

COOPERATION

What a good partner outside of Germany can do for business in Germany

SOLAR VEHICLE

Inside the new SunRiser

INTERVIEW

What is quality and how can we achieve it?

Turkey – market of the future

With an economy that shows stable growth, substantial domestic demand, and a central location, Turkey presents a true opportunity for success

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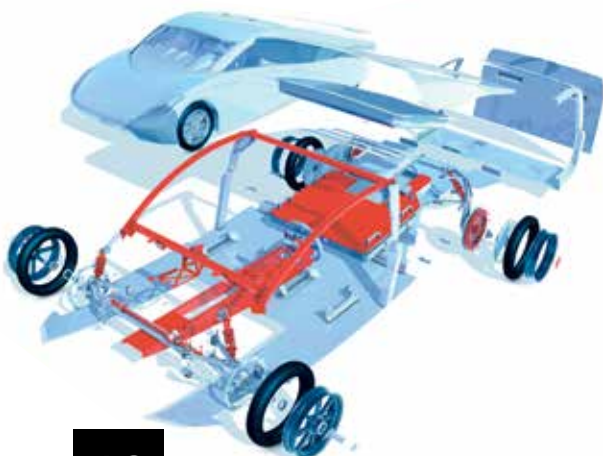
Recognizing quality when you see it: You will learn all about quality in our agenda interview



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Turkish for experts

In Turkey's growth sectors – the energy sector, the building industry, and the automotive industry – ThyssenKrupp Steel Europe's expertise is in high demand.



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Sports car powered by the sun

We are truly going the extra mile to develop our new solar car.



Tick tock: Rudolf Schönenberg (left) and Robert Schmitt at the Turmuhrenmuseum Bocholt for the agenda interview.

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Part-time pedestrian:
Esra Çakal is
the contact for
automotive customers
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Illustration: CS Media Lab



Dear readers,

Many of you will soon be headed off on summer vacation – and some may even be traveling to Turkey. The country is not only a popular holiday destination, it is also a promising new sales market. Let's start by summing up our visit to Istanbul: This metropolis is currently working on a number of massive infrastructure projects with the express goal of becoming one of the world's ten strongest economies by 2023, the 100th birthday of the republic. Together with the Technical Customer Support team of the Heavy Plate business unit, we traveled to Istanbul and while we were there, Dr. Çetin Nazikkol from our Regional Office got us excited about the country's new spirit of growth. Read more about that in our title story.

Carbon steel – and the expertise of our employees – is important to our company development projects too. For another year running, we have joined forces with Bochum University to develop a solar car to send to the World Solar Challenge race to be held in Australia this autumn. Our car will be constructed primarily using our innovative lightweight steels. Whether we are in Turkey, Australia, or anywhere else in the world, steel quality and expertise are clearly our strengths. At the beginning of the year, we created the Quality Management division to help us improve these skills. We brought the new Head of Quality Management, Rudolf Schönenberg, together with Professor Robert Schmitt, Chair of Metrology and Quality Management at RWTH Aachen University, to talk about their experience. We hope that you are also inspired by the many other articles in this issue.

Yours,
Dr. Heribert R. Fischer
Director of Sales & Innovation

View



The complete range

Every year, ThyssenKrupp Steel Europe delivers one hundred thousand perfectly wound steel coils to customers from all over the world, and the products they go on to produce are just as diverse as the materials manufactured by Steel Europe. The new complete product catalog is 102 pages in length and now contains the steel manufacturer's entire range. The beginning of the catalog includes an overview of the steel industry along with information on the many applications and uses for steel. Afterwards, each material is listed along with its important properties such as thickness, width, and length, and sorted according to applicable standards. The new table structure makes it easier for customers to get an overview of the products and find the desired material quickly and efficiently.

Write to broschueren.tkse@thyssenkrupp.com to receive your copy.



A proper upgrade

The core units of hot strip mill 3 in Bochum have been modernized, providing customers with an even wider range of products.

Hot off the roll: The strip coming from the roughing train is coiled in the coil box.

H

ot strip mill 3 in Bochum will be celebrating an important birthday next year – the plant will be turning 50. Since it was first built, thousands upon thousands of kilometers of steel strip has passed through its systems before being shipped out. To ensure that the quality of those products does not suffer over time, ThyssenKrupp Steel Europe regularly modernizes the components of its production plants. Over the past few years, the company has invested EUR 150 million to successfully update a series of individual units. A significant amount of modernization work was carried out at hot strip mill 3: from the additional walking beam furnace to the roll cooling system, and from the heavy edger to the improved descaling system. The roll shifting system and the cooling zone are now state of the art, making it easier to meet the steadily increasing customer requirements for the high-strength steels produced here. The excellent teamwork of the employees in hot strip mill 3 was particularly impressive. They were able to use the modernization process to expand the product portfolio and increase the dimension limits of the steel products. Today, the Bochum site is also able to produce steel grade C90 in special sizes: 1,200 mm wide and 1.80 mm thick.

Visit us in Bochum! We would be happy to show you the modernized hot rolling plant in action. Contact your technical or sales contact partner to arrange an appointment.

Miniature helicopters that peek into smokestacks

The expansive factory premises of ThyssenKrupp Steel Europe, including roads, rail tracks and, last but not least, the various plant facilities, require constant maintenance. To enable this maintenance work to be carried out faster, more economically, and more safely in the future, surveyor Tim Kölscheid (right) and his colleagues have recently purchased a hexacopter to help them get the job done right. This drone, which is equipped with a camera and GPS, is used to make detailed measurements and conduct inspections. Using this mini-helicopter, the team can avoid the need for unwieldy rigging and safety patrols.



Increased presence in the Middle Kingdom

In China, ThyssenKrupp Steel Europe is ramping up its partnership with Angang Steel. In 2002, the two companies formed a joint venture, TAGAL, which is located in northeastern China. They are now cooperating on a new hot-dip galvanizing line in Chongqing in the western part of the country, helping ThyssenKrupp continue to expand its position as a supplier of premium products for the automotive industry. In addition ThyssenKrupp also supplies Chinese automotive manufacturers with modern components for chassis and drive technology, and continues to build its business.

Photos: ThyssenKrupp Steel Europe Photography (6), Alamy



Hans Ferkel (second from the left), Head of Technology and Innovation at ThyssenKrupp Steel Europe at the awards ceremony.

