The customer magazine from ThyssenKrupp Steel Europe

compact

www.thyssenkrupp-steel-europe.com

1/2013

InTruck® moves

New initiative supports the trucking industry

Opel Adam impresses

Modern urban mini with GammaProtect®

Solar car drives

PowerCore® electrical steel in the drivetrain

ThyssenKrupp Steel Europe
Thinking the future of steel

ThyssenKrupp

compact

Issue 42 – 1/2013

editorial 3

view

New turntable generation 4
Magnesium ensures audio enjoyment and modern design

title

Celebrating premieres 6
The InTruck® Roadshow was launched successfully at Sweden's largest truck manufacturer

Offering solutions 8
ThyssenKrupp bundles competencies for green trucks and trailers

Mutual development 10
Launching innovations in a collaborative environment

The interview 12
Prof. Wolfgang Stölzle provides insights into the future of the logistics industry

focus

AEE invitations 14
ThyssenKrupp Steel Europe to exhibit at the new automobile show

Opel Adam, the seducer 16
GammaProtect® coating keeps the look fresh

Developing electric mobility 18
The new E-Mobility Center Drives gives right of way to the electric drive

Solar car ready to go 20
Motor includes electrical steel from ThyssenKrupp Electrical Steel for the first time

Surface series 22
ZM EcoProtect® provides highly effective protection against corrosion

Wickeder Westfalenstahl 24
Clad material is a reliable all-rounder for daily use

PLADUR® family grows 26
PLADUR® StandingSeam is a new development for standing seam roofs

Building lighter cars with steel 27
New grades MBW® 1900 and DP-K® 700Y980T expand the range

DuoBond® stabilizes 28
This composite material is the result of successful teamwork

Inspiring the young 30
Higher education marketing provides an entry point to ThyssenKrupp Steel Europe

service

NewsFlash 15
Company info in brief

Agenda 32
Fairs, exhibitions, events

Cover picture:
Truck and trailer producers' requirements in terms of vehicle economy are increasing globally: reduced fuel consumption, minimum emissions and maximum payload are the key criteria. Maintenance and repair expenditures play a role, as does the highest level of safety and comfort at a competitive cost. The demand is for lightweight designs, efficient drivetrains and durable modules, such as those offered by InTruck®.

ThyssenKrupp Steel Europe AG
Kaiser-Wilhelm-Strasse 100, 47166 Duisburg, Germany
Postal address: 47161 Duisburg
Tel.: +49 203 52-0, Fax: +49 203 52-25102

Editorial team:
Josefine Sarfert (legally responsible)
Strategic Marketing/Support
Tel.: +49 203 52-40785
Fax: +49 203 52-41017
E-mail: josefine.sarfert@thyssenkrupp.com

Christiane Hoch-Baumann (editor in chief)
ThyssenKrupp Business Services GmbH,
Communication Services
Tel.: +49 201 844-524515
Fax: +49 201 845-6524515
E-mail: christiane.hoch-baumann@thyssenkrupp.com

Dr. Daria Szygalski (deputy editor in chief),
Johanna Flöter, Claudia Freigang

Photos:
ThyssenKrupp Steel Europe Photography
Cover by Getty Images
p. 4 Rega
p. 6–7 Shutterstock
p. 12–13 Martin Joppen
p. 14 Automotive Engineering Expo
p. 16–17 Opel

Design:
MERZ Werbeagentur, Düsseldorf

Printing:
ThyssenKrupp Printmedia GmbH, Duisburg

Publishing dates:
The next issue will appear in Summer 2013

Issue 42:
1/2013 – April

info.steel-europe@thyssenkrupp.com
www.thyssenkrupp-steel-europe.com

"ThyssenKrupp Steel Europe is focusing on its strengths: materials competency in steel."

Dear readers, valued customers,

ThyssenKrupp Steel Europe is currently facing major challenges. The situation on the European steel market is intensifying among other things due to high commodity and energy prices, CO_2 certificate trading and a significantly reduced consumption level, especially in south-western Europe.
After a sharp fall in the previous year, the demand for steel in the EU-27 may fall again in 2013 – as the latest forecast of the Eurofer Economic Commission suggests. A gradual upmove will probably only start to gather force at the end of the year; increasing demand is anticipated for 2014 .

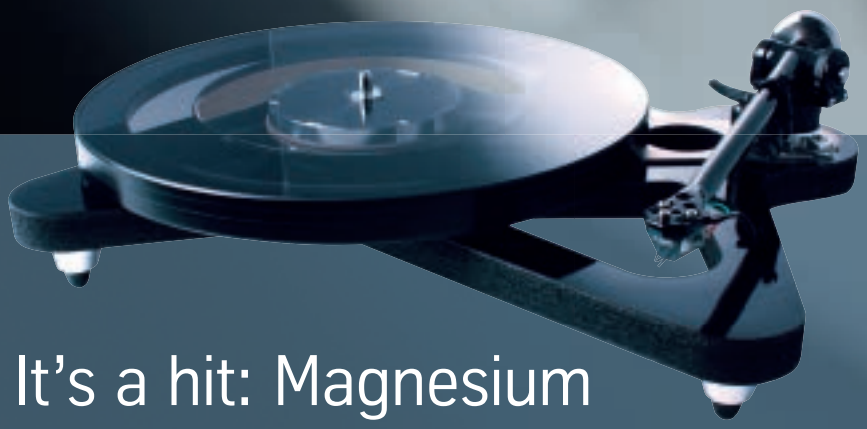
Against this background, ThyssenKrupp Steel Europe has launched a comprehensive optimization program. It comprises the necessary structural changes, with the aim of focusing our technical and logistics capabilities and further increasing our quality performance. Our product portfolio will retain its premium value: ThyssenKrupp Steel Europe will remain a supplier of a wide range of value added products and grades complemented by premium niches.

We will focus on our strengths, especially on our material expertise in steel. We offer you, our customers, the combined know-how of the entire ThyssenKrupp Group. Along with your expertise we seek to develop innovations in future that maintain our strong competitive position. One example of this, and our cover story in this issue, is InTruck®. Within the scope of this Group-wide initiative for the commercial vehicle industry, five ThyssenKrupp companies are available as your engineering partners. We offer many years of experience for the entire range of materials, individual parts and components, through to complete systems.

What development partnership means to us is that we seek to engage in a more intensive dialog with you in the future. In this way, we can jointly respond more effectively to rapidly changing markets and pioneer new, technically-challenging product solutions in an economical way. With this in mind, I wish you an enjoyable and inspiring read.

Yours,

Thilo Lutz
Member of the Executive Board responsible for sales
ThyssenKrupp Steel Europe



It's a hit: Magnesium for listening pleasure

Turntables are like bands themselves – everything has to harmonize perfectly to produce the best possible sound. To achieve this, the turntable manufacturer Rega has turned for the first time to material from MgF Magnesium Flachprodukte. The UK-based company's new high-end system features a magnesium brace connecting the tonearm and the platter bearing.
The brace interacts with the other sophisticated components for pure listening pleasure: The light yet strong material dampens unwanted vibrations. The resonant properties of the turntable are optimized to produce the purest sound quality. But the magnesium material from the ThyssenKrupp Steel Europe subsidiary doesn't just ensure a great audio experience; the bright metallic surface – visible on the right in the background – also harmonizes elegantly with the high-quality appearance of the plinth. In this way, the RP8 provides perfect sound and design that will delight not just vinyl lovers.

Claudia Freigang

Photo: Rainer Schröer
www.rega.co.uk

Contact: **Thi Van Huyen Vu**, MgF Magnesium Flachprodukte, tel. +49 3731 7759997, e-mail: vh-vu@tks-mgf.de

Trucks are getting longer so that they can transport even more goods on our roads. InTruck® offers truck and trailer manufacturers premium technological and economical solutions for this.

InTruck® brings innovations to the road
Truck research project debuts in Sweden

Sweden likes its trucks. Even extra-long vehicles are allowed to ply the sparsely populated country's lonely roads, something not allowed in the rest of Europe. Sweden also likes experimenting: Since 1970 Swedish companies have been carrying out R&D to make their trucks even longer and so increase cargo capacity still further. And Sweden likes innovations, as shown by the huge interest aroused by the first stop of the ThyssenKrupp InTruck® Roadshow at Sweden's biggest truck manufacturer in Gothenburg at the beginning of March.

Green light for LHVs in Sweden: Longer heavier vehicles (LHVs) are used above all to transport logs in Sweden's timber industry. The main reason is cost. Shifting to rail is not an option, particularly in the north of the country where the rail network is limited. The flat roads and sparse traffic in Sweden's thinly populated regions spare Swedes the problems that LHVs cause elsewhere and make them unwanted in the rest of Europe. The huge trucks weigh 60 tons and are 25 meters long, making them 33 percent heavier and seven meters longer than the 40 tonners allowed by the EU for international traffic.

Sweden's biggest truck manufacturer launched its first "Long Vehicle Combination" back in 1997. It was 25.25 meters long and weighed 60 tons. But that wasn't enough for the Swedes: Since 2009 the transport authorities have been experimenting with even bigger trucks weighing up to 90 tons and measuring 30 meters in length – i.e. another third heavier and five meters longer. The trials in the north and west of the country are being carried out in cooperation with the tractor unit manufacturer under the acronym ETT (en trave till), meaning "one more pile". The 660 horsepower tractor unit and the two trailers can carry four instead of the conventional three piles of logs over the 160 kilometer test route from the wooded Överkalix region in the northeast to the port in Piteå. At present the ETT vehicle is running during night time. The test results indicate advantages in terms of pollutant emissions and traffic safety as well as reduced transportation costs. The rest of the EU takes a more critical view of Sweden's moves, fearing disadvantages in terms of transport safety, worn-out roads and excessive loads on bridges.

Whatever the pros and cons, what is clear is that the haulage market today is extremely competitive, not just in Sweden. Operators face high cost pressure and increasingly tight margins. Rising fuel prices and tighter emissions regulations will put further pressure on profitability in the future. The demands placed by truck and trailer producers on the cost-efficiency of their vehicles are increasing worldwide: Greater fuel economy, minimum emissions and maximum payload are central criteria in purchasing decisions. Maintenance and repair costs over the vehicle life cycle play an important role, alongside maximum-possible safety and comfort at competitive cost.

