

100
SINCE 1921



**POWERFUL HERITAGE.
BRIGHT FUTURE.**


One hundred years of SCHOTTEL

Powerful Heritage. Bright Future.
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KEY

 PERSONS | STAFF

 CORPORATE DEVELOPMENT

 IDEA

 DIALOGUE

 PRODUCTS, SHIP PROPULSION SYSTEMS

 SITES | SUBSIDIARIES

 AFTER SALES SERVICE

 PRODUCTS, DIGITAL



Josef Becker (1897–1973)

FOREWORD

On 21 November 1921, our father, grandfather and great-grandfather founded "J. Becker Maschinenbau-Werkstätte". From its humble beginnings in a barn in Niederspays, his small business has since flourished into a global company that has written shipping history with its rudder propeller. 100 years of SCHOTTEL – a milestone that fills us with pride: not only because it is no mean feat to have successfully survived a century full of political and economic upheavals, but also because the company is still owned by the founding family a whole century later. Although it may not always have been easy with many a challenge to circumnavigate along the way, SCHOTTEL has set its own course. Independent in thought and action – true to Josef Becker's guiding principles.

It goes without saying that like other families the SCHOTTEL family has changed and expanded over the years. In 1973, Josef Becker bequeathed his life's work to his four daughters Marlene, Anne, Margit and Inge, and ultimately placed continuation of the business in the hands of his sons-in-law Franz and Adolf and his loyal employees. In the meantime, Josef Becker's great-grandchildren have become part of our family of shareholders. They only know their great-grandpa "Opa Jupp", as some of the grandchildren affectionately called him, from stories. And yet they are also fully committed to SCHOTTEL – living and breathing our family values that include a down-to-earth approach, reliability and a sense of responsibility. Our common goal is to preserve the legacy of Josef Becker and to lead the company successfully into the future.

SCHOTTEL's centenary is an event he would no doubt have been very proud of too. His inventive spirit, technical curiosity and visionary aspirations laid the foundation for what was to come. And these qualities still inspire SCHOTTEL employees today. The fact that SCHOTTEL has continued to pioneer the industry with its innovations is entirely to the credit of all its employees who, with their ideas, loyalty and commitment, contribute to the company day in, day out. Our heartfelt gratitude goes out to them, and to all our customers and business partners who have placed their trust in SCHOTTEL, even in times of crisis, and who have been and continue to be prepared to enter uncharted waters with us.

100 years of SCHOTTEL – and a whole host of stories reflecting an eventful history and an exciting present. Its wealth of ingenuity and the focus of its corporate strategy are reason for optimism that SCHOTTEL will continue to play a leading role in the maritime industry as it moves forward. We are all on board.

We hope you enjoy the read.

The shareholders

NO MONEY, BUT COURAGE

In 1921, Josef Becker sets up a workshop in Niederspay in the midst of hyperinflation. He does not have much to start with: a pedal-driven drill, an old lathe and his metalworker's masterpiece, a hacksaw. "When we founded the business, we may have had no money, but we had courage," he later says, reminiscing about the early days. His courage pays off, as the master locksmith proves to be a man of great craftsmanship with a visionary gift for invention.

1897 

The company history of SCHOTTEL begins in Oberspay, Germany, a small village on the Middle Rhine, situated between Rhine kilometres 579 and 580. At the turn of the twentieth century, it has just over 500 inhabitants. Besides farming, the village is mainly characterized by fruit growing. Among skippers, Oberspay is known as the "Lotsendorf" – pilot village – because there are two sections of the Rhine before Oberspay and the neighbouring community of Niederspay that are difficult to navigate: the Braubacher Grund and Schottel, two shallows that cannot be passed without a pilot on board.

Not far from the dangerous Rhine currents, Michael and Margarethe Becker, the parents of the company's founder, live and work in one of the narrow alleys of Oberspay. Now in its third generation, his father runs the village smithy, shoes horses, repairs everyday objects, including broken water pumps, and produces agricultural equipment.

On 14 July 1897, the family's first child is born: Josef Becker. He grows up with his four younger siblings, three sisters and a brother, in his parents' half-timbered house right next to the smithy. From 1903, "Schmids Jupp", as Josef Becker is called in the village, attends primary school. When he leaves in 1911, his school certificate shows that he is a consistently good achiever. In particular, his "very good" results in the subjects "natural history", "drawing" and "spatial theory" already indicate the skills that will later enable Josef Becker to attain his outstanding technical achievements.

Weekly wage of one mark

After leaving school in 1911, Josef Becker, like his brother Andreas, begins an apprenticeship as a locksmith in his father's smithy for a weekly wage of one mark. He is soon helping his father's business by repairing water pumps. Even as an apprentice, his craftsmanship impresses farmers, who nickname him the "machine man".

1914

1914–1918: First World War

In 1914, the First World War breaks out and Josef Becker is drafted, interrupting his apprenticeship. On account of his technical prowess, he is deployed as the army's youngest armourer at the age of just 19. Once back from the front, he decides to continue his training and further his education in a field that has fascinated him since childhood: shipbuilding. At the beginning of the twentieth century, the Rhine with its ships and small ferries is a fundamental part of everyday life for most villagers. Josef Becker also wants



Josef Becker sets up his business in the barn bought at auction by his father-in-law in 1921.

1921



The married couple Josef and Magdalena Becker in 1921, the year of their wedding and the founding of the company.

to go into the shipping industry and decides to work at the Gebrüder Stumm shipyard in Koblenz-Lützel. It is there that he acquires the knowledge that will enable him to set the course for developing his fledgling workshop just a few years later.

Difficult, challenging times

At the age of 24, Josef Becker decides to set up his own locksmith's shop. This is a brave move, as these are troubled and difficult times to establish his business. Oberspay and Niederspay are in the French occupation zone and feel the brunt of the First World War. Hyperinflation, one of the most radical devaluations of money in history, renders all items of daily use more expensive; from cereals and potatoes to livestock, prices rise inexorably, and fear and panic buying dominate everyday life. At the same time, the founding period of today's SCHOTTEL GmbH is also a time of new beginnings. 1920 sees the first houses in Oberspay and Niederspay equipped with electric lighting. A few years later, the first water pipes are laid, soon followed by the first street signs for the still unfamiliar automobiles, and in 1926 the first radio plays in the local inn.

"So here we are in Boppard ..."

On 21 November 1921, Josef Becker registers his locksmith's business with the authorities in Boppard, located further up the Rhine. It is also the day of another life-changing decision: he marries Magdalena Karbach, an innkeeper's daughter from a neighbouring village, whose commercial skills will contribute significantly to the success of the future SCHOTTEL shipyard. The newlyweds move in with his in-laws in Niederspay, where, thanks to his father-in-law, the opportunity arises to set up his workshop.

Fascinated by technical progress

Like his father before him, Josef Becker initially repairs water pumps – by July 1922, he already has an apprentice on board

to help him. When Spay receives a water supply, the "J. Becker Maschinenbau-Werkstätte", as he calls his business, carries out most of the house connections. However, Josef Becker wants to do more than just carry out repairs and installations



The workforce and Josef Becker's son Walter on a dinghy in 1926. In the background on the left is the house, on the right the barn with the workshop.

and is committed to technical progress right from the start. So he converts an old car engine into a generator so that the drilling machine can be powered by electricity. He buys a cupola furnace in order to produce castings for the pumps and agricultural equipment, and acquires his first welding machine. He also encourages mechanization among



Josef Becker, Niederspays a. Rh.

Station Spay Maschinenbau » Bootsbau Station Spay

Letterhead with extended portfolio
... Mechanical engineering | Boat building ...

Magdalena and Josef Becker
with their children Liesel,
Walter and Marlene

1925

1927

his customers: for the farmers, he develops machines for grinding fodder beet; he designs and builds oil mills, and equips the farmers' grist mills and threshing machines with electric motors and belt pulleys.

From land to water: the sloop

In 1925, the opportunity finally arises to apply the knowledge he has acquired in boat building. A master baker from Oberspays orders a small sloop so that he can row through the narrow streets in high water to fetch flour on the other side of the Rhine as quickly and safely as possible. In order to meet the master baker's requirements, Josef Becker fundamentally changes the shape of the dinghies that were common at the time, thus demonstrating a skill that will accompany him throughout his entire entrepreneurial life: thinking about problems until a solution is found, breaking away from traditions, daring to try something new and resolutely translating ideas into action. This is how he comes to develop a boat made entirely of iron with a transom and raised bow, distinguished by its very low water resistance and how easy it is to row and to turn. When he rows up the Rhine to his customer with this first model of the later world-famous SCHOTTEL sloop and docks alongside a ship, as was customary at the time, the ship owner becomes aware of this

innovative dinghy. The second order is placed and contact is established with the shipping industry. Just two years later, in 1927, boat building has developed to such an extent that Josef Becker includes the new line of business on his letterhead alongside mechanical engineering.



The first motorboat built by Josef Becker: the ferry Helene licensed for thirty-two passengers

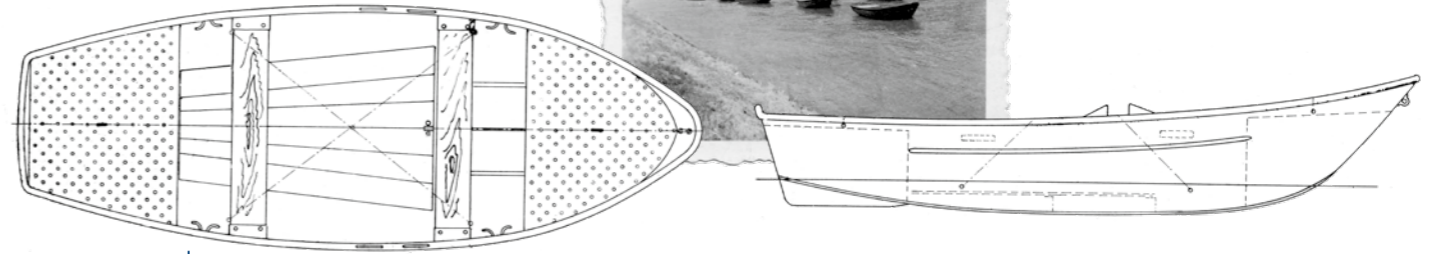
Maschinenbaumeister

"Master mechanical engineer"
Signature from a document from 1927

The first motorboats are built

While the construction of sloops quickly gains momentum, the company is also able to gain a foothold in motorized shipbuilding. A local ferryman wants to switch to motorized operation due to the increase in tourism and orders the first motorboat from Josef Becker – still a rarity on the Rhine at the time. This launches with resounding success, and in the same year the first large passenger boat is built: the Marksburg for the Vomfell shipping company from Braubach.

Large, fixed air boxes make the SCHOTTEL sloop unsinkable. Even when the boat is full of water, it still stays firmly afloat.



Ready for transportation: the sloops are either attached to towing convoys or driven by truck to Boppard, where they are loaded onto the railway.

1931

Decades ahead of the rest

Barely six years after the construction of the first Becker sloop, boat building is an important mainstay of the company, as the demand for the small, manoeuvrable boats steadily increases. Josef Becker continues to develop the sloop. In 1931, he embarks on the next innovation and changes production. Instead of continuing to rivet the iron parts as is customary in the industry, he decides to use a welding process. This move puts him far ahead of his time and makes him a name in the shipping industry. Josef Becker also decides to move away from the traditional frame construction. With no cross planks, the three-millimetre-thick bottom and side sections of the boat are formed overhead in a shell construction, cross-arched and self-supporting without additional bracing. This creates a boat with extremely valuable characteristics for skippers: "smallest dimensions with great loading capacity, a rigid water position and yet smooth movement, even in the roughest water, effortless

handling of the oars and suitable for the highest towing speed" according to an historical product brochure.



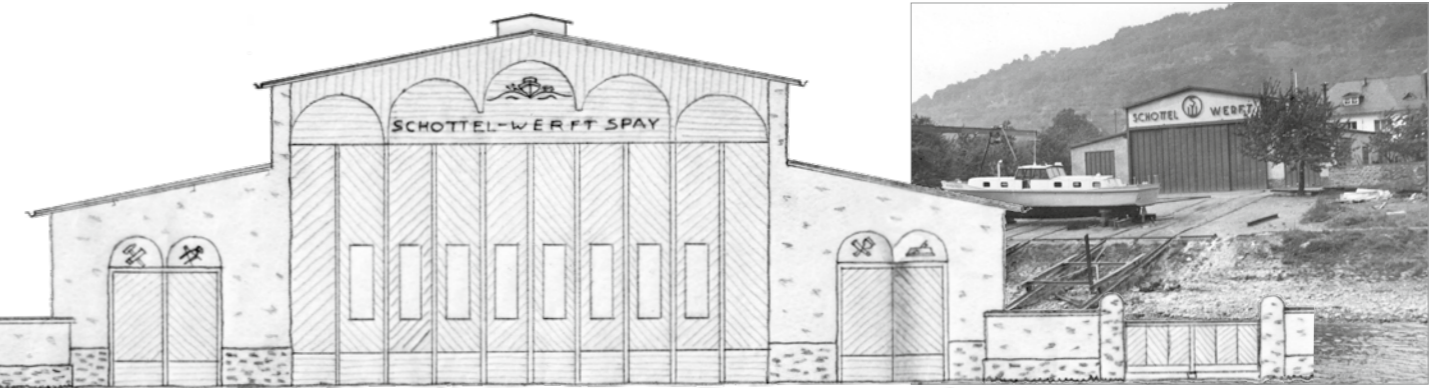
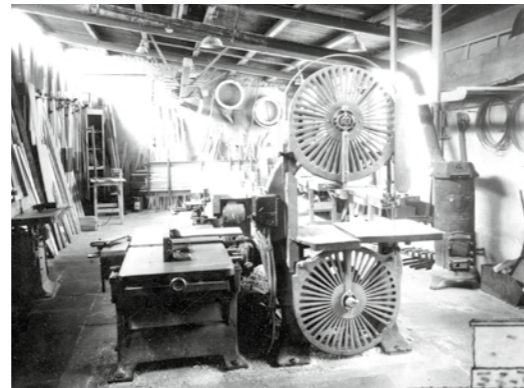
The SCHOTTEL shipyard in its humble beginnings, still surrounded by orchards and with few neighbours

THE LONG JOURNEY OF THE MARKSBURG

The long history of the Marksburg, built in 1928, is testament to the quality already delivered by Josef Becker in the early years. She is sunk in the war and raised again; she sails on the Rhine and Moselle, in Germany and in the Netherlands. In 1966 the vessel undergoes a complete rebuild, in 2005 another general overhaul and today Josef Becker's first large motorboat sails as the passenger ship Herz 2 on the Elbe in Wittenberge.

A complicated manoeuvre: transporting the passenger ship Marksburg over the bank wall and along the tow path to the Rhine





1934

1935

1939 Beginning of the Second World War

“THE MOST BUILT SLOOP IN THE WORLD”

- By 1950, 3,000 sloops have left the SCHOTTEL shipyard. Every day, two to three dinghies are produced – by now in five different designs. It takes the team just 50 hours to produce one model, compared to the 150 hours they needed before the Second World War. The sloop has also long been available with a motor – the Schottin propulsion unit. To ensure that the motor and shaft system do not interfere with rowing, they can be swivelled vertically and lowered into a chamber mounted in the air box.
- In July 1962, a newspaper article reports: 'Recently, the eight thousandth sloop was completed; this dinghy is the most built sloop in the world since the end of the war without any change to the design.'
- In total, more than 16,000 sloops are produced in the SCHOTTEL shipyard.
- In 1973, the yard ceases sloop production. Now that the company increasingly specializes in the manufacture of ship propulsion systems, the sloop division is sold to a shipyard on the Moselle.

At the beginning of the 1930s, the economic situation in the German Reich improves and unemployment figures decline, not least due to the National Socialists' seizure of power and the accompanying rearmament. Business is also good in Niederspay. Josef Becker employs twelve people in 1934, making the shipyard one of only two industrial enterprises in the Boppard district to survive the years of inflation without declaring bankruptcy.

More space at last

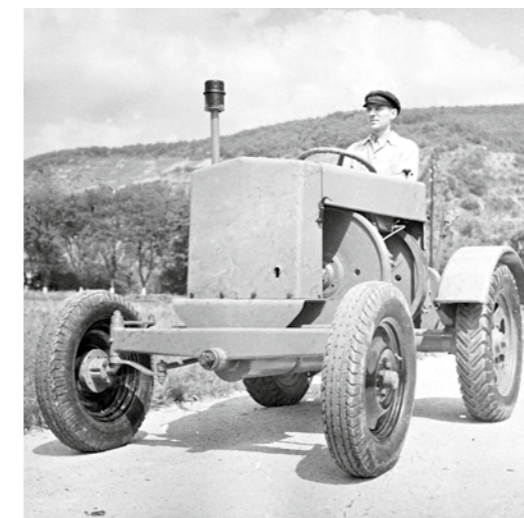
The company's success owes much not only to the inventiveness and far-sighted design work of its founder, but also to the broad range of products that the shipyard now offers and the fact that it specializes entirely in boat building. In addition to sloops, Josef Becker and his team build a large number of different motorboats, including supply boats, inspection boats, small tugs, the first yachts and passenger ships. However, one problem is becoming more pressing: the lack of space in Salmgasse. Josef Becker still builds the majority of his ships in the old barn. He stores them on the forecourt and in rented spaces in the neighbourhood, launching them on a primitive slip trolley. Larger vessels, on the other hand, still have to be carried across the gardens and Rhine promenade because the alley is too narrow for their transport. This state of affairs threatens to inhibit the company's further expansion.

In 1934, Josef Becker decides to build a shipyard on a nearby plot of land at Rhine kilometre 578.4. The plan is to extend an assembly hall, which is already on the site, and to build a home for his then family of six. The construction work makes swift progress and the residential building, the boat building hall and a slipway with an electric lift are all completed bit by bit. At last there is room for a carpentry shop, a turning shop and a forge, as well as for special state-of-the-art machinery, which Josef Becker designs and constructs himself. The

company moves during 1935 and 1936. The company name is also changed: the new shipyard site is located on the river section known as Schottel. To make sure that skippers familiar with the Rhine can locate it straight away in future, Josef Becker decides to rename his company SCHOTTEL-Werft.

Expansion onto land: SCHOTTEL-tractors

Now that he has plenty of space, Josef Becker resumes the construction of agricultural machinery. In 1936, the first SCHOTTEL tractor is built on the new shipyard premises. Tractors are still a rare sight in farming at the end of the 1920s and beginning of the 1930s; teams of oxen and horses take on the heavy work in the fields and woods. Josef Becker will manufacture around twenty tractors to order well into the early war years, each one unique, tailored to the engine currently available.



Test driving a new tractor with Josef Becker at the wheel

Production comes to a halt

The outbreak of the Second World War also marks the beginning of difficult times for the SCHOTTEL shipyard. Although Josef Becker, aged 42, does not have to go to war for the time being, many men from the predominantly young workforce are called up. With each year of the war, more young men join the ranks, which, in conjunction with the increasing shortage of materials, gradually brings production to a complete standstill. Despite the lack of staff, Josef Becker does not resort to using forced labour, as historical documents and contemporary witnesses confirm. "He was far too respectable for that," family members and former employees recollect.

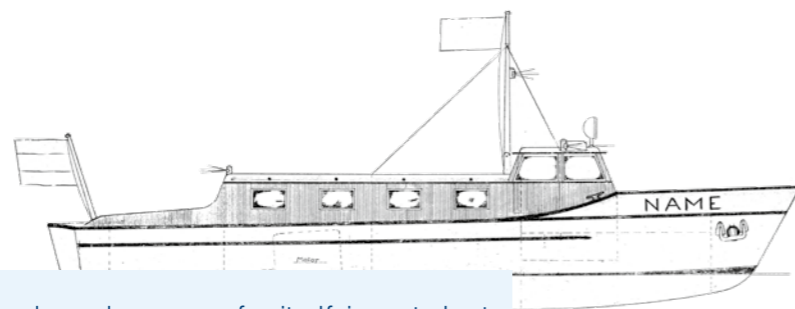
By the end of the war, only "old men, very young apprentices and three women from Spay assigned to the company were working in the SCHOTTEL shipyard to produce simple spare parts," recalled Josef Becker's daughter Anne Krautkremer.

To Josef Becker's chagrin, the assigned women are supposed to do punching work, but time and time again he asks his wife Magdalena to keep the women busy with lighter domestic tasks.

But regular housework and a functioning daily routine have long been out of the question. At the beginning of 1944, Braubach on the opposite bank of the Rhine issues its five hundred and thirtieth air raid warning since the beginning of the war. Magdalena Becker increasingly spends her days with the children in a nearby tunnel, or they take refuge with the workforce in protective bunkers under the concrete foundations of the factory machines. Despite the most adverse circumstances, Josef Becker remains an inventor and innovator. As petrol is no longer available, he develops a "firing stove for vehicle generators" in the mid-war years, which he registers for a patent in July 1944.



By 1950, the SCHOTTEL shipyard had already made a name for itself in motorboat construction, as an historical record shows. In 1950, Josef Becker is awarded the contract for the construction of three police boats by the state of Rhineland-Palatinate as the company demonstrates "the best experience in shipbuilding" and "specializes in the construction of motor vessels." After accepting the vessels, an expert states that "all contractual conditions have not only been met, but positively surpassed."