On the winner's podium with LITECOR® and TriBond®

In the past year, ThyssenKrupp Steel Europe developed and initiated the most innovations worldwide in the categories "car body and exteriors". The Center of Automotive Management (CAM) and consultants PwC presented the company with an award for 'most innovative supplier overall'. The judging panel was particularly impressed with two new developments: the LITECOR® steel hybrid material and the TriBond® material composite. ■

Restructuring on the Neckar

The ThyssenKrupp Steel Service Center Group now has a new member. The finishing specialist formerly known as Herzog Coilex became a full-fledged part of the Group on 1 May 2015. This new subsidiary, now known as Coilex Stuttgart, is one of the leading companies in the steel service industry and adds to ThyssenKrupp's SSC network in southern Germany. Over an area of nearly 25,000 m², Coilex Stuttgart produces custom slit strips and blanks – primarily using material from Steel Europe – and delivers these products to a wide range of customer segments, including automotive manufacturers and suppliers as well as numerous processing specialists from the furniture, fixtures, and white goods industries. ■



Three men, one project: Michael Pühl, Dr. Jens Overrath, and Timm Jesberg (from left to right).

The Group's strong strip

Customers now benefit from more services and improved quality in the range of narrow strip.

Narrow strip specialist Hoesch Hohenlimburg has recently begun to receive slabs from Duisburg-Huckingen that are cut and ground according to its exact specifications, further improving the quality of the company's hot-rolled strip steel products – and that's all good news for its customers. This upgrade was made possible by a new finishing system from ThyssenKrupp MillServices & Systems. Before that, Hoesch Hohenlimburg had to have its slabs processed by external service providers. The idea behind the upgrade was to keep resources in the company while guaranteeing high product quality. It was with this aim in mind that ThyssenKrupp MillServices & Systems and Hoesch Hohenlimburg collaborated to realize their plan for a new slitting line. "The close cooperation is great for us and customers benefit from our specific services and the further improvement in the quality of our material," says Dr. Jens Overrath from the Management Board of Hoesch Hohenlimburg. Logistics in particular has taken some massive steps forward: Railway sidings and transport cranes now help to cover the short distances between the storage areas and the finishing system. "For ThyssenKrupp MillServices & Systems, this cooperation is a good example of the strong connections shared by the Group companies," says Timm Jesberg, Head of Finishing Services, who is very pleased about the new five-year service contract with Hoesch Hohenlimburg.

ThyssenKrupp MillService & Systems is a technical service provider with specialized expertise in the metal producing and processing industry and in industries with complex production processes. For more information, visit www.tkms.com



EVOLUTION IN MOBILE CRANE CONSTRUCTION

Steel used to make the telescopic booms of mobile cranes has to be lightweight, robust, and flexible. The XABO® 1300, a new development in water-quenched fine-grained structural steel, increases lifting capacity while reducing the operating weight of cranes.

300

METRIC TONS OF STEEL

from Hüttenwerke Krupp-Mannesmann (HKM) were processed to build the tip of the new One World Trade Center. At a height of 541.3 meters, it is now the tallest building in the Western world.

Story



Aykut Canpolat has Turkish roots and grew up in Duisburg. For the past three years, he has been regularly traveling to Turkey to represent the Heavy Plate business unit.

Çetin Nazikkol also has Turkish roots and grew up in Duisburg. He moved to his parents' home country two years ago to manage the ThyssenKrupp Regional Office.

An aerial photograph of a city, likely Istanbul, featuring a large suspension bridge crossing a body of water. The city is densely packed with buildings, and the bridge is a prominent feature in the foreground. The sky is clear and blue.

New start on the Bosphorus

Turkey is booming, offering plenty of opportunities for ThyssenKrupp Steel Europe and its customers.

Text: Judy Born

Urbanization in Turkey is extreme. The country boasts nine cities of over one million inhabitants.

Blue water, green hills, a couple of remote villages – the view from the airplane window is positively idyllic. But as we descend, the built-up areas get noticeably denser, the green spaces get fewer, and the container ships multiply on the Sea of Marmara. They wait for days on end just to maneuver through the Bosphorus a few kilometers further east. On the shipping lanes to the Black Sea, congestion reigns supreme. Welcome to Istanbul!

The bustle on the water is nothing compared to the volume of traffic on land. Bumper to bumper, the endless procession of cars crawls along roads that are perilously narrow in places. It shares the cramped space with mopeds, pedestrians, here and there even with streetcar tracks. There's no overlooking the fact: in Istanbul, every hour is rush hour. Traffic dominates the city and the everyday life of its approximately 14 million inhabitants.

Anyone who helps to provide a viable commuter transportation system here can win friends for life – or business partners. “Did you know that ThyssenKrupp is the strategic partner of the Istanbul metro system?” asks Çetin Nazikkol. Raised in the Ruhr area, for almost two years he's been the CEO of the ThyssenKrupp Regional Office in Turkey. If you're helping to keep the metro running, that means good business for you too. According to Nazikkol, that's not because of technology, but because of a company's real business assets: customer relationships and trust. First-class products, outstanding quality,

2023

will be the year Turkey celebrates 100 years of independence. The country aims to complete its transformation into an economic and political power by then.

What's needed

The potential for ThyssenKrupp:

Turkey is massively investing in energy and mining (for example, wind turbines and power stations), infrastructure (for example, escalators and passenger boarding bridges), and the automotive industry (for example, lightweight construction and car body design).

and on-time delivery must in any case form the basic preconditions. “The decisive factor is putting the customer at the center of things,” says Nazikkol. “The customer must feel confident that we know what we're talking about, that we keep our promises, and that our aim is to make them more successful, not ourselves. Then it becomes clear who the customer wants to work with.”

Customer relationships and trust have to be cultivated. That's only possible on-site. “You can't do that from Germany. Anyone who thinks you'd only need to fly over now and again to do business here is making a mistake. It just doesn't work.” Respect also plays a major role – in Turkey especially, it's a success factor that shouldn't be underestimated. As far as his own company is concerned, Nazikkol's primary focus is on the region – not the activities of individual business areas. “I have to find out where we at ThyssenKrupp can slot in around here, and how we can make the best out of it.” That's why it's noticeable that several of the Group's units are more active here than others, and some are hardly involved here at all. From a Groupwide viewpoint, Turkey is in any case a market of the future par excellence, and especially for Steel Europe.

That's because the country has a lot to offer. For ten years, it's been able to point to stable economic growth of over four percent annually. In terms of economic power, Turkey now ranks seventeenth globally. The aim over the next few years is to achieve a ranking in the top ten. The geographic location is an added bonus. From Turkey, over one billion people are within four hours' reach. This is a vast market that, besides Europe, above all stretches to Russia, Central Asia, Africa, and the Middle East as well. Turkish companies have already been active for a long time in nearly all of these markets of the future. If you want to tap into them, there's the chance to cooperate with a promising Turkish partner who is planning new projects and requires modern technologies and materials. “That's where we have to make our move, and quickly at that,” says Nazikkol. “This is precisely the way Asian firms do it, and furthermore they use Turkey as a way of breaking into the European market. Germany is one of Turkey's most important trading partners, and vice versa. Both sides depend heavily on the other and are well aware of the fact.” Çetin Nazikkol shows a selfie taken an hour earlier. Next to him are a former Mayor of Hamburg and an ex-Federal Chairman of the German political party, Alliance '90/The Greens. Forging links with political and economic organizations in both countries, building networks, and creating partnerships – all these form part of Nazikkol's job as well.

