How the Gdańsk Shipyard worked

ANDRZEJ TRZECIAK | ANDRZEJ NAWROCKI

GDAŃSK SHIPYARD • AREA A and B

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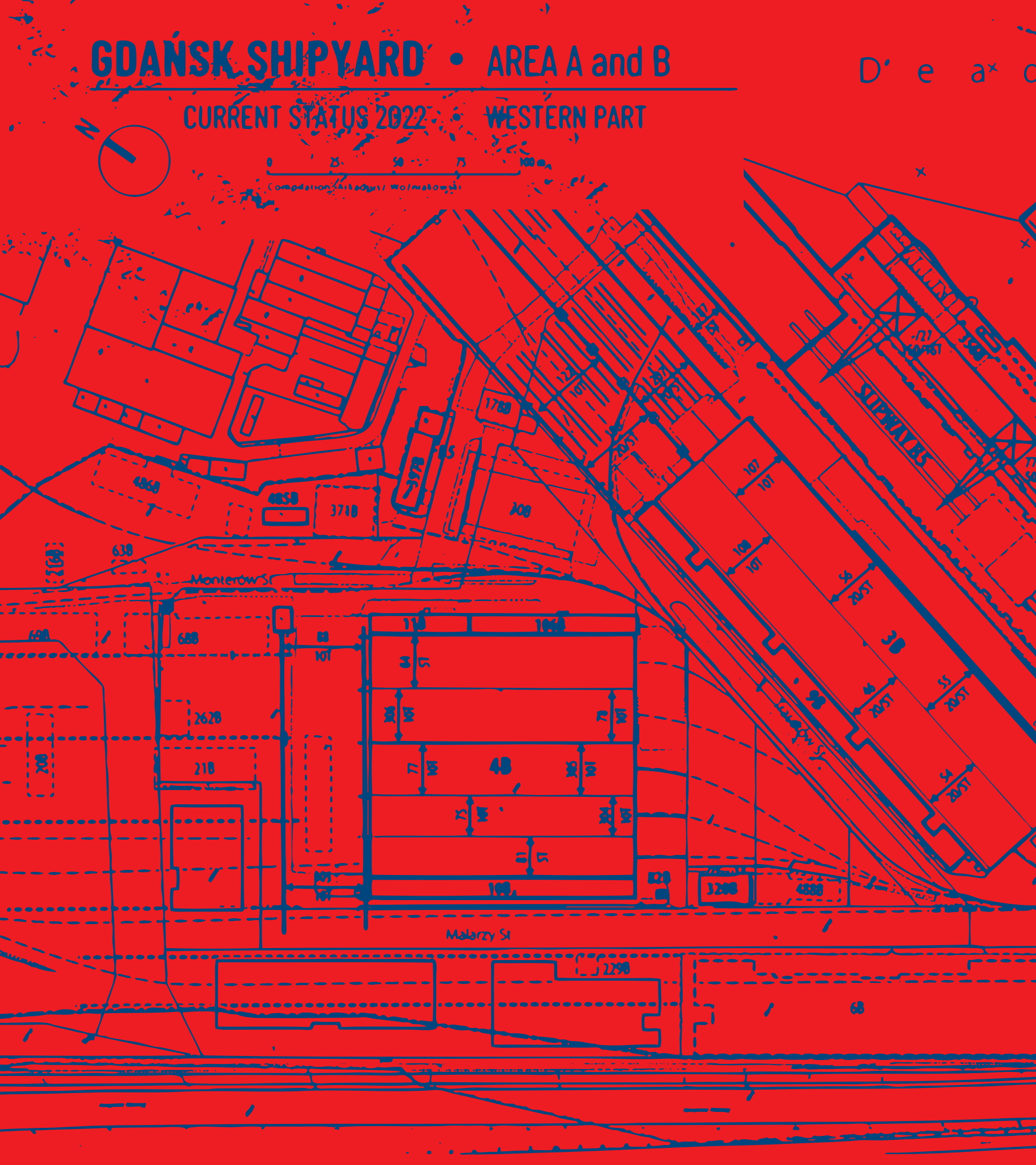

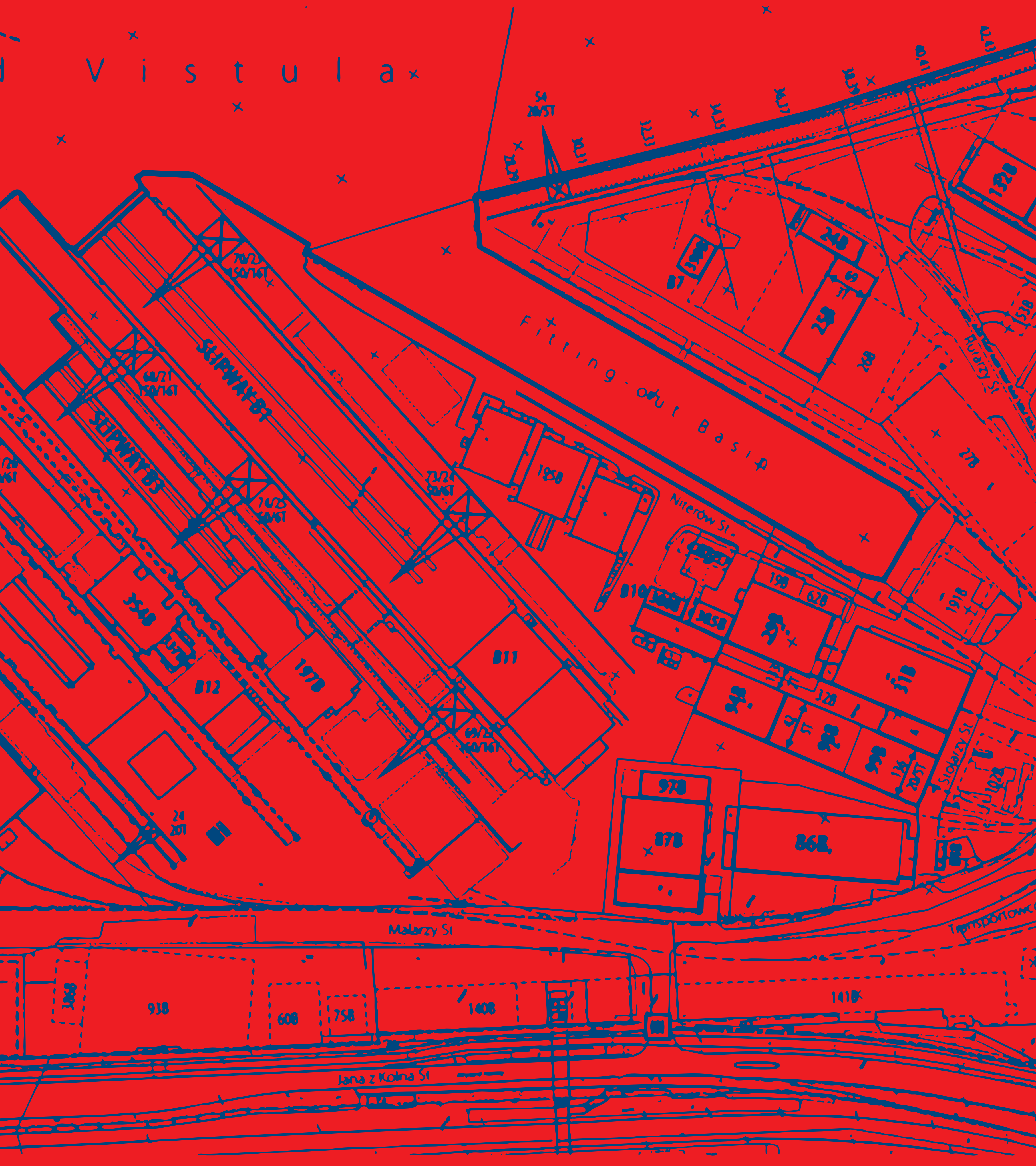
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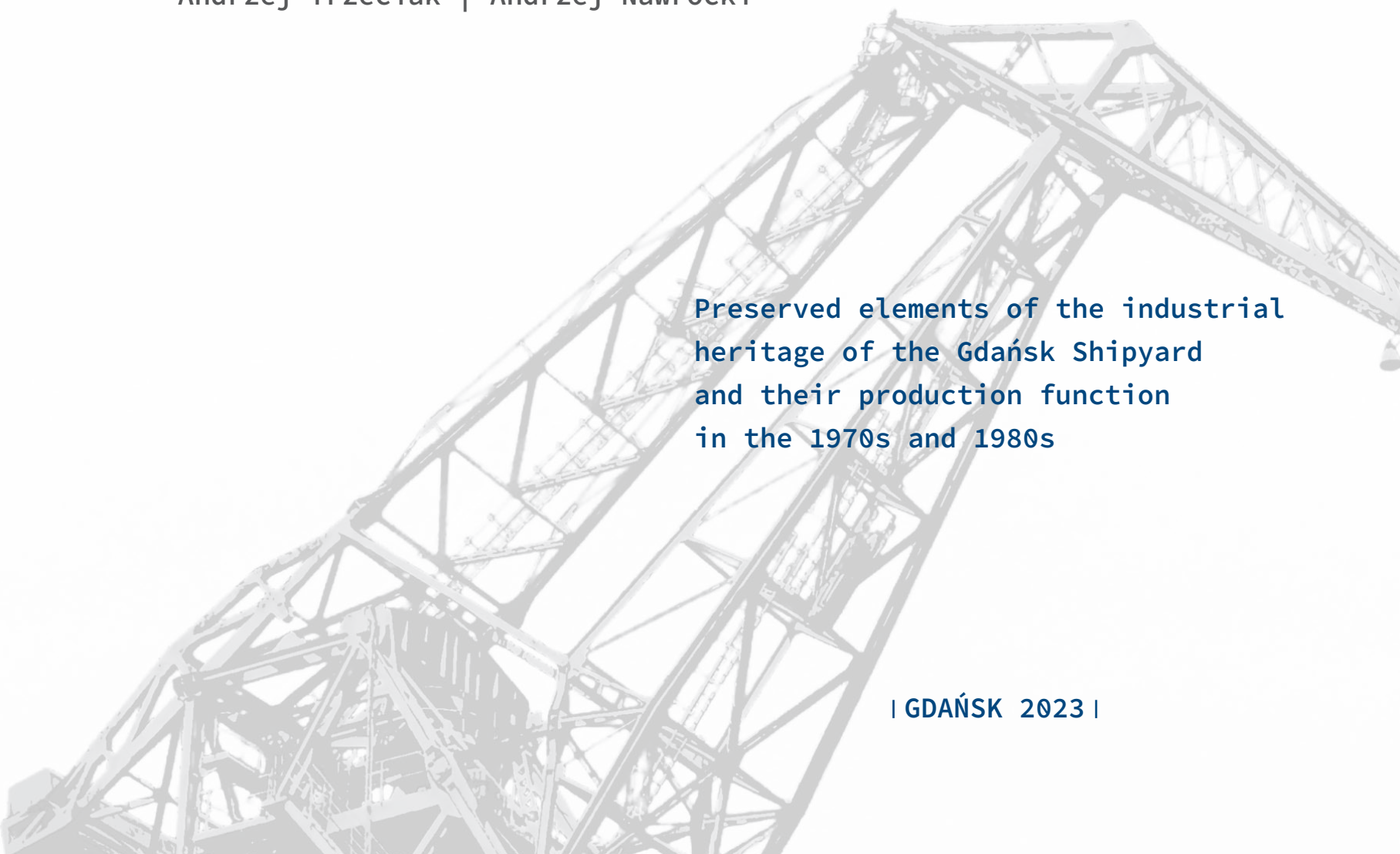
Andrzej Trzeciak | Andrzej Nawrocki



Preserved elements of the industrial heritage of the Gdańsk Shipyard and their production function in the 1970s and 1980s

| GDAŃSK 2023 |

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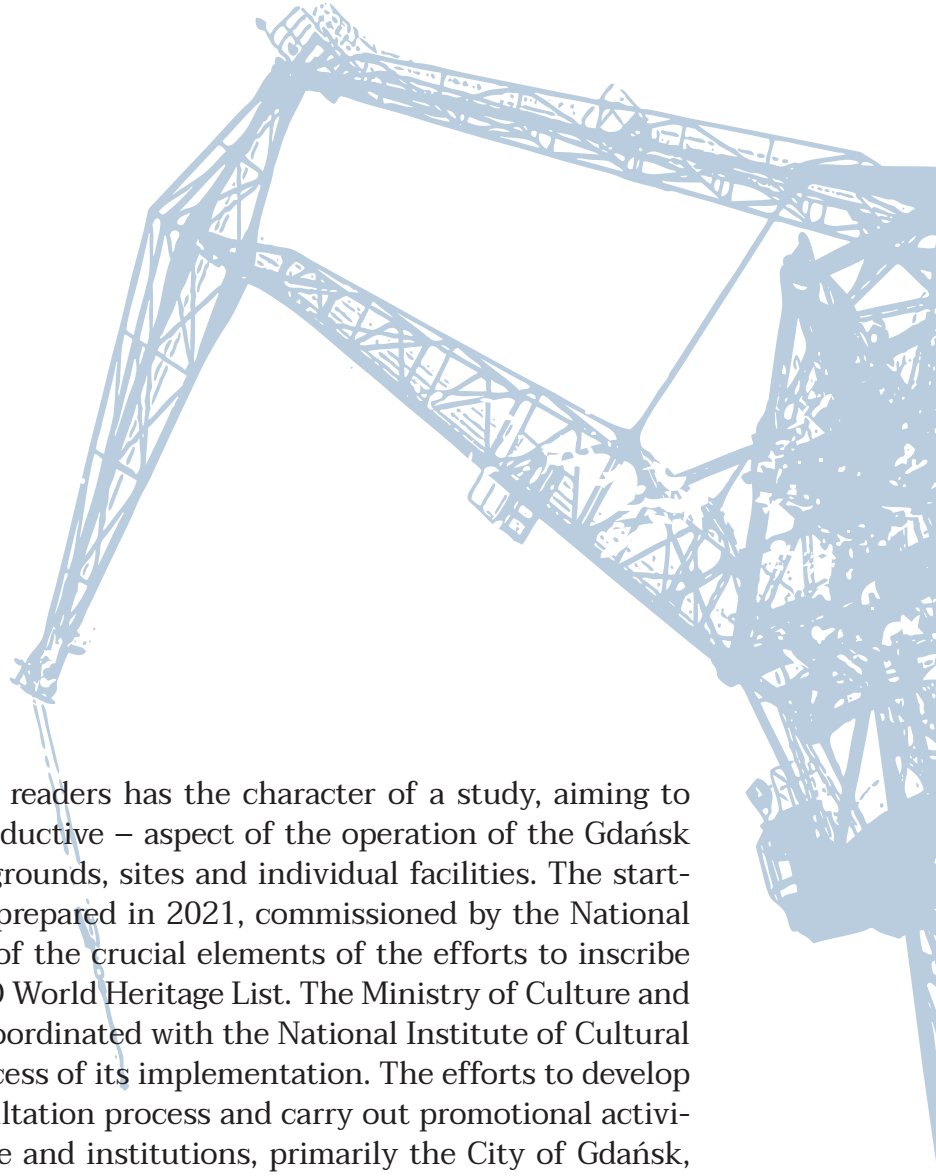
Table of contents



Preface

The publication we are presenting to the readers has the character of a study, aiming to capture and describe the fundamental – productive – aspect of the operation of the Gdańsk Shipyard and the industrial function of its grounds, sites and individual facilities. The starting point was the specialist documentation prepared in 2021, commissioned by the National Institute of Cultural Heritage, which is one of the crucial elements of the efforts to inscribe the historic Gdańsk Shipyard on the UNESCO World Heritage List. The Ministry of Culture and National Heritage initiated the project and coordinated with the National Institute of Cultural Heritage in the complicated and lengthy process of its implementation. The efforts to develop the application, carry out the complex consultation process and carry out promotional activities were supported by many entities, people and institutions, primarily the City of Gdańsk, brownfield owners and community organisations. The authors of this study, as members of the team developing the application materials and as content consultants, also remain participants in this process.

This publication aimed to present the role of the individual surviving shipbuilding structures and elements of the industrial infrastructure against the background of the complex technological processes of shipbuilding and ship equipment. It fills a gap in the literature on the subject. The book illustrates the vibrant and varied production of this unique production facility. The authors attempted to write its history and industrial output into the overall history of local and supra-local shipbuilding, the shipbuilding industry of Gdańsk, Poland and Europe, and the development of the shipbuilding industry. At the same time, it highlights and describes those elements of the industrial legacy of the Gdańsk Shipyard that have survived to the present day despite the significant loss of its industrial infrastructure, facilities and equipment due to demolitions as well as ownership and spatial changes in this part of the city. Not only do they require conservation protection, but also – and just as importantly – a proper interpretation

and presentation of their rich cultural values regarding their industrial legacy. This aspect is still poorly recognised and described.

The main focus of this study is on the operation, activities and production of the Gdańsk Shipyard in the 1970s and 1980s, a period when, after the workers' revolt of December 1970, the social processes that led to the creation of the Independent Self-Governing Trade Union "Solidarity" began, and it was thanks to Solidarity that the Gdańsk Shipyard became widely recognised worldwide. At the same time, this was a period of large-scale, but unfinished, modernisation of the plant to upgrade its infrastructure and increase its production capacity. It should be emphasised that the issues related to the freedom legacy of the Gdańsk Shipyard were only a starting point for the authors. Therefore, due to the publication's profile, the freedom and solidarity narrative was consciously omitted almost in its entirety. Similarly, a complete overview of the changing methods of shipbuilding, forms of industrial activity and the organisation of shipyard work and production over the years was not presented, and the focus is mainly on the activities during the period in question. However, an outline of the former history of the Gdańsk Shipyard and its predecessors operating on the site of the Gdańsk Shipyard before 1945 could not be omitted.

The initial study for this publication was expert material on the industrial history of the Gdańsk Shipyard; hence, the language of the study may seem somewhat hermetic at times. To make reading more accessible, a few basic terms that may cause the reader difficulty are explained in a separate overview.

The body of buildings we have described, together with the more minor elements of the shipbuilding infrastructure remaining in their interiors or immediate surroundings (such as hall cranes, a few pieces of equipment, tracks, mooring polders, piping channels and technical installations, flyovers, electrical switchgear, surfaces, lamps and many others), constitute a unique set of post-industrial cultural monuments, the essence of the material historical heritage of the Gdańsk Shipyard. In these buildings, although still often nameless for most people, the rich memory and industrial heritage of the historic Solidarity shipyard, an integral part of the industrial and economic, but also political legacy of Gdańsk and Poland, is preserved.

Describing the history and industrial function of individual shipyard buildings – reconstructed from publications, documents, iconographic material and from the precious and, at times, colourful accounts of long-term employees of the plant who worked in individual buildings for up to several decades of their professional lives – is intended to perpetuate this memory by permanently inscribing it in the dynamically changing space of the historical Gdańsk Shipyard as part of the city.

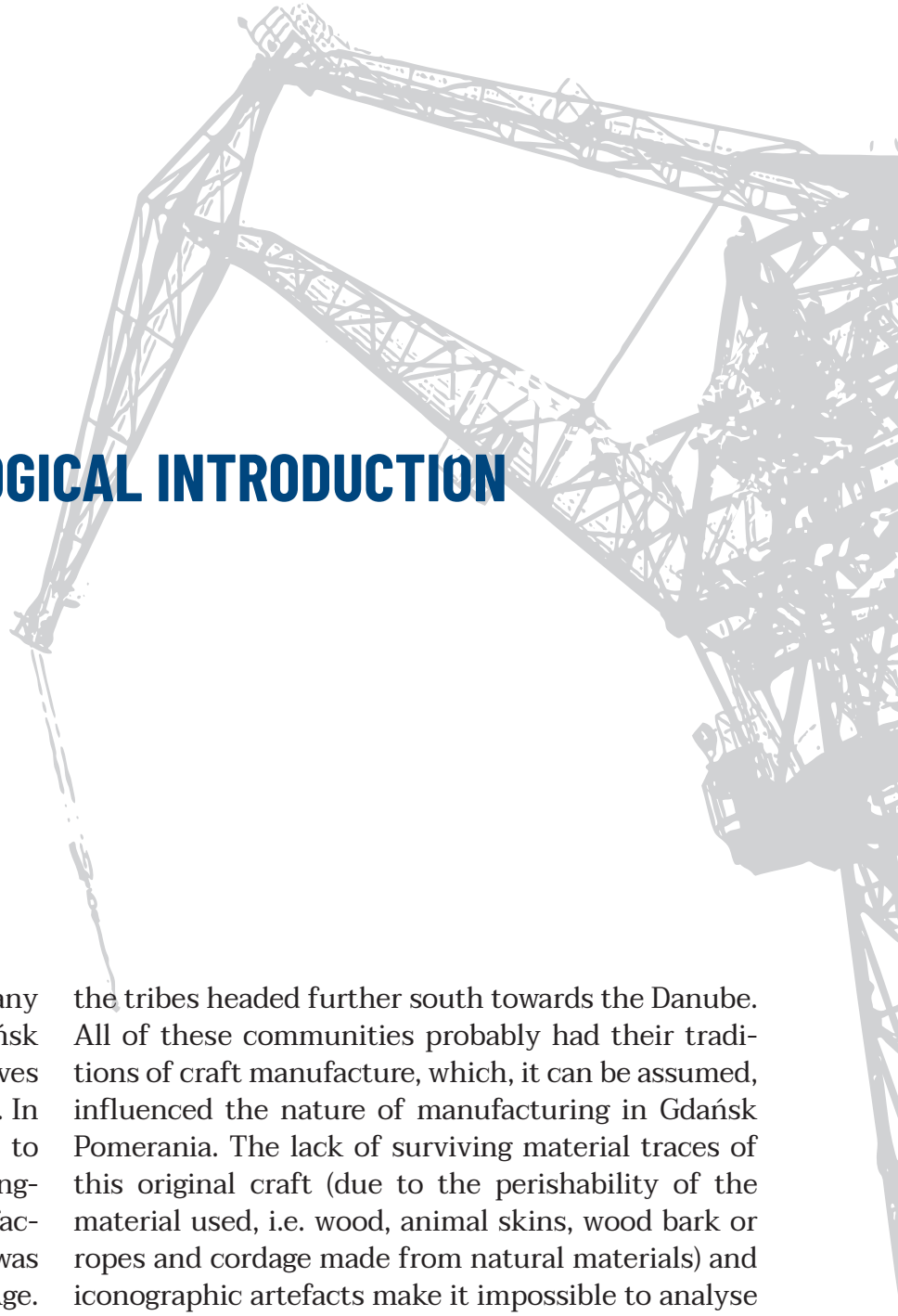
The authors hope that the material prepared will help further efforts related to inscribing the Gdańsk Shipyard on the UNESCO list. Indeed, the unique and universal value of the post-

industrial former factory complex is one of the two criteria for developing the application dossier. It can also be used to help experts in other fields, such as the protection of historical monuments, history and culture, spatial planning, or representatives of the investment sector or local government, as an extension of their knowledge of the significance of the Gdańsk Shipyard – an industrial complex with a transparent process of building vessels preserved in space. The authors hope that the publication will also serve future users of the historic space of the shipyard – the people of Gdańsk, especially the residents of the district that will be built on the site of the historic shipyard, and visitors to Gdańsk who wish to learn about the heritage of the world's most famous shipyard.

We want to express our gratitude to the people and institutions who initiated and were instrumental in the creation and publication of this study. We would like to thank Ms Katarzyna Zalasińska, PhD, DSc, Director of the National Institute of Cultural Heritage, and Mr Tomasz Błyskosz, Head of the Field Branch of the National Institute of Cultural Heritage in Gdańsk, for the initiative and support in publishing the book. We are also grateful to Mr Tomasz Błyskosz for coordinating the formal matters related to the organisation of field research and for his consultations in the field of historical monuments. Industry, technical and heritage consultations were also provided to us: Tadeusz Deptała, former deputy director of the Gdańsk Shipyard for technical matters; Bogdan Garstecki from the "Stocznia Centrum Gdańsk" company; Maciej Multaniak, former manager of the Engine Quality Control Department, deputy testing manager of the S5 Engine Assembly Department; Andrzej Nawrocki, former chief specialist for automation, head of the Design and Construction Bureau of Gdańsk Shipyard, president and vice-president of the board of Gdańsk Shipyard, technical and commercial director, vice-president of the Gdańsk Shipyard Memorial Guard Association; Zygmunt Tyska, former chief technologist of Gdańsk Shipyard and technical chief. Our sincere thanks.

For the funding of the publication, the editorial cooperation and the effort involved in preparing the book for print, we would like to thank the director of the Institute of Solidarity Heritage, Mr Mateusz Smolana, and his colleagues. We want to thank the owners of the former shipyard sites for making the field research possible, making the facilities available and for their care. We want to extend particularly warm thanks to the shipyard workers – long-time employees of the Gdańsk Shipyard – who agreed to share their unique knowledge and memories with us. A list of their names is included in the first item of the bibliography. They devoted much of their private time to us as we took numerous walks around the shipyard and all its facilities and participated in open-air meetings and talks, usually in autumn and winter. Our book is also a tribute to their work and the efforts of the more than 140,000 other workers at the historic Gdańsk Shipyard.

The Authors



Part I

HISTORICAL AND TECHNOLOGICAL INTRODUCTION

I. DEVELOPMENT OF SHIPBUILDING TECHNOLOGY AGAINST THE BACKGROUND OF THE HISTORY OF GDAŃSK AND GDAŃSK POMERANIA

The first vessels were already being built many thousands of years ago in the area of today's Gdańsk Pomerania. They were produced by representatives of the archaeological cultures present in the area. In the Middle Stone Age (Mesolithic period, eighth to fifth millennium BC), fishing began to spread alongside gathering, hunting, and probably the manufacture of very simple vessels to serve it. Fishing was also important for the peoples of the New Stone Age. It was also common in the area during the Bronze and Iron Ages (until the end of the 1st millennium BC).

In the first centuries AD, communities of Baltic Slavs began to dominate along the entire western and central coast of the Baltic Sea. In addition to the Slavs (Baltic Veneti), the area of present-day Gdańsk Pomerania was also settled by Baltic tribes. In the 2nd century AD, communities of Germanic Goths and Gepids appeared here, arriving from Scandinavia via the Baltic Sea. After a temporary stay in the area, the tribes headed further south towards the Danube. All of these communities probably had their traditions of craft manufacture, which, it can be assumed, influenced the nature of manufacturing in Gdańsk Pomerania. The lack of surviving material traces of this original craft (due to the perishability of the material used, i.e. wood, animal skins, wood bark or ropes and cordage made from natural materials) and iconographic artefacts make it impossible to analyse it scientifically.

Around the 7th to 8th century, a Slavic fishing settlement (there may have been several) began to take shape at the mouth of today's Vistula River on the Baltic Sea, giving rise to a Baltic port town. Gdańsk appeared in historical sources at the end of the 10th century, during the period of consolidation of the Slavic Polanian state on the Baltic Sea, which was established in the same century. The Gdańsk settlement centre at this time still had the character of

a fishing, trading and craft settlement (with several main settlement points). One of the most essential branches of manufacturing remained the making of vessels, originally probably built by their users – fishermen, and later by specialised boatbuilders. In the following centuries (11th–14th), the city developed into an important Baltic city, port and craft centre. Settlers from the German territories, mainly from Lübeck, came to the area, and the intensive participation in international maritime and river transport and trade necessitated the development of boatbuilding production. In the late medieval period and the modern period (15th–18th century) – when the city belonged to the Crown of the Kingdom of Poland and the Polish-Lithuanian Commonwealth – Gdańsk remained one of the largest trading centres on the Baltic Sea, as well as being the most significant European exporter of grain and an important (at one time the most important on the Baltic Sea) centre of boatbuilding and shipbuilding production. Numerous types of wooden riverboats and seagoing vessels were built here.

In the 19th century, when Gdańsk was part of the Kingdom of Prussia and then the German Empire, Gdańsk remained a vital shipbuilding centre despite losing its position in the grain trade. Modern shipbuilding enterprises were established in the city; privately owned, such as the Klawitter, Dewrient and Schichau Shipyards, and state-owned, such as the Royal and then Imperial Shipyard, the first government shipyard of Prussia and Germany. The construction of wooden units also continued in the city. However, from the middle of the century, the production of iron ships and vessels began to become widespread, followed by steel structures powered by steam engines and, later, diesel engines and ship propellers.

After 1945 and the reintegration of Gdańsk into Poland, the city saw the birth of an indigenous seafaring industry, the dynamic development of which has strongly marked the city's history. To this day, Gdańsk remains an important local, national and European centre for producing and repairing vessels.

1. Wooden constructions

In prehistoric and pre-state times, as well as in the early Middle Ages, the most common types of vessels used on the Baltic Sea and which also originated in Gdańsk Pomerania were the so-called "leather boats" (boats with wooden skeletons covered with stitched and greased skins), rafts, so-called "bark boats" (vessels with bark hulls) and the so-called "dugout canoes" – boats made from a hollowed-out tree, monoxylons. The latter were made from a single tree trunk by hollowing it out with stone, bronze or iron tools and burning it. Boats made from a hollowed-out tree of various types have been used by numerous communities and cultures. They were also characteristic of both Baltic, Eastern and Southern Slavs. They were also produced in Gdańsk Pomerania, in and around Gdańsk. The numerous archaeological finds of this type of unit in the region evidence this.

It was probably in the last centuries of the old era and the first centuries of the new era that plank boats – vessels with rigid planking – began to appear and spread in the Baltic area. In the southern Baltic zone, overlapping sheathing (clinker or "lapstrake planking") was used. It was distinctive in that the higher strip of sheathing overlapped the lower strip (similar to a tile arrangement). As one might think, plank boats in various regions and cultures, including Gdańsk Pomerania, were created through technological innovation – in order to increase the load capacity of the dugout boats, the sides were

1. Sailing vessels and a small harbour boat at the quay of the Old Packhouse (German: Das Pack Haus; Packhof – a warehouse for packaged goods) on Granary Island in Gdańsk,1761–1765. Engraving by M. Deisch according to a drawing by F.A. Lohrmann, BN/Polona collection/public domain

raised by adding more strips of plank sheathing. A unit of this type was discovered in 1896 on the outskirts of Gdańsk. The sheathing, made in plank construction, was reinforced and stiffened by the unit's internal wooden ribs – the frames. The planks were originally connected to the ribs of the unit by cords – the so-called "lashings" (lashed-lug technique). The next phase in the development of plank craft technology saw the development of the keel beam – the keel – as an integral part of the hull, often with a T-shaped cross-section. The planks of the hull plating began to connect both to each other and to the ribs using pins and iron rivets. Many experts emphasise that using rivets was characteristic of Scandinavian (Viking) makers. At the same time, Slavic boatbuilders were said to have used wooden pegs or a mixed technique: rivets connected the rudders to the plating, while the plating strips were connected with wooden pegs. However, it seems that these technologies, due to the numerous trade and craft contacts in the Baltic zone, may have intermingled to some extent. The hulls were sealed with moss, animal hair or hemp bundles and protected with wood tar. Oars were originally used for

propulsion, then sailing propulsion began to become more widespread. Both types of propulsion – rowing and sailing – were used simultaneously for many centuries. In the 1930s, Slavic plank boats dating from the 10th to the 13th century were discovered in the Orunia district of Gdańsk. The activities of specialised boatbuilders in Gdańsk were indirectly confirmed in written sources in 1227.

The technology of building ships from wooden planks attached to frames was used in subsequent centuries. However, the methods of preparing the primary building material – the planks – have changed, with friction (sawing) being used in addition to riving (splitting the trunk with wedges). The size and appearance of the units being built, as well as their designs, were also changing. As a result, there was a growing demand for timber construction. The Gdańsk shipbuilding industry had an excellent raw material base thanks to the forest complexes surrounding the city and its economic links with the Polish lands. During the dominance of timber units – both in the Middle Ages and in the modern period up to the 19th century – timber was mainly supplied by the Pomeranian forests and other extensive forest complexes of the Crown of the Kingdom of Poland, and later the Polish-Lithuanian Commonwealth. In Gdańsk and Pomeranian shipbuilding, as in other European shipbuilding centres, oak and pine (used, among other things, to construct masts) were used most frequently.

The rigging of the vessels was expanding and the number of masts was also increasing. In addition to the side-mounted rudder, the hinged rudder, located at the rear of the vessel, emerged and became widespread. Between the 11th and 16th centuries, various types of vessels were built and repaired in Gdańsk. These included nefs (a development of the knarrs – Viking seagoing trading vessels), cogs, hulks, carracks and caravels. They differed in size, payload and number of masts, size and shape of sails, among other things. They were vessels designed primarily for the transport of goods and were commonly used in Baltic trade. Due to their primary function, these vessels were characterised by higher sides and more squat silhouettes than the earlier plank boats of the Slavs and Vikings. At the bow and stern (they were no longer as symmetrical as in the Viking and Slav boats), platforms were installed, the so-called crenellated wooden superstructures, from which the armed crew fired arrows and bullets at their enemies. These ships thus combined the functions of warships. Particularly popular in the Baltic trade, as well as in Gdańsk boatbuilding of the medieval and early modern periods, were the cogs and hulks. Their images were often placed on the seals of Hanseatic port cities, including Gdańsk. An important innovation introduced in local shipbuilding was the use of caravel (plank, contact) plating in the second half of the 15th century. The planks of this type of sheathing did not overlap, but were in contact with each other by their long edges. This ensured that the unit's sheathing was even – free of overlapping planking faults. The contact points of the planks were also sealed with a variety of materials and the hull was then protected with wood tar. This significant change in local ship hull technology was associated with the appearance in Gdańsk of the carrack (also referred to as the "great caravel") originally named *Pierre de Rochelle* and then *Peter von Danczk – Piotr z Gdańska*, which, after being damaged during a sea voyage, found its way to Gdańsk in 1462 and remained here for many years, influencing the local boatbuilding and shipbuilding industry.

During the period when Gdańsk belonged to Poland (15th–18th centuries), other types of vessels and larger war and merchant sailing ships – pinnaces, flukes and galleons – became common on the Baltic Sea. They were built to serve the needs of states and monarchs, private owners, shipowning companies both from Gdańsk and from other countries, European cities and corporations such as the Teutonic Order and the East India Company.

A variety of wooden river and port vessels, such as bordyna type vessels, lighters and punts, also continued to be built in Gdańsk. After the stagnation of shipbuilding in the mid-17th century, it began to revive in the following century. Since the Middle Ages, vessels have been built in the area known as Lastadia. The area was divided into plots of land on which specialised master ship carpenters, who leased them, carried out the construction of individual vessels. The area where ships and boats were repaired and smaller vessels built was the Brabank in Gdańsk. These places are called shipyards, but they were not shipbuilding factories in the modern sense of the word but merely areas of concentration of boatbuilding and shipbuilding work carried out using guild methods. In addition to specialised ship carpenters, the boatbuilding and shipbuilding industry in Gdańsk also employed numerous craftsmen of various specialities: anchor, rope and cordage makers (ropemakers), sail cloth and sails makers (sailmakers), fitters, carpenters, locksmiths and others.

2. Shipbuilding in the age of the Industrial Revolution

The economic development of European countries, the expansion of shipping and maritime trade and the exploitation of overseas colonies at the end of the modern era significantly influenced the development of boatbuilding and shipbuilding in Europe. More and more modern and larger vessels were needed to transport goods from overseas territories to Europe and to transport the increasing number of emigrants in the opposite direction. There was also the development of naval vessels to implement the maritime policies of individual states, which sought to control shipping routes, establish sustainable and secure communication with the colonies and secure economic interests. Economic and social progress and scientific developments meant that significant changes were taking place in shipbuilding technology and techniques, and the organisation of ship and vessel production. New construction materials and types of ship propulsion began to emerge and become widespread in shipbuilding. The old craft methods of manufacturing vessels were also disappearing and were being replaced by early industrial methods, no longer based on the guild system, but on hired labour and large-scale material production (iron, steel). The organisation, the scale of shipbuilding companies and the production and supply structure were changing. Smaller boatbuilding, carpentry, metalwork (anchors, nails), ropemaking (ship ropes) and textile workshops (sails) were replaced by larger shipyards, which concentrated the production of various components of ship structures and equipment on their premises. The political and military development of maritime states, especially England, France, Sweden, Denmark, the Netherlands, Belgium and Russia, led to changes in shipbuilding and its organisation – in addition to the private shipbuilding sector, specialised shipyards financed by states and run by navy boards began to emerge, building ships for their needs. All the above factors led to an increase in the scale of production of individual shipbuilding companies. In addition to the manufacturing sector, the services provided by individual shipyards in the field of ship repair have also developed dynamically. These transformations did not bypass Gdańsk and the Gdańsk Coast. However, they began here later than in Western European countries, especially England, where, unlike the Polish-Lithuanian Commonwealth and, after its collapse, the Kingdom of Prussia, there was a more prosperous maritime and industrial tradition.

2. Realistic painting entitled *The Iron Rolling Mill* (German: *Eisenwaltzwerk*) Adolph Menzel became one of the most famous artistic manifestos of the Industrial Revolution era. The products of the steelworks depicted by the painter - King's Steelworks (Königshütte, today Chorzów) - were widely used in the German and European industry, including shipbuilding. They can also be found in the Gdańsk Shipyard. The painting is in the collection of the Alte Nationalgalerie (Old National Gallery), Berlin, 1872-1875. Paint. A. von Menzel, photo: Wikimedia Commons/public domain

2.1. Application of new materials and technologies in shipbuilding

At the end of the modern era and the beginning of the 19th century, new materials – iron and then steel – began to be used in the global shipbuilding industry to construct hulls and other boat and ship equipment. They began to displace the previously dominant timber in shipbuilding to dominate seagoing shipbuilding technology and the large-scale shipbuilding industry at the end of the 19th century.

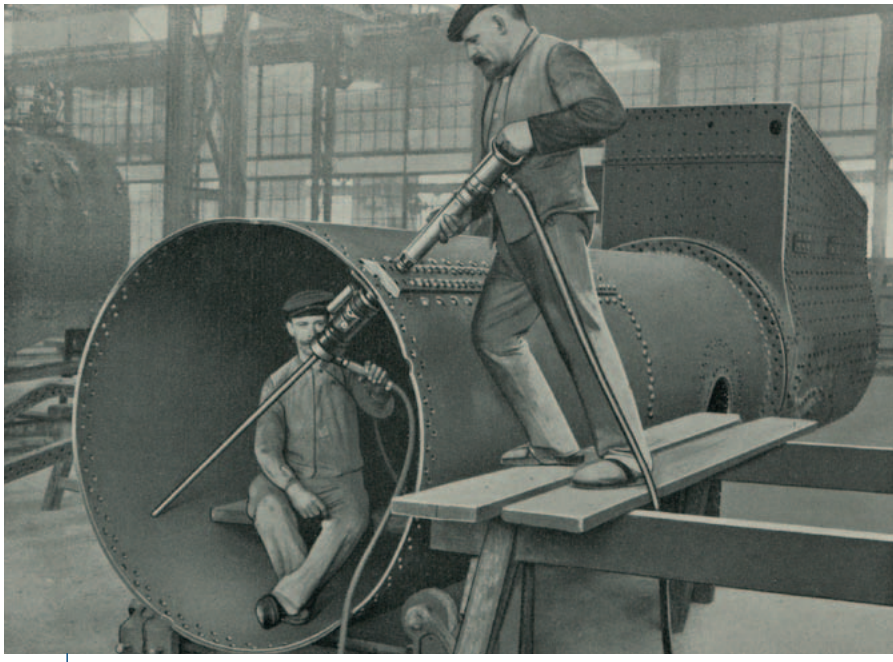
A canal barge built in Britain in 1787 is considered the first iron craft. It was created, among other things, by the commissioning of the country's first rolling mill. This fact also underlines the links between modern shipbuilding and the development of other early industrial manufacturing and transport. The steamship *Aaron Manby* is considered to be the first major ship made of iron. It was also built in 1821 in the UK. It was designed for navigation and river transport, but also made high seas voyages. The ship's structural components were made at a steelworks in Tipton, in the

Birmingham metropolitan area (some 240 kilometres from London), and delivered to a shipyard in Rotherhithe, London. The first iron propelled transatlantic ship was the SS *Great Britain* (SS or s/s – from: steamship or screw steamer), designed by Isambard Kingdom Brunel (1806–1859), an English engineer and inventor of French origin. The ship was built at the William Patterson & Son shipyard (William Patterson Shipbuilders) in Bristol between 1839 and 1843.

On the Gdańsk Coast, and at the same time in the whole of the Kingdom of Prussia (which at the end of the 18th century included the former Royal Prussia, province which had previously been an integral part of the Crown of the Kingdom of Poland and the Polish-Lithuanian Commonwealth and for this reason was also called Polish Prussia), the first iron-hulled vessel was built in 1855 at the Schichau Shipyard in Elbląg. This was the propeller-driven steamer *Borrusia*.

Iron as a new structural material has long paved the way for its full use in the global shipbuilding industry. In the 19th century, there was a widespread belief that wood remained the best material for building vessels and that it was against nature to use iron as a heavier-than-water material. Although around the middle of the nineteenth century, the new material found increasing use in shipbuilding, until the last quarter of that century, there was a belief that wood would continue to be the primary construction material in freight transport and that wooden-hulled, sail-powered ships would be the primary type of vessel.

Until the early second half of the 19th century, wooden vessels also dominated the navies. A circumstance inhibiting the more widespread use of iron was the belief that the wooden hulls of vessels provided better protection against artillery and rifle shells, as bullets often penetrated the wooden sides and, on hitting the iron hull, would break, injuring or killing the people on board with shrapnel. The situation was only changed by the development of



3. Two riveters at work in the hall. One uses a pneumatic rivet hammer to strike the head of a rivet (right), the seated one uses the then modern pneumatic so-called “counter-grip” to support the rivet from the other side, ca. 1913. Photo: NN, public domain

artillery, the effects of which were highlighted by the Crimean War (1853–1856). During this conflict, splash and incendiary shells were widely used, leading to frequent fires on wooden sailing vessels. This situation led to changes in shipbuilding technology. At first, the wooden hulls of the units were secured by sheeting them. This was followed by the use of iron hulls, and eventually entire vessels began to be built from iron, and later from steel. The technology of cladding wooden hulls with sheet metal and making other structural elements of the hull out of steel (e.g. frames, bottom plates) was also used in civil shipbuilding and merchant shipping (composite structures).

The wider use of iron and then steel in shipbuilding also led to changes in the technology of smelting these raw materials and improving their quality. The technology for smelting pig iron was already known

in the early 18th century. From 1856 onwards, a faster and cheaper method of smelting steel through the converter process, involving the blowing of pig iron in a special converter, the Bessemer converter, became widespread. It produced better quality steel to be smelted on an industrial scale. An extension of Bessemer's method was the use, from 1864, of an improved method for smelting pig iron, developed by François Martin and his son Pierre-Émil Martin, based on the solutions previously used by Carl Siemens. This led to the development of the open-hearth furnace (Siemens-Martin furnace), which has been widely used in metallurgy ever since. The development of this early industry, the widespread use of steam propulsion and the use of a new ship propeller led to the spread of steel as the primary structural material in shipbuilding. These changes increased the durability of ship and vessel hulls, improved the operational capabilities of vessels, and reduced maintenance and operating costs. The weight of a wooden ship was about 50% of its displacement, while an iron and then steel vessel was about 10% less. The cost of maintaining a wooden vessel was up to 10% of its value, compared to less than 5% for an iron ship. The lifespan of vessels was also different, with wooden vessels averaging 10 years, while iron and steel vessels had a lifespan of up to 60 years.

Steel became more widely used in shipbuilding in the last quarter of the 19th century. Its introduction to shipbuilding began in France around 1870 and in Germany around 10 years later. Its physical properties made it possible to use materials up to 20% thicker than ferrous materials. This contributed to an additional reduction in the weight of the units while increasing the payload and carrying capacity. It is calculated that the transition from wooden to steel hulls enabled a reduction in hull weight, corresponding to an increase in the carrying capacity of the vessels by almost ¼. The use of new materials, resulting, among other things, in an increase in the size of the units, and the development of steam propulsion resulted in a threefold to fourfold increase in the capacity of the transport units. In the final decades of the 19th century, steel became the dominant material in shipbuilding, both civilian and military. By this time, it was already common for ships and vessels to be built entirely of this material.

The dynamic development of military shipbuilding that has taken place since the 1880s, and the emergence of new powerful gunboats, ships of the line (battleships) – so-called pre-dreadnoughts – was conditioned by European powers' implementation of colonial policies and the naval arms race that began to engulf many countries. During this period, the basic structural layout of large warships (battleships) was developed. One of its main features remains the unequivocal rejection of rigging in favour of the increasingly efficient steam-based mechanical, and soon internal combustion (motor) propulsion. At the same time, the typification and serial construction of units, including warships, was becoming widespread. Advances in ships and shipbuilding – the spread of new technological advances and the increase in the scope of global trade resulted in a significant expansion of merchant and naval fleets in many countries.

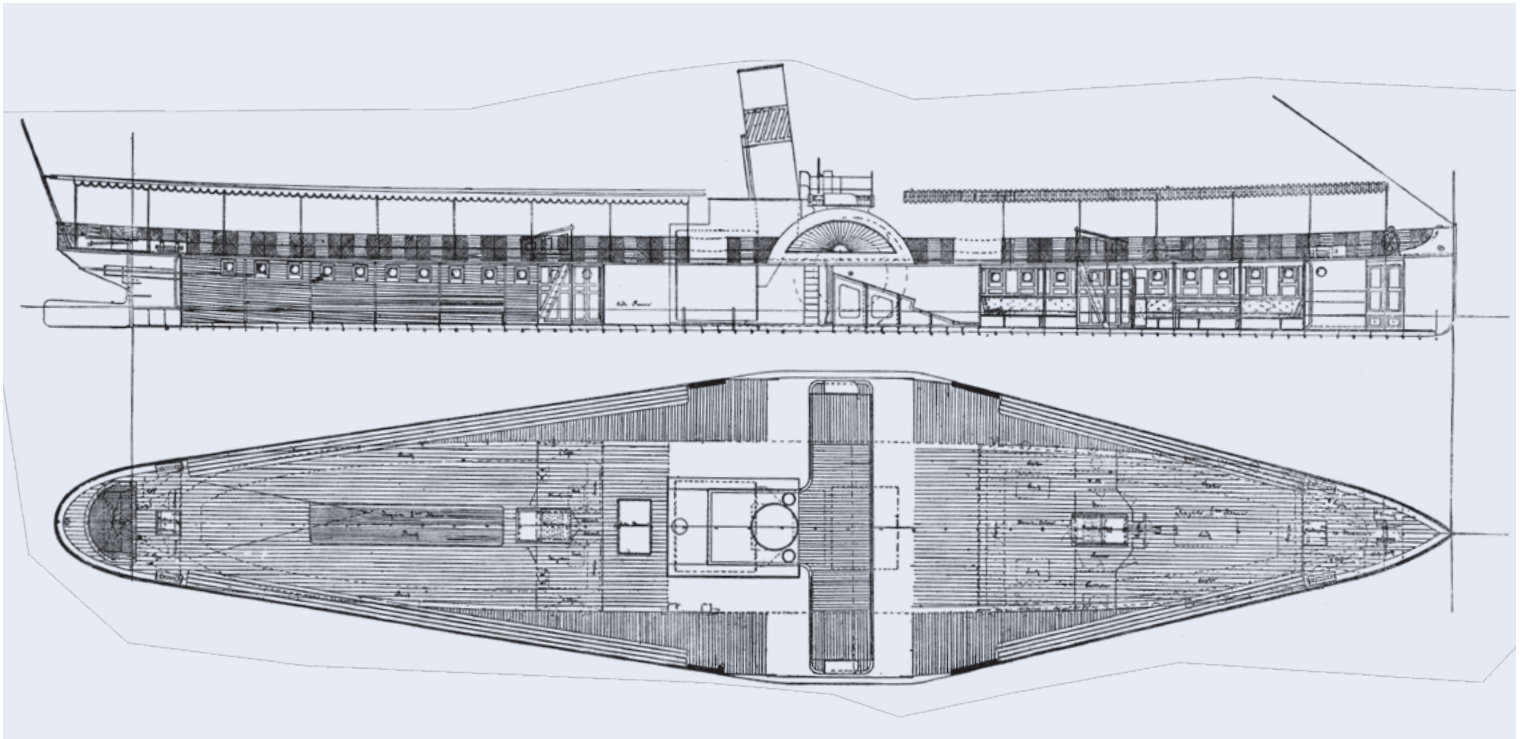
With the spread of iron and steel in shipbuilding, riveting was used as a technology for permanently joining metal parts. In the 19th century, it was the main method of bonding metal parts, and was used not only in the shipbuilding industry. Riveting became one of the symbols of the Industrial Revolution in the second half of the 19th century. Shipyard riveters, working on the construction of vessels, joined sheets of specially prepared metal plates into the hull of a ship or vessel. Sheets were also combined with other structural elements of the ship, such as steel angles, which were used to make frames, among other things. The riveting technology was also used to create ship equipment, such as massive boilers used to generate the steam needed to power ships. This equipment was often manufactured by shipyards for their own use or for sale to other shipbuilding companies.

The technology of joining parts by riveting, which was also used in the shipbuilding industry, consisted of making special holes in the components. These parts (e.g. planking sheets) were then placed together so that the holes were aligned. An appropriate number of rivets were put through them and the parts were finally welded together by sealing the heated rivets. In the 19th century, at the dawn of the technology, hand riveting was the primary method of riveting. It involved the forging (hot or cold) of a rivet head (rivet point) using a hand hammer and a specially shaped stamp. From the mid-19th century onwards, machine riveting also became widespread in the shipbuilding industry, with special tools and machines used to facilitate and shorten the riveting process. The invention of the first riveting machine (originally used for boilers) as early as the 1830s is attributed to Sir William Fairbairn (1789–1874), a Scottish engineer and shipbuilder, and his assistant Robert Smith. Special presses or so-called riveting machines were also later used for riveting. These were of various sizes (including manual) – hydraulic and, from the turn of the 20th century, pneumatic. The method of rigid, non-separable riveting and the placement of the rivets in high densities made it possible to achieve high tightness of the joints, which was of fundamental importance in shipbuilding. Riveting was still used in shipbuilding in the first decades after the Second World War.

Riveters were an extremely important occupational group in the shipyards. If they did not operate riveting machines, they used hand riveting, operating in work teams of several people. In Polish conditions, the riveting team included the so-called heater, driller, foranter (Pl.) and riveter. The heater heated the rivets red-hot in a special hearth (for hot riveting), the driller prepared the holes in the sheets (drilling was also done in halls), the foranter (Pl.) placed the red-hot rivet in the hole with special pliers and held its head, and the riveter forged the rivet with a hammer or hand riveting tool from the other side.

2.2. Energy sources used in shipping and shipbuilding in the 19th century

In the first decades of the 19th century, a new type of propulsion system appeared in shipbuilding and shipping – the steam engine (steam piston engine). It was built (improved) by the Scottish engineer James Watt in 1769 and became one of the most important symbols of the Industrial Revolution. However, due to the difficulties of using the steam engine on vessels, it waited almost half a century to be used in shipbuilding. The reason for this was the high consumption of fuel needed to generate steam (wood, coal) and the consequent need to provide ships with large spaces for storage (bunkering), which would lead to a reduction in the ships' cargo capacity. The first successful vessel equipped with a steam engine is considered to be the *Clermont (North River Steamboat of Clermont or North River*, colloquially *Clermont)*, built by the American Robert Fulton in 1807. In the following years, this inventor constructed further steam-powered vessels. During this period, more steam-powered ships were built in the United States, such as the steamship *Phoenix*, built in 1807 by John Stevens and his son Robert. This ship is recognised as the first steamer to set sail on the ocean in 1809 and set a course from New York to Philadelphia. A little later, the new type of propulsion found its way onto vessels built in Europe. These were mainly river steamers or coastal vessels. The first European steamship is considered to be the *Comet*, built in Great Britain in 1812 and designed by Henry Bell. In Russia, the first steamship was built three years later, while in 1816 the first of its kind was built in Germany – both were river vessels. In the same year, the first steamer crossed the English Channel. The breakthrough in the use of steam propulsion on vessels came with the first transatlantic voyage from America to Europe in 1819. The *Savannah*, built at the Fickett & Crockett Shipyard near New York, was



4. Drawing of the *Blitz* (English: *Lightning*) passenger steamer, built by the Klawitter Shipyard in Gdańsk at the turn of the 20th century. This name was previously borne by one of the first two side-wheelers – steam-powered ships built in Gdańsk between 1840 and 1841 – built by the same shipyard. The second was called *Pfeil* (English: Arrow), before 1906. Photo: NN, public domain

a steam and sail powered vessel. The steam engine was only an auxiliary drive and only powered the vessel for a few dozen hours of travel.

In northern Europe, including former Polish territories (seized by the Kingdom of Prussia at the end of the 18th century), steam-powered vessels began to sail in the 1820s. The first steamship on the Gdańsk Coast (and in Prussia), the *Copernicus*, was built in Elbląg in Fechter's workshops in 1828. Two more were not commissioned until 1840–1841 in Gdańsk. These were the passenger-cargo vessels *Pfeil (Arrow)* and *Blitz (Lightning)* from the local Klawitter Shipyard. They were built from components imported from England. The first steamship built entirely in Prussia was the *James Watt* vessel, constructed at Mitzlaff's Shipyard in Elbląg. The steam engine for this unit was supplied by the Ferdinand Schichau works there. At the end of the 19th century, steam engines with triple or quadruple expansion and the first steam turbines appeared, which further increased the efficiency of steam propulsion.

The nineteenth century was also the period when, with the spread of the steam engine, new ship propellers began to be used on a larger scale – paddle wheels and then propellers moved by steam engine. Although practical experiments using paddle wheels for boat propulsion had already been carried out in previous centuries, it was not until the early 19th century that this solution became effective. Among others, the aforementioned steamships *Clermont* by Robert Fulton, *Phoenix* by Stevens, *Comet* by Henry Bell, *Savannah* and others were equipped with paddle (side) wheels. However, paddle wheels were usually used alongside sail propulsion. Thrusters of this

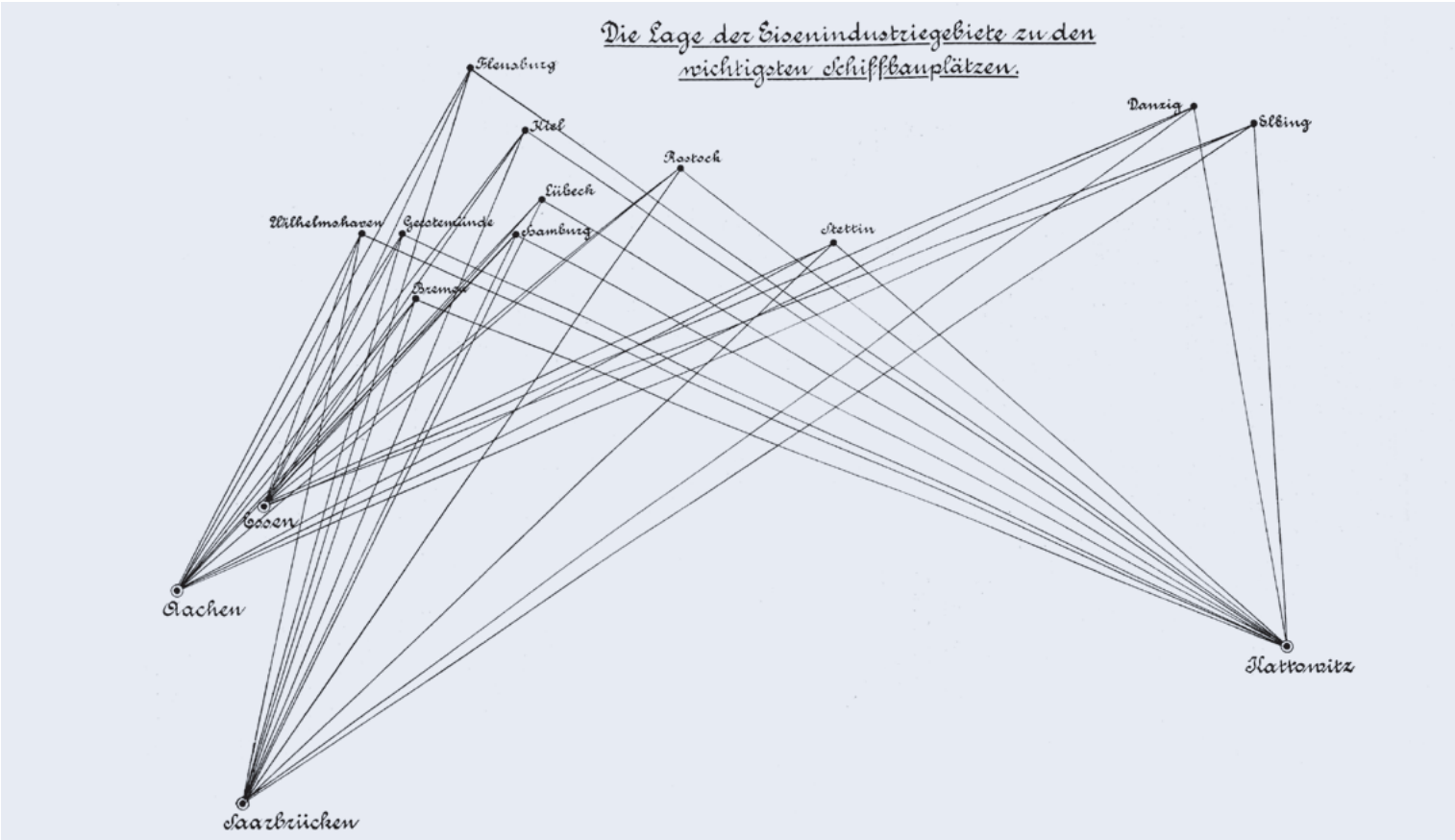
type were not very practical for use in seagoing vessels and warships, as they were easily damaged by wave impacts. In seagoing vessels, they were also ineffective due to the differences in draught caused by the stronger waves at sea. In wartime units, on the other hand, paddle wheel propellers could also be destroyed by artillery fire. The large side wheels, centrally located on the unit's hull, were particularly vulnerable to being hit. Paddle wheels (side and rear) found wider use in the propulsion of river vessels.

A more complete use of the steam engine on ships and vessels was provided by the use of the screw propeller for propulsion, which began to displace paddle wheels. The propeller became more widely used in shipbuilding in the 1830s and 1840s. Its invention is credited to several people. The SS *Archimedes*, built between 1838 and 1839, is considered to be the first propeller-driven steamer. It was instrumental in popularising this type of propulsion on both merchant ships and warships. It also inspired Isambard Brunell – designer of the first iron-hulled screw steamship to cross the Atlantic Ocean and also the largest ship in the world at the time, the aforementioned SS *Great Britain*. In contrast, the first propeller-driven ship was the British HMS *Rattler.* Both vessels were launched in 1843.

The rapid development of shipping that was taking place in Britain, one of the world's most crucial maritime nations and the largest colonial empire, meant that the country's industry was also at the forefront of shipbuilding technology and production. There was large-scale production of ships and vessels, but also, among other things, ship boilers, steam engines and equipment needed for shipbuilding and the shipbuilding industry (e.g. cranes). Many other countries, including Prussia and other German states that lacked a large-scale shipbuilding industry at the time, were recipients of these products. Ships, machinery and equipment also came from Britain to Gdańsk, where a modern shipbuilding industry was slowly being born. The first steamers used not only in Gdańsk, but also in other Polish centres under partition (e.g. Warsaw, for navigation on the Vistula) also came from Britain.