1944 End of the Second World War

Destruction in every direction: the Rhine – a ship cemetery
 In October 1944, Josef Becker is drafted after all. Only a few kilometres up the Rhine, he is stationed in Bacharach as an armourer again. However, he is only there for a few weeks before he is allowed to return to his company on request. Soon thereafter, in March 1945, the Rhine becomes one of the key battlegrounds of the war. Coming from the west, the Americans cross the river in the neighbouring communities of Brey and Boppard. After some fierce fighting and heavy bombardments, the Rhine villages gradually capitulate, and in the spring of 1945 the war on the Middle Rhine is over. Although the shipyard itself has been spared, the Rhine has been transformed into a ship cemetery by the heavy bombing. Everywhere, funnels and ship hulls protrude from the water and it will take years before all the ships are salvaged and the Rhine can be navigated safely again.

A fresh start under French occupation

After the war, Niederrhein, which has been devastated, finds itself in the French occupation zone. To recoup the losses suffered during the war, the French decide to dismantle 264 factories and transport their machinery to France. The SCHOTTEL shipyard is also seized. In the end, only 39 factories are actually partially or completely dismantled; the SCHOTTEL shipyard is not among them.

In 1945, the shipyard tries to resume normal operations with the employees who have returned from the war. In the first year post-war, the workforce numbers 18 men. Their work assignments include construction of the wood gasifier developed during the war. As petrol is still difficult or impossible to obtain, the alternative propulsion unit is still urgently needed.

Much more important to Josef Becker, however, is sloop and boat building. In 1946, twenty-five employees are already

1948

working on this again, in addition to carrying out the urgently needed ship repairs ordered by the French. As before, the work is commissioned by the French occupying power, which partly pays the employees in kind, such as with wine and cigarettes. The fresh start finally comes in 1948. In the year of currency reform, seizure of the shipyard is lifted and two years later, 45 employees are once again producing motorboats in addition to sloops, including the first three police boats for the state of Rhineland-Palatinate. The boats are still equipped with a conventional propeller and rudder system, but Josef Becker has been testing a propulsion unit for some time that will revolutionize shipping: the SCHOTTEL RudderPropeller.



Heavy bombing has turned the Rhine adjoining the SCHOTTEL-Werft into a ship cemetery.

“SHIPS WERE HIS LIFE”

“An optimist with technical skills and a good dose of courage” – this is how Josef Becker describes himself in his acceptance speech in 1961 when he is awarded the Federal Cross of Merit for his life's work. For almost fifty years, Josef Becker powers the development of SCHOTTEL with his ideas and vision – tirelessly, courageously and against all odds.

Professionally disciplined, but fair, straightforward and always above board is how previous SCHOTTEL employees remember the company founder. Every day he does his rounds of the company, showing the apprentices how to weld, turn and forge, always dressed in a brown work coat and hat. Previous SCHOTTEL employees recall: “Ships were his life.” “He was never above any job and helped out everywhere.” “He talked to everyone. We were like his sons, but it was also our company.”

“My father was a very modest person”

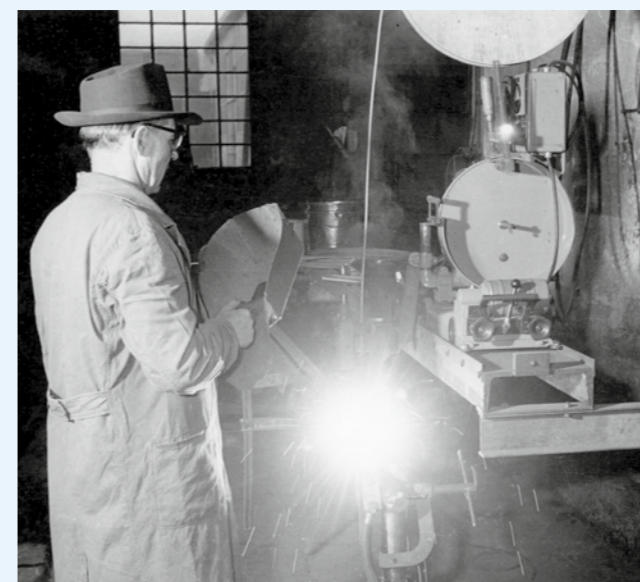


Margit Fohr, Josef Becker's daughter

As a family man, Josef Becker uses his technical skills to surprise his children with doll's houses, merry-go-rounds, tricycles and roadworthy little cars he has constructed himself. He really loves music. Like his father, Josef Becker is an excellent violin and cello player, preferring to play at family gatherings where he entertains his guests with humorous anecdotes after his recitals. “My father was very entertaining. When he started talking, everyone immediately fell silent in anticipation,” recalled daughter Anne Krautkremer.



His health permitting, Josef Becker takes an active part in his company, living for the SCHOTTEL shipyard. When he passes away in 1973, he has over two hundred and fifty employees and just as many in the subsidiaries in the Netherlands, Great Britain and North and South America. Fifty years after setting up his own business, SCHOTTEL products are propelling vessels on all the seven seas and have become synonymous with steerable ship propulsion systems. In 2004, Josef Becker is posthumously honoured with the Elmer A. Sperry Award by five American engineering associations for his outstanding engineering achievement – without ever having studied engineering. The award is given for the “ground-breaking propulsion and steering system, with which Josef Becker and his team accomplished true pioneering work for shipping.”



Patent
No. 793658



Elizabeth the Second by the Grace of God of the United Kingdom of Great Britain and Northern Ireland and of Her other Realms and Territories Queen, Head of the Commonwealth, Defender of the Faith: To all to whom these presents shall come greeting:

WHEREAS Josef Becker, of German Nationality, of No. 128 Mainzerstrasse, Oberspaya on the Rhein, Germany

(hereinafter referred to as the said applicant) hath prayed that a patent may be granted unto him for the sole use and advantage of an invention for Improvements relating to outboard motor propulsion and steering for boats

AND WHEREAS the said applicant (hereinafter together with his executors, administrators, and assigns, or any of them referred to as the patentee) hath declared that there is no lawful ground of objection to the grant of a patent unto him:

AND WHEREAS the complete specification has particularly described the invention:

AND WHEREAS We, being willing to encourage all inventions which may be for the public good, are graciously pleased to condescend to his request:

KNOW YE, THEREFORE, that We, of our especial grace, certain knowledge, and mere motion do by these presents, for Us, our heirs and successors, give and grant unto the said patentee our especial licence, full power, sole privilege, and authority, that the said patentee by himself, his agents, or licensees, and no others, may subject to the conditions and provisions prescribed by any statute or order for the time being in force at all times hereafter during the term of years herein mentioned, make, use, exercise and vend the said invention within our United Kingdom of Great Britain and Northern Ireland, and the Isle of Man, and that the said patentee shall have and enjoy the whole profit and advantage from time to time accruing by reason of the said invention during the term of sixteen years from the date hereunder written of these presents: AND to the end that the said patentee may have and enjoy the sole use and exercise and the full benefit of the said invention, We do by these presents for Us, our heirs and successors, strictly command all our subjects whatsoever within our United Kingdom of Great Britain and Northern Ireland, and the Isle of Man, that they do not at any time during the continuance of the said term either directly or indirectly make use of or put in practice the said invention, nor in anywise imitate the same, without the consent, licence or agreement of the said patentee in writing under his hand and seal, on pain of incurring such penalties as may be justly inflicted on such offenders for their contempt of this our Royal command, and of being answerable to the patentee according to law for his damages thereby occasioned:

PROVIDED ALWAYS that these letters patent shall be revocable on any of the grounds from time to time by law prescribed as grounds for revoking letters patent granted by Us, and the same may be revoked and made void accordingly:

PROVIDED ALSO that nothing herein contained shall prevent the granting of licences in such manner and for such considerations as they may by law be granted: AND lastly, We do by these presents for Us, our heirs and successors, grant unto the said patentee that these our letters patent shall be construed in the most beneficial sense for the advantage of the said patentee.

IN WITNESS whereof We have caused these our letters to be made patent as of the thirty-first day of January one thousand nine hundred and fifty-six and to be sealed

London Grand

Comptroller-General of Patents,
Designs, and Trade Marks.

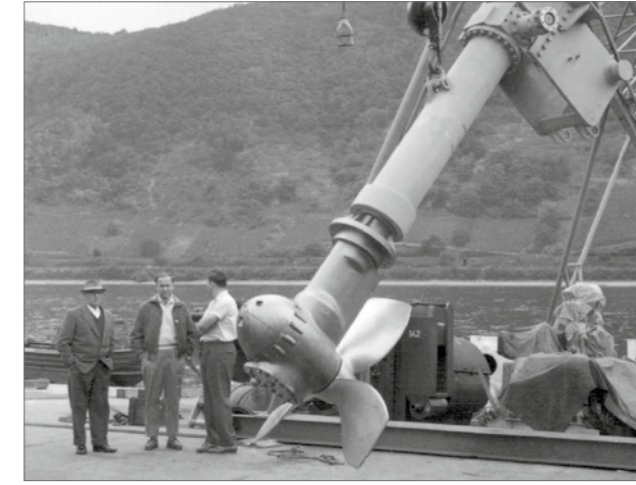


THE RUDDER PROPELLER: A CLASSIC MASTERPIECE IN SHIP PROPULSION

The innovative ship propulsion system, the first to combine steering and propulsion, paves the way for the future of Josef Becker's company. Within just a few years, the invention of the fully steerable rudder propeller elevates SCHOTTEL to a propulsion system manufacturer that is in demand across the globe.

1950: propulsion and steering combined

After the war, Josef Becker sets about solving a problem he has been puzzling over for years: in barges, ferries and motorboats, the propulsion system takes up too much room. He is looking for a system that requires minimal installation space, is straightforward to remove and maintain, and is easier to manoeuvre. As early as 1870, the American, Colonel Mallory, had already tackled the lack of manoeuvrability of

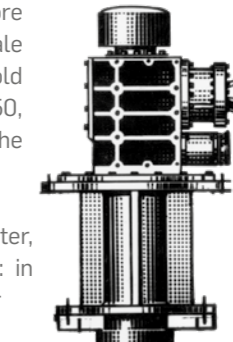


Josef Becker (left) with employees at the slipway on the Rhine

existing ship propulsion systems and designed a steering propeller for steamships. In 1919, Victor von Alten followed suit with the concept of a rudder propeller which could steer through 180 degrees. Presumably unaware of Mallory's and Victor von Alten's designs, Josef Becker begins to make his first sketches. As a starting point for his ideas, he takes the well-known outboard drive, the Z-drive. Time and again he draws, discards and improves his design until he finally finds the ultimate solution: a Z-drive without a separate rudder blade, equipped with a propeller that can be steered 360 degrees around its own axis without any restriction.

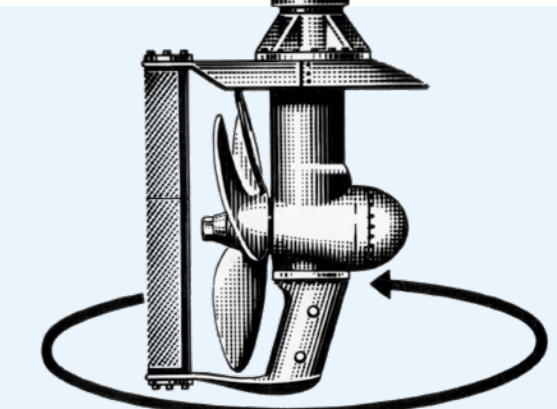
The first police boats with SRPs

As a man of practical experience, Josef Becker first studies the responsiveness of his invention with miniature models in the bathtub before constructing the first large-scale model with bevel gears from old truck axles. Finally, in 1950, the company's own boat, the Magdalena, is fitted with the first rudder propeller (150 PS/110 kW). Two years later, Josef Becker achieves his goal: in 1952, the shipyard receives an order from the Rhineland-



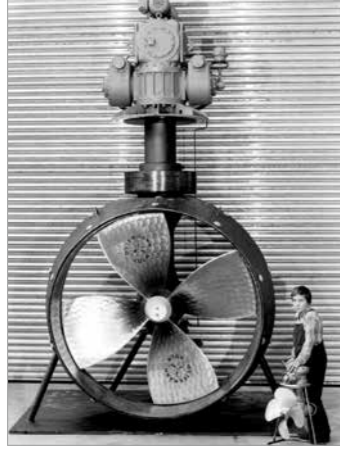
REMARKABLE HANDLING CAPABILITIES

The rudder propeller allows Josef Becker to venture into completely uncharted territory. For the first time, a vessel has the full power of its propulsion engine available for manoeuvring without the need for a separate rudder. Remarkable handling capabilities become apparent: thanks to the rudder propeller, the police boats, which travel at an average speed of up to 16 knots, achieve a turning circle of only one and a half boat lengths at full speed; at low speed, they are able to practically turn on the spot. A propeller turn of 180 degrees is enough to move the boat almost seamlessly from "full ahead" to "full astern".



Five years after being invented, the rudder propeller that is steerable through 360 degrees is patented in Germany in 1955, followed by Great Britain in 1956.

Palatinat water police for four police boats, the first ones to be equipped with the new propulsion unit. Unlike his predecessors, Josef Becker succeeds in taking the crucial step: he develops his idea, which he patents in 1955, until it is ready for the market, establishing the basis for numerous developments in shipbuilding that require maximum manoeuvrability.



SRP 10/500 size comparison with apprentice Herbert Stoffel

SPECIALIZATION IN SCHOTTEL TYPE BOATS

Initially, the company's economic cornerstone is still sloop and shipbuilding, which becomes more and more standardized on the basis of the police boats. In the 1960s and 1970s, the serially produced type boats become the preferred official vehicles for police, customs and water police all over the world. As early as 1957, seventy percent of boats are exported. By the end of the 1980s, almost one thousand four hundred boats have been built and delivered to customer specifications. The end of boat production takes place in 1990 after SCHOTTEL has fully specialized in the development and construction of propulsion units – ushering in the next chapter of the company's history.

1953: first major order from France

One year after their commissioning, the SCHOTTEL police boats can be seen in action during the devastating flooding in the Netherlands, where their superior handling attracts attention. Impressed by what was a sensational new concept at the time, the Dutch Waterways Authority, Dutch Customs and the "Rijkspolitie te Water" order boats with the new type of propulsion. This marks the international breakthrough. Shortly afterwards, the first major order is placed by the French Rhine Army for fifteen vessels. This sets the course for the unique success story of the SCHOTTEL RudderPropeller and the company's worldwide expansion.

1963: ever larger power units

Thanks to its exceptional manoeuvring capabilities, the demand for the universal propulsion system continues

to grow, extending to more and more specialist areas of shipping. Until the beginning of the 1960s, the focus remains on smaller vessels operating on inland waterways or in coastal waters. In 1963, with a move into the offshore industry, the company launches its foray into international waters and into significantly higher power ranges. The next milestone is reached in 1967: SCHOTTEL equips the first harbour tug with rudder propellers, revolutionizing the market for push boats and tug boats.

Offshore industry boosts expansion

In the 1960s, the search for oil under the seabed poses new challenges for shipping. For the first time, vessels have to be dynamically kept in their exact position without anchors, often for days at a time. This task requires utmost

manoeuvrability and can only be performed by one propulsion system: the SCHOTTEL RudderPropeller. In 1963, SCHOTTEL supplies two SRP 150 for the French core drilling vessel Trebel, equipped with the world's first dynamic positioning system. The first real challenge in the offshore sector arises in 1970: SCHOTTEL is commissioned to supply two propulsion units for a free-floating semi-submersible drilling platform which are to be installed in the bottom of the rig's buoyancy chambers. To enable underwater mounting, the SCHOTTEL designers develop a completely new propulsion unit, the SRP 1500, which goes down in company history as the first container unit.



In the course of increasing internationalization, marketing is professionalized; document from around 1970.

Josef Becker and his engineers continue to develop the rudder propeller in line with the burgeoning offshore market and its growing number of requirement profiles for vessels. Thus, just two years later, the SRP 1500 is followed by the SRP 2500, of which 30 units are delivered over the subsequent years. 1976 sees the start of development of the SRP 4500 which is mounted under water. This is set to become one of the largest rudder propellers ever built. In 1986, it is installed in the Micoperi 7000, the world's biggest offshore crane ship at the time. It marks another step forward in the development of propulsion systems,

"EXCEPTIONALLY MANOEUVRABLE SHIPS WITH SCHOTTEL"



Uli Beier has plenty to tell about the early days of the SRP. Joining SCHOTTEL in 1955 as a locksmith apprentice and trained by Josef Becker himself, he worked for the company for fifty years – first as a technical draughtsman, later in the project management section of the Shipbuilding and System Engineering Department, before working in Sales for decades.



How were the first rudder propellers developed?

Unlike today, all improvements were determined empirically. The prototypes were studied on the company's own pontoon: the flow behaviour was optimized, the construction strengthened and the weight reduced. The type series was extended upwards; the data required for this was still determined solely using a slide rule.

It was a success, and so the shipyard had its work cut out for it. Indeed, the only problems in shipbuilding were with capacity. The series production of type boats up to 20 metres in length for the police, customs, water and shipping authorities as well as river safety, push and tow boats could no longer be carried out in Spay, subcontractors were required for the boat hulls. But the entire construction, steering, electrics and equipment were all manufactured in-house. All the joinery for the boats was also undertaken by the company. There were no prefabricated parts. In 1958, The Hague subsidiary was added, which built rudder propellers and navigators. A little while later, type boats started being constructed in Warmond in the Netherlands, where SCHOTTEL bought a shipyard. Nevertheless, issues with capacity prevailed. Anyone who needed a ship with exceptional manoeuvrability turned to SCHOTTEL.

And SCHOTTEL delivered.

I remember that the control desk superstructures were missing on two navigators, but the Spanish haulier was already waiting in the yard. It was late afternoon and our colleagues had already finished work for the day. We ended up calling people from different production areas, who worked through the night to get the work done. At noon the next day, the carrier was able to take the completed navigators with him. Every employee stepped up on behalf of "their" company, working efficiently and effectively. All for one and one for all was the motto. Already back then, SCHOTTEL had a reputation for delivering fair and honest work with a down-to-earth approach.



The orders from the Dutch authorities represent a milestone on the company's evolutionary road to success.

whose designs enable simple and cost-effective underwater installation and removal at sea. 2017 heralds the most recent addition to this portfolio: the 5.5 MW SRP 800 U, which is ideal for offshore vessels and rigs and features more flexible installation options.

Rising to the challenges

Through the close collaboration with the offshore industry, SCHOTTEL propulsion units gradually become established in almost all offshore applications. SCHOTTEL RudderPropellers maintain the positions of production platforms, assistance and supply vessels, cable and pipe layers as well as special vessels such as hydrographic research vessels and diver support vessels – even in the harshest weather conditions. With its propulsion unit, developed over decades and its customized adaptations, SCHOTTEL is able to secure a market share of twenty percent in the platform supply vessel sector during the offshore boom that continues until 2015. Today, SCHOTTEL has successfully positioned itself in the growing market of offshore wind farming.



Current offshore reference: with a load capacity of around 14,000 tonnes and a crane capacity of over 3,000 tonnes, the jack-up installation vessel *Voltaire* will support the renewable energy

SRP 730 > 4,000
INDIVIDUAL PARTS

industry in the construction of wind farms at sea from 2022. The complete propulsion package provided by SCHOTTEL includes four rudder propellers each with 3,000 kilowatts of propulsion power and a propeller diameter of 3.3 metres to generate the thrust.

SRP 4500: THE MOST POWERFUL RUDDER PROPELLER IN THE WORLD

Featuring a propeller diameter of 4.2 metres, a unit weight of 64 tonnes and a transmissible engine power of up to 7,000 horse power: in 1986, the largest rudder propellers to date are delivered to a shipyard in Trieste/Italy, where they are installed in the semi-submersible crane ship *Micoperi 7000*. At the time, this is the largest ship in the world equipped with rudder propellers. Each propeller, installed in a Kort nozzle, generates a thrust of around 80 tonnes. The vessel is still in service today as the *Saipem 7000*; it continues to operate with the same four SRPs from 1986, regularly maintained by SCHOTTEL.



SRP 4500, 1987



Micoperi, 1989

1967: Janus – the beginning of a success story

Just a few years after entering the offshore industry, the company gets off to a flying start in the tug sector in 1967. Together with the shipping company Ulrich Harms of Hamburg, Germany, SCHOTTEL develops the first harbour tug equipped with a rudder propeller: *Janus* which is still in service today under the name *Jan Leenheer*. The tractor tug manoeuvres with two SRP 300s each featuring 342 kilowatts of power and traction (bollard pull) of 12 tonnes. By 1973, the “SCHOTTEL tug” is predominant in Hamburg’s harbour accounting for 14 vessels. In 1978, the trade journal “Hansa” reports: ‘The development of the SCHOTTEL propulsion unit has created completely new possibilities for the design and construction of modern harbour tugs.’ Nevertheless,

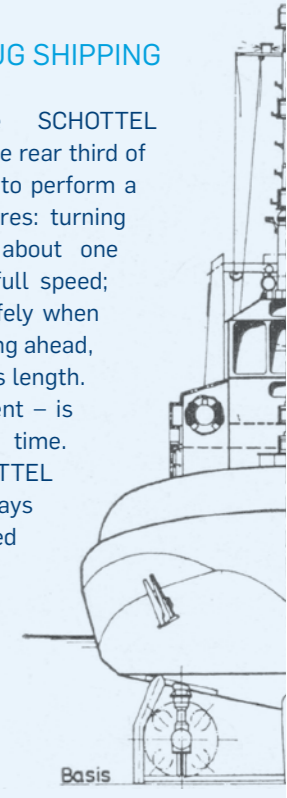


The *Janus* enables SCHOTTEL to enter the tug market at the end of the 1960s.

there are only around 40 tractor tugs with SCHOTTEL RudderPropellers in operation worldwide. The turning point comes with the development of the stern tug, the so-called ASD (Azimuth Stern Drive) tug, which has the advantage of a lower draft compared to tractor tugs. By the end of the 1980s, eighty percent of tugs equipped by SCHOTTEL are stern tugs.