A woman in a man's world: Esra Çakal studied engineering and has been working in customer support at ThyssenKrupp for 12 years.

Photos: Claudia Wiens (4)





At home in a foreign market: Çetin Nazikkol and Aykut Canpolat know what matters when doing business in Germany and Turkey.

We are becoming a brand

Economic growth and huge investments in infrastructure in Turkey are particularly noticeable in the construction and logistics sectors. **Korhan Demirci**, Head of Strategic Purchasing at truck manufacturer Tirsan, explains what that means for the collaboration with ThyssenKrupp Steel Europe.

Interviewed by: Judy Born

Mr. Demirci, what does the company Tirsan do?

Korhan Demirci: Tirsan is a Turkish manufacturer of trailers for commercial vehicles with a wide product portfolio. Your German readers will be familiar with our vehicles under the guise of Kässbohrer – whom we acquired in 2002. We kept on the traditional brand name because it is so well known in Germany. On the whole, Tirsan manufactures curtain-sided trailers, tanks, silo and cooling trailers, dumpers, low platform trailers, container frames, and much more.

So you don't just build construction vehicles but transporters for all kinds of goods?

No matter if it's steel bars, building rubble, lamb sausages or milk – there's virtually nothing you can't transport with a truck or trailer made by Tirsan. With such a wide range of products, we're Europe's no. 1 manufacturer within our segment. Of course, having such a wide range of vehicle models also means we need a lot of different suppliers because we often need a variety of steel grades, formats, and special alloys.

In other words, your manufacturing needs are ideally matched to the range offered by ThyssenKrupp Steel Europe?

I guess you could say so. We definitely rely on each other; Tirsan needs a supplier that can provide products very comprehensively. Steel Europe is a great partner in this regard, both in terms of product range and service quality.

Where does steel or Steel Europe enter the equation at Tirsan?

Our trailers, chassis frames, and carriages are largely made of steel. Steel Europe is our first point of contact when it comes to steel grades that can't be produced inside Turkey. I'm not just talking about quality here, but also about price and shipping.

Isn't quality the overriding factor?

Well, you see, quality can't be negotiated. There's no point in discussing quality.

If a supplier is unable to deliver the required grade with the properties asked for, we won't even get in touch

with them. As far as the steel we buy from Duisburg is concerned, we've never had anything to complain about.

You've been the top player in your market for 30 years. How have you managed to maintain your lead all this time?

Investment is an important factor, as is the desire to grow. That's why we keep investing in new markets and developments. At least two percent of our revenue goes into new research and development activities – that's quite a big budget given our sector. In addition, our R&D department receives public funding. Tirsan is the first and only steel processing manufacturer to receive this type of funding.

You also manufacture in Germany and Russia, is that right?

Yes, we do indeed operate final assembly plants in both of these countries. The pre-manufactured parts are delivered from Turkey, and the vehicles are assembled in the target country from these and local components. We stack our segmented trailer parts together and ship them by sea. That greatly simplifies transport and is comparatively cheap. Another advantage is that the pre-manufactured parts to be assembled at the final destination become a local product. So even though some of the parts may come from Turkey, the final product can be labeled 'Made in Russia' or 'Made in Germany.'

What high-profile construction projects in Turkey are currently making use of Tirsan vehicles?

Among others, our customers are using Tirsan trucks for the construction of the third Bosphorus bridge, and also for the third airport. With the airport project, the current stage is earthworks. Dump trucks and low bed trailers made by us are also being used for building the new motorway between Istanbul and Izmir.

How important will the Turkish market become for Germany in the future?

Trade between the two countries is immensely important, for both sides. In the past, Turkey primarily exported agricultural products, then textiles, and now we're also exporting machinery, technology, and trucks to other countries. The reputation of Turkish products is improving all the time, and Turkey as a brand is also becoming more respected.

As a businessman Korhan Demirci is happy about the increase in the number of trucks on the roads, but privately they annoy him no matter who built them.



A total of 20 percent of the Turkish population lives in the Istanbul metropolitan area.



In the know in Turkey:
Haluk Bayraktar
(right image, center)
from Materials Services
plans ahead.



On the way to Gebze, where ThyssenKrupp Materials Services has established a presence, the traffic runs through high-rise districts, interspersed with half-finished or ready-to-occupy skyscrapers. Gebze is actually over 60 kilometers away, but Istanbul is devouring more and more of the surrounding region, and on the Anatolian side it's already almost touching this industrial suburb. It's easy to believe that the most successful business sector in Turkey is the construction industry. After China, Turkey holds second place in the list of the world's 250 biggest construction firms. The ThyssenKrupp Materials Services business area has recognized Turkey's potential and is pursuing a new strategy, with import, resale, and constructing a warehouse as future possibilities. At present, Materials Services is using existing business contacts to sound out the increased demand for carbon steel and other special steel types. Contacts with suppliers to the automotive industry have already been in place for nearly 20 years.

Turkey has since developed into a key export market for flat steel. "Special steels such as high-strength grades are just the kind of niche market in which Steel Europe can assert itself," says Esra Çakal, responsible for technical and commercial advice to automotive clients in Turkey. Besides Ford, Hyundai, Honda, and suppliers, Toyota in particular is being supplied with special grades by Steel Europe. There are currently also in-depth talks taking place with prospective customers. The automotive industry is Turkey's biggest exporter and receives strong sup-

Who we supply

White goods and chassis parts:
The automotive manufacturer Ford Otosan and household appliances manufacturer Arçelik are two major customers of Steel Europe.

1.5

million tons of flat steel will be required by the Turkish automotive industry by 2018.

port from the government. Major investment projects in steels are in the pipeline for the near future, for which Duisburg expertise is in demand: hybrids, electrical steel, lightweight construction. "The research findings of our InCar[®]plus project must definitely be presented in Turkey as well," says Çakal. "Sure, we don't have the development departments of the big-name car firms over here. But we've got several thousand suppliers, and with their products you can build a complete car."

With huge construction projects afoot in the Istanbul megalopolis and elsewhere in the country, the opportunities for Steel Europe look particularly bright. The city's third airport is already under construction. With capacity for over 150 million passengers, it aims to set a new world record and cater for three times as many travelers as the German hub in Frankfurt. An equally vast undertaking is the highway from Istanbul to Izmir, which will include a fourth massive suspension bridge over the Bosphorus. Moreover, the congested central area with its non-stop traffic chaos offers ideal conditions for the InnoCity project, a steel infrastructure concept from ThyssenKrupp for the urban mobility of the future. Because of the high risk of earthquakes, up to six million houses countrywide must be demolished and rebuilt over the next few years. And on top of this, Turkey aims to generate 30 percent of its electricity from renewable resources by 2023, among other things by investing in wind power. In other words: there's no shortage of future work for Steel Europe in Turkey.