There is a need for weight reduction concepts that conserve resources while increasing payload; efficient drive systems that reduce fuel consumption and emissions; wear-resistant, low-maintenance modules that last longer. This is also proved by the huge interest shown in ThyssenKrupp's InTruck®, which made its first stop at Sweden's biggest truck manufacturer in Gothenburg at the beginning of March, laden to the brim with know-how and innovations. Visitors were offered numerous powerful answers in the form of talks, intelligent materials, innovative parts, modules and systems. InTruck® brings together ThyssenKrupp's entire automotive expertise, specifically for the truck industry. It demonstrates the Group's comprehensive know-how as a simultaneous engineering partner and gives truck and trailer producers access to technologically advanced, low-cost solutions – the basis for a successful development partnership. ThyssenKrupp is planning a further roadshow stop this year at another truck manufacturer in Sweden. The InTruck® will also be touring through Germany, Italy and the Netherlands.

Christiane Hoch-Baumann

Contact: **Helmut Mebus**, Technical Project Management InTruck®, tel. +49 203 52-44937, e-mail: helmut.mebus@thyssenkrupp.com
Alexander Skowronek, Commercial Project Management InTruck®, tel. +49 203 52-45531, e-mail: alexander.skowronek@thyssenkrupp.com

Challenges in the commercial vehicle industry

ThyssenKrupp bundles expertise for tomorrow's trucks

We're drivin', drivin', drivin' down that highway! Whether fresh vegetables, a new spring season coat or the latest smartphone – most of our daily goods are transported by truck. If you check out the inside lane when you are driving, you will quickly see the importance of freight transport. And it will continue to grow, because the EU Commission expects an increase in transport volumes of more than 50 percent by 2030. But rising fuel prices and stringent climate protection policies mean that the commercial vehicle (CV) industry is facing multifaceted challenges.

The truck of tomorrow needs to be lighter, cleaner and safer – and it needs to transport more. In addition to this, driver comfort needs to be improved, thus improving safety. And there is no such thing as the typical truck – the vehicles are characterized by extremely high diversity – and thus there is no universal solution.

The industry is already working hard on new ideas. One thing is clear: the path to green trucks and trailers involves many small, individual steps. "And at ThyssenKrupp InTruck®, we seek to help shape the future of the truck," says Helmut Mebus, Technical Project Manager at ThyssenKrupp Steel Europe. Five Group companies are available to the customer as engineering partners, and they offer many years of expertise. "We provide solutions for the entire range of commercial vehicles. This includes materials, individual parts, components and systems," he explains. Tomorrow's trucks need to drive more and save money: "To reduce fuel consumption and thus help to preserve the environment, weight plays a crucial role," says the mechanical engineer, pointing to lightweight construction as a strategic task. "To allow this to happen, ThyssenKrupp Steel Europe has many materials and technologies." A driver's cab was used to determine the optimization potential – although it is not a weight driver, it still carries weight.

The Duisburg-based steel company developed a virtual model of a typical cab with a net weight of about 380 kg, which could be used in heavy-duty commercial vehicles. Based on this, the experts from research and development (R&D) generated some initial solutions.

The state-of-art LITECOR® composite material is a technologically interesting option for making the cab lighter. This new development, which is produced in a resource-saving way, combines the high strength of steel with the light weight of plastic. "From our perspective, LITECOR® is suitable for the large surface area parts of the cab and superstructures," Mebus explains. BONDAL®, another composite, can create a quieter cabin and improve the ride comfort thanks to its acoustic properties. "For the firewall area, in particular the A pillars, hot stamping seems very promising," he continues. This process allows maximum geometric freedom and gives the manganese-boron steel high strength. One advantage: lower plate thickness, and thus a weight saving of more than 20 percent shown in similar projects. "This means killing two birds with one stone: lightweight construction and safety. After all, the recently updated laws stipulate stricter requirements for the A pillars," as the engineering expert emphasizes.
All told, customers can choose from a variety of highly specialized steels. But to prevent this choice becoming an ordeal, ThyssenKrupp offers a solution: "To ensure the use of the right material in the right place, we have established a classification system that we are continuously developing," said Mebus. WeKoKo (material concept for commercial vehicles – German abbreviation) is a tool that allows an objective choice of materials. "We use it to compare the required component properties with systematically selected materials. This means that we can advise customers individually."

In terms of tailored services, the steel supplier also cooperates with the ThyssenKrupp Stahl-Service-Center. The international group of companies boosts the customer's value chain in the commercial vehicle industry – from precise machining of the material to just-in-time delivery, even of very small quantities. And if things do get tight in the delivery flow, inventories of 250,000 tonnes in the pan-European network and the existing grade variety ensure flexible material availability.

The commercial vehicle industry is always on the move. To allow this to happen, the heart of the truck – the chassis and powertrain – must provide huge performance. To ensure a service life of more than 1.5 million kilometers, without being a major

The model of a typical driver's cab with a weight of some 380 kg, which could be deployed in heavy-duty vehicles, is a development by InTruck®. This is the benchmark against which experts measure improvements in real cabs.

weight driver, the ThyssenKrupp Forging Group consciously relies on downsizing in the powertrain in the form of the Cranktrain U-Shape concept. Cylindrical main and connecting rod bearings are replaced with new, toroidal geometries – which are up to twelve percent lighter. On top of this, camshafts from ThyssenKrupp Presta Camshafts allow the weight of the engine and emissions to continue to drop. Unlike conventional solutions, the cams are pressed on to a tube. They save 40 percent weight and provide the ability to integrate additional functions such as drive wheels. High quality materials also increase the durability of the camshaft. In the suspension area, ThyssenKrupp Bilstein offers a very robust commercial vehicle shock absorber. It offers high dynamic and static strength in its forged base. An innovative welding process also increases the service life. Moreover, the shock absorber offers optimized characteristic stability – thanks to the use of banded pistons.

One thing is clear: ThyssenKrupp's range is as versatile as the vehicles that InTruck® was established to serve. Accordingly, the new project marks the start of an engineering dialog with the industry. Mebus: "We now seek to develop tailored solutions in collaboration with the customer." So that trucks can use tomorrow's highways in a more ecological and efficient way.

Dr. Daria Szygalski

Contact: **Helmut Mebus**, Technical Project Management InTruck®, tel. +49 203 52 44937, e-mail: helmut.mebus@thyssenkrupp.com

Focus on partnership
The road to the future starts today

Prof. Hans Ferkel (left) and Oliver Hoffmann from ThyssenKrupp Steel Europe R&D will continue their path of forward thinking in collaboration with customers in from the commercial vehicle industry, trucks and trailers.

As everyone knows, the best way forward is to shape the path to the future. The critical trends in the commercial vehicle industry have been identified. Whether lightweight design, cost efficiency, environmental friendliness, safety or comfort – it is important to achieve and leverage synergies between suppliers and manufacturers. ThyssenKrupp is entering a dialog with the industry with its Groupwide InTruck® platform. In focus: collaborative development.

"With InTruck® we seek to deepen technical cooperation with our customers and to convert this into production solutions in line with demand," explains Prof. Hans Ferkel, Director of Research and Development (R&D). For years, the steel experts from ThyssenKrupp Steel Europe have been experimenting on higher-performance steel grades with higher strength that are still easy to process. And what a success it has been. "For the passenger vehicle industry, we have already developed a portfolio of solutions," Ferkel explains, referring to the Groupwide InCar® research program. This assembly kit of solutions is the Group's most comprehensive R&D project for innovations in automobile manufacturing to date. "In close collaboration with customers, we developed more than 30 ideas for body, chassis and powertrain to production readiness. They contribute towards making the automobile lighter, safer and greener," as the physicist explains. With our innovative hot stamping technology alone, weight savings of more than 20 percent can be achieved, thus protecting the environment accordingly. The energy balance of InCar® is impressive, as external experts also find. The project took the second place in the ÖkoGlobe awards.

But "cars are not trucks" is a perfectly legitimate objection. "Yes, there are obvious differences," Ferkel admits. They include the much higher mileage of trucks and the lower production volumes that require different manufacturing techniques, as well as the need for lightweight construction at very low costs. "But we also see significant parallels between the industries and thus opportunities to integrate our materials and technology expertise in more depth for commercial vehicles (CVs)," he points out. Oliver Hoffmann, Head of Applications Engineering, which also belongs to the R&D division in Duisburg, chips in: "From the lightweight design projects that we have implemented to date in collaboration with companies from the commercial vehicle industry, we can see that our existing solutions provide usable and adaptable approaches."

The InTruck® project sees ThyssenKrupp companies bundle their expertise for the trucks of tomorrow. ThyssenKrupp Steel Europe has put in some advance work in a very special way. The company developed a representative virtual cab. A good starting point for further collaboration, in Hoffmann's opinion: "On this solid base we can contribute alternative innovations for assemblies and components and refer to this benchmark for detailed comparison. Customers can thus choose the most interesting steel solution for their applications, and then collaborate with us in its development." The Duisburg-based steel manufacturer is optimally positioned to achieve this: "First and foremost, there is our highly motivated development team," says Ferkel. Passion for innovation and high quality has long been the motivating force for his employees. They not only have access to comprehensive knowledge, but also to excellent equipment: for example, laboratories for detailed chemical, mechanical and metallurgical testing, forming presses and a variety of joining and simulation equipment. Briefly: The R&D division of ThyssenKrupp Steel Europe has many options for supporting customers in the implementation of innovations.

But that's not all: For example, ThyssenKrupp Bilstein contributes a shock absorber developed for trailers to the project, and commercial vehicle companies can further reduce fuel consumption and emissions with adjustable camshafts from ThyssenKrupp Presta.

At the same time, InTruck® means more than intelligent systems, materials and components that can be individually tailored in collaboration with and for the customer. This needs to be emphasized again: "It is a platform that shortens the path to new and sophisticated technological and economic solutions," says Ferkel, concluding with an unequivocal statement: "Above all, we seek to offer our customers bilateral development partnerships." This will help shape the path to the future more intensively and quickly.