2.3. Organisation of the shipbuilding process

In the modern era, as in the late Middle Ages, the guild system prevailed in boatbuilding and shipbuilding, developing in the larger centres. Smaller boats and ships were also built in boatbuilding or carpentry workshops located in coastal settlements and even villages located near rivers and wildernesses. In large cities, production took place in designated areas, usually located in or adjacent to the port area. Arguably, these places took shape with the creation and development of spaces for the stationing of ships and the landing of goods. Boat, ship and naval repairs were also carried out at the shipyard and port areas. They were among the indispensable and most essential types of services related to shipping and trade and the operation of ports. For centuries, boatbuilding and shipbuilding workshops have been integral, distinctive elements of the space of Europe's port cities. Landowners were often towns or guilds. These sites usually had outbuildings for storing the tools and equipment needed for shipbuilding and repair and more extensive facilities such as primitive slipways, ramps, platforms, cranes and rafts for work on the launched hulls. There were also spaces in the yard areas used for storing materials – timber, planks, so-called "curves" (timber or untreated logs with irregular shapes), etc. In many parts of the towns, there were workshops for auxiliary production – anchor forges, workshops and ropemaking yards, and places for making sails and other equipment needed to equip vessels (e.g. carpentry, blacksmithing, locksmithing and other workshops). However, shipbuilding differed fundamentally from place to place. It was managed, on behalf of individual shipowners or



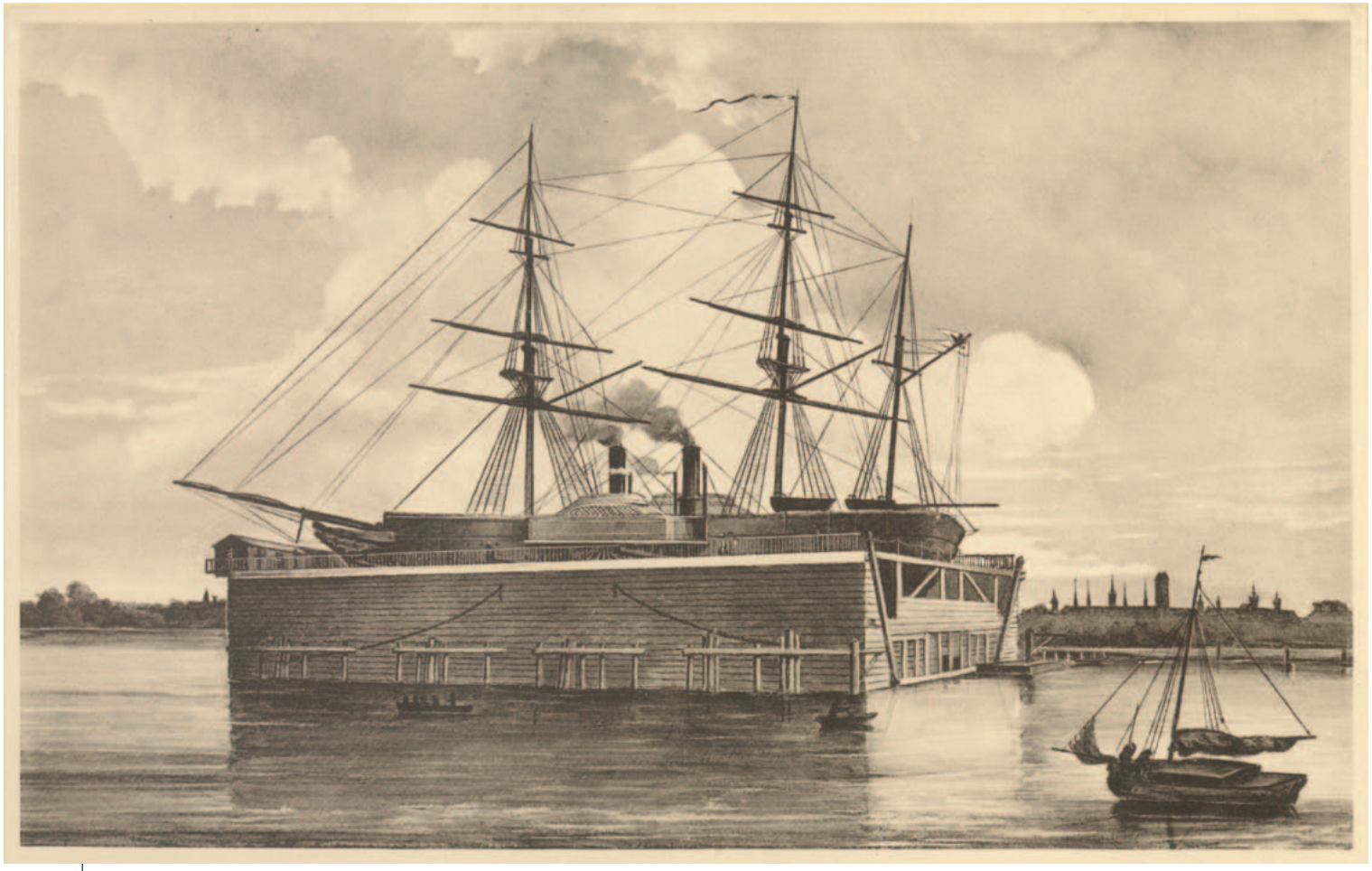
5. Location of the iron industry centres in relation to the main shipbuilding centres of Imperial Germany in the early 20th century. In upper right Gdańsk and Elbląg, 1902. Compil. NN, public domain

shipowning companies, by specialised master ship carpenters, who, because of the use of mainly wood in shipbuilding, were the most important specialists in this field. They organised the entire construction process and controlled its progress from contracting the workmen to selecting the timber to carrying out the actual construction process. There were also highly specialised shipbuilders in many European centres (Holland, England, Italy), designing and directing the construction of ships. The units were built from timber sourced from the immediate area or imported. In the modern era, Gdańsk remained one of the major centres for the export of timber for European shipbuilding. With the start of the Industrial Revolution, the spread of new materials and technical solutions, the development of industrial methods of material production and changes in shipbuilding technology, production methods and processes and the organisation of shipbuilding companies also began to change. However, traditional boatbuilding and shipbuilding methods were still in use in the 19th century. The transition from guild-based construction to modern forms of organising production occurred at different times and in different ways. This happened more quickly in countries with a stronger tradition of shipbuilding, particularly in England. This process was still beginning during the dominance of sail-powered wooden vessels.

II. THE RISE AND DEVELOPMENT OF THE GDAŃSK SHIPYARD UNDER THE INFLUENCE OF NEW TECHNICAL DEVELOPMENTS

1. Shaping the shipbuilding industry in Gdańsk up to 1918

The development of the shipbuilding industry in Gdańsk in the 19th century was closely linked to Europe's economic and political situation – the increase in trade, especially after the Napoleonic Wars, and the intensification of migration. This development was also influenced by the political and economic situation in Prussia and other German countries. The Kingdom of Prussia at the beginning of the 19th century was not a state with significant maritime traditions. Prussian shipbuilding was local and remained



6. Prussia's first wooden floating dock, built at the private Klawitter Shipyard in Gdańsk in 1853. It was used by the state-owned Royal Shipyard in Gdańsk (German: Königliche Werft Danzig). In the centre, the corvette *Danzig* – the first steam and sailing ship built in Prussia, in Gdańsk, at the Royal Shipyard, circa 1853. Fig. NN, public domain

marginal on a European scale. Prussia also had no significant merchant fleet or navy at the time. However, the development of the civilian shipbuilding sector was also taking place in this country. On the Baltic and North Sea coasts, shipbuilding enterprises were established, most often by private individuals with links to the earlier guild stage of shipbuilding or associated with the early machine and metal industry. In the Baltic area, Gdańsk remained the centre of greatest importance in this respect at the time. It was also a prominent shipbuilding centre in the German states. This was determined by the long tradition of boatbuilding and shipbuilding present in this port city since the Middle Ages.

In 1827, the modern shipyard of Johann Wilhelm Klawitter was founded in Gdańsk, who used British models – the best in the European shipbuilding industry at the time. At the Klawitter Shipyard, guild manufacturing methods were not in force, hiring of workers was used. The production profile was initially very traditional – wooden sailing vessels (vessels of this type were built in the shipyard until the 1870s), but in the middle of the 19th century, the company started to build the first mechanically powered steam vessels in Gdańsk and Prussia and to make wider use of the new material, iron, in shipbuilding. The Klawitter Shipyard was the first modern seagoing shipyard in the former Polish lands and one of the first in Germany and Central Europe. It had a significant impact on the development of the Gdańsk shipbuilding industry. Johann Wilhelm Klawitter was actively involved in the development of this industry in the town. He supported the idea of locating a large Prussian government shipyard (the Royal Shipyard) in Gdańsk, with which he collaborated after its establishment. He leased the first floating dock for this shipyard in Prussia, built in his own shipyard according to Dutch models, and led the construction in the Royal Shipyard of the first warship built in Gdańsk for the Prussian navy, which was being birthed in that city – the corvette SMS *Danzig* (SMS – Seiner Majestät Schiff – His Majesty's Ship). In the Klawitter Shipyard, the first screw-propelled steamers were built in Gdańsk (productions of a similar nature were only just beginning in Hamburg at the time).

During the 1860s and 1870s, the Klawitter Shipyard grew its business. It was enriched by a new production area at Polish Hook in Gdańsk, where a foundry and shipbuilding workshops were located at the turn of the 20th century. It stood out for its use of new production methods, such as the introduction of mechanical woodworking. At the beginning of the 20th century, the Klawitter factory also featured a high degree of mechanised production. The shipyard survived until 1931, when bankruptcy was declared due to the high competition in European shipbuilding and the poor situation of the plant.

Of the smaller shipbuilding enterprises established in Gdańsk in the 19th century, we should mention the private shipyard of Grott and Merten, about which no more extensive information has survived, and the Keier and Devrient (later Devrient) shipyard, established in 1856 on the wave of the development of the Gdańsk shipbuilding industry. The latter was a smaller-scale enterprise than the Klawitter Shipyard, building medium-sized sailing ships, gunboats, torpedo boats, boilers, and steam engines. Auctioned off in 1890, it was acquired by a new owner. As Johanssen's Shipyard, it mainly produced ship equipment. It survived until 1914.

2. The establishment of the Royal (Imperial) Shipyard and the Schichau Shipyard in Gdańsk and their locations

2.1. The Royal (Imperial) Shipyard and the inter-war Gdańsk Shipyard

After the end of the Napoleonic Wars, Gdańsk was awarded to Prussia under the terms of the Congress of Vienna. The intensive militarisation of the city began immediately afterwards. This coincided with the process of expanding the war and industrial potential of the Kingdom of Prussia. In 1817, the first nautical (navigation) school in Prussia was founded in Gdańsk to train cadres for the emerging Prussian fleet and navy. Plans to build a marina for the *Amazone* vessel it used drew the attention of the Prussian government to the area near the Young Town Timber Depot – at the time, it was mainly wet meadows and fields. The Vistula of Gdańsk (called the Dead Vistula after the construction of the Vistula Crossing in 1895) had sufficient depth for navigation and, thanks to the new Vistula estuary created by an ice jam in 1840, was not silted up. The concept of building a berthing marina and corvette repair facility (Königlicher Korvetten-Depot-Platz) was developed at this time. In August 1844, the Prussian government purchased 5 morgens of Magdeburg land from the municipality, on which the first small production yards, workshops, material depots, outbuildings and the first slipway soon began to be built. The ground was waterlogged, so it needed to be reinforced by piling. Due to the proximity of the Gdańsk fortress, the buildings were constructed entirely of wood. The stimulus for further development of Prussia's fleet came from its participation in the war with Denmark over Schleswig (1848–1851) and the Crimean War (1853–1856), also fought (however, without Prussia's engagement) in the Baltic Sea between Russia and the Ottoman Empire, France, the United Kingdom as well as Sardinia-Piedmont. In the middle of the 1850s, the decision was made to transform the workshops and berthing marina into a naval shipyard (1854) – the first government-owned, wartime shipyard of the Kingdom of Prussia. The first ship launched there (even before the base was turned into a shipyard) was the corvette *Danzig*, which was also the first steam (steam-sailing) corvette built in Prussia. Her construction was led by the aforementioned Johann Wilhelm Klawitter, who came from a well-known family of local boatbuilders and was the founder of his own shipyard on the Gdańsk Brabant. The keel for the corvette was laid on 24 August 1850 and she set sail on her first voyage on 23 August 1853. The realisation of this unit contributed to equipping the shipyard with new equipment – particularly cranes. Between 1853 and 1858, new land was systematically bought for the needs of the growing Royal Shipyard (Königliche Werft), on which further shipbuilding facilities were built: slipways, an administrative building, boiler rooms, foundries and gunnery workshops. By this time, the shipyard had become the leading shipbuilding facility in the Kingdom of Prussia and the main base of the still small Prussian navy. In the 1950s and 1960s, ships of wooden and mixed construction of various types were built here: corvettes, gunboats, schooners and others. In the early days, the shipyard had to cooperate with ship equipment manufacturers – machinery, engines, structural components and auxiliary equipment – from Prussia and abroad, especially from Great Britain. From the 1860s, the Royal Shipyard in Gdańsk began producing ships built entirely of domestic materials and also vessels with hulls made partly of iron (wooden hulls lined with iron plates) – and became the first German shipyard to undertake this type of manufacturing. After the end of another war with Denmark in 1864 and the occupation of Holstein, the decision was made to move the Prussian naval base from Gdańsk to Kiel (1865). As a result of the transfer of the main burden of state

7. Prussian Royal Naval Shipyard in Gdańsk (German: Königliche Werft Danzig) – the first state shipyard of Prussia and Germany – a few years after its foundation. In the centre, the Klawitter floating dock and the covered slipways with the hulls of the ships under construction are visible. In the foreground, wooden logs joined together to form rafts – raw material transported by water to the port of Gdańsk or for the shipyards, 1861. Fig. NN according to a drawing by J. Gottheil, collection of the Polish Academy of Sciences Gdańsk Library.

military shipbuilding to the shipyard established there, the development of the Royal Shipyard in Gdańsk came to a temporary halt. After the Franco-Prussian War (1870–1871), in connection with the naval expansion projects of a united Germany and the replenishment of the country's treasury with the proceeds of the tribute paid by defeated France, the shipyard in Gdańsk, which was renamed the "Imperial" (Kaiserliche Werft), was expanded and adapted to new production tasks. Between 1874 and 1890, an intensive process of modernisation of the plant was underway. The old wooden buildings and slipways were demolished. The shipyard was equipped with floating docks for, among other things, ship repairs and, in the area of the Dock Basin, new slipways – including unique flat slipways (tracks, slips), warehouses, boiler houses, a new boiler house,

carpentry workshops, housing and social buildings for the workers. Some of the buildings constructed at that time still survive today. In addition, a modern rail network was built for internal and external transport and gas lighting was installed (1878). In order to allow the free movement of large warships, the bed of the Dead Vistula and the port channel were deepened, while near the Dock Basin, a so-called "docking depth" was set up to allow the use of a floating dock here, working with flat slipways, and a turntable to allow ships to change direction. The yard area was also raised to protect it from flooding. Around 1898, the Imperial Dockyard also began to use the area of Gdańsk's Holm Island. The dismantling of Gdańsk's city fortifications at the end of the 19th century created new opportunities for the development of shipyards at the beginning of the following century and contributed to facilitating communication and transport, which was important in connection with the supply of raw materials necessary for shipbuilding, mainly iron, steel and non-ferrous metals (copper). From the beginning, the shipyard's production was geared towards the naval needs of the Kingdom of Prussia and the German Empire established under their primacy. The shipyard built sailing and sailing-steam corvettes (from 1850) and gunboats (from 1860). The greatest increase in the production of larger warships began in the 1890s. From 1889 onwards, small and light cruisers were built at the Imperial Dockyard. Among the largest warships built here were the heavy cruisers *Freya* (1898) and *Vineta* (1899) and the battleship *Odin* (1896). The shipyard also produced numerous auxiliary vessels for the navy – tugs, mine-layers, torpedo boats, lighthouses – and was involved in ship repairs. It was also during this time that the pioneering construction of submarines began. The first ship of this type was the U-2, built and launched here in 1908 – which was the first officially commissioned vessel of its kind by the German Admiralty. From it, the serial production of submarines in Germany began. During the First World War, the Imperial Shipyard was, especially during the first period of the war struggle, one of the two (next to the Germania Shipyard in Kiel) manufacturers of submarines and moved from the production of small displacement types to the construction of large vessels of this type. A total of 39 ships were produced here between 1908 and 1918, many of which made history in naval warfare.

After the end of the war, due to the restrictions imposed on Germany by the Treaty of Versailles, war production was abandoned at the government shipyard in Gdańsk and throughout the city. In the inter-war period (from 1922) the shipyard, as a legal joint property of Poland and the Free City of Gdańsk, was managed by an international company called International Shipbuilding and Engineering Company Limited, with French, English, Polish and Gdańsk capital. The German name of the plant, Danziger Werft und Eisenbahnwerkstätten Aktiengesellschaft, and the Polish name, Stocznia Gdańska SA, were also in use. Attempts to increase the Polish shareholding in the company continued until 1937. However, due to behind-the-scenes action by the Senate of the Free City and the government of the Weimar Republic, the British sold their shares to the German industry. During this period, demand for ships was significantly reduced by the Great Depression of the 1930s. At the time, the shipyard mainly produced small vessels for foreign shipowners, including Argentina, Australia, Brazil and Norway. Among other things, tugboats and passenger ships (*Gdańsk* and *Gdynia*) were built at the shipyard for Polish customers. In addition, shipbuilding equipment was produced here and machinery and equipment for other industries – railway wagons, engines, boilers, pumps, masts and pipelines, steel structures, furniture and even bells for churches of various denominations. Between 1934 and 1936, the yard designed, manufactured and supplied steel structures and carriages for the cable car to Kasprowy Wierch in the Tatra Mountains.

After the incorporation of Gdańsk into the Third Reich in 1939, the Gdańsk Shipyard was taken over by the Gdańsk authorities, and from 1940, became the property of the German state as Danziger Werft AG.

During the Second World War, it returned to building type VII submarines and type XXI, the most modern submarines at the time, using a modern method of assembly. The huge scope of wartime production meant that labour from concentration, prisoner of war and labour camps was used at the plant. The issue of submarine production at the shipyard was taken up during the Yalta Conference, and the plant became a target for bombing raids. As a result of the battle for the city at the end of March 1945, the shipyard infrastructure was partially destroyed. Additional devastation was inflicted by Soviet troops after the occupation of Gdańsk.

2.2. Schichau Shipyard

In 1889, Ferdinand Schichau, a German industrialist from Elbląg, purchased 50 hectares of land on the banks of the Dead Vistula from the Gdańsk authorities to build a shipyard there. Schichau started his business in 1837 by founding a small mechanical workshop in Elbląg, only to become the owner of one of the largest private companies in Germany years later. His Elbląg shipyard was equipped to build small vessels. In order to start producing larger seagoing ships, Schichau had to find a site with a more favourable natural location – including a broader and deeper waterway and terrain that would enable the construction of turntables for large vessels. Schichau decided to build a large shipyard in Gdańsk, close to the government-owned Imperial Shipyard. The site was attractive because of the railway siding in the vicinity and the location near the convenient Vistula waterway, but it was also uneven and boggy. After signing an agreement with the town council and the military authorities, the ground level was raised and strengthened. A special cable car, 480 m long, was used to transport some 200,000 m^3 of sand and stones from the surrounding hills. The remains of the 17th-century Great Limestone Rampart, formerly an essential part of the Gdańsk fortification system, was also dismantled. The work took just over two years to complete. Around 3,000 workers were employed.

The first vessel built at the shipyard was the corvette *Gefion*, launched on 31 May 1893 in the pres-

8. Ferdinand Schichau Shipyard in Gdańsk. In the centre, ramps; on the left, a pool used to fit out vessels. Behind it, industrial buildings, partly preserved today, ca. 1912. Photo: NN, public domain

ence of Kaiser Wilhelm II – a great promoter of naval development, shipbuilding and ironmongery and technical education in Germany. From then, the plant, taking advantage of economic prosperity and government subsidies, began comprehensive construction of commercial, special and passenger ships. Thanks to the favourable fleet expansion legislation of 1898–1900, the Schichau Shipyard was able to secure very lucrative orders for warships. At the time, the plant had, among other things, a Fitting-out Basin and six slipways, four of which were about 200 m long. This enabled the construction of large vessels and placed the Schichau Shipyard in Danzig among the plants with the largest production capacity in the German Empire, Europe and even the world. Specialised dredgers, tankers, river ferries, cargo ships and also ships were launched from its slipways. These vessels were built for shipowners from all over the world – from the UK to Russia to Mozambique.

In 1892, the construction of large passenger ships began. The first vessel of this type was the *Kaiser Friedrich*, launched in 1897, which was not sold until eight years later due to technical problems. It was followed by far superior designs, including one of the fastest passenger ships of the time, the *Grosser Kurfürst*, and another passenger steamer, the *Cincinnati*. The shipyard also built two legendary transatlantic liners originally named *Columbus*, which were the largest ships ever built in Gdańsk. First launched in 1913, it was not completed until 1922. Handed over to the UK, it sailed under the name *Homeric.* Its sister vessel, standing on the slipway of the Schichau Shipyard since 1913, was also named *Columbus*.

Before the outbreak of the First World War, the construction of seagoing warships was an important branch of production at the Gdańsk Schichau Shipyard. Units were built here not only for the navies of the German Empire but also of other countries: Russia, Austria-Hungary, Italy and even China and Brazil. Torpedo boats, destroyers (one of the factory's specialities), gunboats and cruisers were built here, as well as a whole series of powerful ships of the line, such as the *Kaiser Barbarossa*, *Schlesien*, *Oldenburg* and *Lützow* and the unfinished cruiser *Graff Spee*, which was scrapped after the war. The Schichau Shipyard also produced submarines. Throughout its existence, the company also worked on the assembly of marine engines of various types, including pioneering steam and combustion turbines. They were mostly delivered to the Schichau Shipyard in Gdańsk from the parent plant in Elbląg. Thanks to these engines, many of the ships equipped with them were among the fastest in the world in the period before the outbreak of the First World War.

The high competitiveness of the Schichau Shipyard was ensured by low production costs, due in part to the wages (among the lowest in Germany) and outdated infrastructure and working methods. This became the cause of numerous strikes. Shipyard working hours at the beginning of the 20th century were 11.5 hours. It was not until after the First World War that it was reduced to eight hours.

In the post-war period, with the cessation of military production, the shipyard found itself in a very difficult position. The dire situation was further compounded by the detrimental economic decisions of the board of directors, which passed into the hands of Schichau's son-in-law, Carl Ziese, followed by his son-in-law, Carl Carlson. This condition was only improved by the intervention of the German state. In May 1929, the plant was transformed into a company involving the German Reich, the Prussian State, Gdańsk and Elbląg, and supplied with government subsidies. The brother of the director of the Gdańsk Shipyard (Danziger Werft, the former Imperial Shipyard), professor Ludwig Noe-Herman, who managed the company until 1945, became director of the shipyard. The stimulus for production at the Schichau Shipyard came from orders for merchant ships, cargo ships and specialised vessels from the Soviet Union in particular. In the 1930s, despite another downturn, orders were won from shipowners

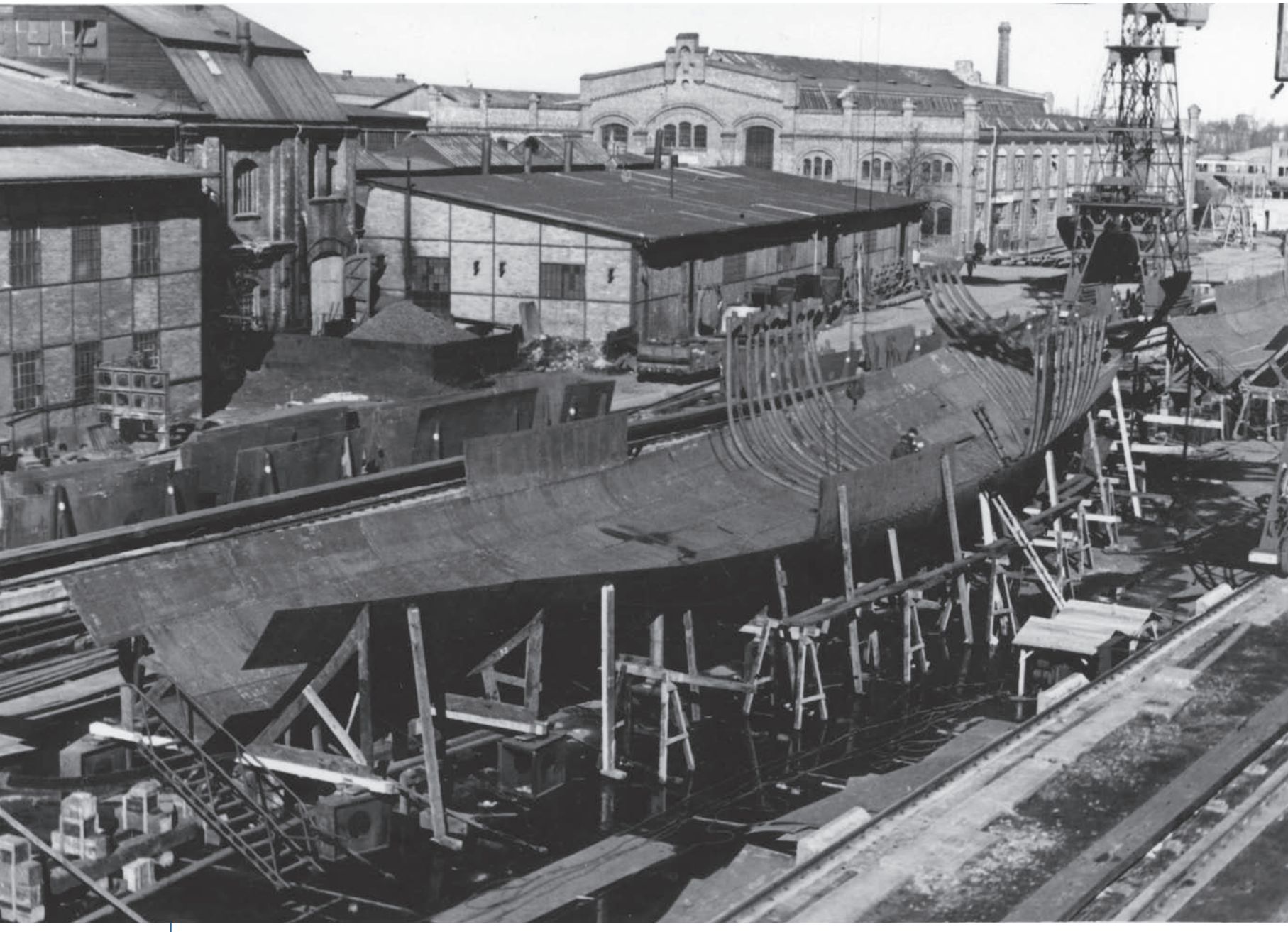
from Norway, Denmark, the Netherlands and the UK, and even the Philippines and China. The new company remained of special interest to the German governments, particularly the Nazis. In connection with armament plans from the mid-1930s onwards, the shipyard once again began working with the German Kriegsmarine, producing vessels for it that could be adapted for military use in the future. During the Second World War, the shipyard was involved in the production of submarines of various types. Among other things, it was an assembly yard for a new type of U-boat (type XXI), sections of which were supplied from equipment shipyards – including the neighbouring Gdańsk Shipyard (Danziger Werft) and the Gdynia shipyard (a former Polish shipyard seized by the Nazis and turned into a branch of the Deutsche Werke Kiel AG shipyard). To increase the production capacity at the Schichau Shipyard, inmates from a branch of the Stutthof concentration camp were used, among others. In April 1944, the first Type XXI submarine, called the Electro-U-Boat, was launched at the Schichau Shipyard. The programme for the mass production of this type of ship was the reason for a visit to the shipyard by Albert Speer, Reich Minister of Armaments and War Production, in August 1944. The history of the Schichau Werft in Gdańsk came to an end in March 1945, after the defence line of German troops running through the site was broken and the shipyard was occupied by Red Army soldiers.

3. Creation and development of the post-war Gdańsk Shipyard

After the end of the Second World War, it was crucial for Poland's economy to rebuild its industry. The former German dockyards retained the greatest production potential on the coast: Gdańsk Shipyard and Schichau Shipyard. After the seizure of the former German shipbuilding facilities, the Russians began exporting shipbuilding equipment deep into the USSR. In June 1945, the Union of Polish Shipyards was established to take over the plants. At the time, the primary task was to secure as much of the remaining equipment and materials as possible from export from the shipyard. The Russians treated the plants as a war trophy. Under an agreement signed in May 1945 in Moscow between the Polish government and the USSR, the Russian side had a share in everything related to German submarine production. In theory, this applied to all the shipyard's equipment. The Polish side tried to influence the few Russians who understood the needs of the nascent Polish industry to leave as much of the machinery and equipment necessary to launch production as possible at the plant.

Another problem hindering the development of the shipyard was the lack of qualified staff and equipment shortages. In 1945, there were only about 20 engineers, 100 technicians and 1,000 craftsmen with any experience in shipbuilding. The shipyard's buildings were in a poor state of repair, often without windows, walls and roofs. In the first two years of operation, the shipyards were mainly engaged in the repair of machinery and equipment and the construction of steel structures. The first equipment, workshops and departments were commissioned, including a press, a floating crane and a foundry. Tractors from UNRRA supplies were assembled at Shipyard no. 2. Using the excavated floating docks, ship repairs began. Thanks to the reconstruction of the halls, the expansion of the machinery stock and the increase in crew numbers, it was possible to start producing ships locally. The delivery of barges for the Port Authority in Gdańsk and modern steel cutters was completed.

On 19 October 1947, the two former German shipbuilding facilities were amalgamated into a single facility, the Gdańsk Shipyard. The keel for the first seagoing



9. One of the first vessels built at the Gdańsk shipyard after the war. It is being built on the non-existent so-called flat slipway (slipway – the former slipway of the Imperial Shipyard) – designated as slipway A3 of the Gdańsk Shipyard, located at the Dock Basin. In the background, the buildings of the blacksmith's shop (left) and the locksmithing workshop (in the background), before 1955, still standing. Photo: NN, State Archive in Gdańsk collection

ship was laid on 3 April 1948. This was the coal and ore freighter *Sołdek*, which was launched on 6 November of that year. This event opened a new chapter in the history of the shipyard and became a symbol of the birth of the Polish shipbuilding industry.

In the post-war period, people from a wide variety of backgrounds applied to work at the shipyard. Although propaganda emphasised the importance of the plant to Polish industry and pointed to its production successes and achievements in labour competition, the first wage strikes began as early as 1945–1946. Their cause was the poor provisioning situation and poor working and pay conditions.

The early 1950s was a period of intensive reconstruction and modernisation of the plant. Production tasks were also being undertaken, and there was increasing surveillance of the shipyard by the communist security organs and intensive political indoctrination of the workforce. As part of the purges, dozens of shipyard workers were then dismissed from the shipyards and displaced from the coast, including many representatives of the well-trained shipyard staff.

In the 1950s and 1960s, in addition to the development of the shipyard itself, there were significant changes related to the production of ships and marine equipment. This to do with the start of serial production of ships, which was connected, among other things, with the agreement on the supply of goods between Poland and the USSR signed in 1949. From 1950, the Gdańsk Shipyard also became, according to the guidelines of the Ministry of Navigation, the main Polish exporter of ships. The long series of units completed at the shipyard enabled the development and application of new technologies and codified production processes and facilitated the introduction of changes. Riveting technology was replaced by welding, and the steam engine was eventually supplanted by the diesel internal combustion engine. The assembly of hull sections for vessels under construction also began to be used in production. Construction of the ship's boilers also began. The Gdańsk Shipyard soon became the plant that satisfied the needs of all Polish shipbuilding plants in the production of these devices. In 1956, slipways for side launching were opened, and between 1960 and 1961, construction of the ships' own main propulsion engines, named *Gdańsk*, began. These drive units were produced under licence from the Danish Burmeister & Wein works. The shipyard fulfilled orders by building various types of ships. The vast majority of production was for the Soviet Union. During this time, bulk carriers were built at the shipyard, as well as ore carriers and coal carriers, especially for the transportation of strategic raw materials – iron ore and coal. In addition to these, fishing vessels, general cargo vessels, tankers and wood carriers were also built. A special place in the shipyard's production was occupied by fishing bases of various types, units that were extremely technologically complex.

At the time, the Gdańsk Shipyard was rising up the world rankings in terms of shipbuilding volume. In the late 1950s, it ranked 11th in terms of tonnage built, and by the early 1960s, it had moved up to 5th in the world. This happened in spite of the existing limitations due to the isolation of the bloc of communist countries and the lack of modern materials, machinery and equipment, technology or access to new global technical solutions. This underlines the strong position achieved by the Gdańsk Shipyard in just a decade after the merger of the shipyards, and points to the exceptional role of the plant's staff, both technical staff and workers.

At the time, it was the largest Polish shipyard and the civil shipbuilding facility, with the largest scale of production in the entire Eastern Bloc. However, the propaganda-publicised successes did not go hand in hand with modern forms of production, good planning, economical use of resources or occupational safety, and were not in line with the mood of the workforce. In December 1961, there was a fire on the general cargo ship MS *Maria Konopnicka*, in which 22 shipyard workers died.

On 15 April 1967, the shipyard was named after Lenin. Three years later, the plant became an arena

for events of great historical significance. In December 1970, shipyard workers from the Gdańsk Shipyard protested against food price rises, sparking a protest that soon covered the entire coast. The strike was violently suppressed by police and army units. There were dead and wounded. There were further protests at the Gdańsk Shipyard in 1971 and 1976.

In October 1972, the decision was taken to modernise the shipyard. These measures were aimed at modernising the shipbuilding processes and making the plant more competitive, but also at the communist authorities winning over the shipyard crews. At the same time, workers were subjected to intensive surveillance. At the time, around 18,000 people worked at the plant and, together with the employees of co-operating plants, even more than 20,000 people. The modernisation measures carried out in the 1970s included the expansion of the infrastructure (including welfare facilities) and technical facilities, the reconstruction of the shipyard slipways to meet the demand for ever larger ships, and the purchase of powerful cranes with a lifting capacity of up to 150 tonnes, which made it possible to introduce significant changes in the vessel production process – the assembly directly on the slipway of increasingly larger and heavier sections and entire ship blocks. Sets of cranes were used for this work, which significantly increased their lifting capacity. Due to the political and economic conditions of the 1970s and 1980s, the planned modernisation of the plant was not fully completed. In 1975, the shipyard was awarded a communist state decoration – the Order of the Banner of Labour.

In August 1980, in response to the deteriorating economic situation in Poland, another massive strike broke out at the shipyard. The protest soon covered the whole country. The result of the strike was the conclusion of agreements in the Gdańsk Shipyard, as well as in other factories in Poland, with delegations from the government of the communist state – Polish People's Republic and the establishment of the Independent Self-Governing Trade Union "Solidarity" – the first independent social organisation in the Eastern Bloc dominated by Communist Russia. From that moment on, the Gdańsk Shipyard became a symbol of the aspirations for freedom of the Polish people. Following the imposition of martial law in Poland on 13 December 1981, another strike began at the Gdańsk Shipyard, once again pacified by the communist authorities. The plant then once again became the centre of nationwide resistance against communist rule.

During this period, especially after the imposition of martial law – resulting in the isolation of the country – shipbuilding at the Gdańsk Shipyard had limited dynamism. Due to the development of container transport, container vessels were built at the plant in the 1970s, as well as roll-on/roll-off units for transporting cars and goods on wheeled platforms. In the 1980s and 1990s, the Gdańsk Shipyard also became a well-known manufacturer of sailing vessels.

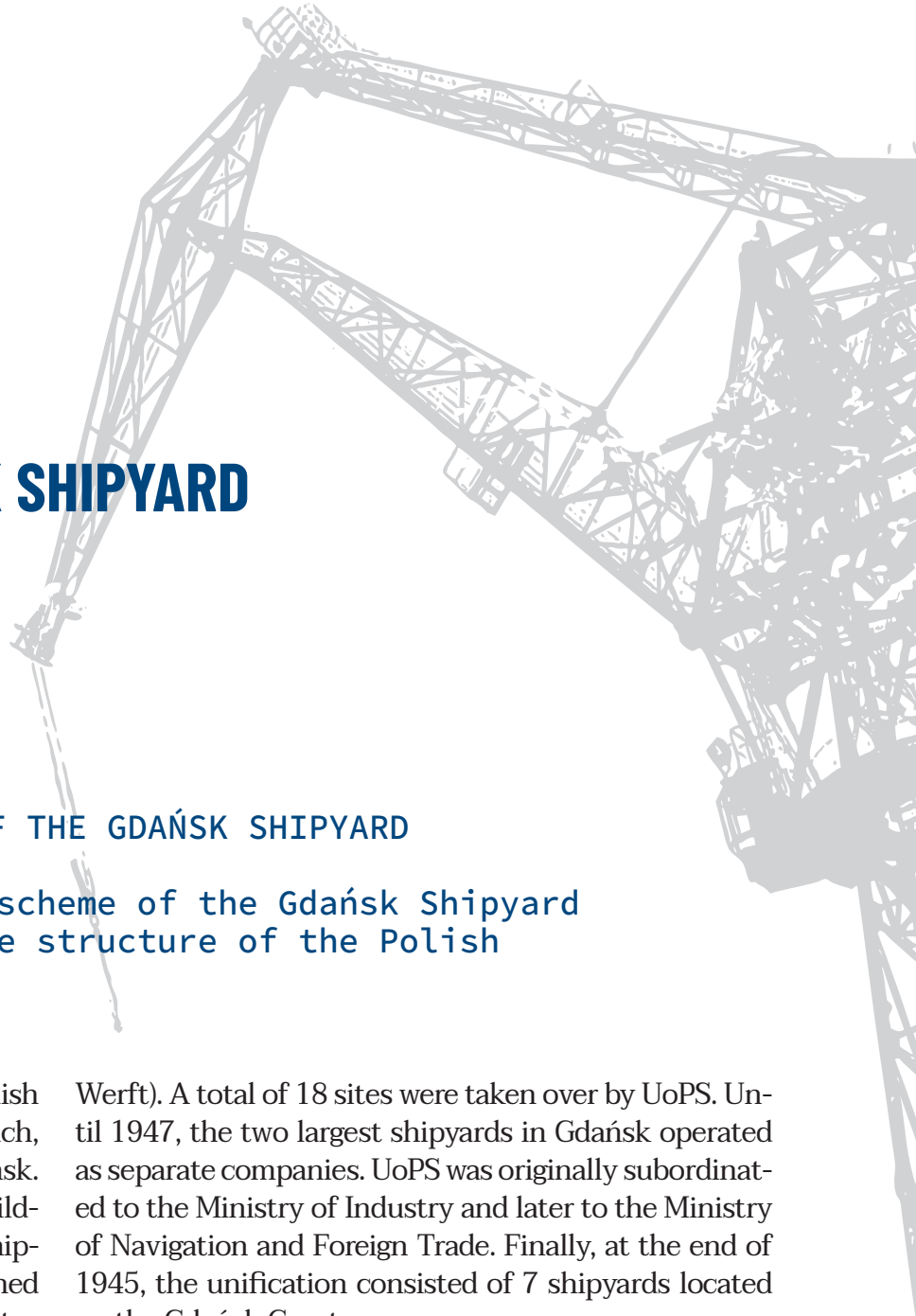
In 1988, there were further protests at the shipyard, the nationwide wave of which led to the start of the Polish Round Table talks. In the Gdańsk Shipyard, these were instigated by the underground Solidarity structures operating at the plant in the 1980s.

In October 1988, Mieczysław Rakowski's government put the shipyard into liquidation. The plant was declared bankrupt in 1996, but shipbuilding was not discontinued. The management and some of the hull departments were relocated to Ostrów Island. In 1998, the assets of the plant were bought by the Trójmiejska Korporacja Stoczniowa (Tri-City Shipbuilding Corporation) and the plant took the name Stocznia Gdańska – Grupa Stocznia Gdynia SA (Gdańsk Shipyard – Gdynia Shipyard Group). In 2006, the plant was separated from the shipbuilding group. It then adopted a new name: Stocznia Gdańsk SA (English: Shipyard "Gdańsk" joint-stock company according to Polish law). Part of its assets were taken over by the governmental Industrial Development Agency, but for years, the majority stake was owned by the Ukrainian company ISD Polska. In 2018, the Polish state-owned Agencja Rozwoju Przemysłu (Industrial Development Agency) became the holder

of 100% of the company's shares and thus full ownership control. In 2021, through a merger of entities, the plant reverted to its historic name of Stocznia Gdańska (Gdańsk Shipyard). It is now part of Grupa Przemysłowa Baltic (Baltic Industrial Group), which specialises in building towers for wind power plants. Part of the Ostrów Island site, which used to belong to the Gdańsk Shipyard, is now owned by the Pomeranian Special Economic Zone.

After the collapse of the plant, the company Synergia 99 became the owner of the oldest shipyard sites, located on the left bank of the Dead Vistula. At the same time, there was a plan to create a new district of Gdańsk here called the Young City. Part of the site has been owned over the years by the Danish company BPTO and multiple other owners. At the time, a number of shipyard facilities were demolished in preparation for new developments. Today, a number of owners are still active in the shipyard. One of the larger ones, owning 16 hectares of the historic site, is the company Stocznia Cesarska Development (English: Imperial Shipyard Development), a company set up by two Belgian property developers; another owner of a large part of the shipyard site is the company Stocznia Centrum Gdańsk (English: Shipyard Centre Gdańsk).

After the collapse of Gdańsk Shipyard, shipbuilding continued to be carried out at the former K3 Hull Assembly Department, owned by Synergia 99. Until 2019, the New Construction Plant of the Nauta Ship Repair Yard of Gdynia operated there. In 2022, the acquisition of the site, together with the preserved infrastructure, by the Danish Karstensen Shipyard (Karstensen Shipyard Poland) was finalised through the buyout of shares in Synergia 99, owned by the Polish Armament Group SA. By 2022, a number of new developments will have been built on the parent, oldest site of the Gdańsk Shipyard. There are also numerous concert venues, clubs and cultural institutions such as the HSE Hall Museum (Polish: Muzeum Sali BHP), the European Solidarity Centre (Polish: Europejskie Centrum Solidarności, ECS) and the New Art Museum (Polish: Nowe Muzeum Sztuki, commonly NOMUS), a branch of the National Museum in Gdańsk (Polish: Muzeum Narodowe w Gdańsku, MNG). However, there is still no place showing the full-scale industrial history of the Gdańsk Shipyard.



Part II

OPERATION OF THE GDAŃSK SHIPYARD

I. ORGANISATION AND PRODUCTION OF THE GDAŃSK SHIPYARD

1. Organisational and production scheme of the Gdańsk Shipyard since 1945 and its place in the structure of the Polish shipbuilding industry

By a decree of 14 April 1945, the Union of Polish Shipyards, UoPS (Polish: Zjednoczenie Stoczni Polskich, ZSP) was established with its headquarters in Gdańsk. This body was to coordinate the takeover of shipbuilding facilities and the organisation of the Polish shipbuilding industry. The UoPS was primarily concerned with the takeover of individual former German sites from the Red Army and the Russian administration. Plants located in Gdańsk, Gdynia and Elbląg were the first to be taken over. Later also in Szczecin. The two largest former German shipyards in Gdańsk – Schichau Shipyard (Schichau Werft) and Gdańsk Shipyard (former Nazi Danziger Werft, formerly International, even earlier Imperial Shipyard) – were of particular importance in the structure of UoPS. These plants were given Polish names with numbers: Shipyard (Polish: Stocznia) no. 1 (Danziger Werft) and Shipyard no. 2 (Schichau Werft). A total of 18 sites were taken over by UoPS. Until 1947, the two largest shipyards in Gdańsk operated as separate companies. UoPS was originally subordinated to the Ministry of Industry and later to the Ministry of Navigation and Foreign Trade. Finally, at the end of 1945, the unification consisted of 7 shipyards located on the Gdańsk Coast.

In the course of the changes taking place within the entire Polish shipbuilding industry, it was decided to merge the previously separate facilities – Shipyard no. 1 and Shipyard no. 2 – into a single facility. Thus, on 19 October 1947, the Gdańsk Shipyard (GS) was established. At the time, it was one of the branches of UoPS. The director of the shipyard reported directly to the director of UoPS and received directives from him on the operation of the plant, the work of the shipyard and production. At that time, the company focused on rebuilding the

plant and its capacity, implementing off-shore production (machine assembly) to the greatest possible extent, repairing Polish and foreign ships and preparing to start shipbuilding. The shipyard's general director managed production. Through the deputy technical officer, the factory office (production preparation) and production departments were subordinated to the general manger, such as: Ship Repair, Hull and Equipment, Mechanical (central) and Foundry and Boiler and Forge (forging) Departments. The reconstruction of the plant and the development of its potential was led by the Shipyard Reconstruction Office. The GS director reported directly to the management units – the planning, statistics, human resources and accounting departments.

The Union of Polish Shipyards was transformed on 11 April 1948 into a state-owned enterprise under the name United Polish Shipyards, UPS (Polish: Zjednoczone Stocznie Polskie, ZSP). Four large shipbuilding facilities – the Gdańsk Shipyard, the Northern Shipyard, the Gdynia Shipyard and the Szczecin Shipyard – became subordinate to it. The company was supervised by the Minister of Shipping and the governing body was the UPS directorate. It consisted of the directors of the individual shipyards. A unique role, as the dominant company, fell to the Gdańsk Shipyard. The director of this plant was involved in major decisions taken by the directorate of the UPS. The shipyards that were part of UPS did not have legal personality, so activities in the areas of finance, material procurement and sales were carried out directly by the UPS headquarters. On 3 March 1950, the UPS was transformed into the Central Board of the Shipbuilding Industry, CBotSI (Polish: Polish: Centralny Zarząd Przemysłu Okrętowego, CZPO). On the same day, the Minister of Shipping issued an order whereby the former UPS branches, the shipyards, were transformed into independent state-owned enterprises. The shipyards were given legal personality. As such, they took over all the competences involved in running the company. The CBotSI retained coordination, supervisory and control functions over its subordinate companies.

On the same day – 3 March 1950 – a separate state-owned enterprise was established under the name Gdańsk Shipyard. This had an impact on the development of the shipyard and the subsequent shaping of the company's organisational and production forms. However, the shipyard continued to receive directives from the CBotSI, which limited its level of autonomy in determining its production development and employment policy. With the acquisition of legal personality, however, the shipyard took over many administrative activities in the areas of finance, materials management and sales. This required the development of new organisational forms for the company. In 1950, the shipyard was managed by a general manager and his two deputies, the technical and administrative directors. Reporting to the chief executive were the head of technical control, the personnel department, the savings commissioner and the Office of Studies and Organisation. The technical director, however, reported to: Technical Department (including planning and construction office), investment service, five production departments – Shipbuilding, Ship Equipment, Ship Repair, Off-Shore Production, Electrical-Shipbuilding – and the Central Equipment Productive Maintenance Department. The following departments were subordinate to the administrative director: Administrative, Financial, Commercial (including procurement and sales) and Social Department.

At the end of 1950, the CBotSI was transformed into a ministry body and incorporated into the Ministry of Heavy Industry in January 1951. These changes were due to the centralisation of the management of the shipbuilding industry in Poland. The CBotSI sought to focus its activities mainly on the construction of seagoing vessels, excluding ship repair activities. Part of this was the spinning off of repair departments from the national shipyards to become independent ship repair facilities. The intention was to leave only the production functions at the parent plants.

By a decision of the Minister of Industry on 9 June 1952, its Repair Department was separated from the Gdańsk Shipyard. From it, on 1 July 1952, the Ostrów

Repair Yard (later the Gdańsk Repair Yard) was established as a repair enterprise independent of the Gdańsk Shipyard – subordinate to the Central Board of the Maritime Repair Yards, established in October 1952. As a result of these actions, the Gdańsk Shipyard became a purely production shipyard. Its organisation also changed – the new structure was introduced in October 1952. The chief executive officer was subordinated to the basic units of the management board, including the Planning Department, Chief Accountant, and Employment and Payroll Department. Because of the company's rapid growth, the Investment Directorate was created in place of the Investment Service. A deputy director for livelihoods was also appointed (given the vast increase in employment and the recruitment of workers from the hinterland). The production units were expanded – among other things, the posts of head of production and his three deputies were created: for hull production, ship equipment, and machinery production. Among other things, this period saw the establishment of the hull departments that existed until the end of the plant's operation – Hull Mechanical Processing Department K1 and Hull Assembly Departments K2 and K3. The Ship Repair Department was formally abolished as the shipyard's repair functions were removed from the scope of operations. Smaller organisational changes were made until 1956.

At the time, the CBotSI remained the operational management unit of the shipbuilding industry – it developed collective plans for the activities of the enterprises, supervised their implementation, coordinated the activities of the enterprises and took care of proper financial and economic management and personnel and payroll policy, constant technical progress, and dealt with the supervision of the exploitation of the assets of the enterprises. However, the CBotSI's powers were considerably limited and were merely an extension of the Ministry of Heavy Industry's administrative management of enterprises.

Following the political and economic changes that took place in Poland after October 1956, efforts were made to decentralise competences in the management of individual branches of the economy and to involve crews in the management of socialised workplaces. New forms of management in the shipbuilding industry were introduced in 1958. These consisted of changing central boards into unions. On 25 July 1958, by a resolution of the Council of Ministers, Unified Shipbuilding Industry (USI) was established in place of the CBotSI. It comprised 4 production shipyards (including the Gdańsk Shipyard), 14 marine equipment manufacturing companies and 2 construction offices. The USI had more competences and powers than the CBotSI. Its task was to comprehensively implement the state's economic and social policy for the development of the shipbuilding industry, in line with the directions outlined in the economic plans. The greater autonomy of the USI and the ceding of many of the ministry's powers influenced more flexible and efficient management of the shipbuilding industry. The USI dealt with cooperation between numerous shipbuilding plants and initiated anti-import measures for the indigenous production of ship equipment (e.g. machinery licence purchases). Due to the significant expansion of the scope of production, the structure of the Gdańsk Shipyard changed several times between 1958 and 1969. At the turn of 1960, Engine Building Plant S was established at the shipyard, where production of main propulsion marine engines under licence from Burmeister & Wein began. At the end of 1960 and the beginning of 1961, Shipbuilding Plant C was established, adapted for the construction of ships up to 100 m in length – mainly fishing trawlers. It was located on the Ostrów Island (Holm). Both plants were placed under the authority of the shipyard's general manager. In 1966, both plants, S and C, were subordinated to the technical director. Due to the significant increase in the scope of production, the technical director's department was significantly expanded. By the end of 1969, the management and production structure of the Gdańsk Shipyard had taken shape, which functioned with some changes in the following years and decades.

2. Gdańsk Shipyard's production function and main assortment

Almost from the beginning of its resumption after 1945, the Gdańsk Shipyard, despite its gigantic destruction, took initiatives in the field of shipbuilding. The business began with wreck repairs, building barges for clearing the port, as well as small boats – fish cutters. From 1948, the shipyard began producing its own seagoing vessels. At the time, it was an enterprise with a complex manufacturing structure. In addition to the construction of seagoing vessels, it continued to overhaul vessels and to manufacture marine equipment. From 1952, the Gdańsk Shipyard became a purely manufacturing enterprise. It was involved in shipbuilding and expanded the production of marine equipment. It was also a subcontractor of many components for other shipbuilding companies. It manufactured sub-assemblies and components for many types of on-board equipment (e.g. trawl winches). From the 1950s onwards, the shipyard became an established manufacturer of specialised marine boilers of various types. In the 1960s and 1970s, its production in this area met the needs of the entire domestic shipbuilding industry. The boilers were also produced for sale abroad. From 1960, the Gdańsk Shipyard undertook the production of main engines under licence from the Danish company Burmeister & Wein. Ship diesel engines were produced in various types. The first main engines were five-cylinder, two-stroke engines. In 1971, production of seven-cylinder engines adapted to remote control began.

With the construction of further engines, the use of domestic materials, including components manufactured at the Gdańsk Shipyard, increased. The first engine produced was composed entirely of parts supplied from Denmark. The third engine already had 40% of the parts and components produced at the shipyard. Subsequent units were almost entirely produced at the Gdańsk Shipyard. A total of 122 main propulsion engines of various types were produced.

The main product of the plant, however, were ships. These were merchant vessels: transport, commercial, fishing vessels produced in many styles, types and versions. The most important innovative ships built at Gdańsk Shipyard from 1947 to 1996, i.e. from the start of operations of the state-owned enterprise, Gdańsk Shipyard, (19.10.1947) until the bankruptcy of Gdańsk Shipyard SA (8.08.1996), which formally ended its existence, are presented later.

The commissioning to Polish shipowners between 1949 and 1951 of six ore-coal bulk carriers (ocbc) of the B 30 type, two small general cargo vessels of the B 51 type (690 DWT) and two steam side trawlers (vessels for side trawling) of the B 10 type (450 DWT) proved that the shipyard had achieved the ability to design and build ships efficiently. As experience was gained and as the shipbuilding market demanded more, the shipyard offered a series of new, often highly innovative ships.

Bulk carriers

Bulk carriers are ships designed to transport bulk cargoes, i.e. cargoes that cannot be individually counted (liquid materials, timber, loose materials, e.g. coal, ores, malt), and combinations of different bulk cargoes. The serial production of ships at the shipyard began with ocbc of the B 30 and B 31 types. Between 1949 and 1961, a total of 101 bulk carriers (coal carriers and ocbc – 86 to the USSR, 8 to Poland and 7 to China) were delivered to shipowners.

From 1966 onwards, the shipyard built a series of multipurpose bulk carriers – commonly referred to as "paragraph ships". The contract contained a provision (paragraph – hence the name) on the contract gross tonnage (the port dues depended on this parameter at the time, among other things) and the optimum loading capacity of the vessel. Every tonne below the contract loading capacity meant signifi-

cant penalties, exceeding the gross tonnage meant the shipowner would withdraw from the contract. It was a challenge for designers and builders. The delivery of 34 vessels of this type to shipowners from Norway, Hungary, Czechoslovakia and Poland opened the shipyard's doors to world markets.

Between 1970 and 1971, 5 bulk carriers were delivered to the Polish Steamship Company, the first in Poland and one of the first in Europe to have class A16 (the engine room allowed for 16 per 24 hours unmanned operation – unmanned machinery space).

Vessels for fisheries

The commissioning of the first trawler of the B 10 series, a simple, partially riveted, steam-engine-powered vessel for fishing in the Baltic, to the Polish shipowner in 1949 was the first step on a path that, after a dozen years or so, led GS to a leading position among builders of vessels for fishing. Between 1951 and 1957, a total of 122 B 10 and B 14 series trawlers were delivered to shipowners for bottom trawling in the Baltic Sea. In the 1960s, fishing moved largely to open ocean areas. The long time required to reach distant fishing grounds and to return to home ports caused that the use of these vessels in the new situation became less and less profitable. Expeditionary fishing began to be organised – in addition to trawlers, merchant ships adapted as bases and equipped with refrigerated holds were involved. Trawlers were allowed to remain in the fishing area for up to 30 days. Expeditions organised by the USSR often included up to 100 trawlers and 6–8 bases.

An innovative solution was the commissioning on 31 December 1958 of the first real fishing mother ship, designed at the Central Design and Research Office of the Shipbuilding Industry (Polish: Centralny Ośrodek Konstrukcyjno-Badawczy Przemysłu Okrętowego) in cooperation with the Design and Construction Bureau of the GS, the B 62 type base, known as the herring mother ship. Its main task was to receive barrel-salted herring from trawlers in the fishery and, after sorting them, to transport them in refrigerated holds to port. The crew consisted of 256 people. They were the last steam propulsion ships built in the GS. Between 1958 and 1963. Eleven such relatively simple ships were delivered to Soviet shipowners.

Based on the experience of operating these bases, in 1963, the shipyard developed a type B 64 processing base, which was a prototype in world shipbuilding for a completely new type of ship. In addition to receiving and storing fish delivered from catcher vessels, the processing plant installed on board provided the ability to process them. These high-tech, cutting-edge vessels combined the characteristics of a processing plant, reefer ship, tanker and passenger ship. Between 1963 and 1975, a total of 49 were handed over to shipowners from the USSR and 2 similar type B 67 processing bases to the Polish shipowner.

The most innovative, also having no equivalent in the global shipbuilding industry, were the fish processing mother ships supplied to shipowners from the USSR. A real canned fish factory was installed on board, covering an area of half a hectare. The factory was able to produce four types of canned fish from the fish supplied by the catching vessels, and there was also the possibility of freezing or salting fish, producing fish meal, as well as caviar, spawns (fish roe), fish oil and cod-liver oil. Per day, i.a. 270,000 canned fish could be produced, as well as 100 tons of frozen fish, 150 tons of salted fish, and 100 tons of fish meal. The unit's crew numbered 400. The ship was equipped for the crew, as well as for the crews of fishing vessels, a dispensary and hospital, a cinema and conference room, recreational facilities and a workshop. Workshops located on the ship provided fishing vessels with the opportunity to make repairs. Six such vessels were delivered to USSR shipowners between 1979 and 1981. The shipyard, by commissioning two of these units each year, symbolically created a new, self-sufficient city each year, with a developed infrastructure and a large industrial plant, with a population of around 1,000.

10. *Ark 3* – type K 17 steel cutter (39 DWT), 1949. The world's first all-steel fishing boat. Polish shipyards built nearly 200 similar vessels following to this design, ca. 1949. Photo: NN, State Archive in Gdańsk collection

11. *Sołdek* – bulk carrier (ore carrier) type B 30 (2540 DWT), 1949. The first ship built in the Gdańsk Shipyard and the entire post-war Polish shipbuilding industry, 1960s (?). Photo: NN, public domain

12. *Ina* – type B51 general cargo ship (690 DWT), 1958. The sixth ship in the first series of nine general cargo ships built at Gdańsk Shipyard between 1951 and 1959. Photo: Z. Mirota, collection of the author

13. *Pribałtika* – type B 69 fish processing base (10,100 DWT), 1974. One of 68 fishing bases built at Gdańsk Shipyard, 66 were handed over to shipowners from the USSR, 2 bases were built for Poland, 1970s. Photo: Z. Mirota, collection of the author

14. ORP *Iskra* – B 79 type sailing training ship, 1982. Three masts, 16 sails, total area 986 m², 1980–1990 (?). Photo: NN, public domain

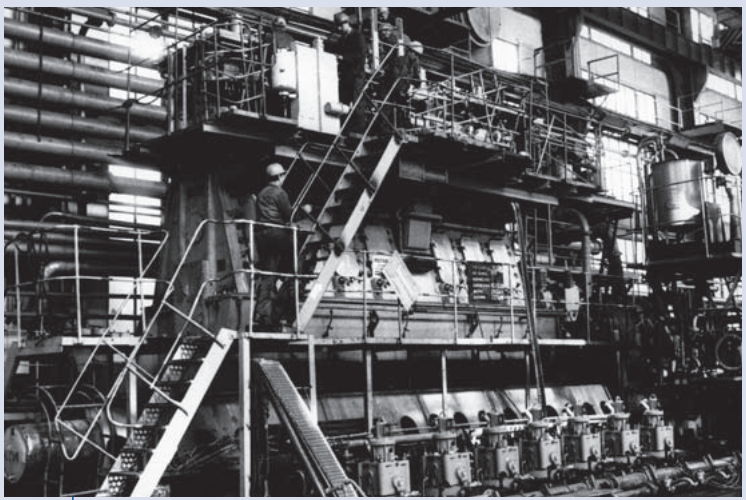
15. *Dar Młodzieży* – training ship of the Gdynia Maritime University, type B 95, 1982. Three masts, 26 sails, total area 3,015 m2, crew – maximum 294 persons, 1980–1990 (?). Photo: Z. Mirota, collection of the author

16. *Dole America* – type B 369 reefer ship (10,400 DWT), 1994. At the time, vessels of this type were state-of-the-art vessels for transporting bananas, among other things, 1990s. Photo: Z. Mirota, collection of the author

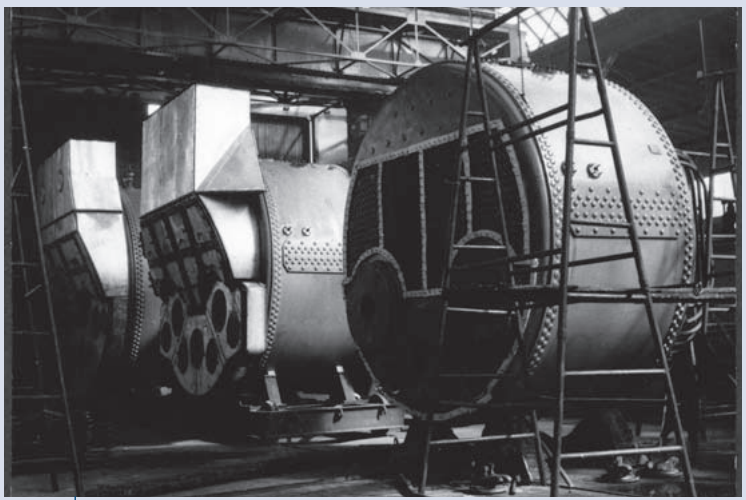
17. *Finnhansa* – combi ro-ro (ro-pax) vessel type B 501 (10,700 DWT), 1994. Innovative ship for ro-ro cargo (on wheeled platforms) and passengers, 1990s. Photo: NN, public domain

18. *Canelo Arrow* – bulk carrier type B 684 (48,041 DWT), 1996. Last ship built at Gdańsk Shipyard SA, 1990s. Photo: D. van Lear, public domain

19. *Cape Norman* – type B 191 container ship (22,800 DWT), 1996. Photo: Z. Mirota, collection of the author



20. The *Gdańsk* marine engines during construction at the Gdańsk Shipyard. These ships' main propulsion units were built under licence from the Danish company Burmeister & Wein, 1970s. Photo: Z. Mirota, State Archive in Gdańsk collection



21. Marine boilers manufactured at Gdańsk Shipyard. The plant met its own needs and the needs of all other Polish shipyards in the production of this equipment, 1960s–1970s. Photo: Z. Mirota, State Archive in Gdańsk collection

Changing fishing conditions also necessitated the rapid development of catcher vessels. On 31 March 1960, the first B 15 processing trawler was delivered, equipped with facilities for freezing and partial processing of caught fish. It could stay in the fishing grounds for up to several weeks. In a 1960 bulletin, the Food and Agriculture Organization of the United Nations (FAO) recognised the trawler and its innovations as one of the most modern fishing vessels in the world. A total of 159 trawlers of nine different series were delivered to shipowners from six countries (USSR, Poland, Romania, Mexico, Norway, the Netherlands). The monthly magazine "Word Fishing" (1–2/1964) described Poland as the world's largest manufacturer of modern fishing vessels.