Photos: Claudia Wiens (3)



Not here yet there

There are certain prerequisites for tapping into foreign markets: You need to have an understanding of the local market, cultural sensitivity, and a local presence. The collaboration between the Heavy Plate business unit from Duisburg with Nazal Metal in Istanbul proves how rewarding **teamwork with a local representative office** can be.

Text: Judy Born



Repair work:
The workshop
at the Tirsan
depot in
Istanbul.



Power couple
in the steel
business: Halit
Özarslan and
wife Banu.



You have to be tenacious to gain a foothold in Turkey.

Aykut Canpolat, Technical Customer Support,
ThyssenKrupp Steel Europe

good personal customer relationships,” says Aykut Canpolat. Canpolat traverses the globe as a customer consultant for Heavy Plate, and he knows full well how important it is to pay attention to your customers. Out of all his travels, Turkey is his favorite destination. “I grew up as a German Turk back in Duisburg. My father worked for Steel Europe before me.” Understanding the customer’s work and literally speaking the same language is crucial to Canpolat. “When I visit a customer, I always make the time to have a look at their production first-hand,” he says. “This is the only way to reliably find out exactly what they’re processing there and how they’re doing it. I find out how processes work, what technologies are being used and what competencies are needed.” This is how the new storage concept was created with cooperation partner Askon, which allows Heavy Plate to react extremely quickly to its customers’ requirements. Furthermore, the Askon service center offers customized steel preprocessing.

If a company does not have a local branch office, a representative is needed. Still, Canpolat makes sure to visit Turkey every two months and has been visiting customers together with Nazal Metal – 20 or more per week, again and again, for three years now already. “You’ve got to be tenacious,” says Canpolat. “I’d say you’ve got to be obsessive!” adds Özarslan. “It’s not easy to infiltrate the local market, but it’s not impossible. You just don’t give up too easily.” Thanks to the continued efforts, Heavy Plate has established itself as a business partner for five of Turkey’s biggest OEMs. These include the construction equipment manufacturer Temsa, the excavator company Hidromek, and the transporter manufacturer Tirsan. At Tirsan, the ongoing tenacity and local presence have really paid off. In order to be successful here, in-depth market knowledge is essential. This requires regular dialogue. In the case of today’s visit to Tirsan, this has resulted in the director of the Strategic Purchasing department there becoming interested in two new steel grades.

Rushing along the Istanbul expressway, a big dump truck just cut in right in front of us. Without batting an eyelid, Halit Özarslan smoothly hits the brakes to avoid a crash. It’s all standard driving behavior around here. “Look, it’s a Tirsan,” he exclaims, “what a coincidence!” It just so happens that we’re on our way to the headquarters of Tirsan, a trailer manufacturer we’re wanting to get to know better. Tirsan has been working together with Nazal Metal, who represents ThyssenKrupp Steel Europe’s Heavy Plate business here.

Özarslan worked at ThyssenKrupp for more than ten years, including in the Group’s automotive business. When the Group temporarily withdrew from Turkey a few years ago, Özarslan went his own way with Nazal Metal. Since 2010, he and his wife have managed the trading company together. “I’ve been working in this sector for 30 years now,” says Özarslan as we drive through the Asian-flavored suburb of Atasehir. “Thanks to my experiences, I was able to elevate our company from the purely local business we started out with to sales on an international scale.” Today, Steel Europe’s Heavy Plate business is Nazal Metal’s most important business partner. The relationship was rekindled when the Heavy Plate business unit was looking for a cooperation partner for the Turkish market. Steel Europe had a good reputation, but business started off slow. “After four years, we jointly managed to increase sales here from zero to 10,000 metric tons per year,” says Özarslan. “That covers about 12 percent of the entire market.” In monetary terms, that’s about 10 million euros per year. This impressive upswing is by no means coincidental. “What this demonstrates is how important it is to maintain

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Photos: Claudia Wiens (4)

Major test in Australia

ThyssenKrupp and Bochum University are entering the **SunRiser** into the World Solar Challenge race. The research partners have high hopes for their first electric vehicle to be designed as a sports car.

Text: Erik Walner

Australia is the destination, Adelaide to be precise, a city on the south coast. On 25 October, Daniel Lohmeyer hopes to cross the finishing line there, ideally in first place, at the World Solar Challenge, the world championship for solar-powered vehicles. However, there is still some way to go. The 25-year-old is a student trainee at ThyssenKrupp Steel Europe and is working on a new solar-powered car in the research team from Bochum University. This is a pioneering project and a unique opportunity for Lohmeyer.

Bochum University has been designing and building solar-powered electric vehicles for 15 years now and is the only university in Germany to do so. Every two years, a model with improved efficiency and suitability for everyday life is released. One of these solar-powered cars drove around the world in 2012 and holds the Guinness World Record for the longest journey driven by a solar electric vehicle at 29,753 kilometers.

The SunCruiser came in second place at the World Solar Challenge 2013. The team is building a sports car for the next world championship this October, and is aiming for first place. The new solar-powered vehicle, called ThyssenKrupp SunRiser, makes increased use of lightweight steels.

They are more cost-effective and more sustainable in comparison to the carbon previously used. High-strength complex phase steel of the CP-W® 1000 grade for the roll bar is built into the inside of the solar cruiser. Magnesium has been used for the center tunnel and dashboard. The Group is also using its collective strength: The suspension specialist ThyssenKrupp Bilstein is delivering customized shock absorbers. ThyssenKrupp Presta is providing part of the steering system. ThyssenKrupp Schulte is supplying aluminum for motor components and ThyssenKrupp Magnettechnik is delivering the permanent magnets for the electric motors. Experience gained from the past years has been used to design the engine for the new model. As for the road profile, strategy, and the speeds to be expected as a result, the use of special electrical steel should help to further increase efficiency. "ThyssenKrupp Steel Europe has developed a range of innovative lightweight steel solutions that are being used in the automotive industry," says Oliver Hoffmann, Head of the Ap-

Solar car research

Projects by Bochum University

In 2001, the university entered the World Solar Challenge for the first time with the model **Mad Dog III**. **Hans Go!** came fifth in 2003 and eighth in 2005. In 2007, **SolarWorld No. 1**, was ranked fourth. In 2009, the **BoCruiser** was the first realistic everyday car to be entered. The ThyssenKrupp **PowerCore SunCruiser** finished in second place in 2013.



Solar power: Daniel Lohmeyer is focusing all his energy on the new ThyssenKrupp SunRiser.



plication Technology department in Duisburg. “We will be trying to implement part of this in the construction of a solar-powered vehicle for the first time.” This has already proved successful as the initiative KlimaExpo.NRW rewarded the Group’s previous model for dedication to electromobility in the interests of climate protection. The judges were particularly impressed by the collaboration between the research team and the company.