Dr. Daria Szygalski

Contact: **Oliver Hoffmann**, R&D/Application Engineering, tel. +49 203 52-44370, e-mail: oliver.hoffmann@thyssenkrupp.com

An interview with Prof. Wolfgang Stölzle
"We need intelligent guidance and control systems"

Germany is successful as a location in part because a competitive logistics industry is available to businesses. The transport volume is increasing, but the good infrastructure increasingly has gaps. "The upkeep of the road network, intelligent transportation systems and future-oriented transportation are the most pressing needs," says logistics expert Prof. Wolfgang Stölzle.

Professor Stölzle, what does a steady increase in transport demand mean for the logistics industry?

The industry is growing at an above average rate on the one hand, even if economic growth itself has stagnated. On the other hand, we see a sharp decline in transport services in the face of global recession, most recently during the economic crisis of 2008/2009. The industry is thus subject to a high volatility of demand.

What are the consequences of high transport intensity for the economy?

The more intensively the industry relies on transport, the more vulnerable it is for logistical problems; that is, we have greater susceptibility in value added networks. We all remember Fukushima, the volcanic ash, the vessel that ran aground on the Rhine or strikes by transport workers in various countries. Then it becomes clear that we only notice logistics if it is not working – when production comes to a standstill, the shelves remain empty, or we are restricted in our mobility.

Do companies take these disruptive factors into account?

In typical outsourcing considerations only to very small extent to date. Cost consciousness and the view of tied-up capital have dominated here thus far. This gave rise to the lean logistics strategy, which provides very little in terms of time and inventory buffers for incidents. The topic of "supply chain disruption" is only gradually being perceived. This is different, for example, in the IT sector, where people have been thinking in risk categories for many years and thus providing redundant systems.

Germany has large companies in the logistics sector. How do you assess their competitiveness?

The logistics companies are basking on the sunny side of economic development. Since the exchange of goods is global, it is also necessary for logistics companies to position themselves worldwide. Thus, for example, DHL and Schenker, but also Lufthansa Cargo with its widely ramified network, are well positioned nationally and internationally. DHL and Schenker are regarded as a full-service providers, that is, they offer virtually any logistics services around the globe. In some cases, incorrect assessments of certain market developments can occur; this explains why these logistics companies are not immune to setbacks, despite what is basically strong demand – just think about DHL's commitments in the USA, for example.

Germany is, an attractive logistics location according to various rankings. According to a recent World Bank study, we still occupy fourth place, but we used to hold the number one spot. What does such a ranking actually tell us?

Rankings are important because they show the importance of logistics in its service function for the economy. Fourth place means that the infrastructural facilities are still largely coherent in Germany.

What are the problems that logistics in Germany can expect to face?

The state, represented specifically by the Federal Ministry of Transport and parliament, has recognized the modernization of the infrastructure as an important task. Despite this, billions of investment in transport infrastructure are still missing annually. This means that the modernity of our infrastructure has been dropping for a long time. Now people have agreed on a formula of "preservation rather than new building" to initially maintain the existing road network.

What is your advice for road projects?

In addition to preserving the existing infrastructure, the key issue is certainly that of investing less in concrete and more in modern transport systems. We need intelligent guidance and control systems that change lane directions to reflect the current traffic conditions, enable use of the emergency lane, notify users about diversions in good time, work with different recommended speeds, and involve the entire transport system at the same time – all with the aim of improving the utilization of the existing network.

What can ThyssenKrupp Steel Europe contribute towards cutting-edge logistics tasks?

The largest increase in traffic will occur on the roads according to our forecasts. That means, we need transport in the form of commercial vehicles that are lighter and yet safer, that run more quietly, emit less CO_2, and are closely oriented on the needs of transport companies and their customers. High-tech specialists are thus needed in the field of composite materials who take new approaches in collaboration with commercial vehicle designers. The InTruck® research project is an example of how a research- and technology-intensive German company approaches the question of tomorrow's logistics.

Interview: Dr. Bettina Wiess, financial journalist

Prof. Wolfgang Stölzle is the Chair of Logistics Management at the University of St. Gallen (Switzerland). The university also offers a part-time diploma program as a start and return point for lifelong learning in the fields of logistics, supply chain management and freight traffic. Prof. Stölzle is also an expert member of the Scientific Advisory Council to the Federal Minister of Transport, Building and Urban Development and of the Scientific Advisory Board of the Federal Logistics Association. He also chairs the VDA Logistics Award jury and the Eco Performance Awards jury for road transport.

Automotive Engineering Expo in Nuremberg
Industry excited about premiere

"Be part of a special premiere" – this is the message the new Automotive Engineering Expo (AEE) in Nuremberg puts across in its brochure. It is currently the only car show with an accompanying congress that maps the complete process chain from body manufacture, through painting, to assembly. Long before the start of the exhibition in early June, the concept is reaping success: The reception in the automotive industry is positive, the expectations are high.

AUTOMOTIVE ENGINEERING EXPO 2013

The trade fair is happening at exactly the right time, say the participating automakers. The global automobile market is growing, but CO_2 emission targets, scarcity of resources and the need to compensate for added weight in drive electrification are challenging the industry. It faces these challenges with lightweight design, process optimization and the use of smart materials – just the right job for ThyssenKrupp Steel Europe. This explains why the Duisburg-based steel manufacturer will be there when international experts travel to what promises to be an exciting venue in Nuremberg, Germany, June 4 to 6. In Hall 7A, booth 419, ThyssenKrupp Steel Europe is exhibiting innovations from its product range. The focus is on sustainable and cost-efficient lightweight steel, amongst other things. On a floor space of some 120 square meters, visitors can experience steel with its versatile properties. One thing the people from Duisburg have in their baggage is the state-of-art LITECOR® product. This steel and plastic sandwich material sets new standards in lightweight body building. And the steel experts also have the right application for reliable protection against corrosion: ZM EcoProtect® with a special zinc-magnesium coating. In addition, GammaProtect® impresses with cathodic corrosion protection for hot stamping. Part of the stand is also dedicated to the developments PrimeTex® and EloTex. They come into their own as premium surfaces for the automobile skin.

At the accompanying Automotive Engineering Congress, ThyssenKrupp Steel Europe is looking to impress at keynotes with its know-how and application solutions for the steel sector. Experts will provide insights into new developments in the field of hot forming at the high-profile meeting: how can structural components meet the contradictory requirements of being lightweight and safe at the same time? What new opportunities does lightweight steel construction offer when it comes to reducing weight efficiently?

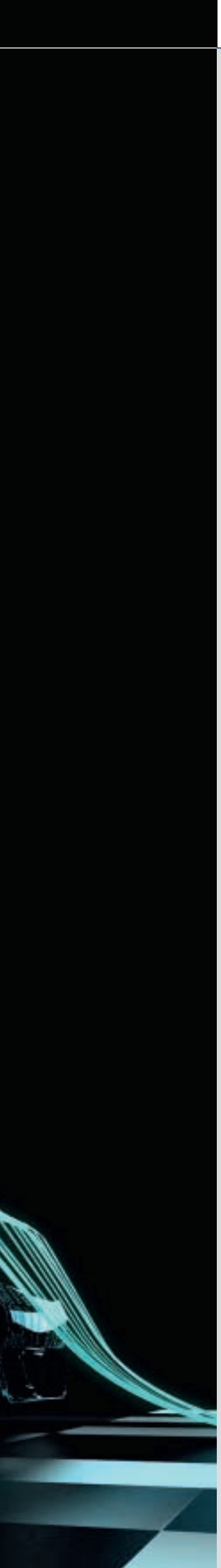
Johanna Flöter

www.automotive-engineering-expo.com

Current trends in car body manufacture is the motto of the AEE, early June in Nuremberg. ThyssenKrupp Steel Europe is presenting its innovations.

Contact: **Oliver Middelhauve**, Auto Sales, tel. +49 203 52-40687, e-mail: oliver.middelhauve@thyssenkrupp.com

News Flash



Discussion point energy transition
The energy transition sees Germany's industry facing major challenges. It can only succeed if it ensures competitive electricity costs for industry. For energy-intensive industries such as steel industry, this is a vital requirement to continued existence. Already, the current electricity costs of the steel industry in Germany are right at the top in international comparisons. In addition, the rapid increase in the levy for renewable energies (EEC surcharge) is causing the electricity price to skyrocket. Uncoordinated development of renewable energies is also threatening the stability of the power grid. Representatives from politics and business discussed the significance for North Rhine-Westphalia with its closely-integrated value chains at the end of February. They met at the Regional Conference of the Steel Industry Association in Düsseldorf and made it clear that essential basic industries such as the steel industry are now clearly reaching their limits. One panel participant was ThyssenKrupp Steel Europe board member Dr. Herbert Eichelkraut.
www.stahl-online.de/english

Multi-tonne anniversary
The millionth tonne of steel has been delivered. ThyssenKrupp Steel Europe and Schütz from the Westerwald have thus reached a successful milestone in their long-term supply relationship. For more than 50 years, the leading international manufacturer of high-quality packaging systems has relied on materials from the Duisburg-based company. The supply portfolio mainly comprises cold rolled and hot-dip galvanized sheet steel. The former is ideal for barrel production. The hot-dip galvanized version meets the requirements in IBC (Intermediate Bulk Container) manufacturing. Because of the excellent, and for some years, more intensive supply relationship the two companies celebrated this anniversary together.
www.schuetz.net

Advanced delivery options
ThyssenKrupp Steel Europe is expanding its supply range. Pickled SCALUR® brand hot strip, which is made on the casting and rolling plant to particularly tight thickness tolerances of 0.05 to 0.07 millimeters, is now also available in higher strenghts – as S600MC/SCALUR® and S650MC/SCALUR® with thicknesses of 2.0 to 6.0 millimeters and beyond this with thicknesses of 2.0 to 4.0 millimeters as S700MC/SCALUR®. For the latter, the steel manufacturer is planning a future expansion to 6.0 mm. In addition, higher strength, micro-alloyed, cold-formable hot-rolled steel strip as per DIN EN 101419 is available conventionally as PERFORM® 600, 650 and 700 up to 10.5 millimeters depending on the grade.