Reefer ships

In order to process fish locally in increasingly remote fisheries, it was cost-effective to leave trawlers and the processing fishing factory on the fishing grounds for as long as possible without returning to port. The need to design special supply vessels arose.

The shipyard's response was to supply 11 fast fishing transport vessels to the Soviet shipowner between 1970 and 1973, and in subsequent years, seven such vessels to the Deep Sea Fishing and Fishery Services Company "Gryf" Szczecin (Polish: Przedsiębiorstwo Połowów Dalekomorskich i Usług Rybackich „Gryf" Szczecin). These vessels picked up frozen fish and other products and delivered provisions, packaging, fuel and fishing equipment, as well as catcher vessel crew stand-ins.

In response to market demand, using the experience gained from the construction of high-speed fishing transporters, GS launched the construction of multipurpose reefer ships. The refrigeration systems and cargo holds on these ships were adapted to also to carry bananas (this cargo posed special requirements in terms of accuracy of temperature maintenance in every part of the hold), citrus fruits, dairy products and meat.

Another challenge was the construction between 1992 and 1994 of a series of 12 Type B 369 reefer ships for shipowners from Norway (6), South Africa (2) and Costa Rica (4). These were vessels for the carriage of refrigerated cargoes in bundles, while ensuring that the holds could be filled with inert gas. Both the temperature distribution and the concentration of the inert gas were adjusted separately for each tween deck. These vessels were considered to be the most modern in their class on the world market in the 1990s, as confirmed in June 1994 by the conference "Refrigeration in Maritime Transport Today and in the Future", organised at the Gdansk Shipyard by The International Institute of Refrigeration – IIR, Paris.

General cargo ships

As mentioned, the third type of ship with which the shipyard's post-war history began was general cargo ships. The first, commissioned in 1951, was a project, B 51, vessel with a deadweight of 690 DWT. The last one, the general cargo vessel B 348, with a deadweight of 16,300 DWT, was delivered in 1984 to a Chinese shipowner. A total of 190 ships were built to nearly 30 different designs. They were received by shipowners from 17 countries. The ships have flown the flags of Poland, the USSR, Albania, Greece, Switzerland, Norway, Hungary, the UK, as well as China, India, Pakistan, Turkey, Iran, the United Arab Republic and Brazil, Ecuador and Colombia.

The first modern general cargo motor ships (with an internal combustion engine as the main propulsion), were B 54 vessels of the 10,000 DWT series – 26 such vessels were built between 1956 and 1963.

The B 444 vessels were considered to be some of the most modern general cargo ships in the world in the 1970s. Ten ships of this series were delivered between 1970 and 1973. These were fast semi-container general cargo ships, reaching speeds of 21 knots and with a fully automated engine room. A complete novelty at the time was the possibility of carrying containers in

the ship's middle holds. The distinctive beauty of the design's architecture led to the first ship of the series, MS *Amaralina*, being voted Miss Kiel Canal, the prettiest ship to pass through the Kiel Canal in 1970.

The ships of this series opened a new chapter in the shipyard's history – the serial production of high-speed semi-container ships, adapted in part for the carriage of containers, and later container ships.

Timber carriers

This type of ship can be categorised as a bulk carrier or general cargo ship, but is distinguished by its unique design. The hulls of these ships had a special reinforced design and the raked bow resembled an icebreaker. They have played an important role in transporting cargo in the Arctic Ocean zone. The holds had hatches that were considerably larger than on other ships. The shipowner justified this by the need to adapt the size to the timber being loaded, but it also allowed the loading of heavy military equipment. These ships were also equipped with what was known as special equipment – a hull demagnetisation system, typical of warships at the time (to prevent possible damage to the ship from magnetic mines), sprinkling of the outer decks and encapsulation of the superstructure (to protect the ship's crew from the effects of radiation in the event of a possible nuclear conflict). It was no surprise, therefore, that these ships were on the front pages of the world press between 1962 and 1963. Because of their design and equipment, they were used by the USSR during the Cuban Missile Crisis to transport military equipment to Cuba. At the time, the press was circulated with pictures of timber carriers built in the shipyard taking from Cuba Soviet missiles fixed on board.

Container ships

The experience in building semi-container ships allowed the shipyard to respond to market demand and, in 1974, to sign a contract to supply classic container ships to a newly formed consortium serving the line from Europe to the ports of the Caribbean Sea. The consortium comprised: Hapag-Lloyd (German, the largest container shipowner at the time), KNMS from the Netherlands, Harrison Line from England and CGM from France. The type B 463 container ship (1416 TEU, speed 22 knots, fully automated engine room) had container cranes installed on board, unique at the time, for loading and unloading containers at destination ports. That the ships in this series met high technical standards is evidenced by the story of one of them. The MS *Astronomer* of the British shipowner Harrison Line, only slightly modified and further equipped with a flight deck and hangar for 13 attack helicopters, took part as a Royal Navy auxiliary helicopter carrier in May 1982 in the then ongoing war with Argentina over the Falkland Islands. It served in South Atlantic waters from July to September 1982, and from December 1982 to December 1986 as a helicopter carrier supply warship under the new name *Reliant*, it was on duty in the Mediterranean and South Atlantic. It became famous for the fact that it spent 566 days at sea without calling at a port and travelled 100,000 nautical miles.

Another exceptional series was the four container ships ordered in 1986 by Polish Ocean Lines. Type B 355 vessels had installed a deep waste heat recovery system from the main engine exhaust. This innovative solution was intended to reduce the adverse impact that the oil crisis of the late 1970s and early 1980s and the resulting spike in oil prices had on ship operating costs. To generate electricity on board during the voyage, a turbogenerator was used – instead of generator sets – powered by steam obtained in a specially designed boiler heated by the main engine's exhaust gas ("free energy"), together with a shaft generator on the ship's main propulsion shaft. Automatic operation of the system maximally utilised the heat energy from the exhaust gases. The voyage took place virtually without the use of generator sets.

The largest container ships built at the shipyard were the two B 500 vessels delivered to a French

shipowner in 1993–1994, with a capacity of 2,282 TEU and of Panamax class (a Panamax is a vessel with a maximum width of 32.3 m, which allowed it to pass through the Panama Canal at the time). At the time, these were some of the largest container ships in world shipping.

Roll-on/roll-off (ro-ro) ships (vehicle carriers)

The reduction in port handling time and the delivery of goods directly from supplier to consignee without the need for transshipment was provided by a new class of vessel: vehicle carriers, popularly known as ro-ro ships. A new feature was the stern-mounted, starboard-swinging ramp that allowed direct entry and exit (roll-on, roll-off) of trailers carrying containers loaded with the supplier's goods. The design of such a vessel (without bulkheads, with large holds) is particularly demanding in technical terms. Between 1976 and 1986, 10 B 481 type ro-ro vessels were delivered to the USSR shipowner. The ramp on this ship allowed entry, in addition to cars and semi-trailers, for tracked vehicles, suggesting the possibility that these ships could be used for military purposes. Indeed, in 1983, Soviet vertical take-off and landing fighter jets landed on board two ships of this series during military manoeuvres. Ro-ro vessels have become another speciality of the Gdańsk Shipyard. Between 1981 and 1990, six vessels of this type with many innovative features were delivered to shipowners in Finland, Germany and Brazil.

The real challenge, however, was the contract signed in 1991 for the delivery of 3 B 501 vessels to a shipowner from Finland. These ships, intended for the Helsinki–Lübeck route, were to provide a journey for tourists carrying cars on holiday, in addition to carrying lorries. This required the preparation of 120 passenger seats in the cabins and the provision of a luxurious experience during the journey. This is how the innovative design of the new ro-pax (from "ro-ro" and "passenger") ship came about. The ship developed a speed of 22 knots and the cargo solutions ensured that all cargo could be replaced in port in less than 12 hours. Also new was the ship's installed computerised, integrated control system for all processes in the ship's systems. It was the first ship in Poland and one of the few in the world shipbuilding with such a high level of automation. At the time, it was the only merchant ship in the world to have a dynamic positioning system, which ensured that the ship's position remained unchanged in the event of a failure of the ship's course control system during its passage between the pillars of the bridge over the Trave River near Travemünde. The ship's concept and the technical solutions used on it have been highly appreciated by the shipbuilding community. The B 501 type ro-pax ship was recognised by The Royal Institution of Naval Architects (RINA) in the UK as "Significant Ship of the Year 1994", i.e. the most interesting and innovative ship of 1994.

Sailing ships

The Gdańsk Shipyard was the world's only builder of large sailing ships in the second half of the 20th century. This specialisation was a great achievement for the shipyard's designers and crew, and pride was taken in the multiple victories of these sailing ships in international regattas.

Between 1980 and 1991, 10 sailing vessels were commissioned:

- barquentine *Pogoria* (1980) – three masts, 15 sails with a total area of 984 m^2, crew 52 persons – training ship of the Brotherhood of the Iron Shackle
- frigate *Dar Młodzieży* (1982) – three masts, 26 sails with a total area of 3,015 m^2, crew maximum 294 persons – training ship of the Gdynia Maritime University
- barquentine ORP *Iskra* (1982) – three masts, 16 sails with a total area of 986 m^2 – training ship of the Polish Navy
- barquentine *Kaliakra* (1984) – parameters similar to the ORP *Iskra* – training ship of the Bulgarian Navy

- five three-masted frigates: *Mir*, *Drużba*, *Chersonez*, *Pałłada*, *Nadieżda* – parameters similar to the *Dar Młodzieży* – USSR maritime school ships
- *Oceania* (1985) – scientific research expedition ship for the Institute of Oceanology of the Polish Academy of Sciences. The ship had an experimental, rectangular, remote-controlled "screen sails" of 430 m². It allowed the sail area to be adjusted without people on board and the ship to be operated with a minimized crew (12 people). Numerous research laboratories were spread out on board and 14 scientists were able to go on 30-day cruises.
- *Gwarek* / *Royal Clipper* – a ship designed as a floating holiday home for miners (hence the name – a gwarek is a miner, a member of the gware, association of miners). Cabins for 120 holidaymakers and 70 crew were planned on the ship. Instead of traditional sails on each of the three masts, a single plastic wingsail of 600 m^2 was provided. Construction began in 1986, but due to changes taking place in Poland, the ship was not launched until 1991, and the project was abandoned due to a lack of funding. In the spring of 1999, its hull was sold, and therefore the ship is not included in the list of ships built at the Gdańsk Shipyard. After extending the hull, installing five masts with classic rigging (more than 5,000 m^2 of sail area), the frigate *Royal Clipper* was created, as that is the name this luxury cruise ship now bears, with seating for 227 passengers and a crew of 106. Until 2019, the frigate was the largest and longest sailing vessel in the world.

The first ship built at the Gdańsk Shipyard was the B 30 type bulk carrier (ore-coal carrier) SS *Sołdek* (2,450 DWT), commissioned in 1949, and the final, the 966th unit, the B 684 type universal bulk carrier (48,041 DWT) MS *Canello Arrow*, built in 1996 for a Norwegian shipowner.

II. OPERATION OF THE SHIPYARD – IMPLEMENTATION OF PRODUCTION AT THE GDAŃSK SHIPYARD

The shipyards established at the turn of the 20th century had the necessary specialised departments, facilities, workshops and plants within their structure to provide access to the materials, utilities and equipment needed for shipbuilding. Such a structure, mostly established at the end of the 19th century and in the early years of the 20th century, was in place in each of the two Gdańsk shipyards that formed the Polish Gdańsk Shipyard in 1947. Although this merger resulted in the creation of a single production facility, practically until the closure of the shipyard in 1996, ship hull construction processes, as a remnant of the historical departments, were carried out in parallel in area A (i.e. the area of the former Imperial Shipyard / Gdańsk Shipyard / Shipyard no. 1) and area B (the area of the former Schichau Shipyard / Shipyard no. 2). Site A was home to Hull Assembly Department K2 (or Shipbuilding Plant A), while Site B was home to Hull Assembly Department K3 (or Shipbuilding Plant B). The equipment departments, specialised plants (such as the forge, boiler workshop, foundry, mould workshop, tube workshop, hardening workshop, Electrical Department, Locksmithing Department), as well as other functions that ensure the operation of the company were integrated. Around 1955, a new comprehensive shipbuilding facility C (PC) was built on Ostrów Island, centred around a side drop slipway.

The buildings, which were constructed at the turn of the 20th century, often changed their functions, were modernised, extended or replaced by new ones.

The need for changes and the construction of new facilities resulted from technical advances, the use of new materials and new technologies used in the construction and operation of ships and their equipment.

A ship is a highly complex product with significant value. In order to meet the contractual obligations, it was necessary to create the appropriate infrastructure and procedures to fulfil the commercial obligations. The conditions for the sale of ships by Gdańsk Shipyard were also changing. Initially, the main customer was the Soviet Union (USSR). Over time, due to the changing economic situation and the increasing demand for materials purchased on the convertible currency market, it was necessary to divert some production to shipowners from capitalist countries. This changed the way the shipyard operated. A fundamental change took place after the political transformation in Poland. In order to win new contracts, the shipyard has been forced to compete in an ever-changing international market. The changing conditions for the execution of ship supply contracts necessitated a modification of the procedures in place for preparing tenders, signing ship supply contracts and agreeing on design details, and the manner of preparing and executing the shipbuilding process. The scope of trials and the procedure for commissioning the vessel were also changing, as well as the scope of warranty obligations. All this meant that appropriate organisational units, a network of functional links and information flow channels were created in order to make optimal use of the shipyard's infrastructure and its production and commercial functions. This study focuses on presenting the operation of the shipyard and the production process in the 1970s and 1980s.

1. Management, contracting, design, production preparation

1.1. Management

The shipyard's management (the managing director / general manager and the directors of the departments, later the board of directors of Gdańsk Shipyard) was based in building number 128A, today known as the Management Building.

The building was where most of the people worked and most of the units and services related to the management of the shipyard and its functioning in terms of both production and sales and administration were located, including:

- Technical Directorate: Technical Management (e.g. Technology Office, Manufacturing Technology and Technical Progress Office, Materials Standardisation Department, Labour Standardisation Department, Invention Department), Head of Technical Supervision
- Economic Directorate, departments: Central Planning, Finance, Chief Accountant, Employment and Payroll, Legal, Calculation, Technical and Economic Analysis, as well as the Head of Export and Sales and the Company Information Processing Centre
- Directorate for Employee Affairs, departments: Training and Personnel Development, Administration and Management, Social Affairs, Housing and Accommodation, Personnel, Social Analysis and Humanisation of Labour.

Some of the departments from the directorates listed above were located outside the directorate building, as well as:

- Production Directorate, which was located in Building 132B; located here, among others, were: Production Preparation Headquarters, Hull Construction Headquarters, Ship Equipment Headquarters, Operational Planning Department, Chief Shipyard Dispatcher
- Directorate of Procurement and Co-operation – initially, the procurement units were located

22. Building of the management of Gdańsk Shipyard (DN). It was built as the management and administrative building of the Imperial Shipyard around 1875. It maintained this function throughout the existence of the Gdańsk Shipyard. In the depths of the shipyard buildings of the Engine Building Plant (PS), 2018. Photo: T. Błyskosz, National Institute of Cultural Heritage archives

in various places within the shipyard. In the 1970s, the procurement and co-operation offices were concentrated in building 322A, on the square opposite the management building. Located there, among others: Procurement Execution Headquarters, Warehouse Management Headquarters, specialised procurement departments (metallurgical, machinery, equipment, general, import).

1.2. Bidding, contracting

Shipbuilding contracts with Polish shipowners were concluded directly by the Gdańsk Shipyard, while contracts for ships destined for export were concluded with the final customer by Centrala Morska Importowo-Exportowa "Centromor" (Import and Export Maritime Head Office "Centromor"). Offers were prepared by the Head of Export and Sales and, once approved by the General Manager, sent to Polish shipowners or

to Centromor. This situation changed in 1991. At that time, the Technical and Commercial Directorate and the Commercial Office were established, and now the shipyard was conducting bidding campaigns and directly concluding contracts for ships built after that date.

Shipyards tended to specialise in the construction of certain types of ship, due to the experience they had gained previously and their production infrastructure. In the period in question, the Gdańsk Shipyard offered general cargo ships, including special vessels for the carriage of timber in packets (so-called wood carriers), fishing vessels (trawlers, processing trawlers, fishing bases, processing bases), reefer ships (fast fishing carriers, vessels for the carriage of bananas – so-called banana carriers), container ships, ro-ro ships (for the carriage of goods on rolling platforms or cars) and ro-pax (a combination of a ferry and a ro-ro vessel), as well as specialised bulk carriers. The Gdańsk Shipyard's offer to build sailing ships was unique in the world.

Following a request for quotation, the Design and Construction Office (RN), located in the now defunct 141B building, prepared the vessel's tender design. This project was carried out based on a database of ships built at the shipyard, containing full information on the hull shape, results of model tests, performance obtained during remote sea trials, weights, amount of materials used, number of hours used in the various stages of construction, detailed and total costs of the prototype and subsequent ships built at the shipyard. This project formed the basis for the initial calculation of the bid price and for checking the deliverable dates that could be offered.

Even when a shipyard offered a vessel according to one of its standard, previously known designs, the ordering party almost always added its own requirements. If these requirements could be met by the shipyard, a contract design was developed.

The contract design documentation – i.e. the technical description of the ship, the list of materials in classes according to the structural division, the list of devices with a long delivery time and the list of this equipment, the type and names of suppliers that will be agreed with the shipowner and will form an annex to the contract (Maker's List) – provided the basis for determining the cost of purchasing materials and the labour required to build the ship. This information made it possible to run the appropriate calculations and place them in the production plans prepared for signing the contracts. The calculations were prepared by the Calculation Department in the Economics Directorate (building 128A) and, after organisational changes, by the calculation team in the Design and Construction Office (building 141B).

The contract for the delivery of the ship consisted of documentation containing the basic parameters (main dimensions, deadweight, capacity, speed under certain test conditions), the so-called Maker's List, i.e. a list of suppliers of the main equipment (main propulsion and power plant, main deck, radio and navigation equipment), standards for the equipment of the rooms, conditions for acceptance tests, construction milestone dates. It also contained the commercial arrangements – delivery date, price, warranty terms and possible penalties should the parties fail to comply with the contractual arrangements.

1.3. Technical design of a ship

Once the contract was signed, the design work in the Design and Construction Office began with two important points: full theoretical calculations and verification of the main parameters of the ship, and the procurement of those materials whose delivery time was long in relation to the planned date of construction of the ship.

Verification of the main contract parameters of the ship was carried out during the testing of a suitably prepared ship hull model in a model pool. The research was conducted in a model pool agreed with the client. The shipyard's standard proposal was to carry out tests at the Ship Technology Centre. At the request of the client, studies were also carried out in the Netherlands

or Norway. The shape of the hull, the correct choice of main propeller and the ship's steering gear were then refined. Ensuring the timely delivery of equipment, which had to be ordered months, sometimes more than a year, in advance, was crucial to meeting the ship's delivery date. A list of these materials therefore had to be prepared as soon as the contract was signed. Full information on the technical details of these devices, important elements in the ship's design, could have influenced the technical and technological solutions used, which had to be taken into account in the development of the ship's technical design.

The list of products with long delivery times included:

main propulsion engines	· HCP – Poznań · ZUT Zgoda – Świętochłowice · Burmeister & Wain – Copenhagen, Denmark · Wartsila – Turku, Finland · MAN – Augsburg, Germany
auxiliary engines *drive of generator sets*	· HCP – Poznań · ZM Wola – Warsaw · Puckie Zakłady Mechaniczne – Puck · Wola Henschel – Rzeszów · MAN – Augsburg, Germany
steel sheets	· Huta Częstochowa – Częstochowa · Rautaruuki – Helsinki, Finland
steel profiles	· Huta Batory – Chorzów
heavy castings *stringers, sternposts, anchors*	· ZM Zamech, ABB Zamech, Alstom Power – Elbląg
heavy forgings *shaft lines*	· ZM Zamech, ABB Zamech – Elbląg · Huta Małapanew – Ozimek
main propulsion screws *fixed pitch screws*	· ZM Zamech, Alstom Power – Elbląg · MMG – Warren, Germanz
main propulsion screws *adjustable pitch screws*	· ZM Zamech, ABB Zamech Marine – Elbląg · A.M Liaeen A/S – Alesund, Norway · Ulstein Propeller A/S – Ulsteinvik, Norway
stream rudders	· ZM Zamech, ABB Zamech Marine – Elbląg · Scana – Volda, Norway · Ulstein Marine – Ulsteinvik, Norway
on-board equipment *mooring winches, anchors, cranes*	· Towimor – Toruń
steering equipment	· Hydroster – Gdańsk · Frydenbo – Oslo, Norway
hatch covers	· ZM Zamech – Elbląg · MacGregor Oy – Kaarina, Finland · HACO – Gdańsk

The RN's technical design of the vessel took into account the results of the above work and included all the contractual details necessary to precisely define the requirements of the contract. The technical design was subject to approval by the buyer and by the classification society that supervised the construction. The rules of the classification societies specified in detail the requirements a vessel had to meet in order to be allowed to sail. The society's rep-

23. Employees of the design offices at the Gdańsk Shipyard at work, before 1955. Photo: NN, State Archive in Gdańsk collection

resentatives supervised the correct implementation of these requirements during the ship's construction and were also arbitrators in disputes between the contracting parties. On completion, the society issued a ship class certificate and the certificate, necessary for the formal registration of the vessel and the buyer's takeover.

The approved technical design formed the basis for the detailed working documentation of the ship, the determination of the detailed technology and the construction schedule of the ship.

1.4. Production preparation

The ship's working documentation was a compilation of all the necessary information needed to ensure that the joint efforts of several thousand people – not only in the shipyard, but also in often distant locations in Poland and abroad – would lead to the successful raising of the flag on a ship that would comply in every detail with the contract provisions.

The shipbuilding process has evolved over the years. In the early days, the scope of the working

papers included only the most important information. Most of the preparatory work was carried out by loftsmen. Based on the mostly sketch-based documentation prepared by the designers, the loftsmen determined the actual dimensions of the individual details. The details, after their initial preparation, were fitted on site, during the work on the slipway, and the fittings were fitted directly on board the vessel after it was launched and the vessel was discharged to the quays, fitting-out basins or piers.

Over time, the ships being built became more and more complex, construction costs grew and their construction time increased. Growing importance began to be attached to preparing the production process as precisely as possible. For this reason, the scope of the working documentation grew so that its contents practically described every detail of the ship under construction in detail. Typical solutions for individual construction nodes were also introduced. The details included in the documentation were intended to ensure that materials were delivered to site in time for the specified technological deadlines. Some of the work, instead of being carried out at the shipyard, was still carried out at sub-suppliers – factories cooperating with the shipyard – who delivered the products ready for assembly. Therefore, the preparation of documentation required a large, well-organised facility for both structural and technological production preparation.

The main document controlling the shipbuilding production processes was the Shipbuilding Schedule (SBS). As previously mentioned, the vessels envisaged for possible construction were already preliminarily (informatively) included in the SBS at the bidding stage. This document was updated by the Central Planning and Economic Analysis Department in the Economic Directorate and the Operational Planning Department in the Production Directorate – annually or when a new shipbuilding contract was signed – and approved by the Chief Executive Officer and, in later years, by the shipyard's Board of Directors. For each contracted vessel, information was posted in the SBS on which slipway a particular vessel would be built on and the key event dates for the project: start of sheet cutting, keel laying, launching, start of sea trials and the date of handover to the shipowner. This key information formed the basis for detailed planning of the construction of each successive ship in the individual services and operational planning in the shipyard departments.

The basis for the work to be undertaken by the shipyard's various organisational units was the working drawings produced by the RN, which contained detailed technical information with the material specifications superimposed on each. The work breakdown team from the Chief Technologist's Department (operating in the office space of Building 34A) assigned each item included in the drawing to a specific department of the shipyard. The entry obliged the department to take specific actions and also set a deadline for their implementation. The deadline was not marked with a specific calendar date; it was only the timing of the delivery of a particular detail or the performance of a particular activity in relation to the date marking the key events for the vessel included in the SBS. Deadlines were also set in relation to the same events for the delivery of materials selected in a given drawing and for services performed by individual departments or on board the ship by cooperating external factories.

2. Material supply, external transport, storage and redistribution of materials on site

2.1. Securing the supply of materials and services required for production

The working papers included a specification of all the basic materials needed to build each vessel. Based on this documentation, the technology units of the individual departments worked out the requirements for the remaining materials (bulk materials, e.g. electrodes, welding wire, bolts, fuel, insulation materials, etc.), as well as the equipment necessary for the organisation of the workplace (e.g. scaffolding, ventilation, etc.).

The Directorate of Supply and Co-operation (DM) was responsible for preparing orders and securing the supply of the specified items within the technologically defined timeframe for individual ships and other types of production. The various DM units were initially located in several locations within the shipyard, including Building 131A. The building was adapted for occupational health and safety training purposes in 1962, and today is commonly known as the HSE Hall, the site of the signing of the Gdańsk Agreement in August 1980. The DM was deployed in 1962 in the new (now defunct) pavilion 322A (these were the so-called domonts, double-storey insulated barracks) on the director's square.

A total of between 1,000 and 1,300 companies from all corners of Poland and abroad have cooperated with the shipyard at various times. Each ship under construction was supplied with materials from several hundred suppliers and the list of materials, depending on the specific type of ship being built at the shipyard, ranged from 30,000 to 50,000 or more items. The purchase list included, in addition to the products supplied as part of long-term deliveries, examples of which are listed above, a wide range of materials and equipment ordered after the documentation was prepared, within a fixed timeframe for each vessel. From pumps, compressors, fuel preparation systems, refrigeration equipment, navigational equipment, radar, communication devices, furniture, kitchen equipment to sets of crystal crockery for the captain's lounge and a set of syringes and surgical needles for the sick bay. For the majority of deliveries, specific technical certificates were required to authorise a particular product for use on a seagoing vessel. Such a certificate was issued by the classification society overseeing the vessel in question, many of which required individual acceptance at the manufacturer by a representative of the classifier.

For the relatively simple Type B 684 bulk carrier, the last ship to be built at the shipyard, the amount of basic materials required was more than 11,000 tonnes of steel hull plates, more than 1,150 tonnes of heavy-duty hull plates, more than 2,100 tonnes of steel sections, about 250 tonnes of pipes, as well as 100 kilometres of various types of cables. This fact points to the importance of a co-operative base in implementing the shipyard's production tasks.

A sample range of supplies is summarised below – materials and equipment for the shipyard arrived from all over Poland, as well as imports.

pipes	· Huta Jedność – Siemianowice · Huta Andrzej – Zawadzkie (Opolskie) · Sandvik AB – Sztokholm, Sweden

aluminium profiles	· Huta Aluminium Konin – Konin · Raufoss – Vestre Toten, Norway
cables	· Krakowska Fabryka Kabli – Kraków · Bydgoska Fabryka Kabli – Bydgoszcz · Zakłady Kablowe Tele-Fonika – Myślenice
distribution boards	· ZOUEiA Elmor – Gdańsk · Elektromontaż – Gdańsk · ZUO Famor – Bydgoszcz · NORD – Gdańsk
transformers	· MEFTA Mikołów – Mikołów (Górny Śląsk) · Elhand Transformatory – Lubliniec · Zakład Aparatury Elektrycznej „EFA” – near Glina Warsaw
paints	· Gdańska Fabryka Farb i Lakierów – Gdańsk · Polifarb Oliva Zakłady Farb – Gdynia · Hempel A/S – Lyngby, Denmark · International Paints – Gateshead, UK · Jotun Marine Coating – Sandefjord, Norway
marine automation	· PKA „Meramont” – Poznań · Zakłady Automatyki Przemysłowej – Ostrów Wlkp. · PIAP Łódź – Łódź · ZUiA „Elmor” – Gdańsk · NORD – Gdańsk · ZUO „Famor” – Bydgoszcz · KFAP – Kraków · Autronika – Trondheim, Norway
electric motors	· Zakład Maszyn Elektrycznych EMIT – Żychlin · Fabryka Silników Elektrycznych Tamel –Tarnów · Fabryka Maszyn Elektrycznych Celma – Cieszyn · Fabryki Silników Elektrycznych Besel – Brzeg
pumps	· Gliwicka Fabryka Urządzeń Technicznych GZUT – Gliwice · Pomorska Odlewnia i Emaliernia – Grudziądz · Kielecka Fabryka Pomp Białogon – Kielce · DESMI A/S – Norresundby, Denmark
furniture	· Fabryka Mebli Okrętowych Famos – Starogard Gdański · Fabryka Sprzętu Okrętowego Meblomor – Czarnków · Fabryka Sprzętu Okrętowego Remor – Recz
refrigeration equipment	· Wytwórnia Urządzeń Chłodniczych – Dębica · PBUCHiK Klimor – Gdynia · Wytwórnia Urządzeń Klimatyzacyjnych – Świebodzice · Termowent – Radom · Sabroe – Hoejbjerg, Denmark · Stal Marine – Norrkoping, Sweden
rescue equipment	· Zakłady Urządzeń Okrętowych Sezamor – Słupsk · Stocznia Ustka – Ustka · Zakłady Konfekcji Technicznej Lubawa – Lubawa

miscellaneous *wood, plywood, machines, radio station equipment, fans, filters, sterilisers, jib cranes*	· Orzechowskie Zakłady Przemysłu Sklejek – Orzechowo · JAFO Jarocińska Fabryka Obrabiarek – Jarocin · Gdańskie Zakłady Radiowe UNIMOR – Gdańsk · Morska Obsługa Radiowa MORS – Gdańsk · Malborska Fabryka Wentylatorów Mawent – Malbork · Techmet – Pruszcz Gdański · Fama – Gniew

2.2. External and internal transport

In the early post-war years, the primary route for transporting supplies to the shipyard was by rail. Deliveries by PKP wagons were made via PKP stations to railway sidings:

– Gdańsk Główny, along the track via Jana z Kolna St. (next to tram tracks)
– Gdańsk Nowy Port, via the Northern Shipyard.

Wagons from the railway siding at the level of today's Gdańsk Shipyard railway stop were transferred to area A of Gdańsk Shipyard via tracks laid in Jana z Kolna St. The transport took place at night, with traffic off the surrounding streets. The same route was used to deliver coal through the shipyard to the Gdańsk gasworks no. 2, near Wałowa St.

Area B was supplied from a siding in New Port. The wagons through the Northern Shipyard mainly went to the metallurgical materials warehouse (an extensive storage area for sheet metal and angle iron) at the back of the sheet metal cutting and processing hall – the sheet metal workshop (4B) and to the warehouses at B.

As transport through Jana z Kolna St., especially in view of the increasing urban traffic, was very inconvenient, changes were made to the layout of the railway tracks at the shipyard by running them partly through the urban area. The railway tracks leading from the New Port siding on the shipyard site were extended in an easterly direction, running through the area of Malarzy St. and Transportowców St. to bring it into line with the old alignment of this line near hall 89B. To make this modification, it was necessary to run the railway tracks outside the shipyard area, through Robotnicza St., the development of which required partial demolition. By doing so, however, it was possible to remove the railway tracks from Jana z Kolna St., so deliveries to the shipyard no longer disrupted traffic and could be carried out without time constraints. As a rule, the carrier, the Polish State Railways (PKP), provided railway wagons three times a day, each time with 10–30 wagons (coal cars, covered wagons, platforms).

Delivered metal sheets were placed in the storage yards – the aforementioned metallurgical materials warehouse (located at the back of hall 4B) and in the area of Gate 2 of the shipyard, in front of hall 3A (now defunct). A dense network of rail tracks was used to transport the remaining supplies within the shipyard, including to the main warehouses – 89A and 90B. The extensive storage yards had separate areas for storing sheet metal and angle iron separately.

With the construction of the Central Hull Processing and Prefabrication Plant (CHPaPP) on Ostrów Island (Holm), a ferry connection was established via the Kashubian Canal. Since then, most of the supplies of materials, including a large proportion of sheet metal and heavy equipment, have been transported by rail via a siding made available to the shipyard at the PKP Kashubian Canal freight station, located on Port Island in the area of Na Stępce St. From there, the wagons were ferried across the Kashubian Canal to the southern part of Ostrów Island in the shipyard's possession. The main sheet metal warehouse (yard) was organised there, equipped with overhead cranes. After preservation and annealing, the steel sheets went to the CHPaPP's extensive processing hall.

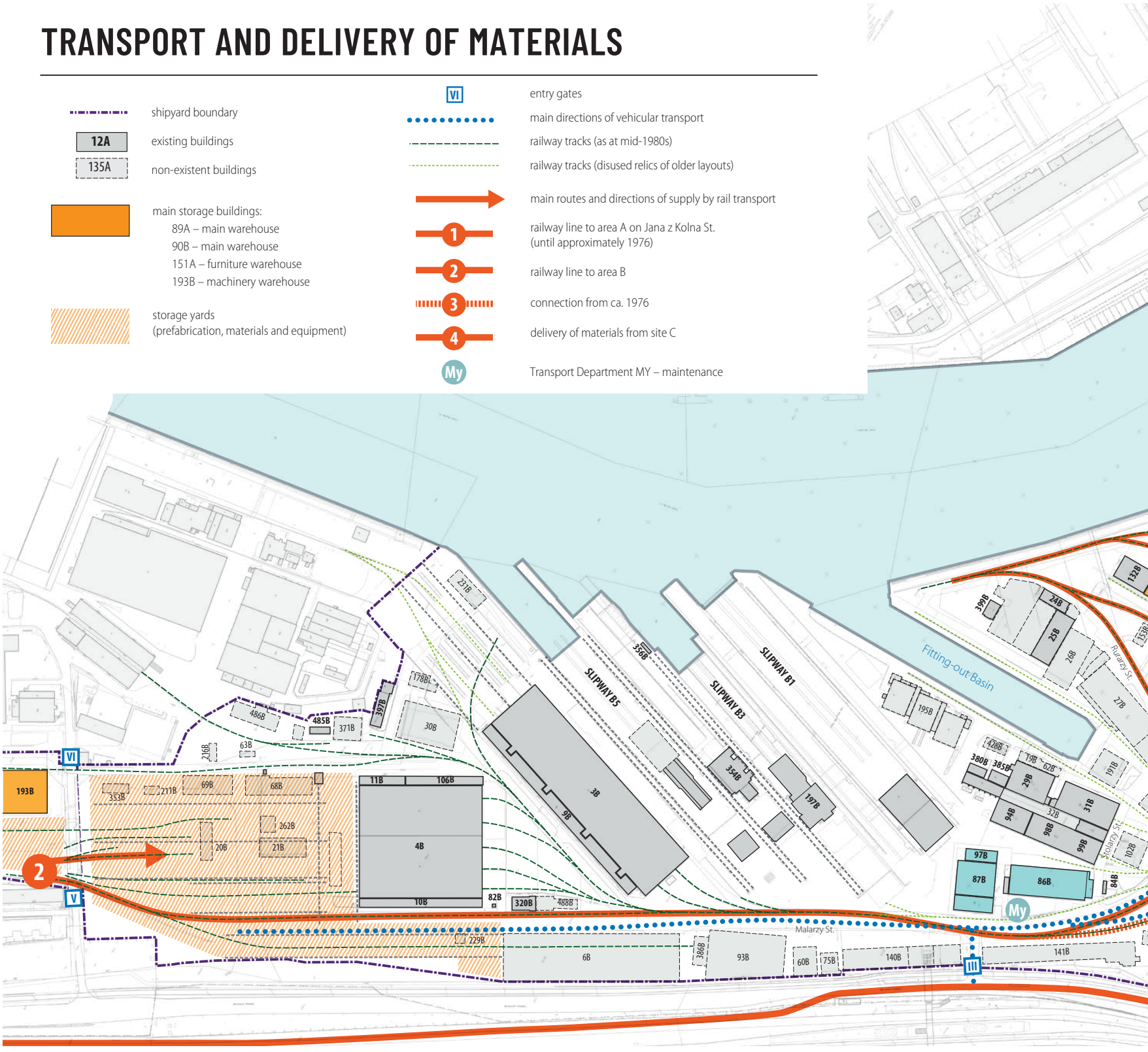
24. Steam locomotive at the shipyard wharf, before 1955. Photo: NN, State Archive in Gdańsk collection

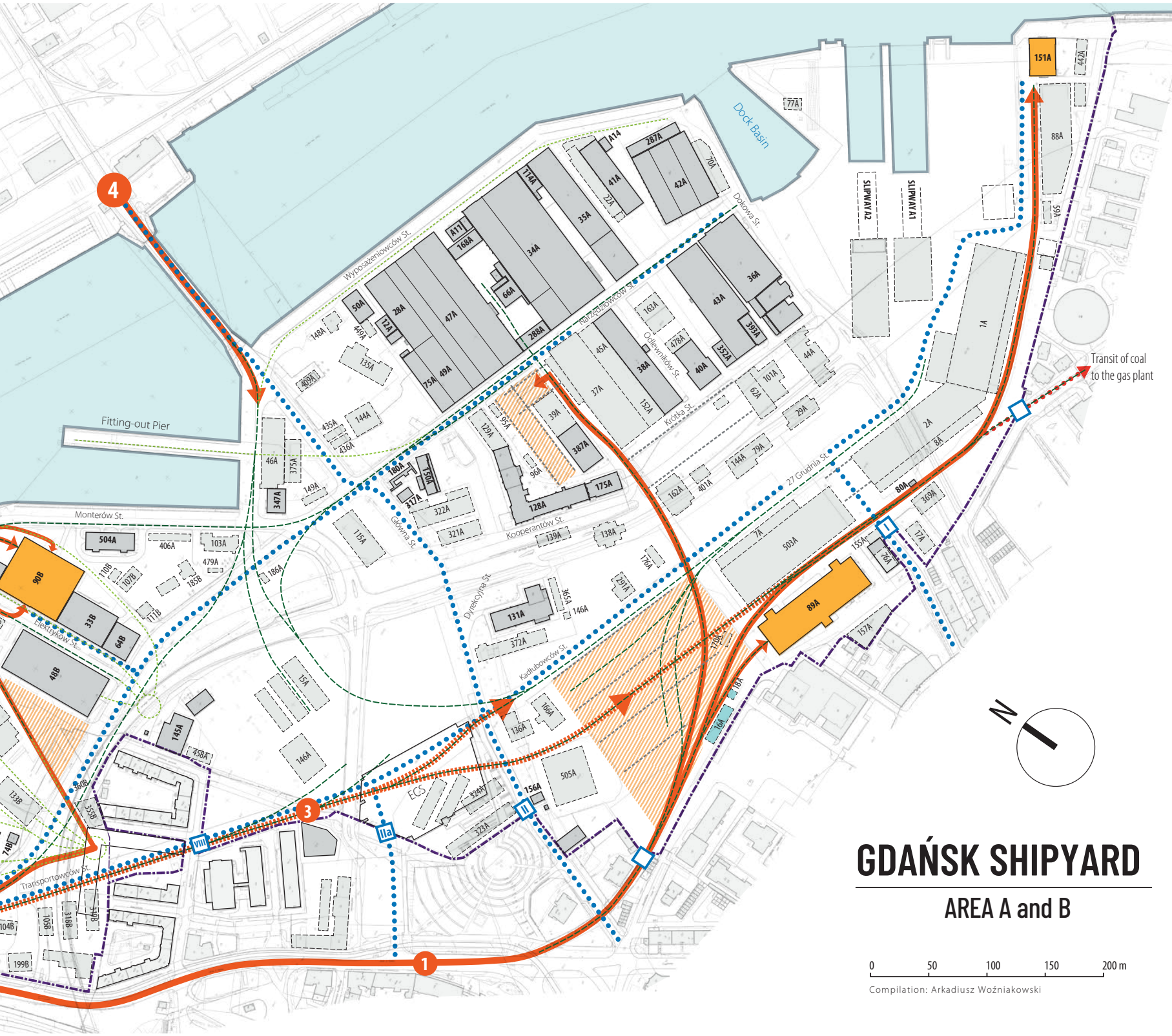
25. Fablok 6D diesel locomotive on Przy Pirsie St., used for transport at the Gdańsk Shipyard until the early years of the 21st century, 2009. Photo: T. Błyskosz, National Institute of Cultural Heritage archives

The shipyard's Transport Department was responsible for ensuring efficient internal transport, as well as the delivery of ordered materials to the shipyard. It consisted of the following branches:

- transport – involved in the unloading of wagons and cars and transshipment;
- electric forklifts – servicing transport needs for smaller sized materials, it had 100–125 electric forklifts, as well as forklifts and stackers. In addition to operating electric forklifts, the department's duties also included battery servicing, including battery charging, and equipment repair. The unit's repair workshop was located in building 86B and battery storage in the adjacent small building 84B;
- railway – using 10 steam locomotives, 4 diesel locomotives and a total of 130 railway wagons to operate the shipyard – 90 platform cars and 40 coal cars, as well as about 10 self-propelled steam cranes (with a capacity of 5 and 10 tonnes) intended mainly for unloading wagons;
- automotive – which had 40 tractors, 120 trailers of 5 and 10 tons, 75 trucks, 10 buses, vans and passenger company cars.

TRANSPORT AND DELIVERY OF MATERIALS




Dock Basin
Fitting-out Pier
Wyposażeniowców St.
Dokowa St.
Północna St.
Oddziałowców St.
Krótka St.
27 Grudnia St.
Monterów St.
Główna St.
Kooperantów St.
Dyrekcyjna St.
Elektryków St.
Kadłubowców St.
Transportowców St.
SLIPWAY A1
SLIPWAY A2
ECS
Transit of coal to the gas plant
1
2
3
4
I
II
IIa
VIII
N
GDAŃSK SHIPYARD
AREA A and B
0
50
100
150
200 m
Compilation: Arkadiusz Woźniakowski

In 1972 and 1978, 70 and 100 tonne capacity self-propelled platforms were purchased from the company Scheuerle which could – working in tandem – provide transport of cargo (hull sections, partially dismantled propulsion engines) weighing up to 200 tonnes. Vehicle service stations were located at various locations within the shipyard. The largest car service and repair station was located at Gate 3 of the shipyard, in building number 87B. Ostrów Island was home to the shipyard's battery-electric truck.

In the years in question, deliveries by transport organised by the shipyard were the norm, while after 1989 materials were supplied ex-shipyard – deliveries by cooperating parties. The shipyard's own vehicles were used to transport goods to the shipyard in emergency situations, and even aircraft from the Shipbuilding Industry Association, stationed at Gdańsk's Rębiechowo airport, were used.

2.3. Storage, redistribution of materials in the shipyard

Purchased materials were directed to central warehouses before being collected by the departments designated in the division of labour. They were located in

26. The main storage yard of area A of the Gdańsk Shipyard. An inventory of post-German shipbuilding metal sheets made by Polish workers around 1945. It was one of the largest storage areas for metallurgical materials and retained its function until the 1990s. Photo: NN, State Archive in Gdańsk collection

buildings 90B (mostly electrical equipment and precision mechanical equipment were stored here) and 89A (bulky, heavy materials). In the aforementioned buildings, the spaces were separate storage units provided for the storage of different materials. In addition to these rooms, deliveries went to other designated storage facilities distributed throughout the shipyard (e.g. the furniture warehouse was in building 151A). In addition to this, warehouses were also located on Ostrów Island, which housed, among other things, a paint store and timber depots. In the distinctive 250C building, also located on the island, medium-speed main propulsion engines, such as those used on trawlers and ro-ro vessels, were stored until installation. In addition, the shipyard had open warehouses – storage yards – mainly for the storage of steel materials (sheets, sections, bars, pipes, forgings, castings), but also other types of materials (e.g. cables). In area B, the sheet metal and angle iron warehouse (an extensive storage yard with overhead cranes) was located in front of sheet metal cutting and processing hall 4B (sheet metal workshop) and framing hall 6B (no longer existing); in area A, the sheet metal warehouse was located in the shipyard to the right of Gate 2 of the shipyard, next to central warehouse A (building 89A). The warehouse for metallurgical products (castings, forgings) was located between Narzędziowców St., the buildings belonging to the foundry (37A – non-existent), the modelling plant (39A – non-existent) and the management building (128A). The pipe warehouse (depot) was located on Rurarzy St., between halls 27B, 48B and 133B. There were also deposit warehouses on the shipyard's premises for the storage of materials of third-party companies that carried out work commissioned by the shipyard on ships under construction, and numerous smaller storage yards belonging to individual departments. In total, the Supply Warehouse Department had around 100 warehouses and depots for various purposes at the shipyard.

From these warehouses, materials were retrieved by the pickers from the various production departments and directed to the departments' premises. Virtually every department had one or more of its own warehouses where materials, semi-finished products or components were assembled, ready before being retrieved for installation on the ship. An example of such a warehouse (storage yard) is the space between buildings 34A, 47A, 288A and 66A.

3. Characteristics of production processes

3.1. Primary production – ships

3.1.1. Processing, prefabrication

The start of the cutting the plates for the hull was considered to be the start of the production of the ship. It was often ceremonial, taking place in the presence of representatives of the shipowner, classification society and shipyard management. Before cutting the sheets, it was necessary to make templates and loft the blanks. Templates were made in the mould loft, which occupied a room located above the entire production area of Building 3B – the hull section prefabrication hall.

In the gangway workshop, on a vast floor area of almost 10,000 m^2, wooden plywood templates (on a scale of 1:1) were prepared according to the construction documentation, reproducing the shape of the

27. Interior of the sheet metal workshop (4B) of the K1 department of the Gdańsk Shipyard, ceremonial start of processing (cutting) of ship's plates for the sailing ship *Dar Młodzieży*. The start of the sheet metal cutting is the symbolic start of the direct shipbuilding process. In fact, it started with the preparation of technical documentation and the making of wooden templates for ship parts in the mould lofts of the K1 department, 1981. Photo: Z. Mirota, State Archive in Gdańsk collection

28. Interior of the hull section prefabrication hall (3B) of the Gdańsk Shipyard – the so-called hull workshop. Here, machined plates and angles were assembled into sections – parts of the ship's hull. Visible prefabricated elements of ship sections, 2020. Photo: T. Błyskosz, National Institute of Cultural Heritage archives

sheet blanks intended for the construction of the ship's hull. The templates were then transferred to hall 4B (sheet metal workshop), where cutting and sheet metal processing was carried out for both hull assembly centres. In this hall, stencils were used to mark the sheets according to which the burning (burning, cutting) of the sheets took place. The next stage was mechanical processing – bending, chamfering or drilling holes. Templates from the mould lofts also went to hall 6B (the framing room), where mainly steel profiles, flat bars, truss and frame materials were cut and processed. Prior to cutting in hall 4B, the plates were rolled to eliminate internal stresses in the steel (in the now defunct 20B building) on rollers ("rolling mill") and cleaned of metallurgical tarnish, scale and corrosion in a cleaner (21B) and preserved (sandblasting and coating with red lead paint and, later, with a temporary protection primer). In the 1980s, the sheets delivered to the shipyard were mostly annealed and protected with a temporary protection primer in the steel mills. They were placed in the square in front of hall 4B.

After sheet metal processing, steel profiles and other details were sent for prefabrication in the hull departments – to hall 3B (department K3) and halls 1A and 2A (department K2 – both halls no longer exist). After processing in the Mechanical Processing Departments, castings and forgings from the shipyard foundry and forge were also received there. The heavy castings for the tail- and bow-ends were supplied by ZM Zamech Elbląg. The forge largely covered the shipyard's needs for smaller forgings and also partly serviced sub-suppliers. Heavy forgings, such as shaft lines and rudder shafts, were supplied by sub-suppliers, mainly ZM Zamech Elbląg.

In parallel with the preparation of the hull elements, the prefabrication of the ship's equipment

continued. This was based on the details contained in the working papers. As mentioned, in the first years after the war, equipment devices were pre-prepared in the locksmith and pipe departments of the Gdańsk Shipyard. Fitting these components in a specific installation location on the ship was carried out during hull construction on the slipway. In the 1960s, it was decided to move most of the detailing and equipment preparation activities to an indoor location and only after proper prefabrication were they assembled on the ship. This involved increasing the accuracy and detail of the documentation being prepared. It was important to coordinate the placement of components and the routing of ship systems and installations. Verification of the solutions adopted in the documentation was carried out in the modelling workshop (building 102B), where a 1:10 scale model of the engine room (engine room) intended for the vessel was built before the start of construction of each prototype vessel. Later, models were also created for other sensitive nodes, such as the cargo pump room on tankers, the engine room of the main refrigeration unit on reefer vessels and the processing room on fishing bases.

Building the equipment elements into the 1:10 scale model made it possible to detect errors in the coordination of equipment positioning and to check the equipment and the required width of the passages and access necessary during the equipment operation in the powerhouse. Based on the information verified in the model, working drawings were corrected and sent to the halls and workshops. Such workshops included hall 42A of the Locksmith Department W3, hall 27B of the Pipe Department W2 and hall 33B of the Electrical Department W4.

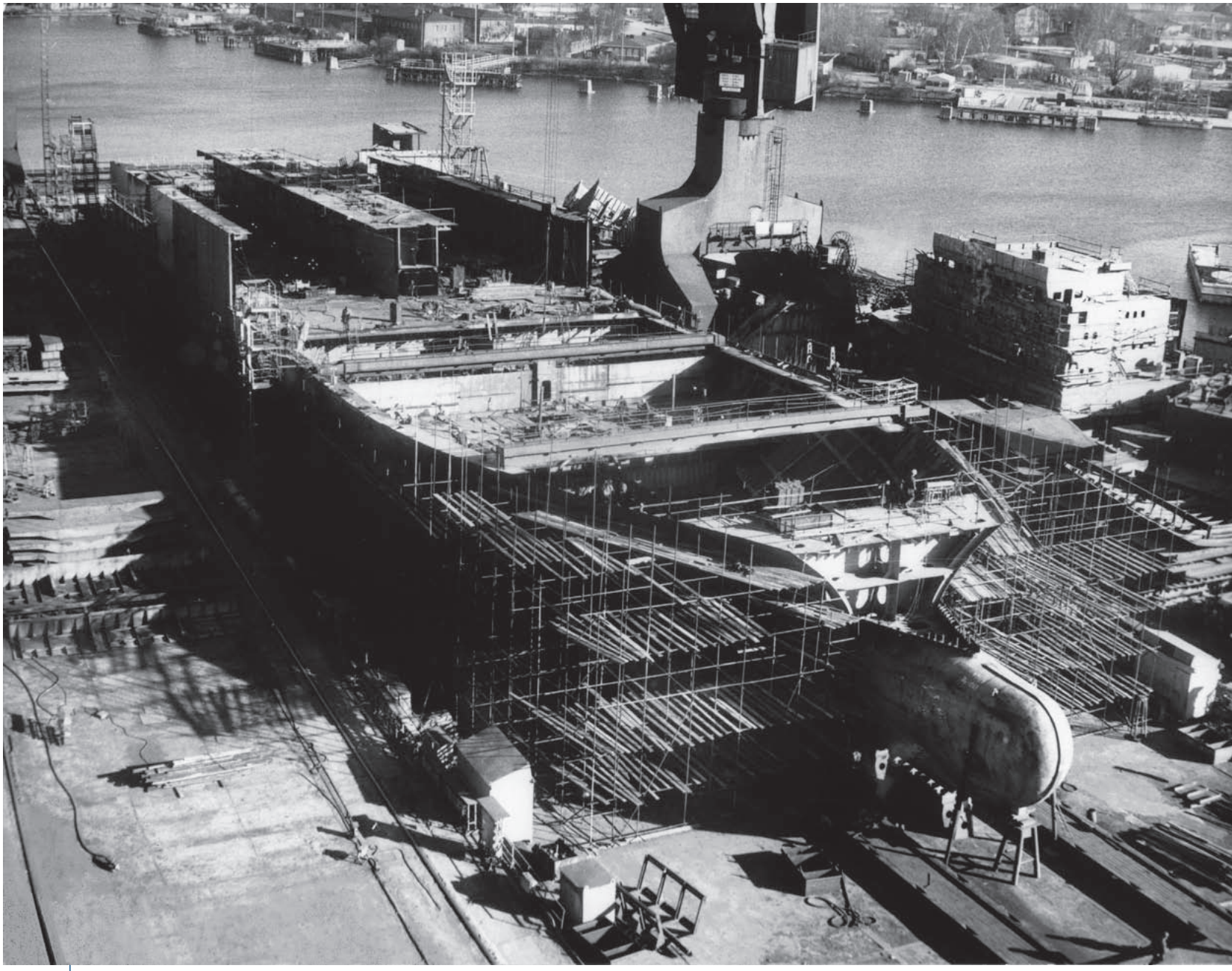
There was a constant effort to fit as many fittings as possible into the ship sections during prefabrication. This only became fully possible after the construction of the Central Hull Processing and Prefabrication Plant (CHPaPP) on Ostrów Island. With the appropriate equipment and lifting devices installed inside the hall, it was possible to build spatial sections with a maximum weight of 270 tonnes. In these sections, fittings and some equipment were assembled. The mechanical processing and prefabrication of hull sections for practically all ships built in the various hull departments were transferred to this hall complex. The sheets went for processing straight from the sheet metal warehouse, which was located on the east side of the hall. Section armament details were also delivered to the hall. However, these components were carried out in the existing distributed structure. The construction of an Equipment Prefabrication Centre (near Gate 2), envisaged in the investment plan, where prefabrication processes for equipment components were to be centralised, was not implemented. The construction of the painting chambers on Ostrów Island was also not completed.

Once the assembly work was completed at CHPaPP, the sections were transported on self-propelled platforms or ferries to the masonry paint chambers located near the slipways, separate for each of their assemblies (none of the masonry paint chambers have survived). There, they were cleaned and painted. The finished sections were transported to the ramp forecourt and positioned within reach of the ramp cranes.

3.1.2. Assembly of the hull on the slipway

In the early post-war period, simple shipbuilding methods were used, based predominantly on manual labour. Based on very general documentation, pre-machined (cut, properly shaped – bent and reamed) sheets and profiles were prepared. They were collected in the slipway area along with the necessary castings and forging sets. The frames, or "ribs" of the ship's hull, were also delivered to the shipyard at the slipway from the frame workshop.

Once a certain amount of the groups of materials thus prepared had been collected, the shipbuilding pro-



29. Assembly of the ship's structural elements on the slipway, 1980s (?). Photo: Z. Mirota, collection of the author

cess began with the laying of the keel on the slipway. It was a beamed steel structure that was one of the main strength elements of the ship's hull. The solemn ceremony included the, usually symbolic, forging of the first rivets in the keel by the most important guests.