PIONEERING WORK IN TUG SHIPPING

The 360-degree steerable SCHOTTEL RudderPropeller, installed in the rear third of the vessel, enables the *Janus* to perform a whole range of new manoeuvres: turning circles with a diameter of about one ship’s length are possible at full speed; the vessel operates just as safely when moving astern as when travelling ahead, and it can stop within one ship’s length. Traversing – a lateral movement – is now achievable for the first time. Furthermore, the first SCHOTTEL tug is non-capsizable, as it always rights itself even when pulled sideways by the tow rope.



SRP 10 AND SRP 730* COMPARED

Weight (kg):	51	80,000
Propeller diameter (mm):	500	3,800
Height (mm):	711	8,780
Power (kW):	36	4,500
Capacity lubrication oil (l):	2.83	8,300
Steering time in seconds for a 180° turn (“crash stop”):	5	20

* According to a customer order in 2010

A demand for growing power requirements

As in the offshore sector, developments in the sea and harbour tug market progress at a rapid pace: at the end of the 1980s, 40 tonnes of bollard pull is still the upper limit, but just a few years later, a performance of up to 65 tonnes is already required for the ever larger container ships. At the end of the 1990s, SCHOTTEL responds to these growing power requirements by developing a propulsion unit that is a resounding success right from the start. In 1998, the SRP 1515 is launched onto the market with a propeller diameter of 2.6 metres. In the first year alone, twelve tugs are equipped with the new rudder propeller type, which will become the most successful model in SCHOTTEL's product history. Renamed as the SRP 460 in 2016, 1,000 propulsion units are delivered by 2019.

WHEN TUGBOATS DO THE TWIST

In 1979, a team working with SCHOTTEL designers come up with the original idea of staging a spectacular show for the delegates of the "Tug Convention": a tugboat dance in Hamburg harbour. In 1984, a newspaper article reports: 'It was so wonderful. The harbour tugs twisted and waltzed on the water with the fire boats, pirouetting and positively swaying their wide hips.' Today, the "tugboat ballet" is an integral part of the annual festivities celebrating Hamburg port's anniversary and has been emulated in ports all over the world.

Tug market leader

In 2005, SCHOTTEL supplies propulsion systems for more than 50 tugs worldwide – in fact, having sold units for over 600 tugs, it is now number one in this sector. Despite the shipping industry hitting rough waters due to the global economic and financial crisis in 2008 and the drastic drop in oil prices in 2014, SCHOTTEL still succeeds in expanding its market share. 2012 sees the delivery of propulsion units for a new fleet of tugs on the Panama Canal. In 2014, 31 out of 44 tugs on the newly expanded shipping route are powered by SCHOTTEL azimuth thrusters. These include 13 ASD tugs each with two SRP 1515s and 14 tractor tugs each with two SRP 2020s, providing the vessels with a bollard pull of 85 tonnes. Furthermore, Europe's first hybrid tug, the RT Adrian of the Dutch KOTUG tug fleet, uses a SCHOTTEL system. The three SCHOTTEL RudderPropellers type SRP 1215 are operated in an environmentally friendly electric or diesel mode. This pole position in the tug market is set to be unrivalled in the anniversary year: in 2021, more than 2,000 tugs with bollard pull capacities of up to 120 tonnes are in operation all over the world with SCHOTTEL azimuth thrusters.



SRP 460, previously named 1515: 1,000 of the most successful rudder propeller in SCHOTTEL's product history are sold by 2019.

LARGEST VESSEL EVER FITTED WITH A RUDDER PROPELLER

Name: Simon Stevin
Vessel type: dredger
Vessel length: 191.5 m
Load capacity: 33,500 t
Equipment: 4 x SRP 3030 (3,350 kW each)
Vessel owner:
 Dredging and Maritime Management/Jan De Nul Group, Belgium



© Jan De Nul Group



Josef Becker's legacy

Maximum manoeuvrability, optimum efficiency, safe and economical operation, space-saving installation and easy maintenance: these are the key aspects still taken into account today when upgrading existing SCHOTTEL propulsion systems and developing new ones; they also inform research and development work. They represent the same goals that Josef Becker not only aspired to, but also achieved more than seventy years ago.



CROSS-SECTION OF THE 1982/5 PORTFOLIO

Type	max. input power*
SRP 50	100 kW
SRP 500	1,000 kW**
SRP 4500	4,500 kW

CROSS-SECTION OF THE 2021 PORTFOLIO

Type	max. input power*
SRP 100	190–225 kW
SRP 360	1,190–1,530 kW
SRP 730	3,270–4,200 kW

* Current ratings take into account standard operational profiles of vessels.
 ** Power specification for type 505

THE RUDDER PROPELLER TODAY: ADAPTED TO THE WIDEST RANGE OF REQUIREMENTS

Since its invention in 1950, the rudder propeller has revolutionized the world of shipping and continued to evolve: from a propulsion system for fast, small inland vessels to an all-round propulsion system for operations on the high seas with continuous operating times of up to 8,000 hours a year. In 2016, a new nomenclature is introduced with the aim of classifying the ever-growing SRP product range and its further developments more clearly and making them easier for customers to understand. Today, SCHOTTEL offers around twenty types: from the SRP 100 to the SRP 800 with a power range of 190 to 6,190 kilowatts, customized to the respective ship design. Rudder propellers are used in tugs of all classes, in inland shipping and at sea, in offshore operations, even in tropical and arctic conditions and are available in a huge variety of designs: with Z- or L-drive, direct diesel or diesel-electric, bolted or welded, with controllable pitch or fixed pitch propellers, mountable under water, hydraulically extendible and as an ice-class version. Seventy years after its invention, the SRP, which incorporates decades of practical experience, is tailor-made to meet the most diverse requirements.

From conception to new technology standards

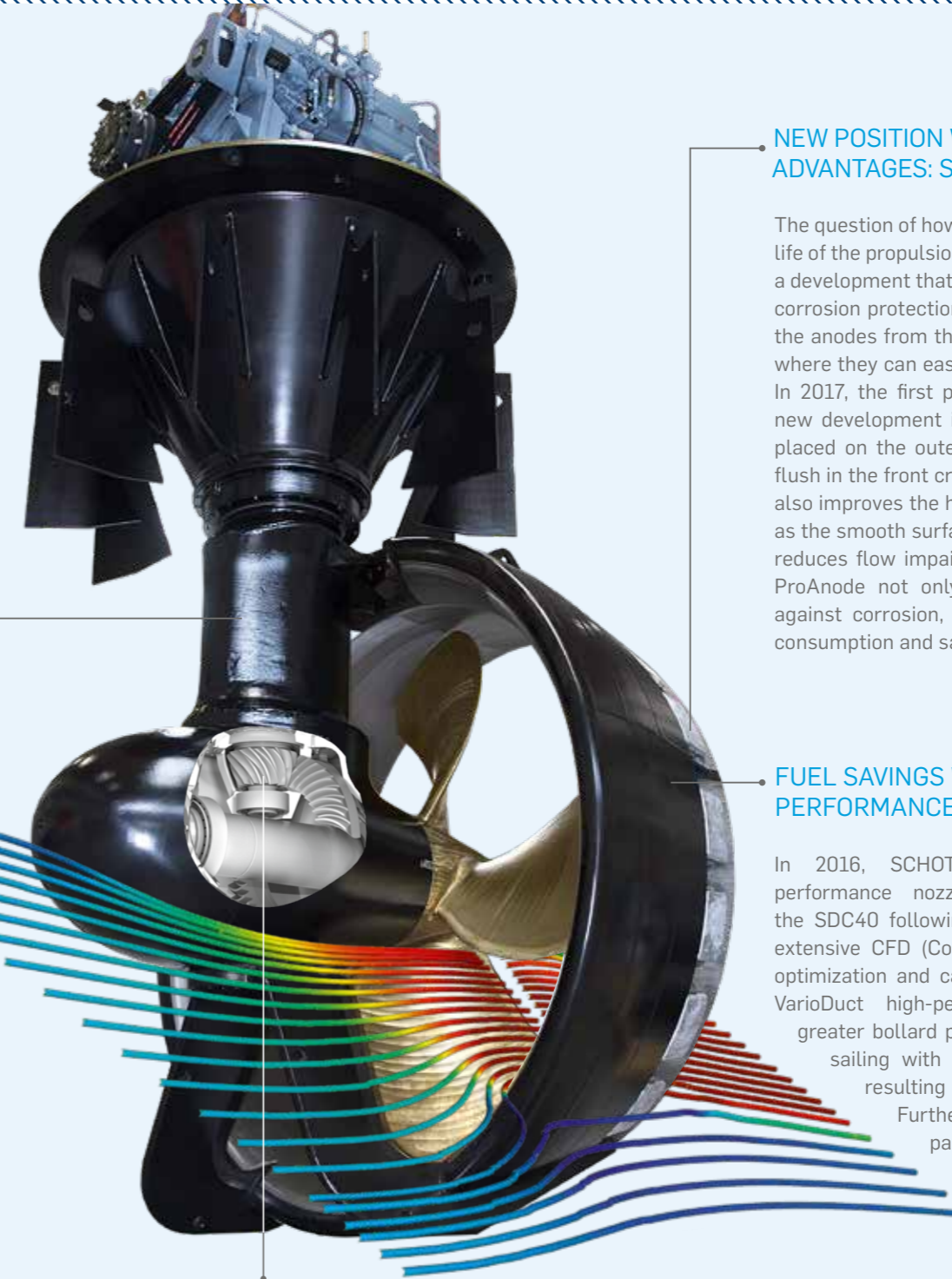
Over the decades, the entire design of the SRP is professionalized: all components are optimized in terms of quality, flow behaviour, noise emission and power density, and numerous innovations are introduced that set technological standards:

SOLUTIONS FOR IMPROVED CORROSION PROTECTION

The production site in Dörth, which went into operation in 2015, is the first to use an optimized process for painting the propulsion units. The propulsion parts below water feature extremely strong, multi-layer two-component epoxy coatings, while a very dense and highly resistant two-component polyurethane coating is applied to the above-water areas. This results in a higher abrasion resistance and, in combination with thicker layers of paint, stronger adhesion for increased corrosion protection.

LEACON SEALING SYSTEM: SAFETY AT SEA

To ensure that ship owners are able to comply with the increasingly strict environmental protection guidelines, SCHOTTEL started developing the LeaCon sealing system towards the end of the last century. LeaCon stands for LEAkaGe CONtrol and is the most effective leakage prevention technology on the market today. LeaCon works with an intermediate chamber design and multiple special seals on the propeller and connecting shaft that separate lubricants and seawater. For this purpose, the system is equipped with a monitoring and alarm unit that continuously checks the condition of the seals. Since 2016, LeaCon has been certified as a leak-free sealing system and is permitted for operation in US waters without the use of bio-oil according to the current VGP guidelines of the EPA.



NEW POSITION WITH MULTIPLE ADVANTAGES: SCHOTTEL PROANODE

The question of how to further extend the service life of the propulsion units is the starting point for a development that will lead to a new standard in corrosion protection: the initial idea is to remove the anodes from the outer surface of the nozzle, where they can easily be knocked off by flotsam. In 2017, the first propulsion unit to feature the new development is delivered. Instead of being placed on the outer surface, the ProAnode sits flush in the front cross-section of the nozzle; this also improves the hydrodynamic flow properties, as the smooth surface structure of the ProAnode reduces flow impairments. This means that the ProAnode not only provides better protection against corrosion, but also ensures lower fuel consumption and savings in operating costs.

FUEL SAVINGS WITH THE HIGH-PERFORMANCE NOZZLE VARIODUCT

In 2016, SCHOTTEL launches the high-performance nozzle SDV45 VarioDuct with the SDC40 following in 2019. Developed using extensive CFD (Computational Fluid Dynamics) optimization and cavitation channel verification, VarioDuct high-performance nozzles deliver greater bollard pull and efficiency during free sailing with the same propulsion power, resulting in significant fuel savings. Furthermore, SDC40 features particularly compact geometry, allowing it to be used in ship designs with limited installation space.

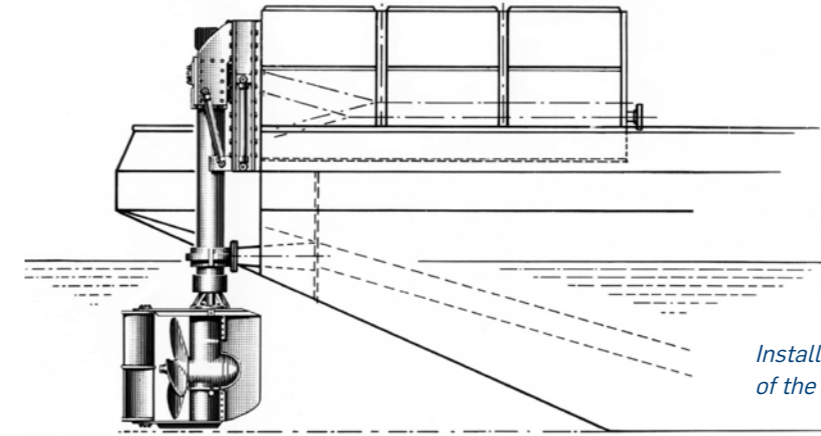
HIGH TORQUE GEAR (HTG) GEARBOX: HOW SCHOTTEL REINVENTS THE GEARWHEEL*

In 2005, SCHOTTEL begins looking for new ways of manufacturing gearwheels. The aim is to increase their load-bearing capacity to such an extent that each tooth may be subjected to fifteen percent more stress; in other words, a gearbox of an equivalent size will be able to transmit fifteen percent more torque – or gearboxes can be reduced in size without any loss in performance. The ambitious development and research programme, which is conducted in close cooperation with the German TU Dresden, yields results. 2012 sees the start of practical trials on the test benches developed by SCHOTTEL and TU Dresden. Simulation results show: the high-performance gearbox HTG (High Torque Gear) achieves the envisaged target by withstanding fifteen percent more torque than conventional bevel gears. Thanks to the patented design, SCHOTTEL is able to construct propulsion units that are both more compact and more efficient.

* The gear arrangement is reversed in this view for better understanding. In the real configuration, the rear of the vertical bevel gear faces the viewer.

TRIUMPHANT CAMPAIGN INITIATED IN SPAY

The rudder propeller is the catalyst for a multitude of further developments addressing the most diverse requirements in the shipping industry. From the small village of Spay, the company expands over the decades to become a global enterprise.



Installation drawing from the early years of the navigator, around the 1960s

1957: foundation of the European Economic Community (EEC)

1952

The year Josef Becker sets up his company is the only one that he works on his own. By 1922, he recruits an apprentice, thus setting the course that SCHOTTEL will pursue for the next 100 years. His untiring diligence and innovative spirit allow him to build up his small business, steadily expand the workforce, production facilities and product range, and establish a secure financial footing for what he has achieved. While Josef Becker limits sales to the domestic market, partly due to a lack of foreign language skills, his son-in-law Franz Krautkremer focusses on internationalization. During his studies in Cologne, he organizes the procurement of sheet metal for the sloops. After graduating in business administration, he joins the company in 1952, the same year that the first police boats are equipped with the new rudder propeller.

1955

PRODUCT HISTORY: 1955 TO 2019

The navigator (NAV) – an all-in-one propulsion unit

Since the rudder propeller is proving its worth in the first police boats equipped with it, Josef Becker sets out on the next challenge. He turns his attention to older, previously unmotorized vessels which are towed in convoys, and are now increasingly obstructing the flow of ever-heavier shipping traffic on the Rhine. Starting with the rudder propeller, he develops a self-sufficient propulsion system at the beginning of the 1950s that can turn almost any floating device into a self-propelled unit: the SCHOTTEL Navigator.

The navigator can be easily mounted on any vessel and combines all the essential components of a propulsion system:

diesel engine, fuel tank, coupling, shaft, the SCHOTTEL Rudder Propeller, switch cabinet and all auxiliary units; in other words, it is a complete engine room on deck. The success of the new type of propulsion unit soon speaks for itself: alongside the sloop, the navigator develops into the second main pillar of the shipyard as early as the 1950s. By the beginning of the 1970s, two thousand units are built, which means that for a decade and a half one navigator leaves the yard halls every other day. In addition to Rhine ferries, tugs and push boats, the SCHOTTEL-Werft also equips crane ships, dredgers, pontoon ferries, tankers and research vessels, barges and hopper barges with navigators, not only in Europe, but also in the Middle East, Asia and South America. By 2019, well over four thousand are sold. Quite a few of them are still in operation today, including on the Boppard Rhine ferry, one of the first propulsion systems built at the SCHOTTEL shipyard in 1955.



EXPANSION INTO ALL MAJOR SHIPPING CENTERS

Franz Krautkremer recognizes the potential of the rudder propeller and lays the cornerstone for the company's worldwide growth by founding SCHOTTEL Nederland B.V. in The Hague in 1958. In quick succession, subsidiaries and agencies are established in the world's most important shipping centers. When Franz Krautkremer leaves the company in 1990, SCHOTTEL has developed into one of the world's largest manufacturers of 360-degree steerable ship propulsion systems and manoeuvring aids. As many as fifty engineers work in the Research and Development Department in Josef Becker House, the original home of the company's founder.



Some of the workforce at the beginning of the 1950s: on the very left, Franz Krautkremer, Josef Becker's son-in-law and subsequent Managing Director; next to him at the front, Josef Becker with another son-in-law on his right, Adolf Volk



Heyday of the navigator production line at the start of the 1970s



As the company grows, sales documents are created and continue to be professionalized.

1958

SCHOTTEL Netherlands

In 1958, the foundation of SCHOTTEL Netherlands in The Hague paves the way for the company's internationalization. Initially for the Dutch market, the first foreign site already produces rudder propellers, navigators and bow thrusters for worldwide export from the mid-1960s. As boat production is at its limit in Spay, SCHOTTEL purchases an additional shipyard in Warmond in 1962, where sloops and type boats are constructed until 1985. At the same time, The Hague site evolves into a specialist for larger rudder propellers, which are primarily manufactured for the offshore sector. At the end of the 1960s, this facility also exhausts its capacity. A much larger factory with state-of-the-art machinery is therefore built on the company's own premises near the old works, which is ready for occupation in 1973. At this point, about fifty employees work in Warmond and one hundred

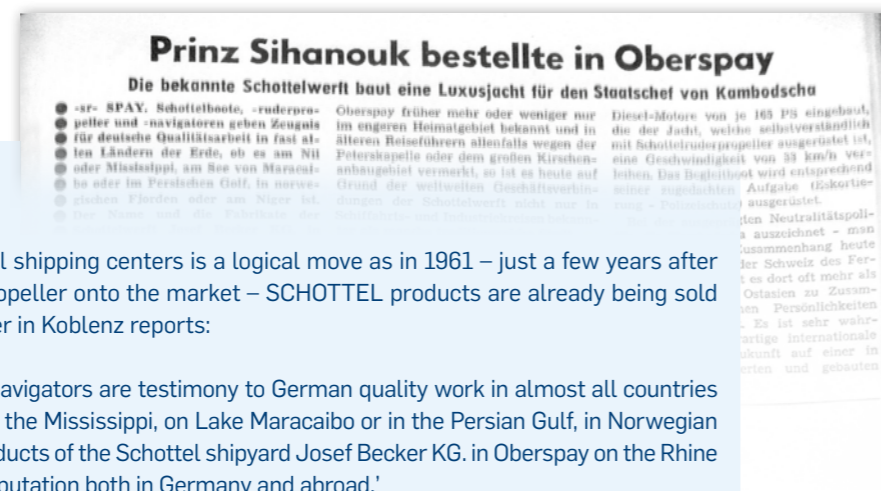
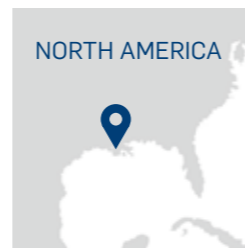


1961

and eighty in The Hague, playing a central role in the global distribution of the SCHOTTEL RudderPropeller. In 1989, the subsidiary finds itself facing a serious crisis, which it is able to overcome with SCHOTTEL Germany's aid. With production relocated back in Spay, the site focusses on sales and after sales service. Since 2019, René Lange has been in charge of business at SCHOTTEL Netherlands in Zoetermeer, where the company moved to in 1990.