Jugend forscht research competition
Great ideas, great scientific curiosity, persistence and a lot of experimentation were recently demonstrated by 88 young researchers at the ThyssenKrupp Steel Europe training center in Duisburg: They presented their contributions in the scope of the 31st Regional Contest of Youth Research/Students Experiment, which was hosted by ThyssenKrupp Steel Europe. "We enjoyed welcoming the young Einsteins, and were impressed – as in previous years – with the ingenious ideas the young researchers came up with," said Labor Director Thomas Schlenz. From a record-breaking pool of 47 entries, an expert jury awarded prizes to contributions from the fields of work environment, biology, chemistry, mathematics/computer science, physics, and engineering. The young contestants came from different schools in the Ruhr area.

40 years of blast furnace 1
On February 13, 1973, the August Thyssen-Hütte (ATH) in Duisburg-Schwelgern fired up the third blast furnace worldwide with a hearth diameter of 14 meters. A gigantic project: On 17.5 hectares of land, 210,000 cubic meters of earth were excavated for the 110-meter tall plant, which had a furnace volume of 4,200 cubic meters. 70,000 cubic meters of concrete and 38,000 tons of steel were needed for foundations, platforms and buildings. Just for comparison's sake: With this amount of steel you could build almost four bridges over the Rhine. In four decades, blast furnace Schwelgern 1 has produced over 115 million tons of pig iron to date. It currently provides some 270 jobs for employees of ThyssenKrupp Steel Europe AG.

InCar® Asia
In April, ThyssenKrupp presented the InCar® research project in China. The host is Tagal, a joint venture of ThyssenKrupp Steel Europe and Angang New Steel. In collaboration with the ThyssenKrupp Business Area Components Technology the presentations are organized into four main regions: in Changchun in the far north, in Chongqing in the Midwest, in Guangzhou near Hong Kong in the south, and in Shanghai on the east coast. Customers from the automotive industry and national automotive suppliers are invited to attend.

Opel Adam is pure lifestyle

The fresh small car attracts modern-day Eves

The modern Opel Adam is an urban mini that has tugged at heart strings since the beginning of the year, becoming the arch rival of the Mini and Fiat 500. This is made possible by its cool design, a city-ready drivetrain, its agile chassis and the innovative GammaProtect® coating by ThyssenKrupp Steel Europe.

Simply trendy – the new urban runabout, Opel Adam. A state-of-art GammaProtect® coating from ThyssenKrupp Steel Europe helped. It enables automotive suppliers and OEMs to design innovative hot forming solutions.

This charming small car faces up to its rivals with innovative solutions and provokes much discussion especially among female drivers. And Adam does its job well: The 3.70 meter three-door hatch has a bold appeal with powerful contours and thus attracts design-conscious customers. There are twelve attractive body colors that can be combined with three roof colors. On top of this, today's young generation have many options for refining the Adam to suit their individual taste, just like their cell phone covers, for example, with colored clips for the radiator grille and painted trim clips in the wheel rims – a discernible trend in the auto market, which is perfectly tailored for its self-confident target group. If you can't find anything, you can't be helped.

Hot forming with GammaProtect®
The electrolytic coating with its high melting point can withstand the extreme temperatures that occur in hot forming, thus providing safe protection against scaling in production. This means that automakers can leverage the economic benefits of direct hot forming, without sacrificing cathodic corrosion protection. The process creates components with strengths of up to 1,650 Newtons per square millimeter. This means that components above all for corrosion-susceptible wet areas of the body can be more thin-walled and lightweight by design.

Aging is definitely not trendy: to prevent road salt, heavy rain and road damage spoiling the fresh look throughout the Adam's service life, GammaProtect® from ThyssenKrupp Steel Europe is on board. "The metallic coating gives automotive suppliers totally new options for advanced processing," says Maria Köyer from the steel producer's Research and Development (R&D) division. For example, the Adam's rear frame is made of very light and thin high-strength steels from ThyssenKrupp Steel Europe to save weight and at the same time meet the highest safety requirements. "Nothing is allowed to rust here – and unfortunately, this component is located in an area that is particularly exposed to corrosion," she says, outlining the challenge. "To be able to create the exact shape directly by hot forming of high-strength, quenched and tempered steels, they are coated with GammaProtect®. Electrolytic coating is very easy to handle and can thus be processed optimally. It is even forgiving of temporal variations in production and thus allows for absolutely stable processes. The cathodic corrosion protection remains fully preserved, thus preventing scale build-up in production," says Köyer, summing up the benefits. "We support our customers in all process steps from hot forming to the finished product. Moreover, we can pinpoint potential weaknesses by simulation and provide targeted engineering solutions. For example, we have already launched the current production of the rear frame on our pilot plants." This is time-saving, economical and state-of-art – totally in keeping with the Opel brand and its young drivers.

OEM Opel is proud of the new rear frame. Christian Mengel, Director of Body Design: "Taking an innovation like this to the market requires permanent development work. In the last three years, we were constantly in touch with our automotive supplier and exchanged our expertise. Steel supplier ThyssenKrupp Steel Europe was also involved." And it was worth it: "We have total confidence in our development. The rear frame shows that this technology is seminal for future lightweight design in corrosion-critical areas. This is why we also use it as the B pillar in our new convertible model, the Cascada, which is currently celebrating its market premiere."

Where car maker Opel has decided on a specific technology, buyers of this chic urban vehicle are also spoiled for choice in the interior. There, casual individuals can live their dream, and choose one of the many decorative trims. From single-color paint to dot patterns, everything is possible. There are countless different ways to create an Adam. The highlight is the headliner with dimmable LEDs. The driver can select from eight different colors at the push of a button: this is pure seduction and a touch of luxury – Rolls-Royce also has something similar to offer.

Whether a modern Eve, or a male trendsetter, the generation of twenty-somethings in particular feels really good in the Adam: The instruments are round, as people know them from sports cars. The control system with its neat knobs and seven-inch touch screen, is hip and smartphone compatible. Users can thus view photos, and play movies and music there and control this via the touchscreen – incidentally, you can also make phone calls. An app provided by Opel handles navigation, preparing the way for lively tours of vibrant cities.

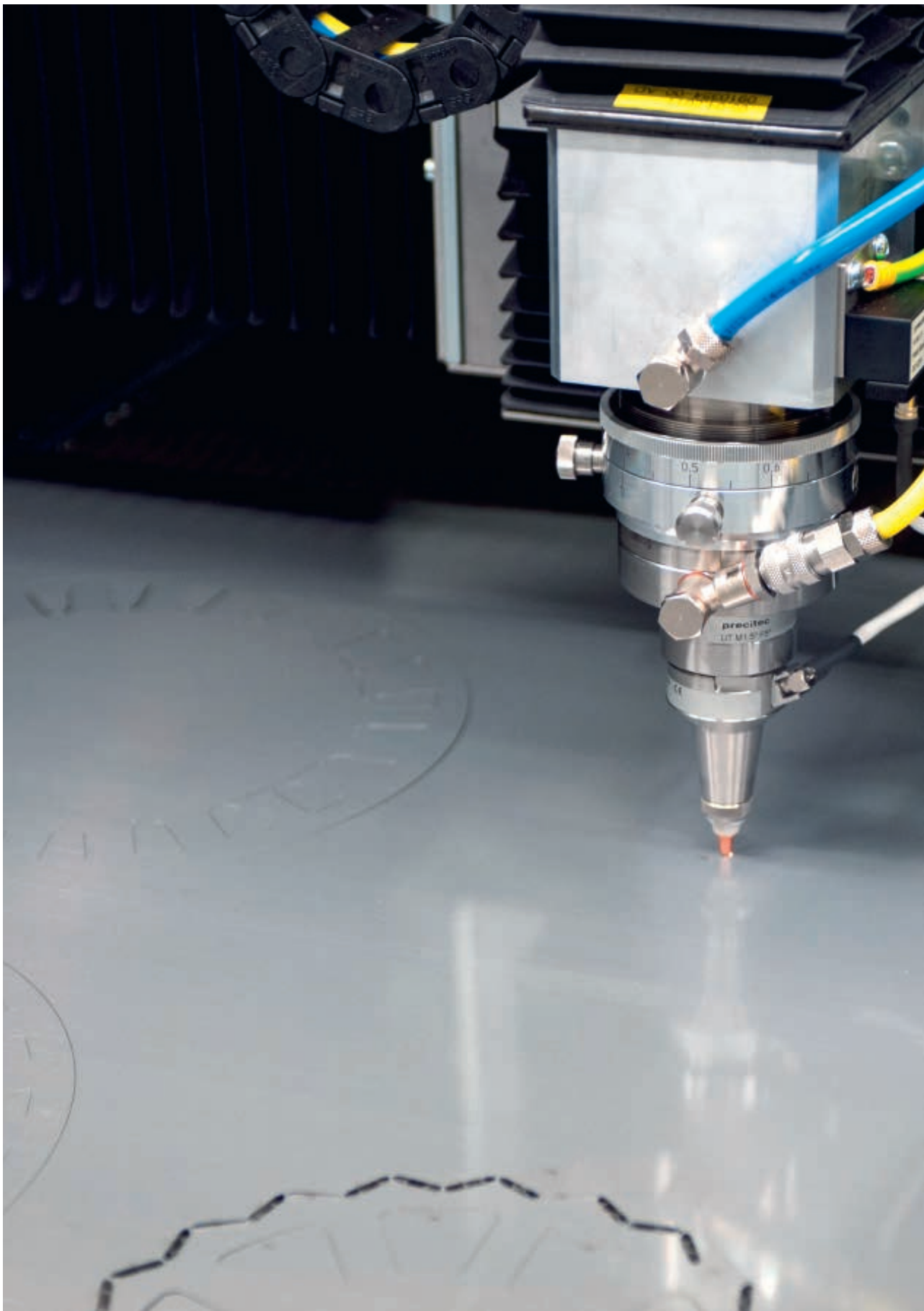
Christiane Hoch-Baumann

www.opel.com

Contact: **Maria Köyer**, R&D, tel. +49 231 844-5451, e-mail: maria.koeyer@thyssenkrupp.com
Christian Mengel, Adam Opel, tel. +49 6142 7-75459, e-mail: christian.mengel@de.opel.com

Future market electric mobility

The e-Mobility Center Drives supports the trend



The modern laser cutting system at the e-Mobility Center Drives cuts thin blanks from new electrical steel grades which are already used in the building of prototypes for future electric and hybrid cars.

