THE COMMEMORATIVE ANNIVERSARY BOOK 1919 – 2019

100 YEARS OF PIONEERING

PWO

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Imprint

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Stephan Baum, Robert Kieselbach, Christoph Laugs

AUGUST DREESBACH VERLAG

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100 YEARS OF PROGRESS-WERK OBERKIRCH AG – A STORY OF SUCCESS!

This year, Progress-Werk Oberkirch can look back on 100 years of a successful company history. The whole town is proud of the development of this company, which over the course of its 100-year history has become one of the largest employers not only in Oberkirch, but also in the entire Ortenau region, and which is closely connected with our town, the region, and its people. On behalf of the town of Oberkirch and the local council, as well as the district councils of Stadelhofen and Zusenhofen, I wish to express my sincere congratulations on this truly proud anniversary.

It all began 100 years ago with the production of air pumps. Today, Progress-Werk Oberkirch is one of the leading developers and manufacturers of sophisticated metal components and subsystems for the automobile industry. The company is part of the local identity, and a foundation of the economic strength of our town and our region. In every generation, the company management has always felt a deep connection with their hometown of Oberkirch, and it also regards its future are being rooted here. Large structural investments testify to this fact.

Personally, it fills me with pride that our town is the home of such a renowned and successful company. When we immerse ourselves in the successful history of the company, we can see that it was shaped by people, by its entrepreneurs but also by its employees. 3,400 employees at five production and four assembly locations on three continents, almost 500 million Euro in turnover, and numerous top awards as well as environmental and quality certification speak for themselves.

From a nucleus in Oberkirch, a renowned international concern with a global reach has developed, which is perfectly equipped for the future. Corporate responsibility, sustainable company policies, and qualified employees who identify with their company and work towards its goals: these are the virtues that have contributed to this successful development.

I wish the company all the very best and every success for its continued development, and in facing all of the associated challenges of the market development. I look forward to our continued cooperation.

Matthias Braun
Mayor

DEAR READERS,

Our company has now existed for 100 years, and over this period it has enjoyed an impressive development, which is documented in this book and of which all those involved can be incredibly proud.

Each decade brought its own challenges. At every stage, even during difficult times, the owners, management and staff have always supported the company, worked together to develop it further, and given it a successful future. To this day, our home and headquarters in Oberkirch, which has now grown to become a leading worldwide producer and corporation, is one of the most attractive employers in the region.

The aim of this book is to outline 100 years of our company history, whereby the first decades were affected by a global economic crisis and inflation, but also by early successes in the automobile supply business. During the National Socialist period, armaments production dominated Progress-Werk. In the post-war period, essential everyday items were initially produced and then, after the currency reform, the era of the field kitchen and the Strolch and Progress motor scooters began at PWO.

The German "economic miracle" inspired PWO activities in the 1950s. The motor scooters were best sellers both at home and abroad, but were eventually pushed out of the market by cars, which had the advantage of a roof. Their production was phased out in Oberkirch at the beginning of the 1960s, and the development of the automobile supply business was expedited. In addition there was the sheet metal and equipment construction area, in which field kitchens, munitions packaging and transport containers for various weapons systems were produced on the one hand, and on the other hand coffered ceilings and convector cladding for the construction industry were made, as well as later the MW-1 dispersion device with transport container for the Tornado and air cargo containers.

A milestone in the company's history was the IPO in 1978. In the following decade, however, sheet metal and equipment construction activities were forced to be gradually reduced, due to changing market demand, and later, after the abandonment or delay of various public sector programmes, abandoned completely.

From 1994, the company concentrated fully on the automobile supply business and its rigorous expansion. In the context of an automobile industry-driven globalisation of vehicle production, and the associated demands on suppliers to take the same path, PWO had to decide at relatively short notice whether to follow the car makers and continue to grow, or remain satisfied with its position as a supplier of minor, at best regional, significance. The answer was clear, since the only way to maintain the turnover volume of the headquarters in Oberkirch and subsequently grow further was to expand and develop an international presence and production. By now, PWO has its

own production and assembly plants in 5 countries on 3 continents in the most important economic areas for automobile production, and also produces for customers in other countries, via cooperation partners.

For some time – just as in this anniversary year – the economy faces problems and pressures that have still not been overcome. The worldwide trend of populism and priority to national interests, including pursuing a protectionist trade policy – including Brexit – is omnipresent. Other sector-related problems of the automobile industry include the diesel issue, the sluggish transition to the WLTP test cycle for new cars, and the challenges of e-mobility. All of this is leading to production stoppages throughout the entire automobile value chain, which will continue to challenge us in 2019.

An increasing source of worry is the framework conditions in Germany as a production location. We have to be careful not to bite the hand that feeds us. Costs have increased much higher than productivity in recent years at the German sites of companies in the metal and electronics industries. That is also the case with PWO. Of particular concern is the increasingly apparent gap between the labour costs in our German locations and those in our neighbouring Eastern European countries.

In order to meet the current challenges that face us in the year of our 100th anniversary, all of our available strengths will need to be combined. I have always said that wealth must be created before it can be distributed. I believe it is high time that politicians should also begin to think about the future viability of the framework conditions that apply, if they are concerned at all about industrial value creation in Germany. One of the burning questions of the future must surely be that of safeguarding German jobs and future wealth. Unfortunately, the current political climate gives me little cause for optimism.

The demands on a future-oriented company management are also constantly increasing. New challenges with regard to assuming responsibility for both the social and the environmental impact of the company must be overcome by the management. Not least, investor demands relating to financial performance are now being articulated more clearly and, together with the diverse and widespread digitalization in business and society, the expectations placed on the company management and its capability for true leadership have increased noticeably.

These days, any company that wants to be successful must also embrace its social responsibility. It is no longer enough to merely make profits. That is the belief of PWO. The expectation is clearly defined: the interests of customers, shareholders, employees, society and the environment must be harmonised. Only when we succeed in creating a permanent balance in this regard, can we continue to have sustainable success as a company in the future. We are working hard to achieve just that.

I hope you enjoy reading this fascinating book and learning about the history of our company.

Karl M. Schmidhuber
Chairman of the Supervisory Board
Progress-Werk Oberkirch AG

DEAR READERS,

2019 is a special year for PWO: One hundred years ago, on 6 September 1919, the "Progress-Werk Oberkirch Aktiengesellschaft" was founded. The object of the newly-founded company was the "manufacture, procurement and sale of all kinds of metal goods". The name of our company, its legal form as a stock company, its location in Oberkirch and its concentration on the remodelling and processing of metal, have remained unchanged over the course of one hundred years. That is quite unusual, and very special!

During the last century, there were large social, political, cultural and economic changes, revolutions and advances: the beginnings of democracy in Germany, the global economic crisis, World War II, the period of reconstruction, the Cold War, the development of space travel, the invention of computers, several drastic stock market crashes around the world, the reunification of Germany, and much more.

For us, our anniversary provides an occasion to look back at the history and development of the company and to document and summarise these in this anniversary publication:

Over the years, air pumps, armaments goods, motor scooters, field kitchens and – almost since the beginning – components and subsystems for the automobile industry were developed and produced. The greatest changes of the course of the company's history, which still have an effect today, were the IPO in 1978, and the exclusive concentration on the automotive area since the early 1990s, with the inevitable internationalisation that accompanied this. PWO is characterised by outstanding expertise, top-class quality, excellent project management and the greatest reliability in all that we do.

The shareholders, management and workforce of PWO have undergone many changes in these hundred years. They all met the challenges they each faced, and the multitude of changes, with courage, creativity, endurance and the will to succeed. They remained close to home and yet open to the world, and – even as a stock company – cultivated a familial character in the company. We look back at these leaders of the past with respect and deep gratitude. Many people worked for PWO for years and decades, some even spent their entire working lives at PWO. They all deserve our warmest thanks; their courage and energy serve us as a model for us!

We wish to thank our shareholders, our customers and our business partners for the trust they have placed in us. Around the world, nearly 3,500 employees demonstrate great commitment, a high degree of motivation and tireless dedication in serving our customers and our company, achieving outstanding results. For this reason, we wish to express our sincere thanks to all our staff!

Special thanks go to the competent individua who created this celebratory publication: to Dr. Matthias Georgi, Stephan Baum, Robert Kieselbach and Christoph Laugs from Neumann & Kamp Historische Projekte, for carrying out the research and authoring the texts, to Dr. Anne Dreesbach for the design and Charlotte Diedrich for the management of the publishing work, to Carolyn Kelly for the translation into English and Emily Pickerill for the English copyediting, to the archivists who supported the research energetically, and to the contemporary witnesses, whose memories opened up a level that had remained hidden from the archival sources. Special thanks go to Charlotte Frenzel, who coordinated the work on this commemorative publication.

This anniversary book about the 100-year history of PWO tells the exciting, entertaining and also informative history of our company. I hope you enjoy reading it!

Volker Simon
Chief Executive Officer
Progress-Werk Oberkirch AG

1921.

A share to the value of 1,000 Marks from 1921. The first shares were all owned by the seven founders. In September 1921 they decided to increase the share capital of the company by 1,500,000 Marks. The founders always thought in large categories: The reference to the nearby city of Oberkirch as an integral part of the PWO name was intended to make it easier in the future for more distant customers to locate the site of the factory.

PROGRESS-WERK
OBERKIRCH A.-G.
STADELHOFEN · Post Renchen (Baden)

1000 Mark **AKTIE** 1000 Mark

Umgestellt auf RM 120.
Hundertzwanzig Reichsmark

Nr. 3996 über

Tausend Mark

Der Inhaber dieser vollbezahlten Aktie hat an dem Vermögen und an den Erträgnissen der Gesellschaft alle jene Rechte, die ihm nach dem Gesellschaftsvertrag und nach dem Gesetz zustehen.

Den Vorschriften über den Gesellschaftsstempel ist nach der Bescheinigung des Finanzamtes Oberkirch vom 26. Oktober 1921 unter Nr. 5 des Reichsstempel-Einnahmebuchs genügt.

Stadelhofen, im November 1921.

PROGRESS-WERK OBERKIRCH A.-G.

Der Aufsichtsrat: Der Vorstand:

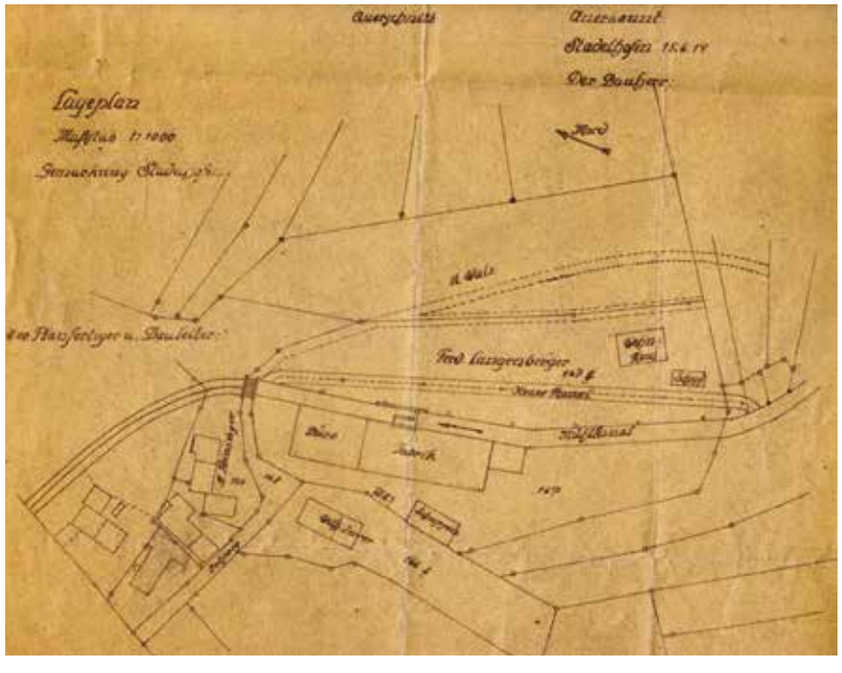
Vorsitzender

1

“Glorious location” – the first years of PWO in the Rench Valley

For hundreds of years, there was a mill in Stadelhofen, the current company headquarters and German location of PWO. The mill was first mentioned in records in 1659. However, a fief document mentions an “old renovation” from 1538, which suggests that the mill was already so old at this time that it required renovation. It is likely that the mill is even as old as Stadelhofen itself, and was built in the 13th century, or perhaps even earlier. In 1645 – just before its first official mention – the mill burned down. The feudal lord at the time, the Strasburg chancellor Baron von Didenheim, had it rebuilt. After his death, Hans Georg Walz purchased the mill in 1666.

The old Stadelhofen mill prior to the large fire in 1914, which was responsible for the end of the chair factory.



One of the earliest site maps of the factory grounds, from 1919. Sketched in the centre is the factory building that still stands to this day.

PREHISTORY: "IN THE BEGINNING WAS AN OLD MILL"

Available sources do not reveal when the hydropower of the mill was used to mill flour for the last time. All that is known is that a much later descendent of Hans Georg Walz, Josef Walz, submitted an application in 1815 to build a scutching machine and oil mill in order to process the raw materials of the flax plant. The oil mill helped to extract oil from the flax. In contrast, in the scutching machine, "4 to 6 light beechwood beaters were set in motion by means of a water-powered roller, causing them to fall on a smooth stone, while two or three persons seated alongside frequently turned the flax that lay beneath and shook it out to remove small pieces of wood".

Decades later, this method had become so obsolete that another descendant, Friedrich Walz, had the water wheels replaced by the first turbine in December 1894. In 1907 the Walz family ceased operating the mill. While the mill remained in the ownership of the family, it was leased out to a miller called Friedrich Frey from Swabia, who soon died in an accident involving a horse-drawn carriage. Shortly afterwards, his dependents left Stadelhofen and returned home. As a result, operations at the mill shut down for several years. Ownership transferred to Maximilian Theodor Walz, who was born on 30 August 1856 and who lived in Erlach. He realised that the Stadelhofen mill might also be a good location for an industrial operation, and put the mill premises up for sale.

Upon its sale, ownership of the site passed to a timber processing company. A contemporary photograph provides an insight into the buildings on the property at this time: In the foreground, it shows the mill beside the millstream, and in the background a barn and a smaller outhouse. From this point on, chairs were manufactured in these buildings. However, this phase did not last long. In 1914, the property burned down, and production ceased. Once again, the Stadelhofen mill premises was idle for a number of years. Towards the end of World War I, a company from Triberg started to construct a screw factory on the grounds, but the enterprise failed before it even began.[1]

6 SEPTEMBER 1919: SEVEN SWABIAN PIONEERS JOIN FORCES

As a result, the first attempts to establish an industrial company on the grounds of the former mill in Stadelhofen never proceeded beyond their initial stages. Furthermore, World War I had only just ended, and Baden once again became a border region when Alsace was ceded to France. Stadelhofen had always been dominated by agriculture and did not have its own railway station. Since goods were still being transported by horse-drawn vehicles, any future company would always have to send its products to the goods handling station in Zusenhofen. Therefore, the chances of establishing any kind of industry here appeared quite slim.

Nevertheless, representatives of the citizens of Stadelhofen and neighbouring communities took up negotiations with a group of Stuttgart entrepreneurs since the location offered some advantages, despite its drawbacks. The half-finished produc-

tion building for the planned screw factory had great development potential, hydropower was available to drive the machines, and the Rench Valley "offered a large reservoir of unskilled workers on which one could rely". In the advertisement, special emphasis was placed on the electrical power of the existing turbines, at 45 horsepower quite considerable for that time, as well as on the building site and the "glorious location" in Baden.

The talks were crowned with success: On 22 February 1919, Ferdinand Langenberger from Stuttgart bought the site and the buildings upon it. Langenberger now owned a property that offered good prerequisites for industrial use. He himself was an investor of sorts who together with his brothers provided financial support to promising projects and thus helped to develop companies. It is therefore not unlikely that it was his idea to set up the metalworking company that would later become PWO.

A few months later, on 6 September 1919, Langenberger and six other Swabian entrepreneurs, manufacturers, engineers and bankers signed a partnership agreement, which established the "Progreß-Werk Oberkirch Aktiengesellschaft in Stadelhofen (Baden)", whose German name is spelled in the sources both with "ß" and "ss". The gentlemen involved already knew each other. Langenberger and another member of the group, Theodor Renner, ran a company in the immediate vicinity of Stuttgart Main Railway Station. Gustav Michelfelder, Matthäus Schmidt and Hermann Michel lived only a few hundred metres apart in the south of Stuttgart. It is no longer known what connected the manufacturer Alfred Buck from Geislingen (Balingen) and Friedrich Groß from Schwäbisch Hall. As famous industrialists of this era – that much is known –, they were probably very well connected in Stuttgart.

The share capital of the Progreß-Werk Oberkirch AG was 300,000 Marks, divided into 300 equal shares of 1,000 Marks each. For conditions at that time, this represented a high valuation for a company that did not yet exist, but it reflected the incipient high inflation, and generally illustrated the boom in the German stock market in autumn 1919. At any rate, there was obviously a strong belief in their own plans, since the shares were assumed completely by the seven founding members. Therefore, from the very outset the future company was well-equipped financially. Gustav Michelfelder was chosen as the only board member, while the remaining six shareholders formed the first supervisory board.

Two months later, on 5 November 1919, the new company was entered in the commercial register. The object of the company was stated as "the production, procurement and sale of all kinds of metal goods, namely cookware made from aluminum, copper, iron, brass, of drawing and punching items or similar products, and also of household and agricultural goods". In addition, the company was authorised to "take shares in similar or related ventures, and to conclude all transactions necessary for fulfilling these purposes".

However, some obstacles still had to be overcome before successful production could begin. First the half-finished factory plant of the planned screw factory had to be made operational. The "continuation of the interior completion of the buildings" required plastering, painting and wallpapering, as well as additional work on

Wasserkraft,

45 PS, mit **Baugelände** für **jede Industrie passend.** Im Mitt
Badens, herrliche Lage, wo **billige Arbeitskräfte** vorhanden,
der Nähe keine Fabrik. Große, in gutem Zustande befindliche Gebäu
neuer Turbinenanlage und etwa 96 a Gelände; 25 Minuten von der
zum Preise von nur 35 000 Mark. Auskunft an Selbstkäufer frei ert

Theodor Walz. Erlach, Post Renchen, Baye

This ad was inserted by Theodor Walz for the sale of the property on which PWO would later be founded. Key aspect was the availability of hydropower. His advertisement was obviously fruitful. On 22 February 1919, Ferdinand Langenberger bought the site and its buildings. This marked the beginning.

Various air pump models are lined up on long tables: air pumps with and without a stand, models with a tube and without a tube. Some employees are tasked with the composition of the individual parts of the pumps.

In the middle is the sequence of the deep-drawing steps from the circuit board to the finished air pump. The photo was taken in the 1950s.

the electrical lighting and steam heating systems. Those running PWO recognised the potential of their company from the very beginning, and started to expand the factory. Thus, by the end of 1919 there were already plans for a pickling plant extension to the annealing furnace building. Finally, in March 1920, PWO started production with 25 workers, who had been brought by the founders primarily from Swabia. By the end of the same year, the number of employees had grown to 50.

Initially, however, the local population greeted the positive development at PWO with some scepticism. The increase in the number of workers led to a deterioration in living conditions in Stadelhofen. The population refused to "rent rooms to Progreß-werk workers from elsewhere, because they obviously feared being overly infiltrated by outsiders". The mayor even received threats that Stadelhofen would be "set alight in all four corners" if he were to exert pressure on houseowners in the matter of renting out living quarters. Eventually, provisional accommodation was organised in the community hall.

At first, there was also a lack of understanding for the needs of the young company on the part of the local administration. For example, the administration did not intervene when the surrounding meadow owners diverted water from the millstream to their own irrigation ditches, causing fluctuations in the power supply to PWO and thus "impairing the constancy of production".

Despite all these problems, production progressed at PWO. Contrary to what had been entered in the commercial register, from the very beginning workers produced air pumps for bicycles, motorbikes and cars. The first pump, Emipumpe No. 401, appeared in 1920. In subsequent years, PWO produced a variety of different pumps. At first PWO sold its products primarily in southern Germany. From 1923 – 24, business relationships expanded across the entire German Empire, and also continuously to the Netherlands, Hungary, Scandinavia, Italy and Turkey.

While at this time the young Weimar Republic was in a phase of economic and political upheaval, business really flourished at PWO. Things went so well that the production conditions soon became insufficient, and in addition to the extension of the production halls, the expansion of hydropower harnessing was considered. At the end of November 1922, the local council granted PWO "the requested water police permit to build a 2nd turbine in the mill canal beside your factory building", followed by a permit to also extend the turbine building. A Francis shaft turbine with a water volume of 2.7 metres was installed, which necessitated raising the water level of the millstream by 20 cm. The turbine swallowed more than 1,200 litres of water per second, thus generating an electrical power of 34.6 horsepower.

The two installed turbines served both to drive the factory systems and to generate electrical energy. Photographs from the production plant show that all of the production facilities, from electroplating to the knee-lever and wheel-drawing presses, were connected to each other and powered by means of shafts and transmission belts.

In parallel with the expansion of the factory in Stadelhofen, the company's share capital was also increased several times. It was announced in the Deutscher Reichsanzeiger and Preußischer Staatsanzeiger on 31 October 1921: "The regular annual general meeting of our company on 30 September 1921 resolved to increase the share

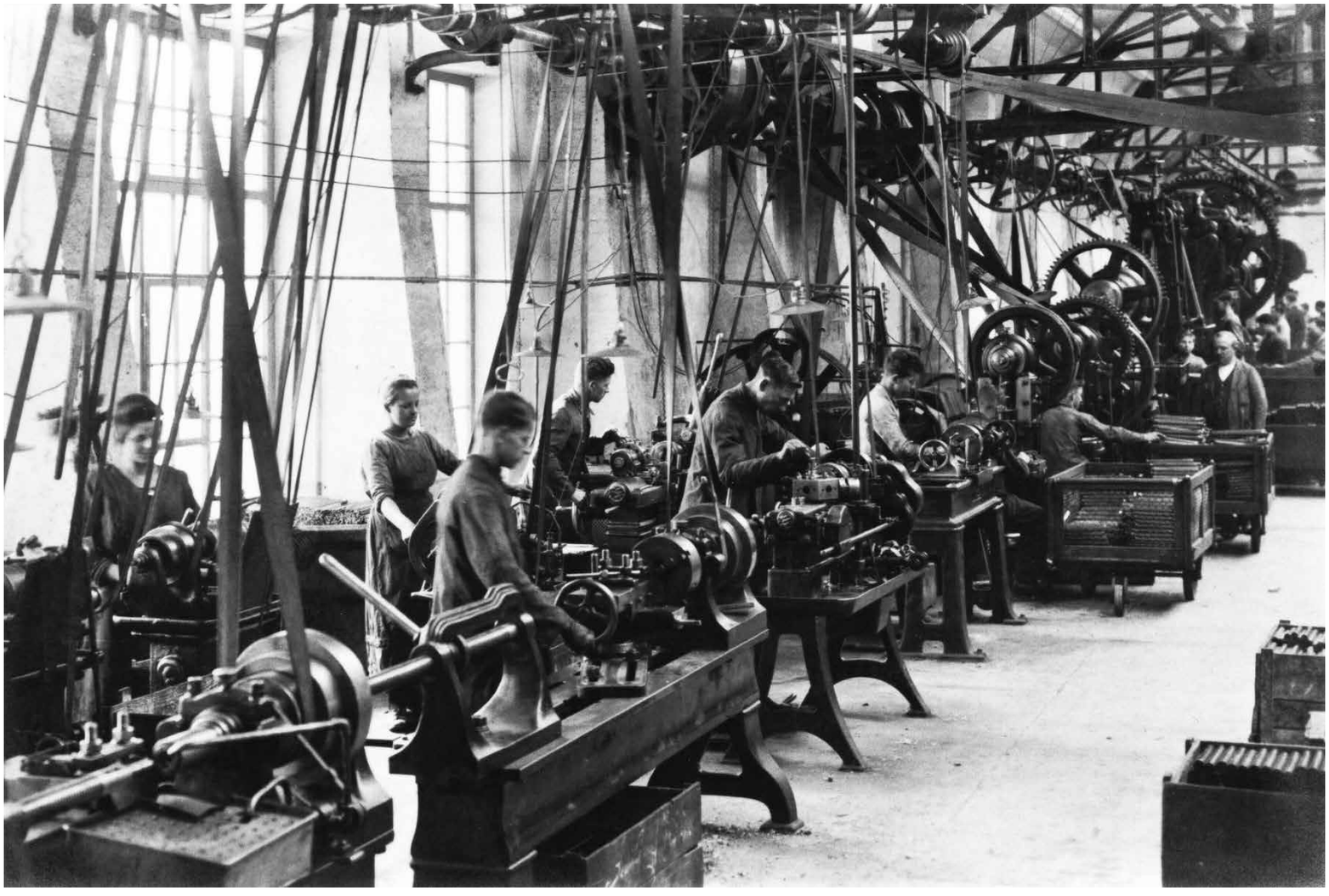
capital of the company by M 1,500,000". This meant that the capital stock multiplied many times over within only two years, with an increase from 300,000 Marks (6 September 1919) to 4 million Marks (30 September 1921). In the first two financial years, 1919 and 1920, PWO still made losses of 52,406.36 Marks and 153,139.51 Marks, but in the 1921 financial year, in contrast, a profit of 286,116.62 Marks was achieved. However, these numbers do not point to remarkable successes but rather illustrate the enormous increase in the inflation rate. During this time, the exchange rate of the US Dollar to the Mark increased by a factor of 100. Whereas one US Dollar could be bought for 42 Marks at the end of 1920, by the beginning of 1922 it cost around 200 Marks, and by the end of the year more than 4,000 Marks.[2]

AIR PUMPS: MADE IN STADELHOFEN, USED WORLDWIDE

Today it is no longer possible to know exactly what PWO produced, and in which quantities – no production statistics or sales lists have survived. But a look at inventory lists and company reports helps to reconstruct some of the business model. For example, the report on the inventory of raw materials, intermediate products, semi-finished and finished products, and operating materials at year-end 1923 shows an overall value of 107,528.93 Marks. The report also reveals the importance of air pumps to PWO at this time: In the inventory, 27,489.85 Marks – over a quarter of the overall amount – was allocated to finished products, of which in turn almost half were air pumps. Inventory reports also provide insights into other products of the early 1920s. At this time, the company made not only pumps, but also pedals, pump holders and manometers as finished products. The inventory of 31 December 1923 listed 137 manometers, while warehouse stock also included 6,000 pairs of pedals, more than 23,000 pump holders, and almost 31,000 pumps. By producing air pumps, PWO demonstrated a good instinct for meeting a gap in the market. Pneumatic tyres had already been invented in the late 19th century, but solid rubber tyres for cars and trucks were still superior to pneumatic tyres. It was only after World War I that the use of pneumatic tyres prevailed in motorised vehicles – and PWO had the requisite air pumps in its programme.