SCHOTTEL USA

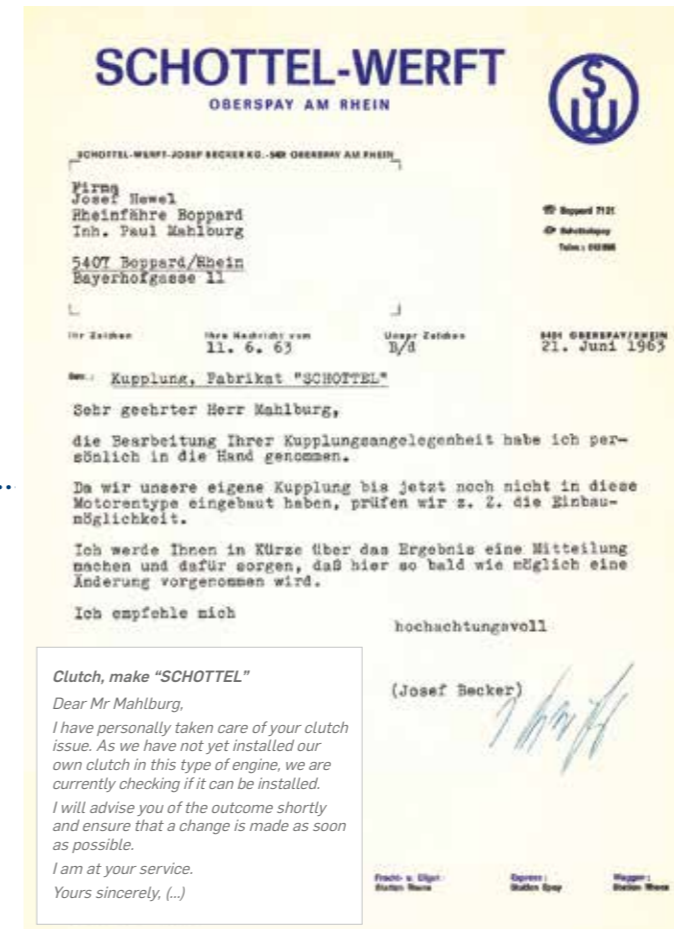
In order to ensure sales and customer service in North and Central America, the North American subsidiary is founded in 1961, initially under a different name. With its excellent contacts to civilian and military authorities, the company generates crucial impetus



FROM THE NILE TO NIGER

SCHOTTEL's advance into international shipping centers is a logical move as in 1961 – just a few years after the successful launch of the rudder propeller onto the market – SCHOTTEL products are already being sold worldwide; the regional daily newspaper in Koblenz reports:

'Schottel boats, rudder propellers and navigators are testimony to German quality work in almost all countries of the world, whether it is on the Nile or the Mississippi, on Lake Maracaibo or in the Persian Gulf, in Norwegian fjords or on the Niger. The name and products of the Schottel shipyard Josef Becker KG. in Oberspaya on the Rhine have earned themselves an excellent reputation both in Germany and abroad.'



Full personal commitment: Josef Becker (image below) assures the operator of the Boppard Rhine ferry, which still sails with a SCHOTTEL Navigator today, that he will personally deal with finding a solution to the problem.



for larger SRPs, which are still in little demand in Europe. In 1997, SCHOTTEL Inc. is founded. Since October 2013, SCHOTTEL Inc. has had its head office in Houma, Louisiana, where the 9,700-square-metre site offers sufficient space for offices, a spare parts warehouse, and a distribution and training center. Customer proximity is also assured, as the core business in the USA is tugs and supply vessels for the oil platforms in the Gulf of Mexico. Gary Aucoin has been General Manager of SCHOTTEL Inc. since 2017.

SCHOTTEL after sales service: focussing on the customer

From the very beginning, customer proximity, expert advice and personal service lie at the heart of the SCHOTTEL philosophy, actively exemplified by Josef Becker, who attaches just as much importance to customer service as he does to the production of high-quality propulsion units. Even though the shipyard workforce already numbers one hundred and fifty in 1963, the company founder still personally attends to the needs of customers.

PRODUCT HISTORY: 1965 TO TODAY

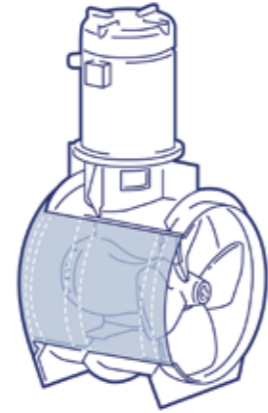
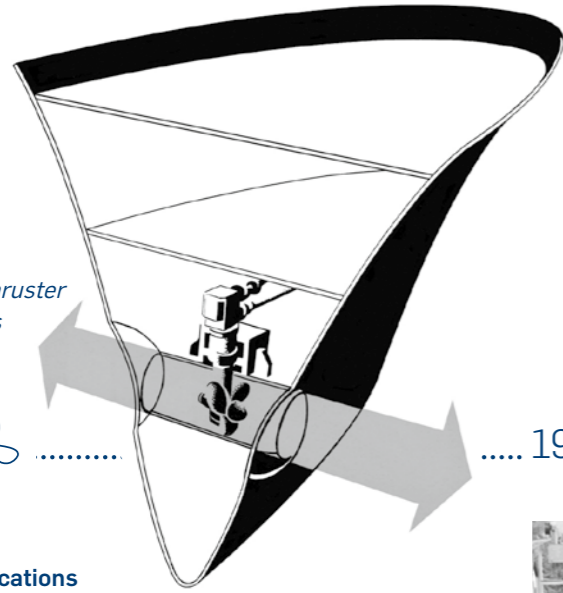
The second powerful unit: the SCHOTTEL Transverse Thruster (STT)

To complete the range of products, SCHOTTEL extends its portfolio by adding transverse thrusters in the mid-1960s – still

known as SCHOTTEL Bow Thrusters. Installed in a tunnel open on both sides at right angles to the sailing direction, where they deliver thrust to port or starboard as required, the auxiliary propulsion units provide a significant increase in manoeuvrability. By 1971, three hundred transverse thrusters are delivered.

Over the decades, the SCHOTTEL Transverse Thruster (STT) as manoeuvring aid is constantly adapted to the demands of the market and the state of the art. Thus, in 2004, the new transverse thruster type series STT 1 to 4 is launched, extended in subsequent years by types 5 to 8. It is characterized by a very compact design, lower noise emissions and easier installation. In 2015, the largest STTs built to date are delivered with an output of up to 3,400 kilowatts.

Transverse thruster from a 1960's brochure



SCHOTTEL Transverse Thruster (STT)

1965



1969

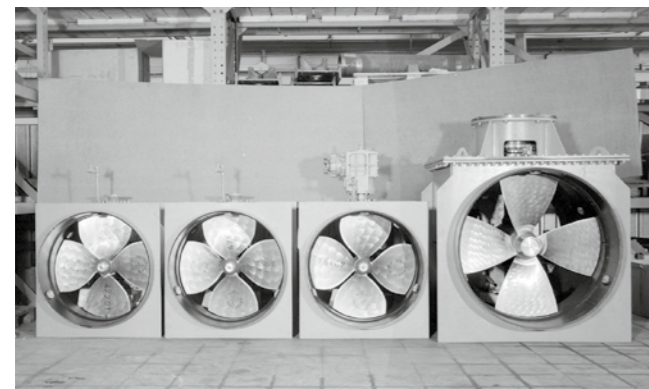


1970



Suitable for special applications

SCHOTTEL Transverse Thrusters, whether equipped with fixed or controllable pitch propellers, improve the manoeuvrability of vessels in many areas of operation: in merchant vessels, they are indispensable for short-term manoeuvring operations in port, while in offshore vessels they enable dynamic positioning even in the harshest conditions. Furthermore, in yachts and naval vessels, they are in demand as extremely low-noise or non-magnetic propulsion systems. In 2020, a special propeller design is developed for Germany's most modern research vessel, the Atair, which, in combination with a resilient well installation, ensures that noise is minimized. This creates the optimal conditions for scientific work on board and protects the marine environment.



Transverse thrusters ready for dispatch at the Spay site

1967: Josef Becker Forschungszentrum (JBFZ)

The JBFZ research center still provides the setting for further technical developments. The spin-offs now referred to as think tanks provide essential impetus for future potential.

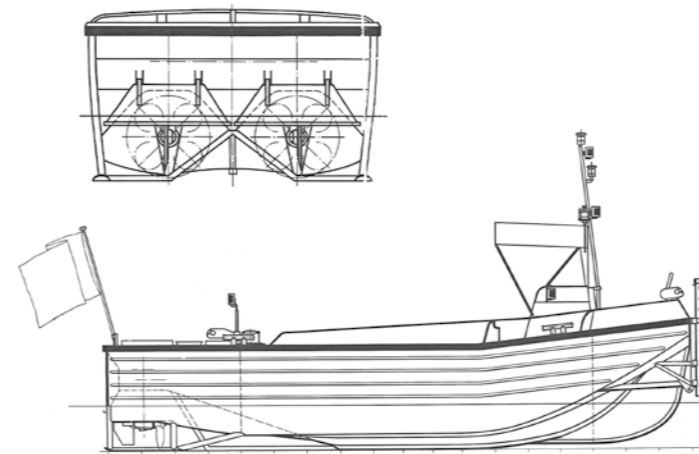


Large M-boats at the slipway in Spay in the 1970s

SCHOTTEL M-boats, 1969–1991

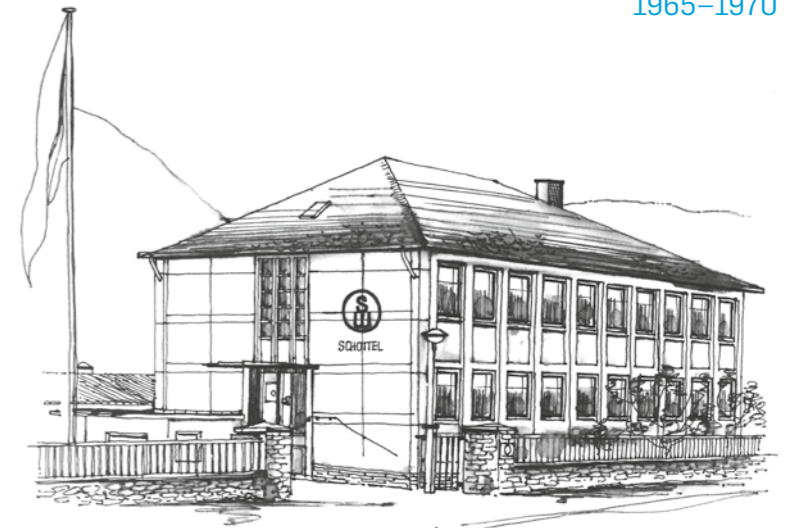
At the end of the 1960s, the SCHOTTEL shipyard designs and builds its first boat for the Bundeswehr (German armed forces): the large M-boat, equipped with an SRP 100. The 9.2-metre-long and 2.5-metre-wide vessel is intended for towing and pushing ferries and bridge parts. However, the large draught of almost one metre proves to be a disadvantage. This gives rise to the development of the small M-boat with a length of 7.45 metres and a draught of just 60 centimetres. Both boats are driven by two rudder propeller systems. By 1987, SCHOTTEL designs, builds and delivers more than 800 of these two boats – also known internally as pioneer boats or large and small motorboats.

In 1987, the first boat is delivered with the designation M3. It is 7 metres long and 3.26 metres wide with a draught of only 39 centimetres when stationary. It features a pump jet propulsion unit. It can be transported overland on existing bridge transporters due to its cuboid shape specially developed by SCHOTTEL – an important requirement of the Bundeswehr. In 1991, production of M-boats is discontinued (see page 37).



The first two models, the large M-boat and small M-boat (the latter shown here in the picture and in the drawings above), are driven by rudder propellers.

View of the administration building before it was built, around 1970.



SCHOTTEL at the headquarters in Spay

In 1935, Josef Becker moves to Oberspay, marking the beginnings of today's company headquarters; the location provides sufficient capacity for the production of sloops and boats until the early 1950s. The increase in demand following the wartime slump and the introduction of the rudder propeller, which sets the stage for the company's worldwide growth, initiate a period of steady building expansion. These construction projects last for more than fifty years until production is relocated to Dörth and have a major impact on the site. Gradually, almost the entire building stock is renovated and extended while the company premises steadily spread through the progressive purchase of neighbouring properties. Over the decades, the initial 3,000 square metres turn into 1.9 hectares, 8,840 square metres of which are built on (see page 57).



The addition of another floor to the existing administration building at the turn of the millennium addresses the demand for more space in administration as well.



SCHOTTEL-VERTRETUNGEN UND -SERVICESTATIONEN

Bulgarien, Dänemark, Finnland, Griechenland, Island, Italien, Jugoslawien, Norwegen, Portugal, Schweden, Spanien, Tschechoslowakei, Türkei, Ungarn, Äthiopien, Ghana, Mozambique, Port. Guinea, Südafrika / Capetown, Südwest-Afrika, Kanada, Brasilien, Chile, Ecuador, Peru, Surinam, Venezuela, Australien, Neue Hebriden, Salomon-Inseln, Burma, China und Hongkong, Indien, Indonesien, Israel, Kambodscha, Korea/Nord, Makao, Pakistan/Ost, Pakistan/West, Philippinen, Taiwan, Vietnam/Nord



Internationalization continues apace: excerpt from a document on the occasion of the company's fiftieth anniversary in 1971

1971

1972

SCHOTTEL France

In 1971, SCHOTTEL France is founded on the banks of the river Seine in Paris-Villeneuve-St. Georges (near Orly). Today, four employees from this location are responsible for sales representation for all French-speaking regions (except Quebec, Canada), including service and spare parts dispatch. Franck Claude has been the Managing Director since 2008.



of which provide customers with their own technical support. SCHOTTEL's global network extends from Ethiopia via Cambodia and Macau to the Solomon Islands and Vietnam. In addition, each subsidiary has a selected staff that is regularly trained at the headquarters. In former West Germany (BRD), strategically placed service locations ensure customer proximity.

SCHOTTEL Far East

Founded in 1972, SCHOTTEL Far East quickly establishes its position on the market. More than two thousand two hundred SCHOTTEL propulsion systems have been sold since 1976. Right from the outset, the site places great emphasis on providing technical support with its own local staff, which has



flourished from an initial five to the current twenty-five members; ten are service employees trained in all SCHOTTEL products. In 1978, the company moves for the first time. Since 2017, SCHOTTEL Far East has resided in Tuas in Tech Park Crescent close to the new shipyard center in south-west Singapore. The location is equipped with its own workshop including two 40-tonne cranes as well as training facilities and a spare parts warehouse. Joachim Schein has been Managing Director since 2012.

Customer contact is a top priority worldwide, be it in Spay or in Singapore.



“SCHOTTEL HAS A GOOD REPUTATION ACROSS THE ENTIRE GLOBE”



Joachim Schein has worked at SCHOTTEL since 1992, and as Managing Director of SCHOTTEL Far East in Singapore since 2012. Before that, he was able to get to know the company from a wide variety of perspectives. Born in Cologne, Germany, he started his SCHOTTEL career as a Sales Engineer in Spay. As General Manager he set up SCHOTTEL Inc.



in the USA and when he was in Wismar the service organization for controllable pitch propeller systems and the Siemens-SCHOTTEL Propulsor before moving to Singapore in 2006.

In 1997, you relocated to the USA for SCHOTTEL. That was no easy feat ...

... not by any stretch of the imagination. SCHOTTEL only had one solitary tugboat in the USA in 1997, while the competition had hundreds. However, one day before the official inauguration of the first McAllister tugboat with SCHOTTEL propulsion units in a long time, in New York harbour, a problem arose that we had to solve overnight. The ceremony went ahead, and the tug literally drenched all the journalists during its manoeuvres. You don't forget something like that. What's more, the position of General Manager in the USA was a unique role for a 34-year-old, especially as a German, and I wouldn't have been given the opportunity anywhere else but at SCHOTTEL.

After a stopover in Wismar, you were then drawn to Singapore.

Back then as Service Manager in Wismar, one of the responsibilities I had was to look after the first shaft lines delivered to Singapore, and then I decided to go there altogether. Of course, Singapore was very exotic and 12,000 kilometres away from Germany. But I had already liked the fact that in the USA we were able to work very independently. Even though the local customers in each different country obviously have their own way of thinking, which you have to adjust to. It helps that SCHOTTEL has a good reputation across the globe that customers trust.

Is this a key factor in SCHOTTEL's success?

Absolutely. SCHOTTEL is synonymous with quality and embodies the typical German mindset: top class engineers, sound technology and discipline. This is acknowledged not only in Singapore, but all over the world. On top of that is our commitment to understanding customer issues. This is the only way we can offer suitable solutions, whether for new products, further developments or services. And this is where we are very flexible and responsive. Thanks to our shareholders, we have always remained independent and thus a manageable, medium-sized company. The fact that we use our own service technicians to commission the propulsion systems and operate independently of Europe is a compelling argument for our local customers.

1972

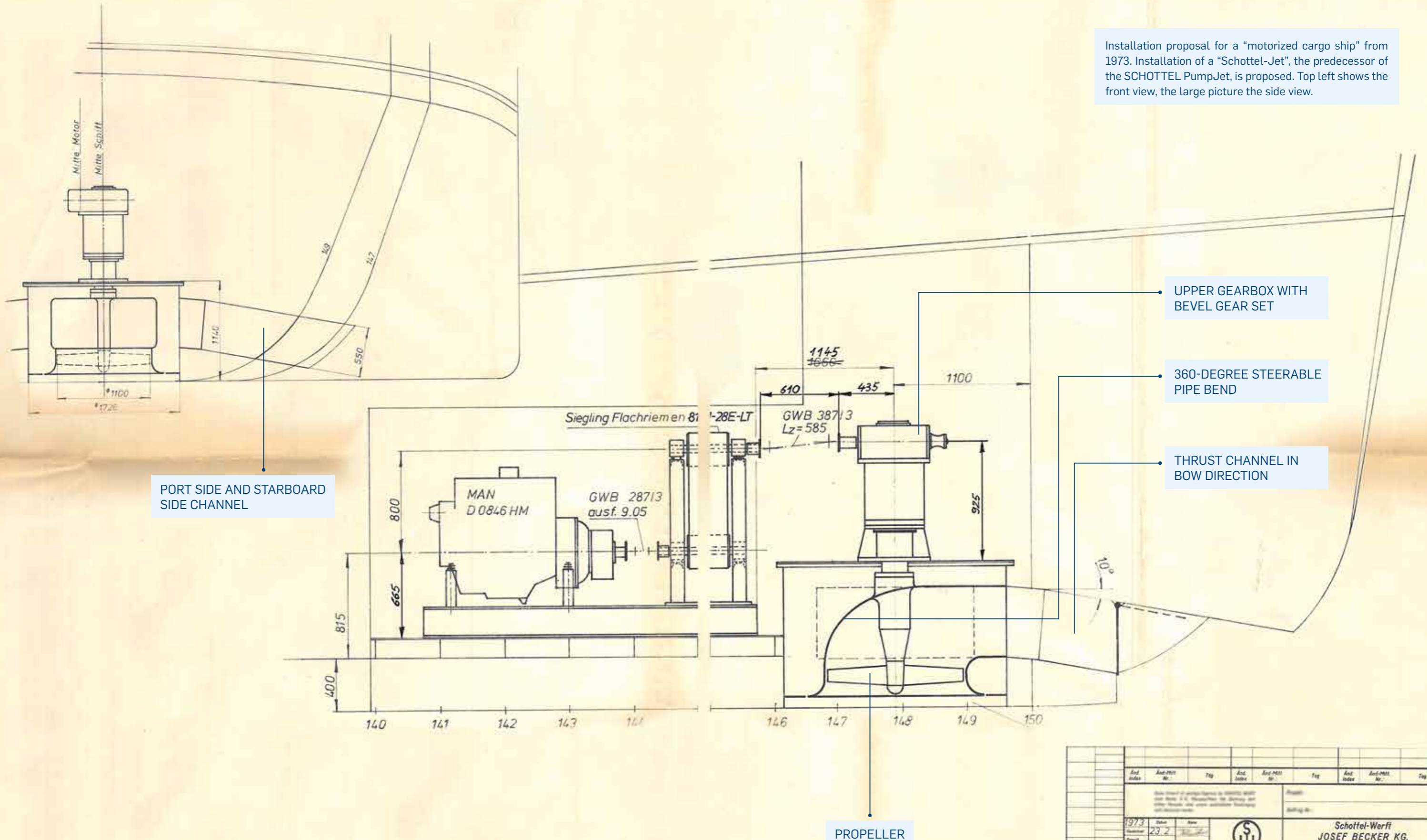
HISTORY OF DEVELOPMENT: 1972 TO TODAY SCHOTTEL Jet and PumpJet (SPJ): the first propulsion unit for extremely shallow water

At the end of the 1960s, a service employee reports to the SCHOTTEL technical designers: "The inland waterway skippers ask for a bow thruster that can manage with just 30 centimetres of water under the keel." This is the impetus for the development of a 360-degree steerable water jet propulsion unit integrated flush into the vessel's hull. It is the first one that can also be used in very shallow water and opens up completely new manoeuvring possibilities for shallow-running vessels such as ferries, pioneer boats and amphibious vehicles. To date, the SCHOTTEL PumpJet is the leading manoeuvring system for vessels that operate in shallow water.

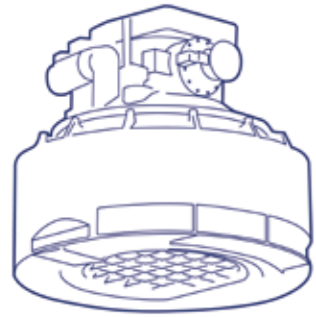


Pump jet illustration from a 1980s sales document

Installation proposal for a "motorized cargo ship" from 1973. Installation of a "Schottel-Jet", the predecessor of the SCHOTTEL PumpJet, is proposed. Top left shows the front view, the large picture the side view.



Änd. Index	Änd. Nr.	Tag	Änd. Index	Änd. Nr.	Tag	Änd. Index	Änd. Nr.	Tag
Date: 1973			Date: 23.2			Date: 1.20		
						Schottel-Werft JOSEF BECKER KG. Oberspy an Rhein		
Einbauvorschlag Schottel-Jet								



SCHOTTEL PumpJet (SPJ)



Company's founder Josef Becker (1897–1973)

1973 

Infinitely rotatable and steerable water jet propulsion system

The first step in development is taken in 1972 with the SCHOTTEL Jet which still uses a propeller but already incorporates the functional principle of what will be the highly successful pump jet. In 1977, the then Bundesamt für Wehrtechnik und Beschaffung (Federal Office of Defence Technology and Procurement) in Koblenz commissions the

further development of a pontoon similar to a catamaran, which heralds the breakthrough: the jet driven by a conventional propeller is replaced by a propulsion unit akin to a centrifugal pump with a semi-axial impeller. It features considerably better suction capacity than a propeller. This allows for an even shallower draught and, especially at speed, a noticeably higher thrust than the jet propeller.