According to studies, about three million electric cars will be humming and buzzing along our roads in the European Union by 2020, in addition to about four million vehicles with a hybrid drive. A clear trend that ThyssenKrupp Electrical Steel serves with the opening of its new e-Mobility Center Drives. Since the beginning of the year a young team at Bochum has given right of way to the electric drive, researching and searching in high gear for solutions with lower energy losses and higher speeds.

Heart of the laboratory is the electric motor test bed. Soon we will be able to take a really close look at motors here for our customers.

"We support, advise and assist automotive suppliers and OEMs in the use of our non grain oriented electrical steel," explains the Head of Applications Engineering, Andreas Jansen, outlining the task of the think tank – a modern, two-floor extension built onto the finishing shop. An all-electric drive requires about 40 to 100 kilograms of electrical steel per motor; for hybrid drives this is about 10 to 30 kilograms. The new thinkers in the e-Mobility Center Drives devote themselves to this growing market, paving the way so that millions of modern electric motors can drive on European roads in less than ten years. "Traction motors are highly sophisticated electric machines that need to continually become more efficient and more powerful," says Jansen. To put the power fully on the road, the stators and rotors of the motor must not have no large core losses. At the same time, high strength is important, because only then can the desired high speeds be achieved – and all of this has to happen in a confined package space, of course. "Our research meets with great interest from our customers. They are increasingly asking us about the appropriate grade for a particular motor. And we deliver the answers."

The e-Mobility Center Drives is just bubbling over with ideas – little wonder when you look in a modern meeting room through the large panoramic view window directly onto the lively industrial backdrop at the Bochum site. This frees up the mind. Senior Engineer Marco Tietz: "We help our customers to rethink the electric motor. In order to create a basis for comparison, we have constructed a neutral reference, we will now measure precisely on our new electric motor test bed." The new two-floor building which is equipped with high-tech systems for this purpose. The heart of the laboratory is the electric motor test bed with associated workshop and a state-of-art laser cutting machine. "Soon we will be able to take a really close look at motors here for our customers."

The aim of this work is to identify exactly where the energy losses arise in an electric motor, and how they can be minimized. In doing so, the steel grade plays a crucial role, because the electrical steel must be extremely thin – less than 0.30 millimeters – to achieve high efficiencies and high power densities. "We deploy totally new materials today," says Tietz. "In collaboration with Research and Development (R&D) in Duisburg, we have continued to develop their alloy concepts and improve manufacturing processes in Bochum." And the results speak for themselves: an electrical steel, with a core loss almost 30 percent below the values of the standard varieties.

The boffins from Bochum actively shape the future of electric mobility. "We are constantly evolving the machine designs, and with them the requirements placed on the electrical steel," says Jansen. Its quality has very significant impact on the performance and cost of future drives. "Our new electrical steel grades are already being used in the construction of prototypes for future electric and hybrid cars – the goal is, of course, volume production," Jansen concludes, following his words through the large panoramic window with its direct view of the vibrant finishing department of ThyssenKrupp Electrical Steel's Bochum site.

Christiane Hoch-Baumann

www.thyssenkrupp-electrical-steel.com

Contact: **Nicole Wiese**, ThyssenKrupp Electrical Steel, tel. +49 209 407-50845, e-mail: nicole.wiese@thyssenkrupp.com

The solar car is ready to rumble
Cruising towards the sun with electric steel

The motor works, the name has been chosen. The specialists for electric mobility at Bochum University are getting their latest solar car ready for this year's World Solar Challenge in Australia. Equipped for the first time with electrical steel from ThyssenKrupp Electrical Steel, the PowerCore® SunCruiser paves the way for a new generation of solar cars.

The heart of steel has begun to beat: Solar car experts at Bochum University and electrical steel specialists from ThyssenKrupp Electrical Steel have worked at top speed on the motor of the new solar vehicle. The result of months of research is now reflected in the name – PowerCore® SunCruiser. The Cruiser is suitable for everyday use: it runs on four wheels, and up to three people can be comfortably seated. While the first models were built to be flat, had three wheels, and typically only seated the driver, the latest version is more similar to today's popular road-going cars. The developers even thought to include a trunk.

For the first time, the motor is constructed from a material from ThyssenKrupp Electrical Steel. Built into the two front wheels, the wheel hub motor transmits power directly to the tires. Large transmission losses are eliminated here. "That we use electrical steel at all here is revolutionary," says Stefan Spychalski who has accompanied the SolarCar Project at the university for over ten years. "So far we have not used any core material in the powertrain. But if you want to achieve better performance, it is necessary." The decision was thus taken to use non grain oriented PowerCore® electrical steel from ThyssenKrupp Electrical Steel. "We were immediately excited by the project and commitment of the students," as Dr. Andreas Jansen, Head of Application

On the left, PowerCore® electrical steel from ThyssenKrupp Electrical Steel at the core of the wheel hub motor. The SolarCar owes its name and optimum drive to it.
Center Creating the solar car of the future with simulation and on the test bed. Bundling the expertise of the Bochum University team and electrical steel specialist, ThyssenKrupp.
On the right The thin specially adapted sheet is used in the motor as a package. There, it ensures efficient an energy yield and low losses.

Engineering with the electrical steel manufacturer in Gelsenkirchen and Bochum, recalls. "We were clear about one thing: we wanted to co-develop the motor." This explains why double expertise is flowing into the PowerCore® SunCruiser: The student team with some 40 member simulates how to put together the core of the car on its in-house test bed, incorporating the know-how from the past five generations of the SolarCar. The tailored solution is provided by the subsidiary of ThyssenKrupp Steel Europe: "We specially adjusted the thickness of the material to 0.30 millimeters. We also changed the alloy of the material and the annealing process in production," said Jansen. And this was extremely successful: The result is an electric steel with the help of which collected solar power can be used effectively – without substantial core loss. From the non-reflective solar panels on the roof, the natural fuel flows directly into the motor, or in strong sunlight into the battery, as a reserve in case of bad weather. "The drive already provides the desired mechanical and electrical properties. Now it's time for the finishing touches," says electric mobility student Benjamin Geiger, who already took part in the world tour 2012 with the predecessor model, SolarWorld GT – 30,000 miles in 14 months with a car that traveled around the world with the energy equivalent of 60 liters of diesel.

The partners have shown their foresight in the joint project: "We can optimally leverage the research results relating to the solar mobile to further establish ourselves in the field of electric mobility," says Jansen. In the neighboring e-Mobility Center Drives, the company's engineers apply this insider knowledge directly (for more details, turn to pages 18-19). As Spychalski knows from experience: "Cars that have to make do with the sun as their only energy source, make you inventive. We have taken a major step towards the future of car making, in terms of, say, lightweight construction and energy efficiency."

Now, for the first time, the heart of the sun racer is to face its first big test: at the end of May, the PowerCore® SunCruiser will leave the workshop in Bochum, and in October it will take to the race track in Australia. The bi-annual world championship for solar cars, the World Solar Challenge, will be the acid test for the new cruiser. Thus far, the team has always been on the sunny side: The idea, speed and style have won awards. And with their new electrical steel concept – the development partners are confident – they will leave the competition standing in the rain.

Claudia Freigang

www.hochschule-bochum.de/en/solarcar
www.thyssenkrupp-electrical-steel.com

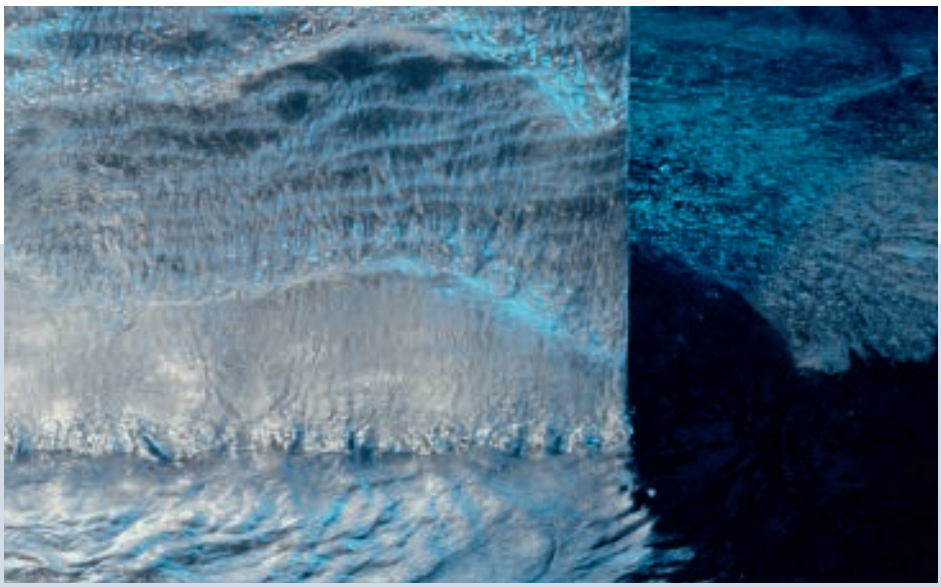
Contact: **Stefan Spychalski**, University of Bochum, tel. +49 234 32-10740, e-mail: stefan.spychalski@hs-bochum.de
Nicole Wiese, ThyssenKrupp Electrical Steel, tel. +49 209 407-50845, e-mail: nicole.wiese@thyssenkrupp.com

Series: A question of surfaces
ZM EcoProtect® is state-of-art

What do wheelbarrows and polar stations have in common? Like many other things, both need rugged rust protection for steel. In applications like these, surfaces increasingly consist of a zinc-magnesium alloy: ZM EcoProtect® is ThyssenKrupp Steel Europe's highly effective corrosion protection for various applications in the field of construction, household appliances and the automotive industry.

"Granted, polar stations are one of the more exotic examples of applications," begins Rasmus Nilles, Director of Technical Customer Service for organic coated sheet at ThyssenKrupp Steel Europe. "Zinc-magnesium coated base material is used in our PLADUR® family wherever the requirement is for durability and longevity, that is, where corrosion needs to be absolutely ruled out." You will find much of this in your everyday surroundings: industrial facades, household appliances, office furniture, shelving systems, fire doors, garage doors and the steel structure of a stacking garage. Why this is so is explained by electro chemistry – the knowledge of the complex processes that are responsible for the phenomenon of rust. "Some people claim that zinc-magnesium coating even has some self-healing power, although this is factually untrue," laughs Jennifer Schulz, an expert in surface development at ThyssenKrupp Steel Europe. "It is true, however, that zinc-magnesium surfaces – like our in-house development ZM EcoProtect® – respond very tolerantly to damage, scratches for example. The dreaded subsurface corrosion between the organic coating and the bare metal is crucially minimized thanks to the addition of magnesium, thus preventing rust spreading at this point. Even untreated edges remain unproblematic for long periods."