As can be seen in hindsight from the product range, PWO was therefore already a supplier to the mobility industry from the outset, at first very strongly in the bicycle business, but also as an automotive supplier with its car air pumps. Particularly remarkable is the large number of different pump models. In all, almost 40 different models were produced at this time, including bicycle pumps, car pumps, football pumps and vacuum pumps. PWO conducted its own product development and registered patents. Some patents, such as that for a tube connection of 11 August 1920, were registered directly to the company; others, such as the patent for an "air pump with a foldable base" of 18 January 1923, were registered to the chairman, Gustav Michelfelder.

The work was worthwhile. Demand for PWO air pumps grew rapidly. Only ten years after the start of production, an average of 500,000 air pumps were produced



The first 25 employees came primarily from Swabia and had the task of training new workers from Stadelhofen and its surroundings, for example, at the lathes. From the very outset, PWO employed not only men, but also women. At this time, it was not yet considered normal for women to be employed.

every month. These pumps were often characterised by improvements to the details. For example, the Havo bracket helped to prevent air pumps from slipping during the pumping process. PWO's success was not restricted to Germany. The Stadelhofen company became the world's second-largest producer of air pumps, and delivered to Scandinavia, the United Kingdom and France, as well as to the Netherlands, India, Indonesia and Indochina. PWO also sold other products abroad, as can be seen from a Spanish advertisement for various different luggage rack systems.[3]

Spanish advertisement for luggage racks from the 1920s and 30s.

1920s/30s.

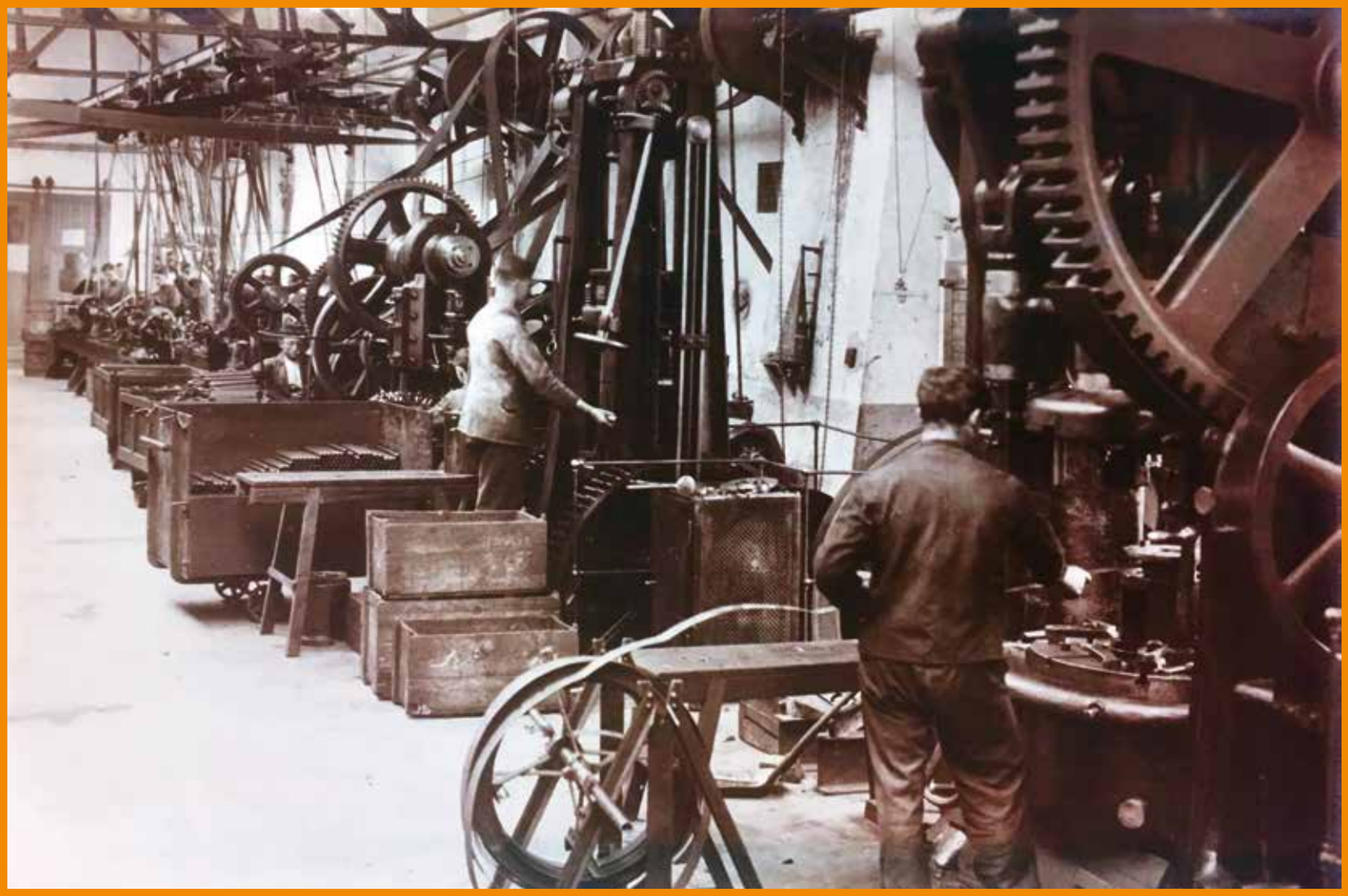
Advertisement for air pumps. The two different ways of writing PWO in the early years can be seen here. It is spelled "Progreß" in Kurrent at the top and "Progress" at the bottom.

1920s.

View of the grinding and polishing shop in the 1920s. The transmission belts powering the machines can be seen clearly.

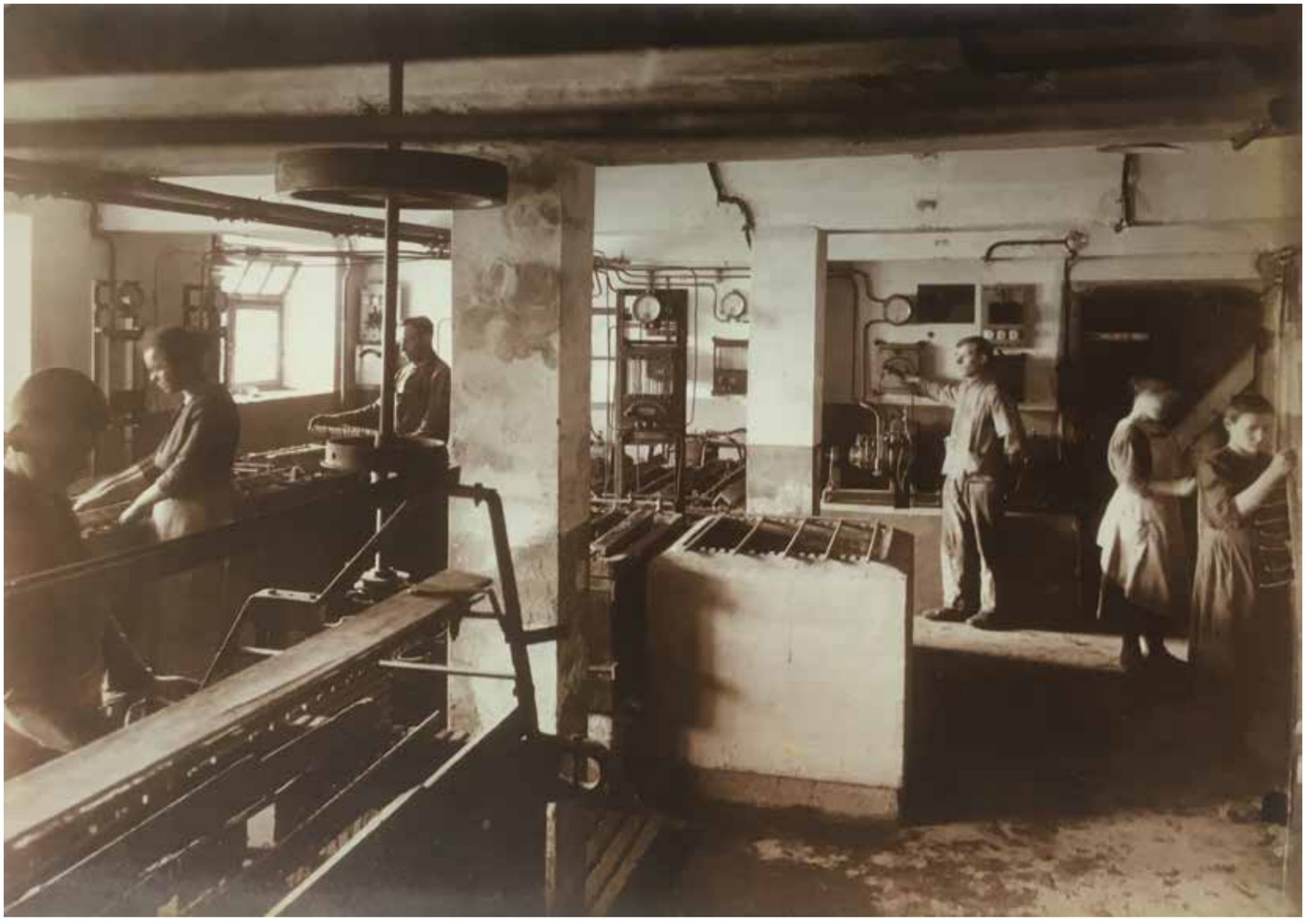
1920s.

Modern production from the very beginning: work on the knee-lever and wheel-drawing presses.



Fresh capital and a new main shareholder

On 30 September 1921, the then forty-year-old private banker Joseph Anton Frisch from Stuttgart was appointed to the supervisory board of PWO, replacing the founding member Hermann Michel. This day marked the start of a new era for the Stadelhofen company, which was only two years old at the time. Joseph Anton Frisch, his two brothers Otto and Fritz Frisch, his daughters and sons-in-law, his grandchildren and some employees of his banking house were to determine the development of PWO until well into the 1990s.



1920s.

View of the electroplating shop.

THE FRISCH BANK BUYS SHARES IN PWO

Before Joseph Anton Frisch joined the supervisory board, the chairman Edgar Pick had made the most important financial decisions for the company. He was the owner of the Stuttgart private bank Pick & Cie., which had financed PWO since the beginning of the 1920s. It is very important to note that the relationship between Frisch and the company was never solely financial in nature. In the years after his accession to the supervisory board, a friendly relationship of trust soon developed between PWO board members and the banker.[4]

THE CONSEQUENCES OF HYPERINFLATION

As early as during World War I (1914 – 1918), the German Empire had amassed huge debts to finance the war, and greatly increased the amount of money in circulation. After the end of the war, the consequences of the conflict and the reparation payments placed an additional burden on the national budget of the young Weimar Republic. Between the foundation of PWO in 1919 and Frisch's appointment to the board in 1921, the value of the Mark decreased by 90 % – and that was only the beginning of German inflation. After the occupation of the Ruhr Region by French and Belgian troops in January 1923, inflation accelerated rapidly, soon resulting in hyperinflation. Ultimately, billions were required to pay for everyday products. For instance, in November 1923, a litre of milk cost more than 300 billion Mark. This meant that the state was no longer able to issue sufficient banknotes, so that many communities and even companies were forced to print their own emergency money. The Rench Valley also issued its own banknotes in 1923. That same year, hyperinflation ended with a currency form. Germany introduced the Reichsmark, the currency system stabilised, and the economy initially recovered.

PWO had experienced rapid development since its establishment. During the period of inflation, wage costs were low, due to the decrease in the value of money, so the workforce grew. The only thing that was expensive were the raw materials, which were traded in dollars. Growth continued after the currency reform, but in 1925 demand for PWO products collapsed. High wage costs and poor turnover almost ruined the company. This crisis placed not only PWO, but also other companies in the region in a critical situation. Due to the war and inflation they no longer had sufficient capital cover, and were now faced with the situation of barely being able to afford important economic tasks such as modernisations. Ultimately, numerous manufacturers from the region were forced to close their businesses, or at least suspend operations temporarily.

On 6 December 1925, the Badische Beobachter reported: "It has been announced that the Progress Werk Oberkirch A.-G., Stadelhofen factory, will close its business until further notice. The management has dismissed all commercial and technical employees, and placed the workforce of 250 people on leave notice." Hopes of receiving orders in the winter of 1925 – 26 proved just as fruitless as those of an economic

recovery in the spring of 1926. In addition, the company's losses meant that by the end of July 1926, around half of the share capital had been lost.

Managing Director Michelfelder stressed in August 1926: "Unfortunately, the general economic situation has also drawn our company into the maelstrom of an intense existential battle, despite its previous prosperity. The situation is amplified by the fact that the main consumer circles are now without work and earnings, which means that our buyers are greatly inhibited in their purchasing capacities." The consequences of the crisis were enormous. The factory remained closed throughout the whole of 1926.[5]

WAYS OUT OF THE CRISIS AND THE INCLUSION OF DRAWN PARTS IN THE PRODUCT RANGE

While the belts in the production hall stood still, the PWO board members worked under high pressure to find a way out of the crisis. First, a strategic change was made to the board: Gustav Michelfelder, who had held the position of Managing Director since the foundation, shared the role from January 1927 with Alfred Maier. On 1 October 1928, he left the board altogether and transferred overall management of PWO to Maier, who in turn passed this position to the previous proxies, the technician Hans Kern and the merchant Ernst Esslinger, on 11 January 1929. The latter would run the company until 1939.

At around the same time, there were also changes in personnel on the supervisory board. As announced in the Deutscher Reichsanzeiger on 5 April 1927, "the previous supervisory board resigned in its entirety". Those re-elected to the board included the Stuttgart banker Joseph Anton Frisch and his brother, the buildings inspector Otto Frisch, the lawyer Dr. Reis and the bank director Max Siegl from Baden-Baden. Those who left included the former chairman of the supervisory board Edgar Pick, who was now replaced by the merchant Richard Preuß from Barmen. The banker Otto Carsch from Berlin also joined the supervisory board.

All signs pointed towards modernisation – and this also affected the workforce: In order for production to recommence, the "production process" had to be "rationalised". In other words, the workforce had to be reduced. Whereas PWO employed more than 250 people prior to the downturn, there were now only 90 people in the whole factory (15 employees and 75 workers). The difficult restart was also marked by a tragic setback. On 28 October 1927 a melting furnace exploded, burning a worker so badly that he died only a few hours later from his injuries.

Nevertheless, the work had to go on: PWO continued its tried and tested business and manufactured air pumps for bicycles, motorbikes and cars. And at this time, the production of drawn parts also began. This proved to be ground-breaking – today, deep-drawing is regarded as one of the key competences of the company, and comprises a major part of production. The factory facilities that already existed, and the technical expertise of the workforce, also allowed an additional use of capacity. The PWO product range was now expanded with the help of the manufacture of punching

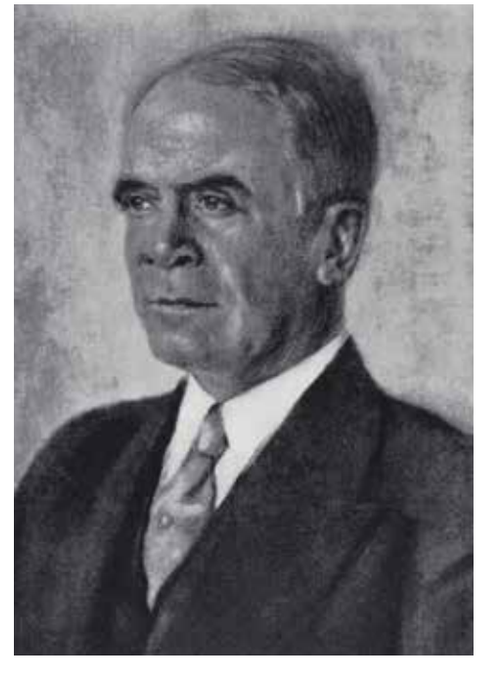
1920s.

View of the PWO building.

Since its foundation, the Frisch Bank was located in the so-called Salamander House at Königstraße 19a in Stuttgart.

1930s.

Banker Joseph Anton Frisch, painting of unknown origin.



and drawing parts for pump tubes, and vacuum cleaner parts. These were joined by drawn parts for large and small grease guns, accessory parts for speedometers and the manufacture of air filters, exhaust and trim components, as well as mudguards. In addition to the new product range, the company modernised its production plants. The drawing and punching shops were expanded with the addition of associated plants such as the annealing, paint and electroplating shops. At the time, these were still hesitant steps in the business of supplying the automobile industry; today, it is a long-standing and successful business.

With a new company management, a rationalised workforce, new product ideas and modernised production plants, PWO turned its attention to the future. Yet this development was not inevitable. It was only possible to recommence production at all thanks to the generous financial support of the supervisory board chairman, private banker Joseph Anton Frisch. Not least for this reason, in a ceremonial speech in 1969 on the occasion of PWO's 50th anniversary, Managing Director Karlheinz Linnenkohl emphasized the gratitude due him: His "wise management" enabled the creation of a firm foundation to ensure the company's continued successful existence during the global economic crises.[6]

JOSEPH ANTON FRISCH

EXCURSUS

Joseph Anton Frisch was born on 11 November 1881 in Gaggenau in Baden, the son of Konrad Frisch, a land surveyor, and Maria Frisch, née Müller. He was the fourth of eleven children, and soon had to learn how to assert himself among so many siblings, especially since his father died at a young age. After attending secondary school in Pforzheim he became a bank clerk and, by his own account, was a board member of numerous companies by the age of 25. He soon moved to Paris, where he was employed by leading banking houses due to his good command of languages. When his father died, his uncle Anton Josef Müller had taken him under his wing and mapped out his path in the world of finance. Müller owned the Jörges Bank in Baden-Baden, in which Frisch himself had shares between 1911 and 1914. However, Müller's influence on Frisch did not always have only positive consequences for the young banker. For the foundation of Salamanca AG, a Spanish mining company, Müller promised to provide share capital of 2 million francs, to be provided by his own bank. In reality, however, Jörges Bank had actually been in the red since the turn of the century. Müller had lied. The consequences for his nephew were dire: due to several cases of fraud he was sentenced to ten months prison in 1915. It is unclear whether Frisch actually went to prison. The verdict was pronounced during World War I, and at this time Frisch was "on military call".

In the 1920s, Frisch moved to Stuttgart, entered his own banking business in the commercial register on 25 March 1922, and set it up with proxies Otto Essele and Eugen Zimmermann. His bank moved into the famous Salamander House on Königstraße. As well as his participation in PWO, the private banker became increasingly involved in the highest levels of national and international business. By 1929 he was a member of the supervisory boards of at least 18 German and foreign stock companies. He invested in companies from numerous industrial fields that were market leaders in their sectors, both within Germany and even worldwide, including the paper tubing factory Emil Adolff AG from Reutlingen, the chemicals and pharmaceutical company Byk Gulden AG from Berlin, Ziegelwerke Ludwigsburg AG or the electric engine factory Himmelwerk AG from Tübingen. In addition, he was an advisor to the Salamander AG in Kornwestheim near Stuttgart as its "sole banker". His tactical approach and his collection of seats on supervisory boards made him one of the eight most influential private bankers in Germany by 1938.

During the National Socialist period, Frisch was categorised as a "commercial Aryaniser", who in some cases contributed actively to the expropriation of successful stock companies owned by Jews, often over several generations, by buying majority shares, after which the companies where then given to a new, "Aryan" owner, as defined by National Socialist ideology. For example, together with a consortium comprising Deutsche Bank, Dresdner Bank and Commerzbank, the house bank of Salamander AG sold a large number of shares owned by the Jewish family Levi, who then owned less than a fifth of the equity share in their own company. While the sale

of the shares did not make Frisch a partner in the company, he nevertheless pocketed a commission on the sale price.

Ultimately, it is impossible to say whether Joseph Anton Frisch was a staunch National Socialist. On the one hand, he was never a member of the NSDAP party, and even after joining the German Labour Front (Deutsche Arbeitsfront, DAF) in 1938, he never held any official position. On the other hand, according to a report from his de-Nazification process, he actively promoted National Socialism: Frisch is said to have hosted the Württemberg Reich Governor Wilhelm Murr and "other leaders of the Nazi party in his villa" and was therefore anything but "acceptable". Privately, he complained about the difficulties caused by World War II and criticised the rationalisation measures, which made it impossible for him to send cigarettes or schnapps from his Aryanised distillery in Emmendingen to the PWO Managing Director Edmund Hess. In general, the economic consequences of World War II presented "only disadvantages" in his view.

For the benefit of PWO he sought tax loopholes in order to gain exemption from the transfer-of-profits tax that was introduced in 1941, thus depriving the National Socialist regime of tax income. It is also worth noting that in his private correspondence with the managing director, Hess, he always refrained from using the expected wording "With German greetings" or "Heil Hitler", instead always closing with "Warm regards".

After his bank was completely destroyed by three air raids in the final years of the war, Frisch first moved to Büchsenstraße 28 in Stuttgart, and after World War II to his country estate in Zavelstein near Calw, which had been built in 1935. While he reassumed his banking activities here, his health took a turn for the worse. In June 1947 he admitted himself to the the Stillachhaus Sanatorium in Oberstdorf in the Allgäu for several weeks.

After the end of the NS era, and as a result of his poor health, his influence as a banker diminished significantly in the post-war period. In 1949 his long-term employee Otto Essele became a partner in the Frisch Bank. Joseph Anton Frisch died on 26 April 1953 at the age of 71, leaving behind his wife, Emma Frisch, née Offermann, and two daughters, Hertha Meeh and Countess Irmgard of Demblin, who then joined the bank as limited partners. They were to play an important role for the future of PWO.[7]

1942.

Military and armaments formed the core of the National Socialist economic policy. This also included the use of all available raw materials for armaments production. Thus in 1942, for example the bell of the Catholic parish church St. Cyriak in Oberkirch was removed in order to be melted down.

3

PWO during the National Socialist era

On 30 January 1933, Reich President Paul von Hindenburg appointed Adolf Hitler Reich Chancellor, and the NSDAP became the governing party. Subsequently, the National Socialists systematically dismantled democratic structures. Those who did not adhere to the ideological and racial norms of the NS regime were ostracised and persecuted. Society was meant to be "brought into line" and adapted to the political-ideological objectives of National Socialism. There was often no need for pressure to be exerted, countless organisations surrendered their autonomy voluntarily – sometimes in overeager submissiveness – and conformed.

1930s.

Everyday scene: Deliveries were still carried out by horse-drawn carriage.

STADELHOFEN AT THE BEGINNING OF THE NS ERA

In the elections to the Reichstag up to 1930, the conservative Catholic Zentrum Party had been the strongest party in Stadelhofen – often with an absolute majority –, such as in 1928 when it won 208 of the 242 votes cast. The NSDAP, in contrast, was especially able to mobilise voters who had never before participated in national elections. With increasing voter turnout, it managed to multiply its votes significantly: whereas in the 1928 election it received 3 of the 242 votes cast, in March 1933 this had grown to a total of 245 of 407. NSDAP supporters in Stadelhofen celebrated this success with parades through the town, by planting two "Hitler lime trees" in April on the Town Hall Square and the schoolyard, and by replacing the black-red-gold flag of the Weimar Republic with the black-white-red flag of the German Empire.

In 1933, local politics in Stadelhofen also changed. In May, the previous mayor, Theodor Zimmerer, who was regarded as "not Hitler-friendly", was removed from office. He was succeeded by one of the earliest Stadelhofen NSDAP members. In the local elections, the NSDAP also won the majority in the local councils. From July 1935 onwards, only NSDAP party members were allowed to become local councillors.[8]

PWO IN THE NS ERA – TOWARDS BECOMING AN ARMAMENTS PRODUCER

At the beginning of the 1930s the crisis of the previous decades could still be felt at PWO. In the 1932 financial year, Ernst Esslinger, who had been chairman of the board since 1929, reported an increase in turnover in terms of volume and value, but he also complained about "the incredibly depressed prices as a result of the very intense (...) competition". After 1933, PWO tried to acquire new customers. Its particular focus was on the emerging airplane industry. In addition, PWO acquired a "public client", the military, as a new customer. Furthermore, the plan was to also develop new sales channels throughout Europe. This corresponded with the economic policy of the time: In the 1930s the NSDAP pushed the export of industrial goods in order to bring foreign currency into the country. Thus, in February 1937 the Stadelhofen company placed a newspaper ad for a multilingual "sales correspondent": applicants should be able to correspond perfectly "in English, French and, where possible, Spanish". Experience in the area of bicycle accessories and a knowledge of export were also desirable.

By 1937 around 90 % of PWO production consisted of air pumps, but due to the poor prices, they generated hardly any profit. The consequence: company profits were not sufficient to cover operating costs. It was possible to balance the losses arising from air pump production by increasing drawn parts manufacture. Nevertheless, the figures spoke for themselves: after "other expenses" and "plant depreciation" for 1937, the profit for the complete financial year was reduced to 5,700 RM.

Esslinger soon faced criticism, since he failed to lead the company out of the crisis. He was succeeded in 1939 by the NSDAP member Edmund Hess. Hess had the backing of Joseph Anton Frisch, who had ultimately spoken out against Esslinger.