Constantly optimized flow control

In 1993, after in-depth development work by the SYSTEC think tank, a new pump jet generation is launched: the T version, in which the volute housing is replaced by a guide apparatus. In addition, the water is ejected symmetrically via three outlet nozzles for the first time, which creates significant advantages in terms of control and propulsion power. The launch of the RD version follows in 1999, equipped with a new guide system, known as the ring diffuser. Compared to the T version, it offers fifteen percent more thrust with the same input power. Efficacy is boosted again with the development of the SPJ 30 in 2019; computational fluid dynamics (CFD) and a new five-bladed impeller enable thrust and propulsion efficiency to be optimized even more, and the design becomes more compact. Today, the propulsion power ranges from 50 to 3,500 kilowatts, with the pump jet delivering full thrust at a minimal installation depth of 15 to 75 centimetres. Since the encapsulated design ensures extremely low-noise and low-vibration operation, the SPJ has also become an in-demand propulsion unit in the naval sector.

Death of the company's founder

On 20 August 1973, the company's founder Josef Becker passes away at the age of seventy-six. At this point, the company employs over two hundred and fifty people in Germany and just as many in the subsidiaries of the time. His inventions propel vessels on all the seven seas and have become synonymous with steerable ship propulsion systems (see page 14ff.).



Since 2020, the SPJ has been available with an optional new feature: the SCHOTTEL CoaGrid. This allows the water flow to be directed more effectively into the pump jet inlet.

1975 

SCHOTTEL Brazil

One of the oldest subsidiaries initially manufactures the SCHOTTEL Mini-Navigator in its own workshops. Components for larger propulsion systems are imported from Germany and installed on site. In 1992, however, production has to be discontinued when the import duties are raised. Since then, SCHOTTEL do Brasil has concentrated on the core business areas of sales, service and repair. On average, SCHOTTEL do Brasil compiles one thousand and eighty-five maintenance reports (as of 2020) each year, such as those for vibration, oil and alarm tests, and thermal imaging camera tests. The maintenance service offered by SCHOTTEL in Brazil enjoys an excellent reputation, which is why customers also have the propulsion units of other manufacturers analyzed there. Stephan Camp has been the General Manager since 2011.



SCHOTTEL do Brasil: a large-scale administration, repair and storage complex is currently being built on an area of 10,500 square metres at the Itajaí, Santa Catarina, location. It is due to open in 2021.



"OUR MAJOR ADVANTAGE IS GREAT DIVERSITY"



Arno Gonçalves has worked in the Service Department at SCHOTTEL Brazil since 2010. Initially working in Warehousing and Spare Part Sales, he has been an After Sales Manager in customer service on-site since 2015.

What role does the SCHOTTEL after sales service in Brazil play in purchasing decisions?

We live in a country that is more like a continent in terms of dimensions, with 7,491 kilometres of coastline and 42,000 kilometres of navigable rivers. The availability of good service and spare parts is a key factor for success here – which is why many customers choose SCHOTTEL for their new build projects. After purchase, we support the customer throughout a vessel's lifetime: our team is available for service calls, spare parts can be provided at short notice from local warehouses and we develop concepts for preventive maintenance. Our major advantage is this great diversity.

Will digitalization change the SCHOTTEL after sales service?

The changes have already come. Thanks to software solutions, we are already able to perform many services via remote maintenance and virtual reality. This is where the customer benefits from all the experience we continue to gain; the constant monitoring of our systems and the subsequent analyses are definitely an added plus for the customer. Nevertheless, we mustn't forget the most important thing: although these tools help, they are no substitute for our knowledge.

10 years in service: are there any experiences that you have particularly fond memories of?

I have many good memories and I've had some great experiences. It's hard to name just one. But one of the biggest challenges was improving the propeller protection on the push boats of Hidrovias do Paraguay. In the first months of operation, Hidrovias noticed that the pollution from fishing lines and mud was greater than originally thought, and SCHOTTEL was assigned with solving this problem. It was a tremendous task and we did a brilliant job. Apart from that, we are always happy to meet customers at trade fairs in Brazil, Paraguay and Colombia. Communicating with colleagues from all over the world also makes SCHOTTEL a great place to work.



SCHOTTEL goes digital

Increasing customer proximity



In the mid-1980s, in addition to the staff in the headquarters in Spay, Germany, there are more than five hundred employees worldwide in the SCHOTTEL subsidiaries, service stations and local dealerships. In addition to new business, they take care of fast and comprehensive after-sales support for all delivered systems.



Scope of delivery of propulsion units including control elements and cabinets, 2021

1980

CAD/CAM:

start of digitalization in Design and Production

With the introduction of CAD software (Computer-Aided Design) in-house, the era of pen, paper and drawing boards comes to an end after sixty years. Prior to the use of digital modelling, project planning and the integration of propulsion systems into a ship's design took several weeks – now, the process lasts only a matter of days. Automation in Production also begins in 1980. The use of CAM software (Computer-Aided Manufacturing) enables computerized control of lathes and milling machines for the very first time.



Copilot, 2020

1981

PROPULSION CONTROL SYSTEMS: 1981 TO TODAY

Propulsion and steering – always in unison

Parallel to the development of the all-round steerable rudder propeller, SCHOTTEL starts working on coordinated control systems that enable 360-degree alignment of the propeller thrust by means of the Copilot, thus considerably



Joystick system for operating six propulsion units, 2010

facilitating the manoeuvring of ships. 1981 sees the launch of the Masterpilot, a robust control module that particularly proves its worth in tugs. From 2001 onwards, the MasterStick is developed, a customized joystick system that allows up to six propulsion units to be manoeuvred with just one lever. It continues to be refined over the years. SCHOTTEL's portfolio of control systems currently extends from the simple, hand-operated steering wheel on the propulsion unit to the remote-controlled, computer-assisted MasterStick.

1986

NUMBER ONE IN DOUBLE-ENDED FERRIES: MILESTONES FROM 1986 TO TODAY

The shipyard receives its first major high-profile order for 24 roll-on roll-off ferries from the British shipyard group North East Shipbuilders Ltd. in 1986; each one is fitted with four SCHOTTEL RudderPropellers type SRP 350/350. In 1996, the twin propeller is launched, quickly establishing itself as the new main propulsion in Scandinavian double-ended ferries, both in the mechanical version and, from 2003 onwards, in the electric CombiDrive version. The introduction of the EcoPeller in 2015 marks the next evolution in the Scandinavian market: as the EcoPeller meets the strict local environmental guidelines as well as the high efficiency requirements of the latest designs, it is selected for eight new Norwegian ferries in 2017. This positions SCHOTTEL at the forefront of the ferry market in Norway.

Ferries require special propulsion solutions: frequent docking and casting off, winding routes and strict schedules necessitate reliable and economical propulsion systems with the best manoeuvring capabilities – all features that SCHOTTEL propulsion systems fulfil. To date, more than two thousand five hundred ferries worldwide have been equipped with SCHOTTEL propulsion and manoeuvring systems. The key markets include Norway and Canada, as well as France. In the conversion business, the focus is on Africa. In response to the current requirements of the ferry industry, SCHOTTEL consistently comes up with innovative propulsion solutions: from the rudder propeller, the pump jet and twin propeller through to the EcoPeller. This enables SCHOTTEL to become the propulsion expert for "floating bridges" and is now the world leader in double-ended ferries.

19 October 1987: stock market crash on the international stock exchanges

1988

1989: fall of the Berlin Wall with reunification of the Federal Republic of Germany in 1990

SCHOTTEL propulsion control systems are still at the cutting edge today and are also utilized as controls in competitor products.

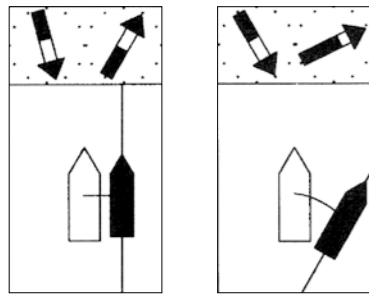
Largest contract in the company's history

In March 1988, the Bundeswehr places its largest order to date with SCHOTTEL: one hundred and twenty-two M3 boats with an order value of fifty million German marks (DM). The contract is to be completed by the end of 1991, and subsequently one boat is delivered every week. In the end, this numbers one hundred and fifty-six vessels which are co-built with the company known then as EWK Eisenwerken Kaiserslautern (now General Dynamics European Land Systems Germany GmbH); they are each equipped with two pump jets type SPJ 55M. The last of almost one thousand boats in total leaves the SCHOTTEL shipyard in 1991. This includes the delivered quantities of all versions, starting with the first large M-boat at the end of the 1960s.



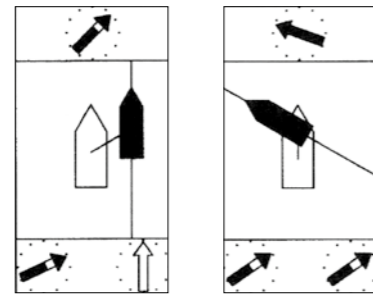
156 M3 boats for the Bundeswehr: a flat bottom and fully protected propulsion units spell enormous success.

Two propulsion systems in the bow



Moving sideways to starboard Moving sideways whilst turning

Two propulsion systems in the stern, one in the bow



Moving sideways to starboard by 60 degrees Ahead with superimposed rotation

In April 1992, the SCHOTTEL Masterdisplay is presented as the "new type of direction display system".



1990

Tense economic situation

Following "Black Monday" in 1987, the first stock market crash after the Second World War, the crisis in the German shipyards comes to a head. This and accelerating globalization with competitors undercutting each other mean that SCHOTTEL is forced to announce short-time work in 1990, and subsequently lays off employees for the first time since the Second World War. Dipl.-Kfm. Dietrich W. Bork assumes the sole management of the company in difficult times in 1990. Under his leadership, the business consolidates in the years to follow.

1992

A new master display with graphics for the first time

In 1992, SCHOTTEL designs a new type of direction display system which provides shipmasters with quick and precise information about the position of the individual propulsion units and the movement behaviour of the vessel at a glance. A large variety of data is used to graphically display the acting forces on the new LCD display for the first time.

Termination of boat building

The end of the Bundeswehr contract in 1991 goes hand in hand with the strategic corporate decision to end boat building and focus exclusively on propulsion systems.

The navy remains an important partner for SCHOTTEL

Even after the end of boat production, SCHOTTEL remains a major partner for navies and coastguards around the world. Today, SCHOTTEL delivers bespoke engineered propulsion solutions and Integrated Logistics Support (ILS) for the specific demands of naval applications from the design phase throughout the entire life cycle of a vessel. For example, ILS encompasses training, services, spare parts and the calculation of life cycle costs.



In addition to the international navy, the German Navy is also a reference customer. The combat supply vessel Bonn (2013) is equipped with SCHOTTEL ControllablePropellers type SCP 1294 as the main propulsion, each with 7,200 kilowatts.



The Spay production site in the immediate vicinity of the Rhine is at risk during floods. From 1989 onwards, a mobile protective wall erected directly in front of the halls helps to safeguard operations; marked in red in the picture on the right (on the left 1988, on the right 1990s).

1994

Certificates confirm high quality standard

In 1994, SCHOTTEL is the first company in its sector to receive verification from the then four international classification societies American Bureau of Shipping, Bureau Veritas, Det Norske Veritas and Germanischer Lloyd that its quality management complies with the guidelines of DIN EN ISO 9001.

PRODUCT HISTORY: 1996 TO TODAY

SCHOTTEL TwinPropeller (STP): powered by two propellers

By the mid-1990s, SCHOTTEL RudderPropellers have already been successfully operating in inland ferries worldwide for decades. However, when landing and in low tide, ferries often face the problem of not having sufficient water under their keels. This is how the idea of distributing the power of a rudder propeller over two propellers arises in the mid-1990s, in order to reduce the required installation space and extend the operating times. The twin propeller is born: based on the principle of the rudder propeller, it ensures combined thrust and 360-degree manoeuvring power for the first time with its two co-rotating propellers.

1996

A highly efficient propulsion configuration

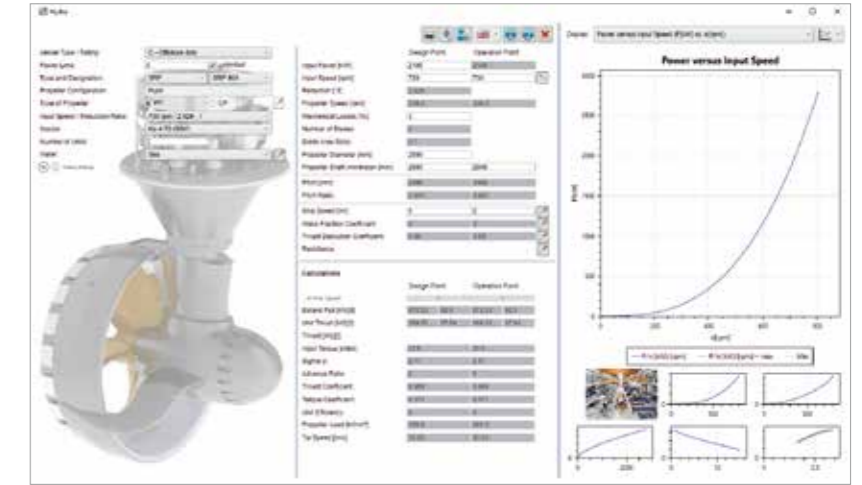
In order to optimally coordinate all system components and achieve the utmost efficacy, the new propulsion unit is preceded by an intensive development process in close cooperation with the shipbuilding testing facility SVA Potsdam. By designing a special propeller geometry, both propellers can be the same size, in contrast to conventional twin propellers. Furthermore, an integral part are the fins between the propellers, which are fitted in the best position to ensure the optimal flow is directed towards the second propeller. This means a significantly greater level of efficiency is achieved in comparison to Z-drives with only one propeller.



Four STPs as a propulsion package in a river cruise vessel



Siemens-SCHOTTEL-Propulsor (SSP), a pod drive with 360-degree rotation and integrated electric motor; here: the ferry Nils Holgersson

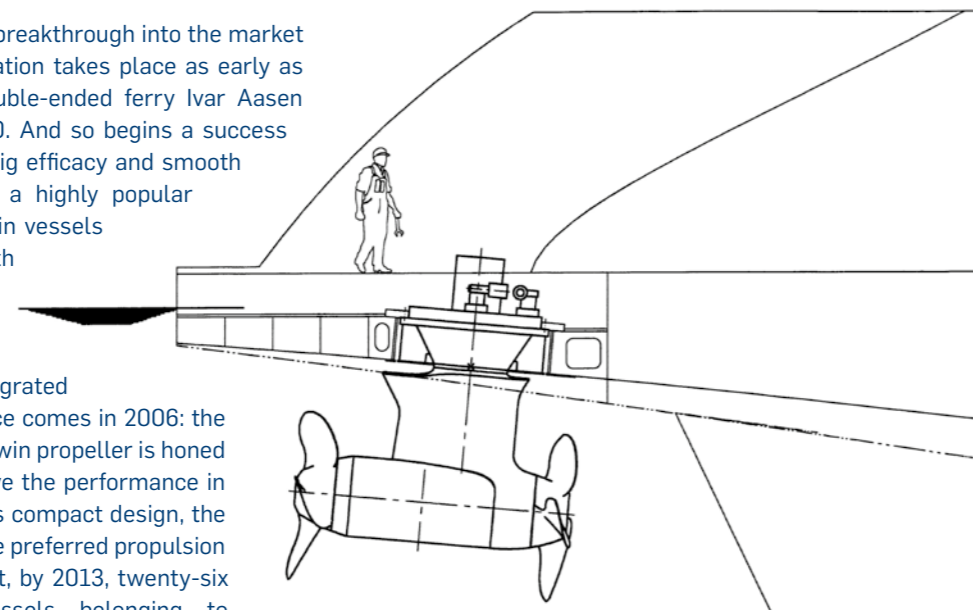


Hydra software determines the system thrust and power absorbed for various propulsion types under different operating conditions.

1997 

1998 

Due to its efficiency, the STP's breakthrough into the market is assured and the first installation takes place as early as April 1998: the Norwegian double-ended ferry Ivar Aasen is equipped with two STP 1010. And so begins a success story, as thanks to its outstanding efficacy and smooth sailing the STP proves to be a highly popular SCHOTTEL product. It is used in vessels of all types and sizes, either with conventional upper and lower gearboxes or, from 2003 on, in the space-saving CombiDrive version with an integrated electric motor. The next advance comes in 2006: the lower gearbox housing for the twin propeller is honed in a cavitation tunnel to improve the performance in a higher speed range. Due to its compact design, the twin propeller also becomes the preferred propulsion unit in river cruise ships. In fact, by 2013, twenty-six vessels belonging to Viking River Cruises are each equipped with four STP 200s, supported by two SPJ 82 auxiliary propulsion units. By 2020, more than sixty of the operator's ships are on the waters with SCHOTTEL propulsion systems, from 2018, equipped with the SCD 150 Twin, the twin propeller version of the CombiDrive electric propulsion unit developed specifically for river cruising. Other important credentials for the STP include two major Canadian ferry companies.



SEP in an installation drawing for a yacht

PRODUCT HISTORY: 1997 TO 2012
Pod drives: extremely high power rating of up to 30 megawatts

Starting in 1997, two new types of propulsion units are developed at the SCHOTTEL-Werft. They are differentiated from the company's traditional products by the type of electric motor used in an underwater pod. The pod propulsion system further consolidates an established trend of market expansion from the harbour dock out to the open seas.

> **Siemens-SCHOTTEL-Propulsor (SSP)**
 In 1997, Siemens and the SCHOTTEL-Werft establish the Siemens-SCHOTTEL-Propulsor consortium with the aim of designing a new marine propulsion system. After two years in development, the Siemens-SCHOTTEL-Propulsor is approved



SCHOTTEL TwinPropeller (STP)

for worldwide use in 1999. The pod drive, which is mounted outside of the ship, consists of the largest twin propeller ever built with a diameter of 4.5 metres, and a reconfigured permanent magnet motor that drives the propellers directly without power diversion. Amongst others, the SSP is in operation in the cruise ferries Peter Pan and Nils Holgersson belonging to the Swedish shipping company TT-Line.

> **SCHOTTEL Electric Propulsor (SEP)**
 While the SSP covers high power requirements from 5 to 10 megawatts, SCHOTTEL responds to a growing demand for smaller podded propulsion systems in 2002 with the development of the SCHOTTEL Electric Propulsor. The complete pod system is offered in five sizes from 1 to 5 megawatts and in single or twin propeller versions, depending

on the type of ship. Multi-purpose vessels, icebreakers, research vessels and landing platform dock vessels, are just some of the applications for the SEP.

Fast calculation of core data with Hydra
 From the end of the 1990s on, SCHOTTEL puts its own software Hydra to work, which calculates propulsion projections swiftly. For the first time, project-related configurations for different propulsion solutions can be presented to the customer 'over the course of a phone call' according to the customer brochure at the time. In 2017, the software is completely updated. Today, Hydra is also available to customers for their own project-related propeller configuration and for rapid data exchange with SCHOTTEL.

SCHOTTEL REPORT

First published in the 1990s, the customer magazine shares details about outstanding projects, the latest technical developments, and news from the subsidiaries.



1998 

Wismar, Germany: high level technology from the Baltic Sea
In 1998, SCHOTTEL takes over the mechanical engineering and propeller company Wismarer Propeller- und Maschinenbau GmbH (WPM) on the back of a close cooperation that has been in place since 1992. As a result, the product portfolio expands to include controllable pitch propellers. This allows a traditional division of business for the Wismar-based company to continue

which has been developing and producing these propulsion systems since 1963. For East Germany's (GDR) shipbuilding industry, the Wismar site is a center for the construction of ship propellers, which are initially installed in fish processing vessels, and later in cargo ships. Under SCHOTTEL's direction, the site undergoes constant development, building on the existing expertise. In addition to controllable pitch propellers, Wismar is now a production, testing and assembly location for particularly large SRP systems.

Investment in state-of-the-art manufacturing

In the same year as the takeover of WPM, ground is broken for the construction of a new production and assembly facility, in which SCHOTTEL invests thirty million German marks (fifteen million euro). It prepares the way for the production, large-scale mechanical processing and assembly of propulsion units, including the SSP which is co-manufactured with Siemens. In 2015, at a cost of four million euro, a modernized lathe and a new machining center are put into operation, enabling turning, drilling and milling of the highest technical standard. The large lathe allows for the machining of components with a computer-controlled radius of operation of 10 metres in width, 4.1 metres in height, and a spatial depth of 1.6 metres. Workpieces weighing up to 200 tonnes can be machined on the floor plate.

Today, SCHOTTEL employs around one hundred and twenty people in Wismar to develop and construct controllable pitch propeller systems of up to 30 megawatts, plus the largest 360-degree steerable propulsion units of 2 to 6 megawatts, and all of the retractable systems. Seven production and storage halls, up to 97 metres long and 16.5 metres high, are available for this purpose on the six-hectare site. Wismar has also established itself as an important service location. The Service Center Nord (north), which is divided into the areas of Service Customer Support and Repair, provides assistance for all SCHOTTEL propulsion systems.



New five-bladed hub, shown here on the left with a 50 metre-long shaft line

THE ONGOING EVOLUTION OF THE WISMAR SITE

1998

Takeover of WPM by SCHOTTEL

1999

Building expansion at the site, including a new production and assembly facility for marine propulsion systems

2008

The assembly capacity for large rudder propeller systems is increased from eighty to one hundred and eighty per year. Thirty new jobs are created.