With its magnesium content ZM EcoProtect® offers better corrosion protection in many applications than pure zinc coatings. Conversely, this means: The coating thickness can be reduced. "We use only 130 grams of zinc and magnesium per square meter



Zinc-Magnesium provides highly effective corrosion protection which is suitable for various applications in the fields of construction, household appliances and also in the automotive industry.

instead of 275 grams of zinc – and have official approval to do so for all steel materials for construction," says Dr. Jens Horstmann, Head of Product Strategy at the Duisburg-based company, pointing to an important field of application. The relatively new development has already established itself in the construction industry. "Architects and designers think in very long terms, not in years, but in decades. And if you use conventional coating thicknesses in surface coating, you extended the service life accordingly."

Otherwise the surface should not just be viewed in terms of saving material – even though zinc is definitely a resource that is becoming scarcer. Professionals value another aspect no less highly: "Zinc-magnesium surfaces offer advantages in forming," as Dr. Christoph Filthaut, who is responsible for surface development with the steel manufacturer, points out. "Forming this sheet metal is far less problematic. The presses are not soiled as quickly, accretions can be avoided – the production process is more efficient bottom line."

Which means that zinc-magnesium coating is also recommended for the car industry. Filthaut: "Most of the requirements are already met. Our current development activities are focusing on the premier class – sheet with the best surface that allows an absolutely premium quality paint appearance across a large surface area. Work is focusing at present on achieving the required process reliability." In other areas of automotive technology, ZM EcoProtect® has naturally already established itself. Components in the vehicle interior, trailing arms in the suspension, or the meter-long trailers of refrigerated trucks are manufactured from zinc-magnesium coated sheet with great success.

"Literally all the world watches these vehicles," says Nilles. "A refrigerated trailer travels more than a million kilometers on the road. And now just imagine that this vehicle transporting fresh food shows visible weak spots… " Accordingly, ZM EcoProtect® can easily be covered with a variety of organic coatings, whether paint, foil, metallic effect, or whatever else is possible. It is here in particular that many interesting applications arise that serve their purpose perfectly – in the case of refrigerated trailers, this means a rugged, durable, and also hygienically impeccable body. And aesthetic requirements can also play a role. An attractive surface impresses – and it casts a good light on the owner. As is shown from the domestic kitchen to the remote Antarctic.

Wolfgang Kessler, freelance journalist

Our **new series** on coatings will continue in the next issue of *compact*.

Contact: **Dr. Christoph Filthaut**, R&D, tel. +49 231 844-3537, e-mail: christoph.filthaut@thyssenkrupp.com

Durable, versatile, safe

You can rely on Wickeder Westfalenstahl in everyday life

Three in one: Various metal layers form the basis for clad materials.

Seat belt, cooking pot and the euro – all of these products are made from materials from Wickeder Westfalenstahl. For 100 years, the company has produced materials that accompany us in everyday life. To allow this to happen, the processors from Westphalia bank on starting material and expertise, among other things, from ThyssenKrupp Steel Europe.

Tradition meets modernity in Wickede an der Ruhr: In the foyer, furnished with colored glass windows and a curved staircase, digital monitors attract attention to themselves. They show the products with which Wickeder Westfalenstahl has shaped history: clad materials and cold-rolled strip. And they have done so for almost 100 years.

In 1913, the merchant Bernhard Bauer founded the Wickeder iron and steel works. "We started to specialize in high-quality cold-rolled strip early on. But above all, we made a name for ourselves as cladders," says Dr. Lutz Hofmann, Head of Applications Engineering, who himself has been with the company for more than 20 years. The clad material is produced on the company's own lines – Wickeder Westfalenstahl received a patent for this in its early years. The secret recipe: you take steel and combine it with metals such as aluminum, copper, bronze and nickel. The result is a composite material with entirely new properties. An example: "The line circuit breakers that you find in the fuse box of any household use copper-clad steel," says Hofmann. With its excellent electrical conductivity and high mechanical strength and lighter weight, this material replaces expensive solid copper. And the material makes the difference in other areas, too: For example, in high-quality cookware an outer layer of copper ensures good looks and heat conduction. The inside of the pot is made of food-safe, cooking grade stainless steel. The clad material with its magnetic properties also makes the euro coin unmistakable. And in the automobile, drivers can rely on the tough seat belt tongue of cold-rolled steel. The products impress both manufacturers and consumers: "Our range of cleverly-combined materials is unique," says Hofmann proudly. That's because: Wickeder Westfalenstahl is one of the leading manufacturers of clad materials today. In Europe, the Westphalians have joined the ranks of the top producers of cold-rolled strip. They have remained faithful to their location. But the family business has changed nevertheless: The merger with Westfalenstahl in the early 1990s gave the company part of its present name. Through the acquisition of subsidiaries, a total of 1,100 employees work for the Wickeder group in Germany, China and the United States.

"Despite all our expansion, we have remained true to our strategy: we offer safe and durable solutions which are reflected in everyday life – such as in cars, household appliances, electronic components, and roofing," says Hofmann. Premium raw material is essential. Thus the cladders have relied on hot-rolled strip steel from ThyssenKrupp Steel Europe for decades. Hofmann: "In terms of material, expertise and consultancy, things just mesh," says Dr. Roman Borovikov, Technical Advisor to the steel specialist in Duisburg: "We take material and technical know-how to the customer." In regular workshops, the partners exchange information on ongoing and future projects. Brainstorming between the product owners shows great effect. "Wickeder Westfalenstahl can rely on tailored semi finished material. And we learn important facts about market needs at first hand. This helps us to improve in terms of process, product and service," says Borovikov pointing to the win-win situation.

Cooperation with ThyssenKrupp Steel Europe pays dividends for the cladders from Westphalia. "We are looking to intensify cooperation in the field of high-strength and high-manganese steels in order to achieve more growth with new materials," says Hofmann. One thing is clear: Wickeder Westfalenstahl has a foundation on which you can build. And in geographical terms, too: Expansion on the top floor shows that the company is reaching for the skies.

Claudia Freigang

www.wickeder.de/en

Together they make steel fit for everyday use: Wickeder Westfalenstahl CEO Jürgen E. Platt (left) and Dr. Lutz Hofmann (right) as Director of Applications Engineering, with Dr. Roman Borovikov, Technical Customer Service at ThyssenKrupp Steel Europe.

Contact: **Dr. Roman Borovikov**, Industry Sales, tel. +49 203 52-2554 7 e-mail: roman.borovikov@thyssenkrupp.com
Lutz Hofmann, Wickeder Westfalenstahl, tel. +49 2377 917-362, e-mail: lutz.hofmann@wickeder.de

New application for standing seam roofs
PLADUR® StandingSeam makes beautiful roofs

The PLADUR® product family welcomes a new member: PLADUR® StandingSeam is the new, non-structural solution for standing seam roofs from ThyssenKrupp Steel Europe. The new development was first used at the Kreuztal-Eichen site.

The standing seam is an aesthetically attractive installation of metal roofing that can look back on a long tradition. Today it is once again enjoying growing popularity. Usually products for standing seam roofs consist of copper and zinc – metals that are very expensive. ThyssenKrupp Steel Europe, which has manufactured modern organic coated products since the 1960s, has developed this traditional idea. Now, one of the oldest coil coaters in Europe offers customers an economical and aesthetically unique alternative. In collaboration with companies that have produced and installed standing seam roofs for years, experts from ThyssenKrupp Steel Europe's Color Unit have developed a new solution made of strip-coated steel in their own laboratory in Kreuztal-Eichen. PLADUR® StandingSeam is strip-coated steel for fully supported roofing and wall cladding elements.

The basic material is top quality steel that adds sustainability to the entire value chain. It is coated with galvanized ZM EcoProtect® material (see page 22 for more details) from ThyssenKrupp Steel Europe, a variant of hot-dip galvanizing with special corrosion protection. Coil coating is done in several layers. This produces a unique matt and structured surface – even protective film can be applied to PLADUR® StandingSeam. The customer can choose from the colors "seam gray" and "seam anthracite". In addition, the material is easy to process – even in case of difficult details and down to a material temperature of minus five degrees Celsius. PLADUR® StandingSeam thus meets high standards of workmanship, appearance and tactile excellence, at the same time representing a less expensive alternative to today's typical products. From the laboratory to implementation: The first reference project has been completed. At the ThyssenKrupp Steel Europe facility in Kreuztal-Eichen the roof of an office building was recovered with 800 square meters of PLADUR® StandingSeam.

The coating visually matches the building design, giving it a high-quality look. And it lasts for decades, because ThyssenKrupp Steel Europe offers up to 20 years' guarantee on the color and up to 50 on the material.

Dr. Daria Szygalski

PLADUR® StandingSeam is a new, non-structural solution for standing seam applications in coil-coated steel from ThyssenKrupp Steel Europe. The first reference project, an administration building, has already been erected at the ThyssenKrupp Steel Europe facility in Kreuztal-Eichen.

Contact: **Axel Pohl**, Color Sales, tel. +49 2732 599-4578, E-Mail: info.color@thyssenkrupp.com

Fit for production

New steel specialties for lightweight construction

Today's cars have never been safer – this is partly a result of the steadily increasing share of high- and ultrahigh-strength steels in the body. With two new specialties ThyssenKrupp Steel Europe is now expanding its portfolio of ultrahigh strength steels.

The new manganese-boron steel (MBW®) is also suitable as a reinforcing member for areas such as the B pillar, where high resistance to deformation is required. Its advantage: It can be hot formed, despite its ultra-high strength.