The castings of the bow and tailplane, frames and stringers were attached to the keel. The fuselage skin panels were mounted (by riveting) to the structure thus prepared. During assembly on the ramp, further components were fitted. This is how the hull structure

CONSTRUCTION OF HULLS

shipyard boundary

12A existing buildings

135A non-existent buildings

railway tracks (as of the mid-1980s)

railway tracks (disused relics of older layouts)

cranes with subgrades

My Transport Department MY – support of the hull construction process (transport of sections and materials)

Hull Processing and Prefabrication Department K1 — K1

1 annealing sheet rolling

2 cleaning and maintenance of sheet metal

3 sheet metal machining (sheet metal workshop hall 4B – "sheet metal workshop")
- I – working of thin sheets
- II – curved cutting
- III – straight cutting
- IV – cutting of manually lofted elements
- V – sheet metal bending

4 profile machining (profile prefabrication hall 6B – "frame shop", no longer in existence)

Hull Assembly Departments K2 and K3 — K2, K3

5 arranging elements into construction groups

6 prefabrication of hull sections (prefabrication halls 1A, 2A, 3B)

6a supply of sections from CHPaPC to hull departments

7 assembly of hull blocks (slipway forecourt)

8 longitudinal launching

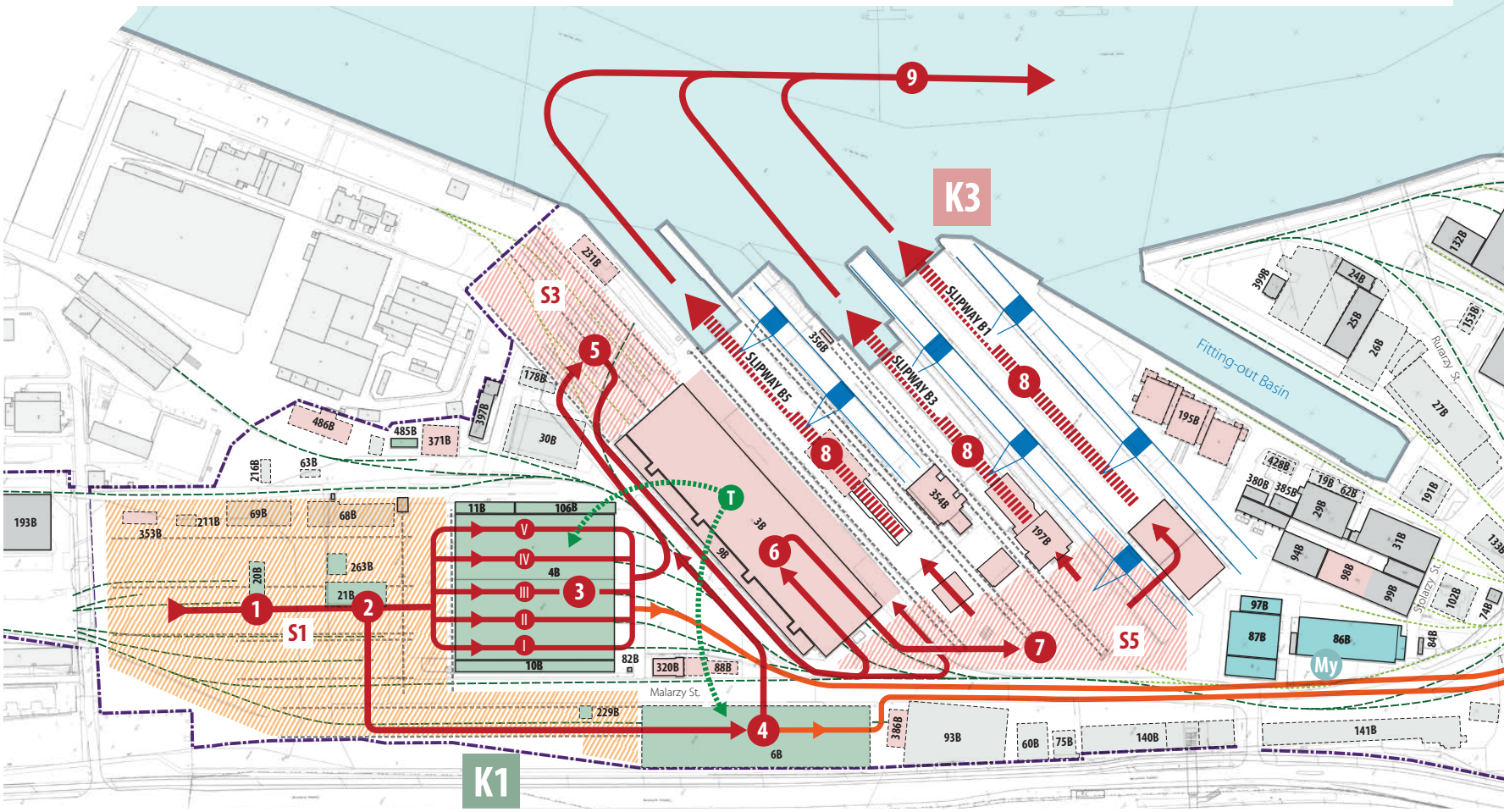
9 towing to berths for fitting-out

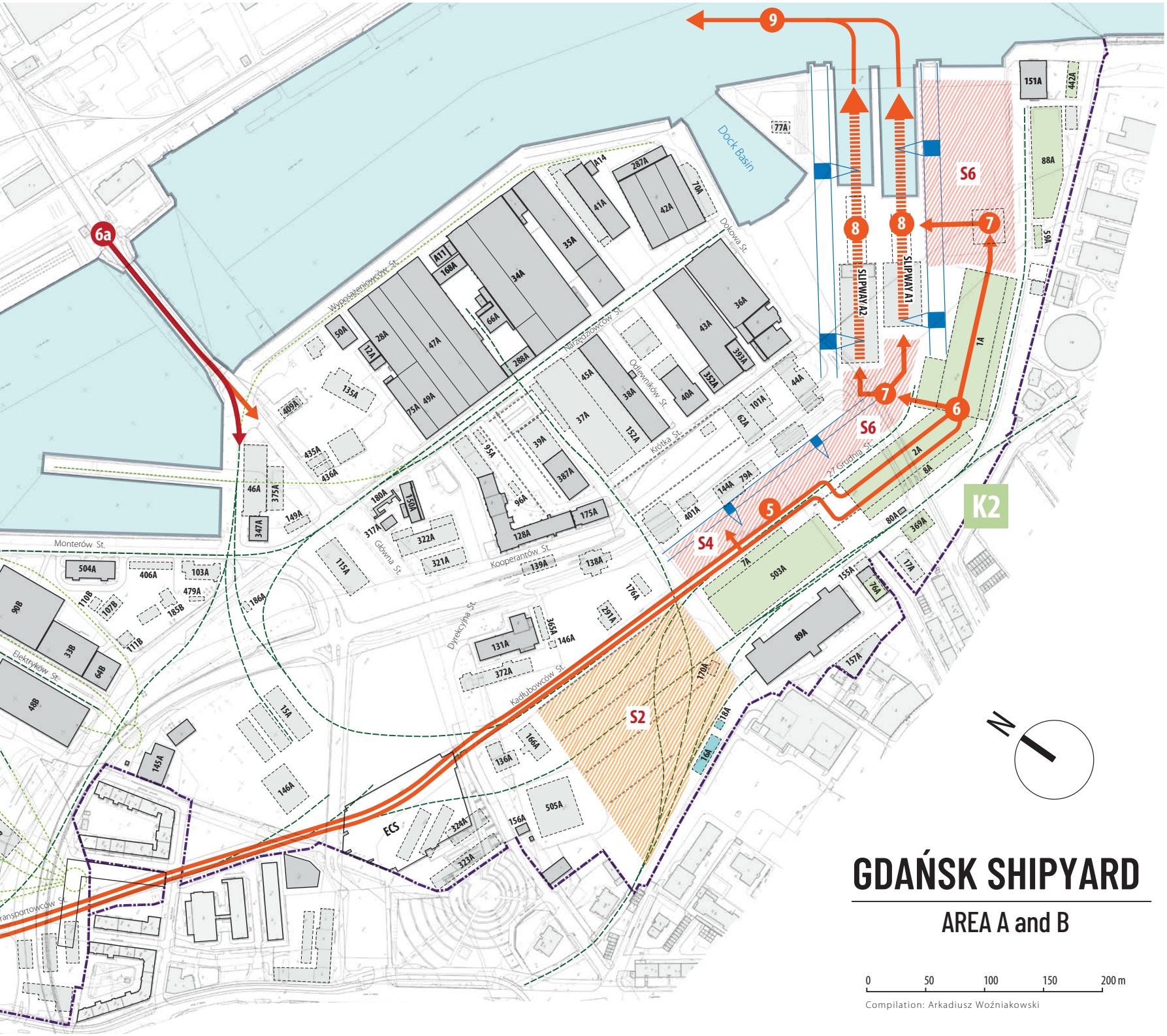
T template routing (mould lofts in the attic of hall 3B)

S1 S2 storage yards (metallurgical materials)

S3 S4 picking depots (arranging elements into construction groups)

S5 S6 foregrounds (assembly of sections into hull blocks)





GDAŃSK SHIPYARD

AREA A and B

Compilation: Arkadiusz Woźniakowski

was created. The components being assembled were weighted to the capacity of the cranes installed at the slipway at the time, most of which had a carrying capacity of only a dozen tonnes or so. This structured process meant that work on the slipway took many months.

In the 1960s, it became increasingly common to prefabricate sections and gas or electric weld them together before finally assembling them into a ship's hull on the slipway. The weight of the sections was limited by the capacity of the cranes (30 tonnes) installed on the flyovers along the slipway. However, the assembly time of the hull on the slipway has been reduced. The sections assembled, however, were "raw", with no additional equipment. The fitting-out work was predominantly carried out after the ship was launched. Once the assembly work on the slipway was completed, it was necessary to clean the outer surface of the hull by sandblasting, or blast cleaning, and to paint the hull. The increase in production recorded during this period was achieved through an increase in the size of the shipyard's workforce, as well as through an increase in the participation of third-party co-operators and service companies in the shipyard's work. The total number of people working at the shipyard at any one time exceeded 20,000.

The modernisation of the shipyard in the second half of the 1970s changed the shipbuilding process. Painted space sections were delivered from CHPaPP to the ramp forecourts, with reinforcement and prefabricated fittings installed in them. The lighter-weight sections could be delivered to the shipyard at the slipway, where they were assembled in the foreground into blocks weighing up to 270 tonnes. Once a sufficient number of blocks had been accumulated, assembly of the hull began – the aim was to have at least 50% of the blocks ready by the time the keel was laid. Using the cranes installed at the slipways (newly purchased, with a capacity of 150 tonnes) working in tandem, blocks with a maximum weight of 270 tonnes could be placed on the slipways and fitted into the hull.

Still, the start of the hull assembly on the slipway was considered to be the laying of the keel. It was mostly a solemn, official event. However, the ceremony took a different form from earlier times. A beam-like structure was no longer laid on the ramp, to which other components were later attached. Now two, mostly aft, hull blocks were being taken to the slipway. The operation to weld them together was treated as a keel position. In this technology, the keel, the transverse stiffeners of the sides – the frames – and the longitudinal stiffeners – the stringers – were part of the construction of the individual hull blocks. Once welded together, they existed as integrated pieces of the hull structure. The tail and bow were also often welded together as an integrated part of the hull structure and had previously been made as castings. When the construction of the hull on the slipway had reached a sufficiently advanced stage, the main propulsion engines (if medium-speed engines were used to propel the ship) or their main parts (if they were slow-speed engines) were installed. The engine room was used to assemble the shaft line, the stern seal and other heavy equipment. Installation of the main propeller, steering gear and thrusters was being carried out. Thrusters were widely used on all ships starting in the 1980s. The superstructure was inserted in its entirety or assembled from prefabricated elements. As the slipway-mounted blocks were previously painted, there was no need for a complete cleaning (sandblasting) of the hull. The paint coating was only touched up by cleaning and painting the contact strips of the blocks. Prior to launching, the hull, or at least the underwater part of the ship, was painted "finished".

The launch – usually ceremonial, combined with the naming of the ship – concluded the work on the

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30. Ship at the Refurbishment Quay of the Gdańsk Shipyard during fitting-out works. Numerous deck and auxiliary equipment, materials and power cables and pipelines visible, 1980s.
Photo: Z. Mirota, collection of the author

FITTING-OUT

shipyard boundary

12A existing buildings

135A non-existent buildings

Fitting-out berths

main equipment warehouses

Tooling Production Department – toolrooms

W2 Ship Installation Department W2 – pipe department

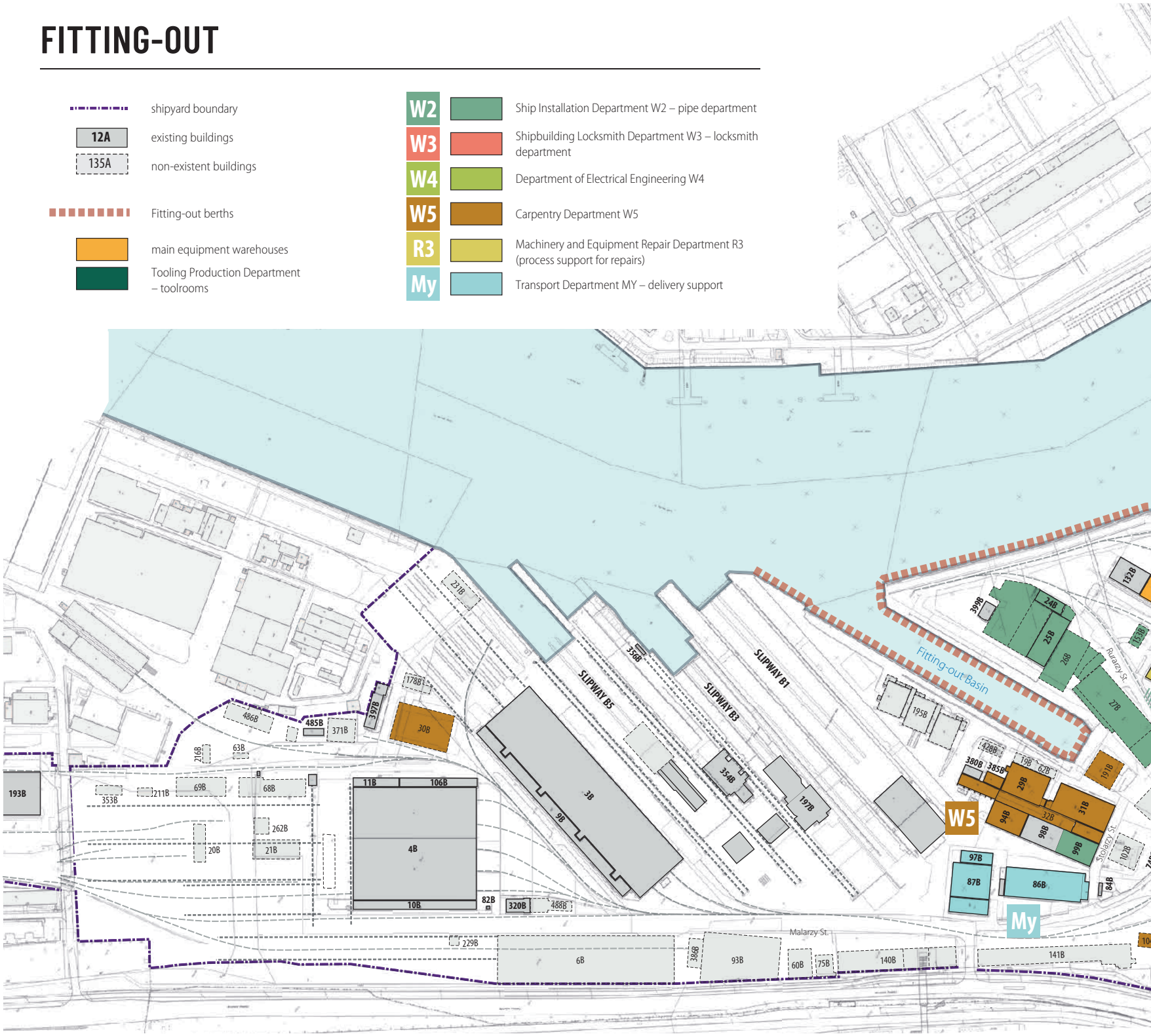
W3 Shipbuilding Locksmith Department W3 – locksmith department

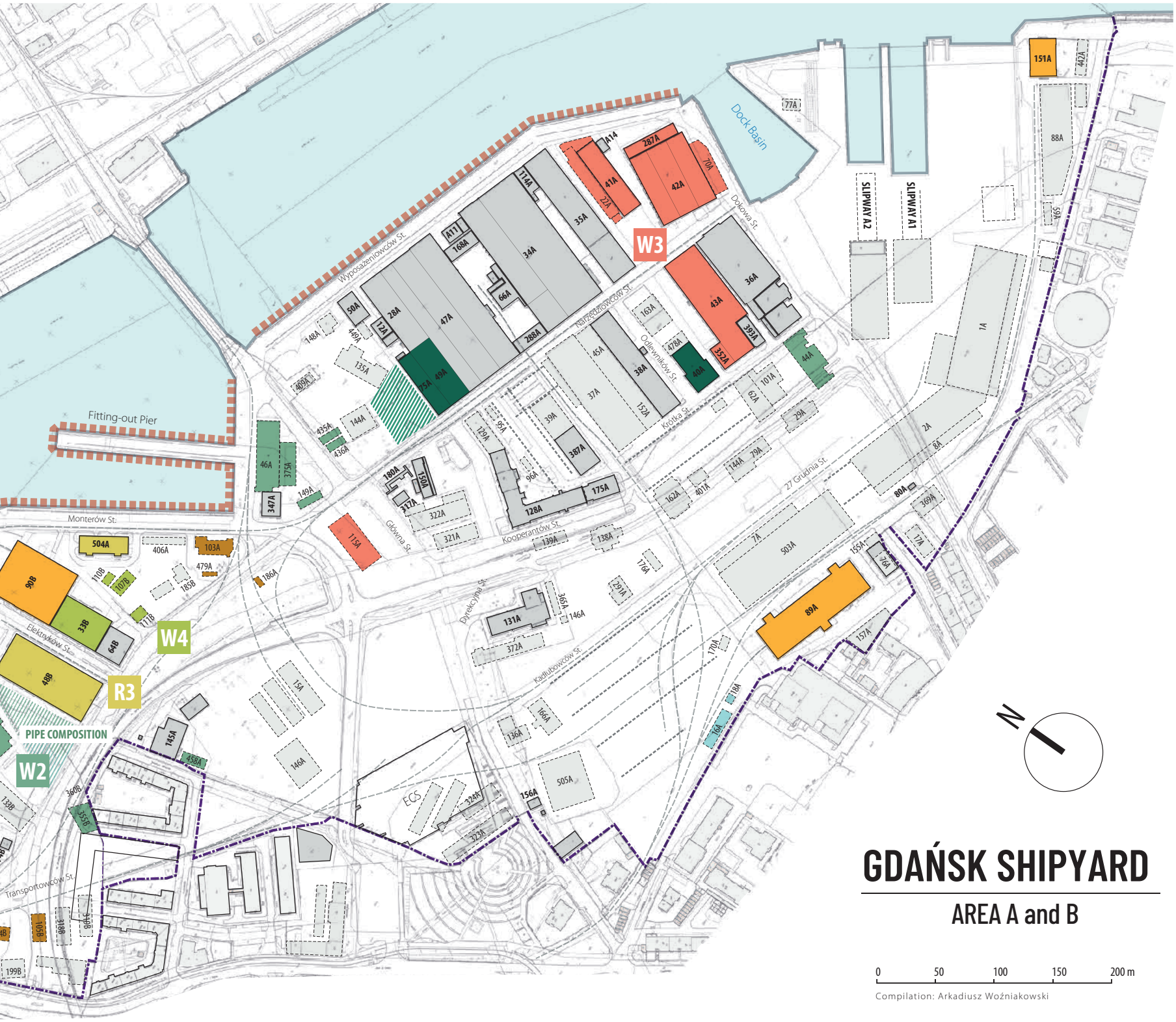
W4 Department of Electrical Engineering W4

W5 Carpentry Department W5

R3 Machinery and Equipment Repair Department R3 (process support for repairs)

My Transport Department MY – delivery support




Dock Basin
SLIPWAY A2
SLIPWAY A1
W3
W4
R3
W2
PIPE COMPOSITION
Fitting-out Pier
Monterów St.
Elektryków St.
Transportowców St.
Wyposażeniowców St.
Narzędziowców St.
Odlewników St.
Dokowa St.
Kooperantów St.
Główna St.
Dyrekcyjna St.
Kadłubowców St.
27 Grudnia St.
Króka St.
ECS
N
GDAŃSK SHIPYARD
AREA A and B
0 50 100 150 200 m
Compilation: Arkadiusz Woźniakowski

slipway. A very common highlight of a ship's christening ceremony was the smashing of a champagne bottle against the ship's bow. This symbolic gesture was a very emotional moment of the ceremony, as the belief is established that a failed attempt to break the bottle represents an ominous omen for the ship and its crew. One of the baptismal ceremonies in the shipyard was memorable. The godmother only smashed the bottle against the bow of the ship on the seventh attempt. However, the story of this ship has given the lie to the stereotype. The ship sailed happily ever after, with no bad adventures.

3.1.3. Ship equipment

After launching, the vessel was towed and moored at one of the fitting-out berths. They were located between the Drewnica Peninsula and Niterów St. (by the Equipment Basin), along Monterów St., along the Fitting-out Pier, and at Refurbishment Quay (along which Wyposażeniowców St. ran).

The various outfitting departments were located near the quays, dealing with the installation inside the hull, on the decks and superstructures of the ship's equipment components. The location of the equipment departments close to the quays was particularly important in the first 20 years of the shipyard's operation, when ships were launched with limited armament and hull equipment. Locksmith work, laying pipes, cable tracks, electrical installation – all these jobs required multiple stays on board and returns to nearby workshops. During this period, carpentry work, including the production of most of the furniture and interior buildings of the ship's spaces, was also carried out by the shipyard's Carpentry and Painting Department. Initially, the carpentry work and the painting of the rooms were carried out by this department, the other departments carried out the painting of those parts of the ship for which they were responsible themselves. In view of the increasing demands of protective coatings (painting), a separate W1 Painting Department was established in 1967 to take over responsibility for all painting work on the ship.

The necessity to carry out the aforementioned preparatory activities after launching, followed by the assembly, connection of equipment and construction of the ship's interior spaces, caused the fitting-out time to increase.

The situation changed when CHPaPP became operational and began building hull sections armed with almost the full range of naval equipment. The scope of the post-launch work has been limited. This is because after the launch, a large part of the installations, foundations for deck and other equipment and a great deal of locksmith equipment were already on board. Manufacturers delivered already standardised furniture ready for installation to the ship, as well as equipment packages prepared for installation in the gym. The Selekt system, developed by the Design Office of the Gdańsk Shipyard and the Shipbuilding Industry IT Department, made it possible to determine the routes of individual cables and their lengths by computer during design work. Cables cut into specific sections in the workshop of the Electrical Department were delivered to the ship. The need for multiple visits to the ship under construction by departmental staff to verify dimensions and "fit" details was reduced. All this made it possible to reduce the time spent on the outfitting phase of shipbuilding. However, the increasing number of vessels commissioned each year and their complexity (trawlers and processing bases) made it necessary to increase the length of quays for berthing vessels during the outfitting process to effectively carry out the final outfitting work. The Kashubian Quay on Ostrów Island was adapted for such works. The vessels moored there – generally for the final work before handover to the shipowner – had already undergone sea trials.

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31. Ship built at Gdańsk Shipyard during sea trials, 1970s–1980s. Photo: Z. Mirota, collection of the author

3.1.4. Sea trials

The trials were divided into two stages – tethered trials and sea trials. They were conducted according to a programme agreed with the ship's owner and approved by the classification society supervising the ship's construction. The programme included a precise description of the conditions and methods for each trial. It also defined what outcome would define the attempt as successful.

Once all the installation work was completed, the cleanliness of the pipelines was checked ("flushing"), and the correctness of the cable connections was confirmed, the tether testing stage followed. The correct operation of all the ship's equipment and systems under port conditions was checked.

In addition to the routine procedures used on most ships, there were sometimes very specific requirements. These included the base of the B 670 canning plant. For the prototype unit, the trial programme included a performance test of a fish canning line in a cannery installed on this base. It is envisaged that a full production cycle would be carried out, starting with taking the catch from the water on board, from the purse seine, and chilling the fresh fish, through the entire processing cycle until the labelled cans were assembled in cartons in the chilled hold on the vessel. To this end, the shipowner provided 70 tonnes of fish. When processing the quantity of raw material delivered, it was necessary to confirm that all operations were carried out correctly in the processing plant and that the time needed to process the quantity of fish delivered, when converted, would confirm the capacity of the processing plant specified in the contract as 220,000 cans produced per day, understood as 22 working hours (two shifts of 11 working hours each). The trial was successful, and it was determined that the processing plant could produce up to 270,000 cans of canned fish in that time!

Positive results from the tethered ship systems tests and a check of the condition of equipment important to the safety of the ship and crew allowed the ship to go out for sea trials. Supervision and proper handling of the vessel from the start of the tethered trials until handover to the shipowner was carried out by the ship's shipyard crew – employees of the Construction Trials and Ship Handling Department P1. Employees in this department manned shipyard tugboats and also crewed ships during sea trials. This department included, among others, seafarers qualified for certain functions on seagoing ships and, for many years, merchant navy officers qualified as captains.

The shipyard crew, assisted by port tugs, guided the ship out into the Bay of Gdańsk. Conducted in the bay and, partly, in the open Baltic Sea, the trials usually lasted several days. In addition to the naval crew, specialists from all shipyard departments and companies whose systems were being tested during the voyage took part in the trials. Some ships had more than 100 people on board during the trials. The proper operation of all equipment on board was checked.

An important part of the sea trials was the speed test. The test was carried out after the main engine was adjusted, near the Hel Peninsula, in a specially marked out area on the Gulf of Gdańsk called the measuring mile. By sailing the designated sections twice under the conditions described in the test programme and at the specified main propulsion engine load, the speed achieved by the vessel could be measured. Fuel consumption was also measured at this time. The measurements carried out were to confirm the shipyard's fulfilment of its contractual obligations.

There were also sometimes specific requirements in the sea trial programme. Among these was the superstructure encapsulation test carried out on all (83) B 514 and B 45 wooden ships. The maintenance of the specified overpressure in the ship's superstructure and the correct operation of the ship's engine room with the air supply to the main engine through

special filters were checked. In the event of a possible nuclear conflict, the encapsulation was intended to protect against radioactive materials entering the ship's superstructure and engine room. At the same time, the ship's decks and superstructure were flushed with a sprinkler system.

Starting in the 1970s, the last point of the sea trials was to test the automatic operation of the powerhouse (without the presence of an attendant in the powerhouse). For 16 hours (most of the time), no malfunction affecting the ship's movement should occur in the engine room and engine room support systems.

If spare parts or additional specialists needed to be delivered to the ship, communication with the shipyard was provided by the shipyard's own tugboat.

Once all the trials provided for in the programme were carried out, a record of the completion of the trials was signed. This often included comments that had to be implemented before the final handover of the vessel to the shipowner.

3.1.5. Handing over the vessel to the ship-owner

After returning from sea trials, the ship usually moored in Kashubian Quay. Defects reported during sea trials were rectified, the final cosmetics of the ship were carried out, and classification society certificates, insurance documents and shipyard guarantees were issued. Guarantees usually covered one year. For the period covered, a shipyard specialist was most often delegated to the vessel, on more complex vessels, two specialists. Their job was to assist the ship's crew in the event of faults. At the same time, by overseeing the proper operation of the vessel, they protected the shipyard from incurring the costs of failures resulting from improper operation.

At the end of the warranty period, the vessel usually returned to the shipyard for any warranty repairs.

3.2. Ship engine production

3.2.1. Organisation of the shipyard's Engine Building Plant (PS)

At the Gdańsk Shipyard in 1959, the decision was taken to start production of main propulsion internal combustion engines. This was due to an increase in orders for the delivery of long ship series. Due to the lack of in-house design solutions at the time, it was decided to purchase a licence from one of the world's leading marine engine manufacturers, the Danish company Burmeister & Wain. This decision was influenced by the desire to make full use of the existing shipyard facilities – halls and production equipment – and to achieve financial savings from not purchasing propulsion units elsewhere. The reduction in expenses also included the cost of fully dismantling the engines at the manufacturer and reassembling them on site at the shipyard, the cost of packaging and transport. At the same time, the Gdańsk Shipyard sought to organise a technological process that would enable the installation of its own fully assembled marine engine directly from the assembly hall to the ship, which would eliminate the cost of disassembling the engine in the hall and reassembling it on the ship and, as a result, significantly shorten the outfitting cycle of the shipbuilding process. The Engine Building Plant (shipyard symbol PS – hereafter EBP) was established to carry out the production of main propulsion engines.

The EBP consisted of:

- Technical Department (Construction and Technology Department) ST
- Foundry Department S1, comprising a moulding workshop (hall 38A) and a foundry (37A) combined into one complex of halls by a so-called connector (45A/152A), which dealt with the manufacture of the necessary cast iron and non-ferrous metal castings
- Forge Department S2, comprising the forge (36A)

ENGINE AND BOILER CONSTRUCTION

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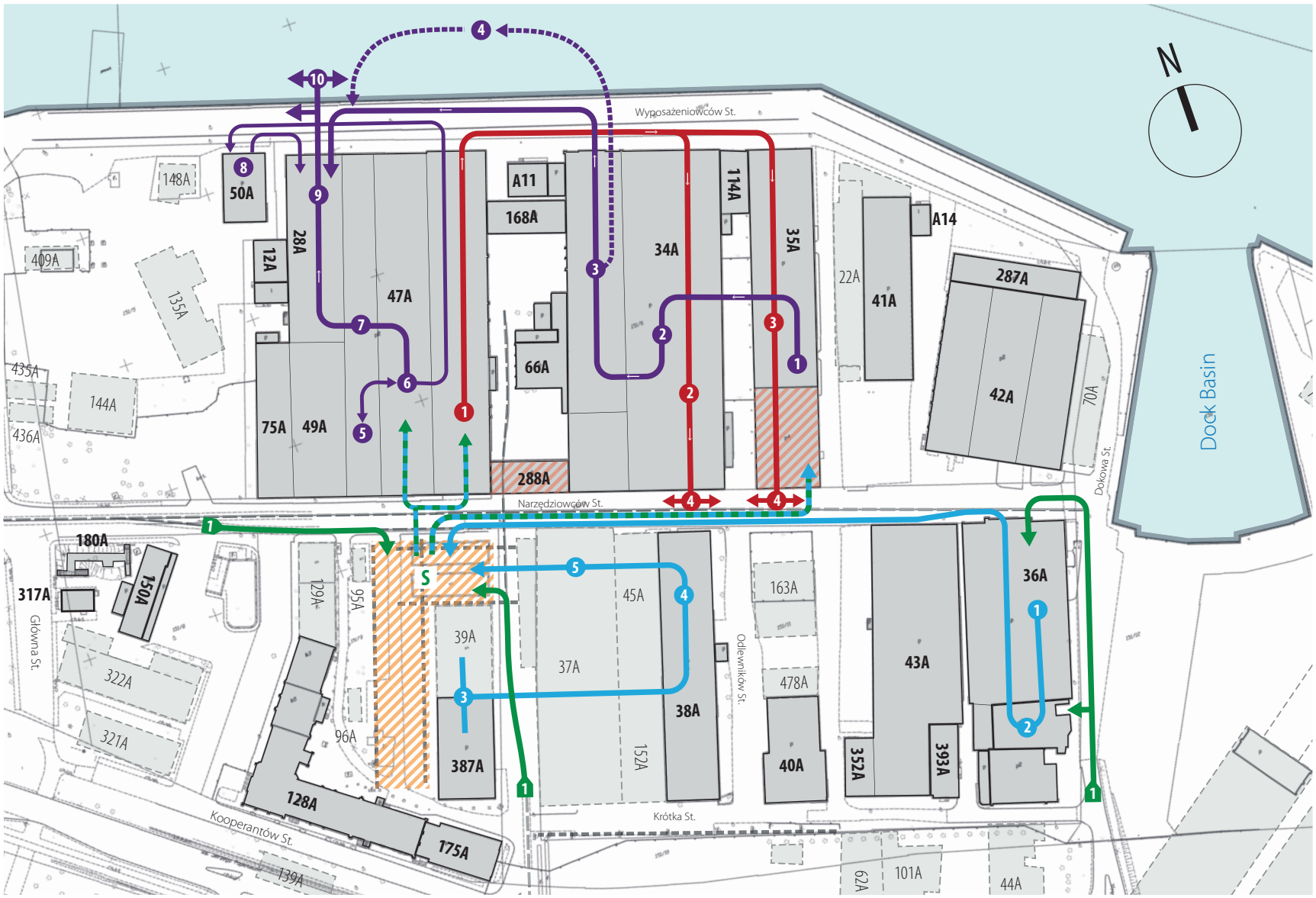
Compilation: Arkadiusz Woźniakowski



offices of the shipyard's Engine Building Plant (PS)

MATERIAL PROCUREMENT

1 supply of materials

S storage of prefabricated elements, materials and equipment

PREPARATION OF FORGING AND CASTING PREFABRICATED COMPONENTS

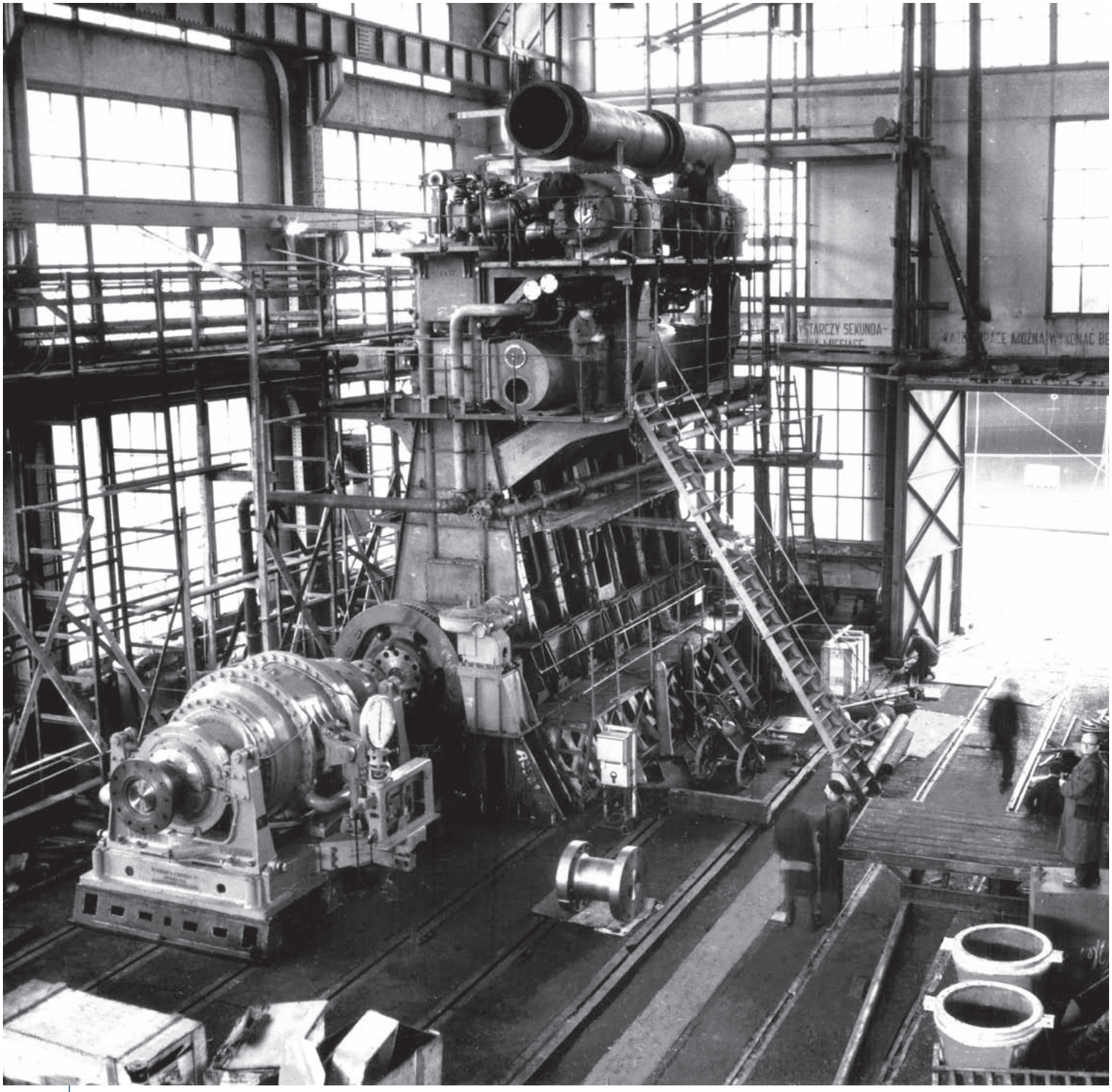
1. warming up
2. forging
3. preparation and storage of casting models
4. casting mould preparation
5. casting

BOILER CONSTRUCTION PROCESS

1. machining
2. installation of main boilers
3. installation of smaller boilers
4. distribution to storage yards, slipways and external customers

ENGINE BUILDING PROCESS

1. welding of engine components (frames and stands)
2. machining and welding
3. heavy machining and fitting (until the mid-1960s)
4. heavy machining with numerical control machine tools in hall 250C (from the mid-1960s)
5. intermediate storage (distribution board)
6. light machining of other engine components (e.g. stringers, crank systems)
7. pre-assembly
8. small engine components to be hardened
9. assembly, trial start-up, dismantling
10. transport of engine parts for assembly in the hull



32. Marine engine at the assembly station in the shipbuilding assembly hall (28A), left, a brake can be seen as a load on the engine during testing, 1970s–1980s. Photo: Z. Mirota, collection of the author

- Boiler and Welding Department S3, comprising Boiler workshop I (34A) and most of Boiler workshop II (35A), apart from the so-called Heavy Machining hall (western part of hall 35A) belonging to Mechanical Processing Department S4. The Department S3 was involved in light mechanical processing, boiler construction and assembly of fish processing lines on fishing bases
- Mechanical Processing Department S4 (customarily referred to as "Mechanical Central" or "Central-Mechanical" – CM, due to the extensive machinery), comprising the mechanical processing hall (47A) and part of the boilermaker's hall (34A) – the heavy mechanical processing hall. The department dealt with mechanical processing, including so-called heavy mechanical processing, casting of shells and so-called pre-assembly of engine components
- Engine Assembly Department S5, comprising the engine assembly hall (28A), the adjacent engine building (12A) and the hardening workshop (50A). The department was involved in the assembly and trial start-up of engines at the test stands in hall 28A, the installation of engines on ships, as well as the assembly of engines for external customers.

On 22 March 1961, the first five-cylinder, two-stroke, 5,450 hp reversible engine was launched and named *Gdańsk 1*. It was manufactured from parts supplied by the licensor. With the implementation of series production, most of the parts required were manufactured in-house at the various EBP departments. A total of 122 licence engines were built at the Gdańsk Shipyard. There were engines of six different types, with between five and nine cylinders. Most of the main propulsion units produced were installed in ships built at Gdańsk Shipyard, 20 engines were exported to the shipyard: Meyer Werft Papenburg (Germany), Schlichting Werft-Travemunde (Germany), John Brown's Shipyard Clydebank (Scotland) and Malta Drydocks (Malta).

3.2.2. Characteristics of the engine manufacturing process

The entire production cycle was managed by EBP management. The engine manufacturing process started in the Design Department (STK). Both the EBP management and the Construction Department were based first on the top floor of forge building 35A (the so-called Olympus) and then in building 288A. The Construction Department was responsible for adapting the Burmeister & Wain licence documentation and converting it into documentation used at EBP, as well as developing the necessary workshop documentation.

The actual production of the ship's main propulsion unit began with the construction of the engine frame. For technological reasons, it was divided into two parts. Frames were first built in the Mechanical Processing Department S4 (47A) and the Boilermaking and Welding Department S3 (in halls 34A and 35A). In hall 47A (mechanical processing), raw steel castings were delivered from the storage yard, from which important transverse components for the engine frames were to be formed (these components together formed the base for the crankshaft system stands and included the lower part of the main crankshaft bearing seat). Their planes had to be planed (machined, milled) first. The outside of the stringers was then welded together with structures made of thick steel plates. Mouldings were also made for the engine crankshaft bearing shells. Hall 34A was equipped with a special station for welding engine frames. Final processing was carried out in hall 250C, from where both frame parts were delivered from the quayside to department S5, the engine assembly hall (28A). Once the two parts of the engine frame were delivered to the assembly station in the hall, they were plane-fitted. These were then bolted together using fit screws. The frame halves were joined in such a way to maintain an exact plane on both halves. They then proceeded to assemble the stands. These were needed to ensure that the cranking system worked. The rack components were prepared (welded) at the S3 depart-

ment. They were then sent to Assembly hall 28A.

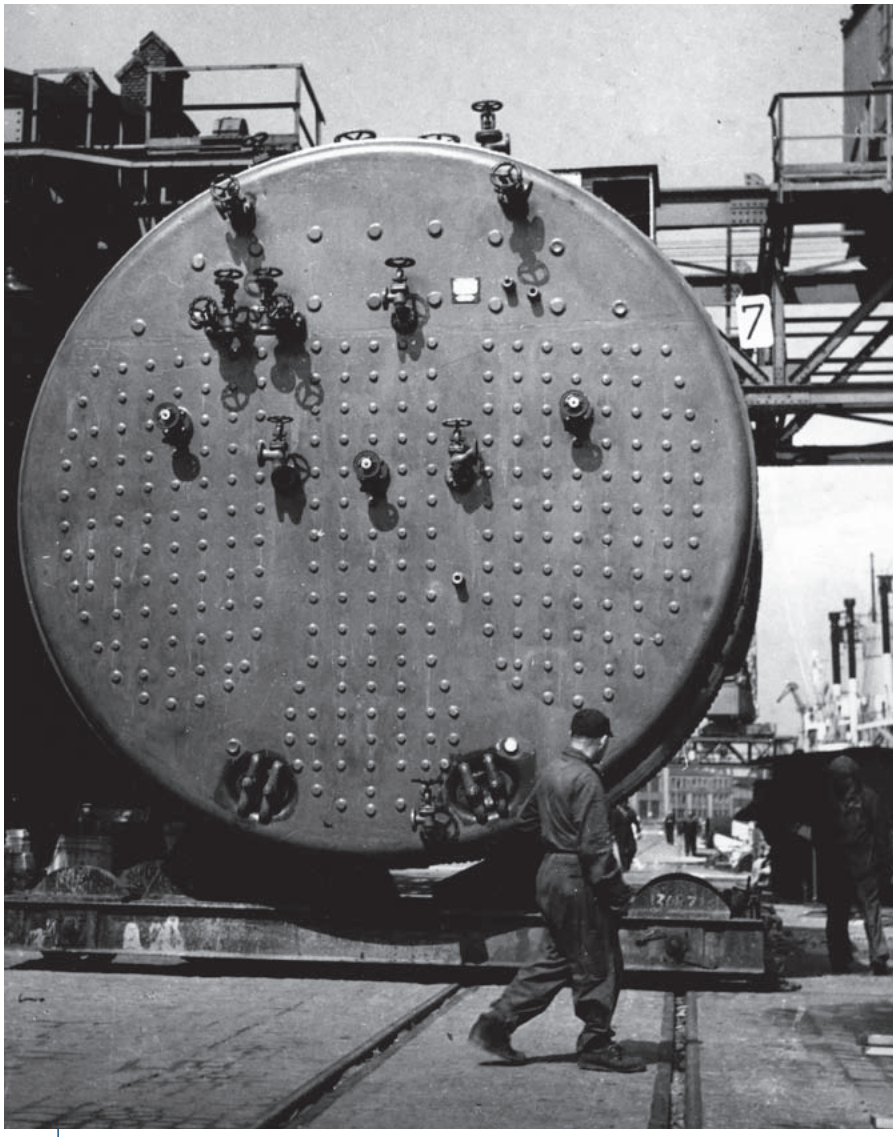
The engine blocks as castings were made in the Foundry Department S1, in the mould workshop (38A), where the casting moulds were made, and in the foundry. The castings were stored in the storage yard, from where they were sent for mechanical processing at S4. In the S1 department, cylinder liners were made (cast). These were cast in ductile iron.

Then, in hall 28A, part of the crank system was put together – the crank bearing was put on the crankshaft, the connecting rod was added, and the crankshaft pin was seated between the rack guides.

The cylinder blocks were then assembled. The planes of the individual cylinder block components had to fit together precisely, which was checked. The blocks were connected to each other using fit screws. The correctness of the alignment of the blocks and their fit was measured by the staff of the gauge and standards room.

3.3. Ship boiler manufacturing

In 1948, the Boiler and Welding Department S3 was established. The first two Howden-Johnson-type boilers produced by this department in 1948 (designed by scientists from the Gdańsk University of Technology) were destined for the SS *Sołdek*. The boilers produced here were supplied to all steam-powered ships built in the Gdańsk Shipyard, as well as to ships built in other developing Polish shipyards. These were the main boilers. On ships under construction at the time, steam provided propulsion for generators, steering, deck and cargo equipment, as well as space heating, in addition to the main propulsion. In the second half of the 1950s, when internal combustion engines began to be used increasingly for the main propulsion of ships (motor drive), the department started to manufacture auxiliary boilers. They provided the supply of steam for space heating, equipment to maintain the correct temperature of the main and auxiliary engines' diesel fuel, and also provided the process steam needed in the processing plants on the fishing vessels. Two types of boiler were manufactured here: utilisation boilers of the La Mont type – which used the heat from the exhaust gases of the main propulsion diesel engines to produce steam, and auxiliary boilers of the VX type – steam was produced using a burner fuelled by fuel oil. The auxiliary boilers were used when the ship's main propulsion engine was stationary. Its production covered the needs of all Polish shipyards, with part of the output going for export. In total, around 8,500 boilers of various types were manufactured at the Gdańsk Shipyard.



33. Ship's boiler during transport, 1957. Photo: Z. Mirota, State Archive in Gdańsk collection

3.4. Other equipment and non-shipbuilding production

Numerous equipment and structural components were produced at the shipyard for its own use and for that of other Polish shipyards. These included pressure vessels for internal combustion engine starting systems (each ship had at least two such vessels). In addition, anchor and mooring lifts were manufactured at the shipyard until production started at the Towimor plant in Toruń, and cargo lifts were also assembled. Beginning in 1961, when the construction of industrial fishing bases began, the assembly of fish processing equipment began at the Gdańsk Shipyard. Between 1961 and 1981, processing equipment was made for 57 fishing bases.

The shipyard was also a supplier of products for the production of marine equipment for its sub-suppliers, such as anchor, mooring and cargo lift body castings for the company Toruńskie Zakłady Urządzeń Okrętowych "Towimor" (Shipbuilding Equipment Plants Toruń) and heat exchanger bodies for Fabryka Urządzeń Okrętowych (FUO) Rumia (Shipbuilding Equipment Factory).

Concentrating production in specialised centres (CHPaPP – installation of heavy-duty universal machine tools in the mechanical processing centre in hall 250C on Ostrów Island) made it possible to offer specialised equipment, including iron castings and non-ferrous metal castings, forgings, as well as spare parts for main engines (i.e.: cylinder liners, bearings, pins, fuel and valve train components) to numerous external customers.

4. Coordination of technological processes, technical control

The course of the shipbuilding process, as already mentioned, was planned according to the key events included in the updated SBS. They formed the basis for planning all activities related to the preparation and flow of production. Managers of individual organisational units (for all ships in various stages of construction) and managers of individual construction sites (for the construction of a specific ship) were responsible for meeting the technical and deadline requirements included in the documentation.

Substantive supervision of the implementation of individual contracts was carried out by the chief construction engineers (TH), while the Head of Quality Control (TKJ) was responsible for quality control of the tasks carried out, acceptance of the work, submission of individual construction stages to representatives of the shipowner and classification societies and implementation of the sea trial programme. Both of these services reported directly to the technical director of the shipyard.

4.1. Chief construction engineers

They were the people involved throughout the life of the project – the construction of the vessel, from the first pre-contract discussions to the handover of the vessel and the end of its warranty period. The chief construction engineers worked with all partners involved in building the ship. They maintained ongoing contact with the shipowner as official representatives of the shipyard. They also led the team developing the plan to prepare and launch production of the prototype vessel. Such a plan included all tasks relating to the construction of both the prototype vessel and the entire contracted series of vessels.

Throughout the production preparation period, as well as the construction of the unit, the chief production engineers worked closely with the general designer, other designers, representatives of the Production Directorate (builders), departmental managers and subcontractors. They were the only ones with

the authority to make commitments and decisions on behalf of the shipyard both during construction and when the ship was handed over to the shipowner (as chairman of the delivery committee).

Between 1959 and 1996, 40 people held the position of chief site engineer.

4.2. Head of Quality Control (TKJ)

The quality of the materials and equipment used in shipbuilding, as well as the correctness of the construction process and the maintenance of technological requirements during construction, are key to ensuring the safety of crew and cargo during ship operations. They were therefore subject to detailed supervision at every stage of production preparation and during the shipyard's construction of the vessel. Safety-critical materials and equipment supplied by subcontractors had to have individual acceptance certificates issued by representatives of the classification society specified in the ship's contract. Also, all work important to the safety of the vessel was subject to individual acceptance. The conditions of each acceptance were included in the test programme prepared by the Shipyard Design and Construction Office (RN), as part of the technical design, which included a detailed description of each test, how it was to be carried out and how the results of each test were to be evaluated. This programme was agreed with the TKJ and the shipowner and approved by the classification society. Successful completion of all tasks included in this programme was a condition for obtaining a ship safety certificate.

In order to fulfil the above-mentioned tasks, the TKJ had appropriately equipped laboratories (central and specialised laboratories), a Measurement Technology Department with central and departmental gauge and standards rooms, and specialised departments to carry out day-to-day control and organise the acceptance of work in the departments. They were: Delivery Quality Control Department, Hull Quality Control Department, Equipment Quality Control Department and Engine Quality Control Department.

5. Ancillary production infrastructure

Appropriate technical infrastructure – sites for the production or transformation of technical gases (such as oxygen, acetylene), steam, compressed air and electricity – was necessary for the smooth running of the business. They were essential both for the execution of individual technological processes, the propulsion of equipment and, among other things, for the heating of buildings and premises. The fact that the Gdańsk Shipyard was practically a plant made up of two previously independent enterprises made it necessary to integrate existing auxiliary production facilities. The existing energy sources did not meet the needs in terms of both quality and available power. Therefore, as part of the modernisation carried out in the 1970s, the following were upgraded:

- power system – a new power supply line to the shipyard was built, including the P20 power substation, and the B5 entrance substation was upgraded
- acetylene plant and carbide storage facility
- oxygen plant
- CO2 gasification station
- compressor rooms supplying the high-pressure air network
- potable water intakes as well as technical water.

The distribution of utilities to the collection points in the various departments and to the ramps was done using covered ducts and earth lines and flyovers running along the main thoroughfares. Of the dense network of flyovers, a section along Narzędziowców St., by the square in front of the management building, remains.

TECHNICAL NETWORKS

shipyard boundary

12A existing buildings

135A non-existent buildings

schematic overview of the power grid

flyover – mains (since the mid-1980s)

transformer substations

boiler houses

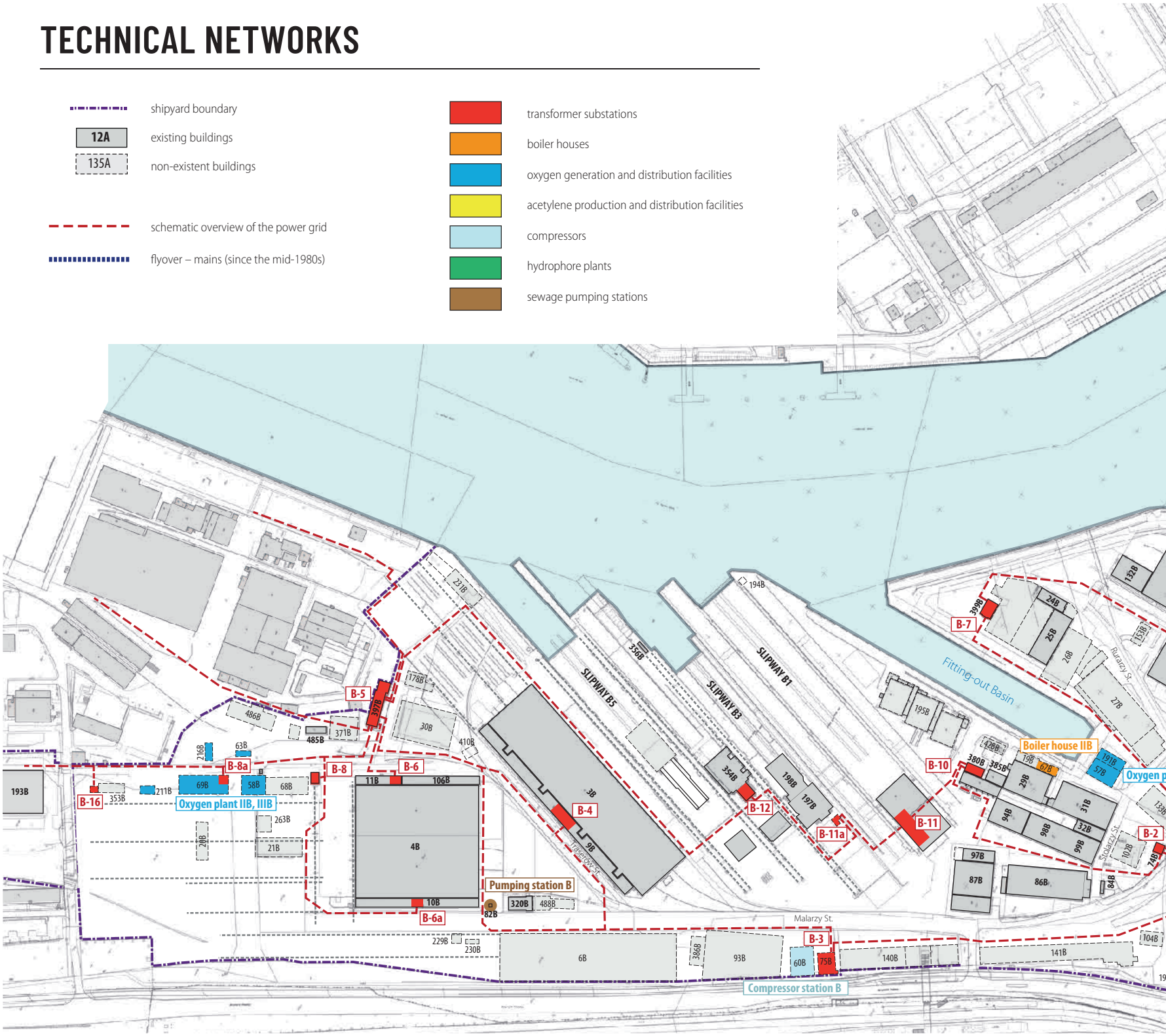
oxygen generation and distribution facilities

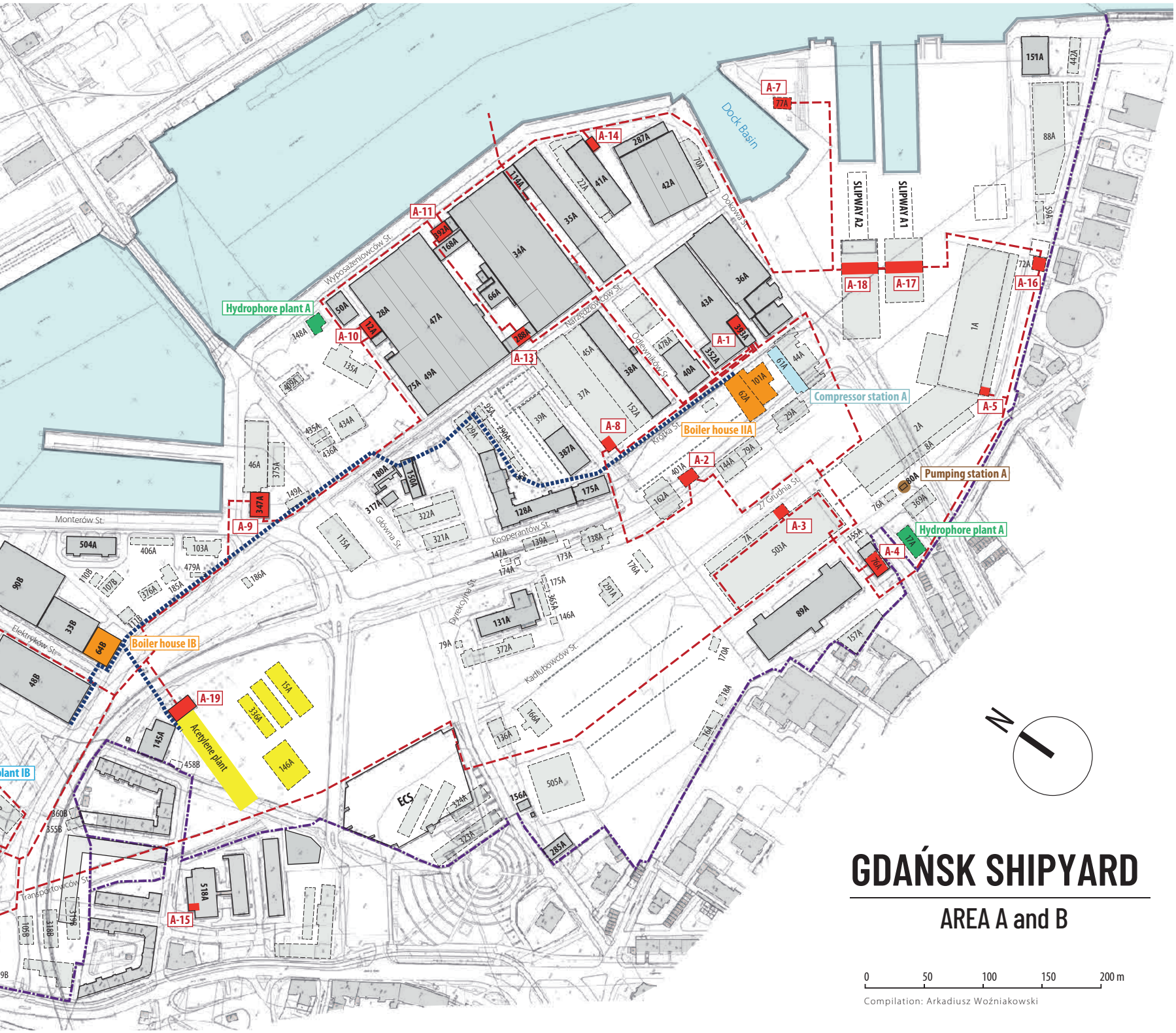
acetylene production and distribution facilities

compressors

hydrophore plants

sewage pumping stations




Dock Basin
SLIPWAY A2
SLIPWAY A1
A-7
A-14
A-11
A-10
A-13
A-1
A-18
A-17
A-16
A-5
A-8
A-2
A-3
A-4
A-9
A-19
A-15
Hydrophore plant A
Hydrophore plant A
Compressor station A
Boiler house IIA
Pumping station A
Boiler house IB
Acetylene plant
ECS
Wyposażeniowców St.
Narzędziowców St.
Dolowa St.
Krótka St.
27 Grudnia St.
Monterów St.
Główna St.
Kooperantów St.
Dyrektorska St.
Kadłubowców St.
Elektryków St.
Transportowców St.
N
GDAŃSK SHIPYARD
AREA A and B
0 50 100 150 200 m
Compilation: Arkadiusz Woźniakowski

Part III

CHARACTERISATION OF THE SURVIVING SHIPYARD BUILDINGS IN THE CONTEXT OF THEIR INDUSTRIAL FUNCTION AND ROLE IN THE PRODUCTION PROCESS

1. Introduction

This chapter provides a comprehensive characterisation of the various industrial facilities of the Gdańsk Shipyard. The shipbuilding structures and the gripping, associated industrial infrastructure that survives today, are described. The following list of preserved objects of shipbuilding heritage has been extended with five buildings that unfortunately no longer exist, but which are of great technical and cultural significance for the industrial heritage of both the Gdańsk Shipyard itself and the Polish shipbuilding industry. These include the foundry (37A), together with the adjacent hall 45A, which connects the defunct foundry hall with the still surviving moulding plant. All three formed a compact complex of industrial facilities of the S1 Foundry Department, closely linked functionally and structurally. The third defunct building whose characteristics are included in the listing is the modelling hall (39A) – also operating as part of the S1 Foundry Department. Without a discussion of these three defunct facilities, it is impossible to understand the method of operation of the shipyard's Foundry Department – one of the most important in the plant, while also forming an integral part of the shipyard's Engine Building Plant (PS), primarily involved in the construction of main propulsion units for ships and ship boilers, products that have gained a nationwide reputation. The fourth non-existent facility, whose description is included in the following list, is the frame workshop: hall 6B – a place where steel profiles were machined, mainly for the manufacture of ship frames and other important structural parts necessary for the assembly of hulls. The fifth and last non-existent shipbuilding building described in

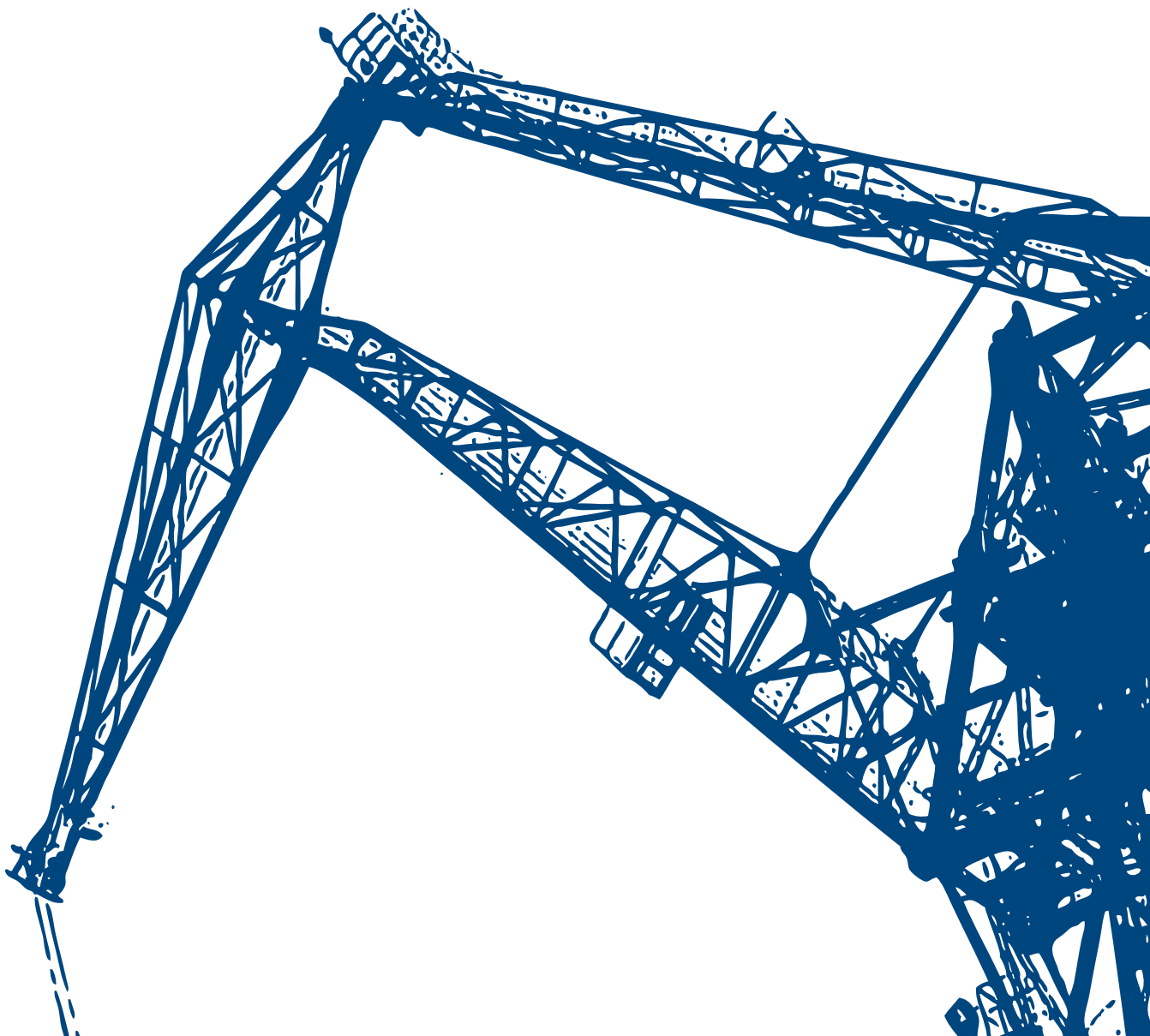
the catalogue below is the building of the Design and Construction Office of the Gdańsk Shipyard (140B) – a place where the necessary technical documentation for the various categories of the shipyard's products was created: ships, engines, ship boilers and many other pieces of equipment or components manufactured at the plant. The building of the Design and Construction Bureau was the birthplace of most of the ship designs built in the Gdańsk Shipyard, including many prototype vessels at a national, European and global scale of shipbuilding and the shipbuilding industry. From the point of view of the manufacturing processes carried out at the Gdańsk Shipyard, it was therefore one of the key locations.