Edmund Hess brought about an economic turnaround in 1939. The company applied for a price increase for tube-less pumps. This was granted in 1940, which meant that no further losses arose in this area. At the same time, turnover figures increased in a new area of production, one that would dominate the company in subsequent years, namely armaments production. The audit report of 1943 stated: "When one considers the results of the different years, the results of the past two years have been very good. It is obvious that in this case, war production exerted a certain influence". Indeed, "operational profit" – as it was defined at the time – rose from 5,700 RM in 1939 to 178,130 RM in 1940. In 1941 it was 147,520 RM.[9]

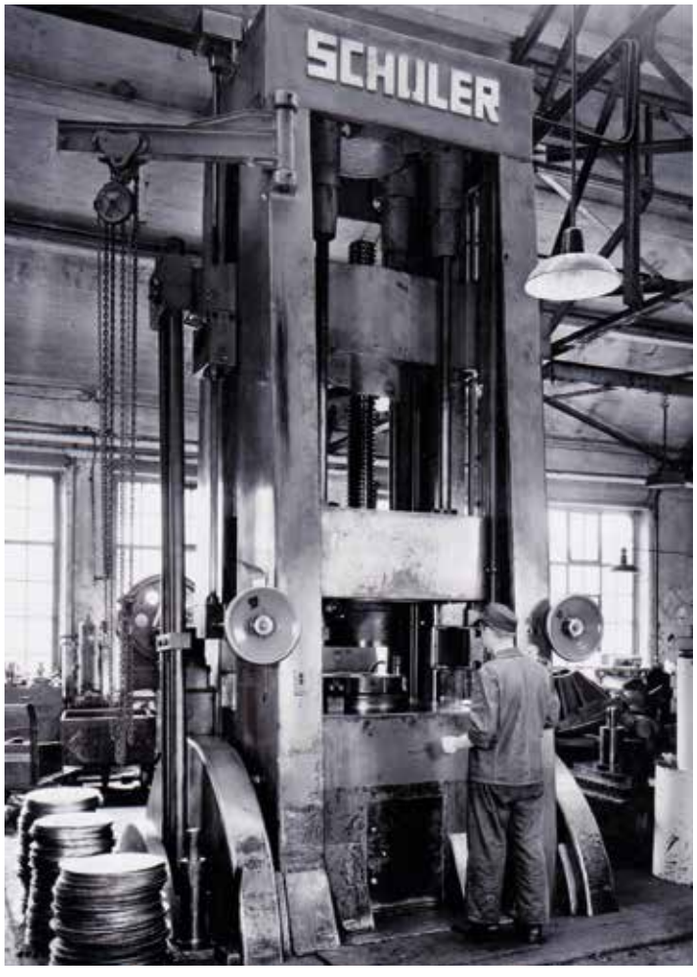
WARTIME ECONOMY AND ARMAMENTS PRODUCTION DURING WORLD WAR II

World War II began on 1 September 1939 with the invasion of Poland by the Wehrmacht. German industry had already been strongly oriented towards the conditions of the wartime and armaments economy. Once the war started, production for civil use withdrew into the background at PWO, as in all metal-processing companies, in favour of the manufacture of armaments.

As a metal processing company, PWO had the technical expertise and the machinery for armaments production. From a production perspective, this was a time of success for PWO, with high profits and modern production. Soon PWO was manufacturing, among other things, ammunition boxes and various drawn components, engine air filters for the army, navy and Luftwaffe, as well as bullets and gas cylinders for guns.

Since PWO was increasingly working at full capacity due to armaments production, the factory had to be expanded. First, the central power plant was extended in May 1941. Furthermore, PWO needed "a new switchgear appropriate to the size of the factory, as the old switchgear no longer suffices due to the war", according to an explanatory report by the company in October 1941.

PWO was able to transfer the experience it had gained from air pump production to armaments production. A message to the commando of the armaments section in Villingen in June 1942 shows the extent of PWO production: "Among the orders we currently have: 47,000 ammunition boxes. We can make the individual parts of these devices in mass serial production, which relieves the burden on the skilled workers considerably by reducing the changeover time for the individual machines. This concerns not only the production of ammunition packing containers, but also bulky drawn parts that we have to make as very urgent orders from the companies Zahnradfabrik Friedrichshafen, Klöckner-Humboldt-Deutz in Ulm, Ford in Cologne, Blaupunkt in Berlin, Electroacustic in Kiel, Kolb, respectively Junkers in Dessau, Dornier in Friedrichshafen and many others." PWO produced the drawn parts primarily as sub-suppliers for other companies, the orders for armaments came from the Luftwaffe. The ammunition boxes were containers for various different grenades for the 3.7 cm anti-tank gun 36 and the 5 cm anti-tank gun 38, which in turn were used by the Wehrmacht.



Production around 1940: By this time the press by the Göppingen firm Schuler has already been owned by the company for twenty years. On the left are the circuit boards, which are placed in the press during deep drawing.

Toolmaking in the 1930s.

Zum Eintritt auf 1. 4. oder früher, gewandter

Verkaufs-Korrespondent

gesucht.

Bewerber müssen in der Lage sein, anfallenden Schriftwechsel nach kurzen Angaben selbständig zu erledigen und perfekt sein in englischer, französischer und möglichst spanischer Sprache in Wort und Schrift.
Erwünscht Kenntnisse in Fahrradzubehör, Exporterfahrung. Unverh. Bewerber (örtl. Verhältnisse halber), die selbst Maschinenschreiben können, im Alter von 25 bis 30 Jahren bevorzugt. (90042)

Gefl. Angebote erbet. an **Progreß-Werk Oberkirch AG., Stadelhofen/Baden über Achern.**

1937.

A job vacancy advertised in the newspaper "Der Führer" on 15 February 1937. A sales correspondent was sought, who was to have command of English, French and Spanish.

1940s.

PWO as an attraction: In the 1940s the company is a postcard motif for the community of Stadelhofen.

The switch to armaments goods strengthened the positive development of PWO operational results, as the managing director Hess explained to member of the supervisory board, Fritz Frisch: "The large revenue this month is due to the fact that we were able to significantly increase our Wehrmacht production." In July 1942 the company had an operational profit of 30,497.44 RM with a monthly turnover of 159,947.96 RM. The annual turnover was ultimately 1,800,000 RM. The following year, overall turnover was a remarkable 2,170,764.14 RM.

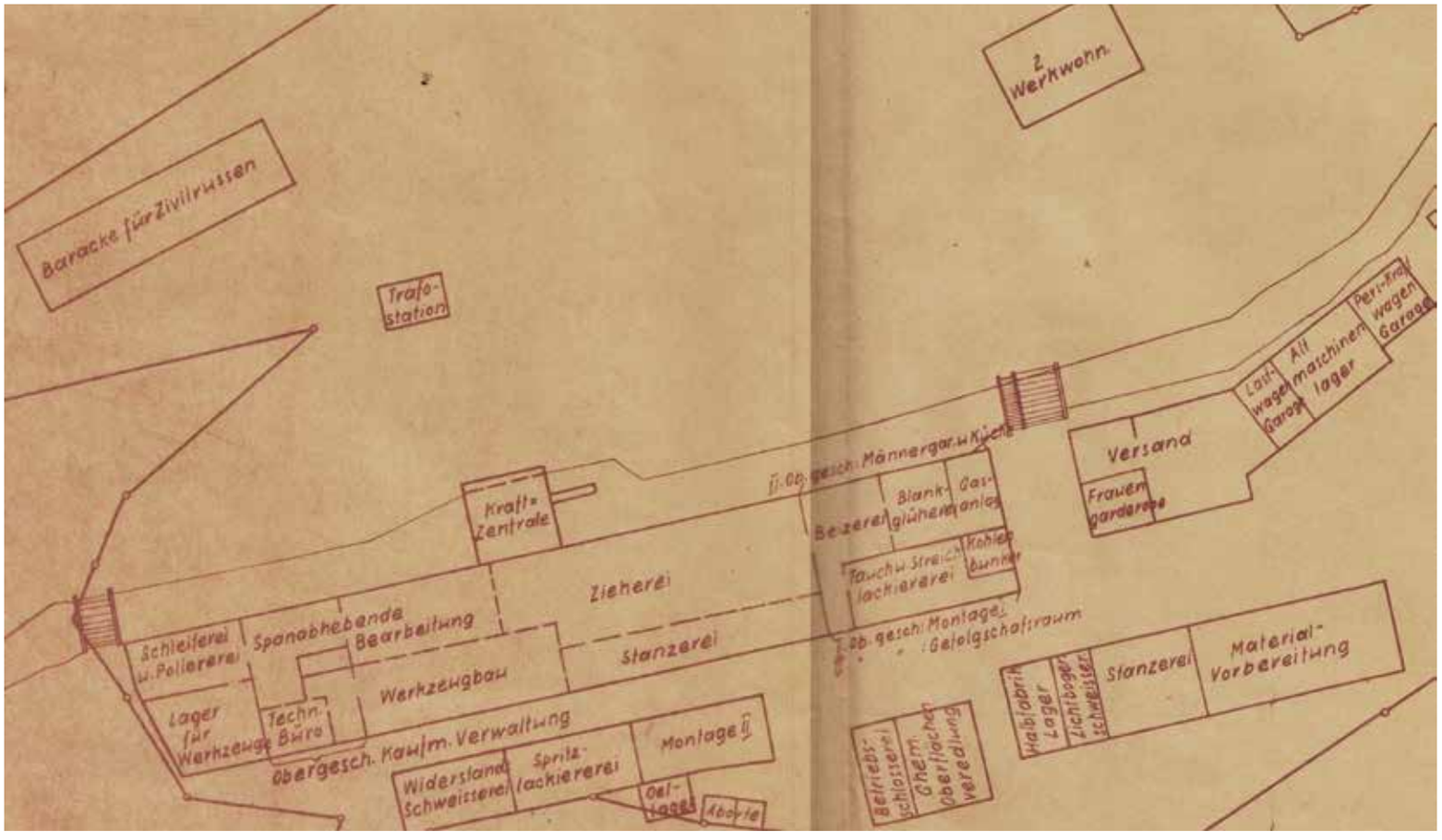
After the production of ammunition boxes ceased in the autumn of 1943, PWO as a sub-supplier produced various different drawn parts, air pumps and air filters for engines on the order of the Army High Command. In 1943 the company achieved a total taxable profit of c. 628,000 RM, around half of which was generated from the production of drawn parts for the Army High Command. The two other production lines – air pumps and army equipment – made up the other half of the profits.

Nevertheless, the annual report for the following year, 1944, listed the "revenue from army equipment" at only 58,206 RM, at an overall income of almost two million RM. We can assume, however, that not all armaments orders fell into this category. As well as army equipment, "pump sales" and "drawn parts sales", which also included the production of metal products such as gas cylinders, also formed part of the income.

In 1944 PWO also produced 132,913 gas cylinders for the companies Haenel and Steyr, at an overall value of 82,406.06 RM. These gas cylinders were installed as gas-operated reloaders in the assault rifle 44, which was introduced in 1943. Until the end of World War II, around 425,000 such assault rifles were made in the German Empire. Therefore, almost one-third of all assault rifles were fitted with the gas cylinders made by PWO. In addition, PWO also made shells for the Army High Command – according to the annual report, 15,000 units in 1944.

All of a sudden, PWO's financial situation was, in a manner of speaking, too good. At the beginning of 1943 the head of the tax authority in Karlsruhe informed the company that "only a reasonable profit of c. 41,000 per year is allowed". The management in Stadelhofen refused to accept this. Practically, "this decision would mean that we would have to remain a bankrupt company for all time, just as we were in 1937 – 38", said managing director Hess to Joseph Anton Frisch. As a solution, therefore, PWO attempted in 1944 to reduce the profits by means of a reimbursement in the form of retrospective discounts to the Army High Command in the air pump production.

In April 1944 PWO additionally opened a small factory, around 200 m^2 in size, "with a heating, lighting and power plant" in Oberkirch. The Rösch chair factory rented the premises. This decision was prompted by various considerations. If the production facilities in Stadelhofen were destroyed in air raids, production could have continued in the new site. Furthermore, it allowed PWO to establish itself in Oberkirch, making it easier to obtain labour from there. At this time, workers had to be allocated, but the PWO management feared that the catchment area for labour in Stadelhofen had already been fairly exhausted, and that no more than 100 workers would be available in peacetime. For Oberkirch, in contrast, the possible additional labour potential was estimated to be 300 to 400 people. It also had to be considered "that in Stadelhofen



1942.

A site map from 1942 shows that PWO's growth led to an expansion of the factory buildings. Numerous buildings were added since the firm's founding, including warehouses and areas for welding, surface finished and shipping. A barrack for the foreign forced labourers who had been allocated to PWO can also be seen.

there will always be a number of people unavailable in the summer months, since most were also farmers on the side, while this situation is less likely in Oberkirch".

Furthermore, the plant in Oberkirch would have been easier to convert to conveyor belt production than the main factory, with its infrastructural restrictions. But building also continued in Stadelhofen. In 1944 PWO constructed a new building on the company premises that cost 35,000 RM to build.[10]

PWO AND THE END OF THE WAR

War, forced labour, and the armaments industry dominated PWO decisively at the beginning of the 1940s. Yet by the end of 1944 the factory in Stadelhofen did not fall victim to the Allied air raids that had attacked numerous German cities since 1942. In a letter to Joseph Anton Frisch on 13 February 1944, Edmund Hess wrote: "Luckily, nothing has happened here yet. To date, the nearly daily air raids have targeted almost exclusively supplies and transport."

In the final winter of the war, the Ortenau region became the target of Allied air raids. On 27 November 1944, the 303rd Bomb Group of the US Air Force took off from the British air base of Molesworth and headed towards Baden. The squadron was supposed to bombard the freight yard in Offenburg in order to destroy infrastructure that was crucial to the war, and to block supply lines. The bomber squadrons then also flew over Stadelhofen, which was hit by at least six bombs. The bombs missed the PWO grounds, but the building shook from the impact "like in an earthquake". Witnesses recall that the detonation caused some windowpanes to break in the barracks for civilian forced labourers (Zivilarbeiter). The forced labourers housed therein fled in fear to neighbouring towns and sought protection there.

Nevertheless, Hess remained optimistic, even just two days after the attack, which was not even mentioned in correspondence between the PWO board and the majority shareholder Joseph Anton Frisch: "In the meantime, our situation has not changed significantly." Around a week later, he reported only on gas and power outages, and the lack of raw materials, which limited production. And the war was now coming ever closer: "In general, the situation has not changed significantly, but since yesterday there has been artillery fire also in Appenweier and Offenburg."

Production at PWO was now considerably restricted. There was an increasing lack of raw materials, since these could be transported to the factory only with very great difficulty. In addition, finished products could no longer be transported away, and had to be stored by PWO. A large number of PWO customers had been bombed out, and postal traffic and money transactions were very risky. Ultimately, the worry that Stadelhofen might become a warzone was omnipresent. For this reason, the PWO management felt it was necessary to remove some of the most important files and papers and "store them further back, to be able to save at least the most urgent papers in the event of an unexpected further advance by the enemy".

With the continued advance of the Allies towards the Rhine, preparations were made at PWO for the evacuation of the company, even though this had initially been

ruled out by the armaments department. In the last months of the war, it was no longer possible to shift the production plant – not least due to a lack of transportation.

In Stadelhofen, work continued under emergency conditions. Just before Christmas 1944, Hess told Frisch: "We are continuing to work, for as long as the materials supplies allow, currently using a one-shift operation, 55 hours per week. We have relieved the half-day women from their duties and dismissed c. 40 foreigners." In addition, between autumn 1944 and spring 1945, around 40 workers were conscripted by the army and the Volkssturm militia, including some skilled workers. This reduced the workforce by around a third, from 350 to around 230.

Although PWO remained unscathed by direct war damages to the very end, operations were still threatened in the final days of the war – however, not by the Allies, but by the German side. On 4 April 1945, managing director Edmund Hess told the supervisory board member Albert Odenwald: "I have just been informed that of the proposed ARLZ measures [breaking up, evacuating, disabling and destruction], the last is planned for our factory." These orders were issued in September 1944 in light of the Allied advances onto Reich territory. Hitler's order to carry out "destructive measures in the Reich territory", the so-called "Nero Decree" of 19 March 1945, intensified this even further: nothing more than "scorched earth" was to be left behind for the Allies. But PWO escaped destruction. On 15 April 1945, French troops occupied the company, thus saving it from annihilation.[11]

Adolf Hitler is cheered while driving along the main street in 1940. He was merely passing through. An important highway from Württemberg to the Rhine Valley, now the B 28, led – back then as well as today – directly through Oberkirch.

FORCED LABOURERS

EXCURSUS

The production success, and PWO's profits, must be seen in a critical light. Not only were its products used in the Wehrmacht's war of conquest and annihilation; as the war progressed, the PWO management increasingly also used forced labourers.

During World War II, a total of around 14 million foreign forced labourers worked in the German Reich. These were prisoners of war, civilian forced labourers, and prisoners from various different concentration camps and jails. In the first few years of the war, some foreign labourers still worked voluntarily in Germany, but the forced element soon prevailed. In the occupied territories, compulsory labour and a brutal system of coerced recruitment was established for large sections of the population.

The everyday working and living conditions of the forced labourers was marked by low pay, racial discrimination and a large degree of external control, which differed in each case depending on nationality and the racist criteria of the National Socialist regime. Western European forced labourers were in a better position, both in terms of pay and treatment, than forced labourers from Eastern Europe. Soviet prisoners of war, and Jewish internees in concentration camps, were subjected to the worst living and working conditions.

The reason for the mass use of forced labour was the increasing lack of workers available to the German economy due to the war, since large amounts of the population had been conscripted for military service by the Wehrmacht. From the beginning of 1942 PWO also experienced the growing conscription of its employees, while at the same time an increase in performance was demanded in the production of armaments and their components. Therefore, in the spring of 1942 the PWO management applied to the labour office in Offenburg to be allocated 50 Russian labourers, since "every additional demand can be met only by using foreigners, or prisoners". Initially, PWO was allocated ten Russian women and ten Russian men. These were probably civilian forced labourers.

Accommodation was provided for the Russian workers from summer 1942 in a barrack beyond the millstream. The original plans for an accommodation block had been rejected by the Reich Air Ministry (Reichsluftfahrt Ministerium, RLM). However, "in personal negotiations" Edmund Hess managed to secure a standard barrack for PWO. The procuration costs of 2,828.05 RM were assumed by PWO, as well as the costs for its construction on the company premises. It was a Type IV/1 barrack, used for simple accommodation by the Reich Labour Service, and was based on a modular system, whereby several wooden modules could be joined to form a single-storey building of optional length. The barrack at PWO was planned in four sections, but only three were completed, and it was around 8×10 m in size. Hess reported in July that

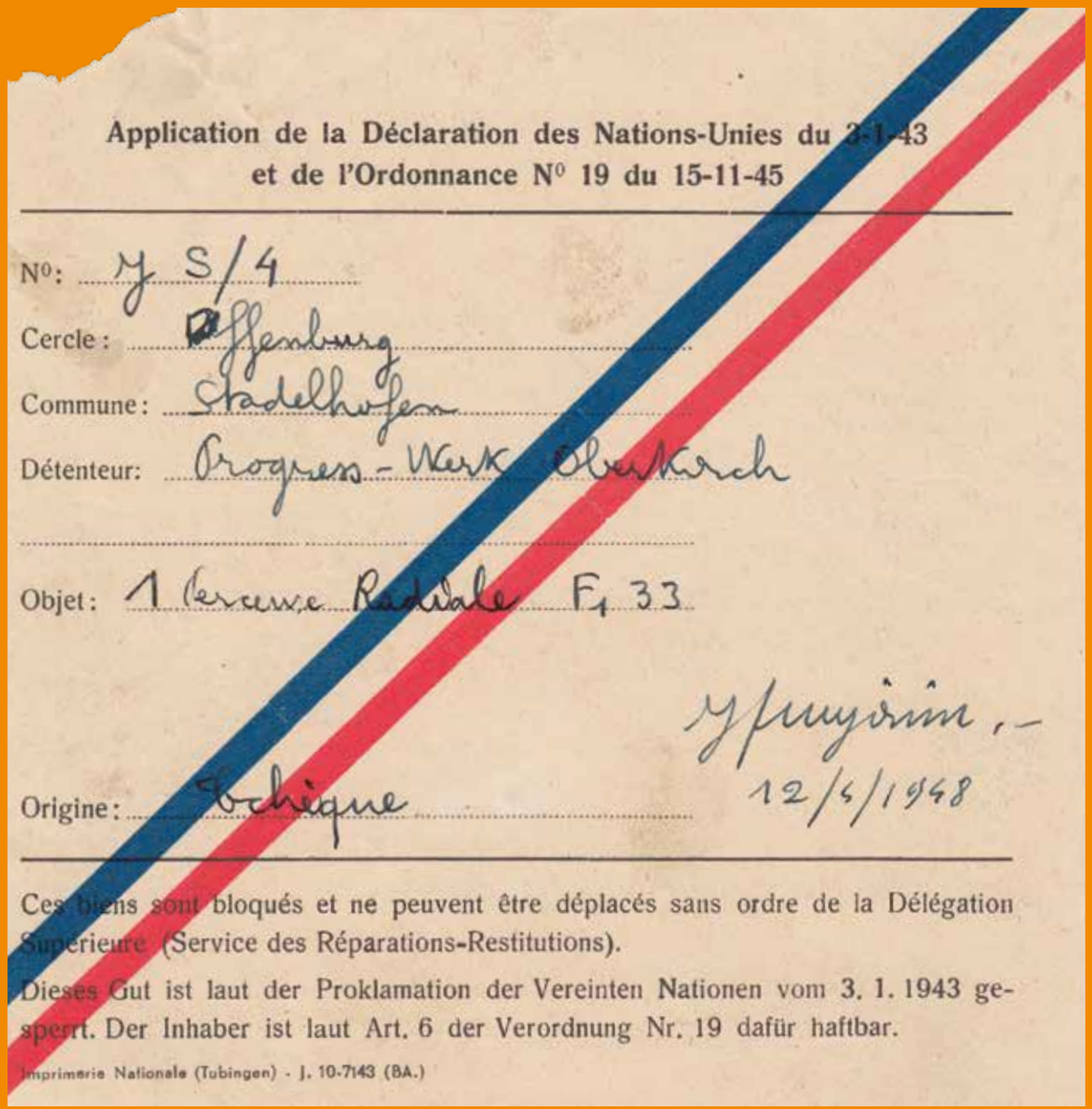
it would "suffice for at least 60 men", and he hoped that PWO would be allocated a further 35 to 40 Russian civilian forced labourers or prisoners of war. However, none of the surviving company documents reveal the exact number of those who were later accommodated there.

Little is known about the daily life of the forced labourers. According to a contemporary witness, the forced labourers planted turnips in front of their barracks, and some worked additionally at weekends for company employees to earn a little bit more to eat. Life was not easy for the forced labourers, who suffered great deprivation. Some company employees secretly slipped them food and clothing.

In addition to the Russian forced labourers there was also an unknown number of Italian military prisoners, who – in contrast to the "Russians" – were allowed to eat in the canteen and were accommodated in their own barracks. In addition, there was a small number of French prisoners of war and Western European civilian forced labourers.

In March 1943, 17 foreign women and 14 foreign men worked at PWO. In this month, 1,220 women and 1,807 men were employed as so-called "eastern workers" throughout the entire area of the Freiburg Armaments Commando. By August 1943 – when reporting ends in the archives – the number had risen to 25 women and 22 men at PWO. Otherwise, the only documentation to provide meaningful figures is a letter from Edmund Hess in November 1944: "As of 31 October, the workforce comprised: 119 German men, 109 German women, 41 half-day women, 57 male foreigners, 24 female foreigners." The nationalities of the foreign forced labourers was not given.[12]

After World War II, with the help of release documents (bons de déblocage), the French occupying troops seized thirty machines from PWO. This is about a radial drill.



Application de la Déclaration des Nations-Unies du 3-1-43
et de l'Ordonnance N° 19 du 15-11-45

N°: M S/4

Cercle: Offenburg

Commune: Stadelhofen

Détenteur: Progress-Werk Oberkirch

Objet: 1 Bohrmaschine Radialbohrer F1 33

Origine: Belgique

Ces biens sont bloqués et ne peuvent être déplacés sans ordre de la Délégation Supérieure (Service des Réparations-Restitutions).

Dieses Gut ist laut der Proklamation der Vereinten Nationen vom 3. 1. 1943 gesperrt. Der Inhaber ist laut Art. 6 der Verordnung Nr. 19 dafür haftbar.

Imprimerie Nationale (Tubingen) - J. 10-7143 (8A.)

Cooperation between Baden and France: From the cooking pot to the first field kitchen

On 14 and 15 April 1945, after five and a half years of war, Stadelhofen was threatened with destruction. Witnesses report how men from the village saved the bridge over the Rench from being detonated by the Wehrmacht on two different occasions. With a bare minimum of weapons, the citizens of Stadelhofen also managed to occupy and defend the tank barriers. On 15 April, French troops entered Stadelhofen just after midday – without firing a shot.

PWO produced around 2,000 FK-38 field kitchens for France, here with a folded chimney. Production took place in a factory hall build specifically for the purpose.

FK-38 with opened containers, which were used to store fuel. The chimney can be folded forward, thus reducing the height of the field kitchen.

A NEW START AFTER THE WAR

For the civilian forced labourers for PWO, the arrival of the Allies meant the end of forced labour. They "united" with the troops immediately, according to sources. The local NS functionaries were deposed, and a former forced labourer became the local commander. Shortly thereafter, two more French companies arrived; the French soldiers searched numerous houses in the town. On the same day, PWO was also occupied, the factory management was arrested and brought to the Church Square, where the French had set up their headquarters. The next day, three more batteries, each with three guns, came to Stadelhofen and from there, for a number of days, fired on Oberkirch, Wolfhag, Gaisbach and Schwend, where there were still German soldiers and SS troops. Eventually, Oberkirch was taken by the French on 17 April.

World War II ended a few weeks later in Europe, on 8 May 1945, with the unconditional surrender of Germany. The victorious Allied powers – the USA, the United Kingdom, the Soviet Union and France – divided conquered Germany into four occupation zones; Stadelhofen lay in the French zone. Eventually, at the end of July 1945, Baden-Baden was declared the headquarters of the military government of the French occupied zone (Gouvernement militaire de la zone française d'occupation). In September 1945 five regional military governments (Délégations Supérieures) were established in South Württemberg-Hohenzollern-Lindau, South Baden, Rhine-Hessen Palatinate, Rhineland-Hessen-Nassau and the Saar region.

At the beginning of the period of occupation, the French imposed a curfew on the inhabitants of Stadelhofen. It lasted from 9.00 in the evening to 6.00 in the morning, every day. The region's infrastructure had suffered greatly. Stadelhofen spent ten days without electricity, thereafter PWO was able to supply the village provisionally. Soon after the occupation of Stadelhofen, the occupying army quartered around 60 soldiers at PWO, and they remained stationed there until the end of the year. After the French occupation, production ceased at PWO for around three months, until the company was granted a work permit on 6 July 1945. The military government in Freiburg allowed PWO the 48-hour week.