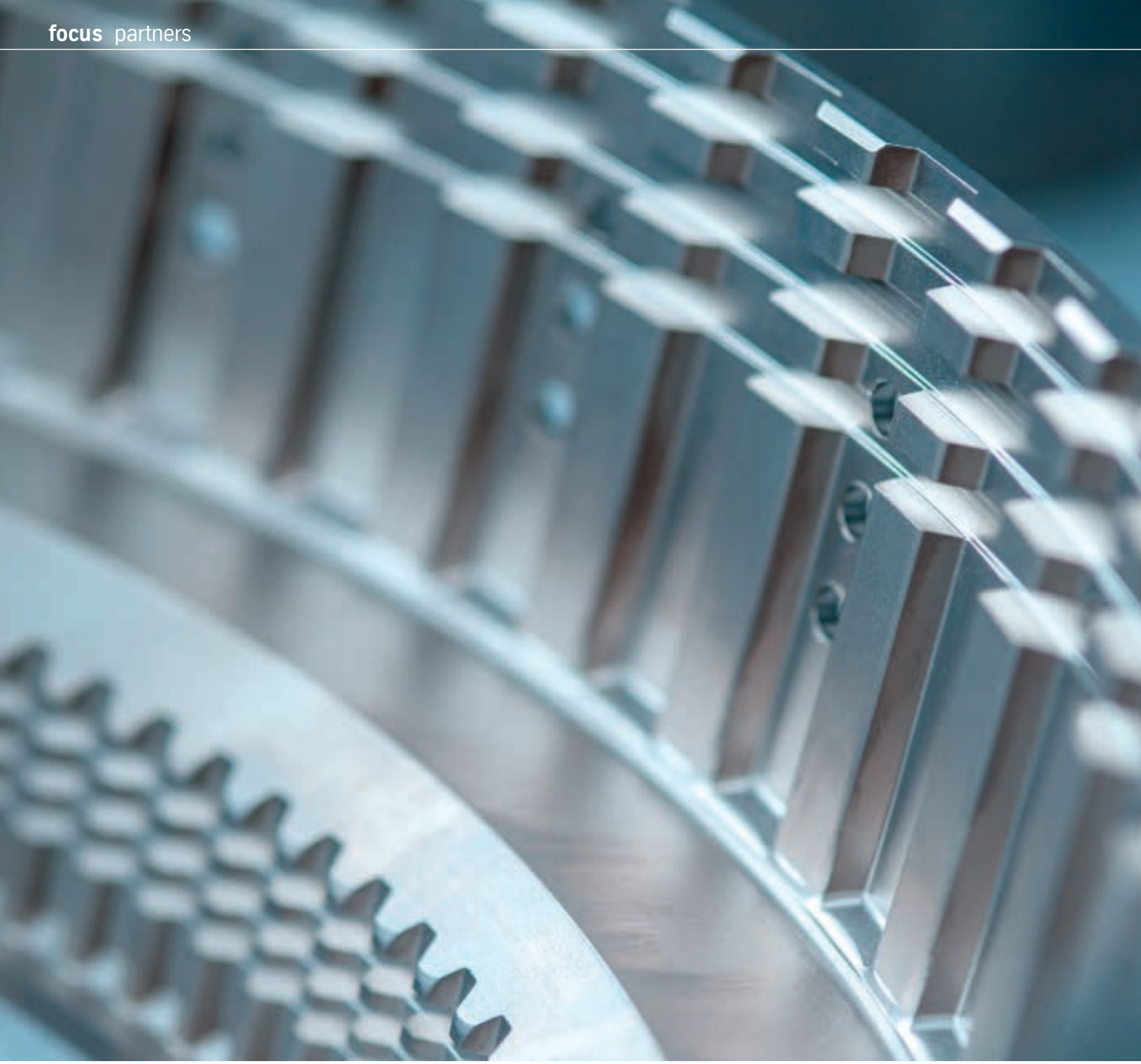
Recently introduced crash tests such as the Small Overlap Test (SOT) by the U.S. IIHS (Insurance Institute for Highway Safety) agency raise the bar in occupant protection requirements. To balance increased safety needs with lightweight design, ThyssenKrupp Steel Europe offers two strength-optimized variants of successful, market-established steel grades in the form of manganese-boron steel MBW® 1900 (MBW19) and dual-phase steel DP-K® 700 Y980T (DPK7).

The Duisburg-based company thus once again provides economically attractive solutions for both body concepts with a focus on cold forming and for car makers with a focus on hot-formed components in crash-relevant vehicle sections. "The new manganese-boron steel is a highest-strength material suitable for hot forming which can be used primarily as a reinforcing part where maximum deformation resistance is required," explains Dr. Jörg Lewandowski, Head of Product Launch at ThyssenKrupp Steel Europe. This includes interior door reinforcements, bumper cross-members, seat structures, and areas of the body that are exposed to enormous loads in frontal impact with very low vehicle coverage – all of which is simulated by the SOT. Compared with the successfully launched MBW® 1500 variant, MBW19 exhibits an even greater tensile strength of up to 2,000 megapascals (MPa). This not only guarantees greater safety, but – due to the great potential for further lightweight design – minimizes weight, consumption and thus CO_2 emissions.

The other innovation from Duisburg is the DPK7 – the result of the on-going implementation of the new VDA 239-100 material specifications for the automotive industry. Lewandowski: "This grade, the high-yield variant of a dual-phase steel in the 1,000 MPa strength class, allows us to expand our range of high strength steels for cold forming." Compared with conventional dual-phase steels – such as the DP-K® 60/98, the innovation offers a significantly increased yield strength of 700 to 850 MPa – while retaining the same good formability. DPK7 is thus an excellent choice for safety-relevant components requiring high strength, resistance to deformation and attractive processing properties. For example, the low carbon content ensures good welding capability with improved hole expansion. Lewandowski: "MBW® 1900 and DP-K® 700Y980T precisely meet customer requirements and are available for volume production."

Ulrike Wirtz, freelance journalist

Contact: **Dr. Jörg Lewandowski**, Head of Product Launch, tel. +49 203 52-4023 5, e-mail: joerg.lewandowski@thyssenkrupp.com



DuoBond® is ready for production
New composite material provides stable drives

Winkelmann MSR Technology and Hoesch Hohenlimburg – two specialists who have researched and developed DuoBond® in successful teamwork. The innovation, which has now reached production maturity, is a modern steel composite material that fulfills the highest expectations and makes the gearboxes in modern vehicles more resilient.

Flow formed disc brackets for sophisticated powertrains are a specialty of WMT and potential field of application for the brand new steel composite, DuoBond® from Hoesch Hohenlimburg.

"DuoBond®, developed in cooperation with Hoesch Hohenlimburg, is ready for production of precision parts by WMT – primarily for use in automobile manufacturing," says Christian Brinkmann, WMT's Head of Sales and the Drive Elements Project.

The newly developed DuoBond® steel-composite material sees metalworkers Winkelmann MSR Technology (WMT) improve the speed and torque of modern vehicles. "We currently have component prototypes with the new material combination in the testing phase with our customers," said Christian Brinkmann, Head of Sales and the Drive Elements Project. The previous development stages were negotiated successfully – in cooperation with Hoesch Hohenlimburg. "ThyssenKrupp Steel Europe has been our material supplier and development partner for more than 20 years. And the new DuoBond® is our joint project." The work has paid dividends: The new development with boron-alloyed tempering and high strength chromium steel was a 2012 Steel Innovation Award prize winner.

The specialty of the company, based in Ahlen: a broad spectrum of forming technologies, in particular flow forming. Customers come from all over the world. "And of course from Germany, an important purchaser country," adds Brinkmann. WMT supplies components and assemblies made of steel, stainless steel, aluminum and titanium for the high-tech industries automotive, aviation and aerospace engineering, and plant construction. For example, it manufactures high-precision plate carriers with internal gears for gearboxes in premium sports vehicles. In passenger aircraft, hydraulic cylinders are installed in the chassis and other cylinders even find their way into space – for example, in the Ariane launcher rocket. These and other products from Westphalia – mainly rotationally symmetrical hollow components – are distinguished by high precision and complexity. And this is where WMT's specialty, flow forming, comes into its own. The company is the global market leader here across all industries. CEO Martin Michelswirth explains: "This forming process allows us to produce complex shapes with very thin walls and high material utilization – while at the same time achieving increases in strength due to cold work hardening."

The company is the manufacturer of the Winkelmann Group and its high-tech unit at the same time. Michelswirth: "Our R&D activities typically lead to small production runs by WMT. Then they are used in the manufacturing activities of other subsidiaries, for example, Winkelmann Powertrain Components, which supplies all German car manufacturers with high volumes." The group, which has its headquarters in Ahlen, stands for more than 100 years of experience in metal processing and expertise in various forming technologies. Today, the hidden champion has more than 2,500 employees worldwide, generating a turnover in 2012 of some 450 million euros with 18 independent business units, seven production and distribution companies, eight distribution companies, a steeltrading company, and two joint ventures in China. The group is organized in three divisions: automotive, heating and water, and drive technology. The latter is especially the focus of WMT for automobile manufacturing of highly specified small to medium-sized series.

The brand new DuoBond®, which was created in cooperation with Hoesch Hohenlimburg, is a development with potential for large scale production. "But first of all, it's all about use in our plate carriers with internal gearing for vehicle transmissions," says Brinkmann looking back: "The starting point for this development was the modern requirements of vehicle manufacturers, who are downsizing engine capacities with a view to future emissions regulations and reducing CO_2 emissions." This means higher speeds and torques – and it puts even more load on the transmission components. This requires adjustments to components and hence changes on the materials side. "For our plate carriers this means improving wear resistance due to the higher torques where the gear tooth system meshes," he says.

WMT then had the following idea and implemented it with Hoesch Hohenlimburg. "On the tooth flanks, the locations of highest stress and thus with the highest susceptibility to wear, the new composite material provides a highly wear-resistant layer," explains Norbert Schönborn, Technical Customer Advisor with Hoesch Hohenlimburg. For this application, DuoBond® combines boron-alloyed tempering steel as a standard constructional steel with high-strength chrome-alloyed high-carbon steel in the areas with extreme load exposure. The two are inextricably bonded at Hoesch Hohenlimburg during hot rolling. Schönborn: "The points with the highest loads achieve strengths of up to 1,300 megapascals. Other steel grades in multiple layers are feasible." Another advantage of joint development: "DuoBond® makes heat treatment, which is often required in flow forming, unnecessary. This saves processes and ultimately costs. Producing larger quantities and thus increasing the degree of automation in production, makes the composite more attractive," adds Schönborn. Despite the current successes, Schönborn and Brinkmann are modest: "Now we have to wait and see what WMT's customers think of the new material development. The material is production-ready in any case."