The following catalogue of preserved industrial buildings of the Gdańsk Shipyard opens with a description of the General Management and Administration Building of the Gdańsk Shipyard – the place where activities related to the comprehensive management of this powerful production facility were undertaken. The description of the management building is followed by a description of the surviving shipyard gates, which are important elements of the communication lines enabling material deliveries to be made. Together with the series of walls and fences separating the plant from the city space, the gates also marked the boundaries of the Gdańsk Shipyard and were places of movement for workers. This is followed by descriptions of the facilities within the company itself, starting from the north, through the shipyard's area B to area A, located in the south-western part of the shipyard. Shipbuilding area C, located on the other side of the shipbuilding channel – the Dead Vistula – on Ostrów Island (formerly Holm), is completely excluded from this study. This is an area where production is still ongoing and therefore remains difficult to access. This arrangement of the description – starting from area B – was dictated by the fact that it is in the northern part of the Gdańsk Shipyard where valuable facilities of the shipyard's industrial infrastructure have been preserved: processing and prefabrication halls, material and completion warehouses, in particular a complex of unique, completely preserved and functioning shipyard slipways (formerly belonging to the K3 Hull Assembly Department of area B slipway) with existing cranes and other industrial infrastructure serving the shipyard's primary task – ship production. Furthermore, research carried out during the preparation of this study has revealed the existence of relics associated with the operation of earlier shipbuilding enterprises on the site, making this space particularly relevant to the overall local industrial heritage. Thanks to the above-mentioned preserved complex of buildings and shipyard equipment (halls, tracks, slipways, etc.), the elements and stages of the most important production cycle carried out in the Gdańsk Shipyard are still visible in the shipyard space. Shipbuilding was not only the most important process carried out in the plant but also the oldest (the production of ship engines and boilers started much later), which is why the facilities and infrastructure for constructing ship hulls were also described first.

Next, the facilities located in the hinterland of the shipyard, adjacent to the quays, formerly belonging mainly to the outfitting departments, dealing with the activities of equipping the vessels under construction and assembling the necessary systems, installations, machinery, equipment, furniture, etc. on them, were characterised. Moving on to area A, there are descriptions of the facilities belonging to the engine departments, which constitute the majority of the structures located in this part of the shipyard, making up the aforementioned Engine Building Facility. It was mainly involved in the production of marine machinery (including main propulsion engines) and marine boilers. The catalogue of shipbuilding facilities concludes with descriptions of warehouse buildings and structures formerly belonging to the second shipbuilding hull assembly department, the K2 department, now sadly no longer existing. The basins of the defunct longitudinal launching slipways in area A, which are of vital importance to the history of Gdańsk Shipyard and the entire Polish shipbuilding industry, remain important

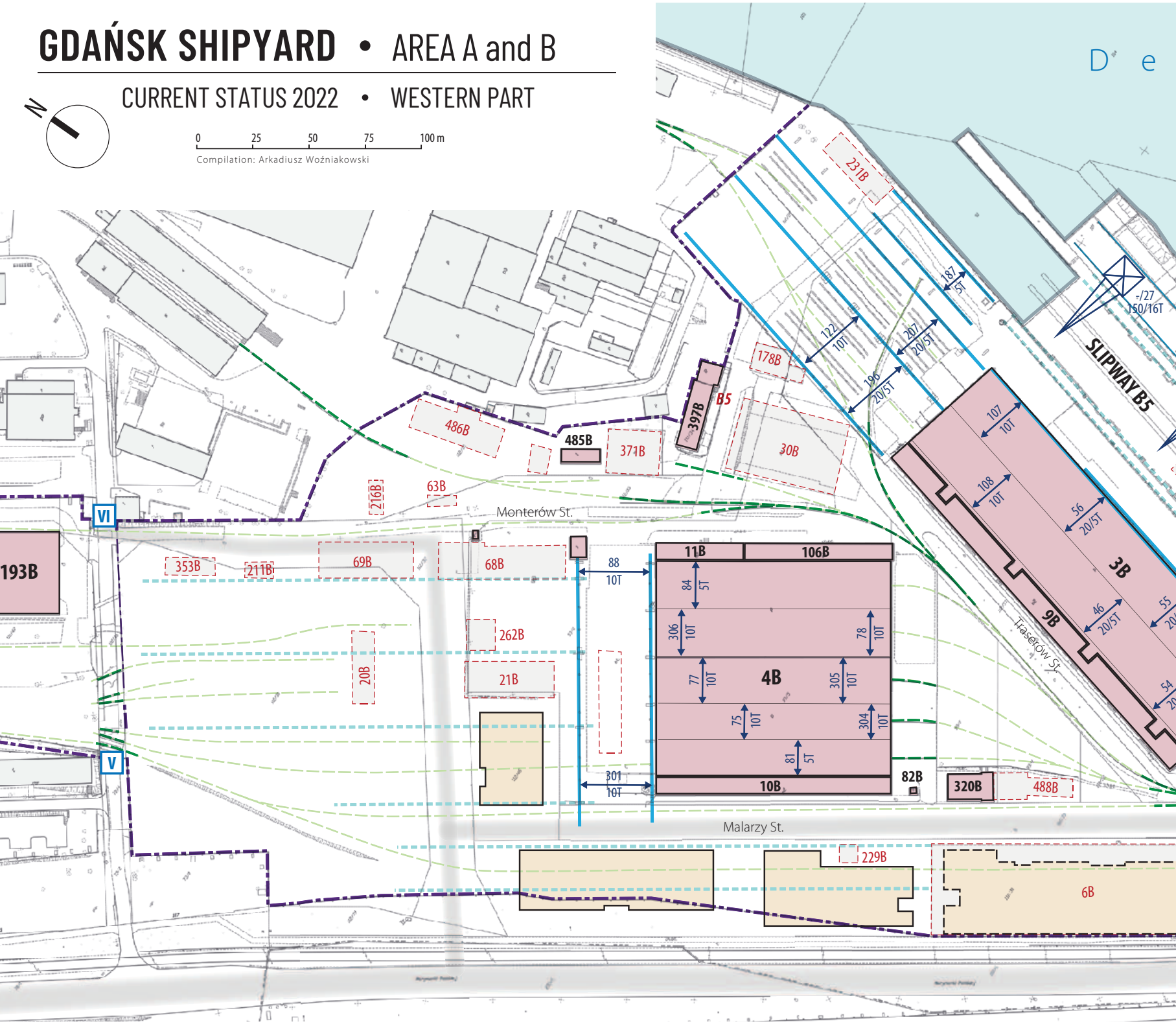
preserved elements of the department's infrastructure. The first Polish seagoing ship, the SS *Sołdek*, was launched on one of these slipways (formerly slipway A2) in 1948, marking the beginning of the history of the production of seagoing vessels at Gdańsk Shipyard and the history of the Polish seagoing shipbuilding industry.

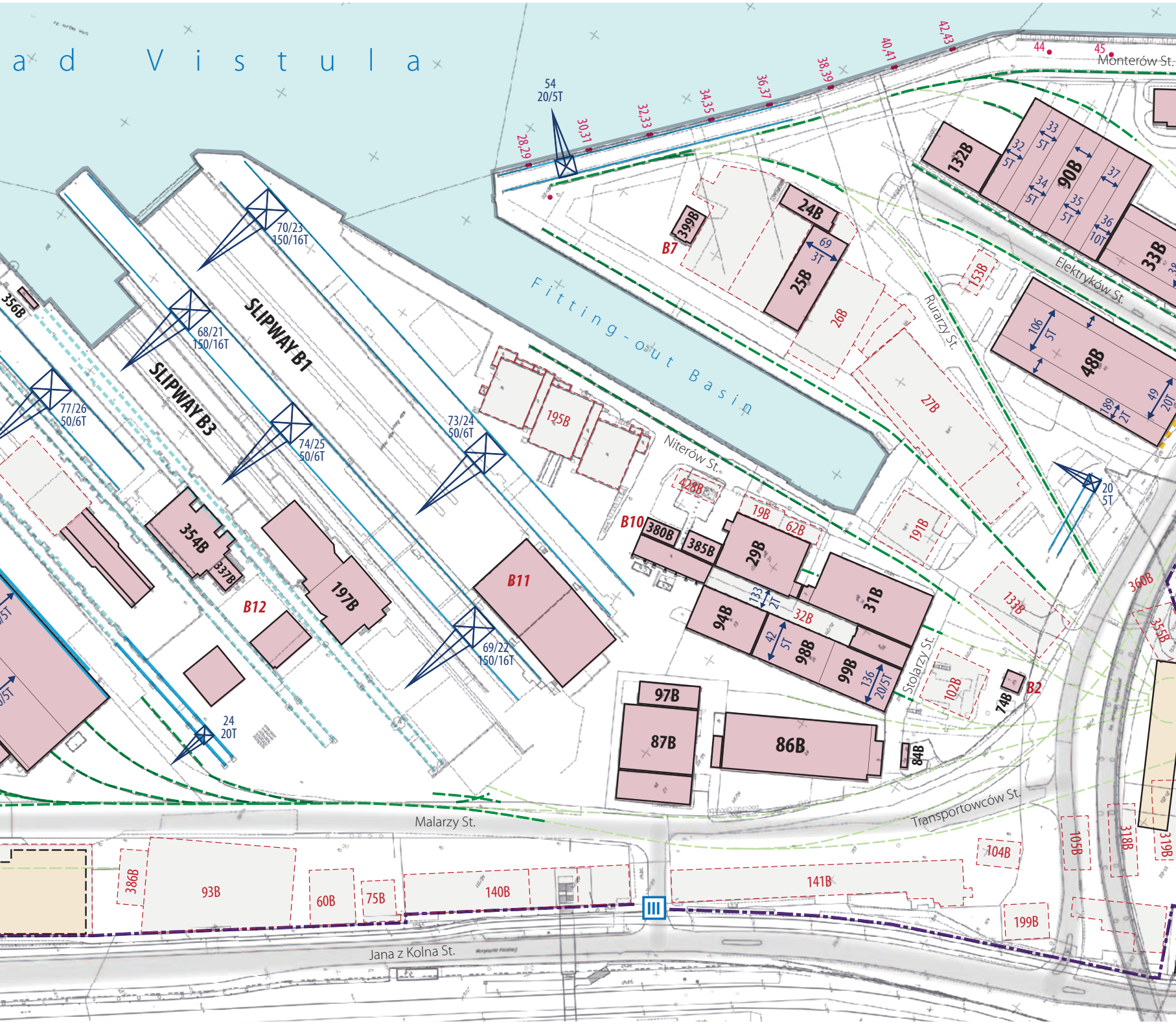
Comprehensive descriptions of individual shipbuilding facilities consist of elements such as a historical background, information on the nature, structure and surroundings of the building, its departmental affiliation, the original equipment, as well as the surviving elements of equipment and infrastructure (if this was possible to record, as some facilities were not completely accessible due to the production processes still taking place in them). The most important part of the descriptions of the shipyard's buildings and monuments is information on the function of individual industrial facilities and the technological processes carried out in them, as well as information on their place in the production structure of the individual departments of the Gdańsk Shipyard and of the shipyard as a whole. This section significantly expands the knowledge available to date on the industrial role of the individual facilities of the Gdańsk Shipyard and their significance as important components of the industrial cultural heritage of Poland's largest shipyard.

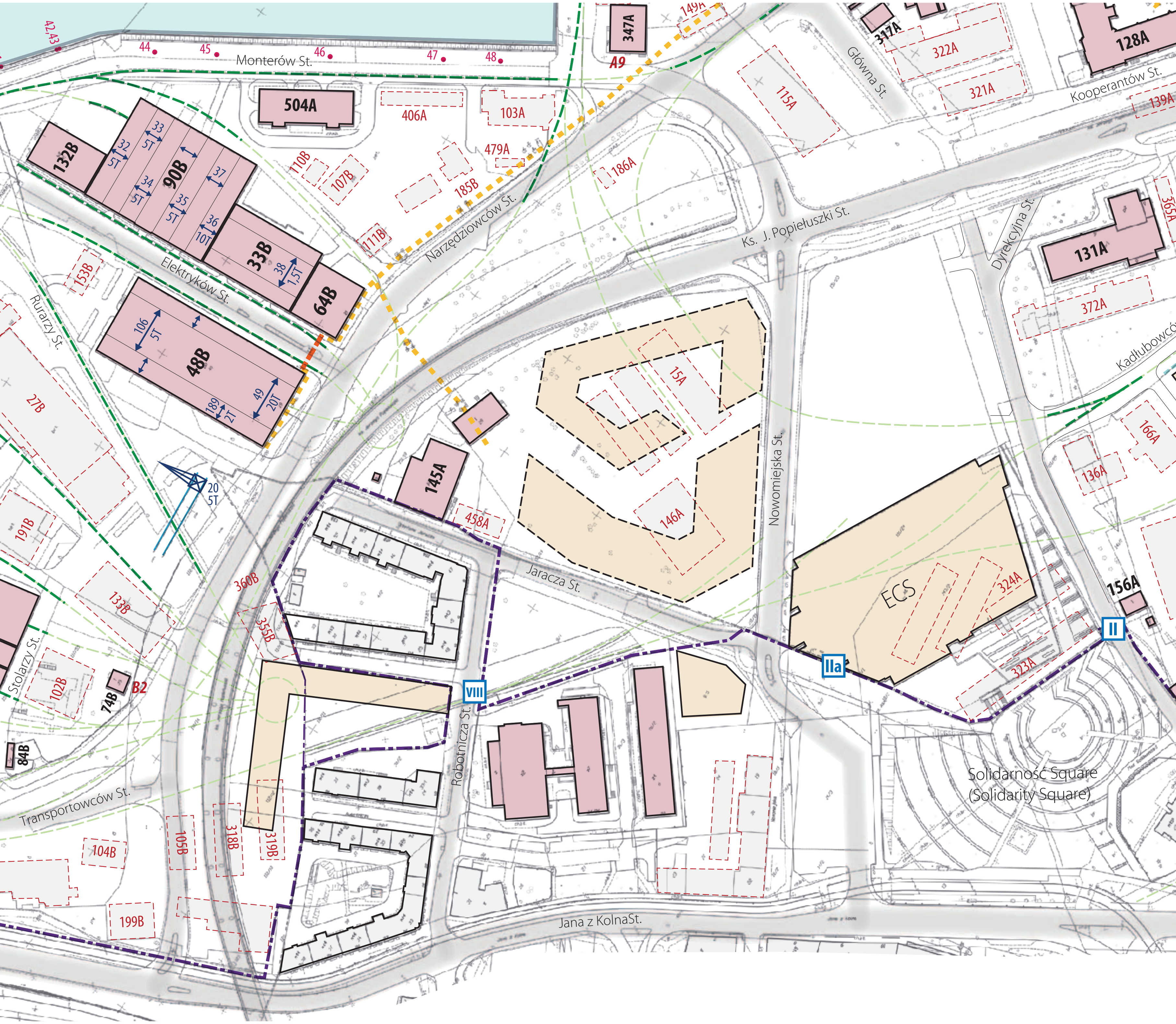


GDAŃSK SHIPYARD • AREA A and B

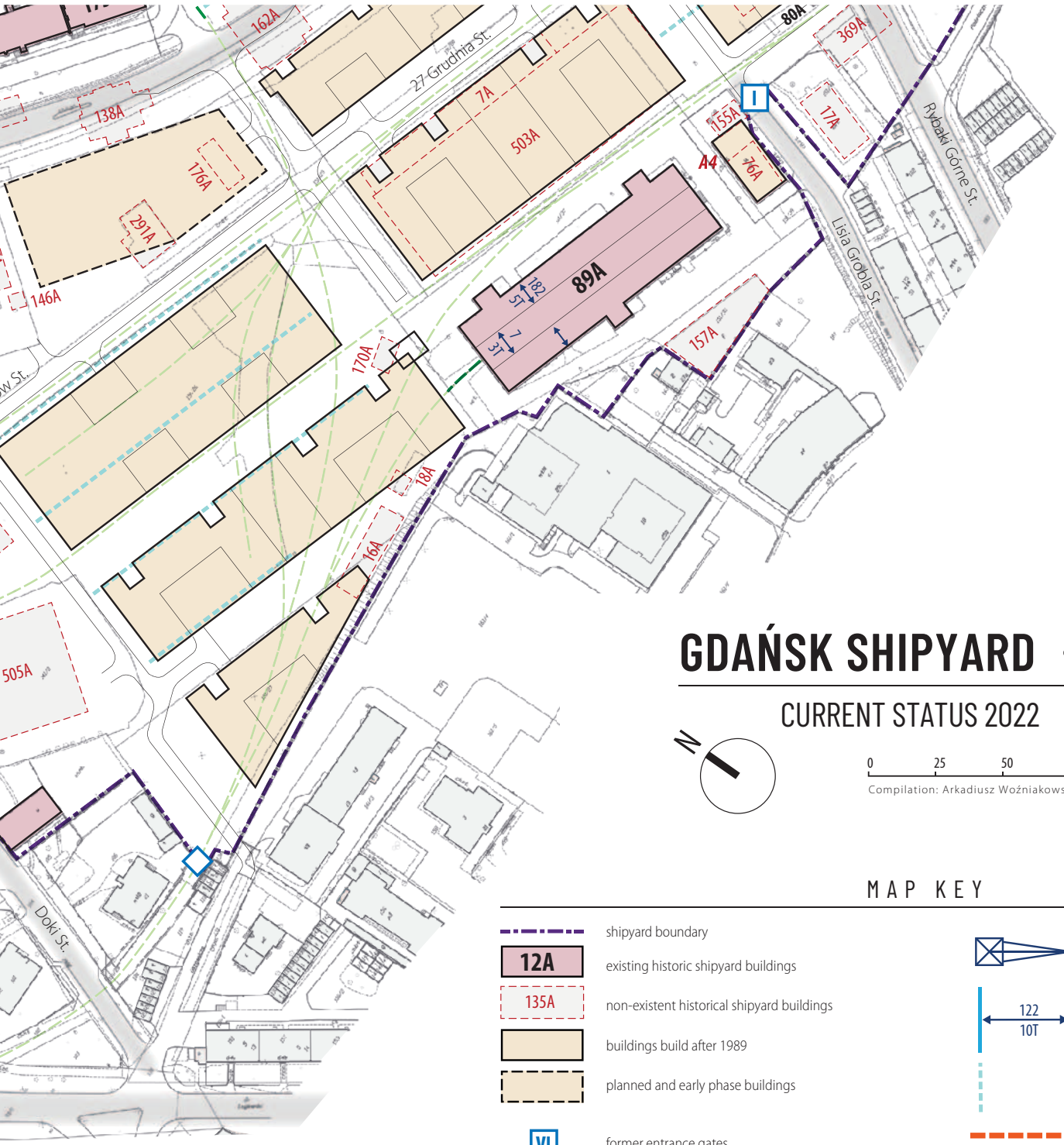
CURRENT STATUS 2022 • WESTERN PART




a d V i s t u l a
Fitting-out Basin
SLIPWAY B1
SLIPWAY B3
70/23 150/16T
68/21 150/16T
77/26 50/6T
74/25 50/6T
73/24 50/6T
69/22 150/16T
24 20T
54 20/5T
28,29
30,31
32,33
34,35
36,37
38,39
40,41
42,43
44
45
Monterów St.
Elektryków St.
Rufarzy St.
Niterów St.
Stolarzy St.
Malarzy St.
Transportowców St.
Jana z Kolna St.
B7
B10
B11
B12
B2
III
24B
25B
26B
27B
132B
90B
33B
153B
48B
195B
428B
19B
62B
380B
385B
29B
191B
133B
31B
94B
32B
98B
99B
136 20/5T
102B
74B
97B
87B
86B
84B
356B
354B
337B
197B
360B
355B
386B
93B
60B
75B
140B
141B
104B
105B
318B
319B
199B



Monterów St.
504A
406A
103A
347A
A9
149A
115A
Główna St.
317A
322A
321A
128A
Kooperantów St.
139A
132B
90B
33B
64B
48B
110B
107B
185B
479A
186A
111B
Narzędziowców St.
Elektryków St.
Ks. J. Popiełuszki St.
Dyrekcyjna St.
131A
372A
365A
Kadłubowców St.
153B
Rurarzy St.
27B
15A
146A
145A
458A
Nowomiejska St.
Jaracza St.
ECS
324A
323A
156A
166A
136A
191B
133B
360B
355B
Stolarzy St.
102B
74B
B2
84B
Robotnicza St.
VIII
IIa
II
Transportowców St.
104B
105B
318B
319B
199B
Jana z KolnaSt.
Solidarność Square
(Solidarity Square)



GDAŃSK SHIPYARD • AREA A and B

CURRENT STATUS 2022 • SOUTHERN PART

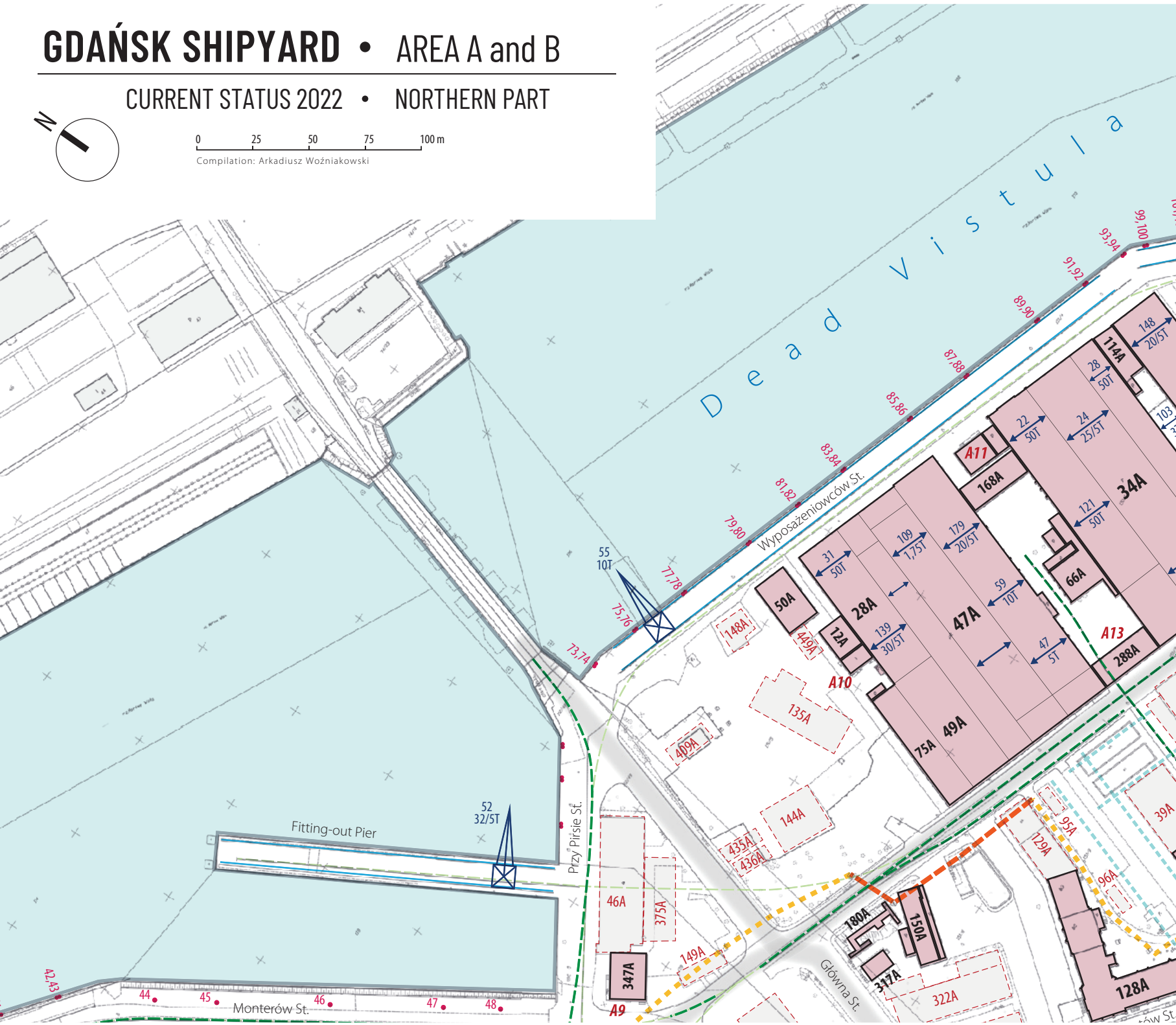
N

0 25 50 75 100 m

Compilation: Arkadiusz Woźniakowski

MAP KEY

- shipyard boundary
- 12A — existing historic shipyard buildings
- 135A — non-existent historical shipyard buildings
- buildings build after 1989
- planned and early phase buildings
- VI — former entrance gates
- railway tracks (preserved/not preserved)
- 54 20/5T — cranes (registration number and load capacity in tonnes)
- 122 10T — flyover cranes (registration number and load capacity in tonnes)
- unmaintained flyover cranes
- mains flyover (retained/not retained)
- 44 — bitts with registration number


GDAŃSK SHIPYARD • AREA A and B
CURRENT STATUS 2022 • NORTHERN PART
N
0 25 50 75 100 m
Compilation: Arkadiusz Woźniakowski
Dead Vistula
Wyposażeniowców St.
Fitting-out Pier
Przy Pirsie St.
Monterów St.
Główna St.
A9
A10
A11
A13
34A
47A
28A
49A
75A
50A
12A
66A
168A
114A
288A
128A
135A
144A
46A
375A
347A
149A
322A
180A
150A
317A
409A
148A
449A
435A
436A
129A
95A
96A
39A
52 32/5T
55 10T
99,100
93,94
91,92
89,90
87,88
85,86
83,84
81,82
79,80
77,78
75,76
73,74
42,43
44
45
46
47
48


Dock Basin
SLIPWAY A2
SLIPWAY A1
A14
A18
A17
A16
A1
A8
151A
442A
107A
88A
59A
72A
1A
287A
42A
41A
35A
36A
43A
393A
352A
40A
38A
387A
175A
Dokowa St.
Narzędziowców St.
Odlewników St.
Krótka St.
27 Grudnia St.
Podstoczna St.
61 8/16T
7 5T
66 10T
27 50T
25 25/5T

2. Building of the management of Gdańsk Shipyard – 128A

History

The building was constructed around 1875, during the reconstruction of the Imperial Shipyard in Gdańsk after the Franco-Prussian War (1870–1871), as the plant's main office building (Hauptbürogebaude). From the beginning, it served as the headquarters for the management and administration of the Imperial Shipyard. It was subsequently rebuilt several times, including in the late 19th century and in 1902. Due to its administrative and office function, it was surrounded by a garden area, one of the largest in the shipyard. From 1945, the building served as the management building of the Polish Shipyard No. 1 and, from 1947, of the establishment created by the merger of Shipyard no. 1 and Shipyard no. 2, the Gdańsk Shipyard.

Character of the object

Office building.

Structure

A multi-storey building housing the offices of the directors, management, personnel and administration of the Gdańsk Shipyard. The south-western part of the first floor (with the entrance opposite the staircase) was occupied by the secretariat, shared by the general and technical directors and the offices of the general director and the technical director (later the technical and commercial director). Adjacent to the chief executive's office was a conference room (known as the Roundhouse due to the fact that it housed a substantial oval table). Access to the conference room was possible directly from the corridor as well as from the chief executive's office. The window from the Roundhouse overlooked the square in front of the management. On a number of occasions during crew gatherings in the square in front of the building, it was used to communicate between the director and the shipyard workers gathered in the square.

Department affiliation of the object

Directorate General (DN)

Function

General management and administration of the plant, production and sales contracting and general management of the core technical departments.

Elements of the original equipment

Office furnishings and carpentry design elements.

Preserved equipment

Some of the decorative elements – window and door woodwork, columns and ceiling in the hallway, chandelier.

Surrounding area of the building

The square in front of the building, Kooperantów St. (part of the former Werftgasse – Stoczniowa St. and Narzędziowców St., on the north-east side there are preserved relics of a cobbled route.

>>

34. Gdańsk Shipyard sign above the main entrance to the management building, 2011. Photo: A. Trzeciak, collection of the author


S C

3. Gate 1 – 155A

History
The industrial gate was built in this area in the early 20th century, after the removal of the earthen ramparts of Gdańsk and the purchase of the area by the Imperial Shipyard. The gate was in the line of a fence composed of brick post-beams, between which an ornamental wrought-iron grille was installed (its relics were still visible around 2013). After the Second World War, Gate 1 was the entrance to the shipyard. Along with the inscription "Gdańsk Shipyard", it was renovated and restored to its original state in 2022, in connection with a development being built in its immediate vicinity.

Structure
A gate consisting in the post-war period of a gate closing the course of the city's Lisia Grobla St. (German: Fuchswall), located between brick pillars, and a wooden covered pedestrian passage (probably a relic of an earlier establishment, now defunct) with a pass office.

Character of the object
The entrance and gateway to the plant.

Department affiliation of the object
Industrial Guard (Zx).

Function
One of the main transit locations for material deliveries made using wheeled transport.

Elements of the original equipment
Pass office equipment. "Gdańsk Shipyard" inscription above the gate passage.

Preserved equipment
Reconstructed inscription with the name of the establishment.

Surrounding area of the building
Municipal Lisia Grobla St., main warehouse A (building 89A), non-existent prefabrication halls of Hull Department K2 – structures 2A and 503A with non-existent storage yards.

4. Gate 2 – 156A

History
In its present form, the building was constructed in the 1970s during the modernisation of the Gdansk Shipyard. It was located on the site of older complexes dating back to at least the 1920s. Until 1983–1984, it was a gate suitable for both pedestrian and vehicular traffic. Following the construction of the defunct freight gate (2a), Gate 2 handled pedestrian traffic only. In 1981, a small pavilion with a kiosk – a point of sale – was added to Gate 2. The pavilion forming part of the establishment of Gate 2 was used as a pass office and industrial guard station.

Character of the object
Plant entrance and gate, industrial guard pavilion, kiosk.

Structure
The gate consists of steel support structures (it bears the name of the plant with its sign and an image of the communist award, the Order of the Labour Banner awarded to the shipyard in the 1970s), steel gates and an industrial guard building and a small sales pavilion (kiosk).

35. Historic Gate 2 of the Gdańsk Shipyard. It was the main and representative entrance to the shipyard. It was also, until the 1980s, one of the most important transport and delivery entrances to the shipyard, 2018. Photo: T. Błyskosz, National Institute of Cultural Heritage archives

Department affiliation of the object
Industrial Guard (Zx).

Function
Until 1983–1984, one of the main transit locations for material deliveries using wheeled transport.

Elements of the original equipment
Equipment of the industrial guard pavilion. Gate inscription with the name of the plant, shipyard sign and image of a communist award.

Preserved equipment
Gate (replaced in 2012), the original inscription with the name of the workplace, the shipyard sign and an image of the Order of the Labour Banner.

Surrounding area of the building
The non-existent company central canteen (505A), Główna St., the railway track, the non-existent pavilions (consisting of buildings that could be quickly put together) of the administration, the Works Council of Trade Unions and, since 1980, the Works Commission of the Independent Self-Governing Trade Union "Solidarity".

5. Gate 5 – railway gate – object without number in shipyard records

History
The gate in its present form was probably created in the 1970s, during the modernisation of the Gdańsk Shipyard.

Structure
A freight gate within the shipyard's fence, made in the form of steel wings.

Character of the object
Freight entrance gate – railway gate.

Department affiliation of the object
Industrial Guard (Zx).

Function
Until around 1976, Gate 5 was part of one of the main transport corridors of the Gdańsk Shipyard. Since 1976, it has been the main delivery gateway for metallurgical materials, accounting for a huge part of the shipyard's material supply.

Elements of the original equipment
Steel gates.

Preserved equipment
None.

Environment
Street leading to the entrance of the Northern Shipyard, the defunct so-called steelworks warehouse – the shipyard's extensive main sheet metal and section warehouse.

6. "Berlin" Hall – object 193B

History
It was built in the late 1970s in the easternmost part of the Gdansk Shipyard, right on the border with the Northern Shipyard. Next to it were the railway turnouts leading to the main railway gate of the Gdańsk Shipyard. Made in parts in the former German Democratic Republic, purchased and assembled at the Gdańsk Shipyard, it represents the "Berlin" type of hall and warehouse buildings assembled from prefabricated parts.

Character of the object
Storage hall.

Structure
Single-space hall with overhead cranes.

Department affiliation of the object
Supply Warehouse Department Gs.

Function
Storage hall for smaller marine equipment and engines.

Elements of the original equipment
No data available (hall still in use in production, not accessible).

Preserved equipment
No data available.

Environment
Boundaries of the shipyard, street leading to the Northern Shipyard, railway gate of the Gdańsk Shipyard, track turnouts.

7. Main electrical switching station of the B5 shipyard – building 397B

History
The building was erected in 1960. The B5 electrical substation was located there. It was the main shipyard power connection supplying the plant. Until 1980, the station provided power to consumers on Ostrów Island.

36. Building of the main electrical switching station at the Gdańsk Shipyard. An example of Polish post-war architecture with an industrial character, 2022. Photo: A. Trzeciak, collection of the author

Character of the object
The main electrical substation of the Gdańsk Shipyard.

Structure
Two-storey building. On the ground floor, there was a set of cable connections – these consisted of feeder cables: from the power plant's Gdańsk 2 switchgear and, after 1980, also from the P20 sub-station located on Ostrów Island, as well as consumer cables: circuits supplying the shipyard's loads and a back-up power supply for the Northern Shipyard. There are two short-circuit current limiting reactor rooms in the western part of the building. On the first floor, there is a switchgear room with switchgear for more than 30 consumer circuits and switching equipment for the switchgear bus sections.

Department affiliation of the object
Chief Energy Officer (RE).

Function
The station was the main electricity supply point for the shipyard.

Elements of the original equipment
Cable connections, reactors, switchgear.

Preserved equipment
No recognition possible.

Surrounding area of the building
Boundary with the Northern Shipyard, non-existent carpentry workshop, section prefabrication hall with mould lofts (3B) and picking shipyard and sheet metal workshop (4B).

8. Main metallurgical warehouse – main storage area for sheet metal and sections (preserved in small fragments)

History of the object
The square was created at the end of the 1940s as part of the development of sheet metal works 4B, on the site of earlier storage areas which, however, laid outside the perimeter of the then Nazi Schichau Werft (Schichau Shipyard) during the Second World War. The site was then and previously located between it and the then Wagon Factory (Waggonfabrik). After the Second World War, it was an extensive yard, originally comprising a new raw sheet metal depot, a steel profile (section) depot, a coal depot, a scrap metal depot and a lumber yard, wooden beams – the so-called block yard, serving the nearby slipway carpentry workshop, which was engaged in fitting out and repairing wooden elements of the slipway (e.g. launching tracks). Later on, the entire yard served as the main warehouse for steel materials – plates and sections, imported from steel mills and used by the steel material processing and hull section prefabrication departments throughout the shipyard.

Character of the object
Storage yard with infeed cranes on flyovers.

Structure
An extensive storage yard armed with tracks (main turnout) and 9 cranes with capacities of 5 tonnes (six cranes), 8 tonnes (one) and 10 tonnes (two).

Department affiliation of the object
Metallurgical Supply Department (Mh).

Function
It was the main storage yard of the Gdańsk Shipyard, which received metallurgical materials (sheet metal,

steel sections) delivered to the shipyard by rail from the steel mills. It mainly stored steel sheets and steel profiles imported to the shipyard, which were necessary for the construction of structural elements of ship hulls. The yard was divided into sheet metal and section storage. From there, the material, after being prepared and cleaned in the rolling mill (20B, non-existent) and the cleaning machine (21B, non-existent) located within it, was sent to the sheet metal processing hall 4B (sheet metal workshop) and the non-existent section processing hall 6B (frame workshop), where it was processed to prepare it for assembly into ship sections.

Elements of the original equipment
Overhead cranes, rolling mill, blasting machine.

Preserved equipment
None.

Environment
The defunct oxygen plant (69B) and the defunct cylinder store (58B), sheet metal processing hall 4B and the defunct section processing hall (6B), the boundary of the shipyard on the city side and the Northern Shipyard.

9. Sheet metal working hall, so-called sheet metal workshop, with yard and social/office annexes – connected buildings 4B, 10B, 11B, 106B

History
The sheet metal building had been under construction since the late 1940s, as part of the post-war expansion of the Gdańsk Shipyard. It was put into service in 1952. It was built on the site of former storage areas (including building materials and hull materials). The preparation of steel material (plates) for the prefabrication of ship sections continued in the sheet metal workshop until 1998. The hall is currently used by a private entity. Social and office annexes were added in the 1950s (south – 10B) and in the 1970s (north – 11B, partly 106B).

Character of the object
Production hall with external cross yard with overhead cranes, as well as warehouses and social and office annexes.

Structure
Production hall, single-storey, single-space with five process passages (process lines with different specialisations), closed by separate gates (now part of the upgraded gates). Social and office facilities were added to the south and north walls of the production hall, with a floor. The first (10B) housed, among other things, the department changing rooms (on the ground floor) and the canteen (later moved to a new annex on the north side). It also periodically housed an optical mould loft (on the first floor) and a toolroom, as well as the Metallurgical Supply Department (Mh), which was responsible for, among other things, the supply and delivery of sheet metal and angle iron to the shipyard, as well as their distribution and issue on the site and the collection of waste material. The Mh department also administered the shipyard's main metallurgical warehouse (the yard, no longer existing). The older extension (10B) also housed the rooms of the master and manager of the sheet metal works department (part of the department K1, also on the first floor). The new annex (11B), located on the north side and built in the 1970s, housed the offices of the technologists and management of the department K1, the Metallurgical Supply Department, a new canteen (on the first floor) and warehouses (on the ground floor), including the blacksmith's stencil warehouse (106B). After 2000, the façade of the northern part of the hall was rebuilt and a massive entrance gate was added. On the west side of the hall is an area

37. Gdańsk Shipyard sheet metal machining hall – sheet metal shop (4B), cutting of ship's plates, 1980s (?). Photo: Z. Mirota, State Archive in Gdańsk collection

equipped with overhead cranes, the former rolled sheet store, which is a cross passage from which materials were fed into the interior of the processing hall.

Department affiliation of the object

Hull Processing and Prefabrication Department K1.

Function

In hall 4B, sheet metal processing took place for the hull departments throughout the shipyard – cutting with gas torches (burning), bending, rolling. From the mould lofts in hall 3B (located on the high floor, organisationally part of the department K1), templates of individual ship parts, mapped on plywood and mould-

ings, were sent to hall 4B. The loftsmen then transferred the shape of each part of the sheathing from the plywood or batten to the metal sheets, using mainly a score, stylus and string (manual lofting). Next, the individual points of curvature of the ship's part were marked (scored) with a punch (sharpened marker), then the welder cut out the shape of the part marked on the sheet metal with a torch (burned). Later, machine cutting (burning) of curved shapes was also introduced. Instead of templates, a 1:10 scale template was used for manual lofting. The shape of the template was read in the reader of the machine, which – moving along the outline of the part mapped on the plywood – cut out the same shape in the ship's sheet metal. In the 1970s, the plywood stencil was replaced by a photocell. The control of the sheet metal cutting machines was guided by data transferred via perforated tape. The sheet metal cutting machines used at CHPaPP were entirely numerically controlled – sheet metal blanks were stored on a floppy disk and then on a CD, with the final cutting data transferred via a computer link.

The templates used to transfer the shapes of the ship's parts onto the sheet metal were stored in a special room with a mezzanine floor, located in the new annex of the sheet metal workshop (106B).

Steel material for the ships' plating (steel plates) was delivered to hall 4B on the west side from the main steelworks warehouse (yard). Before the materials went to the processing hall, the ship's steel plates first passed through the now defunct rolling mill, where annealing (stress-relief rolling) was carried out. This was to eliminate the stress on the steel material created by the manufacturing process in the steel mills (hot rolling). Another purpose of rolling the sheets before processing them in the shipyard was to level the surface – to remove the unevenness created when the material cooled unevenly in the mills after primary rolling, and to eliminate the deformation caused by transport and handling, as well as to remove the scale present on the surface of the material. The metal sheets were then directed to a cleaning machine, where they were cleaned using streams of fine metal particles. The entire scope of the process involved heating the steel material to 60°, blast-cleaning (shot-blasting), so-called temporary protection primer painting (preservation) and drying the sheets by subsequent heating. The rolling mill and purifier buildings were located between the main metallurgical warehouse (yard) and the external cross passage (smaller yard) of sheet metal processing hall 4B. Later, the steel profiles were also cleaned and maintained in the blasting machine for the processes carried out in the section processing hall – the so-called frame workshop (6B). The sheet metal exited the blasting machine on special fixed conveyors – roller tracks (feeders) and entered the open cross passage of sheet metal processing hall 4B – a square (preserved) armed with two cranes: a hook crane – for handling scrap or waste, and a magnetic crane for feeding sheet metal. The square was the site of the sheet metal separation. From there, depending on the technological purpose, the material was directed and fed to individual work passages located inside the sheet metal workshop.

Hall 4B was divided into five process (mechanical processing) passages. Each was enclosed by a separate gate and had its own production specifications. Passage no. 1 (light) was used to process light sheet metal for ship walls, knots, caps, etc. In passage no. 2, curved cutting was carried out on the sheets needed for, among other things, the bottom of the units. This passage was equipped with the numerical machines used for this process. Passage no. 3 was used to make straight cuts in sheet metal intended for, among other things, deck plates, sides, bulkheads and superstructure walls. In passage no. 4, the sheets were lofted by hand, while in passage no. 5, the sheets were bent. The fifth passage was equipped with heavy-duty bending and rolling machines – specialised presses and rollers for bending sheet metal. It housed, among other things, a press with a pressure of 700 tonnes, used to bend the sheet metal necessary for the assembly of irregularly shaped surfaces, including the stern and bow sections of the ship (pear). In passage five, there

38. Part of the eastern elevation of the sheet metal machining hall (4B). Visible gates closing the three working passages, 2022. Photo: A. Trzeciak, collection of the author

was also a workstation for hand-bending smaller steel components – forge plates.

Each passage was armed with two transverse cranes, appropriately selected in terms of the lifting capacity adapted to the weight of the components being prepared in each passage. Overhead cranes were used to transfer the metal sheets to the various workstations. The lightest cranes were used in passage 1 (their load capacity was around 5 tonnes). In the 1970s, magnetic overhead cranes (equipped with special magnetic grippers for sheet metal) were installed in the sheet metal workshop. They were installed on flyovers 4, 3 and 2. One of the cranes working longitudinally on passage 4 was able to move its trolley transversely at a certain point and also feed material to passage 5. Inside the sheet metal workshop, materials were transported on smaller mobile platforms (trolleys) running on tracks. The sheet metal hall was supplied with technical gases – oxygen, acetylene (needed for welding, among other things) and compressed air. Once the sheet metal process was complete, two wagons each loaded the cut or bent sheets into the individual work passages of hall 4B via separate gates and track lines (west side). They were then transported to the picking yards of the various assembly departments involved in the prefabrication of ship sections (K3, K2, C1 – the latter department received the material via a pontoon bridge). A large amount of processed material went to the retained picking warehouse K3 (in the storage yard behind hall 3B).

Hall 4B was in operation 24 hours a day, virtually all week. It worked in three shifts. Work started at 6 am on Monday at the plate shop and finished on Sunday at around 12 noon to 2 pm. Approximately 10–15 rail wagons with processed materials destined for the ship sections were leaving hall 4B every day. Annually, sheet

metal processing hall 4B processed around 100,000 tonnes of steel into the starting material needed for the prefabrication of ship sections!

The annexes housed social and office space to enable the operation of the sheet metal and section processing workshop and the entire K1 Hull Processing and Prefabrication Department.

Elements of the original equipment

Overhead cranes (including magnetic cranes), transport trolleys, forging plates, machine tools (including, for example, bending machines).

Preserved equipment

Overhead cranes (including magnetic), some machine tools.

Surrounding area of the building

The defunct main steelworks warehouse – a storage yard for sheet metal and angle iron with five cranes (5, 8, 10 tonne capacity). Smaller (retained) yard – cross passage with hook cranes (retained, 10 tonne capacity) and magnetic cranes (not retained, 10 tonne capacity). Small brick sewage pumping station building (south side, extant, 82B). Central transformer station (north side, 397B). There was also a carpentry workshop (no longer existing, 30B), belonging to Carpentry Department W5, in the vicinity of the sheet metal works. Among other things, it was involved in the preparation (replacement) of the wooden elements of the slipways (the lining of the launching lanes) and the elements protecting the ship's cargo holds (so-called cargo battens).

10. Profiles processing hall – frame workshop (no longer existing) – object 6B

History

The hall was built around 1937. It had an area of 6,000 m^2 and a volume of 39,600 m^3. Next to it was mould loft no. 2 of the Schichau Shipyard (Schnürboden II), later mould loft no. 2 was probably merged into one complex with the hall in question. The object served as a preparation and processing hall for ship sections and frames. It had two working passages. It was equipped with a set of state-of-the-art machine tools and cranes with a lifting capacity of up to 8 tonnes, and a specialised, double-sided, 16 m-long, coal-heated, five-burner annealing furnace for heating sections for frames. This furnace was used until the 1970s. The building retained its function even after the Second World War. Next to it was an extensive section storage yard, part of the main metallurgical warehouse of the Gdańsk Shipyard. Hall 6B was demolished after a fire in 2012.

Character of the object

Production hall.

Structure

Single-storey, single-space hall with two working passages.

Department affiliation of the object

Hull Processing and Prefabrication Department K1.

Function

The frame workshop was located in close proximity to a warehouse of steel profiles used in the preparation of ship frames. The sections (profiles) warehouse was part of the so-called main metallurgical warehouse, an extensive storage yard located at the shipyard's boundary, to which material from the metallurgical works was transported by rail. The yard was armed with three cranes with a lifting capacity of 5 tonnes. The frame workshop dealt with the preparation of ship frames and the processing of other steel sections – profiles, angles, flat bars, etc. – necessary for shipbuilding. The prefabrication of trusses for large ships was also carried out here.

Steel profiles were delivered to the hall from the depot by wagons or trailers. This was also where the templates for the frames were made (the templates for the frame workshop were also made on the upper floor of hall 3B). The section processing hall had two working passages. Steel profiles were processed in the passage located on the shipyard side – cutting to size (burning), bending frames, mechanical processing (e.g. grinding). The prepared material was then loaded by group onto rail wagons or trailers and taken to the picking depots, where it was arranged according to the technological groups and drawings of the individual hull sections and loaded onto wagons (or trailers) and sent to the individual hull departments K3, K2 and C1 for section prefabrication.

In the working passage of the frame workshop hall, located on the city side, prefabrication (initial joining of section elements) was carried out. Larger foundations for shipboard equipment (e.g. lifts) were also built here, which, due to their size and weight, could not be carried out by the equipment departments specialising in this, particularly the W3 Ship's Locksmith Department (the so-called Locksmith Department). Around 40 people worked on this section of the section prefabrication hall. A special furnace (the old Schichau Shipyard annealing furnace) was used to heat the sections from which the ship's frames were to be formed and to shape (bend) them accordingly. It was used until the modernisation of the Gdańsk Shipyard in the 1970s. It was then replaced by a specialised horizontal frame bending press. Later, ship frames were assembled (by welding) directly into ship sections. However, the prefabrication of the necessary steel profiles was still carried out in the section processing hall. Bent frames were used to a lesser extent until the early 21st century. They were made from so-called bulb flats – sections that stiffen the side plating.

Elements of the original equipment

A set of forge plates for fitters, welding stations, forge plates for forming frames, annealing and bending furnace for frames. During modernisation in the 1970s, a frame bending press was purchased, the furnace fell into disuse and was demolished.

Preserved equipment

None.

Surrounding area of the building

A non-existent section storage yard, part of the shipyard's main metallurgical warehouse, the preserved sheet metal processing hall 4B and the square in front of the section prefabrication hall with mould lofts (3B), the non-existent sports and entertainment hall of the Gdańsk Shipyard.

11. Picking area of department K3, next to hall 3B

History

A storage yard existed next to the hull hall of the Schichau Shipyard, probably from its inception in the late 1930s and early 1940s. After the war, it was called the sheet metal and machined profiles depot, and it retained its function throughout the existence of the Gdańsk Shipyard.

Character of the object

Storage yard serving the hull section prefabrication hall.

Structure

Square located between the hull section prefabrication hall, the Dead Vistula Canal and the North-

39. In the foreground, the hull materials picking yard with crane flyovers and cranes. In depth, north elevation of the hull section prefabrication hall (3B), 2019. Photo: T. Błyskosz, National Institute of Cultural Heritage archives

ern Shipyard boundary. It was initially armed with 4.5-tonne (four cranes), 5-tonne (two cranes) and 10-tonne capacity overhead cranes, as well as tracks that carried the processed material from halls 4B and 6B and took it to hall 3B for prefabrication.

Department affiliation of the object
Hull Assembly Department K3.

Function
The picking warehouse (yard) received pre-treated (cut, bent) steel material for the hulls of the units – plates from the sheet metal prefabrication hall, the so-called sheet metal workshop 4B (individual types of structural elements coming out of the respective working passages of workshop 4B) and profiles from the section processing workshop, the so-called frame workshop 6B. Material brought to the yard by rail wagons was then arranged by pickers into construction groups – complete sets of material needed to prefabricate individual ship sections. The material was then taken in groups to hall 3B by wagons or trailers, but not from the side of the square (there was no rail connection from this side), but from the south side.

Elements of the original equipment
Cranes.

Preserved equipment
Cranes.

Surrounding area of the building
Dead Vistula Canal, Northern Shipyard boundary, prefabrication hall 3B, slipways.

12. Prefabrication hall of the department K3 –hull workshop K3 and mould lofts K1 – hall 3B (commonly misnamed a mould loft)

History
The building was constructed in the late 1930s and early 1940s as part of the expansion of the Schichau Shipyard and to prepare the facility for the military production needs of the Third Reich. During the war, it served as a prefabrication hall for sections of German submarines. The hall survived the war. Shortly after its construction – during the Second World War – it was the largest and most modern hall of the Schichau Shipyard, and in the post-war years, until the 1970s, it was the most modern and largest hall of the Polish Shipyard no. 2 and the Gdańsk Shipyard. In the post-war period – probably in the 1970s – Hall 3B was upgraded due to ventilation requirements. However, it retained a set of its main equipment and tooling (cranes). It served as a prefabrication hall for hull sections. On the high floor was the mould lofts.

Character of the object
Production hall with mould lofts on the high floor and a social and office annex to the side. An extension of the manufacturing function of the hall was an external, uncovered work bay used for the prefabrication of hull flat sections.

Structure
Assembly hall with a mould loft. The hall has an area of 10,050 m^2. Single-space main hall. Part located on the south side – elevated. From this side, the top of the building bears the inscription "Gdańsk Shipyard", the sign of the plant and a depiction of the communist award, the Order of the Banner of Labour. On the west side, there is a social and office annex. A routing room was located on the high floor of the hall – a place for preparing templates for making ship parts. The main hall has two working passages. The third fly-through was the outside space of the hall, located between its east wall and the ramp flyover. This overpass was armed with an overhead crane supported by an overhead crane beam, mounted on the wall of hall 3B. There are bunkers underneath the office part of building 3B.

Department affiliation of the object
The main part of hall 3B and the welfare and office annex belonged to the Hull Assembly Department K3 (Shipbuilding Plant B), the track workshop to the Hull Processing and Prefabrication Department K1.

Function
In the mould loft on the high floor, tracing documentation was prepared for the entire shipyard. The theoretical lines of parts of the units were drawn on the floor and then transferred onto templates made of plywood. The templates were later lowered by special lifts from the high floor of hall 3B to the lower, main part of the hall and were then transported to the adjacent sheet metal workshop (4B – templates for mapping parts onto shell sheets) or the frame shop (6B – templates for mapping sections onto frames), where their shapes were mapped onto sheets and sections.

40. Hull section prefabrication hall (3B) of the Gdańsk Shipyard. On the high floor was the mould loft. The lower part of the hall belonged to the K3 Hull Assembly Department, while the mould loft belonged to the K1 Hull Processing and Prefabrication Department, 2018. Photo: T. Błyskosz, National Institute of Cultural Heritage archives

There was also a handy carpentry workshop in the mould loft, where templates were made, but also, for example, smaller models of ship structural elements, such as anchor drop arrangements with anchor locks (holes through which anchor chains pass), chains and anchors. They were intended to simulate the dropping of anchors and to check that the anchors would not hit the side of the vessel during the drop. The carpentry workshop housed smaller woodworking machines, e.g. planers, planing machines, saws. The boards and slats essential to the work of the mould loft were also made there.

The main part of object 3B – the production hall – was used to prefabricate ship sections. Sections weighing up to 40 tonnes were mainly produced here, as sections of this weight could be loaded onto the platform and taken out of the hall with the help of a team of cranes. The capacity of the cranes was 20 tonnes each. About 25,000 to 30,000 tonnes of steel were processed in the hall annually, about 2,000 tonnes per month. The material was delivered to the prefabrication hall by wagons from the picking yard, located outside the hall on the north side. Four wagons of material entered the hall daily, two for each internal flight. The wagons entered the centre of the prefabrication hall from the south side rather than the north side of the picking yard. They were unloaded during the yard's third shift using overhead cranes. Around 190 people customarily

worked in the hall, while around 40 people worked on the outdoor passageway. There were also two external passages – preparatory, located in the foregrounds of slipway B (outside hall 3B), preparing large blocks (elements made up of several sections) intended for the bows and sterns of ships. Blocks of several tens of tonnes (up to 150 tonnes) were assembled from subassemblies, such as decks weighing around 10 tonnes. Every day, scheduled after 6 pm, multi-tonne sections of ships that were prefabricated inside were taken out of the hall. They were loaded onto rail wagons and later onto self-propelled trailers and taken to the slipway forecourts, where they were used to assemble the larger ship blocks. Once the sections had been hauled out from inside hall 3B, its space was prepared to receive the next batch of material.

After the finished sections were hauled out, two wagons of material from the picking warehouse would enter the hall. From 10 pm to 6 am (8 h), the material was distributed to the various workstations using overhead cranes. In the morning, fitters would come to work and pick up tools and start prefabricating the next ship sections. The third working passageway of hall 3B was the outdoor space between the hall and the ramp flyovers. The prefabrication of the ship's hull plates (double bottoms) was carried out here. The prefabrication of ship sections had six stages. The first was fabricating the frames (in the frame workshop), the second stage of prefabrication was joining the lobes, the third stage was the bulwarks, the fourth stage of prefabrication involved building the flat sections – deck and walls, the fifth stage was adding plating to the walls, and the sixth stage was assembling the ship blocks. The basis for all prefabrication work was a technical drawing with a described technological scheme for each prefabrication step. The drawing specified how many parts a prefabricated element has, where and how the individual elements are to be fitted and where the sections are then to be directed. Documentation from the Design and Construction Office (RN) produced on large boards was passed on to the 14 hull technologists, who prepared a technology diagram based on the RN documentation and drawings, and a technology sheet was also added. Each column of the sheet specified the completion time for each part/stage of the assembly and the cost of each work. These cards were the basis for calculating wages. The individual sections were usually produced by 3–4 workers in work teams (e.g. grinders, welders, fitters, blacksmiths, etc.). The scope of work depended on the mass (weight) of the section.

The finished sections were then transported from the hall and the external working passage to the yards at the slipway – the so-called foregrounds – where they were assembled into larger blocks. Then only the dense sections were painted, while the other sections and blocks were covered with paint once assembled on the ramp. The completion of the area (e.g. cargo hold, engine room, bow – the complete bow section of the ship) was followed by formal acceptance by technical control and the shipowner. The next stage of work was to clean (sandblast) the sections and paint them.

The building, which was a side extension of hall 3B, housed, among other things: the departmental outpatient clinic subordinate to the shipyard medical district, lecture classrooms where theoretical classes were held for apprentices (Basic Shipbuilding School) in the department, changing rooms and master staff rooms.

Staircases and a special lift led to the upper floors, where the e.g. mould loft was located. On one of the mezzanines, there was an exit to the crane flyovers by which operators accessed the equipment cabins.

At the top of the hall (on a high floor located above the production hall) was the classical mould lofts. It was illuminated by numerous lamps strung across the length of the hall. Light was also provided by the numerous windows and skylights, which were washed regularly. Theoretical lines of hull parts, e.g. bottom, plating, decks, were drawn on the floor. In one room, stencils were being made from wooden plywood. The plywood for making the templates was purchased by the W5 Carpentry Department. The finished templates were transported via a special track located under the

mould loft ceiling to a hatch (lift) made in the floor and lowered to the lower part of hall 3B, from where they were transported to sheet metal processing hall 4B – sheet metal workshop, or section working hall 6B – frame workshop (templates were assigned to a particular section, as specified in the documentation).

During the period in which the classic mould loft became a numerical mould loft, numerous side cubicles were added – offices equipped with computers (partially preserved, accommodating workstations for 2–3 people). They were also training rooms for young loftsmen. Around 130 people worked in the mould loft.

Elements of the original equipment

Six 20-tonne capacity overhead cranes (one of them multi-purpose rotary), fitter plates, template lift, feeder rail. Welding warehouse – to the left of the entrance in the form of an annex, office space added in the form of sheet metal sheds. In the mould loft, lamps, a lowering shaft and a track for transporting the templates. In the north-west corner of the hall is an annex – a master's room made by department K3 staff from waste material.