What’s inside counts too

More effort than ever is going into the interior fittings. Driving time is not the only thing that matters at the world championship for solar-powered cars. Suitability for everyday life, design, and comfort are also crucial factors. The designers also place a lot of importance on reliability. Each component needs to remain intact for the entire 3,000-kilometer journey from Darwin in the north to Adelaide in the south. The route traverses the Tanami and Simpson deserts and passes by Ayers Rock and Alice Springs. The World Solar

Challenge takes place every two years in Australia, and the competition is an open road race. The ThyssenKrupp SunRiser will be competing in the cruiser class, which requires the vehicle to be approved for road use in the country of origin and have at least two seats, in addition to suitability for everyday life. In this class, it is permitted to charge the battery pack (maximum weight of 60 kg) once after 1,500 kilometers from the mains grid to supplement the energy generated during the journey by the solar panels installed on top of the car. Maximum speeds of over 120 kilometers per hour can be achieved in this class of vehicle.

Daniel Lohmeyer is one of the mechanics and is responsible for the roof design. He and his colleagues are working under a lot of pressure to complete the project. Time is ticking until Australia in October, but everyone is confident that their efforts will pay off in the end. The journey ‘down under’ will be an experience in itself, but hopefully the team will bring home the title of world champion too.

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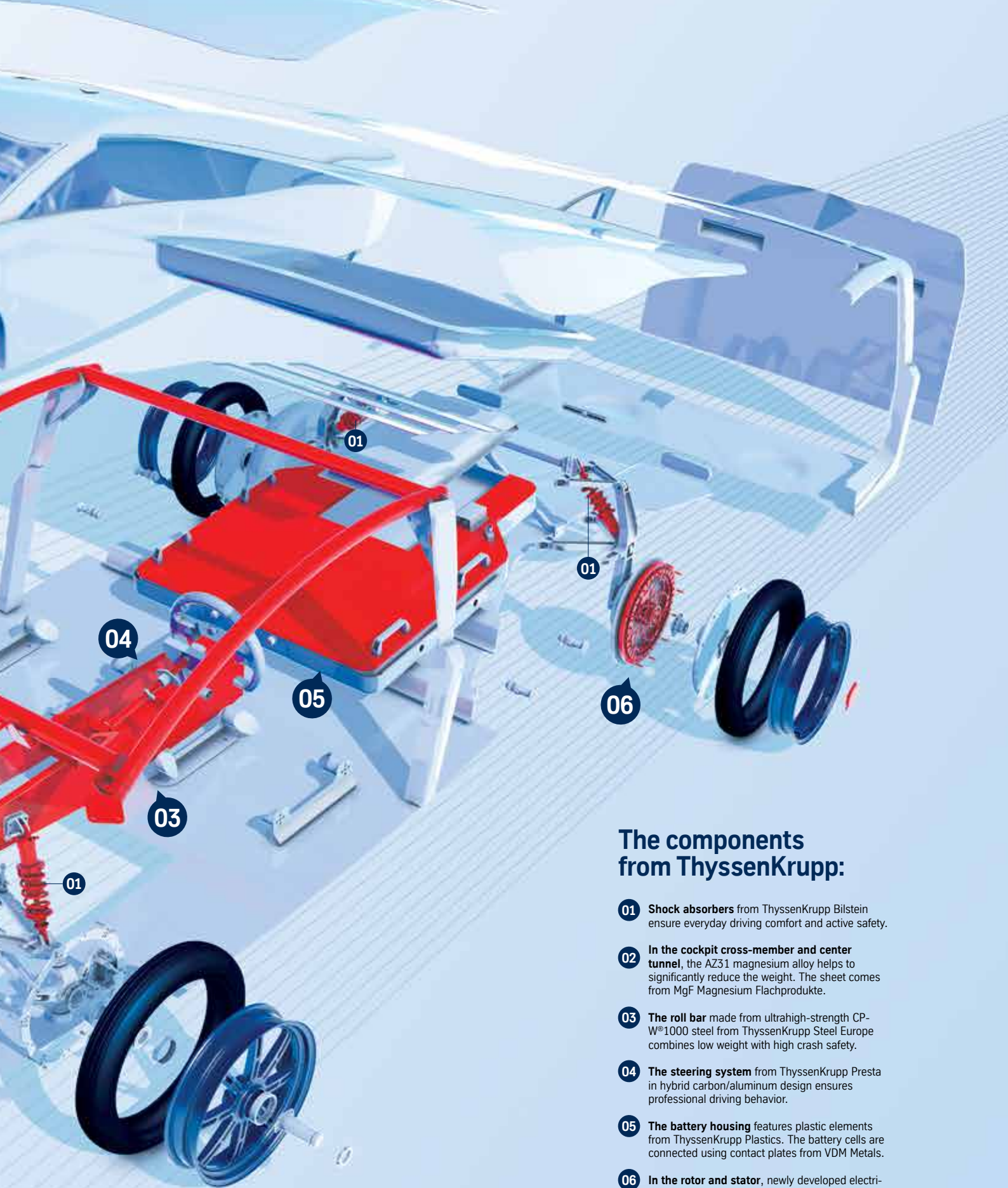
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Photo: Andreas Hempel/zerone, ThyssenKrupp Steel Europe Photography

A motor that soaks up the sun

Plenty of additional knowledge of mechanics and materials has gone into the new electric vehicle, **ThyssenKrupp SunRiser**. The solar-powered car is an example of the collaboration between different departments within the Group.





The components from ThyssenKrupp:

- 01** **Shock absorbers** from ThyssenKrupp Bilstein ensure everyday driving comfort and active safety.
- 02** **In the cockpit cross-member and center tunnel**, the AZ31 magnesium alloy helps to significantly reduce the weight. The sheet comes from MgF Magnesium Flachprodukte.
- 03** **The roll bar** made from ultrahigh-strength CP-W®1000 steel from ThyssenKrupp Steel Europe combines low weight with high crash safety.
- 04** **The steering system** from ThyssenKrupp Presta in hybrid carbon/aluminum design ensures professional driving behavior.
- 05** **The battery housing** features plastic elements from ThyssenKrupp Plastics. The battery cells are connected using contact plates from VDM Metals.
- 06** **In the rotor and stator**, newly developed electrical steel in the 230-30AP class optimizes the drive efficiency together with permanent magnets from ThyssenKrupp Magnettechnik.



Form and function

ThyssenKrupp Steel Europe shares its expertise and is rewarded for its efforts, as shown here in customer Gedia's transition to hot forming in its production process.

Text: Anke Stachow

Cut to size: blanks before the hot forming process.

Making important business decisions takes courage, and luckily courage was among Gedia's many assets when the company's management decided to switch to hot forming almost seven years ago. "ThyssenKrupp Steel

Europe drew our attention to this new technology and encouraged us to give it a try," recalls Dennis Heße, Team Leader of Raw Materials Purchasing at Gedia. Up until then, the car manufacturer had produced its vehicle chassis components using a cold forming process, but nobody regrets the decision made back then.