2013

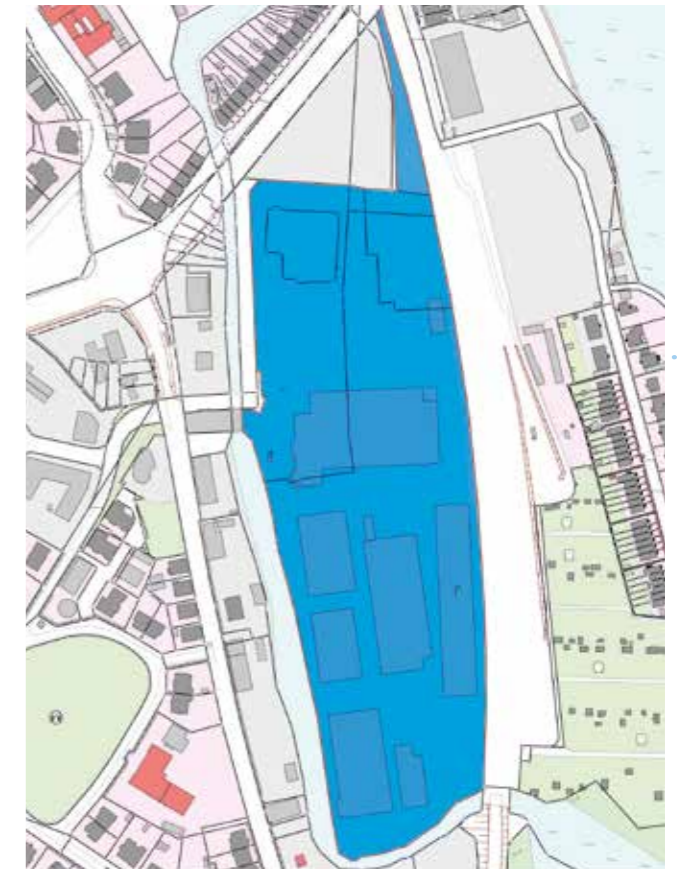
A new repair center for large and small propulsion systems is built.

2015

Commissioning of a modernized mechanical production facility costing four million euro

2020

Investment of over five hundred thousand euro in a new crane system with a lifting capacity of 2 x 50 tonnes





The High Torque Gear (HTG) increases the load-bearing capacity of the gearbox and leads to performance and safety gains. Michael Potts made this the subject of his dissertation at the German TU Dresden.



“SCHOTTEL SIMPLY HAS THIS HIGH LEVEL OF INNOVATION”

Dr. Michael Potts has been employed at SCHOTTEL since 2004. He began his career in Spay immediately after completing his mechanical engineering studies at the University of Rostock. Back in his native Mecklenburg, he is now Branch Manager and Head of Technical Department at the Wismar site.

You played a key role in the development of the HTG gearbox and wrote your doctorate on it. What was the impetus for this development?

The bevel gear is the centerpiece of our rudder propellers. Our ambition was to transmit more torque in a reduced installation space. This has allowed us to fulfil our customers' desire to have a propulsion unit that is even more economical, i.e. consumes less fuel. The patented innovation is called the HTG – High Torque Gear. Our biggest motivation is this: we develop our products with our customers' needs and wishes in mind. That's why we stay in close contact with them. And finally, there is a strong affinity to science and research at SCHOTTEL. Universities support us in this, and in return we provide a practical insight into our work. Both parties benefit from this cooperation. This is an important part of our innovation process – and not just for the HTG.

Apart from increased efficiency, what will be the topics influencing product innovation in the future?

In my view, this will be three-pronged: operating a vessel more ecologically, more cost-effectively and more safely. On-board digitalization provides the basis for this. For example, assistance systems will be able



to support the captain to an even greater degree in saving fuel and manoeuvring the ship without accidents. Furthermore, digital monitoring of our units will enable more cost-effective and predictive maintenance. So, I see digitalization in shipping as a hugely important area, which SCHOTTEL is addressing with new departments.

Josef Becker was an inspired inventor in his day. Has SCHOTTEL retained this spirit of ingenuity?

Absolutely. SCHOTTEL still has a high level of innovative strength, which is a key reason why I'm still with the company after sixteen years. I saw this first hand on the HTG project: the inventive drive of our engineers is encouraged at every level of the company, from group leader to management. When combined with the expertise from other areas of the business, such as After Sales and Product Management, an initial idea transforms into an innovation. That is a great source of motivation and pride.



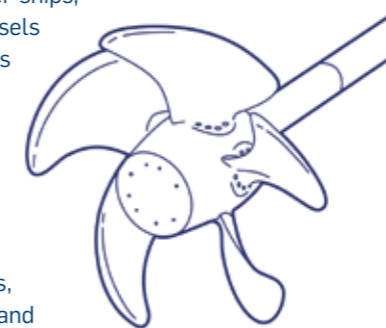
Unlike fixed pitch propellers, controllable pitch propellers have blades that rotate around their own axis and whose pitch can be variably and continuously adjusted. Thanks to this tried-and-tested mechanism and powerful hydraulics, the propulsion unit can always be optimally attuned to changing loads and to the engine map. In addition, sailing ahead and astern becomes possible even without a reversing gear. SCPs with a propeller diameter of up to 8 metres are developed and produced at SCHOTTEL's Wismar site.

.....1998 

.....1999 

**PRODUCT HISTORY:
1998 TO TODAY
SCHOTTEL Controllable
Propeller (SCP):
maximum thrust and
excellent manoeuvrability**

Following the establishment of a modern manufacturing facility in Wismar, production includes controllable pitch propeller systems from 600 kilowatts to 30,000 kilowatts with propeller sizes of between 1.5 and 8 metres. The units are supplied including shaft line, hydraulic and automation systems. Since the pitch of the propeller blades can be adjusted, SCHOTTEL ControllablePropellers offer maximum thrust combined with outstanding manoeuvrability, even at varying speeds and loads. This makes them the preferred propulsion system on a wide variety of vessels: from large ferries to fast container ships, trawlers, research vessels and heavy-lift carriers to offshore supply vessels. In 2012, SCHOTTEL engineers develop a new five-bladed hub for fast ships such as naval vessels, coast guard vessels and yachts, meeting customer demands for significant noise reduction. At the

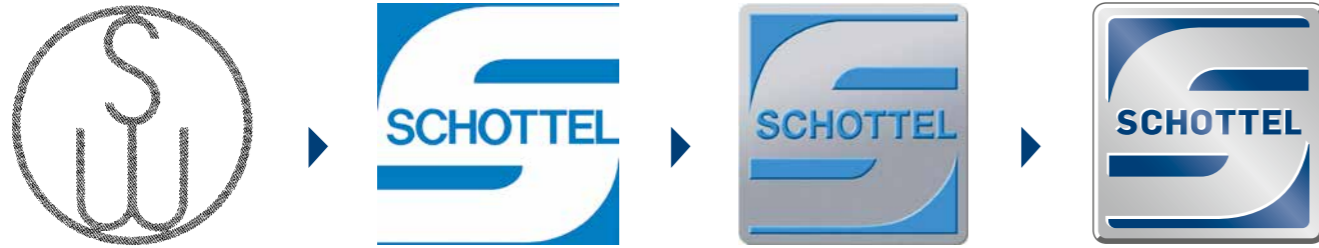


SCHOTTEL ControllablePropeller (SCP)

same time, the optimized propeller design of the new 5-X series leads to improved efficacy, while retaining the proven and maintenance-friendly function and design of the classic controllable pitch propeller systems. Building on this, the second-generation five-bladed hub, focussed on power density and hydrodynamic performance, is successfully brought to market from 2019 onwards.

**SCHOTTEL China (SSPC):
at the heart of global shipbuilding**

In 1999, SCHOTTEL founds its sixth subsidiary in the Chinese city of Suzhou, 95 kilometres from Shanghai: SCHOTTEL Suzhou Propulsion Co. Ltd. (SSPC). In doing so, SCHOTTEL acknowledges the importance of the People's Republic of China as one of the world's largest shipbuilding nations, and, at the same time, establishes a presence in one of the fastest growing economic centers in the world. With an investment of six million German marks (three million euro), the Chinese production facility is completed within just one year. Two production buildings, an integrated warehouse and an administration building are constructed on a site of 12 hectares. The focus is on the production of transverse thrusters, about a third of which go to Chinese shipyards; in 2007, the one thousandth transverse thruster leaves the factory halls. Due to the steadily increasing demand for SCHOTTEL products, a new, larger facility with 4,303 square metres of production space is built in 2008. Further investments are made in state-of-the-art machinery that ensures that the Chinese site complies with the high quality standards and guidelines that apply to production at the parent company in Spay.



Logo creation begins about ten years after the company's founding, incorporating a W for the shipyard (Werft in German). During the period of internationalization, a confusing variety of logos follows until the square SCHOTTEL-S is introduced in the 1980s. To this day, the logo has only undergone slight adjustments in keeping with the times. It acts as a reliable trademark with global recognition.

1999

To this end, strict quality audits are carried out, which all suppliers must pass on a regular basis. The trade dispute between the USA and China, the global economic downturn, plus the slump in offshore oil extraction and the associated decline in new shipbuilding compels SCHOTTEL to realign production at the end of 2019. As part of these restructuring measures, the production site in Suzhou is to be closed and production relocated to Germany. With SCHOTTEL Suzhou Trading and Service Co. Ltd. (SSTS) founded in 2011, SCHOTTEL still has a foothold in China with four locations, which offer customers fast service on site as well as at their premises.

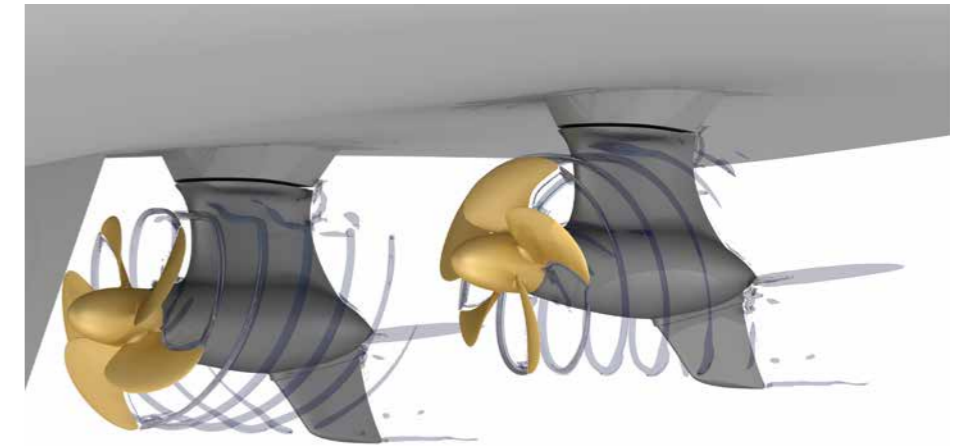


SCHOTTEL retrofits: custom modernizations

SCHOTTEL propulsion units that have been reliably in service for thirty years or more are not uncommon. However, over the decades, the requirements of a ship, its crew and technology change. Improved environmental protection, higher performance, new maintenance concepts or preventive monitoring systems (Condition Monitoring System, CMS) are in demand. The after sales portfolio includes modernization solutions, from upgrades for DP operation and improvements to steering systems to retrofitted propulsion units or the conversion of propulsion units from other manufacturers: each propulsion system replacement significantly extends a vessel's service life and delivers financial benefits to the owners.



Around the turn of the millennium, the first overseas modernizations are implemented, including two new rudder propellers for the tug Brooklyn McAllister. This vessel marks a long partnership between SCHOTTEL and McAllister Towing, USA. Back in the 1980s, it was already equipped with SCHOTTEL products as a newly built ship under the name Brent McAllister.



CFD simulation of a SCHOTTEL EcoPeller (SRE) at 24 knots: vortex areas can be identified and thereafter minimized thanks to CFD.

2002: conversion from the German 'D-Mark' to euro

2001

CFD: a new technology optimizes innovation

To ensure that SCHOTTEL propulsion units rise to their full potential under all conditions, they are continuously improved with state-of-the-art methods prior to practical testing. Since 2001, the computer-based calculation method CFD (Computational Fluid Dynamics) has been used for this purpose. Simulations of flow processes on the propeller and propulsion unit housing allow for the hydrodynamic optimization of the system. In order to increase the high level of CFD calculations, another six-figure sum is invested in the system in 2020. Improved computing capacity means that the degree of detail can now be considerably enhanced allowing all of the factors relevant to flow simulation to be taken into account. Every development project is supported with CFD.

PRODUCT HISTORY: 2003 TO TODAY

SCHOTTEL CombiDrive (SCD): solution for special installations

In 2003, SCHOTTEL engineers develop a high-torque L-type propulsion system incorporating the experience gained from electric pod drives and combining it with the advantages of the mechanical 360-degree steerable rudder propeller: the SCHOTTEL CombiDrive. Unlike pod drives, which have the electric motor in an oversized underwater pod, and in contrast to conventional L-drives with a separate electric motor, the CombiDrive's electric motor is partially integrated vertically in the support tube of the unit. This ensures an extremely compact design and low installation height, ideal for vessels with limited engine room space such as ferries, offshore supply vessels or yachts. The elimination of the upper gearbox also results in fewer mechanical losses, a reduction in noise and vibration levels, and lower maintenance requirements. In the following years, the SCD is produced both as an STP variant and an SRP with nozzle version. – 2006 sees the market launch of the STP version, which, with its lower propeller load, is a particularly low-noise means of propulsion; it is used

2003

wherever more power with less fuel consumption is required. Just one year after its launch, sixteen propulsion systems are in service in five ships, including the first two platform supply vessels with the new distinctive ULSTEIN X bow shape. In 2008, the introduction of the SRP with nozzle version follows, which comes into its own particularly in the lower speed range and at static thrust. From 2018, new technologies bring the advantages of the SCD to the SRP and SRE variants.



SCD in the Wismar production facility

2005 

Under the leadership of Prof. Dr.-Ing. Gerhard Jensen (2005–2015), SCHOTTEL more than doubles its revenue. The company's growing share in the offshore sector can be further increased, while the solid market lead in what has been SCHOTTEL's main area of business, harbour tugs, is maintained.



Prof. Dr.-Ing. Gerhard Jensen

Gear production center

The physical expansion of the company headquarters at the Spay site is accompanied by ongoing investment in machinery, most recently in 2008: 4.8 million euro flow into production development, making it possible to almost double the output capacity for large propulsion systems. This is accompanied by an increase in personnel to fill forty positions and by the location specializing: Spay becomes a center for machining and gearbox production. At the beginning of 2009, the complete gearbox capacity is relocated there from Wismar. The assembly of rudder propeller systems up to a maximum power rating of around 2,300 kilowatts is now also concentrated in Spay.

SCHOTTEL STRENGTHENS BRAND IN NORWAY



Frydenbø Power AS (formerly William Knudsen AS), a subsidiary of Frydenbø Industri AS, has been a sales partner of SCHOTTEL GmbH since 1954. Frydenbø Industri AS is one of Norway's leading suppliers of products and services for ship, land and offshore industries. That this was a partnership with potential was demonstrated in 2007 when Frydenbø Industri AS acquired 15.4% of the shares in SCHOTTEL GmbH, opening up new strategic opportunities for SCHOTTEL. At the same time, a Supervisory Board was established with Knut Herman Gjøvaag, the owner of Frydenbø Group AS, as Chairman.

In 2007, Frydenbø Industri AS purchased shares in SCHOTTEL GmbH. What were the reasons for choosing a strategic partnership with SCHOTTEL?

It was an interesting opportunity that presented itself at that time. With our long tradition as a sales and service partner for SCHOTTEL, I had a good insight into the company, and I wanted to work with a production company within the maritime sector again after we sold Frydenbø Steering Gear to Ulstein. After several meetings with Prof. Dr.-Ing. Gerhard Jensen, I was also convinced that SCHOTTEL had the right leader to take the company to a new level.

How deeply do you feel connected to SCHOTTEL GmbH?

I feel deeply connected to the company and I'm in contact with the senior managers more or less every week. It's also good to visit our sites, either in Germany or elsewhere in the world. I always like to go to the production site and smell the oil and see where the "real work" is being carried out!

How do you envisage the long-term prospects for the SCHOTTEL Group?

As we prepare for our centenary, we are facing a really hard and unprecedented time all over the world with Covid-19. I am confident that with the strong management team that has ensured excellent performance over the years, and with Stefan Kaul as the Captain today, SCHOTTEL is prepared for harder times. We will therefore continue our mission to become "the world's leading propulsion experts".

2010 

SCHOTTEL Academy

The SCHOTTEL Academy is established in a new building on a plot within sight of the company's headquarters in Spay. This is a training center that supports customers from After Sales and employees by enhancing their knowledge.



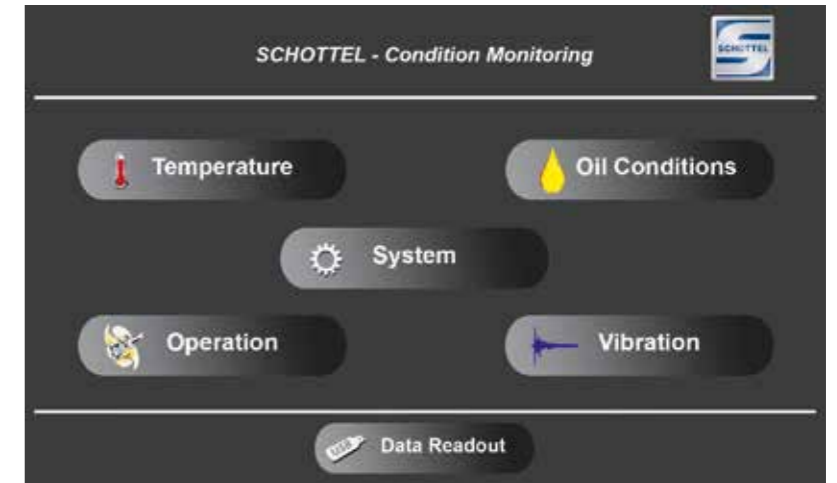
The SCHOTTEL Academy opens in 2010 with spacious training rooms for employees and customers.

The Academy is also the new home to the Josef Becker Forschungszentrum (research center), which was originally founded in 1967. This think tank is being revitalized to bolster innovation, with engineers from a wide range of disciplines working on new solutions. In 2013, one of the research projects gives rise to the spin-off SCHOTTEL HYDRO, which concerns itself with the generation of tidal energy (for Academy training courses, see page 50).

CMS: smooth operation through preventive maintenance service

Since knowing the condition of a ship's propulsion systems is essential for safe operation, SCHOTTEL launches a condition

2011 



Parameters for the condition monitoring system, ca. 2011

monitoring system (CMS) in 2011. This uses sensors to collect data on the condition of the system, including bearing and lubrication oil temperatures, water saturation and vibrations. For the first time, CMS ensures comprehensive and continuous monitoring of all the relevant components in the drive train, and in doing so determines the maintenance requirements of the thruster in real time. Condition-based or predictive maintenance measures replace rigid intervals. In addition to the installed hardware, with ProCMS, customers now have access to a comprehensive analysis service. In the SCHOTTEL Monitoring Center, certified experts evaluate the transmitted data. They provide recommendations for the appropriate measures as they are needed.



Data collected in the engine room using sensors enables remote maintenance.



2011 

KNOWLEDGE AT THE TOP OF ITS CLASS: SCHOTTEL ACADEMY

The aim of customer training courses is to provide crews with detailed knowledge to enable them to repair any potential damage themselves and carry out maintenance tasks independently, thus helping owners to keep expensive downtimes to a minimum.

The courses offered range from individual product training sessions to specialized in-depth instruction – conducted as classroom events, online courses, on-site training and simulation exercises.

The one hundred and fifty SCHOTTEL service technicians (as of 2021) are also brought up to speed with the latest



developments at the Academy. Two hundred and fifty training modules with graded content are taught by around twenty-five qualified instructors.

14,000 KILOMETRES

away as the crow flies was the most remote training location to which a SCHOTTEL instructor has travelled.

To date, an average of fifty external customer training courses with around three hundred participants from all over the world are held at the SCHOTTEL Academy each year. Additionally, there are around two hundred online and classroom training courses for service employees. Furthermore, the company offers more than eighty courses annually for SCHOTTEL GmbH employees on a wide variety of topics.

Training centers around the world

In addition to the training center in Spay, the SCHOTTEL Academy now offers three other training locations and high-quality instruction bases to meet local demand: in Houma, USA, in Singapore and, since 2018, in Fremantle, Australia. Another one is under construction in Itajaí, Brazil.

As well as a bridge simulator with original panels at the training site in Spay, there is also a fully operational engine control room in Fremantle, Western Australia – identical in every detail to the control rooms installed in ships. What makes the training unique in the world is that the participants to be trained on the bridge communicate directly with the personnel at the control system to enact real-life operation with immediate responses.



In 2022, SCHOTTEL Russia will commence service in an administration building with a repair workshop and warehouse in Saint Petersburg.

2011 

SCHOTTEL Russia

Following decades of business relations and the equipping of numerous vessel series with SCHOTTEL propulsion systems, the establishment of SCHOTTEL Russia in Saint Petersburg in 2011 further strengthens the company's market presence there. A commitment that pays off: in 2020, the subsidiary is able to secure market leadership in the inland cargo vessel segment. Sergey Chestny has been General Manager since the company was founded.



EUROPE

SCHOTTEL China (SSTS)

In 2004, a sales and service presence is set up at the production site in Suzhou (SSPC) and in the ports and megacities of Shanghai, Dalian and Guangzhou (since 2006). In 2011, with the established team, SCHOTTEL Suzhou Trading and Service Co., Ltd. (SSTS) is founded. Twenty-five employees from the Sales & Marketing, Technical Support & Order Handling, and Service Departments offer vessel owners and shipyards rapid spare parts provision as well as professional maintenance and repair support on site. The location has been managed by Allan Xu since 2011.