For the civilian population, the post-war period was a time of deprivation, primarily due to food shortages. The black market and bartering soon flourished, the latter also being known as "hamstering". Life was especially difficult for urban dwellers. At the weekends, many inhabitants of nearby towns and cities came to Stadelhofen in order to trade with farmers, bartering their valuables for apples, bread, potatoes or eggs. But the situation was also tough for farmers, since they were forced to surrender almost their entire harvest. Any infringements were strictly punished.

PWO paid its employees with company products, and they in turn exchanged these for food. All of this occurred against the backdrop of the "repressed inflation" of the NS period. While there were plenty of Reichsmarks in almost every household, nobody had any confidence in the currency. All of the money was de facto worthless.

After the resumption of work, PWO initially produced items that were urgently needed by the population: harrows, horseshoe nails and rake tines for agriculture. These were soon followed by enamelled cooking pots and frying pans in large quanti-

ties. One of the greatest challenges was procuring raw materials. They were sourced everywhere, from all over the region. On 27 November 1945, for example, a truck collected 8.5 metric tons of materials from a company in Bühl.

PWO used the opportunity to transition from wartime to peacetime production with as little friction as possible. Joseph Anton Frisch wrote to the PWO chairman Dr. Kurt Roman Müller, who had replaced Edmund Hess, saying that the production of cooking pots would have to be accelerated "with the greatest urgency [...] while the price conditions are favourable". At the time, an enamelled frying pan cost 6.10 RM and a cooking pot with lid 4.05 RM.

Production was profitable and the number of orders remained consistently high also in 1946. Overall turnover in June was 83,865 RM. This meant that the company had once again achieved almost half of the average monthly turnover of 1944, when wartime production was at its highest. In 1946, not only large frying pans, but also other utensils were "sold at very good prices". However PWO soon suffered a shortage of labour, and the company made an effort to "get more workers at all costs, since – once the materials situation has been clarified, and the requisite orders have been received, which is in fact the case – there must definitely be an increase in production, which can be achieved only by employing more workers".

The campaign had only limited success. Although the employment office in Oberkirch made "exemplary" efforts on behalf of the Stadelhofen company, as PWO chairman Müller reported to Joseph Anton Frisch, hardly any new workers were acquired. Nevertheless, a start had been made: Things continued to get better in Stadelhofen. The cooperation with the French occupation government was also promising. Already in December 1945, PWO received its first order from the French for 3,000 automobile air pumps. Although the order presented some challenges, such as the difference between German and French valve connections, the Stadelhofen company recognised the potential. Müller wrote proudly to Frisch: "At any rate there are opportunities here that we plan to exploit." More orders from France would follow.[13]

DISMANTLEMENT AFFECTS PWO

The victorious powers decided that Germany would have to pay compensation and war reparations. Part of these reparations was the so-called dismantlement, i. e. payment in the form of machines and industrially relevant equipment.

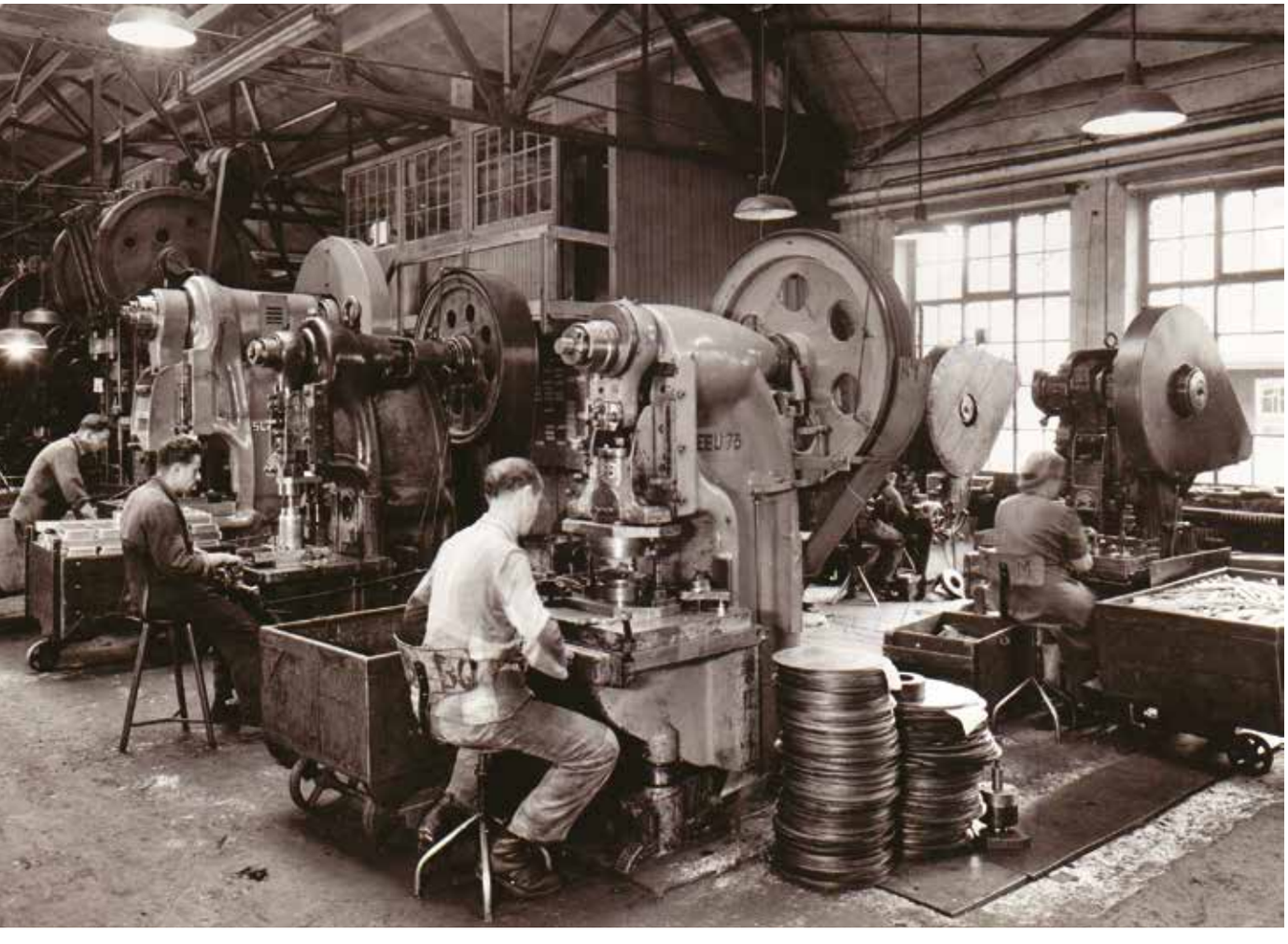
This also had an impact on PWO. On 9 March 1946, a French delegation appeared in Stadelhofen and declared several machines on the premises to be "confiscated". An anxious wait began, since nothing else happened at first. But two months later they were transported away. Müller described the notable moment: "On the morning of Wednesday, 22 May, at around 8.30 a.m. a French transport colony, consisting of 3 wagons, arrived at our factory, and the transport leader, an engineer Felix from the company Renault in Paris, handed over a release document that had been stamped and signed in Baden-Baden, detailing 19 machines." The phones started ringing off the hook: After a number of calls, Müller managed to reach the officer responsible in

1948.

After the end of the war, the product portfolio included multi-part cooking utensils.

1951/52.

After the production of the field kitchens, PWO expanded its sheet metal and equipment construction. Here: the manufacture of airplane superstructures on 5-ton trailers for the French occupying troops. PWO completed the order to produce the wagon structures for the French army in 1951/52.



View of production in the 1950s. In the foreground is an press from the Bayreuth firm EBU Umformtechnik GmbH. It had a pressing power of up to 75 metric tons and could be operated by just one person.

Baden-Baden, Farcot, "personally on the telephone". It was a critical situation for the factory. PWO had just started to recover, and now important machines were due to be dismantled. Müller tried everything, as he said to Frisch: "We have now moved heaven and earth to save whatever can be saved".

He was successful only to a degree. Farcot was open to discussion, and in the afternoon ordered a special commission to visit Stadelhofen in order to re-examine the claims of the French occupying government. On site, one of the special commissioners reported "that the number of seized machines – 19 – could not be altered". However, he had received the instruction from Officer Farcot to proceed as agreeably as possible, and not to "damage [PWO] any more than is necessary, due to the control council provisions".

As a result, the Stadelhofen company was able to save four machines from being dismantled which were particularly important for the continued production by exchanging them for four other machines that were more dispensable. Over the next three days, to the "crippling horror" of the workforce, the 19 machines were deinstalled and loaded onto trucks by the French transport colony. At the end of his memorable report, Müller turns to the consequences for PWO: "From our point of view we must say the operations are naturally severely impaired by the removal of the machines, but luckily not on a form that threatens our existence. Production itself can continue as before and is only indirectly affected, since tool manufacture is of course no longer as effective as it once was."

Further difficulties were presented by the regulations of the French occupying government. Among other things, it decreed that a purchasing permit always had to be obtained from the Section Sidérurgie (steel industry section) whenever PWO wanted to procure goods or raw materials. The PWO management therefore endeavoured from the very beginning to maintain good relations with the French. Only one month after the dismantlement episode, Joseph Anton Frisch wrote to Dr. Kurt Roman Müller: "It is essential that you maintain good relations with the decisive officers."

The strategy was successful, and PWO continued to develop further. There were soon new product ideas. In August 1946, Müller told Frisch by letter that PWO had managed, "in great secrecy", to develop a new high-performance pump for bicycles, which differed from the previous pump "hardly at all in appearance, but to a great degree in terms of performance" by no less than 40 %. And the factory was already prepared to commence serial production. Nevertheless: During further dismantling, a total of thirty machines were seized and transported to France by 1950.[14]

EDMUND HESS RETURNS

The surrender of the numerous production and tool machines after the end of World War II created difficult conditions. Subsequent years were also not easy. The financial situation was fraught, for although the company had massively extended production space during the war, and had modernised und increased its machinery, the dismantlement reversed many of these advances. But not all: what remained was the exper-

1952.

New in the programme: wagon structures in the area of sheet metal and equipment construction. The photo, taken in 1952, shows (from left to right) Erich Ruf, Herbert Manchen, Roman Bürk, Fritz Müller and Josef Busam on the superstructure of a radio car.

tise of the workers, who had learned during the war to produce metal parts in large quantities in a highly efficient manner. This knowledge formed the greatest capital for the post-war period.

Three years after the end of the war, when PWO was making cooking pots, agricultural equipment and air pumps, Edmund Hess replaced Dr. Kurt Roman Müller as chairman, and once again managed PWO from 1948. Before PWO could once again supply customers throughout Germany and Europe with large quantities of pumps, exhaust parts or pressure tanks, Hess' task was to keep the company alive in the first place. One bitter step on this path was that by 31 December 1949, PWO no longer had the financial means available for the company's own provident fund, although the fund had been receiving an annual donation since the 1940s of around 30,000 RM in order to support long-term employees in cases of illness and emergencies, as well as pensioners. Instead, PWO used the money "for the rebuilding of the company, thus securing jobs".

In order to ensure this, and to keep operations going despite the continuing dismantlement, PWO bought used equipment and machines. For example, PWO purchased an automatic tube press with an 11 KW engine from the Karlsruhe machine factory Herlan & Co. Himmelwerk AG in Tübingen, of which Joseph Anton Frisch was a board member, supplied a three-phase current engine with 0.5 hp. In addition, a used typewriter, an unvarnished circular kiln, and tools for drawing pump tubes were also procured.[15]

TEMPORARY SALVATION: FIELD KITCHENS FOR THE FRENCH OCCUPYING TROOPS

Along with the procurement of used machines, the willingness to cooperate well with the French occupying troops also paid off. In addition to the air pumps for the French army, PWO also produced fittings for the French barrack construction programme. For this purpose, the company received special permission from the Military Security Board in Koblenz to manufacture defence-related equipment, one of the first German companies to do so. In addition, PWO made ammunition cases and vehicle spare parts for the French, who were once again at war since 1946, combatting the attempts to gain independence of the Communist Viêt Minh on their colony of Indochina.

The French obviously soon recognised the potential of PWO. In 1948 they enquired, via the occupying troops' procurement office in Oberkirch, whether the Stadelhofen company would be able to produce 300 field kitchens for the army. Such an order gave PWO the great opportunity to finally leave behind the difficult conditions it had faced since World War II, and to experience economic growth once again. At the same time, it meant that PWO manufactured its own large end product for the first time. But the production of field kitchens also presented PWO with some challenges. The company had little experience in steel plate construction. Ultimately, the advantages won out and PWO accepted the order.

1956.

Car structures were not all that were made. In 1956 PWO fitted an entire workshop car with technical equipment.

The product portfolio expanded constantly. Sheet metal and equipment construction offered more and more possibilities: for example, PWO manufactured a bicycle trailer for transporting small loads.

1950s.

For heavy loads, PWO developed a shelving system and had the invention patented as “shelves for stacked materials”.

Sparks flew in the production work in the 1950s. The photo shows metal stools being welded and assembled. The sheer amount of the working materials suggests a high production rate.

PWO benefited from the fact that the field kitchens did not have to be developed from scratch. The model called "M. 38", colloquially known simply as the "roulante", or rolling kitchen, had already been developed by the French during World War I, and was last technically modernised in 1938. The field kitchens of 1916 had still been pulled by two horses, but the new model had rubber tyres and could be pulled by vehicles. The roulante reached Stadelhofen at the technical level of 1938, and was given the type designation "FK-38" (Field Kitchen 1938). The 300 ordered field kitchens were produced and developed further in a factory building built specifically for the purpose in 1950. Instead of extensive heating with firewood, the FK-38 was fitted with four German burners for different fuels, each of which were placed beneath the four 125-litre boilers. In constructing the boilers, PWO used aluminum with a thickness of 5 millimetres, which reduced the weight of the previously heavy roulante by 25 %. Simple dish burners were used. Their special feature was that they could be removed easily, allowing the kitchen to continue to be heated with solid fuels.

For PWO, the processing of this first field kitchen order was an important milestone after World War II since it led to further subsequent orders from the French, as well as an entirely new business sector: sheet metal and equipment construction. In all, PWO delivered around 2,000 FK-38s to France, and in the early 1950s also received production orders from Sweden. The construction of FK-38 also had a considerable effect on business turnover. In 1955, sheet metal and equipment construction made up 40 % of overall turnover. What began in 1948 with the field kitchen developed further in subsequent years: operating facilities were to follow, such as shelving and steel cabinets, metal ceilings and convector casings for the construction industry, superstructures for vehicles, and all kinds of iron and sheet metal constructions.[16]

Engineer Werner Abel joined PWO in 1950 and commuted to Stadelhofen daily on his Strolch.

5

New ideas during the economic miracle: The Strolch and Progress 200 motor scooters

In 1953, PWO introduced an almost revolutionary product to the market – the Strolch ("Rascal") motor scooter. At just the right time, the company provided exactly the right product to suit the consumer euphoria that swept West Germany in the post-war period. There were already a lot of motor scooters on the market. However, the Strolch had a clear advantage over its rivals: Instead of the usual 8-inch wheels, the "successful synthesis of motorbike and motor scooter" had 16-inch wheels, which meant economical consumption and best road holding, even on rough terrain.

Apart from a three-year interruption after World War II, Edmund Hess was PWO Managing Director from 1939 to 1966, here at his desk around 1950.

INTO THE ECONOMIC MIRACLE ON A STROLCH

The Strolch was driven by an indestructible Fichtel & Sachs engine in a 150 cm³ or 175 cm³ version. With only around 2.3 litres' fuel consumption over 100 km, it reached top speeds of 90 to 95 km/h. The four gears were operated by means of a foot rocker switch. The swinging arm suspension and the wheelbase of 1,400 mm were measured in such a way to ensure that no difficulties were presented by either curves or dirty or wet roads while driving. Rather, in the event of "a suddenly occurring series of potholes or frost damage", one could continue driving "calmly and without the least surprise". The Strolch conquered mountain roads and hairpin bends thanks to the integrated fan cooling, which prevented the engine from overheating. The large 35 Watt headlight by Bosch was fixed to the front wheel, which meant that the light was shone in the direction of motion – in other words, also around bends –, thus allowing good visibility, even at night. In all, therefore, the Strolch, with its large wheels and strong engine, combined the driving features of a motorbike with the advantages of a scooter, namely the extensive casing and ease of mounting.[17]

CURRENCY REFORM AND ECONOMIC MIRACLE

Five years before the Strolch came onto the market, a phase of long-lasting economic prosperity began with the introduction of the Deutschmark in 1948. The currency reform created the foundation for a stabilising economy. The capital inflow from the Marshall Plan and the resurrection of international business relationships led to steady economic growth. Against the background of the war and the difficult post-war period, which was still very present in the minds of the population, the boom seemed like a miracle, so that the term Wirtschaftswunder ("economic miracle") entered modern West German vocabulary to describe the economic development between 1948 and 1966. Yet the developments at the time had very little to do with a miracle. Rather, the wartime economy during the National Socialist years created enormous production capacity in German companies. Neither the war nor the subsequent dismantling managed to destroy these resources to such an extent that one can talk of any kind of "Zero Hour" when it comes to the West German economy.

The beginning of the Cold War between the USA and the Soviet Union at the end of the 1940s meant that the economy of the US, British and French zones received support from other western countries. Dismantling ceased in West Germany. A euphoric mood soon spread throughout West Germany, after years of NS rule, war and destruction, which was reflected in free entrepreneurship and an increased willingness to work. As a result, the age of mass consumption began in West Germany, admittedly much later than in the USA. It was a time characterised by the broad distribution of permanent consumer goods among the population.[18]

AN IDEA FOR A NEW PRODUCT

At the beginning of the 1950s, most Germans dreamed of owning their own car – as well as household devices such as vacuum cleaners and refrigerators. But initially, this dream was not affordable for most people. Instead, the market for motorbikes and a completely new means of transport, the so-called motor scooter, boomed in the young federal republic. The latter was originally invented in the USA as early as 1915. The first German equivalent, the so-called Krupp scooter, was a licensed reproduction of the American model, and entered the market in 1919. However, the motor scooter became viable for the mass market only after World War II. In 1946 the Italian company Piaggio presented the Vespa. One year later came the Lambretta by Innocenti. In their construction, both models were oriented on the British Welbike, a light motor scooter from World War II, which was dropped from planes on war missions, together with paratroopers. From now on, with their open mount and their generously cladded frame, which provided protection against the weather, motor scooters conquered the roads. Vespa and Lambretta sprung up everywhere. German developers also recognised the potential of the scooter. Numerous German companies developed their own, such as Walba, Maico, Heinkel and Zündapp: the market was very lucrative.

In Stadelhofen, the managing director Edmund Hess had recognised this development at an early stage. He found a comrade in the young mechanical engineer Werner Abel. Abel joined PWO in June 1950. Hess was impressed by the skills of the young engineer, who first completed an apprenticeship as a machinist at the state railway's repair works in Offenburg during World War II and was then selected for a scholarship to study at the State Technical College in Konstanz. Therefore, only two weeks into his employment, Abel was placed in overall charge of the steel metal works and the construction of the field kitchens. By now the initial order for field kitchens from the French army had expired, but in summer 1950 both identified a new business field in the area of vehicle construction. After all, PWO had already gained some experience in this area, with the production of vehicle spare parts.

However, the company did not yet have its own product to sell. Abel found the solution to this problem in Untertürkheim. There, that same year, he met Gottlieb Gaßmann, who had led the production of airplane engines in World War I, and who had gained a name in the 1920s with the Württembergia-Rad, as a manufacturer of touring cycles and motorbikes. In 1949 Gaßmann had started making a motor scooter, the so-called Strolch, with meticulous craftsmanship. Abel wanted to see whether the construction of the motor scooter was suitable for industrial serial production in Stadelhofen.[19]

THE STROLCH AND PWO

Werner Abel was so impressed by the presentation of the Strolch that he bought the patent for the construction of the scooter from Gaßmann in 1953, on behalf of PWO. The concept was immediately refined technically and improved in Stadelhofen. Together with the head of technical operations, Walter Möschel, Abel made the scooter ready for serial production.

1955.

The two-storey Hall 55, which was built especially for the production of the Strolch in 1954/55, still bears the unofficial name “Rollerbau” (“Scooter Building”) to this day.

1953.

In 1953 PWO appeared at the International Bicycle and Motorbike Exhibition in Frankfurt and presented all versions of the Strolch. Edmund Hess (left) welcomes a famous visitor to the stand: Federal Transport Minister Hans-Christoph Seebohm (beside him). Walter Möschel (right) had previously developed the Strolch for serial production.


J A W

Thanks to its large wheels, the PWO motor scooters demonstrated stable driving characteristics even on difficult terrain – here, for example, during a motor scooter race.

1954.

PWO deliberately aimed to attract the attention of women, such as here in 1954: “Scooter rider Inge is as familiar with most technical details and with the filling station attendant as she is with her hairdresser. And that’s saying a lot. Inge has fallen in love with a Strolch, and rides it wonderfully”.

Yet despite all the euphoria, the production of the scooter presented the workforce with a large challenge: In Stadelhofen they had absolutely no experience in building two-wheeled vehicles, never mind in producing a modern motor scooter. Nevertheless, serial production began soon in a production plant built specifically for the purpose. The Strolch was manufactured in ten work stages in the two-storey Hall 55. In this manner, up to 200 scooters were made each week at peak times.

The Strolch was presented to the public at large shortly after the start of production in October 1953. At the 2nd International Bicycle and Motorbike Exhibition (IFMA) in Frankfurt am Main, PWO presented the new product on its own exhibition stand, and even welcomed the Federal Transport Minister, Hans-Christoph Seebohm. At the same time, an advertising campaign was set in motion in outlets that sold two-wheeled vehicles, while ads were placed in popular trade magazines. Foreign contacts were particularly helpful, for example, in the Netherlands, where PWO had always received many orders, ever since the production of air pumps in the 1920s and 1930s.

In the test report of the April 1954 issue of "Roller Revue", the driver praised in particular how safe it felt to ride the Strolch: "It would require great effort to cause a fall with this chassis," reported the test driver, who also tested its ability to ascend mountains: "After flawlessly driving up a 28 % gradient, the tester gave up, but not the Strolch, which was carrying two adults." At the end of the report the tester's effusive conclusion was that the Strolch construction was so advanced that "it will probably remain a trailblazer in scooter construction for many years to come".

While PWO sold the Strolch ex-works, due to the fact that the company had specialised to date only on the manufacture of products, and not on selling to the end customer, it relied on retailers and wholesalers. For example, the Strolch was sold via the representative Otto Pauli K.G. in Munich, or as "The Man's Size Motor-Scooter" via the London dealer Carr Bros. Garages Ltd.[20]

PWO'S OWN DEVELOPMENT: THE PROGRESS 200

The Stadelhofen company did remarkably well. The Strolch was continuously refined even further, improved technically, and tested. A special test facility was set up on the PWO factory grounds for stress tests of the framework. One test section, called a "railway track", simulated the poor post-war roads. Here the PWO drivers comprehensively tested the suspension of the scooters. They tested the final speed and durability of the Strolch at the nearby Hockenheim ring. The PWO workforce provided a factory team of five drivers and two supporters, who took part in numerous motorsport competitions, thus not only putting the Strolch through its paces, but also spreading its name around the world. In 1955 alone, the PWO team took part in six races, and overall, they won a total of 17 gold medals, four category wins and four team prizes. PWO even employed the experienced racer Hubert End, who represented the company at the 12-hour race at the Nürburgring and participated in ADAC winter races over distances of 1,500 km.

Less than two years after the market launch of the Strolch, the company's own development had advanced so far that PWO was able to present a successor model: the Progress 200. The new, now technically improved scooter had a rubber-mounted 200 cm³ Fichtel & Sachs engine, as well as a tank in the front and a double tubular steel frame for a better driving experience. When introducing the Progress 200, PWO relied on that which had already characterised the Strolch, namely the proven safety of the scooter: "Progress 200. Driving safely is the best way to drive." PWO occasionally also presented one with a sidecar. This long-distance model was suitable for family trips or for transporting luggage on vacation.

Three years after the market launch of the Strolch in Germany, the successor model Progress 200 also managed to cross the big pond. From its base in New York, the Berliner Motor Corporation distributed the German invention and advertised the scooter with the help of the New York fashion model Cindy Faulkner, who commuted to Manhattan daily on her Progress 200. The US press presented the scooter as "top design and typical German craftsmanship", and thus a symbol of the German economic miracle.[21]

THE END OF SCOOTER PRODUCTION

In its 150 cm³ version the Strolch cost 1,645 DM, and in the higher-performance 175 cm³ version 1,740 DM. This meant that it was around half as expensive as a VW 1200 Standard Beetle. The scooter was a best seller both at home and abroad: It generated a record turnover for PWO in 1954 of 4.5 million DM. One year later, the export share even doubled.

In Germany, sales and new registrations of motor scooters declined gradually after 1957. Whereas only just previously the Strolch or the Progress 200 had been regarded as the symbol of new prosperity, the scooter was now increasingly being replaced by the car. The car had one decisive competitive advantage over the scooter: a roof! In his memoirs, Werner Abel defined precisely this advantage as being responsible for the collapse in the scooter market.

In this situation the PWO management demonstrated the "right foresight", as the managing director Linnenkohl claimed some years later. While Werner Abel established initial contact with automobile manufacturers, thus laying the foundation for the present-day supplier business, management phased out the production of motor scooters between 1960 and 1963 and eventually sold the production plant to India: After producing around 14,000 motor scooters, that was it – a special era in the history of the Stadelhofen company came to an end. Now the Strolch and Progress 200 scooters have become much sought-after rarities around the world. Following elaborate repair work, three editions are now once again owned by PWO.[22]

The PWO motor scooters were put through their paces, for example on a railway track. The photo was taken for the magazine “Kraftrad”.

The new drawn and punched parts for the automobile industry included pedals, for example.

Not easily recognisable: the frame for a radiator trim.