Preserved equipment

Overhead cranes, lamps in the mould loft, stencil lowering lift with rail, master's annex, freight and passenger lift to the mould loft room.

Surrounding area of the building

Cobblestones with parts of trackways used to deliver materials for processing – mainly angle iron, sheet metal, etc. (the tracks were in operation until 2003), sheet metal processing hall 4B, ramps with forecourts, picking warehouse (to the north).

13. Hull Department K3 incl. forecourts (with free-standing paint booths - so-called elephant booth and giraffe booth)

History

The first slipways were built around 1891 as infrastructure for the seagoing Ferdinand Schichau Shipyard of Elbląg. There were seven of them at the time. Before 1912, the slipways were rebuilt. At the time, their number was six. They ranged in length from 140 m (slipway I – Helling I) through 180 m (slipways II and III), 200 m (slipway V), 230 m (slipway IV) to 240 m (slipway VI) at the start of the First World War. Powerful passenger transatlantic liners, some of the largest in Europe and the world, and line-of-battle ships (cruisers and battleships) for the Imperial German fleet were built there at the time. The inclines were modernised in the late 1930s. During the Second World War, Nazi Kriegsmarine submarines were built there, including the state-of-the-art Type XXI. As a result of the war effort, the slipways of the Schichau Shipyard were severely damaged. After 1945, they were not suitable for shipbuilding. Therefore, the first shipbuilding work started in the post-war Polish shipyard on the slipways of the former Nazi shipyard Gdańsk (Danziger Werft), i.e. the later area A of the Gdańsk Shipyard. Even in the early post-war years, the former slipways of the Schichau Shipyard (then Area B of the Gdańsk Shipyard) remained neglected. At the end of the 1940s, shipbuilding began on the shipyards after the shipyards were merged and the slipways were overhauled and retrofitted with lifting equipment. There were five slipways at the site at the time. In the 1970s, another major upgrade of the slipways was carried out, while reducing the number of slipways to three – B5, B3 and B1. Between 1974 and 1978, the slipways were armed with new KONE

cranes with lifting capacities of 50 and 150 tonnes. Slipway B5 was the largest slipway in the shipyard until the slipways in area A (slipways A1 and A2) were upgraded in the 1970s. The largest vessels were built on it at the time. After reconstruction in 1974/1975, slipway B1 became the largest slipway in the Gdańsk Shipyard and one of the largest in Poland and Europe. It was formed from slipways B1 and B2. It was 260 m long and 36 m wide. In the slipway area of the department K3, relics of the construction of earlier slipways and flyovers dating from the late 19th and early decades of the 20th century – including stone stairs or the bases of removed slipway flyovers – still remain today.

Character of the object

Shipyard slipways for the construction of ship hulls and the longitudinal launching of vessels with complete infrastructure. A feature of the slipway forecourts (storage and assembly yards) are the so-called elephant's booth and giraffe's booth, which are painting chambers used for painting ship sections.

Structure

One longitudinal open ramp (B3) and two longitudinal semi-dock ramps (B1 and B5) – with a gate to prevent water entering after pumping. A shelter was located under the B5 slipway. Beneath the slipway surface are numerous rooms used by the K3 Hull Department staff. The premises housed handy storerooms, changing rooms, toolrooms and staff rooms. Alongside the set of slipways, extensive sections of so-called slipway foregrounds have been preserved, where ship sections were stored and where they were assembled into blocks, which were then placed on the slipways. The foregrounds include the elephant booth and the giraffe booth – i.e. painting chambers. These are free-standing facilities. The elephant booth was built from, among other things, old launching skids from slipways B1, B2, B4 in 1978.

Department affiliation of the object

Hull Assembly Department K3 (Shipbuilding Plant B).

Function

The inclines were crucial to the shipbuilding process. They were also the most distinctive production facilities and hydraulic structures in the shipyard. In the first, post-war period of operation of the Gdańsk Shipyard, only the hulls themselves were built on the slipways, constructed from riveted sheets of metal and steel sections. The rudder set, propeller and part of the shaft line were also installed on the slipways. The installation of the ships' superstructures, as well as the rest of their equipment, was already done after the ship had been launched, towed and moored at the quays and in the fitting-out basins. Since the 1970s, as a result of the implementation of new infrastructural investments in the Gdańsk Shipyard (especially in the decade 1975–1985), the range of equipment still fitted to the hull standing on the slipway steadily increased. The aim was to install around 40% of the vessel's equipment (including the main propulsion engine and generator sets and other heavy ship equipment) before launching. The increase in the range of equipment on the units while they were still being installed on the slipways was made possible by investments in the expansion of slipway equipment – the purchase and installation of powerful KONE slipway cranes. These facilities made it possible to assemble ever larger and heavier structural components and ship equipment, such as the main propulsion engine, weighing up to 270 tonnes. This

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41. Preserved elements of one of the slipways of the K3 Hull Assembly Department. Pictured are part of the launching track, the slipway basin and the slipway cranes mainly used for the positioning of ship blocks and ship propulsion system components, 2019. Photo: T. Błyskosz, National Institute of Cultural Heritage archives

innovation has significantly shortened the outfitting phase of shipbuilding.

In the late 1970s and early 1980s, the assembly of the hull elements on the slipways and the phase of its partial equipment were as follows: Prefabricated components – ship sections – were delivered to the slipways of the department K3 from hall 3B, and thanks to technological advances and an increase in the lifting capacity of the slipway cranes, it was possible to handle and assemble increasingly larger and heavier components, including blocks (several sections joined together). Blocks were also assembled from sections directly on the ramp foregrounds. The transport of large and multi-tonne shipbuilding components (mainly sections) was originally carried out with tractors and trailers, and from the 1970s onwards with Scheuerle's specialised self-propelled platforms, which were purchased as part of the modernisation of the Gdańsk Shipyard. Pre-painting of the sections and blocks took place in the painting chambers, also located in the foregrounds of the slipway, in the so-called elephant and giraffe booths (preserved). During painting, the sections were set up on special stamps, the number and spacing of which depended on the weight of the piece to be painted. The parts to be painted were delivered to the painting chambers on self-propelled platforms. Once the sections had been lifted on the platform's hydraulic jack, they were supported by stamps. This was followed by cleaning (sandblasting) and painting. The paint chambers were covered with tarpaulins. The building housing the blasting and painting chambers was also located on the opposite side of the slipway, adjacent to the Fitting-out Basin (195B, now defunct).

The sections and blocks were then, with the help of a crane (or, when the blocks were heavier, two cranes connected by a traverse), placed on the ramps and joined together to form the hull. Two cranes with a maximum lifting capacity of up to 150 tonnes were able to lift and position sections/blocks weighing up to 270 tonnes on the slipway in a favourable position of the hull assembly region. The hulls standing on the slipways were partially fitted out, aiming to install as many fittings as possible.

All slipways were equipped with complete power and technical gas installations – oxygen, acetylene (necessary, among other things, for cutting and welding sections and blocks), light gas, carbon dioxide, compressed air, steam and water. Near hall 3B and the slipway was a small electricians' shed (preserved). The specialists working there serviced all the electrical work of the department K3, including ramps, repaired equipment such as CO machines, welding fixtures, etc.

The assembled hull of the ship was longitudinally launched from the slipway of the department K3. A tugboat moved aside a barrier gate so the slipway was partially flooded with water from the canal. The vessel quickly gained buoyancy in the stern section, and passing over the slipway sill with the bow section did not exert as much pressure on it as when launching on open slipways. After launching, the skids on which the ship slid into the water fell away from the hull but remained tethered. They were then retrieved by tugboat so they could be used for subsequent launches after being repositioned on the slipways.

Elements of the original equipment

Six KONE cranes (one K2 crane was added in 1999), smaller items such as equipment sheds and boxes, ship cradles steel scrap bins, etc.

Preserved equipment

Set of KONE slope cranes, numerous smaller pieces of ramp equipment. These elements are still used in production.

Environment

Hull section prefabrication hall, Malarzy St., buildings of the Transport Department MY and W5 Carpentry Department.

14. Car workshop hall with social and office annex – Buildings 87B and 97B

History

Structure 87B is the southern section of the former larger machine hall of the Schichau Shipyard (Maschinenhalle), built around 1890. In its northern part were the toolroom (Werkzeugmacherei) and the machine and boiler house (Maschichen und Kesselhaus). Around 1912, the hall was extended with the addition of a front extension on the south side, which survives to this day (from Jana z Kolna St., now the front part of building 87B). In the 1930s, the building served as shipbuilding hall no. 1 (Schiffbauhalle I). In the northern part, there was still a toolroom, as well as a tool forge (Werkzeugmacherei, Werkzeugschmiede) and an engine and boiler house (Maschinenhaus, Kesselhaus). After 1937 (before 1942), the Schiffbauhalle was partly demolished, presumably because of plans to run a track through it from the Schichau Shipyard main line to the railway turntable located behind the hall on the slipway side. In this arrangement, the hall survived the war. In the immediate post-war period, the northern part of hall 87B housed a toolroom, boiler room and warehouse, while the front annex of the southern part of the hall was home to the fire brigade

42. Front view of workshop and office building 87B (south elevation), belonging to the shipyard's Transport Department MY. On the left, the entrance to the car garage, 2018. Photo: T. Błyskosz, National Institute of Cultural Heritage archives

of Shipyard no. 2. After the merger of shipyards no. 1 and 2 into the Gdańsk Shipyard, the northern part of the hall was demolished. The southern part began functioning as a car repair workshop. Probably in the 1950s, the social and office annex 97B was added to the east of the old part of the hall.

Character of the object

Mechanical (car, repair) workshop halls with repair bays for cars (western section) and lorries and larger machines (central section), with an added one-storey social and office annex.

Structure

The old part of the hall (87B) consisting of two single-storey-high workshop halls. The new part (97B) is a five-storey social and office building, housing the offices of the Transport Department (departmental headquarters, foremen's and technical staff rooms) and the social facilities – departmental canteen, showers and toilets.

Department affiliation of the object

Department of Transport MY.

Function

The building housed a multi-station car workshop. Repairs were made here to the rolling stock of the Transport Department MY and other departments and units of the shipyard (e.g. company cars). In the western part, there were repair stands with channels mainly for cars (incidentally, lorries and tractors were also repaired here). Larger cars, as well as tractors, were overhauled in the central hall, which has more space and large entrance gates.

The shipyard's wheeled fleet comprised about 100 cars – trucks, semi-trucks, about 10 company cars, about 40 tractors, self-propelled cranes, numerous trailers for transporting ship parts (including sections) and more than 100 small electric trucks, etc. From the 1970s, self-propelled Scheuerle platforms were used in the shipyard. The correct operation of the rolling stock was fundamental to ensuring the continuity of the plant's production, including the hull and outfitting departments.

Elements of the original equipment

Car repair channels, mechanical workshop equipment.

Preserved equipment

Car repair channels.

Surrounding area of the building

The yards where repaired cars and tractors were parked, the ramps of the department K3.

15. Electric carriage hall and battery storage – 86B and 84B

History

The building on this site was constructed around 1890 as a warehouse for the Schichau Shipyard (Magazin). It was a free-standing object. It retained its function until at least the second half of the 1930s. A small building was added next door as an annex around 1912 and extended before 1937. In front of the warehouse building, there was a track and a place to park bikes and cars. Next to the annex, a small carbide depot of the Schichau Shipyard (Karbidlager) was built after 1912. After the Second World War, the former warehouse building housed a car repair workshop and later the electric carriage hall of the Transport Department MY of Gdańsk Shipyard. A smaller building (annex) was used to organise the garage and car workshop. The for-

43. The electric carriage hall belonging to the shipyard's Transport Department MY, 2018. Photo: T. Błyskosz, National Institute of Cultural Heritage archives

mer carbide depot housed a car repair workshop after the war and later a battery store for the shipyard's electric trucks. Building 86B was rebuilt in 1946 and in the 1970s and 1980s, as evidenced by structural details of the building, such as a timber or reinforced concrete ceiling, non-uniform pillars, concrete or cast iron.

Character of the object

Electrical vehicle workshop hall with battery charging stations and workshop, storage and welfare facilities, also a separate small battery storage building.

Structure

Two-storey building with a small ground-floor annex – garage. It housed the halls for the electric carriages on the ground floor, while the first floor had spacious changing rooms and social facilities. Battery Storage 84B is a small brick single-space building with glazing.

Department affiliation of the object

Department of Transport MY.

Function

The garage hall rooms, located in the main part of the hall on the north side, contained charging stations for electric trolley batteries. Shipyard electric trucks (battery-electric trucks) would come to hall 86B to recharge the batteries (e.g. at the end of a shift). The Transport Department MY had more than 100 battery-

44. Located in the electric carriage hall is the distinctive, massive socket for charging the batteries of the yard's electric carriages, one of the few surviving, 2022. Photo: A. Trzeciak, collection of the author

electric trucks of various types. In the electric carriage hall, the batteries of dozens of machines could be charged simultaneously. Battery-electric trucks were a common means of intra-shipyard transport in the shipyard. They transported smaller construction elements, such as metal sheets, planks and other types of materials, tools and equipment, as well as other types of supplies (e.g. food, mineral water). The carrying capacity of the trolleys was approximately 2 tonnes. The Department of Transport's electric trucks were an extremely important part of the production and investment supply system. Necessary car repairs were also carried out in the mechanical workshop. Internal cranes and hooks were used to install and pull out heavy trolley components (engines, batteries). In a separate small building 84B, there was a handy depot for spare large batteries for electric cars.

Building 86B was equipped with an underfloor steam heating system (duct system). Maintaining a higher temperature was important in the battery charging process. The hall also had an elaborate ventilation system to vent the gases emitted when charging

the powerful batteries of the electric trolleys. Efficient operation of the numerous battery charging stations was ensured by a special electrical installation, which included a dense network of cable connections, a system of massive battery charging sockets and power distribution boards. Anti-explosion cables (specially insulated) were used to create extensive cable runs and tracks to protect against sparks that could cause gas explosions. In addition, hall 96B had a drainage system for the dirty water and waste water generated during the cleaning of the battery-electric trucks. Dirty water flowed down the drainage pipe system. Outside, in front of the hall, is an indoor settling pond (pool, drainage tank).

The side of hall 86B housed the workshop rooms, where the necessary repairs were carried out on the electric carts, the mechanics' room, the toolroom, the mechanical workshop (this was Lech Wałęsa's workshop after his release from the internment centre), the locksmith's workshop, as well as handy warehouses and office and staff rooms.

On the upper floor, there were social rooms with changing rooms, washbasins and showers. A dozen numbered changing rooms served the employees of the MY, W5 (carpentry) and PK3 (Prefabrication Department of the Hull Department K3) departments. Communication in the building was through internal and external metal staircases.

Elements of the original equipment

Battery charging sockets, crane tracks and hooks, ventilation system components – external and internal, mechanical workshop equipment (workbenches, tools).

Preserved equipment

Electrical socket for battery charging, crane tracks and hooks, workbenches and equipment, (equipment for the display stand, the so-called Wałęsa Workshop display), external air handling units (?), metal external staircase.

Surrounding area of the building

There is a small square in front of the building on the west side, under which a covered settling tank has been located. On the eastern side of building 86B is the Ship Installation Department's storage yard, the so-called W2 pipe yard, which used part of Building 98B/99B/94B. From the south runs Stolarzy St., and to the north are the other buildings of the MY department – the car workshop and the office building (87B/97B).

16. Design and Construction Office Building – building 141B (no longer existing)

History

The building was constructed in the first phase of the Schichau Shipyard around 1891 as a company management building (Verwaltungsgebäude). It formed an important part of the foundation of the new shipyard, designed by Berlin architect Julius Rulffs. The building housed the management and administration rooms of the Gdańsk branch of the Ferdinand Schichau works, as well as the designers' stations located in an open hall. The building was extended before 1937. The building was used to create designs for vessels built at the Schichau Shipyard in Gdańsk. The building maintained its function between the wars and during the Second World War.

After its completion, the building was adapted for the offices of the Polish Shipyard no. 2. Subsequently, the building successively housed from 1 January 1951 – the Central Ship Construction Office, from 1 January 1953 – the Central Ship Construction

Office Number 1, from 25 November 1965 – the Central Construction and Research Centre of the Shipbuilding Industry. In addition to ship design, the responsibilities of this office included research and development work of the shipbuilding industry. From 1 January 1971 until the announcement of the bankruptcy of the Gdańsk Shipyard (1996), the building was the headquarters of the Design and Construction Office of the Lenin Gdańsk Shipyard (RN) and later of the Gdańsk Shipyard SA. After the declaration of bankruptcy, along with the transfer of the shipyard's production activities to the Ostrów Island site, the Design and Construction Office was also transferred. In its last years of existence, the building was not used by entities associated with shipbuilding. The unused building was deteriorating. In 2012, it was demolished.

Character

Office building, with parts of a workshop.

Structure

Multi-storey building. The body of the building consisted of two three-storey segments constituting the northern and southern parts of the body and a central part with two storeys between them. The building had no basement, and for the most part had a low ground floor (located at ground level). On the southern part only, there was a high ground floor, under which workshop rooms were placed. The door to the workshop rooms was located in the north external wall, providing access to these rooms without entering the main building. In addition to the utility workshops located in this space, there was also a modelling workshop here until the 1980s, where wooden ship models were made for promotional and contract purposes. The main entrance to the building led to the high ground floor from Jana z Kolna St. There were several concrete steps protected by a wrought iron decorative balustrade. A similar entrance was located on the side of the shipyard on Transportowców St. Both entrances led to the high ground floor, where there was a small hallway. From the lobby, the main staircase led to three floors. To the south, a short corridor led to the design studio and to the bar; to the north, after descending to the low ground floor level, there was a corridor leading to a staircase located in the northern part of the building, also connecting the three floors. There was a porter's lodge and a kiosk located in the hallway. The building had three internal staircases. In addition to those mentioned above, there was a staircase in the middle of the central segment providing communication with the two floors of the segment. In the ground floor section, to the north of the main entrance, was the office of the head of the Design and Construction Office, together with a secretariat and welfare facilities. These were the rooms occupied by the director of the Schichau Shipyard until the end of the Second World War. After the war, these rooms were occupied by the directors of the subsequent institutions housed in the building. Until the demolition of the building, the original interior design and facilities of this office (including e.g. an elegant sanitary facility, among others) were preserved in these rooms. Such equipment was not available in the other offices at the shipyard, including those in the shipyard management building. The first floor and some of the rooms on the second floor contained extensive rooms where specialist design studios were located. The corridors running along the entire complex had wooden windows and walls in the upper part. The entire space on the east and west sides of the building was occupied by rooms dedicated to specialist design studios. There were also rooms for the document copying and binding, as well as an archive room for the technical documentation produced by the design office. The archive was located near the central staircase. The room was structurally reinforced and had special heat-resistant insulation. In addition, access to this room was secured from the outside (armoured door), from the side of Jana z Kolna St. These doors could have been used in the event of a fire to evacuate documentation outside the building.

Department affiliation of the object
Design and Construction Office – RN department.

Function
The office was responsible for developing comprehensive technical documentation for the ships under construction. The entirely project-based phase of production preparation was carried out here. The office staff also ensured appropriate supervision of the documentation and its compliance. The office prepared the technical working design documentation for every ship in production, for all departments of the shipyard. This resulted in the need for continuous expansion of reprographic facilities. Therefore, the abovementioned duplicating and binding hall was created in the northern part of the ground floor in the late 1970s and early 1980s. The need for the safe storage and controlled accessibility of original technical documentation (tracing paper) and the increasing amount of digital media (perforated and magnetic tapes) led to the creation of an archive room (popularly known as the bunker) in the central part of the building, intended for the storage of original technical ship documentation in current use. When the production of a particular series of ships was completed, the complete technical documentation from this archive was transferred to the shipyard's central archive.

In the aforementioned modelling workshop, models of the projected units were created. Very often they became, as stipulated in the ship's contract, part of the captain's lounge facilities. They were delivered to the shipowner's office or were a coveted gift when important guests visited. They were also presented for promotional purposes at many exhibitions abroad.

The furnishings and functions of the various rooms changed, as did the number of people working in the building. Nearly 700 people worked here at the Design and Construction Office of the Gdańsk Shipyard (RN). In addition to the purely design studios, the import purchasing, technology, computer-aided design and management studios were placed here after reorganisation in 1990.

Elements of the original equipment
Furnishings for offices, including design offices (numerous drawing boards, many of which survived until the building was demolished in 2012) and workshops and studios.

Preserved equipment
None.

Environment
The non-existent Gate No. 3 of the Gdańsk Shipyard, the square in front of the building through which the junction of Transportowców St. runs, the buildings of the Department of Transport MY and the boundary of the shipyard and the urban Jana z Kolna St.

17. Hall of the Ship Installation Department (W2) and Carpentry Department (W5) – carpentry workshop III – with storage yard – object 99B/98B/94B

History
The building was constructed in the first phase of the Schichau Shipyard between 1890 and 1891 as a boiler forge (Kesselschmiede). At the time, it was connected to the locksmithing workshop (Schlosserei), a narrow, covered space (later hall 32B of the Carpentry Department). Before 1912, the boiler house was connected to the neighbouring copper forge building (Kupferschmiede). At the time, it was a sheet metal processing hall. In the

45. Part of the interior of the Ship Installation Department W2 building, the so-called tube and pipe manufacturing. Attention is drawn to the wooden ceiling and the massive wall-mounted pillars on which there is a beam – the track of the hall crane visible in the depth, 2018. Photo: T. Błyskosz, National Institute of Cultural Heritage archives

1930s, the hall served as the locksmithing workshop no. II of the Schichau Shipyard (Schlosserei II).

Character of the object

Production hall – prefabrication by the Pipe Department and carpentry workshop.

Structure

Single-space hall divided by a wall. Two-thirds of the hall was used for the prefabrication of ship installations – the piping of vessels. The remainder of the hall was used by Carpentry Department W5 and, later, by other departments (e.g. Hull K3).

Department affiliation of the object

Parts 98B/99B – Ship Installation Department, so-called piping (W2), Part 94B – Carpentry Department (W5). Later, this part was used by other departments of the shipyard.

Function

The first two sections of the hall (99B/98B) were used by the Pipe Department W2. Prefabrication of components for marine piping systems – pipes, flanges, etc. – was carried out here. Among other things, cutting, bending or welding of pipes and other components of the units' piping system was carried out here. The hall

contained numerous machine tools used to carry out ironwork and welding work on the pipelines – bending machines, drilling machines, milling machines, etc. – as well as welding stations. Adjacent to the building in question was a modelling workshop, where wooden models of ship's engine rooms were made in 1:10 scale. The removal of piping measurements mapped to scale and then in the fabrication documentation facilitated the work of prefabricating the units' piping components, carried out in the 99B/98B/94B section of the hall. Materials for the prefabrication of the pipelines were delivered to a storage yard adjacent to the hall. It was equipped with a crane that still stands there today. The components of the piping systems of the units under construction, which were prefabricated in the hall, were delivered to the ships standing at the fitting-out quays, where they were assembled.

The last part of the hall was periodically used by the carpentry department W5, operating in adjacent buildings. This part of the hall was also used later by the neighbouring Hull Department K3 as a warehouse. Outside the hall was a storage yard with an overhead crane (now only the beam of the external crane survives).

Elements of the original equipment

Overhead cranes, machine tools for ironwork and pipeline work – bending machines, drilling machines, milling machines, cutting machines, etc., outdoor crane.

Preserved equipment

Internal crane.

Surrounding area of the building

Buildings of the Carpentry Department W5, Stolarzy St., department K3 slipways.

18. Hall of the Carpentry Department W5 – carpentry workshop II – object 32B

History

Narrow hall located between carpentry workshop I (29B) and wood drying room (31B) and the hall of the Pipe Department and carpentry workshop III (94B/98B/99B). The northern part of the hall was built around 1890, probably at the same time as the neighbouring buildings. It originally housed the locksmithing workshop of the Schichau Shipyard (Schlosserei). The southern part of the hall was created around 1910 by covering the space between the Schichau Shipyard's copper forge (Kupferschmiede – post-war wood drying room 31B) and the boiler forge (Kesselschmiede – later hall 94B/98B/99B) with a roof. At the end of the 1930s, the entire hall 32 B served as locksmith workshop I (Schlosserei I). After the war, the northern part of the hall housed the rigging workshop and the southern part housed the tool forge and hardening workshop. Subsequently, the building served as the carpentry workshop and toolroom of the department W5.

Character of the object

Workshop, storage and office space.

Structure

Covered walkway between buildings. Part of the roof now removed. Facility housing workshops, storage space, department W5 toolrooms, service rooms.

Department affiliation of the object

Carpentry Department W5.

Function
The southern part of the hall housed the Technical Department, the toolroom and the repair and servicing of tools and carpentry machinery. The central and northern sections housed separate workshops, as well as a paint workshop and a warehouse for marinite panels (for furniture components on ships). It was a processing hall for formwork manufactured from marinite panels. The modular panels were covered with a resin laminate – unilam. Formwork was used to form the walls in the accommodation cabins on ships, but also in cargo holds and cold stores.

Elements of the original equipment
Small carpentry machines, overhead crane.

Preserved equipment
Crane.

Surrounding area of the building
The object is located in the centre of the complex of facilities of the W5 Carpentry Department – halls 29B and 31B, 94B and the facilities of the 98B/99B Pipe Department.

19. Wood drying room with office/social floor – hall 31B

History
On the site of the drying hall (ca. 1891–1900) was the small, free-standing copper forge building (Kupferschmiede) of the Schichau Shipyard. Before 1912, the building was rebuilt and connected to the neighbouring large boiler forge hall (Kesselschmiede). In the 1930s, and in the early post-war years, the building was used as a timber warehouse (Holzlager). It was subsequently used by the W5 Carpentry Department. A wood drying room and toolroom were located on the ground floor, while the first floor housed offices, social areas and medical offices, among others.

Character of the object
Wood drying hall with ancillary rooms on the ground floor. Above, an office and social floor.

Structure
Two-storey building. Downstairs – drying space with drying chambers ("ovens") and a storage area. On the office and social floor – department and master staff rooms, a dining room, a common room and medical offices (including a dental room) and a waiting room. On the ground floor by the staircase (next to where the time clock was located, as well as the departmental board for time cards punched in the clocks and the departmental notice board), the Labour Discipline Department verifying the punctuality of employees had its premises. On this level, there was also a departmental toolroom for issuing smaller and larger tools (smaller tools, such as planers, screwdrivers and drills, were issued in exchange for tokens, and larger tools, such as machines, planers, etc., were recorded in a special file). There was also a Social Department issuing, among other things, work clothes, shoes, towels, soap, washing paste, and milk (half a litre of warm milk before starting work).

Department affiliation of the object
Carpentry Department W5.

Function
Until the second half of the 1970s, the department W5 was involved in the equipment of ship interiors and the production of furniture for ship cabins. Its employees carried out all carpentry and joinery installation work. Some of the furniture was supplied from outside. After furniture production was moved to the Famos plant in Starogard Gdański, modular equipment was brought into the shipyard. However, some of

46. Hall with wood drying room (31B) of the Carpentry Department W5 of the Gdańsk Shipyard, 2018. Photo: M. Czacharowski, National Institute of Cultural Heritage archives

the work – such as the equipment of the officers' cabins, located at the extremities of the superstructures – was carried out individually in the shipyard based on the measurements taken directly in these rooms by the markers from the departmental (W-5) marker workshop. The carpentry elements manufactured by the department include veneered or plastered walls, built-ins, etc. There were about 600 people working in the department W5 and, together with the people of the department W1 (which originally belonged to W5, but was later separated and had premises next to the auditorium), about 900.

On the ground floor of the main part of building 31B, there was a wood drying room. Raw timber material was delivered to the Carpentry Department from the storage yard next to the hall or from the timber warehouse on Ostrów Island. The timber was delivered to the hall on special platform trolleys. The space contained five to seven electric wood drying chambers and storage racks on which the material was stacked after the drying process in the chambers was completed so it did not become damp again.

As the different batches of wood had different moisture contents at the beginning of the process, the drying of the wood started by levelling the moisture content of the different batches of materials – mainly boards, beams and logs – to avoid the wood cracking during drying. The raising and levelling of the moisture content of the timber material was carried out in the drying chambers in drying room 31B. This was achieved by blowing hot steam with fans to saturate the different parts of the wood equally with moisture. Steam was supplied by pipelines from the shipyard boiler house. Once the individual batches of wood were evenly moistened, a drying process lasting two weeks started in the drying chambers. The timber (approximately 4–4.5m in size – the material was graded by thickness into planks, beams and logs) was laid in

the chambers in layers, with gaps in between to ensure adequate air circulation. The chamber was closed and put into operation. Drying was done by blowing warm air into the chambers. When the presumed reduced moisture content was reached, the person controlling the drying process in the individual chambers would switch them off and the removed material was placed on shelves in the drying space. The timber was then delivered to the processing hall – carpentry workshop I located in an adjacent building (in hall 29B), with which the drying room was connected by trolley and platform tracks. The Gdańsk Shipyard also carried out a wood drying service on behalf of external parties.

The first floor of the building housed the offices of the technologists (each office had three technologists) in charge of developing the production cycle, the office of the head of the technological section, the offices of the typist who typed up the technological documentation, the offices of the W5 economic and human resources department, the departmental doctor's office with a waiting room, the dentist's office, the common room and the departmental dining room (which served, among other things, regenerative soups for those working in harmful conditions).

Elements of the original equipment

Tracks, wood drying chambers, storage racks. On the first floor in the canteen space – a lift with a preserved rail for transporting components (perhaps earlier or later). Office and study equipment.

Preserved equipment

Track, rail for transporting components located on the first floor.

Surrounding area of the building

Stolarzy St. and Niterów St., the Fitting-out Basin, Carpentry Plant II and the department W2/W5 building – 94B/98B/99B.

20. Woodworking hall – carpentry workshop I – hall 29B

History

The hall was built around 1890. It housed the carpentry workshop of the Schichau Shipyard (Tischlerei). The building served this function until the outbreak of the Second World War. In the 1930s, a small building annexed to the hall housed a model carpentry shop (Modeltischlerei). After the war (presumably during modernisation in the 1970s), the department W5 (19B) office and staff building, now defunct, was built on its site. Hall 29B also retained its function as a carpentry workshop after the Second World War. This building is one example of the sustainability of an industrial site's function.

Character of the object

Workshop and production hall.

Structure

Two-storey hall. On the ground floor, the machine hall (machine room, machine hall) or woodworking machine hall (mechanical processing hall) was located, while on the first floor, the furniture hall was located.

Department affiliation of the object

Carpentry Department W5.

Function

On the ground floor was located the machine room (or mechanical processing hall, machine hall), where large carpentry machines – machine tools – were located. The dried wood was transported on trolleys from the dryer in hall 31B to the processing hall. In the machine room, it was pre-processed

47. The two-storey carpentry hall (29B) of the Gdańsk Shipyard – in the centre, 2018. Photo: M. Czacharowski, National Institute of Cultural Heritage archives

(cut, planed, trimmed into mouldings, panelling, etc.). According to the scribe's specifications, ship carpentry fittings were also made here.

Upstairs was the carpentry workshop, the so-called manual or furniture hall. It was staffed by skilled carpenters. The equipment consisted of smaller carpentry machines – jigsaws, band saws, joiner's benches (carpentry tables) and presses, which were used to bend furniture, wall and shipbuilding pieces. Components for carpentry and furniture fittings were made here, including from material machined in the machine workshop on the ground floor of the building. The building had a freight lift, which was used to transport material from the machine hall to the upper furniture hall and to take already-made pieces from the furniture hall to the ships.

Elements of the original equipment

Joinery machinery – saws, jigsaws, planing machines, wood bending machines (presses), joiner's benches (tables), goods lift, external extractor (or ventilation system component).

Preserved equipment

External chip extractor or ventilation system component.

Surrounding area of the building

Next to hall 29B is a small building, numbered 385B, where shuttering (wall) boards made from, among other things, marinite were processed and glued together. Building 29B is located on the shipyard's Niterów St. Social building 19B, a former model carpentry workshop stood here, which is not preserved today.

21. Fitting-out Basin

History

It was built in the first phase of the Schichau Shipyard around 1890. An industrial crane with a lifting capacity of 100 tonnes was installed on its quay at this time, and a second, smaller crane with a lifting capacity of 16 tonnes was installed adjacent to it. A shipyard rail transport line ran along the western quay of the basin. In 1914, a powerful hammerhead crane (Hammerkran) with a lifting capacity of 250 tonnes was installed at the eastern edge of the basin to carry, among other things, machinery and equipment transported from the Elbląg plant to the vessels standing in the basin and being fitted out. As a result, the older cranes were removed. As one of the shipyard's most valuable pieces of equipment, the hammerhead crane was dismantled (destroyed) by the Russians in 1945. Despite the modernisation, the pool has retained its geometry to this day. This hydraulic structure has been used from the beginning as a Fitting-out Basin (Ausrüstungs-Bassin). It served the subsequent shipbuilding facilities operating on the site – the Schichau Shipyard, the Polish Shipyard no. 2 and the Gdańsk Shipyard. After the war, the pool was modernised – on the west side and then on the east side of the pool, crane subgrades were installed along with cranes (the previous cranes were decommissioned). In the 1970s and 1980s, two truss cranes with capacities of 10 and 20 tonnes were operated at the pool.

Character of the object

Shipyard fitting-out basin.

Structure

A basin of approximately 200 m in length for the mooring of vessels under construction, with shipyard quays equipped with the necessary elements – i.e. mooring polders, subgrades, installation channels.

Department affiliation of the object

Shipyard dispatcher (Dp) and individual departments.

Function

The basin, together with the quays, was used to moor vessels during fitting-out and installation work. Materials and equipment were delivered to the units by cranes working at the basin (with a capacity of 10 and 20 tonnes).

Elements of the original equipment

Quay equipment.

Preserved equipment

Pieces of quay equipment.

Environment

Department K3 slipways, the buildings of the outfitting departments – the Carpentry Department and the Ship Installation Department W2.

22. Pipe depot – object without shipyard's numbering record

History

The pipe yard was built in an area where there were already material sheds for storing wood (Holzschuppen) for the shipbuilding operations of Schichau Shipyard in 1891. Probably after reconstruction, one of the other buildings (or one built on the site of an earlier building in a similar layout) continued to serve as a storage facility (probably a pipe depot) at the Nazi Schichau Shipyard during the Second World

War. It was a covered object. After 1945, the building (or the area created after its demolition) was used to store the pipes of Shipyard no. 2 and the Gdańsk Shipyard. In the following years, the pipe yard changed its geometry due to the relocation of the yard's boundaries and the construction of the process road – Narzędziowców St. However, the function of the pipe depot was maintained until the end of the plant's existence.

Character of the object
Storage yard with crane.

Structure
A storage yard for pipes and other components of ship piping systems equipped with a crane (perhaps the former Schichau Shipyard's 5 tonne capacity overpass crane, near to the slope) on a track bed and racks for pipes and other stored materials.

Department affiliation of the object
Ship Installation Department W2.

Function
The yard was used to store pipes and structural components of ship installations brought into the shipyard. The resulting material was transported from the yard to the prefabrication halls of the Ship Installation Department (tube and pipe manufacturing W2), where it was processed for prefabrication of ship piping systems. A small crane with a lifting capacity of 5 tonnes was used to move materials to the ship's installations, stacking them on the yard and on conveyors carrying them to the halls.

Elements of the original equipment
Crane (one of the oldest or oldest surviving cranes in the yard) including track, material stacking racks.

Preserved equipment
Crane with track.

Environment
Rurarzy St. and Narzędziowców St., Machinery and Equipment Repair Department hall (48B), Carpentry Department hall W2 (27B).

23. Hall of the Ship Installations Department (W2) with annexes – objects 25B and 24B

History
Since the establishment and operation of the Schichau Shipyard (1891), there have been material sheds for drying wood (Holztrockenschuppen) on this site. Slightly further towards the quay – on the headland of the present Drewnica peninsula – an associated sawmill (Schneidemühle) was located. Wood drying kilns operated on the site until the first decades of the 20th century. As part of the modernisation of the Schichau Shipyard, which had been underway since 1929, two building complexes were constructed in the area before 1937. These were mainly related to the process of equipping ships and vessels with instrumentation and mechanical equipment sent to the Gdańsk branch from the Schichau parent plant in Elbląg (including ship engines delivered by barge to other company facilities). On the north side, these buildings were: machine building hall no. 3 (Schiffbauhalle III), another building housing the so-called Elbląg warehouse (Elbinger Magazin) on the upper floor and the so-called Elbląg locksmith's workshop (Elbinger Schlosserei) on the ground floor (later building 25B). The hall provided workshop and storage facilities for work on the installation of marine engines, mechanisms and other tooling and machine parts supplied from Elbląg. Heavier parts were handled with the

48. Hall of the Ship Installation Department W2 (25B) of the Gdańsk Shipyard. It originally belonged to the Schichau Shipyard. The last element of an extended complex of halls built in the area starting in the first decades of the 20th century, 2018. Photo: T. Błyskosz, National Institute of Cultural Heritage archives

help of a powerful hammer crane (Hammerkran), which was located in this area by the quay (on the site of a former sawmill). The final element of this ensemble of new industrial facilities at the Schichau Shipyard was locksmithing workshop no. 3 (Schlosserei III). To the south of the described complex, also in the vicinity of the existing Fitting-out Basin (Ausrüstungs-Bassin), a second group of combined shipbuilding facilities was built: a copper forge (Kupferschmiede) and a welding workshop (Schweisserei) with an annex (Anlage). Before 1942, the facilities of the first complex were extended. In the post-war period, these buildings (which later bore the separate numbers 25B, 24B, 26B) housed the ship's equipment workshops, while the main building of the second complex (later hall 27B, no longer existing) housed the pipework workshop, where installation and piping components for the vessels were prefabricated. Both sets of buildings survived until the second half of the 1960s. They were mostly used by the Ship Installation Department W2, the so-called tube and pipe manufacturing. Only the northern part of the first complex belonged to the Ship's Locksmith Department W3. In subsequent years, this part was demolished (probably during a major modernisation of the shipyard in the 1970s). Part of the remaining building bearing the shipyard number 25B was also demolished. How-

ever, its small annex numbered 24B remains. All the other facilities in the area were already used exclusively by the tube and pipe manufacturing W2 department, which also included part of hall 94B/98B/99B and hall 46A, located in another part of the shipyard – by the pier – along with several smaller facilities in its vicinity (all of which no longer exist). Later, hall 26B (part of the northern complex) was demolished. After the collapse of the shipyard, hall 27B (one of Anna Walentynowicz's workplaces, the largest part of the southern complex) disappeared in 2014. The surviving buildings 24B and 25B are the only remnants of this important outfitting centre for the German Schichau Shipyard and the Polish no. 2 and Gdańsk Shipyards.

Character of the object
Production hall with ancillary facilities.

Structure
Single-space production hall (25B) with lower annex housing storage and ancillary facilities (24B).

Department affiliation of the object
Ship Installation Department W2.

Function
The facilities were being used by the Pipe Department W2. Here, mechanical processing and prefabrication of components for marine piping systems (pipes, flanges, etc.) was carried out, e.g. cutting, bending, drilling, welding of pipes and other components. The hall was equipped with machine tools for locksmithing and welding work on pipelines. Materials for the prefabrication of the piping systems were supplied from the pipe yard. The prefabricated components of the piping systems of the vessels under construction were delivered to the vessels standing at the fitting-out berths, where they were assembled.

Elements of the original equipment
Machine tools for the prefabrication of pipework.

Preserved equipment
None.

Environment
Fitting-out Basin, Drewnica quay, Rurarzy St.

24. Machine and Plant Repairs Department Building R3 – object 48B

History
The building was constructed in the early 1940s as part of the expansion of the German Schichau Shipyard for the production of submarines for the Nazi Kriegsmarine. The building was 3,440 m^2 in size. It was an important part of the Schichau Shipyard's outfitting centre, supplying vessels with marine equipment and machinery. It served as a mechanical workshop where smaller items of mechanical equipment for the units were machined, possibly also items that were not machined at the parent plant in Elbląg. After the war, the hall retained the character of a mechanical workshop, but no longer of a purely equipment nature, but of a general repair workshop, where the machines and equipment necessary for production were overhauled. Machine repairs were carried out for the entire Gdańsk Shipyard. The hall was part of the Repair Department R3.

Character of the object
Workshop hall with office and staff area.

Structure
A single-space production hall with three aisles, with an elevated ceiling of the central aisle. The

49. The R3 department's machinery and equipment overhaul hall (deep, higher) and boiler room (64B – on the right). In the foreground, on the left, the preserved section of the shipyard railway line, Narzędziowców St. and a now defunct section of the flyover with pipelines for the transmission of, among other things, industrial gases, 2009. Photo: T. Błyskosz, National Institute of Cultural Heritage archives

building has an office and staff area to the north, together with the retained impressive department common room.

Department affiliation of the object

Machinery and Equipment Repair Department R3.

Function

The Machinery and Equipment Repair Department and the hall and equipment belonging to it provided production support (including hull and outfitting work) for repairing the mechanical equipment and machinery necessary for other technological and manufacturing processes. Equipping the hall with specialised smaller machine tools (lathes, drills, etc.) made it possible to carry out repairs to almost all the equipment and mechanical equipment necessary for direct production – carrying out locksmith work, making replacements for damaged parts and components of machines and equipment, etc.

Elements of the original equipment

Overhead cranes. Machine tools for light mechanical processing and locksmith work – including drills, milling machines, lathes, etc. Office and common room equipment.

Preserved equipment

Overhead cranes. Smaller pieces of equipment, such as tool cabinets. The hall continues to be used for production purposes. It is possible that the equipment used did not come from the Gdańsk Shipyard.

An extremely interesting room in the building, which does not have a production function, is the department common room with its ornate furnishings.

Environment

Pipeworks depot, Rurarzy St., Elektryków St. and Narzędziowców St.

25. Production Management Building – 132B

History

The building was erected in the early 1940s (or late 1930s/early 1940s) as part of the modernisation of the Schichau Shipyard for the construction of submarines for the Kriegsmarine and the development of the area around today's Elektryków St. – an area annexed to the shipyard in the 1930s. The building served as an office during the Second World War as well as during the operation of the Polish Shipyard no. 2 and the Gdańsk Shipyard. At that time, it was the headquarters of the Production Directorate.

Character of the object

Office building with offices (1st and 2nd floors) and storage, laboratory and social areas (ground floor).

Structure

A multi-storey building with a predominantly office function. There are bunkers under the building. The building is connected by a passage to the neighbouring building 90B.

Department affiliation of the object

Production Directorate (DP).

Function

It was a key facility for the planning and management of the production process of individual ships at Gdańsk Shipyard. There were individuals and units in the building dedicated to programming production work at individual units. The director of production (DP) and his two deputies responsible for hull (PK) and equipment (PW) production issues had their office here. Reporting to them were a number of technologists (including chief technologists, construction technologists), production planners and builders of individual vessels (each vessel under construction had a team of builders headed by a chief construction engineer). These employees also had offices in building 132A, but the builders (mainly those responsible for carrying out the work of equipment the vessels) usually worked in barracks erected on the fitting-out quays near the vessels they were building and fitting out. In building 132B, there was, among other things, a PO department, in charge of production planning, and a TTO department responsible for the division of labour. On the first floor, in addition to the office of the Production Directorate (colloquially: Production Headquarters), there was the office of the shipyard's chief dispatcher, responsible for the operation of the plant at night, after both shifts had ended and in the absence of the director and his deputies. Amongst other things, the dispatcher was responsible for receiving overnight material deliveries, in and out of the plant, yard safety (e.g. calling the fire brigade in the event of a fire), and contacting units returning from trials. The location of the facility right next to the shipyard quay provided better supervision of production work (mainly outfitting) at the vessels moored nearby. It also made it possible to observe the shipyard channel and the movement of vessels (e.g. those returning from trials and those approaching the quays), and to quickly make day-to-day decisions that were the responsibility of the people working here and the plant's units.

Handy storage facilities were located on the ground floor, including a paint store, a laboratory, office space and a canteen.

Elements of the original equipment
Office equipment.

Preserved equipment
Building currently used for other purposes.

Environment
Drewnica fitting-out wharf and Monterów St. and Elektryków St., the equipment centre buildings (25B, 24B), warehouse B (90B), which remain today.

26. Main Warehouse B – hall 90B

History
The building was built together with the rest of the development of the current Elektryków St. (see buildings 48B, 132B) as a warehouse for the German Schichau Shipyard. During the war, due to the height of the building, the highest parts were probably used as observation points, possibly also as firing positions. After the war, the building continued to serve as a warehouse for Shipyard no. 2 and the Gdańsk Shipyard. Unlike the main warehouse of area A of the Gdańsk Shipyard, it was the central warehouse of Area B, where specialised equipment and items of marine equipment, particularly electrical equipment, were stored.

Character of the object
Warehouse building with social areas.

Structure
A multi-storey building with an unloading hall on the ground floor and extensive storage halls on the ground and upper floors.

Department affiliation of the object
Warehouse Department (Gs).

Function
Equipment requiring good storage conditions was stored in the B warehouse building. Much of this was electrical equipment – electric motors, switchgear, generator sets, ship automation systems, instrument panels, etc. Equipment and materials were delivered to the storage building by rail. The wagons were entering the interior of the hall. On the ground floor, there was an unloading hall with a ramp. Heavier and larger items and equipment (e.g. large generators) remained on the ground floor, while lighter items were hoisted to the upper floors through openings in the ceiling, using overhead cranes with hoists and a 5 tonne capacity goods lift. The height of the hall is 7 m on the ground floor, 6 m on the first floor and 4.5 m on the second floor. The area of one floor of the warehouse is approximately 3,000 m^2. The storage spaces were separated by nets into cubicles, where materials and equipment were stored according to their type and assortment. In the storage halls, transport and communication routes (partially preserved) are marked with paint. Horizontal transport of components to specific storage spaces was made possible by overhead cranes located above the individual passages of the storage hall. Deliveries of equipment and materials were supervised by a dedicated Delivery Control Department. They were also checked by unit designers to determine whether the contracted equipment had arrived at the warehouse. The storage and issue of equipment and materials was handled by warehousemen. The warehouse functioned close to the W4 Electrical Department workshop, allowing its staff quick access to the equipment they were using. The freight lift allowed smaller pieces of equipment and appliances accumulated on the upper floors to be transported directly to the fitting-out berth and then to the vessels being built (fitted out). The lift was operated by trained crane operators or lifters. The heavier equipment located on

50. In the centre, the central warehouse building of area B (90B), view from the shipyard channel. Attention is drawn to the open gates of the hall that allow materials and equipment to be transported directly to the shipyard's fitting-out berths, visible in the foreground. The central section of building 90B (vertical), marked by a superstructure on the roof, houses a freight lift. On the left, department's W4, W1 and R3 social and workshop building (504A); on the right, in the background, the Production Management building (132B), 2022. Photo: A. Trzeciak, collection of the author

the ground floor was transported to the quay and the ships standing alongside it via a rail gate, which was used to bring in wagons of supplies.

Elements of the original equipment

Overhead cranes (5, 10, 20 tonnes), goods lift, unloading ramp, tracks on the ground floor.

Preserved equipment

Overhead cranes (5, 10, 20 tonnes), goods lift, unloading ramp, tracks on the ground floor.

Surrounding area of the building

Elektryków St., Production Management building, Electrical Department W4 hall, fitting-out berths.

51. The Electrical Department Hall W4, located on the Shipyard's Elektryków St. – in the foreground. On the left, the multi-storey warehouse hall 90B, 2018. Photo: T. Błyskosz, National Institute of Cultural Heritage archives

27. Hall of the Electrical Engineering Department – 33B

History

The hall was built around 1940 as part of the modernisation of the Schichau Shipyard for submarine production. It housed a locksmith workshop. In the post-war years (at least until 1950), a locksmith (equipment) workshop was also located here. Later, the building belonged to the Electrical Department W4, and a locksmith and electrical workshop was organised.

Character of the object

Production hall (workshop) with office/social floor.

Structure

Two-storey hall with open central space (workshop) and mezzanine floors and rooms of an office/social nature. They included rooms for departmental managers (head, deputy), a technology section with rooms

for technologists and rooms for middle technical staff – masters. Underneath the building are bunker chambers with partially preserved equipment from various periods (including World War II-era anti-aircraft doors – Luftschutztür manufactured by Steinau Neheim/Ruhr, air intakes, air generators, etc.).

Department affiliation of the object
Department of Electrical Engineering W4.

Function
The Electrical Department W4 had a wide range of tasks. The department was involved in the implementation of all electrical installations on ships, as well as the installation of electric motors, switchboards and automatic protection and measurement equipment. The department staff also tested the electrical installation. The Electrical Department employed electricians of various specialities as well as turners, locksmiths, welders and precision mechanics. The department had around 500 people. The W-4 workshop prepared the cables and the so-called cable tracks (metal) in which the cables were laid. In the main part of the hall (ground floor), under the windows and in a well-lit central space, there were locksmith stations with machine tools (lathes, drills, etc.) and welders' stations. Storage spaces were also located here. Components of the ship's electrical installations were prepared in the hall – cable cutting, prefabrication of cable ducts, approaches, pipes constituting cable sheaths (cutting, welding, etc.), preparation of equipment constituting parts of the electrical installation. The transport of heavier components was made possible by an overhead crane. Prepared equipment and plant components were delivered to the vessels being built (fitted out) at the quays.

Elements of the original equipment
Locksmith and welding stations with machine tools. Bunker equipment.

Preserved equipment
Bunker equipment.

Surrounding area of the building
Elektryków St., yard between buildings 33B, 90B and 504A, boiler house 64B.

28. Boiler room – object 64B

History
The building was constructed at the same time as other buildings on what is now Elektryków St. – in the late 1930s or early 1940s, as part of the expansion and modernisation of the Schichau Shipyard. The boiler house supplying the shipyard with steam was located here, including in the post-war period. In the 1990s, as a result of the failure of the old boilers, two unused ship boilers originally intended for fishing base vessels were installed in the plant. The boilers were equipped with modern burners, suitable for firing two fuels – gas and fuel oil.

Character of the object
Boiler hall, part of the heating infrastructure of the following shipyards.

Structure
Single-space hall with lowered floor level.

Department affiliation of the object
Chief Energy Officer (RE).

Function
Steam production to feed the heating system.

Preserved equipment
None.

Elements of the original equipment
Boilers.

Environment
Narzędziowców St., the buildings of Elektryków St.

29. W4 Electrical Engineering Department staff building with workshop – object 504A

History

The building was erected during the post-war reconstruction and expansion of the Gdańsk Shipyard, as part of the development of the social base carried out in the 1950s and 1960s. Later, the building was used by the Electrical Engineering Department W4 and the Painting Department W1 as

52. The hall of the shipyard boiler house with the now defunct overpasses with pipelines for the transmission of, among other things, industrial gases, 2009. Photo: T. Błyskosz, National Institute of Cultural Heritage archives

a social building. The workshop was part of the R3 repair department.

Character of the object

A building of a social and office nature, with a workshop on the ground floor.

Structure

Multi-storey building. On the ground floor facing the quayside – a workshop illuminated by a row of large windows. Above, on the following floors – social and sanitary rooms, changing rooms, showers and toilets, as well as the space left over from the canteen (now partly converted into office rooms).

Department affiliation of the object

Department of Electrical Engineering (W4), Department of Painting (W1), Department of Mechanical Engineering and Plant Repair (R3)

Function

The workshop, located on the ground floor, complemented the production activities – repair work carried out in the central hall of the R3 – 48B Machinery and Equipment Repair Department. The main purpose of the building was a social function. On the upper floors, there were extensive changing rooms, bathrooms, showers, etc., which were used by employees of departments W4 (second floor) and W1 (third floor).

Elements of the original equipment

Workshop equipment, changing room equipment – staff lockers, dining room equipment, including an external lift used to deliver meals to the departmental canteen.

Preserved equipment

Partially used building. Some of the cupboards and external lift retained.

Surrounding area of the building

Fitting-out wharf from Monterów St., the square between buildings 504B and 90B, 33B, 64B and Narzędziowców St.

53. Interior of the workshop of the R3 department in the W4/W1 department's social and workshop building. Attention is drawn to the health and safety slogans hanging on the walls in the 1980s, which were a distinctive feature of production interiors – halls, workshops etc., 2022. Photo: A. Trzeciak, collection of the author

30. Fitting-out berths

History

Quays have been built or upgraded in all periods of the shipyard's history. They were one of the main elements of the shipbuilding infrastructure for the production and repair of vessels. In the mid-19th century, these berths were mainly wooden; later, from the second half of the 19th century onwards, they were increasingly masonry, being built using stone and brick elements, as well as steel structures and elements. The lack of a comprehensive technical survey of the quays of the Gdańsk Shipyard does not, unfortunately, make it possible to define even an approximate typology of them and to indicate their structural features, all the more so as these hydrological structures have been repeatedly modernised and rebuilt over the decades of their existence and the operation of successive shipyards. Conducting structural and typological studies of the shipyard quays and their integral components (such as mooring polders) could yield interesting results. In the area covered by the study, the fitting-out berths of the Gdańsk Shipyard extend from the Fitting-out Basin to the Dock Basin. The two longest strings of shipyard quays bear post-war names: Drewnica (on the shipyard's Drewnica Peninsula – in Area B, the former quay of the Schichau Shipyard) and the Refurbishment Quay (in area A, the former quay of the Imperial Shipyard and the Danziger Werft – Gdańsk Shipyard). The current quays at the Gdańsk Shipyard are still partly used for production and repair work and retain much of their original equipment.

Character of the object

Yard fitting-out berths – used to moor vessels during the outfitting phase of production.

Structure

Quays with infrastructure – elements such as mooring polders, power distribution boards, ducting of industrial gas and power network, crane substructure with cranes.

Department affiliation of the object

Shipyard dispatcher (Dp) and individual departments.

Function

The quays were used for mooring the vessels under construction after launching, for fitting, installation and assembly work, hull cleaning and painting, etc. Individual outfitting departments operated in their vicinity or had their own designated area for storing materials. The quays were equipped with technical gas networks (oxygen, acetylene, steam, compressed air, etc.) and the power grid necessary to carry out the various works. Cranes were used to install larger structural components, tooling, equipment and machinery. In the 1970s and 1980s, a total of six cranes with capacities ranging from 5 tonnes (two) through 10 tonnes (one), 16 tonnes (one), 20 tonnes (one) to 50 tonnes (one) were working at Drewnica and Refurbishment Quay.

Elements of the original equipment

Bitts, power distribution boards, gas connections, ducts for the distribution of electrical cables and technical gas networks.

Preserved equipment

Largely retained original furnishings.

Environment

The entire shipyard area was adjacent to the quays.

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54. A section of the shipyard berth with preserved infrastructure, including the substructure of the quay crane, 2018. Photo: T. Błyskosz, National Institute of Cultural Heritage archives

31. Fitting-out Pier

History

The Fitting-out Pier was built in the 1950s in connection with the modernisation of the Gdańsk Shipyard and the increase in the number of quays. It was built in a distinctive shoreline bluff (created while the First World War was still in progress, around 1916) to create a port for the floating docks of the Imperial Dockyard. At the time of the pier's construction, the shipyard was struggling with, among other things, a lack of specialised quays. This was a period when the Gdańsk Shipyard was in the post-war expansion phase. It increased its manufacturing capacity by building new production halls and increasing the length of the outfitting and repair quays. The shipyard, with its combined repair and production functions, was then becoming a purely production shipyard, where the serial construction of vessels was already carried out from 1947/48.

Character of the object

Pier – mooring platform.

55. View of the Fitting-out Pier from the west. A floating dock with a refurbished vessel inside, 2018, moors by it. Photo: T. Błyskosz, National Institute of Cultural Heritage archives

56. The Fitting-out Pier with the ship (left) and floating dock (right) moored at it. The Gdańsk Shipyard pier has an almost complete set of infrastructure, including tracks, technical gas connections, electrical switchgear and mooring polders, etc., 2022. Photo: A. Trzeciak, collection of the author

Structure

Fitting-out pier with complete technical infrastructure – gas connections, networks, switchgear etc.

Department affiliation of the object

Shipyard dispatcher and individual departments (Pd).

Function

The Fitting-out Pier fulfilled the same role described above as the quays and the Fitting-out Basin. In the 1970s and 1980s, two cranes with capacities of 5 and 10 tonnes were operating on the jetty.

Elements of the original equipment

Bitts, industrial gas ducts and connections, electrical networks, etc.

Preserved equipment

Largely preserved to this day.

Environment

Przy Pirsie St., the pontoon bridge to Ostrów Island (Holm), Drewnica quay with Monterów St.

32. Transformer and distribution station (transformer substation, transformer) – object 347A

History
The facility was built before 1965.

Character of the object
Transformer and distribution station.

Structure
One-storey building with transformer units and a distribution room (switchgear room). On the roof is a distinctive large vent with a semi-circular design, used to dissipate heat from the transformers.

Department affiliation of the object
Chief Energy Officer (RE)

Function
The distribution of electricity and the supply of electricity to individual shipbuilding facilities – production facilities (halls, quays) and others. A high voltage (15 kV) was supplied to the building via an external electrical system, which was then reduced in transformers to 380 volts. In the adjacent switchgear room, there were current distributors distributing voltage to the individual electrical circuits and

57. A9 transformer and distribution substation – object 347A. On the right, the defunct building of the tube and pipe manufacturing department W2, on the left in the background, the social and office building of the department W4, 2015. Photo: A. Trzeciak, collection of the author

cables bringing electricity out to the individual shipyard facilities (on the quays etc.), to the switchgears located there. Each circuit was protected in the event of a short circuit.

Elements of the original equipment
Transformers, electrical switchgears.

Preserved equipment
As above. The station is still in operation.

Surrounding area of the building
Fitting-out pier, basin at the pier, Przy Pirsie St., the site of the defunct Pipe Department W2 Hall (46A).

33. Toolroom hall(s) – combined objects 49A and 75A

History
At the end of the 19th century, the halls were replaced by warehouses for the Imperial Shipyard and material sheds for the shipyard's boiler forge (Materialien-Schuppen für die Kesselschmiede). The main hall of the toolroom was built around 1905 as a copper forge (Kupferschmiede). The hall retained this function until the end of the First World War. Before 1923, side halls, aisles (the western one later designated as hall 75A), were added to it. Later, the two combined halls were used as a machine-building workshop (Maschinenbauwerkstatt – this is commemorated by a preserved inscription on the top of the central part of the hall) at the Gdańsk Shipyard between the wars. The building was merged with other neighbouring buildings into one complex of mechanical workshops in the inter-war period, due to the (machine) production being carried out at the time – it was one of the most important industrial complexes of the shipyard. In the immediate post-war period, the halls served as tool rooms and maintained the character of mechanical workshops. Later, the first of these functions was perpetuated.

Character of the object
Interconnected production halls with mezzanine floors housing offices.

Structure
Two halls (aisles) connected by a glass wall. The smaller hall has internal departments. Larger, single space – with annexes against the north wall and office mezzanines housing the technologists' rooms and a social area (the departmental so-called breakfast room). Adjacent to the halls on the west side is a square which is an extension of their function.

Department affiliation of the object
Tooling Production Department (T2), since the 1980s the S6 department.

Function
The hall was used to make a variety of technical components, machine parts, tools and tooling of smaller sizes – commissioned mainly by the production departments, especially the hull departments, where there were not enough smaller machine tools to make such components. Tooling for special production operations, such as non-standard assembly, was produced. Prototypes of the necessary technical components, tools and instruments were prepared in the Technology Department of the Design and Construction Office (RN). At the contract preparation level, a chief site engineer was appointed in the TH Department and a production preparation team was formed once the contract was signed. The team was preparing operations to launch production of the

58. The toolroom hall of the Gdańsk Shipyard (in the centre behind the flyover). On the left, a section of the shipyard fire station building is visible. Behind the toolroom, machine assembly hall 28A, 2018. Photo: T. Błyskosz, National Institute of Cultural Heritage archives

prototype ship. It also took into account the need for larger components and equipment to create the prototype. The Instrumentation Construction Department prepared the technical documentation of the equipment (drawings) and the manufacturing of these components was outsourced to the UN department. Within the structure of the Construction Department, there was a special unit responsible for preparing the tooling. Prefabricated components for the manufacture of these technical components were supplied from outside, e.g. from the following warehouses: metallurgical (MH – depot next to the sheet metal works at the railway entrance to the shipyard), piping and others. But also from the hull departments. Often, this was waste material, such as fragments of ship's plates. Other components were supplied from shipyard warehouses. The hall contained workstations with machine tools – drills, lathes, milling machines, grinders, etc., where the various stages of production work were carried out. There was also a small forge/hardening workshop operating for the toolroom and welders' stations.