ASIA

SCHOTTEL Middle East

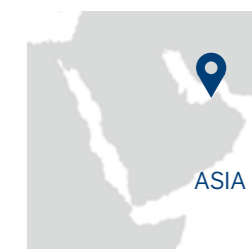
Also in 2011, SCHOTTEL expands its sales and service activities to the Persian Gulf and opens SCHOTTEL Middle East in Dubai. The most populous city in the United Arab Emirates joins the ranking of the world's ten largest maritime capitals in 2019, offering SCHOTTEL ideal conditions to consolidate and



SRT

2012 

broaden its commitment in twenty-three countries in the MIA region (Middle East, Indian Subcontinent, English-speaking Africa). Dirk Wagner has been Managing Director there since April 2021.



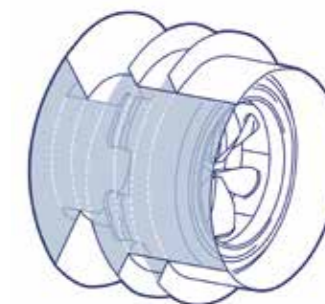
ASIA

PRODUCT HISTORY: 2012 TO TODAY

SCHOTTEL RimThruster (SRT): low noise and low vibration

In 2012, SCHOTTEL acquires ring propeller technology from Dutch engineering company Van der Velden with the aim of developing a low-noise, low-vibration propulsion unit for superyachts and passenger ships. As an electric propulsion system without a gearbox or a shaft, the SRT converts electrical energy directly into propulsion with minimal noise. It is also water-lubricated with no risk of oil leakage, making it particularly environmentally friendly. The optimized hydrodynamic design with internal propeller blades is extremely compact. Depending on the application and size, the propulsion units offer nominal outputs of between 200 and 800 kilowatts and a variable number of blades. Following careful refinements

of the overall system, the first 200-kilowatt unit is sold in 2015. It is installed in the superyacht White Rabbit, where it ensures extremely quiet and vibration-free manoeuvring alongside two pump jets designed for continuous operation.



SCHOTTEL RimThruster (SRT)



The site of the company headquarters in Spay in 1934 ...



... and 2009

2012

Outgrowing the Spay site

With its economic success, SCHOTTEL's importance for the village of Spay and the municipality grows. Shortly after the war, SCHOTTEL becomes the most important local employer with forty-five employees. Most of the SCHOTTEL workforce have short commutes: they come from the immediate surrounds as well as the neighbouring communities of Brey and Rhens; some are also from across the Rhine, for which a SCHOTTEL boat is used to ferry employees every day until 2005. By the time of the fiftieth anniversary in 1971, the workforce in Spay has already grown to two hundred and fifty. Entire families are employed by SCHOTTEL, often in the second and today in the third generation. The people of Spay have a great affinity for "their" company. After all, the tax revenues also bring benefits to the residents allowing the economy and cultural development of the village to prosper. But there are also downsides. The tremendous delivery and pick-up traffic is a daily ordeal for local residents, especially as the surrounding area has changed beyond recognition since the company began there: where once there were orchards and fields, dense housing has enveloped the company premises, preventing further physical expansion from the 1990s on. This means serious repercussions for SCHOTTEL: as well as partly difficult production conditions, there is a constant lack of space. In 2010, for example, spare parts have to be moved to a new logistics center in nearby Koblenz-Kesselheim. Despite all the spatial, production-related and organizational improvements, the limits in Spay are finally reached. In December 2012, it is decided to move forward with a new production site: SCHOTTEL acquires a nine-hectare plot of land in the industrial park of Dörth in the Hunsrück region, to which all production relocates in 2015.

2013

New service and repair center in Spay

This frees up sufficient capacity at the Spay site for a perfectly configured service area: the former production site provides space for the previously outsourced service warehouse with hundreds of thousands of individual parts. There is an enlarged repair area with a newly created mechanical production facility that enables rapid processing of spare parts, a coating section, and a testing and development hall. As before, the headquarters of the SCHOTTEL Group comprising all administrative and commercial business areas is located in Spay, where around three hundred people are currently employed.

Part of the SCHOTTEL philosophy: high-performance spare parts warehouses

Since 2013, SCHOTTEL has had the status of an "authorized consignor" with the German Federal Aviation Office. This means that freight can be moved directly onto the aircraft without further inspection. With this accelerated processing, every spare part reaches its recipient by the fastest route. High-performance spare parts warehouses in Spay and Wismar are dedicated to this task, and swiftly respond to customer enquiries. All in all, SCHOTTEL keeps countless spare parts in stock which, thanks to global warehouse logistics in Germany and at subsidiaries such as those in the USA and Singapore, ensures fast delivery.

Comprehensive service and state-of-the-art repair shops

The spare parts service goes hand in hand with the globally available repair service. The one hundred and fifty service technicians operating worldwide can be dispatched to sites as needed, at short notice, almost anywhere around the globe. The service team is supplemented by continuously upgraded repair shops in Spay, Wismar, the USA, Singapore, the Netherlands, Norway, France and, in the future, Brazil and Russia.

SCHOTTEL Industries GmbH



In 2013, the areas of marine propulsion systems, automation technology, gearbox technology and renewables are brought together under the umbrella of the industrial holding company SCHOTTEL Industries GmbH.

2013

There, repairs and overhauls can be carried out to OEM standards – original equipment manufacturer quality.



Repair workshop Wismar

SCHOTTEL Australia

The SCHOTTEL Australia subsidiary in Fremantle allows SCHOTTEL to successfully get a foothold in the markets of Australia and New Zealand, especially in the tugboat sector, where more than fifty tugs with SCHOTTEL propulsion systems are in operation today. The company has been



2014

managed by Mohamed Salah Ghonem since its inception.

Since 2019, the SCHOTTEL Training Center in cooperation with Svitzer Australia has broadened the range of services offered by the Australian location. With a globally unique set-up, the center enables particularly realistic training and supports crews and engineers in being able to carry out repairs independently and optimize fault management.

SCHOTTEL Canada

Sales and service activities for Canada, the New England region and the Great Lakes in the USA have been handled by SCHOTTEL Canada from Quebec since 2014. The office is headed by Sylvain Robitaille. For this sales territory, he can draw on a pool of fifteen service technicians for North America. In 2018, the company signs a contract with Damen Shipyards for the first all-electric vessels in Canada.



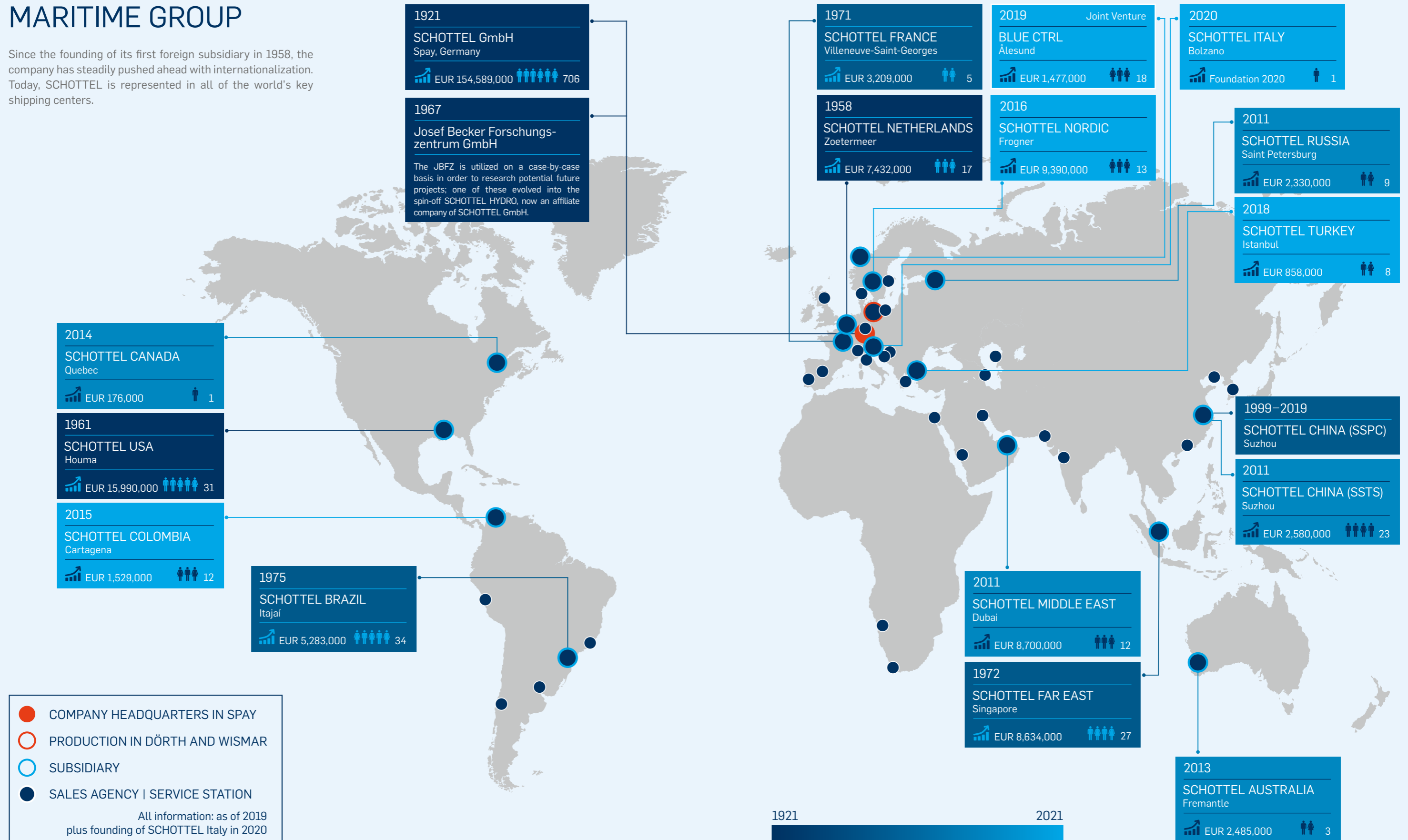
SCHOTTEL Colombia

To reflect the strategic importance of Colombia for the Caribbean and Latin America, SCHOTTEL founds a subsidiary in Cartagena in Colombia in 2015, the first to focus on the Spanish speaking market. Providing new installations and after sales service, it is dedicated to a total of eighteen countries, including Venezuela, Costa Rica, Mexico, Cuba, Peru and Ecuador, and has a spare parts warehouse and six service technicians. The General Manager since its formation has been Julio Carrasquilla.



MARITIME GROUP

Since the founding of its first foreign subsidiary in 1958, the company has steadily pushed ahead with internationalization. Today, SCHOTTEL is represented in all of the world's key shipping centers.





2020: the SRE in a new construction project at a Turkish shipyard

2015



In April 2020, the EcoPeller is installed in a retrofit project for the first time as part of the electrification of the Norwegian double-ended ferry Torghatten.

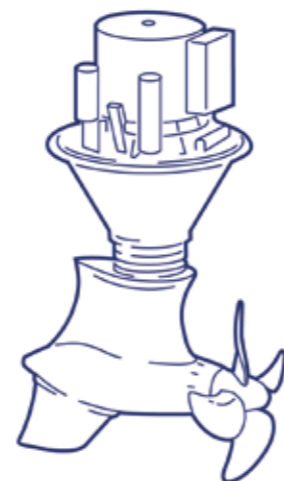
PRODUCT HISTORY: 2015 TO TODAY

SCHOTTEL EcoPeller (SRE): efficient and ecologically sound Stricter environmental guidelines and emission restrictions, as well as the increased technical demands of owners and shipping companies, prompt an innovation workshop in 2013 to consider the following: what does the rudder propeller of the future look like? This leads to trials of various propulsion variants in hydrodynamic model tests and in flow simulations using state-of-the-art CFD technology; in parallel, the entire mechanical drive train undergoes real-life optimization with the aim of keeping mechanical losses to a minimum.

In 2015, the outcome: SCHOTTEL unveils a highly efficient

and ecologically sound propulsion unit created primarily for the open sea and coastal operating conditions – the SCHOTTEL EcoPeller. It based on the winning design principle already featured in the SCHOTTEL CombiDrive: the L-unit's electric motor is vertically integrated in the support tube, with omission of the upper gearbox. The SRE is equipped with the newly developed, patented HTG gearing technology as standard; this allows for transmission of a higher torque or a slim housing geometry, resulting in extremely low flow resistance. Featuring a powerful propeller thrust and fin, the SRE meets all the requirements of a modern high-performance propulsion system: with maximum course stability, it reduces fuel consumption, cuts emissions and lowers operating costs. In 2016, it is awarded the Fuel Efficiency Award by the "Marine Propulsion" magazine.

The EcoPeller also excels in practice. In fact, market shares are gained as a result, in particular in the Scandinavian ferry newbuilding programme; in turn, this plays a key role in compensating for the offshore business, which slumped in 2015. Following the order for installation in eight Norwegian ferries in 2017 and numerous follow-up orders around the world, it proves popular across all sectors. The SRE is now recommended internationally for the propulsion of tankers, offshore vessels, naval vessels and expedition cruise ships. The SRE type portfolio is unique within the market.



SCHOTTEL EcoPeller (SRE)

EVOLUTION OF SCHOTTEL AT THE COMPANY HEADQUARTERS IN SPAY OVER THE DECADES



Spay's coat of arms indicates that the village is home to a worldwide pioneering invention: the SCHOTTEL RudderPropeller.



1935 1
Construction of today's "Josef Becker Haus" (house) with boat building hall and first slipway

From the mid-1950s
Erection of a new spacious assembly hall for the production of rudder propellers and navigators, installation of a modern turning shop and carpentry workshop, construction of a new boat hall for the production of sloops

1972
Completion of the 2-storey administration building that has extensions added over the decades, culminating in a new top floor in 1998.

1970s
Construction of new south and west halls for gearbox assembly and final assembly – this more than doubles the production area.



A topping-out ceremony in the 1970s

1989
A mobile protection wall is added. This puts an end to the annual flooding of the company premises, which repeatedly causes production downtimes.

2005
Expansion of the mechanical production hall

2008
4.8 million euro investment in the expansion of manufacturing capacities and major hall refurbishments

2010 2
Construction of the SCHOTTEL Academy

2015
After the relocation of production to Dörth, a new service and repair area is set up, among other things.



2015

**Optimal overall layout:
the new production site in Dörth**

Following a construction period of around two years, the new production site is completed in 2015. An investment of forty-five million euro has created an ultra-modern rudder propeller factory in Dörth in the Hunsrück region, around 12 kilometres from the headquarters in Spay as the crow flies. This enables SCHOTTEL to manufacture on premises that are custom-made for the production processes for the first time. The result is four production halls, up to 280 metres long and 18 metres high, as well as a three-storey administration, social and technical building with a total of 23,000 square metres of production and office space. Since 2015, the new location has provided around three hundred workplaces in production and administration, including up to twenty apprenticeships. A spacious, modern training workshop is available for the industrial apprentices.

With cutting-edge design and a variable layout, maximum efficiency is achieved in all areas: in the connection to the transport network, the logistics with a roofed goods receiving and delivery area as well as the intelligent material flow. The new site allows SCHOTTEL to increase production capacity by around thirty percent and, thanks to a new machinery and system park, expand the traditionally high vertical range of manufacture once again. The relocation to Dörth means that the company is now in a position to produce all essential components itself.

Healthy and motivating working conditions

In addition to optimized production processes, the design of the new factory aims to create a healthy and dynamic work environment. The working conditions for the around two hundred employees in production include halls suffused with daylight-bright illumination with automatically controlled lighting systems that also promote a positive energy balance,

modern ventilation and exhaust systems that ensure a continuous supply of fresh air, plus ergonomically designed workplaces.

Energy-conscious and sustainable

The Dörth site also complies with the latest requirements in terms of environmental protection: photovoltaic systems supply the factory with eco-friendly electricity, reducing the consumption of conventional energy. The ventilation systems feature heat recovery. Even the heat from the compressors is harnessed to support the heating of the coating and drying booths. The same applies to the energy supplied to the water in the test stand: the warm water is channelled through a heat pump to heat the offices.

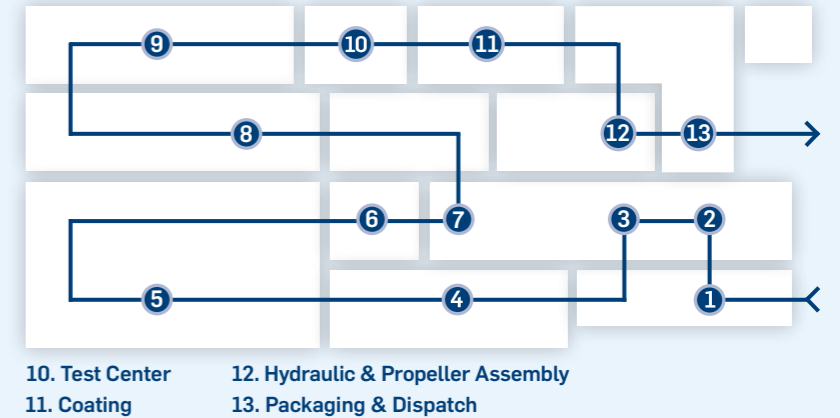
With a progressive product policy, backed by major investments, SCHOTTEL succeeds in gaining ground in the market after the shipping crisis and the slump in the offshore industry – contrary to the industry trend.



The total area in Dörth covers 9 hectares. The production halls, which are arranged to suit the material flow, measure up to 280 metres in length.

MATERIAL FLOW IN PRODUCTION AT DÖRTH

- 1. Incoming Goods
- 2. Quality Check
- 3. Warehouse & Intralogistics
- 4. Steel Processing
- 5. Mechanical Production
- 6. Coating
- 7. Warehouse & Intralogistics
- 8. Gearbox Assembly
- 9. Thruster Assembly



2016

New type designations

In order to help customers navigate the ever-growing product range, a new nomenclature is introduced in 2016 with clear classification within the series and across the different types (e.g. SRP 1515 is now called SRP 460).

SCHOTTEL Nordic

SCHOTTEL has had a prominent presence in Scandinavia for many decades. It all begins with the SCHOTTEL sales agency William Knudsen AS. 2013 sees a restructuring in cooperation with the company Frydenbø Power AS. Already established in 2016, SCHOTTEL Nordic has been an independent subsidiary of the SCHOTTEL Maritime Group since 2019. Headed by Jan Helge Telseth, it is responsible for sales of new propulsion systems and customer service for all vessels with SCHOTTEL propulsion systems operating in the Nordic countries Norway, Sweden, Finland, Iceland and the Faroe Islands.



EUROPE

2018: Stefan Kaul appointed CEO

Having joined the company in 1989, Stefan Kaul takes over as Chief Executive Officer. Previously, he held several key positions in Research and Development as well as

2018

in Hydrodynamics. Since 2007, he has served as Chief Technology Officer (CTO) and is responsible for company-wide technology.

SCHOTTEL Turkey

Initial market cultivation in Turkey dates back to the 1970s with steadily mounting success. As a result, a subsidiary is set up in Istanbul in 2018 under the management of Mustafa Müslüm. This provides better support for long-standing customers in their search for suitable propulsion solutions and closer cooperation in the areas of after sales and spare parts supply.



EUROPE

First ferry with SCHOTTEL EcoVoy autocrossing system

The first autocrossing system from SCHOTTEL goes into operation in the Norwegian ferries Flatøy and Lysøy in 2019. Combinable with any SCHOTTEL propulsion unit, the innovative system optimizes speed, acceleration and deceleration of the vessels depending on the route, taking into account actual environmental conditions. By adhering precisely to the timetables, the best possible speed profile is accordingly set in order to reduce costs, fuel consumption and emissions.

NEW SALES STRUCTURE: "ONE FACE TO THE CUSTOMER"

In 2016, Sales is reorganized. Today, it is structured as follows for new propulsion systems and modernization:

- Tug & Offshore Energy
Merchant Vessels
- Ferries & Passenger Vessels
Navy & Governmental
- Automation & Digital Products
Modernizations/Conversion

BOOSTING CAREERS

As a mechanical and system engineering company SCHOTTEL offers a unique, international work environment in the shipping industry. There are plenty of opportunities for school and college students, graduates and experienced professionals to develop and gain qualifications around highly complex products for the engine room and bridge – with a full focus on digitalization as a given. Having embarked on a maritime course with SCHOTTEL, few will ever change their mind again.

THRIVING FAMILY TRADITION



Four descendants of the company founder, Josef Becker, are currently employed at SCHOTTEL.

TRAIN FOR EXCELLENCE

80+ The wide variety of staff training courses offered at the SCHOTTEL Academy cover both professional and personal skills. In 2020, there were more than 80 training courses included in the programme.



UP TO SPEED

SCHOTTEL has cultivated close ties with colleges and universities all over the world for decades – with the dual study programme, lectures, practical phases, final theses and joint research projects.

A CAREER WITH PROMISING PROSPECTS

SCHOTTEL has around **20** young people at various stages of their vocational training in Germany each year. There are eight different apprenticeships to choose from: industrial mechanic, cutting machine operator, construction mechanic, mechatronics technician, technical product designer, IT specialist for system integration, warehouse logistics specialist and industrial clerk. Our qualified apprentices are always among the best in their respective academic year.

FROM TRAINEE TO THE BIG WIDE WORLD



“After my apprenticeship and moving to Service, I had the opportunity to carry out around 50 foreign assignments in my very first year. I’m really happy to be out and about so much at SCHOTTEL.”