PWO DISCOVERS THE AUTOMOBILE INDUSTRY

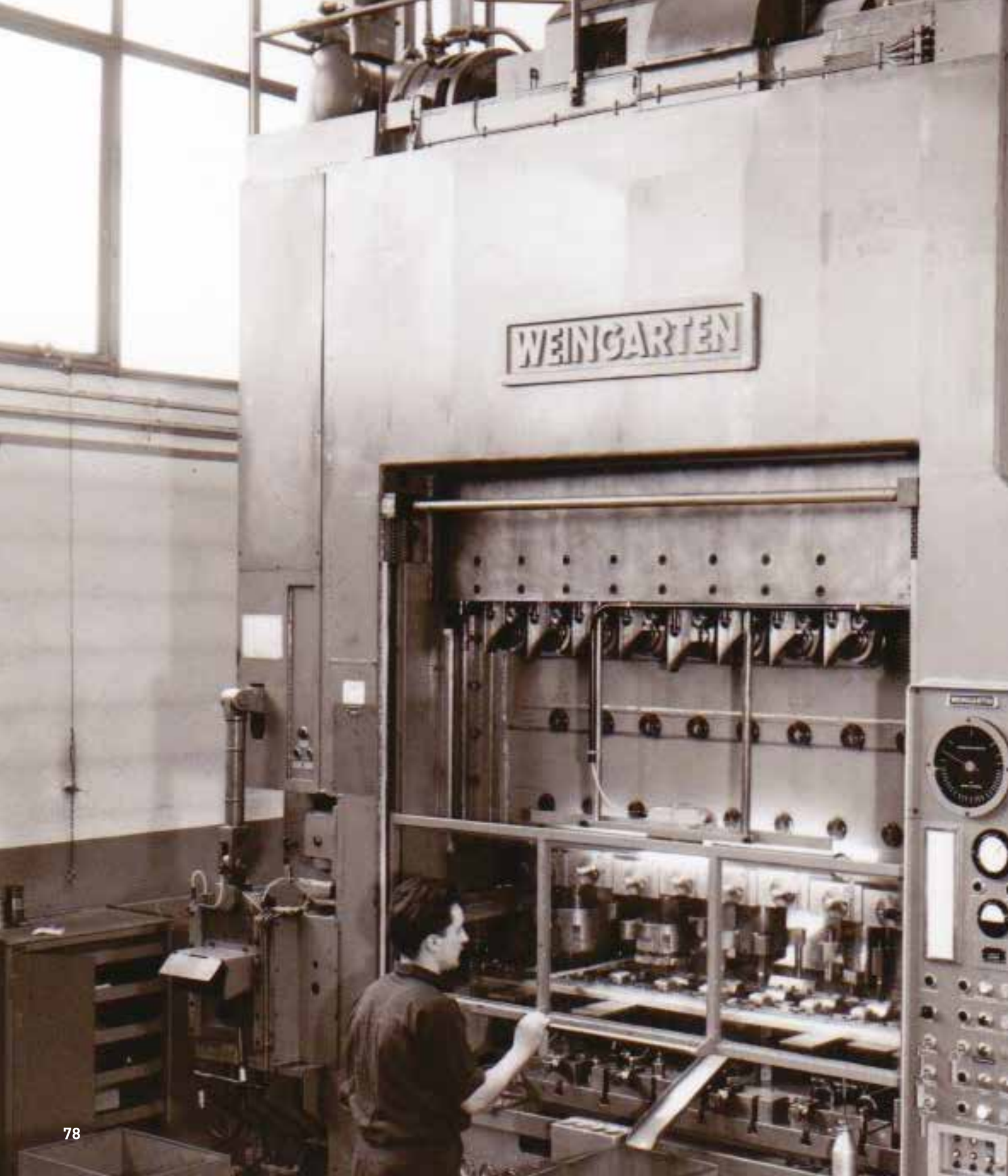
The growth in real earnings soon made it affordable for those with medium incomes to own their own car, which "in the 1950s became the keyword for social wellbeing, the bourgeois feeling of freedom, economic opportunities and social prestige". Between 1951 and 1961 the number of cars on the road rose more than seven-fold, from 700,000 to more than 5 million. The share of ordinary workers who became new car owners also increased – from 8.8 % in 1950 to 53 % in 1960. Accordingly, the automobile market was dominated by small cars, such as the brands Lloyd (Borgward), Isetta (BMW) and Goggomobil (Glas) – and of course the VW Beetle.

Since by 1957 more new cars had been registered than motorbikes, it made sense that the PWO management turned their attention increasingly to the automobile industry, and ultimately ceased scooter production. At first, PWO even briefly considered producing its own small car. But these ideas were soon abandoned. Instead, PWO managed to obtain attractive orders from the automobile industry for the production of supplier parts. Therefore, for the first time, PWO started the extensive production of ready-to-install sub-aggregates for companies in the automobile sector.

Indeed, the company had generally begun to expand its punched and drawn parts production. PWO was able to supply not only drawn parts as semi-finished products, but also as complete or pre-installed components, mostly surface-treated. The main customers, besides the automobile industry, included the manufacturers of electrical and household equipment. The decline in the scooter market was already offset in 1958 by a remarkable increase in the punched and drawn parts business, as well as in sheet metal construction: "Thanks to a transfer within the individual divisions of our production programme, overall turnover could be maintained at around the same level as the previous year". PWO's net profit this year was 168,795.43 DM.

Many supplier companies at the time, who were often bound to individual clients with more than half of annual turnover, ended up becoming strongly dependent as a result, giving automobile firms the ability to intervene directly in their pricing and programming. The management of PWO, in contrast, managed "to conclude long-term deals with almost all large concerns in the automobile and electronics industries, while avoiding any great or dangerous dependencies," as Karlheinz Linnenkohl summarised on the occasion of the company's 50th anniversary.

The commemorative publication for this anniversary bears the telling title "A diverse programme" and thus describes the situation in which PWO found itself. The company had a broad product portfolio, which was oriented to the needs and wishes of its customers. The end of scooter production represented only the end of one successful chapter in the company's history – more chapters would follow. The supplier sector really took off at this time. As well as products for the emerging automobile industry, such as complete pedal groups for Mercedes Benz, the firm in Stadelhofen also made supply parts for household equipment such as cover flaps for washing machine drums. In short: PWO had once again adapted to the changed needs of customers and to the latest technical developments, thus setting the course for the coming successful decades.[23]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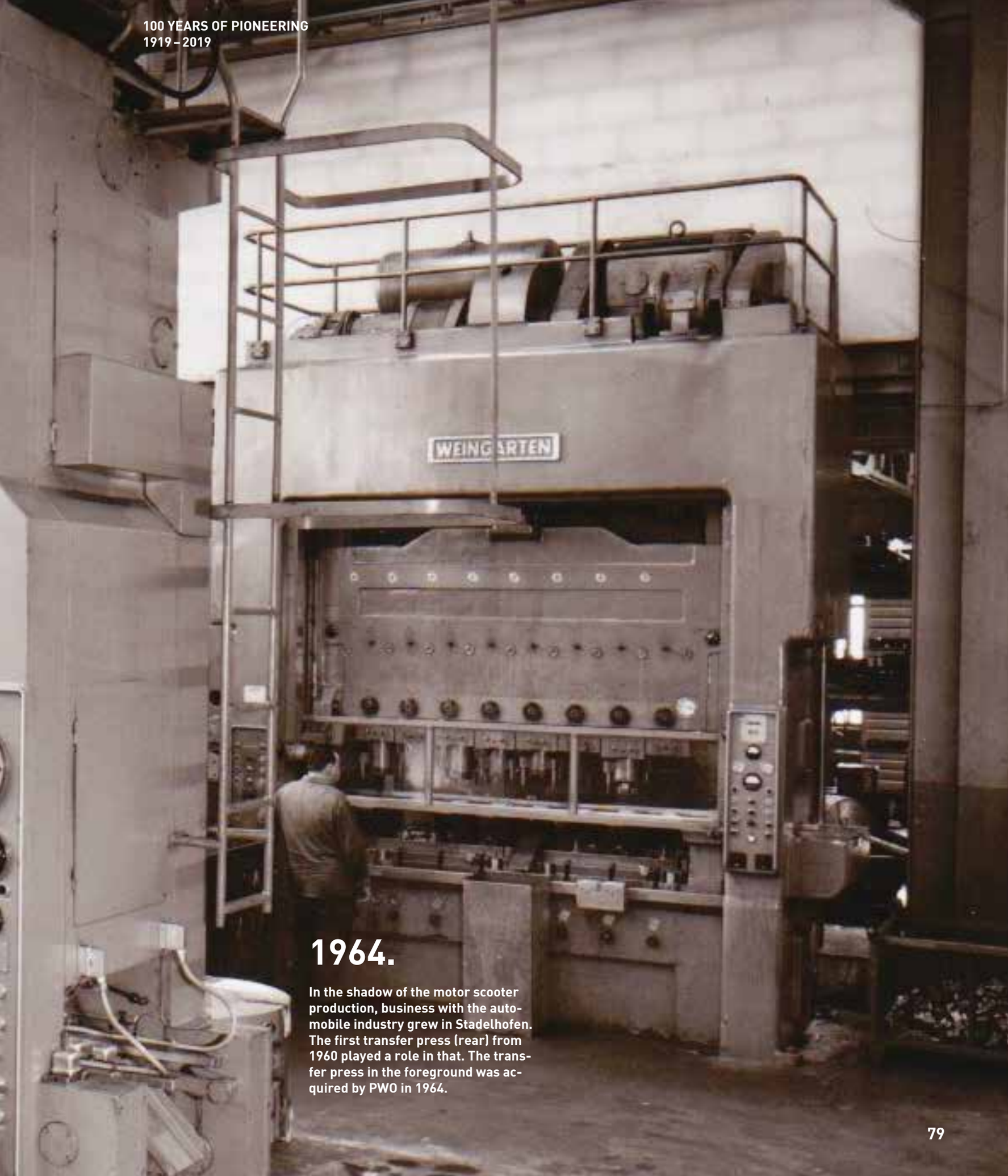


1964.

In the shadow of the motor scooter production, business with the automobile industry grew in Stadelhofen. The first transfer press (rear) from 1960 played a role in that. The transfer press in the foreground was acquired by PWO in 1964.

1969.

An FK-57/4 in use at PWO, on the occasion of the 50th anniversary of the company in 1969. With a volume of 170 litres, the field kitchen provided large capacity for a steaming hot goulash soup.

PWO as an armaments firm

One of PWO's unique key features is offering optimal solutions for the individual needs of customers. The Stadelhofen company already demonstrated this ability in 1948 with the FK-38 field kitchen, which was continuously refined in subsequent years. In the 1950s PWO reworked the undercarriage of the FK-38 for the Swedish army. It was then so stable that the field kitchen could even be pulled by track vehicles over heavy terrain.

A FIELD COOKER FOR MILITARY AND CIVILIAN AID ORGANISATIONS ALL AROUND THE GLOBE

The FK-38 was followed some years later by the FK-57/4, which was conceived for civilian aid agencies such as the Red Cross, the Red Crescent, and the Order of Malta. It was fitted with a 45-litre stewing pan made from chrome-nickel steel and two double-walled aluminum cooking kettles, each with a volume of 85 litres. Later, PWO would advertise this as "the light model". A reinforced model was developed for the Dutch military, based on this model, with a height-adjustable coupling loop and an air brake, FK-57/5. This was known as the "all-terrain" model. With an ever-broadening product range, PWO become one of the leading suppliers of field kitchens.

As the conflict between the NATO states in the west and the states of the Warsaw Pact in the east continued to intensify into the Cold War over the course of the 1950s and 1960s, a worldwide arms race began – and the soldiers had to be fed. The field kitchens by PWO were urgently needed. For this reason, armed forces were the primary buyers of the FK-57/5; first the NATO states Netherlands and Norway, then later Sweden, Saudi Arabia, Algeria, Singapore, Malaysia and also the German army.

For PWO, the field kitchen production and development posed something of a challenge, but at the same time, the product opened up a market for niche and special products with relatively little competition. Furthermore, PWO relied on the single-axis system, rather than on truck superstructures or two-axle trailers, like its rivals. The comparatively light trailers could therefore be used much more flexibly, since they could be "installed on all-terrain undercarriages and, fitted with off-raid tyres, attached to a jeep, thus enabling them to follow the motorised and armoured troops on almost all terrain". The FK-57 models were followed in 1975 by the "self-initiated and self-financed" FK-75. The new model was 300 kg lighter than the FK-57/5, built lower, and more expediently designed. It had a stable, robust and all-terrain chassis with a torsion bar spring axle and wheel shock absorbers. These gave the FK-75 "futuristic features", according to PWO's advertising slogan. Therefore, in sales brochures the company called the kitchen "the future model".

"Even the best field kitchen is nothing but a dead object without the people who operate it", stated PWO in an information leaflet. The company therefore also offered the requisite instruction in how to operate the field kitchens by conducting training on-site or on the customers' premises. Former employees recall in particular their cooperation with the Dutch army – an especially demanding customer. An important client of PWO since 1957, the Dutch tested the newly developed field kitchen models extensively for their driving and cooking capabilities. For example, a PWO field kitchen model was tested comprehensively in parallel with a competing product from a rival over the course of six months. Only then did PWO receive the final order.

In 1978, thirty years after the start of field kitchen production, PWO advertised with the slogan "Quality derived from knowledge and experience". At this time, six different models were on offer in the sales brochure: "The small model" (FK-38/1), "The light model" (FK-57/4), "The all-terrain model" (FK-57/5), "The future model" (FK-75), "The versatile model" (FK-83) and finally the field kitchen trailer "The large model".

The field kitchen was exported all over the world, here for example to Iran, more precisely Khorramshar on the Persian Gulf.


13

1975.

The International Red Cross and Red Crescent Movement was an important buyer of the PWO field kitchen. After the earthquake in eastern Turkey on 6 September 1975, for example, the FK 57/4 was used in the disaster operation.

1980.

The 86th German Catholic Conference was held in Berlin from 4 to 8 June 1980. Stew was provided from 60 PWO field kitchens, run by the Red Cross. However, as the kitchens were too large for distributing meals, these were served from separate boilers, which were driven to the venue using forklifts.

1983.

In addition to the production of field kitchens, PWO also provided instruction on how to use the products – which could take place directly on site. Here, for example, in October 1983 with the Indonesian defence ministry in Magelang on the island of Java.

PWO did not lack confidence: "We have not been building field kitchens for 30 years in order to offer you prototypes today! We operate serial production for many countries in large quantities." And these quantities were indeed enormous: In 1980 more than 10,000 units of the "now famous FK-57/5" were produced, theoretically enabling "two to three million people to be fed with a warm meal simultaneously". Another indication of the market success of the field kitchens is the fact that they made up a third of overall production by PWO that year.

In the civilian sector, PWO field kitchens were used at numerous large events. At the 86th Catholic Convention in Berlin in 1980, for example, the Red Cross used 60 PWO field kitchens from all over the country. Many tens of thousands of portions of stew were prepared each day. Since the burners of the field kitchens were fuelled with diesel, a tanker had to refill all of the cookers every evening. After years of success, there did not seem to be any end to the production in sight. In 1978 the development of the FK-83 began, another model that was developed on the orders of the German army and adapted to the changed requirements of the customer. With this model, PWO returned "to the lighter, handier (...) old goulash cannon in a decent form".

The kitchen containers and mobile kitchens were "portable and yet stationary", and quite a bit larger than previous models. The containers could be transported on dual-axle trailers or by rail, or flown by airplane or helicopter directly to the field of deployment. They had a fully equipped kitchen with their own electricity supply and facilities for cooking, frying and deep-frying.[24]

THE PRODUCTION OF MUNITIONS PACKAGING: AMMUNITION BOXES, TRANSPORT AND STORAGE CONTAINERS

During World War II, PWO had made munitions packaging for the Wehrmacht. Immediately after the war, the company produced similar packaging for the French occupying forces. For the Ordnance Procurement Centre (OPC) in Mannheim, the procurement centre for ammunition of the American occupying forces, PWO later made large quantities of Type M2A1 and M19/A1 ammunition boxes for infantry ammunition.

In hindsight, 5 May 1955 was a key date for PWO's defence technology: ten years after the end of the war, the German Bundeswehr was founded. The event was preceded by severe domestic political confrontations between the governing CDU under Federal Chancellor Konrad Adenauer and the SPD. It concerned the question as to whether it was morally justified for Germany ever to have armed forces again in the aftermath of National Socialism and World War II. For PWO, the decision in favour of "rearmament" meant that the Bundeswehr would become a customer for munitions packaging. Other NATO states were to follow.

In the next few decades PWO produced – alongside field kitchens – munitions packaging for numerous European armies. As with the field kitchens, the company's own share in development was high in this segment. On the orders of the Federal Office for Defence Technology and Procurement, in 1970 PWO developed a container

At the presentation of the new field kitchen generation in April 1983, PWO received a visit from the Army Office in Cologne. As well as Werner Abel, the PWO co-developers Kiefer and Leibrecht (right) guided the representatives of the Army Office through the production facilities.

PWO are received visits from abroad. From 8 April to 2 May 1980, a delegation from the Algerian defence ministry visited Stadelhofen and were shown how the field kitchens were maintained by Rolf Gramm, with Elke Klecker as interpreter.

for 20-mm ammunition, and a container for 25-mm ammunition for the Dutch army. Moreover, PWO had been developing various propellant tanks for the Bundeswehr and the Dutch army since the beginning of the 1970s.

In addition, PWO made transport and storage containers for various different weapon systems for the Bundeswehr, such as explosives containers for sidewinder rockets, heat-seeking air-to-air guided missiles for deployment by fighter planes and helicopters, as well as containers for the Mk 82 and Mk 83, unguided NATO air bombs. PWO also made transport and storage containers for the Bundeswehr for the anti-tank system HOT and the anti-aircraft missile system ROLAND. Both systems were also used by the French army. In 1981 the company reported: "In addition we have made numerous other types of ammunition packing containers for all NATO states, and have the requisite type-specific tools." In the 1980s, PWO advertised its packaging as "second ammunition" and stressed: "Ammunition can only be as effective as the packaging that preserves it!"

Over the years, defence technology became an important mainstay for PWO. In the annual reports, ammunition boxes were listed under products for the first time in 1975. In 1978 the company stated: "In the area of sheet metal construction and defence technology, the expected disproportionate growth in turnover was achieved thanks to the receipt of several long-term orders for field kitchens and specialist packaging. These orders also led to a strong rise in the export share of our turnover, from 12.8 % in 1977 to 30.6 % this year." In 1985, munitions packaging made up 17.2 % of total production.

In contrast to the field kitchens, PWO initially exported the munitions packaging only within the NATO region, the export share was 22.3 %. Later, PWO intensified its acquisition of international customers and no longer restricted itself to NATO member states. In 1986, for example, PWO inserted an ad in the Chinese edition of the magazine International Defense Review, advertising not only field kitchens, but also munitions packaging containers.[25]

THE TORNADO MUNITIONS DISPENSER FOR THE BUNDESWEHR

Over time, the equipment-building department gained a lot of experience in the construction of munitions packaging. Another order came in 1985. The previous year, the German Defence Ministry had advocated acquiring the multi-purpose weapon MW-1 for its Tornado airplanes. The MW-1 is a stainless-steel container for cluster ammunition, i. e. for various different bomblets and mines.

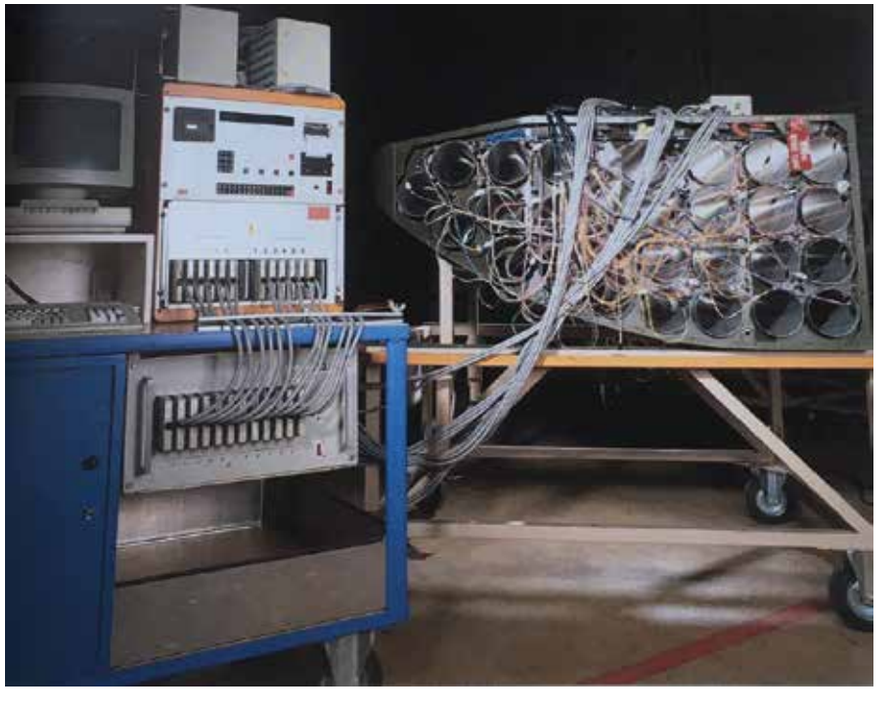
The responsibility for processing the order lay with Unterhachinger Raketentechnik GmbH, which included PWO among its suppliers. The participating firms came together on a monthly basis and coordinated the special order. The order to manufacture 2,554 MW-1 containers was so significant for PWO that subsequently a separate assembly line was procured to drill and rivet the containers. The total sum of investments ran to 35 million DM.

"After the detailed training of the company's own personnel", PWO took on important production stages of the stainless-steel containers. First the surface of the flow-formed aluminum dispenser pipes was treated in the company's own anodising plant. In parallel, the outer metal coating of the MW-1 container was riveted fully automatically, and composite parts were added using sandwich construction. Then 28 treated aluminum pipes were glued to each of the containers with a special epoxy resin adhesive and hardened in an oven. The last production stage was the electrical installation of the container, so that its munition could be dispersed at the push of a button during later combat missions.

Installed on the fighter plane, the multi-purpose weapon MW-1 consisted of four PWO container elements, with a total of 112 dispenser pipes and, together with the munition, it weighed up to 4.5 metric tons. Depending on the load and the mission, a "mine and munitions carpet" with a width of 300 to 500 metres and a length of 180 to 2,500 metres could be achieved with the MW-1 at speeds of 1,000 km/h from a height of 60 metres. Due to its impact, the MW-1 was also known within NATO as the "small man's nuclear weapon". Since "all kinds of mines" were included on the Federal Justice Office's military weapons list, PWO was obliged to maintain a military weapons log. This provided seamless evidence of the location of the weapon from its production to any military deployment.

At first, the acceptance of the order paid off. In 1987, two years after the start of production, annual overall turnover in Stadelhofen exceeded the 100 million DM mark, whereas at the beginning of the decade it had still been only 67 million DM.[26] However, the end of the Cold War some years later would lead to significant changes.

In 1986 Werner Abel and Brigadier General van den Bosch from the Dutch defence ministry signed a contract for the manufacture of the latest field kitchen, FK 900 NL, which was developed especially for the Netherlands.



PWO assembled not only the metal parts of the MW-1 container. The 28 individual dispenser pipes were also wired using cable harnesses for the ignition device. This allowed the pilot to drop the entire load of the fighter plane with a simple push of a button.

Karlheinz Linnenkohl led PWO from 1966 to 1986. To his left the former sales manager, Hermann Tauber.

7

The search for Plan B and success in the automotive area

“Should PWO ever be buried for some reason and an excavation is carried out in two hundred, five hundred or a thousand years, then one would discover: PWO was a paper factory and not a metal-processing operation,” Werner Abel once joked about the production at PWO in the 1980s. All plans, work instructions and documentation were still being carried out literally with pen and paper. The precision of the processing methods in Stadelhofen contrasted with the less-than precise piles of paper. “What we produce in paper is not fitting for us,” complained Abel.

PWO ENTERS THE COMPUTER AGE

In principle, the computer age had already reached PWO at the beginning of the 1970s. At the time, the payroll accounting department used a punch card system. It was connected to a kind of printer, which recorded the entries in the punched cards. Initially, however, PWO could not evaluate the entries. The punched cards were sent to IBM in Karlsruhe. Then, in 1981, PWO started using its own IBM computer, a System/34. This computer was now able to record employees' wages electronically on site with its 256-kilobyte working memory.

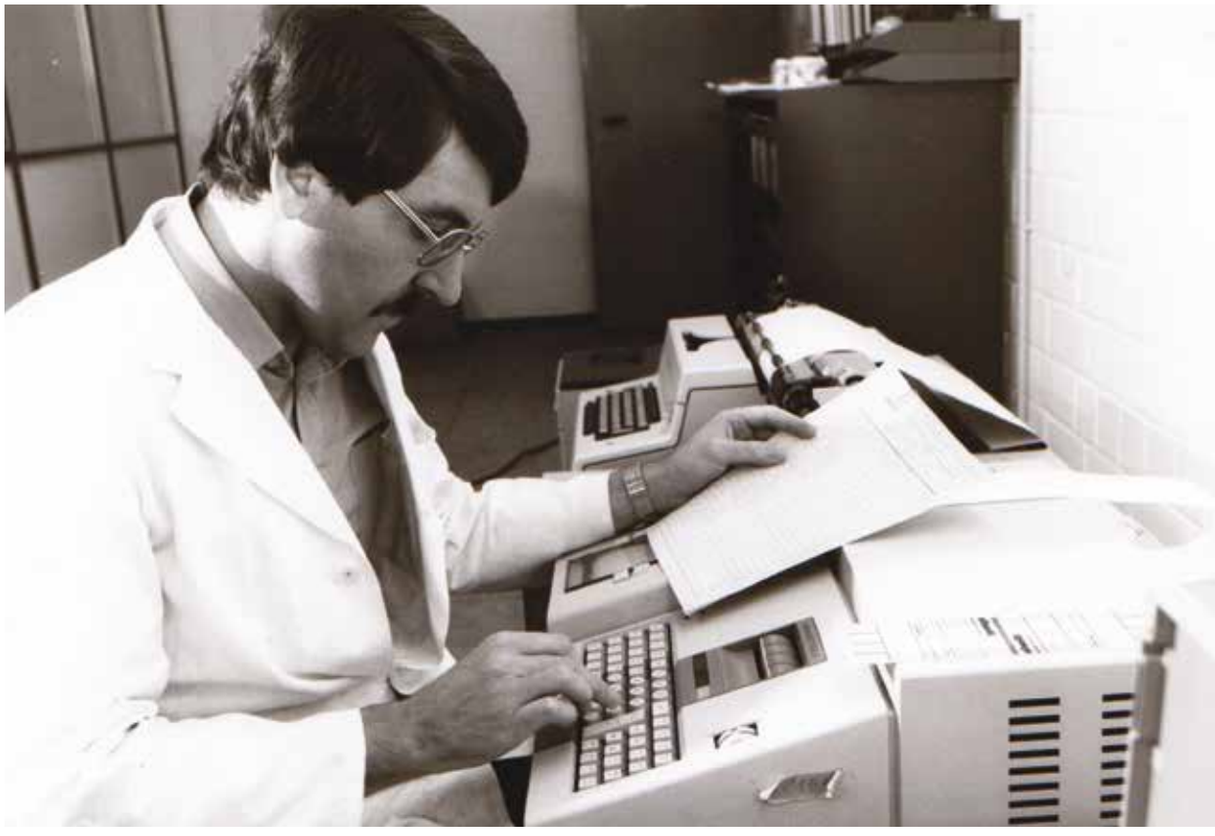
In 1982, in the brochure "A company introduces itself", PWO presented the advances in the computerisation of its production processes: the numerically controlled jig boring machine in the cutting tools production, which was activated by the manual entry of control commands, four numerically controlled eroding machines and a measuring machine with a digital display. Six years later, PWO used a robot for the fully automated welding of aluminum, one of the first companies in Europe to do so. Now, while one component was being welded, the next could already be prepared at a second station – a huge increase in efficiency, due to the faster work rate. The welding robot was used especially in the production of the MW-1. The new working method meant that precision was improved even further. PWO could now achieve "tolerances in the micrometre dimension".