When Gedia decided to implement this new process, the company nearly doubled its orders from ThyssenKrupp Steel Europe and its steel service center group. "Hot forming is a crucial part of today's automotive industry, and for a supplier of our size, it's simply a necessity," says Walter Braunschneider, member of the Gedia Management Board. Hot-formed steels are extremely strong and therefore require less material in the manufacturing process. These steels are mainly used to produce components that are critical to ensuring the safety of the passengers inside the

vehicle. But the process of implementing this new technology is no simple matter, even for an experienced steel processor like Gedia. "We had to learn that we are now able to influence the material itself. That means that we are responsible for its properties," says Braunschneider. Using the new hot forming technique, the material develops its special properties through a heating and subsequent cooling process. "There are a number of parameters that determine whether or not the material develops the desired properties – the material itself, the furnace temperature, the cooling speed – and these characteristics are all interdependent," explains Dr. Julia Mura, Product Manager for hot forming at ThyssenKrupp Steel Europe.

ThyssenKrupp Steel Europe's qualified experts help clients through the learning process by providing training, workshops, and test runs on the machines. Before deciding to implement the technology itself, Gedia representatives were invited to visit Application Technology in Dortmund. There they met with the then Product Coordinator Dr. Franz-Josef Lenze and watched the process in a laboratory setting where they could precisely observe the machines and obtain detailed explanations. A row of three furnaces, each with seven flat chambers, now make up the heart of Gedia's system. Their resemblance to pizza ovens earned them their nickname with the employees. The system automatically transfers the steel sheets from the furnace to the transfer press where they are formed and subsequently cooled by water circulated through the die.

Heat imaging cameras monitor each step of the production process to ensure that the components display the correct temperature and hardness. Each component is labeled so that it can be tracked to determine if all necessary parameters were met during the production process. "We are endowing these components with entirely new properties, so we constantly have to inspect the materials we are producing," explains Maik Winderlich, who is responsible for process technology in the hot forming system at Gedia.

Although the hot forming processes are firmly established at Gedia, the company still maintains close contact with Steel Europe and their service center as processing partner. "We are currently discussing the new TriBond® material and testing it for ourselves," says Heße. A batch of test parts is currently being produced in the prototype system in Attendorn. "Cooperation like this is very important to us," explains Mura. "We are responsible for developing new steels for different applications, and it is crucial for us to have solid partners who work directly with these applications and utilize our new materials in their components."

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Innovative brainstorming: Mr. Winderlich, Mr. Braunschneider, and Mr. Heße from Gedia (from left to right) and Dr. Julia Mura from Steel Europe.



Advantages

Hot-formed components...

...are **extremely strong** and retain their shape very well in the event of a crash.

...do not have to be as **thick** as cold-formed components due to their high strength.

...help to **make** cars lighter so that they use less fuel and emit less CO₂ as a result.

Bumper-to-bumper innovation

ThyssenKrupp engineers have **developed new bumpers** as part of the InCar®plus project. The special feature of this model is its innovative, geometric design.

The engineers had some pretty lofty goals this time around. Their aim was to develop a bumper that offered the same crash performance as current models while being lighter, cheaper, and ideally, more sustainable to produce than ever before. “It was a massive challenge, but we achieved it in the end and came up with a number of extremely impressive solutions,” explained Martin Kibben.

Kibben is responsible for bumpers and longitudinal members as part of ThyssenKrupp’s InCar®plus project. InCar®plus is a Groupwide program in which engineers strive to discover different ways to optimize vehicle components.

After testing some of its preliminary ideas, the team developed a number of promising concepts. These were then subjected to intensive computer simulations. However the Group’s laundry list of objectives often proved to be somewhat conflicting. “If the forming process checked out, then crash performance would be a problem. Or maybe an idea looked like it would save on weight, but then the production process was too complex and forced our costs up,” says Subproject Manager Andreas Keutz.

The engineers rejected several ideas right away, choosing to develop others instead. One of the approaches they focused their efforts on was the idea to use an open crash beam as a central element of the bumper. The advantages

were obvious: The specialized wave-shaped profile allowed the steel sheet to be thinner without compromising on crash performance and eliminated the need for the closing plate used in the reference model. That alone saved an impressive 1.7 kilograms in weight.

But before this bumper could be built, the team needed to develop the required forming technology. Good thing they had the expertise of ThyssenKrupp System Engineering to back them up. “We combined our knowledge in materials and processes to develop a solution that would allow our customers to eliminate a significant amount of weight without raising costs. In fact, our solution is cheaper than the reference model,” explains Kibben.

Now that the development phase of InCar®plus is over, this solution is one of four different ideas that the team put together. At a weight of 8.25 kilograms, the new bumper system is almost two kilograms lighter than the reference model.

Wave shape:
The new bumper system optimizes weight, cost, and function.



Engineers at work:
Martin Kibben presents the new bumper with its open crash beam.

A few of the other solutions are under nine kilograms as well.

Less weight means that the car uses less gas, which means that it produces less CO₂. Over time, the drop in material costs will make up for the cost of implementing the new production methods, so the new product will be lighter, but no more expensive.

Currently, the four bumper concepts are on tour as part of the worldwide InCar®plus roadshow. “Which approach works best for which customer? That’s something that has to be decided on an individual basis,” says Kibben. “And we’d be happy to offer our advice.” Car manufacturers are already interested in the solutions and concrete talks are taking place.

— mlü

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Bottrop's sparkling star

Facades made from **PLADUR® Relief iceCrystal** are not only attractive, they are also energy efficient and utilize sustainable production processes, making them just the right material for Germany's first Energy Plus office building in Bottrop.

Awavy facade glitters in the sunlight, looking just as though it were covered in ice crystals. This modern look might give the impression that the building is brand new, but that is most certainly not the case. This building is actually rather old, but it has undergone a complete energy-efficiency overhaul with the help of the company Oliver Helmke in cooperation with Bayer MaterialSciences and Innovation City Bottrop – and today it is Germany's very first Energy Plus office building.

"When we were planning the facade, we looked for a material that could give us the wavy aesthetics we wanted – and something with an extravagant surface," says architect Anna Vering, who led the project at Helmke. Another criterion was that the material needed to have a texture and color that allowed it to fit in with its existing surroundings – and it needed to be environmentally friendly. PLADUR® Relief iceCrystal from ThyssenKrupp Steel Europe was just the material the owner had been searching for: high-quality flat carbon steel with a surface that shimmers like the ice crystals once did on the building's windows. Of course, the triple-glazed windows on this new Energy Plus building have turned icy glass into a thing of the past.