Tooling necessary for the construction of the hull was made here, but also tools for the machine fitters and workers in other production departments. The design and manufacture of tooling, for example, had to do with the adoption of new types of ships for production. This was specialised instrumentation used on certain types of craft. For example, the installation of a propeller, shaft line, rudder set, etc. used both tools and structural components or appurtenances (e.g. anchor-fixing fixtures to prevent the anchor from dropping onto the quay or the side of the hull, trolleys, a special propulsion test wheel, a dynamic brake and many others).

Hardening of components, e.g. to straighten them by heating them with torches and immersing them in containers (vats) of oil, also took place here. The toolroom also repaired and refurbished tools from the production departments (sharpening, etc.). Larger components were prepared in the yard, where toolroom products and necessary materials were also stored.

Elements of the original equipment

Buildings – mezzanines, floors, small-scale machine tools – drills, grinders, welding stations.

Preserved equipment

Metal staircase and mezzanine floors, including with office cubicles, office space located on the ground floor in the northern part of the hall. Internal components for technical gas pipework. Timber pavers and steel kerb elements.

Environment

Narzędziowców St. and Mostowa St., 28A machine assembly hall.

34. Square at toolroom 49A and 75A

History of the object

This is the oldest part of the Gdańsk Shipyard. In 1844, the Prussian corvette repair base was located on the site of the square, later developed into the Royal Shipyard, later renamed the Imperial Shipyard.

Character of the object

The work area, which included buildings made partly of lightweight construction (now defunct) and storage spaces. The yard was equipped with the necessary technical connections – electricity and industrial gases.

Department affiliation of the object

Tooling Production Department (T2), since the 1980s the department S6.

Function

The scope of work carried out in the yard was an extension of the functions carried out in the toolroom building (49A and 75A). Metal waste, mainly ship steel from the hull departments, was transported here and parts of the structure and auxiliary components were made. Larger templates were made in the yard, smaller ones in hall 49A for prototyping smaller devices. Templates (parts) of beds used to prepare bent fuselage components, including the bulbous bow, were made here. They were fired and cut by hand in the yard. The material to be processed in the yard came from the Hull Department K1, where a lot of waste material – fragments of ship's plates – remained as a result of the technological process carried out there. They were cut and welded in the yard. Later, this production was transferred directly to the hull departments – K3, K2, K1 – which carried out the prefabrication of ship sections.

Elements of the original equipment

Electricity, oxygen and acetylene connections for cutting and welding sheet metal.

Preserved equipment

Concrete slabs lining part of the square (of undetermined date of construction).

Surrounding area of the building

Refurbishment Quay, Wyposażeniowców St. and Narzędziowców St., toolroom halls (49A and 75A).

35. Hardening workshop hall – object 50A

History

At the beginning of the 20th century, there was a machine parts depot (Lagerschuppen für Maschinenteile) on the site of the hardening workshop. The quenching building is probably a converted storage building. It may have been built independently on the site of the warehouse in later years.

Character of the object

Production hall with welfare and office and storage areas.

Structure

A single-storey building with the largest production area and rooms of a different nature – office and storage.

Department affiliation of the object

Tooling Production Department (T2).

The facility's technological process and production range

In the hardening workshop, heat treatment of structural components was carried out – metal parts were refined by hardening, coating, oxidation (blackening), carburising. Smaller components used in the production of ship engines, trawl winches and many other components manufactured in the shipyard were delivered here. Material was brought to the quenching plant by battery-powered trolleys. The parts were heated in specialised furnaces (vertical or horizontal depending on the shape of the parts to be hardened) to the desired temperature and then immersed in liquids. They were hardened using, among other things, oils, water and salt solutions. The hardening process was used to harden, among other things, all the bolts that were important and used in the production of marine engines (and had the necessary strength), e.g. the special large bolts used to fasten crankshaft bear-

59. North-west elevation of the hardening plant building. Behind it, engine assembly hall 28A, 2005. Photo: T. Błyskosz, National Institute of Cultural Heritage archives

ings and crossheads, connecting camshafts, as well as the worm spindles of trawl winches and numerous and varied tools and utensils. Smaller pieces were put into steel baskets. These processes were carried out in the main space of the building.

Elements of the original equipment

Two electric vertical furnaces, two electric horizontal ovens, overhead crane.

Preserved equipment

Overhead crane, steel circle in the floor – under one of the vertical furnaces, smaller fittings.

Surrounding area of the building

Square at the tool workshop, Refurbishment Quay, machine assembly hall 28A.

36. Machine assembly hall – object 28A

History

After the expansion of the Imperial Shipyard in the 1870s and 1880s, there was a ship's chamber building (Schiffskammer-Depot) on this site, housing the Imperial Shipyard's warehouses (Inventarien Magazin, Spezialien Magazin) and their administration (Verwaltung). During the First World War, there was also a mechanics' workshop (or mechanics' rooms). Other mechanical workshops and the machine parts depots serving them were located in the immediate vicinity of the hall. The building retained its form in the 1920s and 1930s. It was rebuilt in the early 1940s (or in the late 1930s, probably with partial retention of the old internal steel structure) in a frame construction. After the war, the hall was used as a repair and assembly workshop for (diesel) engines; described as: "diesel overhaul and assembly") and was therefore commonly referred to as the "diesel hall". Then, from the 1960s onwards, it was part of the Engine Building Plant and belonged to Engine Assembly Department S5.

Character of the object

Production and assembly hall.

Structure

Single-space building with office annexes.

Department affiliation of the object

Engine Construction Department, Engine Assembly Department (S5).

Function

In the hall, the final stage of engine construction before installing it on the vessel – assembly – was being carried out. The trial start-up and braking of the ship's main propulsion unit was also carried out

60. The engine assembly hall (right) of the Gdańsk Shipyard (28A), 2018. Photo: M. Czacharowski, National Institute of Cultural Heritage archives

here. The hall originally housed two engine assembly stations. A third stand was assembled due to the subsidence of one of them and difficulties in levelling the machines. The hall received individual engine parts from other halls, where they were processed and prefabricated, e.g. from boiler workshop I (34A), from where the huge engine frames were delivered, and from the neighbouring pre-assembly hall, from where, for example, previously tested heads and valves were delivered. Once the engine was completely assembled, a gantry-carried brake was connected to the engine, and the unit was then started and the operating parameters checked. Once the trials were completed, the engine was dismantled and transferred in sub-assemblies to the ship. On the vacated site (stand), the installation of the next drive unit began.

Elements of the original equipment
Engine assembly stations, smaller machine tools.

Preserved equipment
The foundations on which the engine assembly stations were located.

Surrounding area of the building
Quay from Wyposażeniowców St., hardening workshop 50A, toolroom 49A.

37. Mechanical processing hall – so-called central mechanical / mechanical central – facility 47A

History
One of the oldest shipyard halls. In the 1860s, the slipways of the Prussian Royal Shipyard, with their characteristic wooden canopies, were located on its site. During the modernisation of the Imperial Shipyard after the Franco-Prussian War (in the 1870s and 1880s), the mechanical engineering workshop hall (Maschinenbauwerkstatt) was erected on this site. Connected to it was the model carpentry workshop (Modell-Tischlerei) and other smaller ancillary buildings, such as the copper forge (Kupferschmiede). Before 1908, the hall was expanded and extended southwards. Expansion of the facility was also carried out during the First World War. The hall also maintained its function as a machine-building workshop in the inter-war period and during the Second World War. After its completion, it belonged to the Mechanical Department of Shipyard no. 1 and the Gdańsk Shipyard. From the early 1960s, it became part of the shipyard's Engine Building Plant as a mechanical processing hall. In order to better illuminate the hall, the structure of its roof was changed in the 1960s.

Character of the object
Production hall with storage and social functions.

Structure
Hall divided into three sections (aisles). The two main ones are separated by an arcade, the third part is separated by a wall. The hall's central part (nave) had a separate two-storey section to the north (from the quay) housing the toolroom and sharpening room in the lower storey and the office area of the neighbouring department S5 in the upper storey. The central and eastern sections of the hall had two-storey office and staff areas to the south. The ground floor included a breakfast room, builder's office, drawing distribution room and doctor's office. The first floor housed various types of offices, including those of the technologists, the head of the department, the deputies, and the departmental secretary of the communist PZPR (Polish United Workers' Party). The west aisle housed the switchgear (inter-operation depot) in the southern part and a room where the pre-assembly of the engine was carried out. In this room, all components

supplied for engine assembly were checked in detail, including the accuracy of manufacture, but also engine head leakage tests, for example, were carried out. From Narzędziowców St., there was a separate section enclosed by a wall (storage of cut materials – bars, etc.).

Department affiliation of the object

Mechanical Processing Department (S4) of the Engine Building Plant (PS).

Function

It was a mechanical processing and deck equipment assembly hall. In the two main parts of the hall (aisles), numerous devices were used to machine, for example, ship engine pistons, engine camshafts, shafts for trawling mechanisms, piston rods, connecting rods, engine cross-braces and rudders. Deck mechanisms such as trawl winches and anchor winches (including steam lifts) were also assembled in the hall. The work was carried out using special mounting plates and specialised machinery. It was a hall from which complete shipboard equipment (for all Polish shipyards) came out. Material was delivered to the hall from the storage yard (forgings) or from the warehouses, as well as from other halls and workshops, such as the forge (where, among other things, connecting rod heads were fired, which were then processed in hall 47A). Material was delivered through both gates – from the quay and Narzędziowców St. Structural components and materials in the hall were moved by overhead cranes, as well as by self-propelled cranes and trolleys running on cross-track (originally manual trolleys, then electric trolleys). The control of the cranes – the placing of material on the workstations – was done from floor level by means of fixed hand signals (instruction boards with signals were hung up in the hall, some of which have survived). The work and material to be processed on the various machines in the hall was distributed by the technologist according to the needs and availability of machines and equipment. Large engine components were transported from hall 47A directly to assembly hall 28A. The third part of the hall, separated by a wall, housed the switchgear room, the locksmithing workshop, the mould loft (with surface plate) and the cutting material store. A large part of this aisle comprised the pre-assembly. Smaller components for further processing or use were sent to the switchyard. Pre-assembly involved partial assembly of engine components, such as complete installation of exhaust valves. Checks were also carried out here on all components supplied for assembly, including hydraulic testing of heads and pistons. The pre-assembly was connected to the rest of the hall by a track for transporting components. This track ran from the pre-assembly through the gate, including in the other direction – to the 28A engine assembly hall.

61. Mechanical processing hall S4 – so-called "mechanical central" (in the centre), 2018. Photo: M. Czacharowski, National Institute of Cultural Heritage archives

Elements of the original equipment

In the first hall (aisle; passage) were set up on both sides of the main tract: large assembly (routing) plates and large, heavy machine tools such as: carousel

lathes, two heavy milling machines (located on the right), a large grinding machine (capable of grinding shafts 5 m long and 800 mm in diameter), a large two-station milling machine, a large drilling machine, two large boring machines (for mechanically processing medium-sized rudders, large rudders were machined in the heavy mechanical processing hall), a long heavy planer, a heavy TCA 125 lathe (capable of mechanically processing workpieces up to 125 cm in diameter and 6 m long), a TCA 1500 lathe (capable of mechanically processing workpieces up to 150 cm in diameter and 10 m long), a plate boring machine, a planer. There was an overhead crane in this part of the hall. All the machine tools were electrically driven.

62. Interior of the machining hall. Attention is drawn to the skylights in the roof, providing good lighting for the workstations, the original semi-circular window openings and the crane beam laid on brick supports, 2021. Photo: A. Woźniakowski, collection of the author

The **second aisle** housed smaller machine tools: boring machines, milling machines, drilling machines, grinding machines, lathes. The lathes located in the southern part of the hall were positioned diagonally so as not to throw shavings onto neighbouring workstations (the positioning of the machines is still legible in the floor). The floors around the machine tools were made of wood. Their function was to isolate and dampen vibrations. A departmental grinding and tool sharpening workshop (for knives, machine tool drills, etc.) and a large departmental tool rental workshop were located in the northern part (quay side). Above it, on the first floor, the rooms (offices of, among others, the department manager, technologists) of the S5 Machine Assembly Department were located.

The **third aisle** (switchgear and pre-assembly) was equipped with ceiling-mounted cranes and shelving arranged in part of the rooms.

Preserved equipment

Overhead cranes. Concrete platforms for machinery. The hall now uses fitter's plates constructed from blacksmith's plates, possibly from the defunct frame workshop of the Gdańsk Shipyard. The wooden block floors are also preserved. Some of the floors of the unpreserved workstations are oriented diagonally and reflect the original positioning of the workstations and machines (lathes). There are also cross tracks in the hall, which are part of the engine-building process line (the track was not connected to the S-3 halls, although it was planned to make such lines). The hall retains many small details – doors, gates, hooks, feed windows, overhead crane control instructions and more – as well as original painting in many places.

Surrounding area of the building

Narzędziowców St., hall 49A, shipyard – through towards the quay.

38. Engine house and filling station including transformer substation (A10) – Site 12A

63. Attached to the brick engine assembly hall (28A) is a rendered engine and fuel station building. In the lower part (with a characteristic vent on the roof) there is a transformer substation (A10), 2018. Photo: T. Błyskosz, National Institute of Cultural Heritage archives

History

The buildings were constructed in the mid-1960s – during the expansion of the Gdańsk Shipyard and the adaptation of Building 28A as an assembly and testing facility for main propulsion engines.

Character of the object

Engine room building – this housed the systems necessary for the diesel engines to operate during operational tests in hall 28A and the transformer station.

Structure

A building with internal transverse divisions and distinctive large glazed façade. The adjacent transformer station is a single-storey building.

Department affiliation of the object

Engine Assembly Department (S5).

Function

The facility was used to carry out test engine start-ups in the test station – engine assembly hall 28A after the ship's main propulsion unit under construction had been fully assembled, and to carry out engine tests under load and thus check its proper functioning and all the necessary elements of the process. During the engine trials, Engine Room 12A performed a similar function to the engine room operating on the ship. Its task was to prepare and supply everything necessary for the trial start-up and operation of the propulsion unit being assembled in hall 28A, which was being commissioned. The necessary utilities for engine operation were delivered to hall 28A: fuels, lubricating oils, water for engine cooling, compressed air for engine starting, etc. This was carried out by means of the relevant machinery and equipment in the building, e.g. pumps, compressors, generators, tanks, filters, etc., as well as the pipelines connecting the gym to hall 28A.

Elements of the original equipment

Compressors, pump units.

Preserved equipment

None.

Environment

Quay, yard at the tool workshop, hardening workshop (50A) and machine assembly hall (28A).

39. Office and staff building (so-called connector) with transformer station (A13) – object 288A

History of the object

The building was constructed in the late 1960s or early 1970s as part of the modernisation of the Gdańsk Shipyard and the expansion of its office and social facilities.

Character of the object

Office and staff building with transformer station.

Structure of the facility

A multi-storey building with lift, housing part of the changing rooms of the S5 Machine Assembly Department on floors 1 and 2, and office space on floors 3 and 4. On the ground floor of the building structure – transformer station A13.

Department affiliation of the object

Engine Building Plant (PS).

Function

The building was the headquarters of the Design Department (STK) of the Engine Building Plant (PS), the Technology Department (STT), the management of the Engine Building Plant – the head of the plant, the two deputies for the production preparation of STT and STK, and for the affairs of the production departments and the Structural and Technology Service. It housed a conference room and the offices of the deputies (4th floor), and the technologists of the PS plant worked on floor 3. The departments and units of the departments belonging to the PS and the people employed in them were involved in the preparation and realisation of the production of the shipbuilding Engine Building Plant. The service rooms were relocated to the constructed 288A building from the upper floors of the older 35A hall.

Elements of the original equipment

Passenger lift, offices with their equipment.

Preserved equipment

Passenger lift.

Surrounding area of the building

Narzędziowców St. (to the south), courtyard with the S4 department's storage yard.

64. Two post-war buildings of the Gdańsk Shipyard. The first (288A; in the lower right corner, with a two-coloured façade and gate) is the headquarters of the shipyard's Engine Building Plant (PS). The second (168A; with a light-coloured façade, located on the canal side) served as a social and office facility for the PS plant, 2018. Photo: M. Czacharowski, National Institute of Cultural Heritage archives

40. (Light) locksmithing hall – object 66A

History

The building was constructed before 1908. Originally, there was a boiler house (Kesselhaus) operating at the boiler forge hall (Kesselschmiede) of the Imperial Shipyard. Also, after the First and Second World Wars, the building served as a boiler house and later as a locksmith's workshop.

Character of the object

Production hall with social and office space.

Structure

Single-storey building with social and office annexes.

Department affiliation of the object

Boilermaking and Welding Department (S3), part of the Engine Building Plant (PS).

Function

In the hall, smaller structural welds were made and locksmith work was carried out for the department S3 and other shipbuilding departments and the production carried out in the shipyard, including off-ship.

Elements of the original equipment

The hall had no lifting capacity. It featured mounting plates. The building was connected by a line of tracks to the adjacent heavy processing hall, part of hall 34A, and other spaces in that hall. Today, this connection is not clear.

Preserved equipment

Hall devoid of equipment. The east wall retains the older decorative consoles supporting the later steel structure.

Surrounding area of the building

Adjacent to the building was the S3 department's storage yard (between buildings 288A and 66A). Materials and fabricated components were stored here. There are also relics of what are probably older tracks in the vicinity of the building (the surviving track lines are truncated).

41. Social and office building with transformer station (A11) – object 168A

History

The building was constructed in the late 1960s or early 1970s. This was done in the 1980s as part of the modernisation of the Gdańsk Shipyard and the expansion of its social and office facilities. Adjacent to the building, the transformer station was located in the single-storey building of the former turn-of-the-century Imperial Shipyard hand forge.

Character of the object

Social and office building, transformer station next door.

Structure

Multi-storey building housing office rooms and social facilities (changing rooms etc.).

Department affiliation of the object

Engine Assembly Department (S5).

Function

The building had the character of an office building. It carried out activities in the areas of branch management, production preparation and execution, lower-level supervision and analysis of production documentation.

The building housed the offices of Branch 2 of the S5 Engine Assembly Department (EAD) – the rooms of the Branch 2 manager, the master's rooms, the rooms of the machine foremen ("machinists" – on the south side), and the foremen of the locksmiths. Each EAD branch – apart from Branch 1 of hall 28A – had both machine fitter and locksmith brigades. The locksmith brigades made, for example, floors, cranes in the ship's engine rooms, while the fitters assembled machinery. EAD Branch 1 worked in hall 28A, while Branch 3 was based on Ostrów Island next to the Sampling Department P1. Assemblers from EAD Branch 1 were only engaged to assemble motors in the hall. The fitters from Branch 1 provided external services, e.g. for the repair and overhaul of equipment on the ships of the Polish Baltic Shipping, when they were not occupied with their duties in Branches 2–3. Building 168A housed the welfare facilities for the crew of the Engine Building Plant (PS).

Elements of the original equipment
Office and changing room facilities.

Preserved equipment
Workers' lockers.

Surrounding area of the building
Quay, courtyard-gate, mechanical processing hall 47A, boiler hall 34A.

42. Boiler (heavy) construction hall - boiler house I (old boiler house; heavy boiler house) - hall 34A

History of the object
The hall consists of several parts dating from different periods. The structure located on the north-west side was built in the 1880s. It served as a workshop (Werkstatt) next to the boiler forge (Kesselschmiede) and the boiler store (Kessel-Lagerhaus). Closing off the complex from Narzędziowców St., the lower part (south-west) was built around 1901. It was built as an annex to the boiler forge (Anbau für die Kesselschmiede). The central hall was built on the site of the torpedo boat slipway (Torpedoboots-Schuppen Helling I), which was located here until the early 20th century. This hall was erected before 1923. It is closed off from Narzędziowców St. by a very high massif. During this period, another, lower side hall – the so-called New Hall – was also built next to the central hall on the east side.

Character of the object
A production hall made up of several production spaces.

Structure
The oldest part of the north-west hall housed the so-called heavy mechanical processing hall of the Mechanical Processing Department S4. The lower section located on Narzędziowców St. contained a passageway for transporting materials to the heavy processing hall, and offices were located on the first floor. The central part of the complex was the boiler hall. A lower hall was added to it on the south-east side.

Department affiliation of the object
Boilermaking and Welding Department (S3), part of the Engine Building Plant (PS). Part of the building (the hall located on the north-west side) – the heavy mechanical processing hall (locksmithing workshop) – belonged to department S4 – the Mechanical Processing Department.

The facility's technological process and production function
In the main part of hall 34A, the main ship boilers were built. It encapsulated the entire process of build-

ing these devices. The production carried out in hall 34A met the needs of the entire Polish shipbuilding industry for the use of ship boilers. Boilers were also built for export. Structural components for ship engines, such as the massive engine frames, were also built in the hall. In the heavy mechanical processing hall, large rudders were also machined on a large boring machine.

The material – mainly metal sheets – was delivered from the depot next to the K1 department by rail platforms or wheeled transport (cars, tractors with trailers). Smaller components were brought inside the hall by trailer. Material was also delivered to the hall from a depot nearby, e.g. boiler bottoms manufactured outside the shipyard (at the Rafako plant in Racibórz). Materials were transferred by cranes and overhead cranes to workstations. An overhead crane extending on trestle bridges outside the hall was used to transport materials directly from a railway wagon or trailer. The sheets for the boilers were then lofted and bent with a vertical jaw bending machine. The bent sheets were then welded together. The bottoms of the boilers were bevelled and the whole thing was welded on a special turntable (constructed and made in the Gdańsk Shipyard) (originally manual welding was used, then automatic). Among other things, boiler shells were created. The components were then annealed in an annealing furnace for steel structures. This was a stress-relieving annealing, removing the stresses in the steel created during earlier processes. Before a large (6 x 6 x 6 m) annealing furnace was installed in the northern part of the hall in question in 1967, structural components, including main engine frames, were sent for annealing to Hutmen in Wrocław. Engine frames and other components were transported there by rail. During the annealing of components outside the shipyard, supervision by the shipyard's specialist technologists was needed. Complete engine frames, boilers or other structural parts were then assembled from the annealed components. Finished structures were sent out of the hall for further processing, e.g. engine frames were transported to the heavy processing hall (part of hall 34A), where they were further processed and fitted, or, after it was built in the 1960s–70s, to hall 250C on Ostrów Island. Finished products, including main boilers, were transported from the hall via Narzędziowców St. to storage yards, shipyard slipways or directly to external customers. The boilers were placed in a wagon, on a trailer or on a Scheuerle running platform by means of the aforementioned overhead crane leaving the hall. Some boilers were stored in the square next to the fire station building, adjacent to the management building.

65. Boiler production in the heavy boiler hall (34A), 1970s (?). Photo: Z. Mirota, APG collection

The heavy processing hall was part of Complex 34A, but was a space separate from the central boiler room. It was part of the S4 Mechanical Processing Department. A driveway (also part of Complex 34A) led to it from Narzędziowców St., which was used to transport smaller metal sheets and other materials by

battery-powered trolleys. The through-room also housed an X-ray machine for screening smaller structures, and on the first floor were the offices of, among others, the department manager (at one time), the planning office and the boiler room technologists. Larger materials were delivered to this hall via the main entrance located on the quay side. Among other things, main engine frame components and main engine bearings were machined and fitted in the hall. These components were delivered after pre-treatment (welding) from the department S3. The heavy processing hall was equipped with a special large surface plate (20 m long x 5 m wide). The supplied components of the engine frames and racks and other large structural components were traced on it. The stamped parts were transferred from the lofting board to specialised boring machines located in another part of the hall (closer to the quay): WD160 (spindle diameter 160 mm) and WD250 (spindle diameter 250 mm), for further processing. The machines were also used to machine through-hulls, engine racks and charge air reservoirs, among other things. After mechanical processing on the boring machines, the frame parts (and others) were transported to a special station closer to the centre of the hall. Here, they were subjected to final boring and the frame parts were fitted, bolted together and the plane aligned. Bearings were also fitted. The stand was provided with a drive and armed with a special 10 m long boring bar. Special fixtures were placed on it and the frame axle (axle for the main shaft) was bored out. After measurements (by the gauge and standards room) and acceptance of the component by the technical inspection, the frame was transported via a quay to the engine assembly hall of the department S5 – 28A. Part of hall 34A – on the side of Narzędziowców St. – housed the locksmith stations (workshops), where the assembly of lifts, cargo hoists and others (including steam hoists) took place.

66. South massing of the boiler house (34A) including the external flyover of the crane for material and product handling, 2018. Photo: T. Błyskosz, National Institute of Cultural Heritage archives

Elements of the original equipment

Overhead cranes, a vertical jaw bending machine used to bend the shells of the main boilers (on the right side of the hall), two rolling mills, a turntable for welding the boilers. At the end of the hall on the quayside side was an annealing furnace, used to anneal welded structures – boilers, engines and others: racks, engine frames and other components created in the halls of the department S3. Engine stands, for example, had to have proper alignment in the furnace so they would not warp or bend during annealing. The annealing furnace in the boiler hall of the Gdańsk Shipyard was one of the largest annealing furnaces in Poland. It no longer exists today. In addition to the above equipment, the hall contained a routing plate and a rotary lathe with a table diameter of 3.5 m.

Preserved equipment

Overhead cranes in the hall's aisles, an external main crane (with a capacity of 20–25 tonnes) and

sections of internal track. Full recognition of the facility has been prevented by the production processes currently underway there.

Surrounding area of the building

Next to the hall on the eastern side is a storage area for materials, mainly sheet metal. The yard is armed with the original crane on a beam spanning between halls 34A and 35A. It also has a preserved old trackbed. To the west is a courtyard with buildings 66A, 168A and preserved tracks. The courtyard originally housed the department's (S4) storage yard.

43. Boiler (light) construction hall – boiler house II – hall 35A

History of the object

The site of the hall was already home to slipway no. 2 of the Imperial Shipyard (Helling II) in the 1880s. In the early days of the First World War, its pool still existed. After 1915, a sheet metal workshop hall (Blechbearbeitungwerkstatt) was built on the site, still in existence between the wars. Before 1942, the hall was expanded and extended towards the present-day Narzędziowców St. After the war, the hall housed a repair workshop (machine tool overhaul) and a warehouse. In the 1950s, boilers were built in the hall. Since the early 1960s, the building was part of the Engine Building Plant, maintaining the function of a boiler house.

Character of the object

Production hall with social and office space.

Structure

Originally single-space, now separated by a brick wall. The upper floor (until the construction of building 288 A) housed office and design space and social areas. Among other things, the construction office of the shipyard's Engine Building Plant and the engine tooling production office were located here.

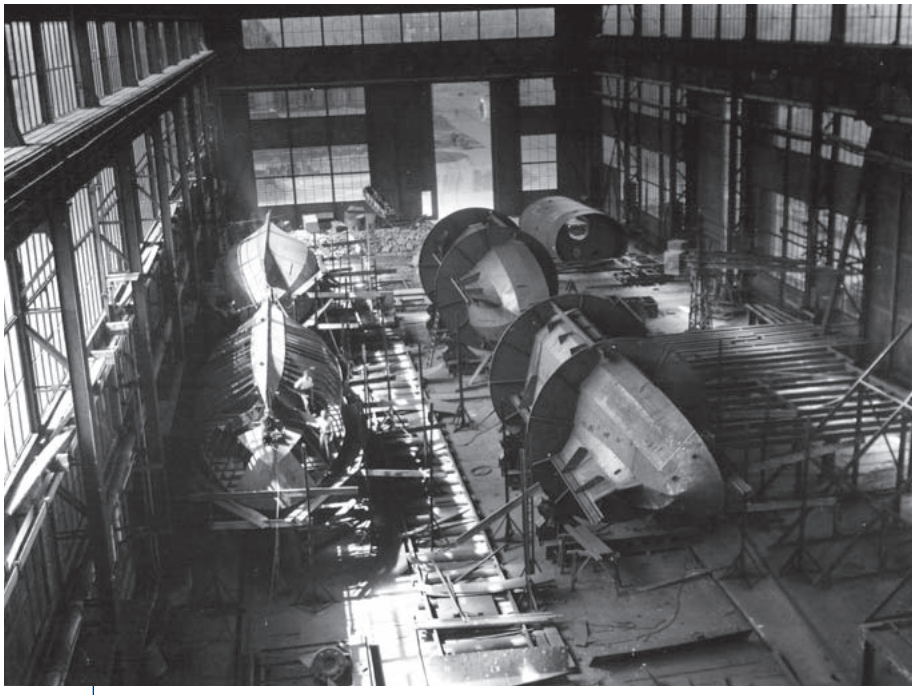
Department affiliation of the object

Boilermaking and Welding Department (S3), part of the Engine Building Plant (PS).

The facility's technological process and production function

On the high floor of the building – in the rooms of the engine design office and the engine tooling office – the necessary technical documentation was created and adapted for the work and production needs of the Gdańsk Shipyard's Engine Building Plant.

The production part of the hall was used to build smaller boilers and welded components for



67. Production (welding) of steel fishing boats in the post-war Shipyard no. 1, even before its merger with Shipyard no. 2 and the creation of the Gdańsk Shipyard. Pictured is the interior of boiler hall 2 (35A), ca. 1947. Photo: NN, State Archive in Gdańsk collection

the production of marine engines and boilers and the shipyard's other shipbuilding production, as well as for disposal. Among other things, boilers and structural elements for ship engines were manufactured here – frames, brackets, racks, platforms, through-hulls, air tanks and other types of minor welded structures for shipyards and other customers from all over the country and abroad (colloquially known as "customer treatment" – these included tyre testing machines for the rubber industry works "Stomil"). Small structural components for engines and boilers, such as bolts and various types of fittings, were also made.

68. North elevation of boiler hall 2, 2018. Photo: T. Błyskosz, National Institute of Cultural Heritage archives

Material – sheets were delivered from the metallurgical materials warehouse next to the department K1 (Mh metallurgical warehouse) by rail platforms or by wheeled transport (cars, tractors with trailers). Smaller components were delivered by trailer entering the hall. Material also entered the hall from a warehouse nearby. It was then moved by overhead cranes and smaller hall cranes to the work stations – the assembly slabs – where the individual welded structures were built. Finished products were sent from hall 35A for further processing, e.g. engine frames were transported to the heavy machining hall (part of hall 34A), where they were further machined and fitted, or to the large hall 250C on Ostrów Island (Holm). Finished products were transported from hall 35A to storage yards or directly to customers.

Elements of the original equipment

The hall contained a number of mobile, large cast-iron assembly plates on which structures were assembled and welded (plates were added or removed as required), and routing stations. Hall 35A was also equipped with overhead cranes for transporting heavy materials to workstations and smaller wall-mounted cranes (davits), distributed along the hall, necessary for handling smaller items. It also housed smaller machine tools (welding and grinding machines) and lathes in the spaces and side rooms.

Preserved equipment

Overhead crane.

Surrounding area of the building

Next to the hall on the west side is a storage area for materials, mainly sheet metal. The yard is equipped with the original crane on a beam spanning between halls 34A and 35A. It also has a preserved old track bed. The obliterated Kotlarzy St. runs from the east. To the north is the quayside – Wyposażeniowców St. – with its preserved infrastructure (including tracks, poling and canals), and to the south runs Narzędziowców St. with its original tracks.

44. Shipbuilding locksmithing workshop hall W3 – locksmithing workshop 1, including transformer station A14 and storage yard – objects 41A, 21A, 22A

History

The building was constructed on the site of the work sheds (Arbeitsschuppen; Arbeitsdach) that had existed here since at least the 1880s, probably serving the adjacent slipway no. 2 (Helling II) of the Imperial Shipyard. These were upgraded or demolished in the early 1920s. Other buildings were erected in their place. After the Second World War, it housed the transport branch of Shipyard no. 1 and the Gdańsk Shipyard, and later the hall was used as a workshop for ship repair work. Subsequently, the building was used as the locksmith workshop of the W3 Shipbuilding Locksmith Department.

Character of the object

Production hall with annexes and transformer room as well as a storage area on the south side.

Structure

Main part – hall 41A single-space. Due to the work being carried out internally, it is not possible to fully discern the structure. To the south of the hall – a storage yard (originally with a crane flyover).

Department affiliation of the object

Shipbuilding Locksmith Department (W3).

Function

Department W3 was mainly involved in the assembly of ventilation and air-conditioning systems and the prefabrication of heavy ironwork components such as hatch covers and hatches. From a certain point onwards, air-conditioning systems were made by Klimor company. The Gdańsk Shipyard supplied some of the purchased air conditioning

69. Locksmith hall 1 (41A). The wooden cladding of the masonry, not used in other shipyard buildings, draws attention, 2018. Photo: T. Błyskosz, National Institute of Cultural Heritage archives

system components to Klimor, assembled the foundations, walkways and ventilation ducts, and Klimor handled the final installation of the systems on the ship and their handover. Material, mainly light sheet metal and small equipment, was supplied on a demand basis from specialist warehouses. The sheets were transported from the metallurgical warehouse (Mh) – a depot in the department K1, which was the disposer of the sheets and metallurgical materials. In hall 41A, work was being carried out in the field of light ironwork (light ironwork workshop). It made parts from thin sheets, max. 5–6 mm thick. For example, galvanised steel ship ventilation ducts. Round or rectangular sections were formatted here. These components were prefabricated in the hall and then transported to the ship and assembled. The entire department W3 had around 600 people working in the 1970s – if there was a production need, 24 hours a day. The scope of work included mechanically processing smaller components, including bending with smaller hand-held tools. Smaller items not available on the local market were also produced here. Sometimes they were imported from the depths of Poland (nowadays, many such parts can be purchased on the market). A similar range of works were carried out in neighbouring rooms 21A and 22A.

Outside on the south side, there was a storage yard adjacent to hall 41A, where prefabricated components were stored before being transported to the ship.

Elements of the original equipment

Smaller weight overhead cranes on flyovers (one of which initially went outside to the storage yard and ran into the neighbouring hall 43A, belonging to the same department), machine tools such as bending machines, guillotines, cutters for cutting thin sheets (approx. 3–6 mm).

Preserved equipment

Overhead cranes and flyovers, a small section of external flyover above the storage yard.

Environment

Kotlarzy St. to the west, Narzędziowców St. to the south, hall 42A to the east and Refurbishment Quay to the north.

45. Hall of the Shipbuilding Locksmithing Workshop – locksmithing workshop 2 with side annexes – Buildings 42A and 70A

History

The first building on the site was constructed between 1876 and 1882. It originally served as a warehouse for the Imperial Shipyard and was rebuilt around 1902. Until the First World War, it housed a locksmith's workshop (Schlosserwerkstatt), a copper forge (Kupferschmiede) and a handy warehouse (Ressortmagazin). At this time, a side aisle was added to the hall, with a smaller annex next to it. The building retained its three functions between the wars. After the war, it housed a mechanical workshop (machine tool overhaul) and an oxygen storage facility. Then there was the locksmith hall of the Shipbuilding Locksmith Department, where construction of, among other things, ship lifts was carried out.

Structure

A two-storey building with an open-plan central space on the ground floor and mezzanine floors and social and storage annexes on the first floor.

Character of the object

Production hall and warehouse with social area.

Department affiliation of the object

Shipbuilding Locksmith Department (W3).

70. A sprawling, three-bay early 20th century ironwork hall 2 (42A; with extension 70A). Behind it, the 1970s social and office building (287A) – one of the few surviving buildings in the shipyard space built after the Second World War, 2018. Photo: M. Czacharowski, National Institute of Cultural Heritage archives

Function

Lighter sheet metal and metal profiles were processed in hall 42A. Steel foundations for deck equipment such as cranes and pumps were also built. Prefabrication of complete ventilation and air-conditioning ducts, etc. was also carried out based on models of the ship's power plant. The assembly of connections and equipment was carried out and prepared for transport to the ship. One of the workshop's specialisations was the construction of ship lifts – anchor and sweeping winches. The locksmith hall also housed a handy storeroom for finished components, such as small fans, ventilation heads, air handling units, duct connections, and components already partly fabricated, such as ventilation duct components purchased outside the shipyard. Larger items were stored outside the hall, including in the storage yard in front of the neighbouring hall 41A.

Elements of the original equipment

Smaller capacity cranes (4.5 t), tracks, machine tools, equipment for social areas.

Preserved equipment

Smaller capacity cranes (4.5 t), tracks, boiler to heat water for bathrooms.

Surrounding area of the building

Dock Basin, dockyard and locksmithing workshop 1 (41A), Refurbishment Quay, Narzędziowców St.

46. Social building – object 287A

History
The building was constructed in the 1970s during the major expansion of the Gdańsk Shipyard, including its base of social facilities.

Character of the object
Building with social and office functions

Structure
A multi-storey building housing mainly changing rooms, dining rooms, showers, sanitary facilities, etc., as well as office space.

Department affiliation of the object
Shipbuilding Locksmith Department (W3).

Function
The facility did not have a purely manufacturing function. It had the character of an office and welfare facility for the department W3, supporting production functions.

Elements of the original equipment
Furnishing of social areas and offices.

Preserved equipment
Partial changing room facilities.

Surrounding area of the building
Wharves, remaining department W3 buildings – locksmith workshop, Dock Basin.

47. Shipbuilding locksmithing hall – locksmithing workshop 3 – object 43A

History
As early as the 1880s, there was a shipbuilding workshop (Schiffbau-Werkstatt) on the site, one of the most important production departments of the Imperial Shipyard. The department's production specialisation was the mechanical processing of sheet metal and angle iron (Blech und Winkeleisen Bearbeitung) – which are the main components of the plating and hulls of vessels. At the end of the 19th century, the hall was called Shipbuilding Workshop no. 2 (Schiffbau-Werkstatt no. 2). Next to the hall was an extensive storage yard for sheet metal and ship materials (Schiffbau-Eisen-Lagerplatz). Before the First World War, the building was extended by adding a covered working annex (Arbeitsdach) and other smaller annexes on the side of the square. During this period, the building continued to function as an angle iron workshop (Winkeleisenbearbeitung Werkstatt) – i.e. a so-called framing workshop. It maintained this function during the First World War and the inter-war period, and probably also during the Second World War. The buildings were partially demolished in the early 1930s. Before 1942, the processing workshop hall was rebuilt. The remaining decorative, eclectic buildings of the original building (complex) have disappeared and have been replaced by a frame structure – built of bricks filling a steel frame – which survives to this day. After the Second World War, a locksmithing workshop and a ship repair workshop operated here. The function of the ship's locksmithing workshop was also performed by the hall as part of its affiliation with the W3 Ship's Locksmith Department.

Character of the object
Production hall with office space.

Structure
Single-space hall with central communication flyover and internal staircases. The hall is used for

production, which prevents a full analysis of its structure.

Department affiliation of the object

Shipbuilding Locksmith Department (W3).

Function

It was a heavy duty locksmithing workshop. Here, heavier elements of ship's equipment, such as the so-called insert tanks (e.g. fuel, oil) of various parameters, as well as ironwork elements such as galleries, landings, stairs, steel gangways (later aluminium, imported from outside), hatch covers, manholes, davits for lifeboats, reinforcements, equipment foundations, etc., were made (prefabricated). (later, all outfitting work was to be transferred to the so-called Central Equipment Prefabrication Centre). The ship equipment manufactured here required the hall to be better equipped with lifting equipment. Often prefabrication (picking) continued until 6 pm, as long as it was light in the hall. After 6 pm, welders would start work and weld the previously prepared parts. Heavy ironwork was also carried out here – prefabrication of manhole covers or hatches, slipways, etc. Often the material for prefabricated cover components in the W3 department, e.g. hatch covers, was fired (cut) in the department K1 and the completed material was delivered to the hall of the department W3, and sometimes also fired in W3. Later, covers and hatches were made in the K2 and K3 hull departments and assembled on the ships by specialised workers in the department W3. Later, the executive work was outsourced to the company Zamech.

Elements of the original equipment

Machine tools such as bending and guillotining machines, cutting machines for medium-thick sheet metal (approx. 8 mm), welding machines, etc.

Preserved equipment

Flyovers, overhead cranes, timber floors for machine tools, shaft with staircase to flyover, tracks. The hall is used for production. Access restricted.

Environment

Narzędziowców St. and Krótka St., a forge and toolmaking workshop – the toolroom.

71. South façade of the shipyard's locksmith hall – locksmith shop 3 (43A) of the W3 department, 2018. Photo: T. Błyskosz, National Institute of Cultural Heritage archives

48. Dock Basin

History

The construction of the Dock Basin began in the 1870s, during the modernisation of the Imperial Dockyard. It was originally envisaged that it would be a rectangular shaped pool, connected to two slips (either flat or horizontal slips). Eventually, a fan-shaped pool was built, connected to the need for slipways (Horizontal slip I, II, III). This was unique in the global shipbuilding industry. Still, around 1914, one of the slips was shortened. The Dock Basin, which has the character of a dry dock, was, together with the slips, the main place for the construction and launching of vessels of the Imperial Shipyard and the inter-war Gdańsk Shipyard (Danziger Werft) until 1938, when the first heavy slipway (the post-war A2 slipway) was built. Two smaller vessels, including submarines, could be built on each slipway. A floating dock, moored close to the basin in the shoreline bluff, was introduced into the Dock Basin when launching and dragging ships ashore for repairs. The Dock Basin and slips (post-war slipways A3 and A4) were used until the late 1960s and 1970s. When the slips were removed, the new heavy slipways of the K2 hull centre of the Gdańsk Shipyard were built in their place. The Dock Basin has since become a mooring for smaller vessels and shipyard rolling stock.

72. Dock Basin in the post-war period. Among other things, it also acted as a marina for smaller auxiliary units during this time, 1950s. Photo: NN, APG collection

Character of the object

Dock basin, also referred to as “dry dock”.

Structure

Dock basin with berths. It was originally enclosed by a massive gate allowing the water to be pumped out of the pool.

Department affiliation of the object

Shipyard dispatcher (Dp) and individual departments.

Function

It was originally a launching site for vessels under construction. After the removal of the slipway and the loss of the function of the slipway basin, it began to be used as a shipyard marina.

Elements of the original equipment

Barrier gate, elements of quayside infrastructure.

Preserved equipment

Elements of the basin’s waterfront infrastructure.

Surrounding area of the building

The non-existent heavy slipways of the department K2, berths, forge 36A, locksmithing workshop 42A.

49. Forge with office annex – hall 36A/36Aa

History

The building was constructed during the modernisation of the Imperial Shipyard after the Franco-Prussian War (1870–1871). It was built in the late 1870s or 1880s. It housed a forge and a locksmith's workshop (Schmiede und Schlosserwerkstadt). It consisted of a narrow hall and an office area, located on the south side. Next to it, on the north-east side, was a work shed – an attic (Arbeitsdach). At the end of the 19th century, the building was also described as a shipbuilding forge (Schiffbau-Schmiede). This hall was connected to the other facilities and the rest of the shipyard by rails led into the building. Around 1900, a side annex of the locksmithing workshop (Anbau für die Schlosserei) was built on the north-west side. Before 1915, the work shed was rebuilt, connected to the main body of the forge hall and locksmith workshop and lengthened. The side hall of the locksmithing workshop was also extended. The office annex housed the main electrical switchgear (Hauptzentrale). Around 1919, side annexes erected with a frame construction were added to the headquarters building. There was also a small material storage yard next door. A small extension to the work shed and main hall on the street side was also built. The complex also maintained its current functions during the First World War, the inter-war period and during the Second World War. Its form has also not changed significantly. Probably in the post-war years (or during the war), the former work shed was rebuilt and closed with a wall to form a side annex – the nave of the forge hall (later the so-called cold hall). The north gable of the hall was also rebuilt. In subsequent years, the hall was raised and skylights were also added. In the post-war period, the main hall and its annexes continued to function as a forge, workshops and housed a forge materials store.

73. The forge hall of the Gdańsk Shipyard (36A) together with the office area (36Aa; right). Building 36A maintained its function as a shipbuilding forge workshop from its construction in the 1880s until 2016, 2018. Photo: M. Czacharowski, National Institute of Cultural Heritage archives

Character of the object

Production hall with side hall and workshop and office/social annexes.

Structure

The building has a single-storey main space and a side hall (cold hall), with an integral two-storey office and staff area on the side of the main entrance (north side – Narzędziowców St.). The office and social areas included a canteen and departmental kitchen, changing rooms and showers for women, and changing rooms for men. On the first floor were the offices of the head and technical staff of the department. A two-storey office annex (37Aa) was located on the south side of

74. An antique forge press manufactured in Cologne dating from the late 19th century, located in the forge hall (36A). It was one of the most important pieces of equipment in the hall. It is also the oldest piece of industrial equipment preserved on the site. The press was used until 2016, 2019. Photo: T. Błyskosz, National Institute of Cultural Heritage archives

the hall, separated from the main part of the hall by a through corridor closed by gates on both sides.

Department affiliation of the object

Forging Department S2, part of the Engine Building Plant (PS).

Function

The Gdańsk Shipyard forge produced forgings for the manufacture of smaller engine components, as well as, among other things, forgings for the shipyard tool workshop for the production of various utensils or tools. Here, for example, forgings were produced for making steel wedges for engines (to stabilise and level them), bolts for fixing ship engine foundations, various steel rings, shafts, chains (slings), springs, etc. (in earlier years, rivets, among other things, were also made). These were then machined in Mechanical Processing Department S4 (forgings from the forge were then turned on lathes, reamed and threaded here, for example).

For forgings for larger engine components, such as crossheads, connecting rods, piston stems and piston elements, the shipyard ordered from large metallurgical plants (mainly Huta Warszawa, which was the main supplier of forgings to the shipyard, as well as Huta Ostrowiec – then named after Marceli Nowotko). The shipyard forge was not involved in large-scale metallurgical production. A large part of its production consisted of individual, smaller steel components, which were also made on individual orders from external recipients if the larger steelworks did not want to produce these components. This is because the large steelworks usually made specific series of metallurgical products produced by drop forging (repetitive, made with dies that produced identical parts), which the shipbuilding forge did not use. The ordering parties usually supplied their own material to the yard or used material purchased by the yard. The commissioned forgings were then machined in other departments of the yard (mainly S4) or taken by the contractors for mechanical processing elsewhere (e.g. at the principal's home plant). The fulfilment of external orders carried out by the forge was one of the sources of income for Gdańsk Shipyard.

The initial metallurgical materials were ordered by the shipyard's materials section from steel mills (e.g. Huta Ostrowiec, Huta Katowice, Huta Warszawa). They arrived at the shipyard by rail transport and were delivered to the forge.

Work in the forge began at around 4 am with the proper heating of the gas furnaces used to heat the feedstock and prepare it for work. The ovens were located in the central part of the main hall. Firing up the furnace was handled by two people. Other workers would arrive between 5 and 6 am to start their daily work. It lasted until 10 pm, when the furnaces were

dimmed (not extinguished completely). The forge employed around 40 workers, 32 of whom were in direct production.

Steel billets supplied from steelworks were fed into the furnaces. They were heated to a temperature that depended on the type of feedstock and its composition (e.g. steel was often heated to 1000–1300°C). The forge had several furnaces (about 10 in total), including four larger ones. Two were located on the left side of the hall (looking from the main entrance). They had approximate dimensions: the first about 1.5 x 1.5 m (wide and long, this furnace was taller) and 1.8 x 2.0 m (wider). The third furnace, the largest (longest), was located deeper to the right of the hall (dimensions approx. 2.2 x 2.0 m). Another furnace, a pass-through, allowed an approach from two sides – it was used, among other things, for coiling springs, and was decommissioned in the late 1980s. Among other things, it was used to heat parts for longer shafts. The two smaller furnaces mentioned were equipped with two gas inlets, the largest had six inlets. Two more 1 x 1.5 m ovens were located closer to the entrance of the hall. A rotary kiln was also in operation.

Once the billets had been sufficiently heated in the furnaces, they were extracted with tongs, transported on trolleys and placed under the main press with a pressure of 800–900 tonnes or under smaller forging hammers, depending on the method of shaping adopted (pressure, hammering). The main press was powered by steam. Using a press and hammers, the billet was hot-formed (forged). If the billet cooled during the forming process, it was then returned to the oven to restore the forging temperature. The pieces, depending on their dimensions and nature, were then subjected to manual processing (e.g. on anvils or smithing plates). The forged parts were transported on trolleys or by means of a hall crane. The semi-finished products made as a result of the forging process were then sent for further (mechanical) processing to other shipbuilding departments – mainly the S5 Mechanical Processing Department.

In the side so-called "cold hall" (there were no furnaces, so the temperature here was much lower than in the main hall) was the locksmithing workshop. Materials were cut (burned) here according to the weight of the components to be made. The cut pieces were then sent to the furnaces and forging. This included metal cutting saws and bending machines. Also located in the "cold hall" were four positions of welders engaged in, among other things, the welding of chain links (e.g. for various slings), carried out on behalf of external parties. Cable crossings were also manufactured here. The hall was equipped with an overhead crane.

The side annexes of the main hall housed warehouses and workshops and workstations with smaller machine tools (lathes and milling machines).

Elements of the original equipment

Approximately 10 furnaces for heating billets and smaller components (gas-fired, electric, including a small rotary furnace), hammers, including a larger one (the so-called Zygmunt, made at the Zygmunt Ironworks in Bytom-Łagiewniki around 1949) and several smaller ones operated by hand and foot (including an electric one), at least two forging presses, including the largest one with a pressure of 800–900 tonnes (dating from the 19th century) and one smaller one (the third one was purchased in Warsaw in the late 1980s). In addition, a so-called friction press (among other things, for ramming screw heads). Overhead cranes, smaller machine tools (lathe, milling machine, metal-cutting saws), blacksmith's plates, items of equipment for workshops and blacksmith's stands – anvils and blacksmith's hearths (so-called blacksmith's cauldrons), hand tools.

Preserved equipment

Idle 800–900 tonne press.

Surrounding area of the building

Narzędziowców St. and the area by the slipways of the K2 Hull Assembly Department.

50. Hall of the Tooling Production Department – toolroom – object 40A

History

In the 1870s and 1880s, there was an extensive storage yard for sheet metal and iron ship materials (Schiffbau-Eisen-Lagerplatz). Around 1905, a complex of buildings was erected on the storage yard, comprising a "plainer hall" – a framing hall (Richtplatten Halle from Richtplatte – plainer [blacksmith's] plate), a connected building housing a large annealing furnace (Glühofen Anlage; Glühofenhalle) and work sheds (Arbeitsschuppen). A little further on was a separate building housing the master's office (Werkmeister Büro). The hall housing the furnace was built as a low single-storey pavilion with a high chimney, while the other two elements of the complex were built as elevated halls with walls made of frame construction with brick infill (the office building was entirely of brick). The first hall (Richtplatten Halle), connected to the hall housing the annealing furnace, served as a hot-forming hall – the framing room. The complex maintained its function until the end of the Second World War and the early post-war years. At the time, it housed, among other things, forge hearths (fires), a surface plate, and a machine for pitching angles. It survived in its entirety until the second half of the 1960s and was then partially demolished. The only thing that survives is the former framing hall, which was the toolroom within the Tooling Production Department.

Character of the object

Production hall.

Structure

Single-space hall.

75. South façade of the tool room and tooling production workshop (40A). The former framing yard of the German Imperial Shipyard, the inter-war and Nazi Gdańsk Shipyard and the post-war Polish Shipyard No. 1, 2021. Photo: A. Woźniakowski, collection of the author

Department affiliation of the object

Instrumentation Production Department T2, then S6.

Function

In the hall, the necessary tooling for the commissioning of the various ship series was made.

Elements of the original equipment

Machine tools.

Preserved equipment

None.

Environment

Narzędziowców St., Krótka St., moulding workshop and locksmithing workshop buildings 3.

51. Foundry Department hall – foundry moulding workshop – object 38A

History

The building was constructed in the 1870s and 1880s. It was subsequently rebuilt. The lower storey originally housed the carpentry workshop (Tischlerwerkstatt), while the upper storey was the mould loft (Schnürboden) of the Imperial Shipyard and subsequent shipyards, including the inter-war and Nazi Danziger Werft (Gdańsk Shipyard) and the Polish Shipyard no. 1 (1945–1947), and in the early years also the Gdańsk Shipyard. In the nineteenth century and in the first half of the twentieth century, the northern part of the building housed the Blockmacher-Werkstatt (block preparation workshop) and the shipbuilding workshop, which were probably the prefabrication workshops of the shipyards that followed, assembling sheet metal and angle iron into larger sections or ship blocks (riveted at the time) that were later transported to the slipways at the Dock Basin. In addition, a warehouse and a painting workshop (Maler-Werkstatt) were located here. At the end of the 19th century, the entire hall was referred to as Shipbuilding Workshop no. 3 (Schiffbau-Werkstatt no. 3). She served in this role during the First World War and during the interwar and Nazi era of the Gdańsk Shipyard. After the Second World War, a moulding workshop was located on the lower floor of the building in place of the carpentry workshop. In the first post-war years, the mould loft of Shipyard no. 1 and the Gdańsk Shipyard continued to operate on the upper floor, where, among other things, templates were prepared for the construction of the first ships produced in the post-war Gdańsk Shipyard, including the SS *Sołdek*. Later, the mould lofts level was eliminated in part of the hall, creating a spacious single-space hall section on the south side, entirely used as the moulding plant of the S1 Foundry Department.

Character of the object

Production hall with social and office area.

76. Moulding workshop hall (38A; in the centre). In front of it, a preserved flyover for running, among other things, industrial gas pipelines. The building was connected to the now defunct foundry hall (37A), 2018. Photo: T. Błyskosz, National Institute of Cultural Heritage archives

Structure

The building consisted of the production part – the moulding (so-called wet) hall and the machining plant – as well as a social and office area. Originally, the hall was divided into two floors. The division of the hall section was also maintained in the first post-war years. In the 1970s, the main part of the building – the moulding hall – was single-space. The demolition of the ceiling was driven by the need to force adequate air circulation. Only the social and office area, located to the north, remains two-storey.

The northern part of the building housed changing rooms (on the ground floor) and offices and a social area (first floor). There was also a secretariat, a room for the head and deputy head of the department, a technology office, a planning office, a mechanic's office, administration, a common room and a so-called breakfast room (where regenerative meals were served to the workers).

Department affiliation of the object

Foundry Department (S1) of the Engine Building Plant (PS).

Function

The building housed the so-called wet moulding workshop (hence the usual name of the moulding workshop – "wet hall"). In the moulding workshop, casting moulds were prepared for machine parts (engines) and other components manufactured by the Foundry Department. Wooden models of the cast parts were placed in special moulding boxes (consisting of two lockable parts) filled with moulding sand (in the machine moulding workshop, the models were metal – aluminium, and later made of resin). The models were made in a separate modelling building (39A, no longer existing) and delivered to the moulding workshop. The models were then backfilled with the rest of the moulding sand, which was tamped down with specialised pneumatic rammers to ensure that no holes were created in the compound where liquid metal could enter. The moulding sand used in the wet moulding workshop, used to make castings of smaller parts, had to be wet, not dried (a different moulding sand was used for "dry" castings than for "wet" castings). The models varied depending on the parts being made – simple or made up of several separate components. A so-called core (core box) made of core mass was added to some of the models. It was used for casting parts that have a hollow internal space and used to reproduce the internal shapes of the parts and to obtain the corresponding wall thicknesses of the parts after pouring. The mould prepared for making the casting was poured with metal – either cast iron or coloured metal – through special holes (ingots). Metal smelted in vats at the neighbouring foundry was transported to the moulding plant on trolleys running on rails. Using overhead cranes, the vats transported by trolleys were lifted and the molten pig iron inside was poured into prepared moulds. Not the foundry, but the moulding plant was therefore the *de facto* place where the castings were created. Once the metal had solidified, the cast part was removed from the mould. The moulds were then sent to a purification plant located in the moulding hall and partly in the so-called connecting hall (hall 45A/152A) in order to knock out the dried sand, clean the moulds and prepare them for subsequent casting work. In the machining plant, special shakers were used to remove moulding sand residues and then rinsed with water. The so-called "rims" that remained on the workpiece after the casting process were cut off the castings in the machining plant with a chisel. The remaining moulding sand, no longer suitable for processing and reuse, was sent to a landfill site in Gdańsk-Szadółki. The smaller castings removed from the moulds were then cooled and put into a special drum (chamber), where they were shot-blasted – cleaned. Shotblasting was carried out with abrasive jets, consisting, for example, of small shapes – balls (metal, mineral) sprayed and directed at the cast cleaned parts at very high speed, e.g. by compressed air. Shotblasting cleaned the surface, blunted the sharp shapes of the castings, eliminated irregularities and descaled the

castings. After blasting, the castings were ready to be sold or used. Such prefabricated components went partly to the storage yard next to the foundry hall.

Elements of the original equipment

Overhead cranes for transporting vats of pig iron and other components, narrow-gauge cross-track.

Preserved equipment

Fans in the walls, other elements missing.

Environment

The site of the defunct link and foundry hall 37A with its surviving cross tracks, as well as the tool-room hall, Krótka St. and Narzędziowców St.

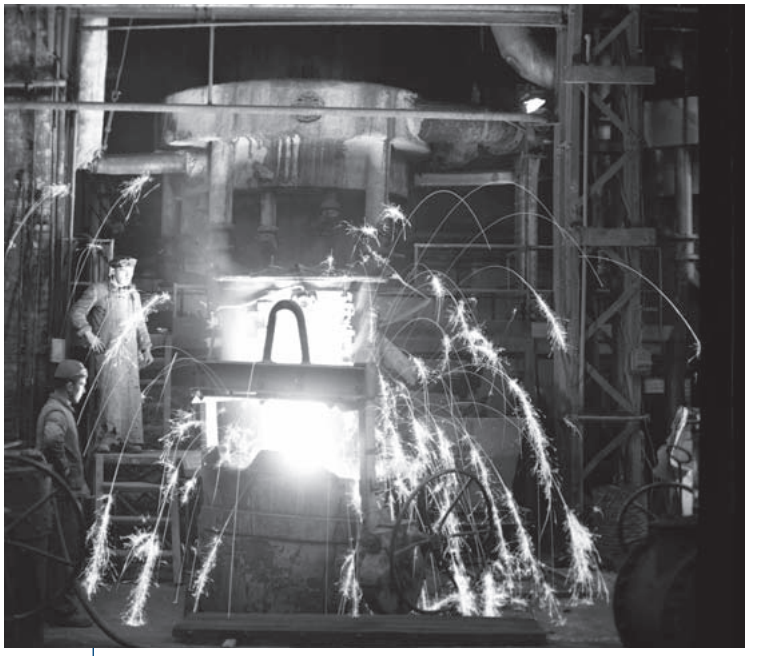
52. Foundry (cast iron and non-ferrous metals – no longer existing) – hall 37A

History

It was built around 1901 on the site of the sail and rigging workshop (Takler-Werkstatt, Segelmacher-Werkstatt) of the Imperial Shipyard, which had existed here since the 1870s or 1880s. It consisted of a sprawling new foundry hall (Gießerei – from today's Narzędziowców St.) and a narrow hall housing the model carpentry workshop (Modeltischlerei) on the ground floor, and the rigging workshop (Taklerwerkstatt) and handy store (Betriebsdepot) on the first floor. The narrow hall was a remnant of the former, longer rigging hall. It was expanded in subsequent years. Subsequently, probably in the 1930s or during the Second World War, the space between the foundry and the neighbouring carpentry workshop (later the moulding workshop) was roofed over, creating what is known as the "connector". This created a single hall complex. In the inter-war period, the foundry hall contained, among other things, casting pits in which bells were cast, one of the specialities of the Gdańsk Shipyard (Danziger Werft) in the inter-war period. The foundry hall has served this purpose throughout its history. It was severely damaged during the Second World War. Immediately after the war, it was modernised. It was demolished around 2004.