The conversion to a modern IT system in the production department ensured that delivery deadlines could be met more precisely, since order volumes, material inventories, production capacities, etc. were now recorded and analysed.

In the summer of 1989 the next IT evolution stage came to Stadelhofen: networked computer technology. Gerhard Gmeiner, member of the board since 1986 and responsible for sales and materials management, set up an IT committee. Gmeiner argued: "IT has increased considerably in importance in recent years, also at PWO. Almost all areas of the company are affected. The interlinking of the different IT applications mean that changes in individual areas have an impact on other departments that are not directly affected by the application, and these must be coordinated."

As well as regular meetings, the committee also organised computer training for employees, such as the event "Text processing using a PC" for administrative staff. Erich Sutterer, then as now responsible for the installation of PCs, networks and special applications, gave an "Introduction into dealing with computer-aided quality". This concerned production control. Both shop floor managers and technical staff took part.

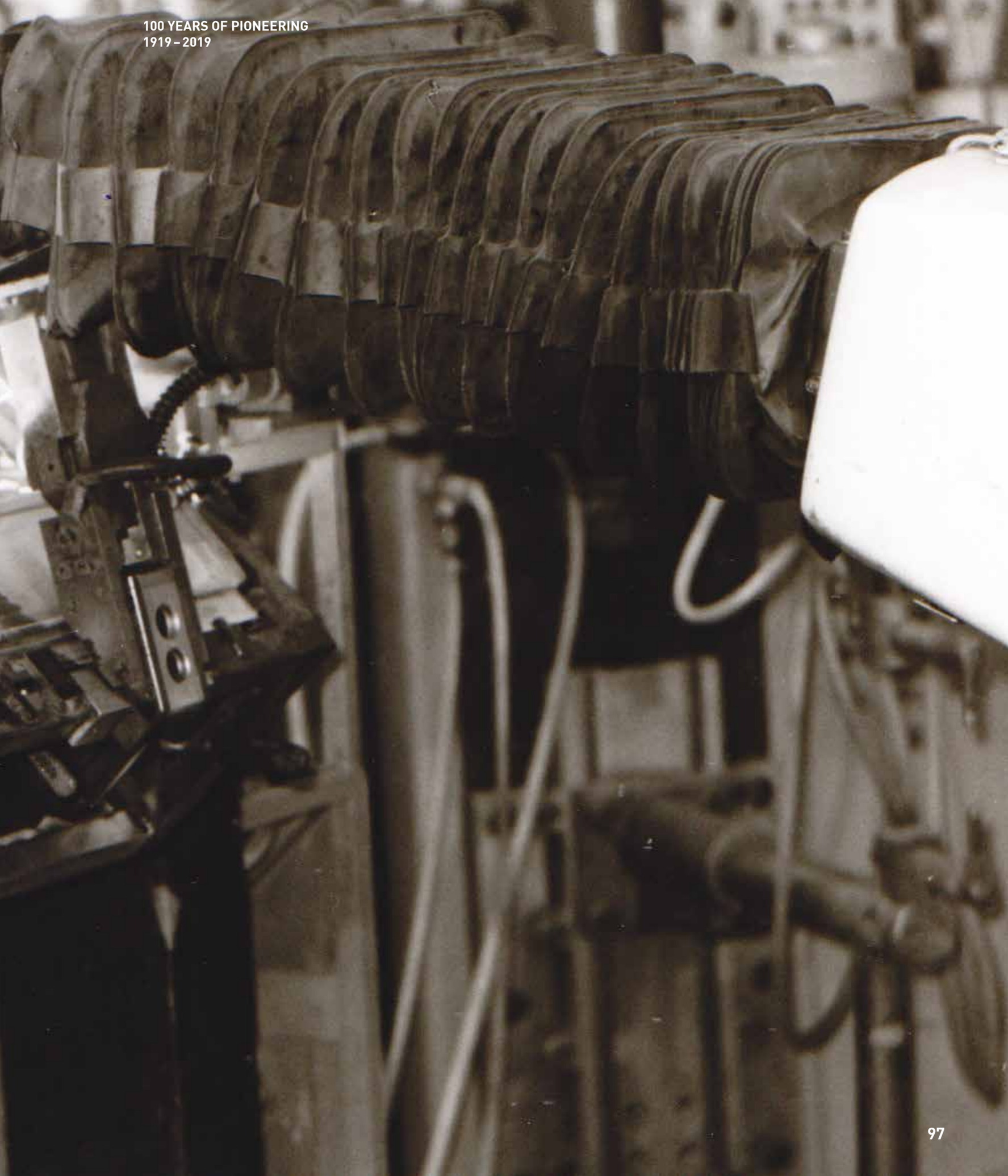
The same year, fibre optic cable was laid for the purpose of internal communication, connecting the new central computer AS/400 with the individual office computers. Management announced proudly that the entire planning and control of production could now be processed via the high-performance central computer, "starting with sales and shipping data, through materials purchasing and requirement planning to capacity utilisation". In addition, the AS/400, which had come onto the market only the previous year, had a processing power that "will surely be sufficient for the next decade". Compared with the first IBM computer from 1981, the capacity of the new 16-megabyte working memory was in fact 64 times higher. Thus, PWO adopted the



First steps towards a modern IT. An Olivetti P652 can be seen, which was connected to a plotter via an interface. The age of analogue product development thus came to an end.

View of the control station of the production control. IT operating data were recorded on the wall.

An automatic welding robot at work. Such robots were used beginning in the early 1980s.



latest technology at a very early stage, although of course these capacities seem very low from today's perspective.

Eventually, computer-aided design (CAD) arrived. The CAD centre had eight construction spaces. Here the so-called phase plans were first created. They also contained, alongside the component parts, information about the heat and surface treatment, and about the work necessary to shape the planned components. At the CAD workplace, staff also selected the required tools for production. Since the central computer had two interfaces with a tape drive, the operations entered could be stored on magnetic tape and passed on "per tape instead of drawing". The next work phase was carried out at the computer-aided manufacturing (CAM) workplace, with a plotter. Here, for example, the optimal cutting speed or the required surface quality were defined. Then the selected programme data were transmitted via the new fibre optic cable directly to the production machines.

The "stacker management system" followed in 1993, which electronically recognised and controlled all transports that were necessary in the daily workflow across the entire factory. From now on, there were hardly any more empty runs.[27]

BUILDING PANELS FROM A SINGLE SOURCE: COFFERED CEILINGS AND CONVECTOR HEATER CLADDING

From 1968 PWO supplemented the product portfolio and produced coffered ceilings and convector heater cladding for the construction industry. The building components were included in the company area of sheet metal construction, which had previously been dominated by the production of field kitchens and munitions packaging and was therefore heavily dependent on government clients. Management wanted "greater independence" from the public sector and wanted to "increase profitability after the amortisation of the start-up costs". These hopes were realised: As early as 1969, the annual report shows that the production of building components "contributed considerably to the increase in turnover".

Interestingly, one of the first customers was nevertheless a public sector client: the European Organisation for Nuclear Research in Geneva – CERN. They were looking for a supplier for the cladding of magnets in the Intersection Storage Rings (ISR), a particle accelerator. CERN became aware of the new products from Stadelhofen at the Hannover Messe. This represented a very prestigious order for PWO. The particle accelerator became operational in 1971.

More projects were to follow, for example, coffered ceilings in the Sparkasse Oberkirch, the College of Education in Esslingen or the Frankfurt Bank für Gemeinwirtschaft. At this time, around one in ten orders for construction elements came from abroad, for example, the parapet cladding for the Koninklijke Bibliotheek in The Hague in 1983.

For one of the biggest orders in the area of cladding, PWO reached for the sky. In Frankfurt, PWO was also involved in the manufacture of modern surface cooling systems for the towers of the Deutsche Bank. These systems allowed the temperature in

The first NC-controlled machines are used in production. Here is a device from the company Wöhrle from Steinenbronn near Böblingen.

Screen print of the start page of the first PWO website around 1999.

When planning ceiling cladding, PWO oriented itself completely on the wishes and needs of the customers. Here, for example, for a supermarket.

The convector heater cladding at VDO Automotive in Schwalbach was given clear edges and form.

the offices to be regulated better than the air cooling system that was more usual at the time. It was installed in both skyscrapers. Work was completed in 1984, and the ceremonial opening took place in February 1985.

The coffered ceilings and cladding elements were produced in Hall 70. They were then coated in Hall 72, which had the largest electrostatic coating system in the area at that time. Numerous production steps and processes were necessary before the finished products were ready for delivery. One challenge was installation, where PWO had little experience. Therefore, this was done by a subcontractor. Problems were also caused by the later need for environmentally-friendly coating, for which reason production had to be halted from time to time. In terms of production, there were differences in the shading of the construction elements, which became visible depending on the incidence of light – a problem that could be solved often only by the complete, and expensive, replacement of the ceiling cladding.

Over time it emerged that the business model was not profitable in the long term. This was also due to the increasing competition in a fiercely contested market. Although a "modern special plant for the rational manufacture of ceiling elements" was procured in 1984, which in the following year led to a brief increase in turnover from 2.4 to 3.2 million DM, cutthroat competition continued to increase.

In 1986, management made a decision: Since cost-covering prices could no longer be achieved due to competition in large projects, "we have decided to remove metal ceilings and construction cladding from our programme by the end of 1986". The manufacturing plants would be sold, and the freed workforce would be accommodated in other business areas. After less than twenty years, a chapter in the history of the company came to a close.[28]

THE SUPPLIER SECTOR BOOMS: PWO AND THE AUTOMOTIVE INDUSTRY

In parallel with the products for the "public sector clients" in defence technology and cladding, the automotive sector became a new focus for PWO in the 1960s and 1970s. The management in Stadelhofen opted for a partner that has accompanied them to this day: the automobile industry.

As early as the beginning of the 1960s, PWO made brake and clutch systems, spark coil casing and parts for gears, shock absorbers and alternators. In addition, fuel tanks, oil sumps and filter parts were also produced. In subsequent years, PWO equipped the existing operational facilities, such as the punching and drawing shop and the presses, with many new machines. These included an automated arc welder and a fully automatic portal welder. Furthermore, the main coating shop was fitted with two conveyor ovens and a water spray booth. However, the initial post-war boom eased in 1966 and 1967. The consequences for PWO: "Order cancellations and cuts in supplier parts for the automobile industry have caused annual turnover to drop by 11.9 % compared to the previous year, and a decline in the total workforce of c. 7 % by means of natural departures, which have not been replaced."

But this temporary crisis had already been overcome by 1969. Large-scale serial production of punched and drawn parts for the automobile and electrical equipment industries was expanded further. This company segment increased turnover by 51 % compared to the previous year. PWO developed to become a reliable partner for the automobile industry that could deliver cheaply, punctually and at a high quality.

Due to the oil crisis in 1973, however, the economy soon weakened. The automobile industry, and thus also PWO as a supplier, were particularly affected: turnover declined. In 1975 the economic development remained negative in West Germany, but in the last quarter of the year, production in the automobile industry increased significantly, and the economic situation improved. In 1976 the results for PWO were once again positive: "The greatly increased capacity utilisation of our punching and drawing operations in the last quarter of 1975, which was due to the increased production of supplier parts, was maintained throughout the whole 1976 financial year, and led to a turnover increase in this production sector of more than 50 %. This meant that the annual turnover of the company rose by a total of 14.3 %, whereby necessary price increases contributed only with an average 3 %." This positive trend also continued in the next few years.

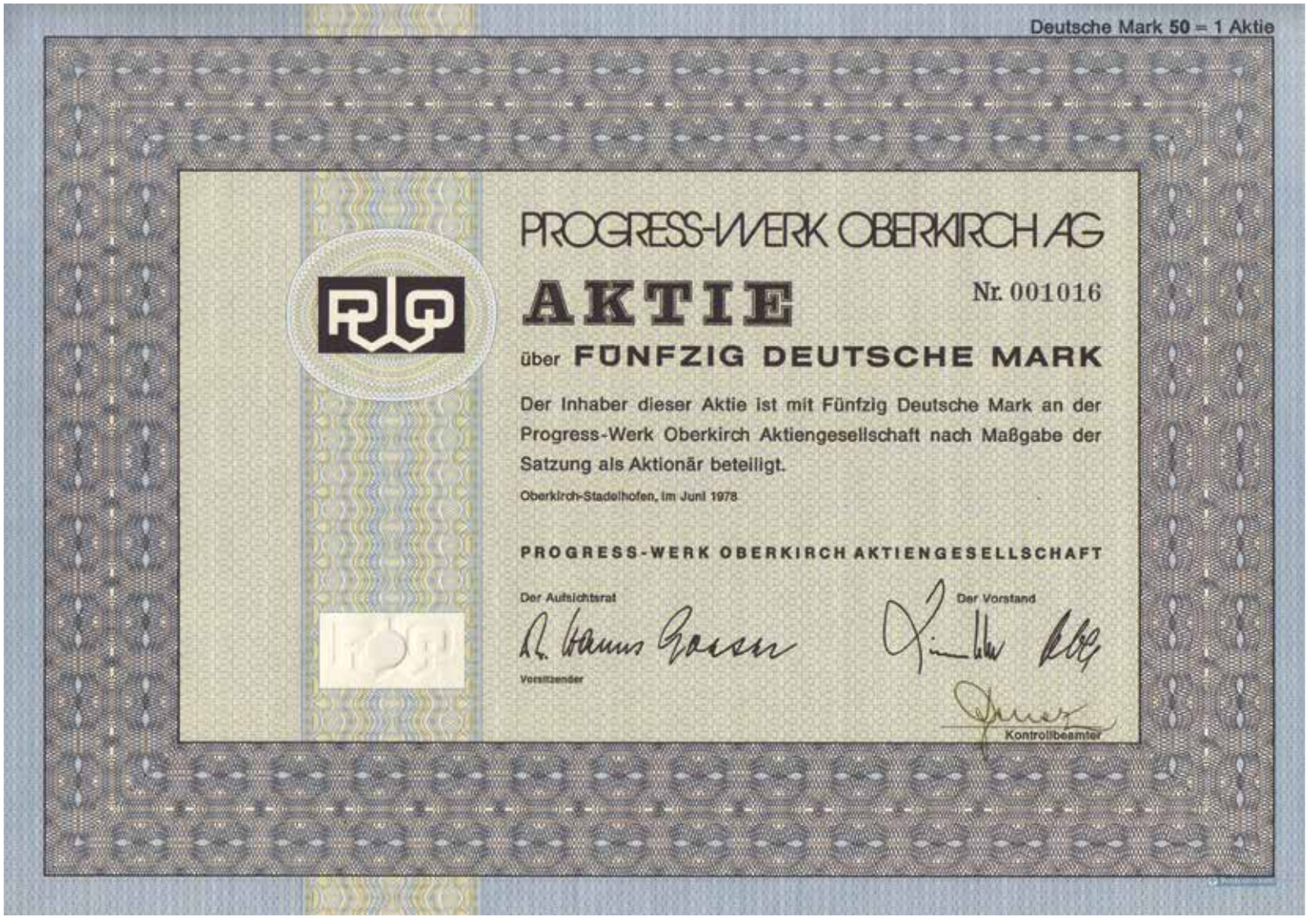
The high demand from the automobile industry and on machine and apparatus construction was met by PWO thanks to continuous rationalisation, quality improvement and the use of new machines and plants. PWO built more production halls and warehouses, for example in 1976 a 3,000 m² space for arc and resistance welding plants.[29]

THE STOCK EXCHANGE FLOTATION IN 1978

1978 brought a significant change for PWO. For the first time, shares in the company were traded publicly on the stock exchange. Over the decades, the shares of Joseph Anton Frisch had been divided more and more among his family through inheritance. When financing for further expansion was required in the 1970s, PWO considered whether and how to increase capital.

Ultimately, at the AGM in 1977, a capital increase of 1.5 million DM, from 4 million DM to 5.5 million DM, was decided. Due to the complex shareholder structure and the different interests involved, the capital required for an expansion could not be produced solely by the existing shareholders. The time was ripe. The balance sheet total increased in 1977 compared to the previous year by 11.1 % to 27.7 million DM. Net profit was 485,468.81 DM. Employee numbers increased by 8.5 % to 722, and the order books were well filled.

Analysts and the business press were generally positive about PWO's IPO in spring 1978. The Handelsblatt reported on 8 June 1978 that, if dividend distribution remained the same, a dividend yield of 7.81 % could be expected. The June edition of "Bank und Wirtschaft" calculated 7.80 % , and argued that this was higher than the cost of capital rate of 6.15 %.



1978.

Share for 50 Deutschmark from 1978.

In 1978 a total of 55,000 shares were offered, which could be subscribed in May and June. However, not all PWO shares were to be traded on the stock exchange, only 50 %. The rest remained in the ownership of the Frisch family; however, they sold them bit by bit. Despite the IPO being in June, the shares were already entitled to dividend from 1 January, so that the entire dividend for 1978 was paid out. All of these factors meant that the shares were very popular and were already oversubscribed one week before the end of the subscription deadline.

The positive business developments also continued in the year of the IPO. The balance sheet total increased by 10 % and turnover revenue even rose by 18.8 %. The dividends remained unchanged, so that new shareholders already received 6 DM per share in the first year. Many employees were also able to profit from this. The company management and the works council had agreed that employees should have a pre-purchase right to 25 shares each. Some of the employees at the time report that they still hold their shares today, and meet regularly at the AGMs in Offenburg. They are happy with their purchase, since the share has increased in value over decades.[30]

SOCIAL COMMITMENT FOR THE REGION

EXCURSUS

PWO is very aware of its social, economic and ecological responsibility and this sense of responsibility also shapes the company's actions. This includes its commitment both to employees and their families, and to Oberkirch and the entire region. In addition, PWO encourages the social involvement of its staff – as it has already done for many decades.

One important component of the social engagement for employees and their families was the benevolent fund, which helped them in difficult circumstances over a number of decades. This included financial help in cases of illness or accident, but also an increase in the pensions of former PWO workers. In particular in the post-war period, this type of support was very important since the state social security systems could provide only very basic services. Donations from PWO provided the income of the fund; these, however, were capped due to tax-related provisions. The benevolent fund was dissolved on 31 December 1998. Since then, payments are made directly by PWO, which has the advantage of greater legal force for employees and their families.

As a company, PWO has also long been involved in the social area through donations and contracts to counselling services. PWO donates regularly to charity projects throughout the entire region and supports, for example, the children's hospice in Ortenau. The company organises raffles for the benefit of various different social organisations at annual family or fitness days. Furthermore, PWO supports SV Stadelhofen and sponsors the jerseys of the football team. The gift-giving events for employees' children, which established by PWO in 1950, was also very popular in Stadelhofen. At the time, the presents mostly consisted of clothing, which was scarce and therefore coveted in the post-war period. The tradition is continued to this day, albeit with different types of gifts.

Another focus is the promotion of the social engagement of employees. At the beginning of the 1990s, for example, staff collected material donations for those fleeing the war in Bosnia and brought them by truck to Croatia. PWO supported them by providing storage space and by calling for donations in the employee magazine. In recent years, the social engagement of trainees in particular has increased greatly. PWO trainees in all trainee years support various projects in the region, including traffic education for nursery school children, support for the organisation of a summer party in a nursing home, or excursions with senior citizens to the countryside – including a visit to the café.

One social contribution by PWO that should not be underestimated is the trade tax payment to the town of Oberkirch. In contrast to many large concerns, PWO accepts this responsibility, and thus contributes to the implementation of local projects. This aspect was even more important prior to the incorporation of Stadelhofen into Oberkirch in 1974. The tax payments by PWO allowed the community of Stadelhofen to connect with the large sewage treatment plant Renchen, build a new consecration hall, and finance a sports club.[31]

1990s.

Since the 1990s, PWO has concentrated on the automotive area and has become a global player in this sector. In this context, crossbeams – here in the coating shop – were an important product and were developed in cooperation with an American partner.

Decision in favour of the automobile industry

Celebrations at the Brandenburg Gate! People are standing on the Berlin Wall with ladders, hammers and chisels, climbing over the ramparts, hugging each other with joy. It is 9 November 1989, German Unification is once again possible. Almost one year later, on 3 October 1990, Germany – divided since World War II – is constitutionally reunited.

THE END OF THE COLD WAR AND THE SHEET METAL CRISIS

As the Cold War drew to a close, PWO continued to work as before, despite the political excitement. The Bundeswehr order for the production of MW-1 dispersion containers had run since 1985. There was an order from Libya for 300 field kitchens in 1987; this was fulfilled by 1989. The last 20 field kitchens were delivered in November. Another large order came from the Netherlands. In 1989, the royal armed forces ordered 570 field kitchens from PWO.

Business was flourishing: turnover in the area of sheet metal and equipment construction rose in 1989 to 65.7 million DM. Employment figures remained stable at 840 workers. PWO invested 1.5 million DM in product development that year. The company management observed the results with pride: "On behalf of our customers we have developed various special containers. Thanks to the development and refinement of key components of our field kitchens (...) and an increase in efficiency, we have also been able to consolidate our market position here, and design our kitchen programme attractively and individually for the future."

With the end of the "East-West divide", the global political situation also changed. And just a short time later, the consequences were also felt by PWO. With the fall of the Iron Curtain, the danger of the previously feared Soviet intervention disappeared, and soon there was even talk of some Warsaw Pact countries such as Poland or the Czech Republic possibly joining NATO. Diminishing threats from the east led to lower requirements for new armaments. In addition, the convergence of Europe into an economic and currency union intensified international competition for the last available armaments contracts. Due to high German wage costs and the labour-intensive production methods, this competition was becoming increasingly less profitable for PWO.

Karl M. Schmidhuber, board member of PWO since May 1993, summarised the new challenge as follows: It was no longer important "whether it was possible to work 5 or 10 % faster at a drawing press by manually inserting and removing a work piece". What was now important was that "the same activity at the same speed was now on offer for less than a quarter of our wage costs – for example in the Czech Republic". It was clear to him that jobs can be saved in Stadelhofen only with "innovative production processes and flexible workflows". At the same time, orders from the public sector now collapsed. While PWO was still able to process the order for the Dutch army, the Defence Ministry in Bonn cancelled the MW-1 programme practically overnight in 1993, although it was actually supposed to run until at least 1995. Instead of the 2,554 containers ordered, only around 850 units were purchased. PWO lost customers for other defence products at the beginning of the 1990s. PWO was hit by a crisis.

Management had to react. At the works meeting on 13 May 1993, management announced the introduction of shutdowns and short-time work, as well as savings in the voluntary contributions by the company. The Christmas bonus was cut to 60 %, wage increases above the standard rate were ruled out, and the travel allowance was axed.

One of the last field kitchen models being tested. For better stability, the field kitchen could be removed from the trailer and placed on the ground.

The mobile rapid response kitchen (Ekü 2) was the result of a cooperation with Doll Fahrzeugbau GmbH.

A tour of the rapid response kitchen is worthwhile: It had a gas cooker, various cupboards with generous storage space in order to safely transport up to six gas canisters, a sink with a freshwater tank that held 200 litres, as well as electric power units, a gas boiler and a large refrigeration system. Behind the driver's cab was a group of cooking pots with steam extraction hoods, consisting of two pressure cookers with drain taps, each of which held 150 litres, as well as a frying facility with an oven.

At the same time, a massive reduction in staff was predicted for winter 1993 – 94, despite attempts to accommodate production workers in other business areas. The number of employees did indeed decline from 889 in 1991 to 674 in 1994. The annual reports for subsequent years provide clear information about the challenges now facing the company. Turnover in sheet metal construction fell dramatically, from 67.5 million DM in 1989 to 43.5 million DM in 1993 and again by 73 % to only 11.9 million DM in 1994.

"Many a company fails to survive such a slump," announced Schmidhuber in October 1994 in his speech on the occasion of PWO's 75th anniversary, which due to the "difficult economic and personnel situation" was celebrated only on a small scale, in keeping with the circumstances. Despite the difficult situation, he declared the future of sheet metal and equipment construction to be the "central issue for PWO". The company did not want to abandon its long-proven business area easily.[32]

PROVEN AND NEW STRATEGIES: MOBILE FIELD KITCHENS AND AIR CARGO CONTAINERS

In 1993 PWO had still hoped that the crisis in sheet metal construction would be merely temporary. At the very least, PWO had managed to acquire a big contract in 1993: the Federal Border Guard ordered 53 mobile rapid response kitchens (Ekü 2). For this contract, the company cooperated with Doll Fahrzeugbau GmbH from neighbouring Oppenau, which had made a name as a supplier of special superstructures and installations in vehicles. The foundation of the kitchen vehicle was an IVECO truck chassis with a superstructure by Doll. PWO was the coordinator and "general contractor", with responsibility for equipping the canteen kitchen. The Ekü 2 was adapted to the needs and requirements of riot police and the Federal Border Guard. Even on difficult terrain, the kitchen allowed the preparation of "complete menus for more than 200 persons within 2 hours".

The volume of this order was more than 13 million DM in 1993 and partially compensated for the premature cancellation of the MW-1 programme. The cooperation with Doll Fahrzeugbau GmbH worked. The first 44 kitchens were delivered by 1996. PWO hoped to bridge the difficult phase with the help of the Ekü. It was also important that the technical expertise gained from the many years of developing and manufacturing military equipment did not get lost.