While the material already graces many industrial building facades in the form of sandwich elements, this is its debut role as a facade for a high-quality,

multi-story building such as an apartment complex or corporate office. "Visually, PLADUR® Relief iceCrystal is a dream come true. I love that the material allows us to create such clear edges," beams Vering. And this facade has more than just good looks: "It is resistant to scratching and dirt, and thanks to the zinc-plating and the organic iceCrystal coating, it is effective in protecting against corrosion as well," says Klaus Kottkamp of the Construction Initiative at ThyssenKrupp Steel Europe. The material resists wind and weather as well as the effects of time – all the while increasing the value of the property. It also offers excellent value for money, and

PLADUR® Relief iceCrystal prevents corrosion.

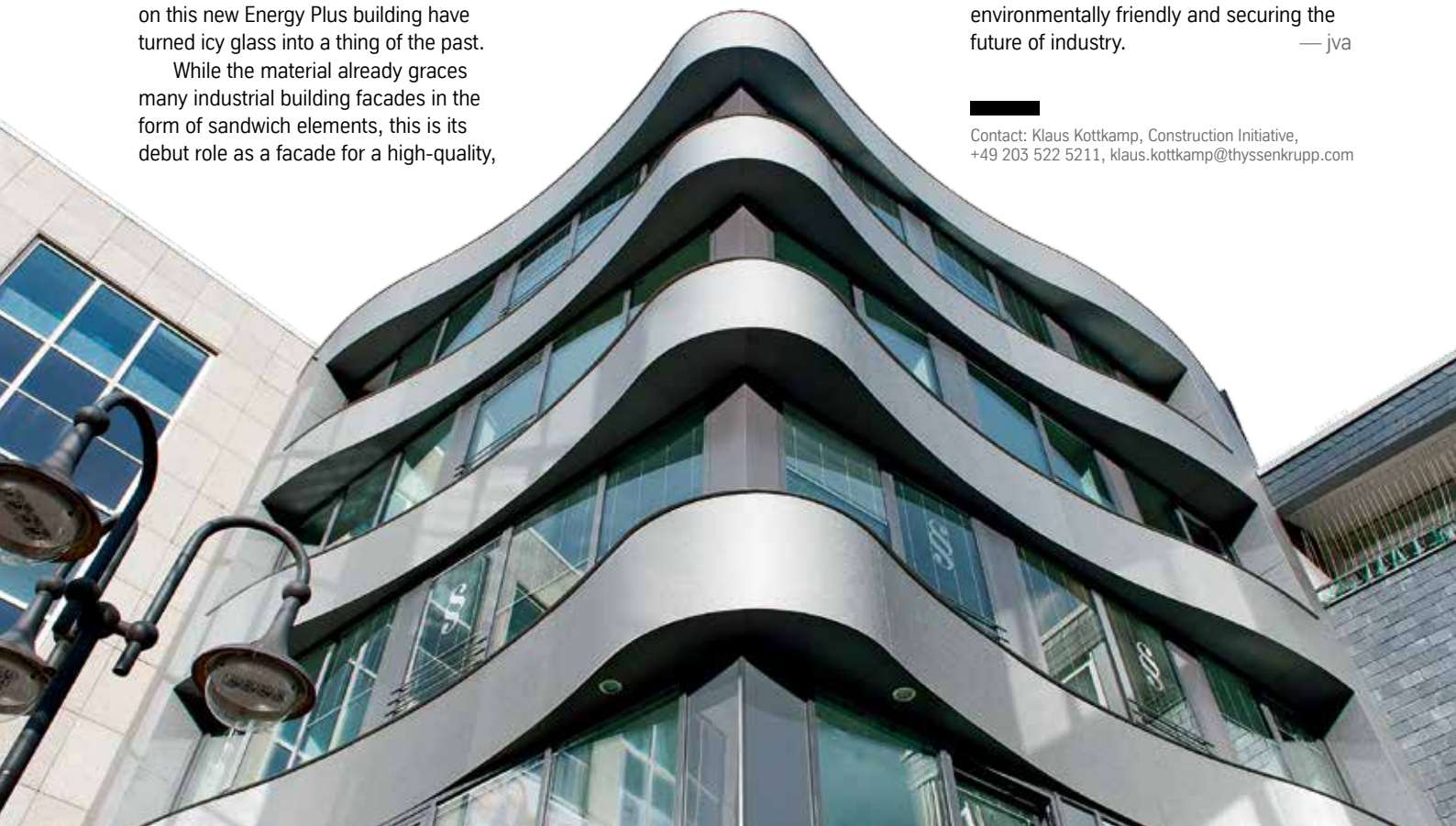
Klaus Kottkamp, Construction Initiative, ThyssenKrupp Steel Europe

on top of it all, the material is recyclable and does not lose quality through the recycling process. The recycled steel is of the highest quality and just as valuable as primary steel.

PLADUR® Relief iceCrystal also provides the customer with a wide variety of processing options. It can be curved, stretched, or bent, it can be shaped, cut, joined, and bonded with other elements – all without cracking the material or compromising the stability of the facade. "The processing and detailed finishing took quite a while, but it all went very well," confirms Lars Werner, Managing Director at HSP-Fassaden, which processed the elements and installed them on the building. "The 1.25-millimeter-thick steel sheet is perfect for curved facades." HSP-Fassaden delivered the finished elements straight to the construction site, and within just a week the building had a whole new wardrobe.

The concept was very well received by Innovation City Rhine-Ruhr. Since 2010, the Innovation City Management team has been working together with industry partners to develop ideas and solutions for rebuilding cities to make them more environmentally friendly and securing the future of industry. — jva

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Agenda



Like clockwork:
When two gears
lock together, it is
true perfection.



Quality is a promise that lasts

What makes something good? Why does one thing have value and another does not? We spoke with **Robert Schmitt**, Dean at RWTH Aachen University, and **Rudolf Schönenberg**, Head of Quality Management at ThyssenKrupp Steel Europe, about how they define and measure quality.

Interviewed by: Judy Born

Mr. Schmitt, Mr. Schönenberg, can you tell us: What is quality?

Schönenberg: Well, first there are personal quality standards: My washing machine should last a long time, my detergent should do the job right, and my food shouldn't harm me when I eat it. When it comes to our steel products, quality depends on the needs of the individual customer, so it is important for us to know all about the application for which a particular product is produced.

Schmitt: I agree. Quality is a relative construct, and when it comes to fulfilling customer needs, there is more than just one dimension to quality – there are many. One of these dimensions is certainly the properties of the product itself and its ability to fulfill the task for which it was designed. Another dimension of quality is flawlessness. Reliability, life cycle, sustainability, and company image play just as much of a role. These factors are instrumental in helping me decide on where to shop, because as a customer I am rarely in a position to be able to judge a product based on all of its properties. That's why it's better to just go to your favorite bakery or to a butcher you trust.

Is quality a subjective property?