Ulrike Wirtz, freelance journalist

Contact: **Christian Brinkmann**, Winkelmann MSR Technology, tel. +49 2382 856-689, e-mail: christian.brinkmann@winkelmannmsr.de
Norbert Schönborn, Hoesch Hohenlimburg, tel. +49 2334 91-2295, e-mail: norbert.schoenborn@thyssenkrupp.com

ThyssenKrupp banks on higher education marketing

Inspiring the young, securing ideas

ThyssenKrupp seeks to help keep the world mobile and worth living in with its products and services. For this, the company needs qualified young people with team spirit and good ideas. One important pillar for securing the support of the next generation is the higher education marketing program; in particular, cooperation with ThyssenKrupp's focus universities.

Whether training or the mentoring program: Dr. Karina Wallwaey and Bernd Linke first came into contact with the Group through the higher education marketing program. Today they work for ThyssenKrupp Steel Europe.

A model that sees ThyssenKrupp interacting directly with universities, students and graduates: ThyssenKrupp meets university. Earlier this year, the Group organized this event at the RWTH Aachen, TU Bergakademie Freiberg and TU Dresden – another one will follow in the summer at the TU Dortmund. This recurring event at the beginning of the year is a career fair for students, where they can network with top representatives of the Group. "Most students will never again get this close to executives," says the co-coordinator and driving force behind the events, Dr. Peter Biele. With openness and transparency ThyssenKrupp seeks to inspire young talent and generate interest. "We clarify important questions relating to what a potential employee can do with their training at ThyssenKrupp. Besides this, however, it is the simple things that we talk about: What entry options and career advancement options exist in the Group?"

If the initial contact at this event or other events is positive, an internship is usually not far away. As Bernd Linke knows. The 24-year-old was studying materials engineering in Aachen; his application was accepted after just a few days. "ThyssenKrupp replied fastest. Responding flexibly to my needs, and taking the university's requirements into consideration, was a great thing." This is part of the internship concept at ThyssenKrupp: process and allocate quickly. Positive side effect: The uncomplicated and personal approach is becoming public knowledge at the universities. The next step towards a sustainable connection is, for example, the mentoring program at ThyssenKrupp Steel Europe: each year, the top six students at the universities of Aachen, Freiberg and Dresden are invited, and a mentor is assigned to them. "He or she supports the graduate whenever they have questions and does not need to be an expert in a particular subject. The main thing is: The mentor offers support, for example, in soft skills," says Biele, who attends the recruiting fairs as the CEO of ThyssenKrupp Electrical Steel.

Dr. Karina Wallwaey, now a customer adviser with the Duisburg-based steel company, first came into contact with the Group via this path. Her mentor: the steel manufacturer's former CTO. "Despite his elevated position, we had regular contact and were able to exchange information; this has meant a great deal for my career." After his internship, Linke also returned to ThyssenKrupp to take part in the mentoring program.

Whether an internship or the mentoring program, both can mean easy entry into employment with ThyssenKrupp. The Group has taken on up to 23 percent of young academics from the cooperating universities in Germany in recent years. Wallwaey is one of them: After studying metallurgy and materials engineering at the RWTH Aachen in 2008, she joined the Duisburg-based company. But even more: The steel experts offered her the opportunity to complete a PhD: "An opportunity that is not common," she emphasizes – and she immediately said yes. As a post-graduate student, she developed a new grade of steel for pipeline construction with a greater strength and toughness. "I can now put this knowledge into practice," says today's technical customer adviser for large-scale and precision tubes. Linke, who joined ThyssenKrupp Steel Europe's Research and Development department at the end of 2012, is also already working on his doctorate. His goal: "I'm working on developing a hot forming steel that can absorb a lot of energy in the event of a crash despite its very high strength." These and other outstanding ideas, and the commitment of junior staff, are exactly what the technology group needs to maintain its materials expertise.

Johanna Flöter

www.facebook.com/ThyssenKruppCareer
www.thyssenkrupp.de/karriere

Contact: **Rico Gerstenberger**, Recruiting, tel. +49 203 52-47299, e-mail: rico.gerstenberger@thyssenkrupp.com

Agenda

bauma 2013 – April 15 to 21, 2013, Munich (Hall A6, Booth 429)
bauma, Munich, impresses with a wide range of fascinating technologies and attracts an international audience with world premieres and more. At the 30th Trade Fair for Construction Machinery, Building Material Machines, Mining Machines, Construction Vehicles and Construction Equipment, ThyssenKrupp Steel Europe is also represented with its Heavy Plate Unit. Besides the special structural steels, XAR® and NA-XTRA®/XABO®, the company is exhibiting interesting product solutions in the field of prefabrication.

Practice seminar lightweight construction systems – April 17, 2013, Berlin
In cooperation with the Industrial Association for Lightweight Metal Building Systems (Bausysteme im Metallleichtbau e.V. – IFBS) the Steel Information Center Düsseldorf is offering a practical seminar in Berlin: "Lightweight steel construction systems for roofs and facades – energy- and cost-efficient solutions for new and existing buildings." ThyssenKrupp Steel Europe is accompanying what is the sixth seminar of this kind with a display stand and exhibiting strip coated flat products from the **Reflections**Pearl® color series as well as other solutions for building in steel. Following the seminar, participants will have the opportunity to participate in a site visit to the new Berlin Brandenburg airport. The event is free of charge.

CWIEME – June 4 to 6, 2013, Berlin (Hall 4.2, Booth 4315)
CWIEME in Berlin is a leading international trade fair and conference for coil development, insulation and electrical manufacturing. At the fair, more than 600 exhibitors from 40 countries will be demonstrating their expertise in coil winding, electrical equipment, insulation and materials, as well as the latest equipment, products and services. The exhibition is complemented by a conference program. For the tenth consecutive year, ThyssenKrupp Electrical Steel is presenting its innovations in grain oriented and non grain oriented electrical steels under the PowerCore® brand to an international audience in Hall 4.2, Booth 4315. In addition, ThyssenKrupp Magnettechnik is represented at the booth.

Ligna 2013 – May 6 to 10, 2013, Hanover (Hall 13, Stand B76)
For the first time, the Remscheid Saw Steel Center, a ThyssenKrupp Steel Europe company, is represented with a small exhibition space at the globally significant woodworking and processing fair. The Saw Steel Center offers a broad range of products and dimensions for the saw and knife industry. It will be demonstrating its expertise in Hall 13, Booth B76.

AEE/AEC – June 4 to 6, 2013, Nuremberg
AEE stands for Automotive Engineering Expo and AEC for Automotive Engineering Congress. This exhibition with its close automotive ties, and the adjoining professional congress for the "painted body" process chain is a joint project of the Automotive Circle International and Nuremberg trade fair. The event is regarded as a supplement to the Bad Nauheim series, which met with great acceptance among automotive customers. ThyssenKrupp Steel Europe is presenting its material and surface innovations at its own booth and thus directly addressing decision makers and experts in the automotive industry. Similarly, specialists from the Duisburg steel company will be presenting keynotes at the accompanying conference.

Aerosol – September 24 to 26, 2013, Madrid, Spain (Booth 37-44)
The international conference and exhibition for aerosols takes place in different European cities every three years. The special technical exhibition attracts almost all major market participants for aerosols. Following successful participation in Rome, 2010, ThyssenKrupp Rasselstein is involved again this year at the fair in Madrid. The ThyssenKrupp Steel Europe subsidiary will position itself at the fair with a 72 square meter booth (37-44) as a reliable quality supplier for all tinplate applications in the aerosol field, and as a strong partner with an outstanding range of services. As the market leader for the raw material for valve discs, ThyssenKrupp Rasselstein is leveraging this industry meeting to deepen relationships with clients and promote further expansion.

Alihankinta – September 24 to 26, 2013, Tampere, Finland
This international trade fair for supplier contacts is Finland's largest industrial trade fair. On its three days, Alihankinta attracts around 900 exhibitors and 16,000 visitors from around the world. ThyssenKrupp Steel Europe's Heavy Plate Unit is again represented this year as co-exhibitors at the booth of long-standing trading partner Flinkenberg and, in addition to its special structural steels XAR®, NA-XTRA®/XABO® and PERFORM® will be exhibiting interesting product solutions in the area of processing.

Coiltech – September 25 to 26, 2013, Pordenone, Italy (Booth D7/E12)
This is the second time that ThyssenKrupp Electrical Steel is attending Coiltech in Italy. The fair focuses on coils, electric motors and transformers. The range includes all types of materials, equipment and services for the production of electric motors, generators and transformers. ThyssenKrupp Electrical Steel can be found at booth D7/E12.

Contact: **Achim Stolle**, Strategic Marketing, tel. 49 203 52-4100 5, e-mail: achim.stolle@thyssenkrupp.com

Echo

The modern way to build economically
"LITECOR® is the innovative, new sandwich material for the automotive industry: lightweight, inexpensive, environmentally friendly and easy to process. ThyssenKrupp Steel Europe developed this modern lightweight material for flat components such as spare wheel wells, doors, roofs, and doors. (...) LITECOR® sample material is already available in small quantities. (...) Components made of LITECOR® open up brand new lightweight options to the automobile manufacturer."
Stahlmarkt, 01/01/2013

Magnesium sheet: on its way to volume production
"In collaboration with the Technical University of Freiberg, MgF Magnesium Flat Products GmbH (...) has developed, a special casting and rolling process for magnesium sheet, producing magnesium strip down to a thickness of just one millimeter. Also in Radebeul, in Germany's Saxony region, the local ThyssenKrupp Stahl-Service-Center has demonstrated that the strip can also be slit using conventional equipment."
Metall Magazin, 02/01/2013

ThyssenKrupp Steel Europe and Solliance: Research on organic photovoltaics on steel
"Solar cells made of light-active polymers that support flexible deployment and can be produced inexpensively using a process suitable for large-scale production are the aim of the research. (...) The integration of organic photovoltaics in flat steel products offers significant advantages over previously known organic solar modules on plastic films and can therefore lead to an acceleration of the trend towards market-ready products."
VIK Mitteilungen, 02/12/2013