As well as the Ekü 2, PWO also placed great hope in its self-developed air cargo containers. In October 1989 a questionnaire had been sent to 20 purchasing managers or ULD managers at European and North American air cargo companies. PWO wanted to know exactly what the potential market looked like. From the beginning of the 1990s, the air cargo containers LD-1 and LD-3, and the ground baggage container GBC 520, were intended to open the door to the attractive air cargo market. "The new solution in aluminum" was how PWO advertised the goods, which had also received approval from the German Federal Aviation Authority in Braunschweig on 6 February 1992. PWO was also registered as a supplier with the International Air Transport As-

sociation, the umbrella association of airlines, and referred to as a "IATA-registered supplier" in the advertising brochures.[33]

DEPARTURE FROM SHEET METAL CONSTRUCTION

In 1994, the development of "various new generation special packaging for defence equipment" and the air cargo containers programme continued. In addition, PWO received compensation from the Federal Defence Ministry in 1995 for the premature cancellation of the MW-1 programmes, amounting to "3.2 million DM, including revenue from the dissolution of reserves and from fixed assets disposals".

Then, however, when no new orders had been received one year later, the PWO management reacted and declared at the financial statement press conference on 29 March 1996 that "due to the faltering investments for the public sector clients, there were only very few activities" in the area of sheet metal and equipment construction. And indeed, the initially promising Ekü 2 contract turned out to be obsolete. In response to a journalist's question as to when PWO would hand over the last nine vehicles to the Federal Border Guard, the management explained that while the remaining vehicle would be delivered, there would in fact be hardly any further demand for the future: "The warehouses are full – no more contracts will be issued, also not to our competitors".

In the next few years, no more new contracts were acquired. And none were expected. The "production line" had long been "mothballed", according to board member Rainer Molenaar at the financial statement press conference on 3 April 1998. In the annual report for 1998, there was only the sober sentence: "Due to the market perspectives, which do not suggest any growth potential, we no longer count kitchen systems among our core business areas." As well as the field kitchens, the development, production and sale of air cargo containers was also discontinued.[34]

THE CRISIS AS AN OPPORTUNITY: PWO AND THE AUTOMOBILE INDUSTRY

PWO went through incredibly difficult times: In contrast to the provisionally highest overall turnover of more than 177 million DM in 1991, turnover in 1994 had declined by almost a quarter. However, the gradual end of metal and equipment construction, from a constant reduction in orders received to the final cessation of production and development, did not spell the end. PWO survived the sheet metal crisis since the company had ensured for decades that it had a broad base. As well as the public sector contracts, PWO had generated the majority of its turnover since the 1980s in the area of supplier parts and systems, which continued to make a reliable profit during the sheet metal crisis.

Moreover: The area of supplier parts and systems grew and grew – in less than ten years, turnover almost doubled, from 67 million DM in 1985 to 123.4 million DM

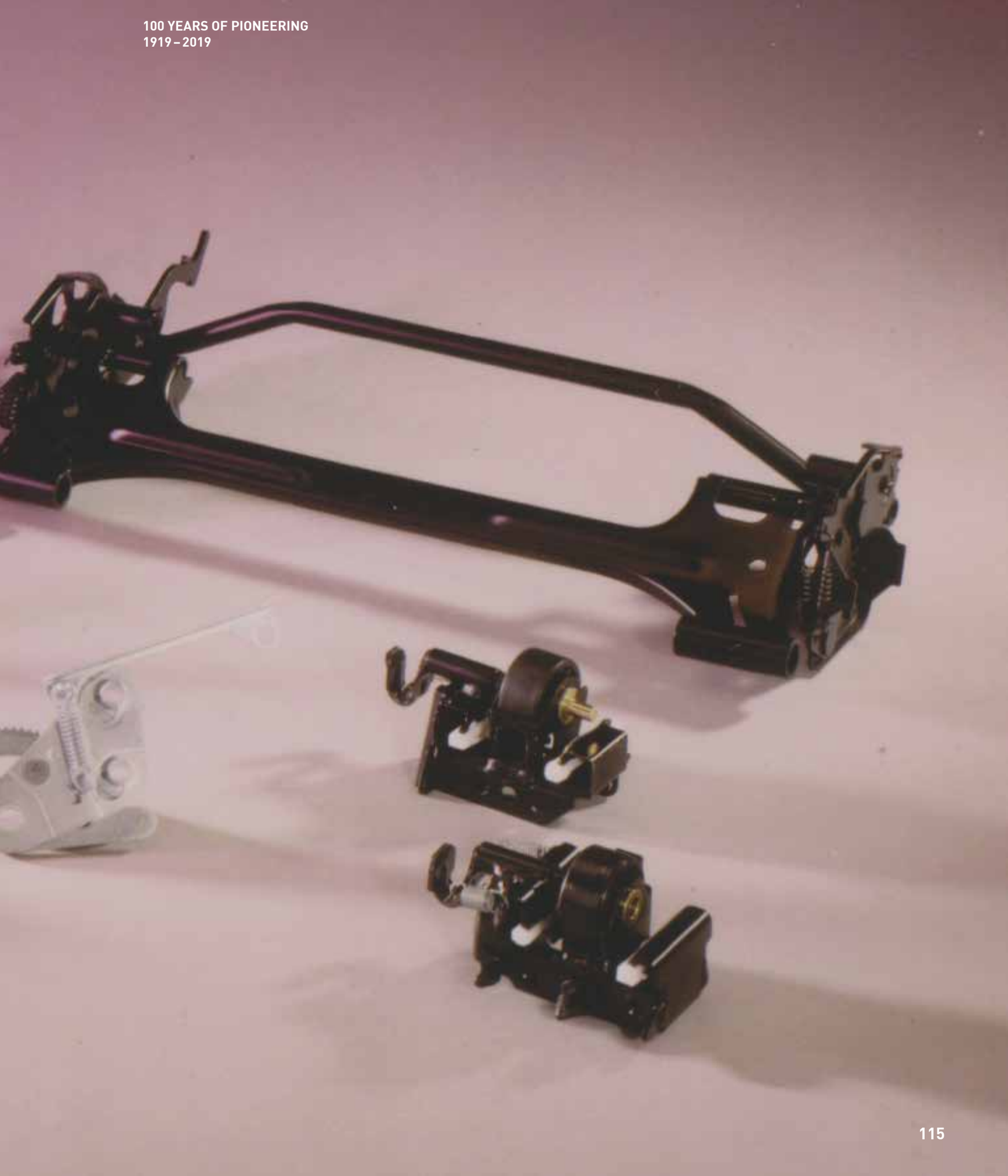
1992.

In the context of a strategic placement on the attractive air cargo market, PWO had itself certified by the Federal Aviation Authority on 6 February 1992 as a "Developer Company for Aviation devices". Unit load devices, the "new solution in aluminum" were one of the new aviation products.

1997.

View of tool production in 1997.

Already in the 1990s, the product segment from the area of supplier parts and systems ranged from the smaller assembly units to complete installation components. Here, for example, a tilt adjustment and locking unit for car seats. Today, these belong to the area of safety components.



in 1994. The decline in turnover for the whole company in 1994 was due solely to the faltering sheet metal and equipment construction. Freed-up capacities could now be used: PWO decided to concentrate on the long-proven area of supplying the automobile industry.

Already from the early 1990s the business area of "supplier parts/system" formed the focus of the company's public image, such as at the Hannover Messe. In 1993 the new orientation was described to the press as follows: "In Hanover, Progress-Werk Oberkirch AG (PWO), based in Stadelhofen, placed its dominant business area, supplier parts/systems – the other being sheet metal and equipment construction – at the forefront of its trade fair presentation, thus resolutely continuing its march towards becoming a development partner and systems supplier for the automobile industry ..."

In 1994, Karl M. Schmidhuber stated in a nutshell how PWO would have to deal with the changed situation: "Either we solve the problem, or the market will do so." From now on, PWO would concentrate on its core competencies, in other words "complex metal forming in combination with high-quality connection technology processes," said Schmidhuber. His words were followed up with action. The spectrum of produced marts that could basically be categorised as punched or assembly parts was astonishing. The first category included curved and phased press parts, which were made with "optimum precision in modern presses". Assembly groups were made using the company's own punched parts, with the help of modern arc or resistance welding methods. The products ranged from the smallest assembly units to complete assembly groups, ready for installation.

Thus, at the beginning of the 1990s, PWO made seat adjustments and locking mechanisms, motor housings for windscreen washer systems or window regulators, and parts for anti-brake systems. In addition, it made front panels for car radios and dashboard supports and aluminum lining for heat and noise insulation – some of these products are still among the most important in PWO's range today.

PWO also became established outside the automobile industry and was involved in different supplier areas – true to its 1994 motto "We develop and make what the customer needs". PWO made mechanic parts for electronic control units and DIY equipment, as well as cover panels for top-loading washing machines.

The expansion of the product diversity in the area of supplier parts and systems proved worthwhile. While the share of sheet metal and equipment construction in overall turnover once again declined in 1995, by almost 30 % to a single-digit million sum, turnover of supplier parts and systems increased diametrically, so that the company balance sheet showed growth for the first time since May 1991, with an overall turnover of 150.2 million DM. The foundation for the present-day success of PWO was laid.[35]

1979.

Review of the history of the PWO exhibition stand: In 1979 the stand was divided into three equal sections, with the coffered ceilings and convector heater cladding, the sheet metal and equipment construction, and supplier parts and systems. The company name presented to the public was "Progress-Werk Oberkirch AG".

1991.

In 1991 the areas were much more clearly separated. Here is a view of the supplier parts and systems section at the Hannover Messe. Progress-Werk now appeared publicly as PWO, which dominated the exhibition stand.

Still a trademark in the product portfolio today: Fans for the automobile industry, here in the serial production of the 1980s.

PWO was represented internationally at exhibitions even before the 1990s. At an exhibition in China, PWO board member Karlheinz Linnenkohl distributed promotional gifts to curious visitors.

New challenges since the mid-1990s

Strategically, two issues occupied PWO from the mid-1990s onwards: Once the orientation towards the area of automobile supplies had been established, PWO expanded its production significantly and set up new international locations. In parallel, PWO introduced strict environmental standards at the Oberkirch location. Both of these were developments with a long history.

ENVIRONMENTAL PROTECTION AT PWO

A company always impinges on its immediate environment, and PWO is no exception. As early as its founding in 1919, the hydropower of the millstream was used to drive the first production machines. PWO was not alone in this, since the water in this stream had been used to power oil and paper mills since the 13th century. What was new, however, was the extent of the utilisation. The preindustrial millwheel was dismantled and the hydropower was harnessed from that point on with the help of a turbine system, which in subsequent years was constantly adapted to the needs of modern electricity generation. The water was dammed, fed to the turbines via an artificial slope, and then released back into the millstream.

Furthermore, wastewater that was often polluted was added to the millstream. Since the expansion of the product portfolio in the area of sheet metal and equipment construction in the 1950s, this wastewater contained, among other elements, chemicals containing chrome and cyan, which were used to refine surfaces. Today such a thing is barely imaginable, but at the time it was standard practice throughout Germany – releasing hazardous substances into the environment was common. The logic behind it was the idea of diluting the pollutants. In the municipality Stadelhofen itself, extensive drainage works were carried out in the late 1950s, and a sewage treatment plant was built for 270,000 DM in 1958.

PWO made its own contribution to environmental protection 1973 with the procurement of a modern degreasing and coating system. Around this time, one can speak of an increase in environmental awareness at PWO, since the company did not merely react to existing circumstances, but rather took responsibility for itself and started acting with foresight. For example, the 1974 annual report shows that, from this time on, PWO made a separate budget available for environmental protection measures. In the years 1980 – 81 a wastewater treatment and detoxification plant went into operation, which ended the uncontrolled release of pollutants into the millstream. From 1983, environmental protection was such a key topic for PWO that it was even given its own chapter in the annual reports, showing in detail the measures taken by PWO. In 1983 they amounted to an investment sum for environmental protection measures of around 800,000 DM. To a certain extent, the new strategic orientation also contributed to environmental protection. Surface treatment, in this context, was outsourced to external specialists.

The focus on the reduction of local emissions was typical for environmental protection in Germany at this time. During the course of the 1980s, the orientation changed. By the 1990s at the latest, environmental protection increasingly began to be seen on a national and global level. At the same time, the renaturation of waterways and the removal of contaminated sites increasingly formed the focus of environmental protection measures. In this context, PWO commissioned a geological institute in 1993 to examine the soils of the factory premises in Stadelhofen for pollutants. Some contamination was detected, created primarily by the use of chlorinated hydrocarbons in production. PWO decided to take comprehensive and complex decontamination measures: with the help of perforated metal pipes that were driven into the grounds

of the PWO premises (and also beneath buildings), pollutants were sucked out of the soil per vacuum, and cleaned with activated carbon.[36]

THE JUMP ACROSS THE "POND"

In parallel to the developments in the area of environmental protection, the early 1990s at PWO were dominated by the economic effects of the global political situation. The consequences of the fall of the Iron Curtain were increasingly noticeable in the German economy. The end of the Cold War also had a direct impact on PWO. Contract cancellations at short notice in the area of defence technology led to an existential crisis that lasted some years. Board member Rainer Molenaar even regarded 1994 as "the year with the worst results in the existence of the company". Many companies were similarly affected at this time. But order cancellations were not the only problem. In an international comparison, costs and above all tax and contribution rates were high in Germany. By now, it was possible to produce in a much more cost-efficient manner in other countries – including Eastern Europe – than it was in Germany, since both wages and the tax burden were well below the German level there. The competitiveness of Germany as a location suffered enormously, and not a few companies relocated parts of their production abroad for this reason. PWO also outsourced some wage-intensive work to supplier companies in Eastern Europe, including the Czech Republic.

However, at first the expansion of PWO sites abroad pointed in a new direction in the mid-1990s: to North America. The goal was not only cheaper production but to expand internationally given the fact that people drive cars all over the world. Large customers from the automotive sector, with whom PWO had maintained a close partnership for decades, manufactured their cars increasingly worldwide, and PWO had to keep pace. Thus, as the board announced at the financial statement press conference in May 1996: "The international activities of our customers also demand an increasing PWO production presence abroad."

Any concerns held by employees at the Oberkirch location were vigorously countered by the board in the staff magazine: "With our involvement abroad, we ultimately safeguard turnover and production at the Oberkirch site, and thus your jobs." One thing was clear: A prerequisite for new orders and new projects was worldwide delivery at corresponding costs. Therefore, two connected objectives were announced at the financial statement press conference: an improvement in competitiveness, and consequently the safeguarding of jobs in Stadelhofen. The board knew that, besides the permament improvement of competitiveness, only an internationally manufacturing company in the automotive industry would have a chance of survival in the future, and the Oberkirch site can be saved in the long term only by these means.

PWO had gathered experience abroad from the very beginning. Their products were exported all over the world from Stadelhofen, starting with various kinds of air pumps. After World War II, in the years of the economic miracle, PWO was increasingly represented at international exhibitions, first at the Hannover Messe, later also

abroad, for example, in the Netherlands, France, the United Kingdom, the USA and more distant countries such as Malaysia, China and Saudi Arabia. Until that point, however, production only took place at the home site in Stadelhofen.

The announcement by the PWO board that it would be taking "shares in a foreign company" was soon implemented. Contacts with a Canadian company had already been made in the background. In 1996, the boards of both companies signed a letter of intent and worked out a set of agreements in preparation of the takeover of the Canadians by PWO. Thanks to the North American Free Trade Agreement (NAFTA), henceforth it had also been possible to deliver to PWO clients in the USA from Canada, customs-free. The future PWO subsidiary was Brattan Tool Industries Limited (BTIL), which had been founded in 1968 in Kitchener, in the south of the province of Ontario. BTIL was located only a few minutes away from Highway 401. Therefore, the company was ideally connected to the large cities and industrial centres of Ontario, the metropolises Montreal and Toronto, as well as Detroit in the USA. The product portfolio also offered some advantages to PWO. The Canadians specialised in moulded parts and metal components, and already produced for customers such as Siemens, ITT and Bosch in Canada and the USA.

Still in 1996, the parties concluded the contract and PWO initially took over a share of 48.9 % in BTIL at the beginning of 1997. Then, in 1999, PWO purchased the remaining business shares. On 1 May 2000, BTIL was renamed PWO Canada Inc. and became an integral part of the PWO concern. Another step towards internationalisation was taken on the North American continent prior to the millennium. A cooperation contract was signed with L&W Engineering & Co. in Belleville (Michigan/USA), also in the summer of 1996. The bridge between Belleville and Oberkirch was the development and production of the cross members for Ford, which PWO took on in 1995, initially for the Ford Fiesta in Europe. In return, L&W Engineering Ford supplied markets in the USA and Mexico with cross members for various vehicle models. For the successor to the Ford Escort, which was also to be built in the USA, PWO in cooperation with Ford developed the dashboard supports. By means of a cooperation and licensing contract, PWO and L&W agreed to cooperate closely in the development and production of so-called car cross beams for Ford. Similar agreements were also made with companies in Brazil, Argentina, India, South Africa and Thailand, as well as in England, Portugal and Spain, some of which still exist, but which were replaced in the USA, Canada and Mexico by PWO producing its own goods in its factories.[37]

SUSTAINABILITY AS A COMPANY GOAL

While internationalisation was being introduced, PWO also reorganised itself in the area of environmental protection and made sustainability the company goal. Since 1996 the company had committed itself in its guiding principles to its social, economic and ecological responsibility. This was in line with the Eco Management and Audit Scheme, which was passed by the European Community. The scheme was aimed at commercial companies and motivated them to voluntarily implement innovative en-

“Car cross beams” for Ford – now known as dashboard supports – were developed and produced from 1996 in a cooperation between PWO and the US company L&W Engineering & Co. from Michigan.

In 1997 PWO bought a share of 48.9 % in BTIL. Two years later the remaining shares were successfully acquired. As a fully integrated subsidiary, the company was renamed on 1 May 2000 to PWO Canada Inc.

At the Czech site in Valašské Meziříčí PWO produces seat components amongst other things.

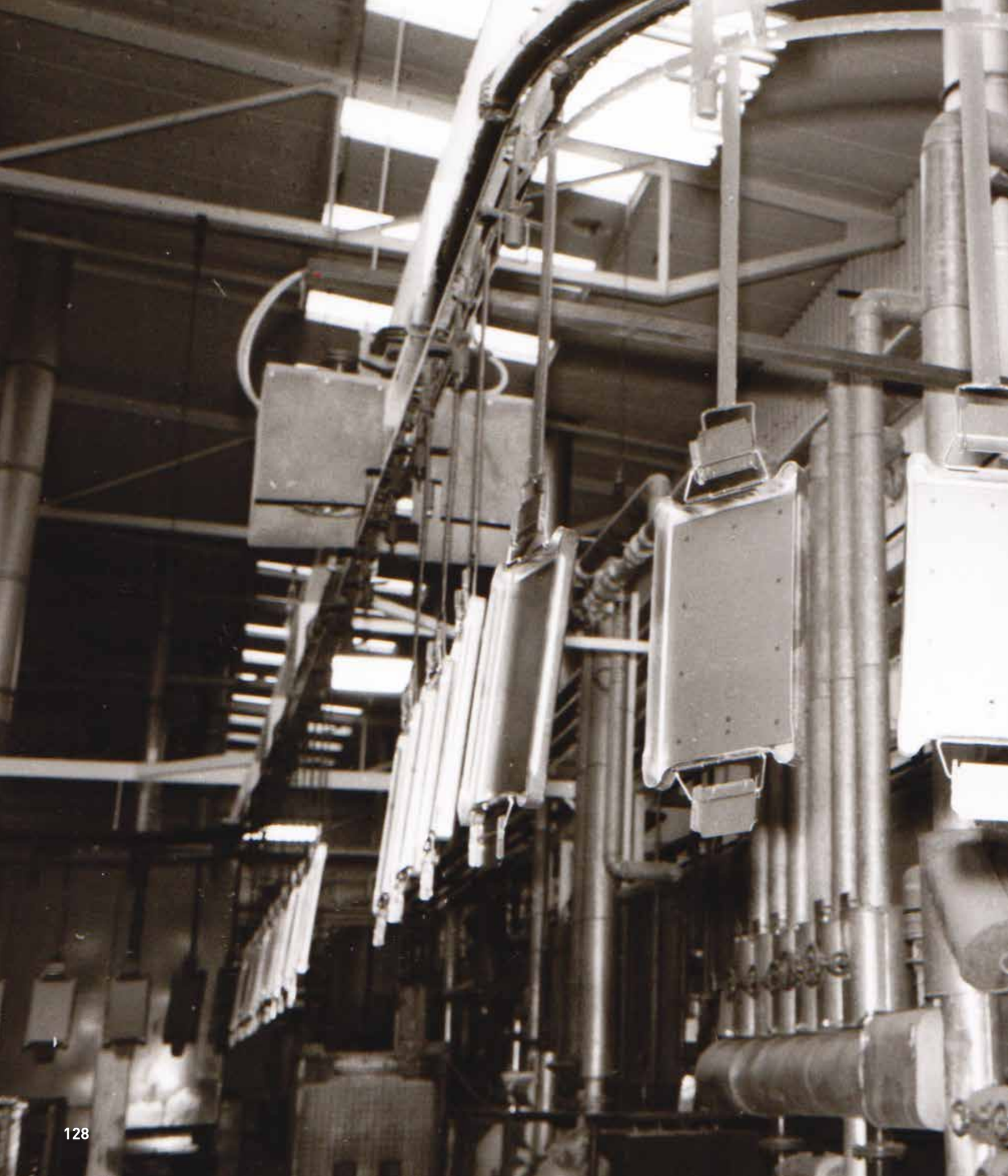
vironmental policies. In principle, the intent was to sensitise companies to their contribution to the consequences for the environment.

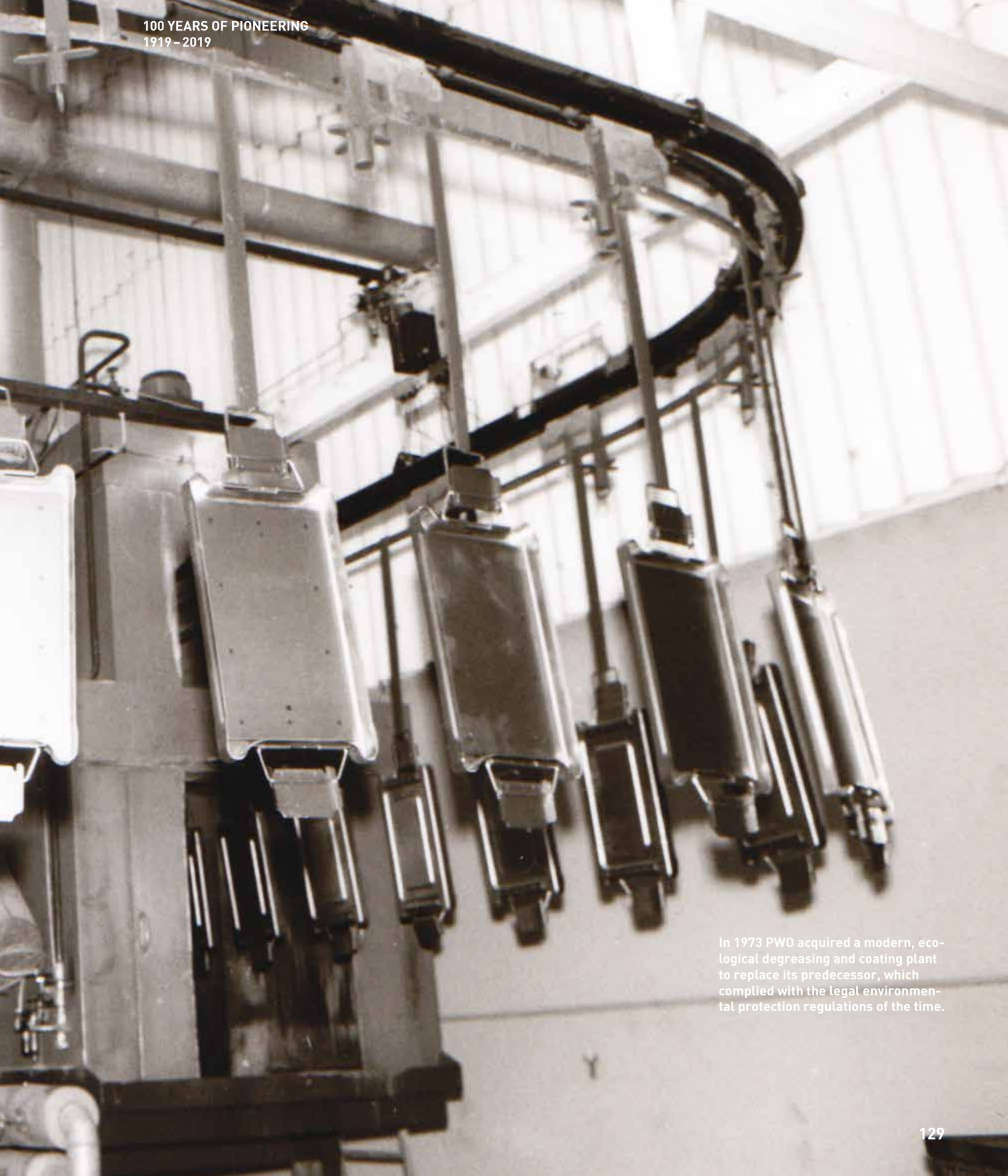
PWO accepted this responsibility and in 1996 drafted the new motto: We act in an environmentally-friendly manner. Already the previous year, PWO had introduced further measures and drafted a 13-point plan for the company's own environmental policy: Among other things, it was agreed in the plan to declare environmental protection as one of the company's objectives, and to give it equal weight with all other company areas. Thus, environmental aspects must also be considered in development and production processes, and both suppliers and customers should be informed of the new PWO guidelines. Another component of the plan was the agreement that PWO would submit itself to checks and audits at regular intervals in order to notice and remove possibly still existing errors or environmental damage. The "worthwhile feat of strength" took one year. On 10 September 1996 "the Freiburg Chamber of Industry and Commerce entered us into the location register under the number DE-S-126-00002, and reported our location to Brussels," as the staff magazine PWO Aktuell announced proudly.