Schmitt: Absolutely. There is even a specialist term for it: perceived quality. It describes the quality that I am able to detect with my senses, because I can't judge all of the product's characteristics on a physical or chemical level.

Is quality also related to marketing?

Schmitt: Yes, as long as the company takes it seriously. Marketing is a promise that I make to the market. I have to ask: Where do I want to position myself? As one of many? Am I the cheap alternative, or am I the reliable one who is energy efficient, who delivers on time, who responds quickly to market fluctuations, and who resolves errors as they arise? If you can meet these criteria, that is the hallmark of quality.

Schönenberg: Quality is the product of combining all of these requirements into a single, optimized whole – just like these clocks here at the museum. All of the cogs have to fit together to create a system that operates as a

single unit and keeps everything running.
Schmitt: It is important that industrial operations distance themselves from the notion of 'craft'. We are in a museum because it shows how products were made in the past. The art of industry lies not in creating a single, perfect object, but rather in the ability to make that promise of perfection over and over again in the long term. That is the dimension of quality as it applies to design.
Schönenberg: When we apply that idea to our company, it means we have to produce a coil material that has the same mechanical properties every single time so that, for example, an automotive producer can use it to make one engine hood after another – regardless of whether they're in France, Japan, or Turkey.

How is that possible?

Schönenberg: The key lies in the standardization of production processes. Of course, that's no simple task in the steel industry as there are so many different steps that take place between the production of the steel itself and the process of shipping the various materials.
Schmitt: You can see how complicated that is. You start with different materials, but you have to end up with the same product. It makes having an understanding of the material and knowledge of physics and chemistry – as well as the production processes involved – very important. Above all, the employees must understand exactly what they are doing.
Schönenberg: This 'operational excellence' is an important point, but it doesn't mean that we need to employ engineers to do every single job. The employees have to develop an understanding of the big picture so that they can see why standardization is so important.



The key to quality lies in the standardization of production processes.

Rudolf Schönenberg



Industrial operations need to distance themselves from the notion of 'craft'.

Robert Schmitt

People

Robert Schmitt

was always interested in figuring out how to produce flawless products on a lasting basis. Since 2004, he has been passing on his expertise in the Chair of Metrology and Quality Management at the RWTH Aachen University. Three years ago, he was appointed Dean of the Faculty of Mechanical Engineering.

Rudolf Schönenberg

has been working in the Group for the past 35 years and assumed to role of Head of Quality Management at the beginning of the year. Schönenberg, who holds a degree in engineering, is responsible for ensuring that ThyssenKrupp Steel Europe always fulfills its customers' quality needs.

You mean transparency at all levels?

Schönenberg: Yes, I need transparency in my own processes to identify potential problems and determine what I need to do to stop those problems from spreading. In addition, modern systems generate vast amounts of data that we need to evaluate. The biggest challenge here is to determine which of these many pieces of information are significant to the process at hand.
Schmitt: And to do that, we need employees who understand the processes that produce these data. The future looks very promising indeed when we consider the fact that we will be able to use the properties of the material itself to predict which parameters to select in order to produce the exact product we need. It's no longer a matter of trial and error, it's about using data.
Schönenberg: In the case of steel, it is particularly important to make the best possible use of these data. We need the expertise and the systems to allow us to work with data – and we need the right employees for the job.

So quality as such seems to be in constant flux...

Schmitt: Exactly. Quality management is the engine we need to prevent complacency and keep a company moving in the right direction.
Schönenberg: We can never be satisfied, and we have to move past our comfort zone; otherwise, we risk standing still. That would be fatal for a Group like ours.
Schmitt: Companies that stop questioning themselves get left in the dust. More and more competitors are entering the market, rapid developments are being made, and production cycles are getting shorter. Customer loyalty is dwindling, and the company with the best solution for future challenges is rewarded in the end.

Photos: ThyssenKrupp Steel Europe Photography (4), C3 (3), PR (4)

Dates



bauma Conexpo 15–18 September, Johannesburg/South Africa

With an indoor area of over 50,000 square meters and an outdoor space spanning over 60,000 square meters, bauma Conexpo is South Africa's largest exhibition space. For four days, the arena will be devoted to construction machinery, building material machines, mining equipment, and construction vehicles. ThyssenKrupp Steel Europe will be one of 34 companies in the German pavilion. Here, experts from the Heavy Plate business unit will be presenting news and trends from the field of hard-wearing and high-strength steels. www.bcafrica.com

HUSUM Wind 2015 13–18 September, Husum/Germany, Booth 5 B01



Following the WindEnergy 2014 in Hamburg, the trade fair for the wind energy sector is returning to Husum. This year's event will focus on 'wind energy you can see and touch' in the sector's core market, Germany. ThyssenKrupp Steel Europe and ThyssenKrupp Rothe Erde will team up to present non-oriented electrical steel as an efficient steel solution for constructing wind turbines. www.husumwind.com

As Head of Marketing, **Achim Stolle** is responsible for publications and events addressing customers and business partners.
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September

Alihankinta 15–17 September, Tampere/Finland

This event for industrial subcontractors is an annual fixture of the Heavy Plate Business Unit of ThyssenKrupp Steel Europe. Our colleagues from Hüttenheim will be present alongside our long-term trade partner, Flinkenberg, providing visitors with information about the steel products XAR®, N-A-XTRA®, XABO®, and PERFORM® along with other materials. For the heavy plate experts, this event will be a good opportunity to highlight ThyssenKrupp's extensive expertise in the area of materials. www.alihankinta.fi



Coiltech 23–24 September, Pordenone/Italy, Hall D7, Booth E12

For the fourth time, ThyssenKrupp Steel Europe will attend the Italian trade fair for coils, electric motors, and transformers. This year it will present its non-oriented products for manufacturing transformers and generators. The Coiltech event is set to host visitors and exhibitors from over 15 countries.



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Quality requires precision, and what is more precise than the internal workings of a clock? For this issue's agenda interview, we invited our guests to the Turmuhrenmuseum (tower clock museum) in Bocholt. Owner Josef Schröer (top left) has collected clock faces, hands, chime mechanisms, clock units, and bells dating back centuries.

You can view a video of our visit to the Turmuhrenmuseum online at:
www.thyssenkrupp-steel-europe.com/de/magazin



Competition

How long is an Olympic-sized swimming pool?

Write to us if you know the length of a lane in an Olympic-sized pool!

One winner of an iPad mini 3 will be chosen at random from all correct entries.

Send your answer to: ThyssenKrupp Steel Europe AG, Heading: Competition compact^{steel}, 47161 Duisburg, Germany, or by e-mail to: compact.tkse@thyssenkrupp.com. All entries must be submitted by 20 July 2015 (postmark date). The winner will be chosen at random from the correct entries. Employees of ThyssenKrupp Steel Europe and their dependents are not eligible. The judges' decision is final. Note: Your personal data will be used for the purposes of the competition only.