Character of the object

Production hall.



77. Drainage of pig iron (molten metal) from the metallurgical furnace into vats in the foundry hall, 1960s (?). Photo: Z. Mirota, State Archive in Gdańsk collection

Structure

A single-space production hall with casting furnaces and workstations for making larger iron castings and castings in non-ferrous metals. It housed foundry furnaces, a dry moulding workshop, non-ferrous metal foundries and moulding sand mixing rooms.

Department affiliation of the object

Foundry Department (S1) of the Engine Building Plant (PS).

Function

The input material for the smelting furnaces was supplied to the hall from outside (either directly from the smelters or from a depot in the neighbourhood) in the form of, for example, cast iron cubes, aluminium, brass, bronze or scrap from these materials. The same route was also used to supply the materials needed to make the moulding sands. In the northern part of the hall – from Narzędziowców St., there were smelting furnaces where the so-called pig iron was smelted. The molten pig iron reached a temperature of 1100–1200°C. The ovens were fuelled by coke. The furnace for smelting non-ferrous metals was induction (electric). The pig iron was poured into special vats, which were transported to the so-called dry moulding workshop located in this hall – a place where castings in non-ferrous metals (colours) were produced – and the wet moulding workshop located in the neighbouring building 38A. Next to the furnaces was the aforementioned so-called dry moulding workshop (in this moulding workshop, moulds were used in which the moulding sand had to be properly dried after the model was imprinted). Large castings were prepared here as semi-finished products for the production of e.g. the bodies of sweeping and anchor windlasses built by (Shipbuilding Equipment Works) Toruńskie Zakłady Urządzeń Okrętowych "Towimor", and the bodies of large electric engines produced by (Ship Electrical Equipment Works) Zakłady Okrętowych Urządzeń Elektrycznych "Elmor" in Gdańsk. They also went to, among others, (Ship Equipment Factory) FUO Rumia, where ship coolers were made, and to Hydroster, where hydraulic steering machines were manufactured. The complete machinery and equipment produced by these plants was then sent back to the shipyard and to the ships it built. The foundry hall only smelted cast iron and non-ferrous metals needed to make engine parts and other components needed for shipbuilding production. No steel was smelted here. In the southern part of the foundry hall, there was a foundry for non-ferrous metals, where castings were made from bronze, aluminium and brass, among others. Between the section where non-ferrous metal parts were cast and the furnaces was a space for preparing moulding sands with a special mixer.

Elements of the original equipment

Metallurgical furnaces, overhead cranes, cross-rail (narrow-rail) transport lines for transporting vats of pig iron and finished castings, a mixer for making moulding sand.

Preserved equipment

Fragments of cross-track (narrow gauge).

Environment

Narzędziowców St. and Krótka St., the moulding workshop hall, the street with the track, the model shops and model warehouse (no longer existing) and the storage yard.

53. Hall, so-called connector (part of the foundry and moulding workshop) – object 45A/152A (no longer existing)

History

The halls of the foundry and the carpentry workshop (later the moulding workshop) were partially connected in the 1930s (or thereafter). The hall (canopy) was subsequently extended in the post-war years.

Character of the object

Part of the production hall.

Structure

The covered space between the foundry and the moulding workshop.

Department affiliation of the object
Foundry Department (S1) of the Engine Building Plant (PS).

Function
This hall combined the functions of a foundry and a moulding plant. The connector was an intermediate space used to transport molten material from the furnaces to the wet moulding room for pouring the casting moulds. The building also partially housed a casting cleaning plant. The moulds, after the cast parts were removed, were directed to a purification plant, where there were special shakers that removed the moulding sand remaining in the moulds. The moulds were then rinsed with water. A chisel was also used to remove the so-called pouring residue – fragments of solidified metal – that remained at the junctions of the mould parts, after which the moulds were ready for the next use.

Elements of the original equipment
Forming and cleaning plant equipment.

Preserved equipment
None, the facility no longer exists.

Environment
Foundry (no longer existing) and moulding workshop halls, Narzędziowców St. and Krótka St.

54. Hall 39A – modelling workshop (no longer existing)

History
In the 1880s, there was a material store (Materialen Magazin) and a special store (Spezialien Magazin) on the site of the modelling plant. The post-war modelling building was most likely its remnant. The building also retained its function as a materials depot in the interwar period. After the war, a modelling plant operating for the foundry and moulding workshop was located here, and an outdoor material store was built on part of the building's grounds.

Character of the object
Production and storage hall.

Structure
Three-storey building. On the ground floor, there was a machinery hall and a timber warehouse. Higher up was a modelling workshop with staff workstations. On the next floor was a storage area for smaller models.

Department affiliation of the object
Foundry Department (S1) of the Engine Building Plant (PS).

Function
The model wood warehouse was located on Ostrów Island. From there, the wood was transported to the drying room of the Carpentry Department W5 (the modelling workshop and the Foundry Department did not have their own drying room). The primary woods used for casting models were pine and alder. Plywood and aluminium sheets were also used for model fittings to extend the life of the model kit (the sheets were cut into strips from which the fittings were made). The wood went into the dryer when it was about 30% moisture content and above, and was taken out when it was about 12–18%. After seasoning in the drying room of the department W5, the material was transported in the form of 3–4 m long planks by battery-powered trolley with a trailer to the storage area on the ground floor of the 39A modelling building. Here, it was further dried. New material was delivered after everything in stock had been used up. The boards were then cut to length with a table saw in this part of the building (cross-cut, sliding on a trolley), and the cut material was then processed on specialised machines: a levelling machine

78. The defunct model hall (39A; taller right) and the surviving model storage building (387A), 2011. Photo: A. Trzeciak, collection of the author

and a thicknessing machine, in order to achieve the right thickness and eliminate any unevenness in the wood. The material was then transported to the upper level (1st floor) of the building, where there were modellers' workstations and machines for more precise processing, e.g. band saws, lathes, levelling machines, and a large disc grinder with two discs. The boards were then glued together to give the initial material for the model the right size and thickness. This was then used to cut out the appropriate shapes for the whole model or, in the case of larger models, the individual parts, which were then glued together to form a complete model of the component to be cast. Final processing was also carried out with hand tools, including chisels, planers (planes), files (rasps) and wood strippers. Each modeller had a workstation with a planer, where models were finally machined or, with larger models, assembled from several parts. After mechanical processing and appropriate reinforcing hardware, the models went to painting. The painting stations were located on the same level of the modelling plant. The cast models were still puttied and then coated several times with wood paint to protect them from moisture. Before casting, the model was also lubricated with a special liquid with soapsuds, oil or cream so the moulding sand would not stick to it when the mould was made and so the model could be extracted more easily from this mould. The completed model, depending on its size, went to the smaller model warehouse, located on the top floor of the modelling building 39A (2nd floor), or to a separate model warehouse (larger – building 387A). From there, it was taken to the moulding workshop, where it was used in the process of preparing a complete casting mould. The models were made according to drawings – special technical drawings on a scale of 1:1, including plans and sections. Among other things, models were created in the modelling workshop to make components for ships' main propulsion engines, trawl lifts, covers for refrigeration equipment or electric or hydraulic motors, and much more.

Elements of the original equipment

Specialised freight lift for transporting casting models, crosscut circular saw, machine tools – levelling and thicknessing machines, band saws, lathes, a large disc sander with two discs, planing machines, smaller carpentry tools.

Preserved equipment

The building no longer exists.

Environment

Material and prefabricated warehouse, model warehouse, Narzędziowców St.

55. (Large) model warehouse – hall 387A

History
The building was constructed in the late 1960s or early 1970s during the expansion of the Gdańsk Shipyard. It was located on the site of the former special warehouses (Spezialien Magazin) of the Imperial and Gdańsk shipyards, which were demolished in the post-war period. Originally, there was a square in their place.

Character of the object
Storage hall.

Structure
Single-space hall.

Department affiliation of the object
Foundry Department (S1) of the Engine Building Plant (PS).

Function
The facility was used to store larger casting models, made in the neighbouring modelling workshop 39A (no longer existing).

Elements of the original equipment
Ceiling rail (guide) for transporting components. No data is available on other equipment.

Preserved equipment
Ceiling rail.

Environment
EBP storage yard, modelling plant (non-extent), foundry (non-extent).

56. Storage yard of the Engine Building Plant (Foundry Department S1 and Mechanical Processing Department S4)

History
The square was built in the early 1970s during the modernisation of the Gdańsk Shipyard and the expansion of its storage and warehousing facilities.

Character of the object
Storage yard with overhead cranes.

Structure
As above.

Department affiliation of the object
The Foundry Department (S1) and the Mechanical Processing Department (S4) of the Engine Building Plant (PS).

Function
The yard was used to store material imported into the shipyard, semi-finished forging and casting components and materials necessary for the production carried out by the Engine Building Plant. Equipment imported from other factories and needed for production at the shipyard was also stored here. The storage facilities included cylinder liner castings, trawl winch housings (manufactured by the shipyard to order for (Shipbuilding Equipment Plants Toruń) Toruńskie Zakłady Urządzeń Okrętowych "Towimor"), heat exchanger components (manufactured for the Ship Equipment Factory FUO Rumia), bottoms for ship boilers (imported from outside – components used in the construction of boilers), anchor windlasses, cargo lifts (the department S4 manufactured around 70 deck mechanisms and around 10 ship engines a

year, their components and the mechanisms themselves were stored on the yard). The yard also received, among other things, steel castings for the crossmembers of the engine foundation frames, steel materials necessary for the construction of the engine – welded stands (guides), materials produced in the shipyard for the S plant and engine production and for other plants (Towimor and FUO Rumia), and steel billets for the forge (delivered by rail from steelworks). About a third of the square belonged to the foundry. The remainder belonged to the Mechanical Processing Department. The square also housed a trawl winch test station, now defunct. In addition, coke for the foundries and input materials for the furnaces – cast iron cubes, brass, aluminium delivered from steelworks, scrap metal, etc. – were stored here in special boxes. The depot was operated by a magnetic crane feeding material into the furnaces.

Elements of the original equipment
Overhead cranes on flyovers, concrete coke boxes.

Preserved equipment
None.

Environment
Model warehouse (no longer existing), management building.

57. Furniture warehouse – object 151A

History
The building was erected before 1919, probably as an outfitting warehouse, located at the then (now defunct) Outfitting Basin of the Imperial Shipyard and the inter-war Gdańsk Shipyard (Danziger Werft), the so-called Pfandgraben (the former so-called Pfandgraben, a relic of the moat system surrounding the former modern ramparts of Gdańsk), the later Outfitting Basin A of the Gdańsk Shipyard. The warehouse was built on the premises of the offices and management of the shipbuilding yard of the submarine construction centre, a small park and an oil tank (U-Boots-Kammer-Gebäude; Bürogebäude; U-Boots-Kammer-Verwaltung, Baumgarten, Öltank). In the following decade (1925), and probably also in the 1940s, the building was extensively modernised. Its masonry exterior was reinforced with an internal reinforced concrete structure. The top floor was also rebuilt (perhaps in connection with the works described earlier or in the post-war period). An extensive underground

79. South elevation of the Gdańsk Shipyard furniture warehouse building (151A). The wall shows traces of numerous alterations and modernisations. The building is connected to an underground shelter, probably created during the Second World War. The shelter is located underground in the vegetated area visible in the foreground, 2022. Photo: A. Trzeciak, collection of the author

shelter was located next to it, presumably for the workers of the hull and equipment centre of the Nazi Gdańsk Shipyard. After the war, the building retained its function as a warehouse where furniture equipment was stored. It currently houses the WL4 art gallery.

Character of the object
Storage facility.

Structure
A multi-storey building with a basement and a preserved underground shelter next to it.

Department affiliation of the object
Warehouse Department (Gs).

Function
The building housed a warehouse of furniture components for the shipbuilding production carried out at the now defunct K2 Hull Assembly Department.

Elements of the original equipment
Unknown.

Preserved equipment
None.

Environment
The defunct Fitting-out Basin (former Pfandgraben), the defunct welding school (88A), the shipyard canal, the storage yards and the defunct slipways of the department K2 and the shipyard boundary. Also part of the environment is a 1930s Polish-made semi gantry crane.

58. Main warehouse A – object 89A

History
The building was constructed around 1941 at one of the plant's entrance gates (postwar Gate 1 – now reconstructed) as a warehouse for the Nazi Gdańsk Shipyard (Danziger Werft). On the side of the gate was the loading ramp of the warehouse. The upper floors of the building were fitted out with cubicles for storing materials and smaller items. On the ground floor, larger components could be stored and equipment stored or partially assembled (e.g. generators or medium-speed drive motors). The roofs of the warehouse's

80. Site A main warehouse building (89A). Next to it was a sheet metal warehouse. The halls of the K2 Hull Assembly Department were previously in the empty area in the foreground, 2009. Photo: T. Błyskosz, National Institute of Cultural Heritage archives

distinctive pylons, which housed staircases, were observation and fire positions for anti-aircraft defence during the Second World War. After the war, the building was the warehouse of Shipyard no. 1 and later the main warehouse A of the Gdańsk Shipyard. Between 2021 and 2023, the building underwent a major revitalisation and modernisation. It currently serves as a hotel and catering facility.

Character of the object
Storage building.

Structure
A multi-storey building with an open central space running through all floors, around which were galleries (mezzanines) where storage boxes were located. The building had an unloading ramp and a partial basement. It was characterised by three pylons housing the staircases (two on the north side, one on the south side). In the underground section, there was waterproofing (suggesting that water seeped in at one point), a fire reservoir and concrete trestles positioned along the walls, presumably for stacking tanks or storing materials in such a way as to protect them from flooding in the event of high groundwater levels.

Department affiliation of the object
Equipment Storage Department (Gs).

Function
Warehouse building 89A was located adjacent to the large (non-existent) sheet metal warehouse located in area A (the former Danziger Werft and Kaiserliche Werft warehouse), forming one of the largest warehouse and storage complexes in the Gdańsk Shipyard. It was also located close to Gate 1, Gate 2, as well as the former main railway gate A, located near the junction of today's Gazownicza St. and Doki St. and the shipyard railway junctions running just behind it, which facilitated the transport of materials and equipment by both road and rail. Specialised equipment, instrumentation and materials that could not be stored outside were stored in the building. Among other things, engines for generators, generator sets and other machinery and mechanisms were delivered to the 89A warehouse and stored on the ground floor. The upper floors were used to store, among other things, non-ferrous metal materials and semi-finished products requiring indoor storage, such as sheet metal, copper pipes and smaller components. There was a ramp leading down to the basement of the building, which could be accessed by handcarts or even smaller trolleys and mechanical conveyors. As in warehouse 90B, materials were transported by wagon. The trains would drive on tracks into the interior of the hall through a gate closed with massive gates (on the west side). The space on the ground floor was open. The upper floors had mezzanine floors with barred boxes for storing a variety of goods. Smaller materials were transported to the upper levels by freight lifts.

Elements of the original equipment
Overhead cranes and freight lifts, warehouse equipment.

Preserved equipment
Overhead cranes and freight lifts.

Surrounding area of the building
The non-existent Biblioteczna St., the defunct A metallurgical materials yard, Gate 1.

59. Building with the Health and Safety (HSE) Hall (Polish acronym BHP) and the plant's memorial chamber ("museum") – object 131A

History

The building was constructed between 1882 and 1889 on a section of land separated by a wall from the main Imperial Shipyard complex, adjacent to the management building. It served as a torpedo depot (Torpedo-Lagerhaus, the German inscription is still legible above one of the windows). A railway track led from the main yard area to the depot building, with a small turntable next to the entrance to the hall. In 1908, the building was extended with the addition of the western hall section, which survives to this day – a single-storey annex covered by a pitched roof with skylights (later housing the historic HSE Hall). Around 1918, the north-eastern two-storey office part of the building was extended. The building survived in this form until the Second World War. As a result of the war, the older, eastern hall section was damaged, which was demolished in the late 1940s, after the end of the war. The building was subsequently upgraded for a so-called 'occupational safety office' and for the display of safety devices, equipment and clothing. Subsequently, in the 1960s, it housed the headquarters of the Co-operation Department. After another adaptation, the conference room of the Gdańsk Shipyard was created on the ground floor of the building. The building was the scene of talks between the workers on strike in December 1970 and a representation of the shipyard management. The building was modernised again between 1978 and 1980, installing, among other things, a modern sound system. A memorial chamber for the shipyard has also been set up here. The building and conference room (HSE Hall) was the venue for many official events and ceremonies, meetings, academies, rationalisation exchanges and working meetings with shipowners, etc. In August 1980, the Strike Committee of the Gdańsk Shipyard, and later the Inter-Enterprise Strike Committee (MKS), met in the building and the HSE Hall. On 31 August 1980, the historic Gdańsk Agreement was signed here between the independent workers' representation – the MKS – and a committee of the communist government of Poland. Since then, the building has been the venue for trade union meetings of the Independent Self-Governing Trade Union "Solidarity". The last meeting of the National Commission of the Independent Self-Governing Trade Union "Solidarity" before martial law was imposed also took place here. Following the end of the Gdańsk Shipyard and changes in ownership, the building became the property of the Independent Self-Governing Trade Union "Solidarity". It was entered in

81. Building with the historic Health and Safety Hall of the Gdańsk Shipyard. It has hosted, among other things, health and safety training, conferences, invention exchanges and working meetings between the shipyard's technical staff and shipowners' representatives, 2018. Photo: T. Błyskosz, National Institute of Cultural Heritage archives

the register of historic buildings in 1999. A year later, on the 20th anniversary of the founding of the Independent Self-Governing Trade Union "Solidarity", it opened an exhibition entitled *Roads to Freedom*, dedicated to Poland's recent history. The building was once again modernised between 2006 and 2010 to restore its August 1980 appearance. It remains to this day a venue for celebrations, meetings and events of an official, anniversary, artistic, educational, scientific, etc. nature. It also houses an exhibition that draws on the idea of the former Gdańsk Shipyard Memorial Chamber.

Character of the object

A building with meeting and workshop rooms, office space and a historical exhibition.

Structure

The building consists of a spacious single-storey ground-floor section, housing the historic HSE Hall (conference room), and a two-storey office section.

Function

The facility was not directly related to production functions. It did, however, hold meetings with representatives of shipowners ordering vessels from the shipyard, and various arrangements were made for the construction, quality and handover of vessels. In the shipyard's memorial chamber, executive models of vessels under construction were collected and largely displayed, illustrating the scale and scope of production at the Gdańsk Shipyard. This had an important informational and promotional dimension for the plant, its contractors and cooperators.

82. Wall decoration (sgrafitto) over the side entrance to the building with the Health and Safety Hall. It depicts silhouettes of shipbuilders representing typical shipbuilding professions – a riveter (with a riveter's hammer), a shipbuilder (with a model of a ship) and a welder (wearing glasses and with a welding handle). It was probably created in the 1950s, 2009. Photo: A. Trzeciak, collection of the author

Elements of the original equipment

Meeting room and office equipment. Objects from the shipyard exhibition.

Preserved equipment

Some of the furnishings of the historic HSE Hall – tables, chairs and numerous exhibits from the former memorial chamber, including ship models.

Environment

Dyrekcyjna St., Kooperantów St. and Kadłubowców St.

60. Company fire station building – fire station – object 150A

History

The fire station building at the Imperial Shipyard (Feuerlösch-Depot) was built during the redevelopment of the plant in the 1880s. It was extended at the beginning of the 20th century. The gables of the building were raised, among other things. A tower was built next to the fire station for drying fire hoses

(Schlauchturm). On the lower floor of the building, there were rooms for the horse-drawn fire engines (coach house) with the necessary equipment storage areas, as well as a stable for the horses. On the upper floor were the service rooms. After the Second World War, the building became the fire station of the Gdańsk Shipyard. The building was rebuilt, with annexes added to enlarge the fire engine stations (garages).

83. Company Fire Brigade building – fire station. The building has served this function since its inception in the 2nd half of the 19th century, 2018. Photo: T. Błyskosz, National Institute of Cultural Heritage archives

Character of the object

Fire station building – with garages and staff and service rooms.

Structure

Two-storey building. On the ground floor, there are garages/fire engines, fire equipment storage, a telephone switchboard and a doctor's office. Above, staff rooms and a common room. Two fireman's poles were installed in special openings in the ceiling/floor between floors.

Department affiliation of the object

Company Fire Brigade of the Gdańsk Shipyard.

Function

Facility related to the complementary function of production – fire protection of the workplace. The fire brigade protected against fire and, in the event of fire, extinguished fires in shipyard buildings, including production halls, as well as possible fires on ships. Particular surveillance was carried out on those facilities where flammable materials, substances and gases were present, such as carpentry shops, timber depots, acetylene plants, oxygen plants, paint and varnish warehouses, plastic warehouses and others. In addition, the units under construction and the people working on them were under the fire brigade's supervision.

Elements of the original equipment

Fire equipment, fire engines and necessary infrastructure.

Preserved equipment

Fireman's poles.

Environment

Square in front of the management building, Główna St. and Kooperantów St.

61. Vocational school and school-production workshop building – object 145B

84. The preserved part of the factory vocational school building (145B), where many Gdańsk Shipyard employees, including graduates of Gdańsk shipbuilding schools, were educated, 2019. Photo: T. Błyskosz, National Institute of Cultural Heritage archives

History

The building was constructed between 1935 and 1937 as the school workshop building of the then Nazi Schichau Shipyard. After the Second World War, it served as the canteen and common room of the Polish Shipyard no. 2. From 1946, it resumed its educational function. The building consisted of a single-storey section with an attic and a main body, two-storey with an attic. There was a further education school, then a Secondary Mechanical School, then a Basic Shipbuilding School and an evening technical school. The facilities were managed by the School District Board of Trustees. From 1963, the building became the property of the Gdańsk Shipyard. After adaptation of the basement, the building was converted into a school and production workshop. On 22 February 1965, part of the building was destroyed by an acetylene explosion. The death toll at the time was five. After partial reconstruction and renovation, the building continued to serve as a shipbuilding vocational school. The building retained the character of an educational establishment until the end of the shipyard. After 2000, it held cultural functions. From 2004 to 2014, the "Island" Institute of Art operated here, and after another adaptation from 2021, the New Museum of Art (NOMUS), a branch of the National Museum in Gdańsk established in 2017, operated in the building.

Character of the object

A school building with educational, office and social spaces and a workshop area.

Structure

By 1965, the building consisted of a single-storey and a two-storey section. The former was completely destroyed in 1965 after a gas explosion. The building housed, among other things, the school's manufacturing workshops, i.e. in the basement: the carpentry workshop and warehouses, on the ground floor: the galvanising workshop, etching room, forge, tool refurbishment workshop and mechanical processing hall, on the first floor: the locksmith's workshop with a surface plate and the hardening workshop, on the second floor: STS (Shipbuilding Technical School) and SITS (Shipbuilding Industrial Technical School) school workshops, later MaETS (Mechanical and Electrical Technical School) and lecture rooms, a common room, canteen, on the third floor: changing rooms and washrooms.

Department affiliation of the object

Department O1.

Function

As a school facility, the building served a complementary function to production, but the workshops

located at the school manufactured components used in the shipyard's production in accordance with their profile.

Elements of the original equipment

Educational equipment for classrooms and workshops – educational utensils, models of equipment, tools and workshop machinery.

Preserved equipment

None.

Environment

Transportowców St., Kooperantów St. and Narzędziowców St., the urban part separated by a wall and the non-existent acetylene plant and carbide warehouse.

62. A2 and A1 slipway basins of the defunct K2 Hull Assembly Department, storage yard with half gantry crane

History

The first heavy slipway (later A2) was built in 1938 during the expansion of the interwar Gdańsk Shipyard, which was jointly owned by Poland. Immediately after the end of the war, the construction of the second heavy slipway (later A1) began. After its completion, the construction of the first Polish seagoing ships – ore carriers – began on both slipways. The first of the series and also the first Polish seagoing ship, symbolising the birth of Polish shipbuilding – the ore carrier SS *Sołdek* was launched on 8 November 1948 from slipway A2. The preserved basin of this slipway therefore has great historical and symbolic value in the context of the history of Polish, European and world shipbuilding and the shipbuilding industry. Both slipways were rebuilt in the 1970s in connection with the modernisation of the shipyard and the preparation of the plant for the production of larger and more modern vessels. Between 1973 and 1974, massive reinforced concrete half-dock ramps were built here, operated by four KONE cranes, also installed at the time, with a lifting capacity of 150 tonnes and one smaller crane with a lifting capacity of 20 tonnes. After the collapse of the shipyard, the infrastructure serving the former K2 Hull Assembly Department was systematically demolished. The slipways disappeared in the spring of 2013. Only their basins remain. Next to them also remains a section of the storage yard, created on the

85. Launching of the first post-war ship built in Poland – the SS *Sołdek* from the now defunct A2 slipway of the Gdańsk Shipyard. It was an event that came to symbolise the birth of the shipbuilding industry in post-war Poland. Today, only the basins of the historic slipways are preserved, 1948. Photo: NN, State Archive in Gdańsk collection

86. Elements of the K2 department's semi-docking slipways – the now defunct launching tracks and a fragment of the preserved basin of slipway A2, from which the SS *Sołdek* ship was launched before reconstruction. Attention is drawn to the wooden lining of one of the tracks, probably remembering dozens of launches at the K2 department, one of the largest production departments in the Gdańsk Shipyard. On the left, the non-existent prefabrication hall of the K2 department (1A). Urban buildings in the background, 2010. Photo: A. Trzeciak, collection of the author

site of the canal (former Pfandgraben) that was buried between 1973 and 1974, namely Fitting-out Basin A. This yard was served by two cranes on flyovers, one of which also survives.

Character of the object

Longitudinal, semi-dock slipway basins (formerly slipways armed with cranes and serving infrastructure), storage yard (forecourt) with crane (formerly two).

Structure

As above.

Department affiliation of the object

Hull Assembly Department (K2).

Function

Construction of hulls and launching of vessels built in the department K2.

Elements of the original equipment

Ramp cranes and other slipway infrastructure. At the storage yard, two smaller 5-tonne cranes.

Preserved equipment

A preserved crane at the storage yard, a half gantry crane with a lifting capacity of 5 tonnes, made in 1937 at Steelworks "Zgoda" in Świętochłowice.

Environment

Shipbuilding Canal, Dock Basin, forge, defunct mechanical processing and prefabrication halls 1A and 2A and furniture warehouse.

63. Fragments of shipyard flyovers for the transfer of industrial gases, utilities and electrical power

History

The flyover system was installed in the shipyard in the 1980s because, in the decades before, a large number of cables and connections of various technical networks had been placed in the ground, for which precise technical documentation was lacking.

Character of the object

Steel flyovers with industrial gas transmission pipelines.

Structure

As above.

Function

The transmission of technical gases such as oxygen, acetylene, compressed air and steam, which are necessary for production processes and for heating shipyard buildings.

Structural components

Steel beds and pillars, and pipe and duct runs.

Preserved equipment

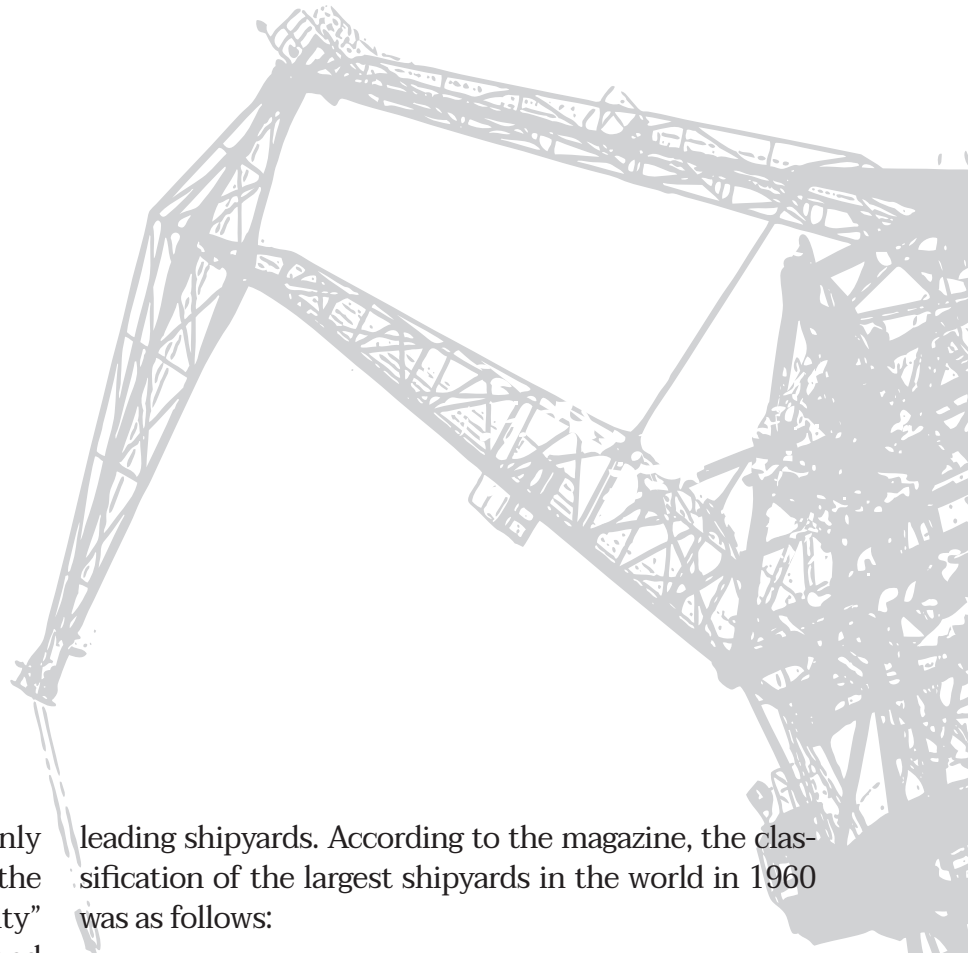
The two surviving parts of the flyovers at the plaza next to the management building and toolroom 49A and along the shipyard's Krótka St.

Environment

The flyovers ran in a single line across most of the yard. The preserved ones are located on the square next to the management building and the toolroom at 49A and Krótka St.

87. Non-preserved fragment of a shipyard flyover located at the rear of the Gdańsk Shipyard management building. An old cobbled road runs beneath it, 2011. Photo: A. Trzeciak, collection of the author

End



The Gdańsk Shipyard was, and remains, not only the cradle of a great peaceful social movement – the Independent Self-Governing Trade Union "Solidarity" – which significantly influenced the history of Poland and Europe. It is also the birthplace of Poland's modern shipbuilding industry. The plant significantly influenced the dynamic development of the shipbuilding sector at home and abroad for decades. It built many prototype vessels on a national, European and even global shipbuilding scale. The total number of ships produced at the Gdańsk Shipyard is close to a thousand units of many types.

In the post-war period, the shipyard was the largest shipbuilding facility in Poland. In the late 1950s and early 1960s, it also enjoyed the status of the largest civilian shipbuilding facility in the former Eastern Bloc and one of the largest shipyards in the world. The extremely dynamic progress that has been made in Poland in just over a dozen years in shipbuilding was largely the work of the employees of the Gdańsk Shipyard. This process was noted by the global trade media. In 1960, after the launch of 32 ships with a total tonnage of 173,476 GRT, the classification in the renowned *Glasgow Herald Trade Review* shipping magazine of that year gave Gdańsk Shipyard the fifth place in the ranking of the world's leading shipyards. According to the magazine, the classification of the largest shipyards in the world in 1960 was as follows:

1. Kieler Howaldtswerke AG	Kiel	FRG	270,266 GRT
2. Chantiers de L'Atlantique	Saint-Nazaire	France	240,800 GRT
3. Deutsche Werft	Hamburg	FRG	193,526 GRT
4. Harland and Wolff	Belfast	United Kingdom	185,547 GRT
5. Gdańsk Shipyard	Gdańsk	Poland	173,476 GRT
6. Mitsubishi	Nagasaki	Japan	172,759 GRT

At the dawn of the 1960s, the British shipbuilding magazine *Journal of Commerce and Shipping Telegraph* highlighted the extraordinary role of the Gdansk shipyard in the dynamic development of the Polish shipbuilding industry. The magazine said: "The record of achievements of Poland's shipbuilders, particularly at the Gdańsk Shipyard, is one if industrial success stories of recent years. It is more outstanding in that it is only a matter of 15 years since Poland began to build tonnage designed for deep-sea trading".

The existence of the Gdańsk Shipyard was also an extremely important economic and social factor influencing the history of Gdańsk. The shipyard was an

important part of the city on the Motlawa River, and its operation was intertwined with the lives of thousands of residents of the city and the region. The company operated in conjunction with an extensive co-operative network of around 1,300 plants throughout Poland and abroad. The existence of many of these enterprises was largely dependent on cooperation with the Gdańsk Shipyard and other Polish shipyards.

Since the announcement of the collapse of the Gdańsk Shipyard in 1996, a period of decline in its material fabric has begun. This process intensified after 2008, as a result of preparations for planned new infrastructure investments. The demolition of the existing industrial buildings has partly changed the character of the historic space and has become one of the factors in blurring the memory of the site. This was the result, among other things, of low sensitivity and a superficial awareness of the real importance of the material, industrial heritage of the shipyard. It should be emphasised that even in the not-so-distant past, the legacy of industrial culture did not enjoy much interest and esteem in our country. For years, the post-industrial areas of the Gdańsk Shipyard were treated almost exclusively as investment areas with a dominant service and residential function. What has for decades, through its specificity, economic and social role, constituted much of the city's character and influenced its economic and social history, with regard to its post-industrial heritage, has largely faded from public memory. Plans to implement new spatial, architectural, urban or aesthetic qualities into the post-industrial space of the shipyard have often come into conflict with the memory and identity of this space. They posed, and still pose, a danger of weakening the character of Gdańsk as a city of freedom and the Solidarity that was born in the Gdańsk Shipyard. Its character has been shaped by its coastal and riverside location, developing trade, crafts and industry over the centuries, including mainly shipbuilding, continuing the centuries-old local tradition of building vessels in Gdańsk. This industry, represented by the Gdańsk Shipyard, but also other Gdańsk shipyards, acquired a unique historical significance in the perspective of domestic history after 1945, especially through the events of 1970–1989.

The authors of this study attempted to describe the basic industrial function of the shipyard area, to explain the importance of individual shipbuilding facilities in the implementation of production tasks and to show how the technological processes of shipbuilding, the implementation of which was the essence of the shipyard's operation, shaped the space of the former plant. In other words, to show, as it were, an industrial schema, a kind of DNA, a code of space and an ensemble of buildings of the Gdańsk Shipyard. In addition, the authors carried out an analysis of the state of preservation of the industrial heritage in the context of the function of the former shipyard and its various facilities.

The conclusions that emerge from the research tasks are twofold. Firstly, the absence of many interesting elements of the industrial infrastructure and equipment of the Gdańsk Shipyard, consisting of historical monuments of technology, specialised machinery and equipment from different periods of history, smaller pieces of equipment of buildings and external industrial spaces, is a great loss. These elements, which are an important part of the valuable industrial historical heritage of the city of Gdańsk, the region and the country, have been completely dispersed or destroyed. These devices, once equipment of halls, storage yards or other fragments of the shipyard's industrial space, were also an important carrier of the identity of these places and of the memory, especially of the people who worked there. Exceptions include hall cranes, a powerful late 19th century forge press located in the former forge hall, and some industrial cranes. In the accounts given by former workers of the Gdańsk Shipyard, there were often recollections of specific machines or equipment, part of the equipment of a particular hall, closely linked to the name or names of people, often high-class shipyard specialists, sometimes participants or initiators of strikes. The historic strike of December 1970 began at one such piece of equipment. This makes it all the more of a loss, as in the future these

elements could be valuable parts of the design, decoration and variety of the historical interiors of halls and post-industrial spaces adapted to new functions.

The second, and this time extremely positive, conclusion that emerged from the work on the publication is that despite the demolition of buildings and the loss of equipment in recent years, the historical space of the Gdańsk Shipyard has retained its essential spatial layout and character resulting from its former industrial function. It is also still strongly saturated with unique technical monuments and industrial architecture. This makes it possible to embed the story of the plant's operations and production and to read the industrial processes carried out in the shipyard space. The preserved shipbuilding facilities can be divided into three main, interrelated groups of monuments, representing in an almost complete way all major types of production, technological processes and stages of shipbuilding.

Firstly, one of the most important ship hull production centres of the Gdańsk Shipyard, the buildings of the former K1 and K3 departments, is almost complete. These objects show, one by one, the directions of the flow of materials – mainly sheet metal and angle iron – and the successive stages in the formation of the ship's hull. After strictly programmed pre-processing, carried out in the sheet metal workshop based on wooden templates supplied from the mould lofts, the plates were stacked in the picking yard into technological groups (picking comprising elements of one ship section), then assembled into sections (ship parts) in prefabrication hall 3B. After the sections were transported to the yards at the slipways, or foredeck, they were assembled into multi-tonne ship blocks made up of several sections. The blocks were in turn moved by a crane or group of cranes and attached to other blocks on the slipway, which were then joined together to form a complete ship's hull. Its launch from the slipway finalised this stage of production.

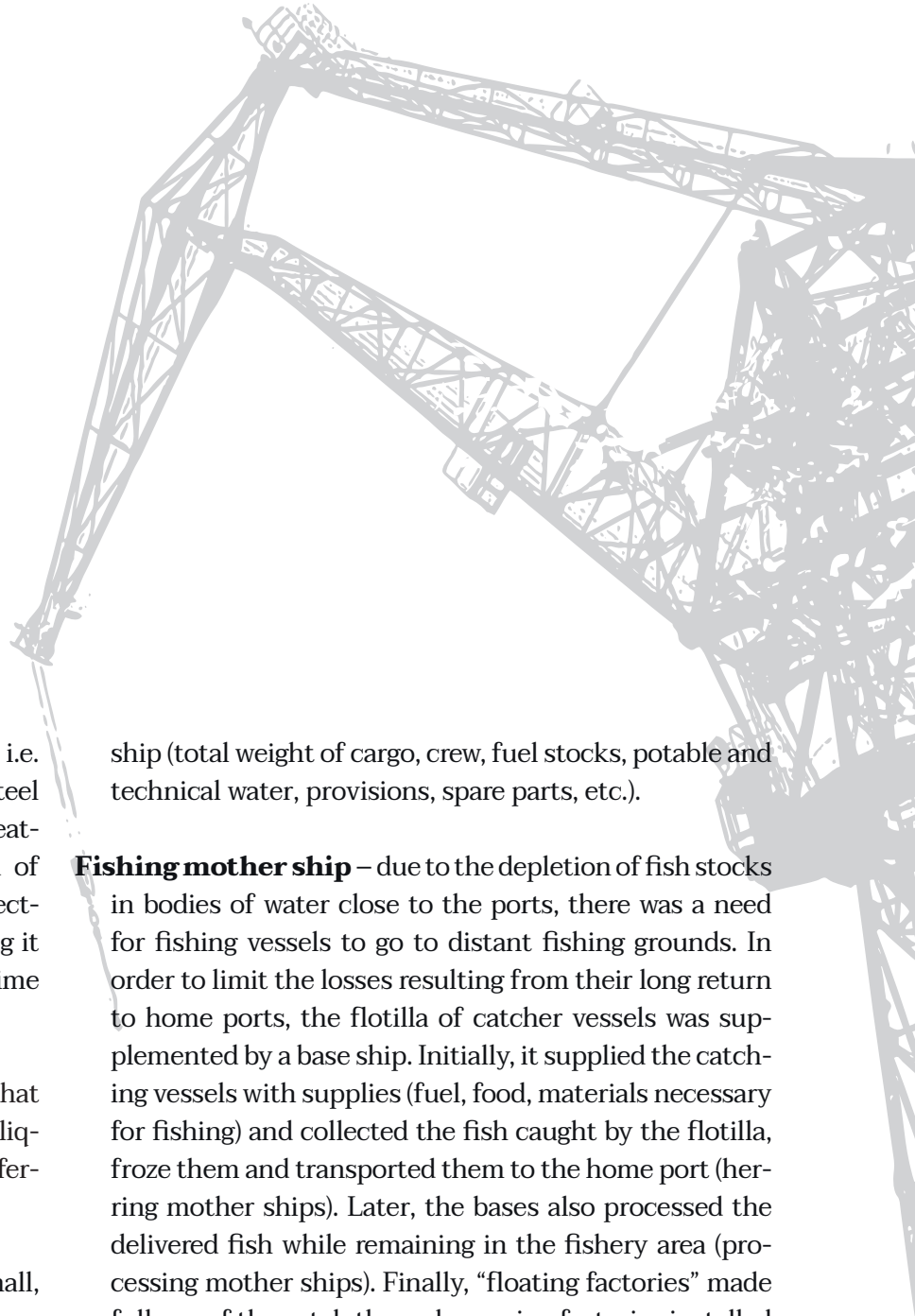
Secondly, in the Gdańsk Shipyard space, buildings have been preserved in almost all the departments involved in equipping the ship's hull with the necessary components – mainly locksmithing (e.g. steel foundations for deck machinery), pipes, electrical installations and carpentry pieces (e.g. room equipment). An interesting example is the existing facilities of the carpentry department, which have largely retained their production function since the turn of the 20th century. They show the flow of timber and other materials required for the prefabrication and fabrication of ship's fittings, such as furniture and cabin furnishings. The facilities of the Electrical Department are also preserved, as well as the most important storage buildings, where materials and the necessary equipment and facilities for many shipbuilding departments were collected.

In addition, an almost complete set of buildings of the ship engine plant of the Gdańsk Shipyard, essential components for the propulsion of vessels, has been preserved. The production of this centre completely satisfied the Gdańsk Shipyard's own demand, as well as that of all Polish shipyards, for high-quality ship boilers. Here, too, it is possible to trace almost all the technological processes serving this production.

There are also still a number of buildings and facilities where many of the production organisation and support activities were carried out – such as the management building or the facilities of the transport and repair departments and the social buildings.

In summary – with proper care for the preserved elements of industrial heritage, a full understanding of its high status and importance, and cooperation between governmental and self-governmental institutions, NGOs, landowners and planners, investors and designers, it is still possible to show the richness of the industrial legacy of the Gdańsk Shipyard and to enable its presentation and deeper interpretation. It is to be hoped that the Gdańsk Shipyard, with its industrial legacy of unique and universal value, will find recognition both in the eyes of UNESCO specialists and the future users of its space and facilities. At the same time, it has the potential to become a vibrant but identity-conscious space, a modern part of the unique city that is Gdańsk. Building this awareness is also the purpose of this book.

Glossary



Selected terms are included in the glossary, the specification of which will help the reader to understand the information contained in the book.

Annealing furnace – a furnace used for annealing, i.e. removing the stresses that arose in responsible steel structures during mechanical processing, heat treatment or welding. Stress-relief annealing consisted of placing the structure in a specialised furnace, subjecting it to heating to a fixed high temperature, holding it at this temperature for a strictly defined period of time (annealing) and then slowly cooling it down.

Bulk carrier – vessel designed to transport cargoes that cannot be individually counted, e.g.: coal, ores, bulk, liquid materials, timber, malt, and combinations of different bulk cargoes.

Corvette – originally, this was the name given to small, fast sailing ships, mainly intended for reconnaissance and intelligence services. During the Second World War, the name was used to describe small warships designed mainly to protect convoys, especially against submarine attacks. Today, they are medium-sized multipurpose warships armed with missile launchers designed to combat surface targets and land targets, and to perform detection and anti-submarine warfare measures.

DWT – *deadweight tonnage* – a value given in English tonnes (1016 kg) indicating the carrying capacity of a ship (total weight of cargo, crew, fuel stocks, potable and technical water, provisions, spare parts, etc.).

Fishing mother ship – due to the depletion of fish stocks in bodies of water close to the ports, there was a need for fishing vessels to go to distant fishing grounds. In order to limit the losses resulting from their long return to home ports, the flotilla of catcher vessels was supplemented by a base ship. Initially, it supplied the catching vessels with supplies (fuel, food, materials necessary for fishing) and collected the fish caught by the flotilla, froze them and transported them to the home port (herring mother ships). Later, the bases also processed the delivered fish while remaining in the fishery area (processing mother ships). Finally, "floating factories" made full use of the catch through canning factories installed on board the vessel (canning mother ships).

Flyover – a steel structure designed to provide a collision-free solution for the crossing of installation or technical equipment with roads or other elements of the yard infrastructure. There were two types of flyover in the shipyard:

slipway flyovers – riveted, multi-span truss structures along the slipways with tracks on them, on which the

cranes serving the slipways and the place along the slipways ran. For example, the flyover at slipway B5 on the side of hall 3B was 278 m long and 20.17 m high. A crane with a lifting capacity of 20 tonnes was moving on the flyover. Similar flyovers were located at the other slipways. Most of the flyovers were built shortly after the Second World War. Most of them were eliminated when Kone cranes were installed at the slipways;

pipeline flyovers – welded structure, designed to run steam pipelines and fuel oil to the boiler burners in boiler house 64B, from tanks located near Fire Station 150A, over the roadway of Narzędziowców St., Główna St. and Krótka St. Other technical installations were also run on this flyover in the 1990s.

General cargo ship – a ship designed to carry countable goods (in units, pieces – therefore general cargo). These are dry industrial products. They require, depending on their weight and dimensions, individual arrangement and fixing in the hold or on deck, on the ship's hatch covers. Such an operation is referred to as **stowage**. Most often, these are crates, bales, drums or individual pieces. Heavy and bulky equipment, such as locomotives, is also treated as general cargo. Goods are carried in holds divided into spaces called tween deck or on hatch covers. The development of containerised freight (container) has led to a new class of general cargo vessels. These are container ships designed to carry goods placed and secured in standard 20- or 40-foot containers (see TEU).

Gunboat – small- to medium-sized vessels designed primarily for firing on land targets, coastal defence, minelaying and support tasks. They were also used in overseas service (colonial gunboats). Initially, they were sailing or rowing vessels. After the First World War, they were virtually withdrawn from service.

Keel blocks – the fixed supports on which a ship's hull rests during construction on a slipway. These are wooden blocks whose height is adjusted by wedges. They are also metal sand boxes with a special design, the height of which can be adjusted by changing the amount of sand in the box. Before launching the vessel, sand is removed through a specially prepared hole in the box casing. The lack of sand causes the top of the box to slide into the bottom of the keel block. This allows the keel block to be removed from underneath the hull, which is lowered from the fixed substructure onto a movable substructure. The movable substructure is the skids on the tracks of the slipway, together with their fittings, which enable the ship to move down the slipway and launch.

Magnetic cranes – installed in steel plate processing halls and in warehouses, cranes equipped with a set of electromagnets located on the crane beam. Electromagnets make it possible to pick up steel products, particularly plates, and move them to processing sites. Controlling the electrical power supply to electromagnets located in the grippers grips or releases the plate. The mechanisms used in the crane beams also make it possible to operate (rotate, move) the plate during technological operations.

Model production workshop – there were three plants in the Gdańsk Shipyard with different tasks:

pattern workshop in the S1 Foundry Department: The patterns created here were used to make casting moulds in the moulding workshop of this department. For the most part, these were wooden models of a special design, enabling casting moulds to be obtained to ensure that the liquid metal was fed and distributed to produce the often complex casting forms;

ship engine room model workshop that was part of the Design and Construction Bureau (BPK): Wooden models of ship's engine room in 1:10 scale were made in this workshop. The equipment, furnishings and fittings provided for in the ship's working documentation were placed in the model. In the course of this work, the

correct layout of equipment, the spaces necessary for its operation and the passages and escape routes were checked. This enabled any design coordination errors to be rectified and technological documentation to be produced, enabling equipment (pipelines, cable tracks, foundations) to be prefabricated in the workshop and efficiently installed on board;

workshop making model ships: In the modelling room located in the ground floor of the BPK building, next to the carpentry workshop, scale models of the ships being built in the shipyard were made. These models, supplied in accordance with the provisions of the ship's contract, furnished the shipowner's offices, were used for promotion, displayed at exhibitions, etc.

Mould loft – a unit within the steel cutting and prefabrication department, where the details of the ship's hull shape (moulded lines) provided in the ship's documentation were developed to shell expansion and drawn out in full scale lofting on the workshop floor. Based on these, wooden templates of the various parts of the hull were made. These templates were used to apply markers to the sheets, according to which the sheets were cut or the sections were machined. The tasks of plotting the shape of the individual hull components, making templates, as well as applying markers to the sheets in accordance with the templates and marking the individual parts in accordance with the construction documents were carried out by the **loftsmen**.

Numerically controlled steel cutting – mechanical processing of ship plates using numerically (computer) controlled (gas or plasma) cutting machines. The path of the torch was determined by the punch card stored in the computerised torch control system. This technology enabled the precise blanking of individual parts, as well as the optimal use of the sheet metal. During this operation, the workpieces were marked according to the working documentation, and unused parts of the sheet are also marked for later use.

Ore-coal carrier – a bulk carrier designed to transport a special cargo: iron ore and coal. As there is a large difference in the specific weight of these cargoes, specific design solutions were required in the design of these vessels.

Reefer ship – a vessel designed to carry perishable foodstuffs. Initially (in the 2nd half of the 19th century), it was mainly frozen meat, later fish and other food products. In the twentieth century, cargo holds and ship systems also allowed the carriage of fruit, including those requiring careful temperature control, such as bananas. Towards the end of the twentieth century, these goods were increasingly transported in refrigerated containers, carried on container ships with electrical power sockets on open deck and in the holds for connecting the refrigeration systems in the containers.

Roll-on/roll-off (ro-ro) vessel (vehicle carrier) – reducing port handling times, as well as the delivery of goods directly from supplier to consignee without transshipment, was provided by vehicle carriers, popularly known as roll-on/roll-off vessels. The stern-mounted, starboard-swinging ramp allows direct entry and exit (roll-on, roll-off) of lorries, semi-trailer tractors with containers with goods loaded at the manufacturer's site. This resulted in a maximum reduction in the time it takes to handle a ship in port and in the time it takes to deliver goods from the producer to the final customer.

TEU – a unit of capacity that defines the capacity of ships and the capacity of ports. It is equivalent to the volume of a standard 20-foot-long container (***t****wenty-foot* ***e****quivalent* ***u****nit*). Dimensions of a standard container: 20 × 8 × 8.5 feet, that is 6.10 × 2.44 × 2.59 metres, which is approximately equal to 39 m^3. Such containers have been in common use since the 1960s. Also in use are containers that are twice as long, **FEU** (***f****orty-foot* ***e****quivalent* ***u****nit*), which is equivalent to 2 TEUs.

Mould loft – a department within the mechanical processing and prefabrication department, where the details of the ship's hull shape (theoretical lines) included in the ship's documentation were developed and drawn out in life-size on the gangway workshop floor. Based on these, wooden templates of the various parts of the hull were made. These templates were used to apply markers to the sheets, according to which the sheets were cut or the sections were machined. The tasks of plotting the shape of the individual fuselage components, making templates, as well as applying markers to the sheets in accordance with the templates and marking the individual parts in accordance with the construction documents were carried out by the loftsmen.

Annealing furnace – a furnace used for annealing, i.e. removing the stresses that arose in responsible steel structures during mechanical processing, heat treatment or welding. Stress-relief annealing consisted of placing the structure in a specialised furnace, subjecting it to heating to a fixed high temperature, holding it at this temperature for a strictly defined period of time (annealing) and then slowly cooling it down.

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ACCOUNTS OF WORKERS AT THE GDAŃSK SHIPYARD AND ORAL HISTORY SOURCE MATERIAL (NOTATIONS)

I. ACCOUNTS OF WORKERS AT THE GDAŃSK SHIPYARD RECEIVED IN THE FIELD RESEARCH AND RESEARCH WORK FOR THE DEVELOPMENT (audio recordings, created by A. Trzeciak, material in the collection of A. Trzeciak)

Barański Zbigniew, foundry modeller, employee of the Foundry Department S1 of the Gdańsk Shipyard (below: GS).

Brynkiewicz Tadeusz, head of the Mechanical Processing Department at the GS Engine Building Unit.

Burhardt Józef, head of the Ship Equipment Departments in the Production Directorate of the GS, Member of the Board of the Gdańsk Shipyard SA.

Knapiński Henryk, a technologist in the carpentry workshop of the Ship Interiors Department W5 GS.

Kusiak Franciszek, GS chief energy officer.

Lachowski Kazimierz, master, carpentry technologist in the carpentry department of the Ship Interior Equipment Department W5.

Łubiński Sławomir, head of the Hull Assembly Department K3, GS production director.

Maleszyk Franciszek, head of the Hull Assembly Department, chief dispatcher of the shipyard.

Mehring Ryszard, energy specialist, chief energy officer GS.

Multaniak Maciej, head of the Engine Quality Control Department, deputy head of the Engine Assembly Department S5 for testing.

Nawrocki Andrzej, chief automation specialist, head of the GS Design and Construction Office, president of the GS Management Board, vice-president of the GS Management Board, technical and commercial director.

Piłatowicz Andrzej, head of the GS Transport Department, head of the GS Shipbuilding Department C.

Sażalski Jan, chief of the Company Fire Brigade of the GS.

Sołtysiak Kazimierz, head of the Engine and Boiler Construction Department PS GS.

Stawicki Antoni, locksmith fitter, technologist, master in the modelling workshop of the S1 Foundry Department.

Wilk Stanisław, senior master in the sheet metal workshop, deputy head of the Hull Processing and Prefabrication Department K1.

Wójcik Tomasz, crane operator, maintenance specialist in the Main Mechanical Department.

II. NOTATIONS WITH GDAŃSK SHIPYARD WORKERS ON THE INDUSTRIAL HISTORY OF THE FACILITY FROM THE COLLECTION OF THE EUROPEAN SOLIDARITY CENTRE (ECS) AND VIDEO RECORDINGS OF SELECTED PAPERS AND MEETINGS OF SHIPYARD WORKERS AT THE ECS, CARRIED OUT BETWEEN 2015 AND 2020

(Coordination of the Gdańsk Shipyard workers' meetings at the ECS, idea of a series of recorded interviews with shipyard workers in the context of industrial history and heritage, script and management, and substantive and organisational supervision: A. Trzeciak; execution: P. Tomaszkiewicz, A. Trzeciak, A. Mydlarska, organisational cooperation on recordings and archiving of audiovisual material: Z. Chłopecki, A. Legutko)

A. NOTATIONS

Baranowski Brunon, welder, employee of the Hull Assembly Department K2 of the GS, social HSE inspector in the department K2.

Czarniecki Jerzy, designer, head of the GS Design and Construction Bureau.

Czerski Andrzej, designer at the GS Design and Construction Office.

Deptała Tadeusz, deputy director of the GS for technical affairs.

Kowalczyk Alicja, technologist at the GS Development Office.

Lewna Halina, loftsman, employee of the GS Hull Processing and Prefabrication Department K1.

Multaniak Maciej, head of the Engine Quality Control Department, deputy head of the Engine Assembly Department S5 for testing.

Nawrocki Andrzej, chief automation specialist, head of the GS Design and Construction Office, president of the GS Management Board, vice-president of the GS Management Board, technical and commercial director.

Nowak Bernadetta, employee of the GS Design and Construction Office, senior designer of marine electrical installations.

Pabiś Zygmunt, head of the Maintenance and Painting Department W1 GS.

Prędkiewicz Wiesław, deputy head of the Carpentry Department W5 of GS.

Przewoźniak Brunon, head of the K1 Hull Processing and Prefabrication Department of the GS.

Puchaczewska Teresa Joanna, specialist in the Department of the Chief Chemist of the GS.

Ramus Kazimierz, employee of the Forging Department S2 GS.

Skrzyński Jerzy, deputy head of the GS Engine Building Department.

Szyślak Wiesław, specialist in ship architecture, employee of the Design and Construction Office of the GS, head of the design team, co-author of the Fallen Shipyard Workers Monument 1970.

Tyska Zygmunt, chief technologist of the GS, technical chief of the GS.

Zakrzewski Marian, head of the GS Export and Sales Office.

B. RECORDING OF PAPERS

Hajduga Karol, head of the Shipyard Development Office, head of the Technical Office of the GS.

Deptała Tadeusz, deputy director of the GS for technical affairs.

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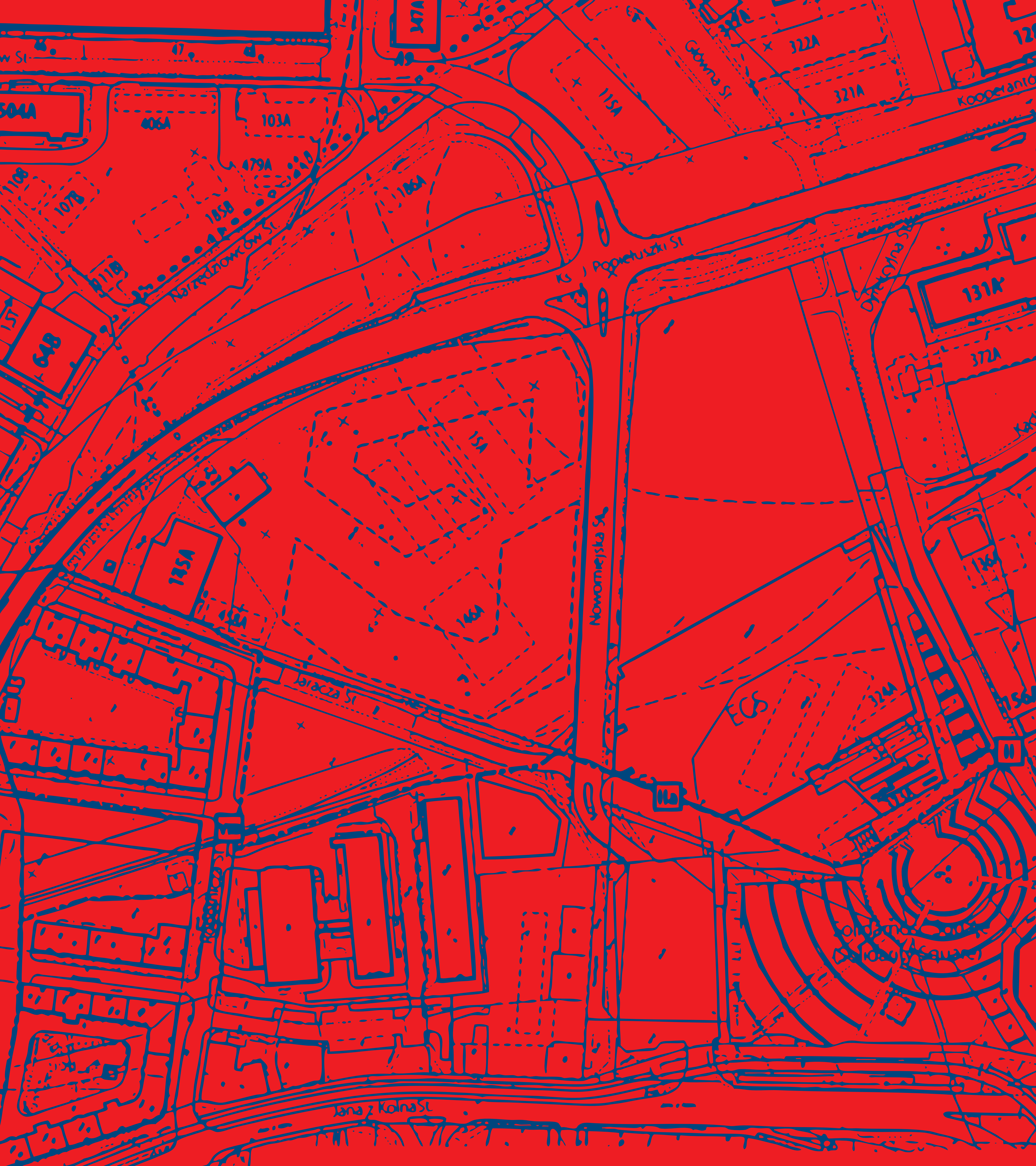
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Jaracza St.
Jana z Kolna St.
Popiełuszki St.


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