There was every reason to be proud. After all, the audit process, led by the expert Werner Reif, confirmed that PWO belonged to the "upper third" of companies to have received this certification to date. Between 1991 and 1995 PWO had demonstrably managed to reduce hazardous waste from 344 to 37 metric tons, and landfill waste from 177 to 58 metric tons at the Oberkirch site. During the same period, the occurrence of production wastewater had declined by 94 %, and the multiple use of cooling water meant that 30 % fresh water could be saved.

As well as the prestigious certification in itself, the introduction of an innovative environmental policy brought other great advantages to PWO. By saving energy and reducing the use of resources, considerable cost savings were possible. While efforts in the area of environmental protection intensified, in the subsequent period – at an interval of two to three years – PWO was newly audited, with success. For example, TÜV Hessen audited the environmental management system in 2001 under the European Eco-Management and Audit Scheme EMAS, in accordance with DIN EN ISO 14001. These audits generally lasted several days and encompassed both the presentation of implemented and planned measures by the board, and an inspection of the operational sites. Transparency in environmental issues had always been of the highest priority to PWO, after all. The company published an environmental report on an annual basis, with the latest figures, which was explicitly praised by the auditors.

The next big step in environmental matters came in 2012. As part of a new energy concept, the heating system was converted from steam to warm water in the rebuilt energy control centre. To this end, two new boilers were installed and a new pipeline system was laid. The new energy concept also provided for the operationalisation of two cogeneration units with a total electric output of 2,000 kilowatts, for which the company invested more than 3 million. Compared to the previous conventional heating system and power generation, CO2 emissions were now reduced by 58 %, since the cogeneration units also covered 75 % of the entire heat requirements on the factory premises.





In 1973 PWO acquired a modern, ecological degreasing and coating plant to replace its predecessor, which complied with the legal environmental protection regulations of the time.

With the commitment to environmental protection, collection trays were introduced to the oil warehouse. The protection of soils and waterways is now a high priority.

2012.

Since the initial ideas on environmental protection were proposed, the concepts have been refined constantly. In 2012, for example, a new energy concept was successfully implemented. The installation of a new cogeneration unit can be seen here.

Two years later, the Oberkirch site had itself certified again. The refined energy management system under ISO 50001 served to detect and exploit savings potential in all processes. In that context, PWO participated annually beginning in 2015 in an initiative of the Chambers of Commerce and Industry, which educated trainees using workshops and practical projects to become "energy scouts". The "young efficiency experts" at PWO contributed, for example, to optimising the public lighting situation in the factory. Instead of mercury vapour lamps, a modern LED lightning system was now used, which required the installation of a completely new infrastructure. Nevertheless, the savings potential was large here since in 2015, lighting constituted c. 14 % of the entire electricity consumption. Inefficient compressors were also replaced, which at the time were the main consumers of energy at the Oberkirch site. Recently, in July 2017, the engagement of the "energy scouts" was even praised by the Federal Environment Minister Barbara Hendricks.

Since committing strongly to environmental responsibility and sustainability in the mid-1990s, PWO has continued to develop further in this regard to this day, and has found a series of solutions that contribute to reducing emissions and saving energy. And this development continues.[38]

WHEREVER OUR CUSTOMERS PRODUCE: THE GLOBAL EXPANSION OF PWO

In the area of internationalisation as well, PWO continued to develop and expand worldwide. The positioning on the Eastern European market, where PWO had cooperated with supplier companies since 1997, was advanced with the successful takeover of the Czech tool manufacturer UNITOOLS CZ a. s. in Valašské Meziříčí. Since its integration into the PWO concern in 2005, the factory near the Slovakian and the Polish border has developed "from being a small tools maker to a serial supplier with more than 600 employees". After many months of preparation, production began here in 2006. Beside tools, nowadays serially produced seat components are the company's special product, which is now called PWO Czech Republic a.s.

At the end of 2006 after the takeover of UNITOOLS, PWO looked to Mexico, where a majority holding of Cartec S.A. de C.V. was aquired. In 2008 PWO then took over the Mexican company. The production site of the present-day PWO de México S.A. de C.V. is favourably located: namely in Puebla, a centre of the Mexican automobile industry that has formed around the Volkswagen production facilities there. The last step in the international expansion for now occurred in China. As early as 1998, PWO board member Karl M. Schmidhuber predicted a shareholding or cooperation in China. It would take until 2006. That year, PWO agreed a joint venture with the Korean company TAE HWA Enterprise Co. Ltd, a market leader for sophisticated metal components in Asia. Safeguarded by contracts from a common customer, the joint venture invested in production plants and used the buildings and infrastructure of the partner's production site the business metropolis Suzhou near Shanghai. Following intensive talks with customers and an estimation of the business potential, PWO decided at

In China, more precisely in the 10-million-inhabitant city Suzhou near Shanghai, the foundation for a new PWO location was laid in 2008. In 2009 the buildings were inaugurated and production commenced.

2014.

Another step was taken across the Big Pond in 2008. In Puebla, Mexico, PWO took majority shares in Cartec S.A. de C.V., and in 2008 took over 100 % of shares. Things didn't stop with the takeover. In 2014 a new 3,000 m² logistics hall was inaugurated, which provides sufficient space for warehousing and shipping. The flags have already been raised.

the end of 2007 to establish its own subsidiary and production site in Suzhou, which commenced production at the beginning of 2009. TAE HWA took over the PWO shares in the joint venture. Also, since 2015 there has been a second Chinese PWO site in Shenyang, in northeast China, which assembles dashboard supports for BMW and Daimler. This completes the process of internationalisation for the time being.

In addition, production cooperations that have existed since the 1990s have been expanded where it made sense. Following the operationalisation of additional production plants, for example, in Mexico, the whole PWO concern now comprises five production and four assembly locations in five countries on three continents. All of the locations have been strategically chosen, and indeed are situated everywhere in the world where cars are built and PWO clients are manufacturing.[39]

A press for every age: The mechanical "HiLo" eccentric press AB VIII from the machine factory Hiltmann & Lorenz in Aue, Saxony, was procured in 1939. With the brand new 2,500 ton forming press at its Czech location, PWO will push forward into new dimensions in the coming years.

PWO today and tomorrow

In 1919, with 25 employees and only a few machines, the production of all kinds of metal goods began in Stadelhofen. One hundred years later, PWO is a globally active key player in the automotive sector, with five production and four assembly locations in five countries on three continents, employing around 3,400 workers worldwide, around 1,600 of whom are based at the company headquarters. The production space there alone is almost 80,000 m^2 in size. In all, the group manufactures more than 1,000 products for the automobile industry, most of which are cold-formed metal components that ensure the safety and comfort of car drivers and passengers, either as individual parts or as ready-to-install assembly groups that are joined using high-quality connection technologies.

Continuities and constancy at PWO can be seen from the inventory numbers. The first multi-stage press by Weingarten was acquired by PWO. in 1960, and bears the inventory number 9 PZ-28. This means it is the direct successor to the eccentric press of 1939, with a press strength of 160 metric tons. The work mottos that were published annually in 1993, 1994 and 1995, are mounted on the side. The multi-stage press provided its service for more than thirty years before being sold and replaced in 1995.

2013.

Production grew considerably in March 2013 with the forming press by Schuler AG from Göppingen. It has a press strength of up to 1,250 metric tons and is used in the manufacture of seat components, engine mounts, and motor housings. Two sister models are located at the PWO sites in the Czech Republic and China.

FROM SHEET METAL PROCESSOR TO PARTNER OF THE AUTOMOBILE INDUSTRY: PWO TODAY

PWO products can be divided into three categories: mechanical components for electrics and electronics, safety components for airbags, seat and steering, as well as structural components and subsystems for body and chassis. PWO is well prepared for the pending transformation towards electromobility or other alternative drives. 90 % of turnover is made with products that are independent of the type of vehicle propulsion. They can be used for diesel, petrol, electric or alternative-driven vehicles.[40]

PWO CONSTANTLY REINVENTS ITSELF – AND YET REMAINS TRUE TO ITSELF

The 100-year history of the company could be told purely as a success story with a series of positive headlines: A small metal processor in Baden becomes a global market leader for air pumps. PWO builds the best motor scooters, field kitchens by this company are in use worldwide. In the end PWO became a leading supplier to the automobile industry. The history could also be told as a story of crises: after all, neither air pumps, motor scooters nor field kitchens are still being produced today. Every adjustment to the product range means a veritable transformation in the company. Both are correct, since 100 years of PWO show that, on the one hand, the company masters metal processing like no other, and at the same time, it has utilised this ability in every decade, in accordance with the markets and with demand, thus remaining economically successful to this day. Diversification, in other words the diversity and variety in the product programme, was always an important companion. That can be seen from the product history: the air pump was the first flagship product. By means of numerous changes, many of them patented, PWO improved its pumps continuously in the 1920s and 1930s. As early as 1924, the company had 39 different air pump models on offer.

During the "economic miracle" after World War II, consumption rose rapidly in Germany. Initially, people needed necessities to allow them to return to everyday life. Many small metal items were required, and PWO delivered: PWO now offered affordable flasks, first-aid boxes, bicycle trailers, handcarts, metal stools, tables, lockers, metal cabinets, and much more. The prerequisite was that the production plant, the "heart of the business", was adapted to the latest technology, and constantly enlarged with useful additions.

And once mass motorisation arrived – in Germany initially with motorbikes and motor scooters – the company built its own scooter: In 1953 PWO managed to position itself on a highly competitive market within only one year, with the Strolch and Progress 200 scooters, despite the fact it had no previous experience in motor vehicle construction. A complete success, as demonstrated by the 14,000 scooters that were made.

Innovation factor lightweight construction: PWO has been deploying a resource-saving method of lightweight construction for many years. One thing is true of the combustion engine, which will remain the dominant vehicle propulsion for some years to come: the lighter the car, the less energy it consumes. As little as 100 kilograms less weight leads to an average lower fuel consumption of 0.4 litres over 100 kilometres. For example, PWO managed to reduce the weight of precision engine housings by around 50 %, while maintaining the same performance. Each year we produce more than 120 million units of these housings – at an output rate of up to 100 housings per minute.

One of the worlds lightest metal construction for front seats – manufactured by PWO with highest precisicion, joined at the client by laser welding. Highly precise components of ultra high strength steel and aluminum; for luxury sports cars and other premium vehicles.

Another example of the reorientation of the company is the period after the end of the Cold War. As soon as PWO recognised that products such as field kitchens or ammunition boxes had no future, it turned resolutely to the automotive sector. This reorientation formed the basis for growth and the international expansion from the 1990s until today. Thanks to its extensive experience in the area of remodelling and connection – including that of high-strength steels and aluminum – PWO today combines functionality, safety, comfort and resource-saving lightweight construction to the highest quality standards.[41]

LONG-TERM THINKING AT PWO

Long-term thinking and continuity of action are further success factors in the company history. Since the founding of the company, it was clear to all involved that sustainable success is more important than short-term profits. This was particularly clear among the shareholders, who contributed to PWO's success story by sticking with the company even through difficult times – including during the hyperinflation of the 1920s – and by supporting the new directions of the company.

This commitment led to decades of long-lasting connections. The family of Joseph Anton Frisch influenced the company from the 1920s over several generations, as shareholders and members of the supervisory board. Even after 50 % of the shares were sold diversely upon the IPO in 1978, the connections between the company and the family remained strong: only in 1998 did Bettina Brötel, the last member of the Frisch family, leave the supervisory board. Dr. Klaus-Georg Hengstberger, whose Consult Invest Beteiligungsberatungs-GmbH now holds 46.62 % of the shares, has been with the company for a long time – in fact, since the 1990s. The same applies to many of the smaller shareholders, some of whom have held shares since the IPO, and thus have a close link to the company.[42]

THE PWO EMPLOYEES: THE KEY TO SUCCESS

Both continuity and constancy, as well as innovative strength, are closely connected with PWO's core success factor: the employees. Their critical importance is also enshrined in the company's guiding principles: "We ensure that our employees are aware that they are the key to our success." This appreciation goes right back to the earliest company history. As early as 1919, the seven founders were aware that a relationship based on partnership and trust between the company management and staff would be crucial for success. From the post-war period on, there was widespread belief that working for PWO should be fulfilling, and that the successes should be visible. Then as now, a career at PWO ideally lasted several decades, often even from the apprenticeship to retirement. The company's goal is to provide all staff with good development opportunities. The motto has always been: "Those who work hard can made a career, regardless of the level at which they join, or what qualifications they bring."

Element of this are the training and education measures with which PWO cultivates the skills of its employees. And there is a tradition of that. The very first 25 workers came from Swabia and had the task of training new workers from the Rench Valley, who had previously mostly worked in agriculture, to become qualified skilled workers. Initially, this training and education was primarily informal in nature. It only became institutionalised in the period of the "economic miracle". In 1959 a youth and trainees council was set up, which also had two members on the works council. Since this time there has been an "apprentices' workshop", where new recruits are trained to use modern plants. In addition to this technical training, there was also commercial training, even in the early days. Both training branches still form the basis of the apprenticeship system at PWO to this day. In addition, under the motto "Career in Progress", the company also offers its staff the chance to study mechanical engineering, industrial engineering or applied information technology alongside their career. They can also get to know another company location during work experience abroad lasting several weeks. Furthermore, unskilled workers have the opportunity in the project "Partial and post-qualification" to get a modular education. In all, PWO invested 3.2 million in education and training throughout the whole concern in 2018.

In addition to promoting employees by means of extensive training and education offers, PWO is also active in other areas to ensure a pleasant working atmosphere and a close relationship between employees, as well as between the staff and the company. Photos from the 1930s show that there were regular work excursions into the countryside at this time. This offer has been repeatedly expanded in recent decades, and now encompasses occupational health management, an extensive sport and fitness programme, a canteen and a series of parties for all staff. In addition, employees can benefit from a company security scheme that goes beyond legally stipulated contributions. From 1940 to 1998, a provident fund was responsible for paying a company pension, and also supported employees and their families in cases of illness or death. Since 1998, the company now takes care of these tasks as part of a legal binding structure. Worker participation is also important to PWO. A worker's representation was already in place even before this was legally prescribed in 1952. Since then, the works council has represented the concerns of the employees and cooperates on a basis of trust with the company management. Together, they have developed varied and diverse work-life balance measures in recent years, which include flexible working hours, home office, and above all individual solutions for all employees. Building on its past, PWO now stands for a strong community that provides support and embraces its social responsibility. Success is celebrated together, throughout one's career.[43]

INTERNATIONAL CORPORATE CULTURE AT PWO

During the course of internationalisation in recent decades, the company developed an awareness for the fact that it influences social life not only locally, in Oberkirch, but also at international level, in each of its locations. Accordingly, PWO embraces its

1998.

Flowers of farewell from the PWO chairman Rainer Molenaar. Bettina Brötel, the last remaining member of the Frisch family, left the PWO supervisory board in 1998 – for almost 80 years the company was able to rely on the trust and support of the family dynasty.

2010.

A gift was also present to the current anchor shareholder, Dr. Klaus-Georg Hengstberger (right) on the occasion of his 80th birthday by the PWO board members Dr. Winfried Blümel, Bernd Bartmann and Karl M. Schmidhuber. The commercial lawyer, entrepreneur and patron from Stuttgart-Untertürkheim joined PWO as main shareholder in 1977 with his Böblinger Consult Invest Beteiligungsberatungs-GmbH.

Joint leisure activities and sports events have always been a part of PWO's history. The PWO football team, for example, played in local tournaments against other factory teams. Chairman Edmund Hess, wearing a suit, coordinated the team in the centre circle.

Today, football is only part of a wide-ranging company sports programme. Other activities include beach volleyball, jogging, cycling and yoga, or events such as the family or fitness days.

worldwide responsibility for products, services, and in particular for its employees, which in turn significantly shapes the international corporate culture.

For instance, the concern ensures an environment that is free from discrimination, and it actively promotes diversity. Moreover, PWO is considerate of staff with disabilities, and supports them, for example, by taking rebuilding measures at the workplace as well as at home so that they can fully develop their capabilities. In addition, the company's agreed codes of conduct define standards to ensure mutual respect, honesty and fairness in dealing with employees and business partners – both within the company itself and among suppliers.

The international corporate culture also includes the consideration of employees' interests. At the Oberkirch site, employees send representatives to the supervisory board and thus play an active role in the company's strategic development. At the locations in Canada, Mexico and the Czech Republic there are also representations of the interests of workers. In contrast, such a form of employee participation is practically unknown in the Chinese business system, and not covered by law. Nevertheless, here too the concern has committed itself to upholding the common corporate principles, while taking account of local circumstances. The motto at all locations is: "By recognising and cultivating achievements such as a democratic structure, fair income distribution, and fundamental employment rights, we are then acting in a social and sustainable manner."

For years, staff at the individual PWO companies have been coming closer and closer together – and that is intentional. After all, cultural exchange to promote the internationality of the workforce is a central aspect of social sustainability. Incidentally, that also applies during training, as the concern offers the chance to complete work experience abroad. Furthermore, in preparation for a trip abroad, employees can participate in intercultural training or internal language courses, in order to learn not only the language but also appreciate country-specific behaviour. Although all employees are part of the PWO family, there are still some differences, for example, in the canteen: In China and Mexico, it is usual to serve three warm meals during the day, while in Oberkirch there is a warm meal only once per day. In Canada and the Czech Republic, in contrast, they do not have their own canteen, but instead bring their own lunch.[44]

PWO – A PROMISE OF QUALITY

PWO provides its services on three continents. The company has therefore positioned itself as a global problem solver for the international automobile industry – at every location, with the aim of zero-defect quality and the same high-quality standards.

PWO is successful because the company can do certain things especially well: from the technical perspective of production, this means metal processing by means of cold forming, as well as the connection and installation technology, welding and gluing techniques, and sophisticated, often self-developed assembly solutions. In addition, the company seamlessly integrates downstream process phases such as the

Innovation factor digitalisation: Automation and digitalisation form the focus at PWO for some time. In split seconds, optical testing methods assess whether production parts have any defects or deviations, and remove them automatically.

cutting of screw threads or the gluing of magnets in the production processes. Heavy castings e.g. are replaced by lighter deep-drawn products, thus saving weight and reducing vehicles' consumption.

This is all made possible not only by the training and qualification of the staff and of course one hundred years' experience in metal processing, but also by the internal tools construction. This allows PWO to realise highly complex geometries, and thus meet the diverse design demands of customers. High-strength steels, aluminum or coated materials can also be processed in this way.

PWO supplements this expertise in production with comprehensive quality assurance, with strict test plans that often comprise up to several dozen features, and which are permanently observed and extensively documented, to also ensure traceability. Due to the fact that the quality tests are often automated and always integrated seamlessly, the zero-defect quality is a fixed part of production at PWO.

The result: Metal components in cost-optimised lightweight construction, solution competence across the entire product cycle, and a high level of customer satisfaction and customer loyalty.[45]

Many generations have passed though the apprentices' workshop, which has existed since 1966 at the latest, and thus for more than 50 years. Filing, filing and even more filing. Handling different materials and tools forms part of the training to become a toolmaker.

And things are hardly any different in this anniversary year. Here is a view of part of the present-day apprentices' workshop.

Into the future with determination and energy – the PWO board (left to right): Johannes Obrecht, Dr. Volker Simon (Speaker of the Management Board) and Bernd Bartmann.

11

Thinking Ahead: The future of PWO

Today, PWO is a prestigious, excellently positioned automobile supplier on the global stage. Experts and customers confirm: PWO offers the right range of services and products for the coming decades, and demand from the automobile industry will remain high in the future, perhaps even more so than today in many cases. In the future, PWO will continue to react to new and unexpected challenges with determination and energy – always oriented towards the needs of the customers and the market.

WHAT WILL THE FUTURE BRING?

Since the beginning of the 1990s PWO has concentrated solely on the automotive industry, which begs the question: How will this sector develop in the next few years? Experts from the consultancy firm Oliver Wyman and the German Automobile Industry Association (VDA) have analysed the major trends and expected developments, which they have summarised in the study "Future Automotive Industry Structure – FAST 2030":[46]

It is expected that the share of networked and autonomously-driven vehicles will increase significantly by 2030. E-mobility will also transform the automobile sector. It is estimated that by 2030 over 60 % of newly-registered cars worldwide will be powered electrically, a figure that includes both battery and fuel cell-driven vehicles as well as hybrids. Another development is the trend away from owning one's own vehicle towards a mobility in which vehicles are rented according to current need. As a consequence, the equipping of vehicles will change, and the functionality of the interior and special fittings and features will gain in importance.

It is expected that by 2030 both value creation and the number of vehicles produced will rise by around 30 %. This growth will not be equally distributed in geographical terms. The Chinese car market will grow the strongest – in particular in the premium segment. From today's perspective, North America, Europe, Korea and Japan will lose a share in the worldwide automobile market. Nevertheless, the automotive sector will also continue to grow in these regions.

As well as the geographical shift, the production chain will also be affected by other factors. The impulse for this change is the digitalization of manufacturing processes, also in this area. In addition, it can be expected that in the next few years, the automobile concerns will recommence manufacturing components that they previously procured from suppliers, while also outsourcing some work steps or components that they had previously carried out themselves.

Under growing cost pressure, both manufacturers and suppliers will have to make significant investments and reorganise their business models at the same time. Due to the large volume of investment, new alliances and partnerships will emerge that will change the market – including, for example, cooperation between vehicle producers in the area of autonomous driving. For some companies in the sector this will mean that their market base will collapse, and their products or services will no longer be required. For other companies, in contrast, demand will increase. The entire automotive industry will experience a massive transformation like never before, in practically all areas.

IMPACT ON PWO

Two large trends and changes above all will have an impact on PWO: electromobility and autonomous driving. Comprehensive analyses and intensive discussions with large customers show: The services and products offered by PWO will remain in de-

mand in the automotive sector in the future – some probably more so than now. This reinforces the strategy of our company to continue developing and refining the product portfolio. Not least the geographical shifts in the worldwide automotive industry will have an effect on PWO, and growth will take place above all in the large markets of North America and China.

Although we might believe that we can see, or at least, guess the basic outlines and contours of developments in the next few years and decades, nobody knows what the future will hold. In the last 100 years we have had to react quickly to unforeseen events and adapt the company's course. Worth mentioning here are Joseph Anton Frisch, Edmund Hess, Werner Abel, the chairman of many years and todays honorary chairman of the supervisory board Dieter Maier, as well as Karl M. Schmidhuber, who influenced the company for decades in its most decisive phases. We must assume that the next one hundred years will bring similar highs and lows and similarly sweeping changes and setbacks in terms of technology and society. And – as always – the greatest changes will occur surprisingly and without warning. Before they arise, they will seem barely conceivable. Yet after they occur, they will feel like an inevitable, logical consequence of what went before.

How are we preparing for the new, the unexpected and the unknown?

In order to remain successful in the long term despite big changes we may face, we need to do the following, both individually and as a company:

- be open, flexible, innovative and creative
- think and act carefully, thoroughly and courageously
- set ourselves the highest professional and ethical standards
- orient ourselves solely towards the needs of our customers and markets, and
- always act in the best interest of the company.

Just as in the last one hundred years, PWO will continue to approach all challenges resolutely and energetically, and we shall successfully master all tasks that lie ahead!

Supervisory Board Chairmen

Engineer Gustav Michelfelder
Board member (1919 – 1928) and supervisory board member (1919 – 1920)

Banker Edgar Pick
Supervisory board member (1920 – 1927)

Banker Joseph Anton Frisch
Supervisory board member (1921 – 1939)

Engineer Otto Frisch, brother of Joseph Anton Frisch
Supervisory board member (1922 – c. 1958)

Walter Meeh, son-in-law of Joseph Anton Frisch
Supervisory board member (c. 1949 – 1978)

Dr. Wilhelm Bonnet
Supervisory board member (1951 – 1971)

Bank manager Dr. Hanns Goeser
Supervisory board member (1970 – 1988)

Merchant Karlheinz Linnenkohl
Board member (1966 – 1986) and supervisory board member (1987 – 1993)

Dieter Maier
Todays honorary chairman of the supervisory board, supervisory board member (1989 – 2016)

Engineer Karl M. Schmidhuber
Board member (1993 – 2014) and supervisory board member (since 2016)

Management Board

Engineer Gustav Michelfelder
Board member (1919 – 1928) and supervisory board member (1919 – 1920)

Alfred Maier
Board member (1927 – 1929)

Techniker Hans Kern
Board member (1929 – c. 1930)

Merchant Ernst Esslinger
Board member (1929 – 1939)

Edmund Hess
Board member (1939 – 1945 and 1948 – 1966)

Dr. Kurt Roman Müller
Board member (1945 – 1948)

Engineer Werner Abel
Board member (1966 – 1990)

Merchant Karlheinz Linnenkohl
Board member (1966 – 1986) and supervisory board member (1987 – 1993)

Gerhard Gmeiner
Board member (1986 – 1989)

Engineer Hermann Kurtz
Board member (1986 – 1989)

Economist Winfried Herbert Otto
Board member (1986 – 1991)

Engineer Harry A. Lange
Board member (1990 – 1992)

Economist Rainer Molenaar
Board member (1991 – 2004)

Engineer Karl M. Schmidhuber
Board member (1993 – 2014) and supervisory board member (since 2016)

Engineer Dr. Winfried Blümel
Board member (2004 – 2016)

Bernd Bartmann
Board member (since 2005)

Dr. Volker Simon
Board member (since 2014)

Johannes Obrecht
Board member (since 2016)

List of the Chairmen of the PWO Supervisory Boards and members oft the Management Boards in chronological order. The years stated after each name refer to the total number of years they served on the Management or Supervisory Boards as simple, deputy or presiding members, and not exclusively to their function as Chairmen of the Board. The latter duration can no longer be reconstructed fully, firstly due to the many changes in personnel in PWO's initial years, and secondly due to gaps in the sources.

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Chapter 11

46 20180601-OW-FAST 2030-FINAL-Summary.

IMAGE CREDITS

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In 1919, “Progreß-Werk Oberkirch AG” was founded in the old mill at Stadelhofen in Baden and started producing metal goods with 25 employees. The company quickly became a global market leader for bicycle air pumps. Later, PWO produced the prize-winning motor scooter Strolch and supplied field kitchens that catered for many thousands of people. Since the 1990s, PWO – thanks to its experience with forming high-strength steels and aluminum, as well as with resource-saving lightweight construction to the highest quality standards – has focused successfully on the automobile industry. Today, with five production sites and four assembly plants in five countries on three continents and around 3,400 employees, the company is a globally active key player in the automotive industry.