Rico Seis, Commissioning Engineer with international remit at the Spay site

STRAIGHT OUT OF UNI



“Being a trainee at SCHOTTEL was the perfect way to ease me into a sector that was a complete unknown. A year and a half in Service, Engineering and Production gave me a really good overview of how things work in the company. And at the end, I was taken on in Technical Controlling.”

Fabian Henseler, Controller at the Spay site

23 %

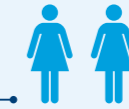
Number of employees at the German sites who have worked for the company for more than twenty years.

BACK TO SCHOTTEL



“After four years at SCHOTTEL, I switched to a different sector in 1995. And a few years later, I came back – vessels and the propulsion systems from SCHOTTEL are what really fuel my passion for sales. Nothing else comes close.”

Joachim Müller, Senior Sales Manager, Spay



WOMEN

WHO STAND THEIR GROUND

“In 1993, I was one of the first two female apprentices in our Production Department, where I trained as a cutting machine operator. We were both respected right from the very beginning. I would recommend this career path to any woman who is interested in the field.”

Bianca Mollink, Incoming Goods Office/Dörth site



873 Number of employees worldwide



FRESH START WITH A CHANGE IN CAREER

“I used to be a roofer and hadn’t planned on leaving the profession. But then SCHOTTEL offered me the chance of a lateral move into Dispatch. I now work as a shift manager in the service warehouse.”

Daniel Köhl, Spay

DIVERSITY THANKS TO INTERNATIONALITY

“I carry out on-site audits at our suppliers’ premises all over the world as well as accompanying domestic and foreign customers during their audits at our company. Product acceptances by respected auditing companies are just as much a part of my job as case-by-case consultations at the shipyard. It doesn’t get much more international and diverse than that.”

Martin Hinz, Head of Quality Assurance at the Wismar site

SOUND EMPLOYER



“One of the key factors distinguishing SCHOTTEL from other employers is its full confidence in its employees’ sense of personal responsibility. Excellent social benefits, a great deal of flexibility for the perfect work-life balance, plus financial stability all provide long-term job security.”

Gary Aucoin, General Manager SCHOTTEL Inc., Houma/USA



TOP PROSPECTS

“The company enabled me to do a part-time Master’s degree in import and export management. I feel I am able to constantly expand my horizons. I truly value that.”

Paula Francisco, Supply Analyst SCHOTTEL do Brasil, Itajaí

All information: as of 2020



“I CONSIDER MYSELF LUCKY TO BE ABLE TO WORK HERE”

Nancy Xiao has worked at SCHOTTEL (Suzhou) Trading & Service Co., Ltd., (SSTS) for 16 years. She joined the company as a newly graduated marine mechatronics engineer, and today she is a Spare Parts Supply Manager for customer support. She feels that her job has helped her to grow, both as a person and as an employee.

What would you say is a typical day at work for you?

My work primarily involves fulfilling customers' requirements swiftly and accurately. Most of the time, the cases are urgent and I have to act very fast. I identify the spare parts needed, prepare a quotation and, after approval, organize the fastest possible delivery in coordination with other departments.

What do you really appreciate about your work at SCHOTTEL?

The way that customer requirements are met at SCHOTTEL with zero compromises, but also the career opportunities available to me. For that reason alone, I consider myself lucky to be able to work here. My job is also a wonderful way to get to know the world, because I work with clients and colleagues from many different countries. Overall, I can say that I benefit from working at SSTS on both a personal and professional level.



“WE ARE ALL EQUALS”



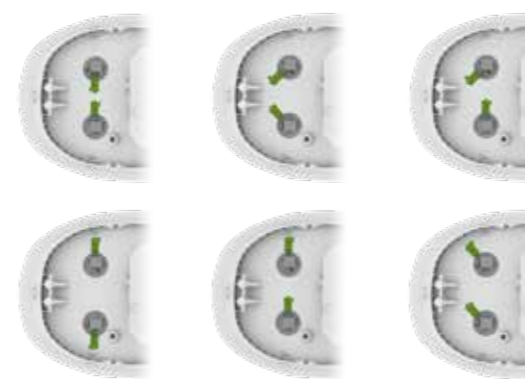
Christian Strack completed his training at SCHOTTEL. In 2017, he graduated from the dual study programme in mechanical engineering at the Dörth site, starting his part-time Master's degree one year later. He also envisages his future to be at SCHOTTEL – and not only for professional reasons.

Mr Strack, how did you find your time as an apprentice?

Really good – especially the support I got from SCHOTTEL. We always communicated as equals and the feedback was definitely a great help. We also had a very good working relationship during the part-time Master's programme. Temporarily reducing my weekly working hours gave me the time I needed for full-time studies.

You have just submitted your Master's thesis. Where do you go from here?

Actually, I'd really like to stay at SCHOTTEL. A company synonymous with an exciting product offers excellent opportunities for personal development. There's a lot of expertise within the company, and the majority of production and assembly is done in-house. It's a great place to work because of the open attitude among colleagues and mutual appreciation shown across the hierarchy. That's why I'm so happy that talks are already being held about my future responsibilities after I graduate.



SYDRIVE-E, coloured green, enables variable positioning of the electric motor.



SYDRIVE-M with two diesel engines that can be activated separately or combined.

2019

Pioneering in the hybrid tug sector

At the start of the new millennium, operators of harbour craft face increasing pressure to run zero-emission vessels, which in turn gives hybrid technology a crucial boost.

> SYDRIVE: almost any vessel can be converted into a hybrid

Following the launch in 2014 and 2015 of the first hybrid tugs equipped with SCHOTTEL propulsion units, Eddy1, Fairplay IX and Fairplay XI, the company continues to forge ahead with hybridizing ships with the patented SRP-Y upper gearbox. In 2019, SYDRIVE enables all vessels to be converted to hybrids for the first time using a SCHOTTEL azimuth unit (SRE, SRP) of between 400 and 2,550 kilowatts. This is due to the innovative engineering that offers a wide variety of options for installing hybrid propulsion systems in any existing ship – without it requiring any design changes or modifications. SYDRIVE is the perfect choice for vessels with multiple but distinctly different operational profiles, such as those found in tugs and workboats.

> SYDRIVE-E

SYDRIVE-E combines a combustion engine and electric motor to form a classic hybrid design; the motor version can be variably positioned thanks to the Y-arrangement. Depending on the desired operating mode and the required propulsion power, SCHOTTEL SYDRIVE-E activates the appropriate power source either individually or together. The engines are operated efficiently in their optimal load ranges, reducing fuel consumption and emissions.

> SYDRIVE-M

SYDRIVE-M enables the operation of two propeller systems with only one of the two main engines and does not rely on any other source of electrical power. An additional synchronous shaft and a further coupling between both upper gearboxes suffice. In light operation or free sailing mode, one of the main engines is switched off in SYDRIVE-M, while the active

2020

one is used to its optimum capacity. This not only reduces operating hours, maintenance effort and fuel consumption, but also emissions. If full drive power is needed, the connection between the two propulsion units can be disengaged leaving the full power of the two main engines available.



Fairplay IX

SCHOTTEL Italy

SCHOTTEL has traded successfully on the Italian market for more than sixty years. In the new-build business, the passenger shipping and tugboat sectors have enjoyed years of positive growth. The establishment of the subsidiary in October 2020 allows for more concerted market development across all sales segments, both in the new construction and modernization areas (continued on page 65).



EUROPA

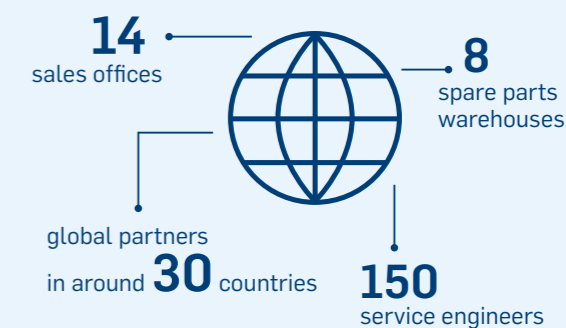
SALES AND SERVICE WORLDWIDE

The worldwide service and sales network is as global as the shipping industry. SCHOTTEL is represented by more than one hundred sales and service locations in addition to its fourteen subsidiaries. The partners receive regular in-house training and ensure with their rapid-response support that downtimes are reduced to a minimum and vessels are ready for operation again as quickly as possible.



After sales support for maintenance: remote assistance with augmented reality

AFTER SALES SERVICE IN FIGURES



2020

SCHOTTEL PUSHES AHEAD ...

First hybrid yacht with azimuth propulsion units from SCHOTTEL

Since mid-2019, the 31-metre-long motor yacht Vanadis is the first hybrid in the world to sail with two TwinPropellers type STP 150 (260 kW each). The power system features diesel engines with electric motors connected in series.

First all-electric vessels in Canada with SCHOTTEL propulsion units

The first fully electric ferries on Canadian waterways, Amherst Island and Wolfe Island, are equipped with four TwinPropellers type STP 260 each with 550 kW. The main propulsion is powered by batteries, with a diesel generator serving as a backup to ensure mobility.

First hydrogen ferry fitted with SCHOTTEL propulsion units

Two new eco-friendly ferries belonging to the Norwegian ferry operator Norled have been sailing with EcoPellers type SRE 340 L FP (960 kW each) since early 2021. Both new vessels are driven by a hybrid mix of batteries and hydrogen fuel cells. In the first project – the one with liquid hydrogen – batteries and fuel cells are utilized equally, for the first time in the world. The second ferry runs on batteries only.

The world's first zero-emission push boat sails with SCHOTTEL

The hybrid canal push boat Elektra is powered by a combination of fuel cells, accumulators and an electric motor. There are two RudderPropellers type SRP 100 (200 kW each) with nozzle on board. It is scheduled to go into service in 2021.

First tug with SYDRIVE-M

A new tug that is extremely environmentally friendly and efficient will operate in the Port of Aarhus after its planned commissioning in the second half of 2021. This is ensured by two RudderPropellers type SRP 430 FP (2,000 kW each) with SYDRIVE-M hybrid solution.

First tug with SYDRIVE- E

Southern Asia's first LNG hybrid tug will be setting sail with SYDRIVE-E around the end of 2021. The SRP 430 FP thrusters (2,000 kW each) are supplied by electric motors and main engines run on liquid gas.

... with these and many other pioneering projects.



The motor yacht Vanadis featuring a hybrid propulsion unit and built at CCN Shipyard (Baglietto) sails with electric motors connected in series and two SCHOTTEL TwinPropellers (STP).

While smaller and medium-sized vessels are produced in Italy and now managed locally, customer care is also guaranteed for Italian private owners who have larger vessels built abroad. Giorgio Alemanno is Managing Director.

PRODUCT HISTORY: SINCE 2020 SCHOTTEL Marine Services (SMS): smooth operation through preventive condition monitoring

From the company's inception, customer service plays a key role and remains a top priority over the decades. In 2020, the well-established condition monitoring system from 2011 is enhanced by ProCMS. It is an advanced tool to support preventive maintenance strategies for SCHOTTEL propulsion units. A 24/7 condition analysis algorithm is applied to evaluate data from various sensors with the aid of ProCMS, which ensures the monitoring of all relevant components. The system is backed up by the specialist knowledge of SCHOTTEL experts, who recommend the right course of action at the right time.

PRODUCT HISTORY: SINCE 2020 SCHOTTEL Automation Systems (SAS): automation solutions for intelligent ship management

To enable ship owners and operators to utilize and benefit from the full potential of their vessels, SCHOTTEL incorporates a modular software system into its portfolio. This allows

the integration of numerous automation solutions for monitoring all processes and components of a vessel. The system basis is a software platform implemented in close cooperation with Norwegian partner Ulstein, which can be scaled to any type of ship and fully configured to individual requirements. Optional components are an Alarm and Monitoring System (AMS), an Integrated Automation System (IAS) that actively controls individual vessel components such as ballast tanks, and a Power Management System (PMS) for efficient control of power generation and distribution. Furthermore, the data collection and transfer system MariHub is a core component. The IoT (Internet of Things) gateway solution collects signals from sensors, machines and other ship equipment and transmits them to an onshore cloud server. This is supported by the IoT platform MariNet where all collected data can



be analyzed, providing the operator with a sound basis for optimal ship operation.



2021 

OUTLOOK APPENDIX

100 YEARS ON AND FOCUSSED AHEAD

Innovations that write shipping history, early internationalization, state-of-the-art production facilities, constant portfolio expansion and successfully tackling of crises are all important hallmarks of the company's hundred-year journey. A whole century that has made SCHOTTEL synonymous around the globe with robust and low-maintenance, as well as efficient and environmentally friendly ship propulsion systems. Proving its reliability as a partner and propelling the shipping industry forward, whether in times of a good or challenging economic situation. And in its centenary year, SCHOTTEL can once again claim its place at the top across all vessel types. Offering intelligent digital products with high customer added value, the company continues to chart a successful course.

POWERFUL HERITAGE. BRIGHT FUTURE.

Our heartfelt thanks extends to all who have played a part in our company's tremendous achievements and growth. We are committed to honouring Josef Becker's legacy and together with our customers and our team we will continue to steer the company into a bright future.

Your SCHOTTEL GmbH



“BEING THE FIRST CHOICE – THAT’S WHAT DRIVES US”

Stefan Kaul joined SCHOTTEL in 1989 straight after graduating from university; he has been Chief Executive Officer (CEO) since 2018. He knows better than anyone what drives SCHOTTEL and how the company intends to meet the challenges of the future.

SCHOTTEL has continuously evolved from its origins as a propulsion supplier for inland and harbour vessels. How broadly diversified are the sales segments today?

First of all, we’ve kept a focus on our traditional business, assisting our customers with further innovations that add value over the life cycle of their vessels – be this through technical developments or with the greatly expanded reach and performance of the after sales service. Meanwhile, the range of vessel types has become very varied. We entered the merchant shipbuilding market with CP propellers and thanks to global goods trading this sector has shown strong growth. Sophisticated, highly technical propulsion solutions are in demand for luxury yachts and by the navy. Whilst a wide range of specialized ships used in research, coastal and water protection, ice management, cable laying or for the construction of offshore wind farms present us with interesting challenges that we are able to meet. More recently, the area of fishing and fishery research vessels is becoming increasingly important worldwide. Overall, we are very well diversified.

And in which segments do you see particularly good opportunities for the future?

The future can’t be divided into segments, it applies to all of them. For several years now, we’ve been ramping up research and development. We adapt our products to market needs with regards to size, performance, propulsion type, as well as ecological and digital requirements thus the customer has a high degree of flexibility. Another area for the future is hybrid vessels or purely battery-powered ones. SCHOTTEL RudderPropellers, which feature this technology and are already in operation by customers, are consolidating this future trend.

Speaking of trends: SCHOTTEL has set many and has literally driven the shipping industry forward for over a century. Do you think it will stay that way?

I’d like to answer that with our mission statement, which we’re showing renewed commitment to, particularly in our centenary year. “We are the first choice in ship propulsion solutions, combining experience with innovation.” We don’t just say it, we live and breathe it. Customers always commend us for our multifaceted technical expertise and excellent after sales service. But the key is that our innovations and services pay off for the customer. With them in mind, we’ll always think a little ahead and so continue to set trends. This will also be what spurs us on in the future.

You have been working at the company since 1989. What are you particularly proud of as a SCHOTTEL employee?

History has shown that SCHOTTEL has had the confidence to take action at the right moments. Josef Becker’s idealism still runs throughout the company, in the sense that we have the courage to take the next bigger step. This is reflected in outstanding product ideas such as the pump jet, the twin propeller, new types of propeller nozzles and the high-performance gears in our gearboxes. But also in the entry into high power markets with pod propulsion units and large SCPs. This has opened the door for SCHOTTEL into virtually every segment. And when it comes to advanced calculation and simulation methods, we’ve also recently worked our way up into the Champions League. That’s something to be proud of.

As a young engineer, I was encouraged to play my part, and we still cultivate and benefit from this philosophy today. Ongoing internationalization has also paved the way for the company’s success.

SCHOTTEL is majority family-owned. What influence does this have on the corporate culture?

The company is a very personal concern for our shareholders. They value the contribution of the workforce and the management. Everyone feels this and it creates a sense of family and trust. It also shapes our interactions and our values: we communicate openly, treat each other with respect, act in a customer-oriented and responsible manner, and we share our knowledge. We never stop learning so that SCHOTTEL preserves a future.

What role do the employees play?

The loyalty and solidarity of the workforce, coupled with the many and varied attributes of individuals, are the foundation of our success. Personally, I’m truly inspired by the people at SCHOTTEL. There is a great willingness to go above and beyond the call of duty, and cooperation is shaped by trust, a desire to help each other, and a common goal. No matter whether in Asia or Europe, America or Australia – and in all functions, whether in sales, administration, IT, production or logistics. Even and perhaps especially now, it makes me proud and fills me with joy to work with this team, for these people.

What is your personal wish for SCHOTTEL on its centenary?

That we remain true to our values and principles – what makes SCHOTTEL special. But also that we take on the challenges ahead. This includes constantly rethinking the company, positioning it in a relevant and profitable way, and steadily growing the business with intelligence and creativity in both traditional and new areas. Then future generations will be able to celebrate the company’s two hundredth anniversary with pride.

POWERFUL HERITAGE. BRIGHT FUTURE.



The circle of shareholders cares deeply about the close connection with the company. On the one hand, it has a positive effect on the values of corporate culture. On the other, it enables long-term, strategic decision making.

OVERVIEW

CEOs and predecessor companies (excerpts)

Stefan Kaul
since 2018

Dr. Christian Strahberger
from 2016 until 2018

Prof. Dr.-Ing. Gerhard Jensen
from 2005 until 2015

Dietrich W. Bork
from 1988 until 2006

Franz Krautkremer
from 1952 until 1990

Josef Becker
from 1921 until 1973

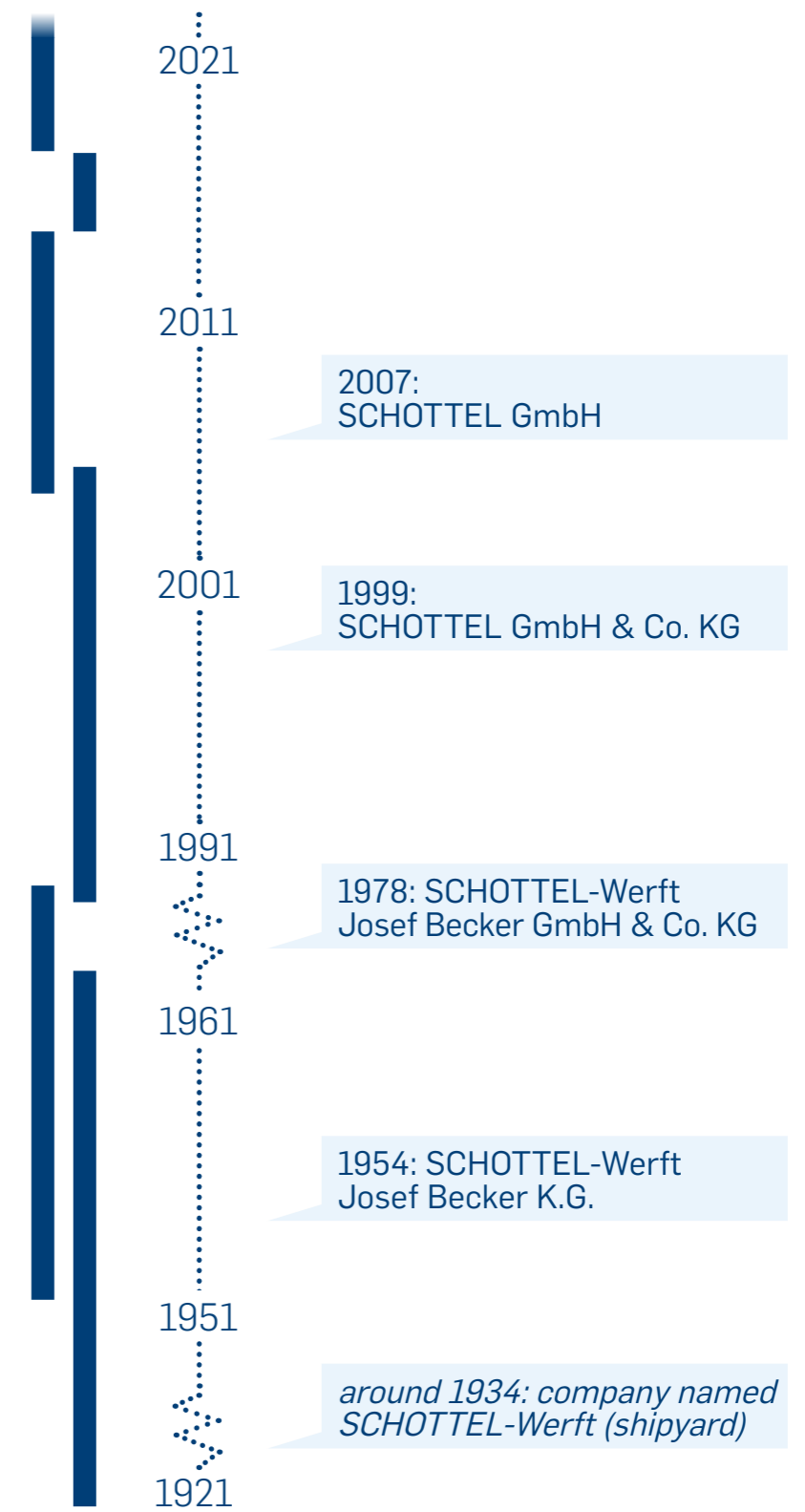


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