The customer magazine of ThyssenKrupp Steel Europe

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3/2011

Research and development

ThyssenKrupp Steel Europe
Thinking the future of steel

Heavy plate in India

Goods and services in demand

Steel semi-finishing

Good service creates strong values

ThyssenKrupp Steel Europe
Thinking the future of steel

ThyssenKrupp

compact

Issue 37 – 3/2011

Cover Picture:
ThyssenKrupp Steel Europe has reorganized its research and development arm. To push ahead with ground-breaking inventions for versatile industrial applications like cars, rail vehicles and aerospace, the area is bundling all its R&D activities together in a unified whole.

The former three areas are now a unified whole: from materials skills through the whole of process technology, refining and developing surfaces through to application engineering designed specifically for customers. The front cover shows the inside of a sulfur analyzer to establish the sulfur content of fuels.

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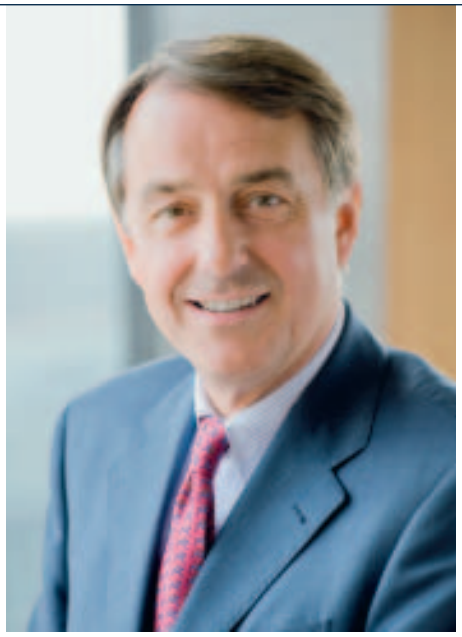


"Not reacting to trends, but finding and setting them ourselves, is what we are looking for from our restructured research and development"

Dear readers, valued customers,

The first days of the New Year – that's the time to look back. And ahead. Something which the European financial crisis is making very difficult.

The financial year 2010/2011 was a successful one for ThyssenKrupp Steel Europe in many areas. Our plants were running at full capacity up to the summer; but then the unusually high demand tailed off somewhat after early summer, as our customers' stockholdings were full. As the market calmed down, we had to run our facilities down to suit. Even so, we dispatched 13 m t of quality flat steel in the financial year ended, 8% up on the year before.

We look forward to developments in the world steel market with cautious optimism in 2012. The steel markets in Europe and NAFTA should go on growing, but only very moderately. The main drivers of the global steel market remain the emerging nations in Asia, Latin America and the Middle East. China is continuing to expand its capacity and production to suit. The situation might appear rosy, but it has a downside: the situation in the commodity markets will not calm down to any great extent. In other words: the costs of the raw materials used in making steel will remain high.

Steel is what megatrends are built on: today, society is becoming increasing urbanized, with more mobility and creating an energy infrastructure to meet the needs of today. For ThyssenKrupp Steel Europe, these developments bring many opportunities: because we know using new, sophisticated quality flat steel products knows no boundaries – as our reorganized R&D area shows. Our declared aim is to spot trends ourselves and lead them: we can do this thanks to our young innovative team in research and development. Our cover story gives you an insight into the creative but, at the same time, practical work of our developers and trend researchers, and explains how we've restructured this area that is so important to us.

Our society will need steel as much in future as it does now. The same goes for the automotive industry, precisely in view of the trend towards e-mobility, as for other industries in Europe and worldwide. You can read interesting details of this in India and about the innovative applications that our high-grade electrical and hot rolled strip is being used for.

Steel is a success story with a future, in which you as our customers play a decisive part. In the past financial year, we have worked together to use the opportunities of the upturn and created firm foundations for a successful 2012 – despite the turbulence we are experiencing in Europe above all. I would like to thank you for this and for everyone working together in a spirit of confidence on my own behalf and on behalf of my fellow directors. I wish you and your families success and satisfaction in the New Year.

Yours,

Dr. Jost A. Massenberg
Chief Executive Officer
ThyssenKrupp Steel Europe

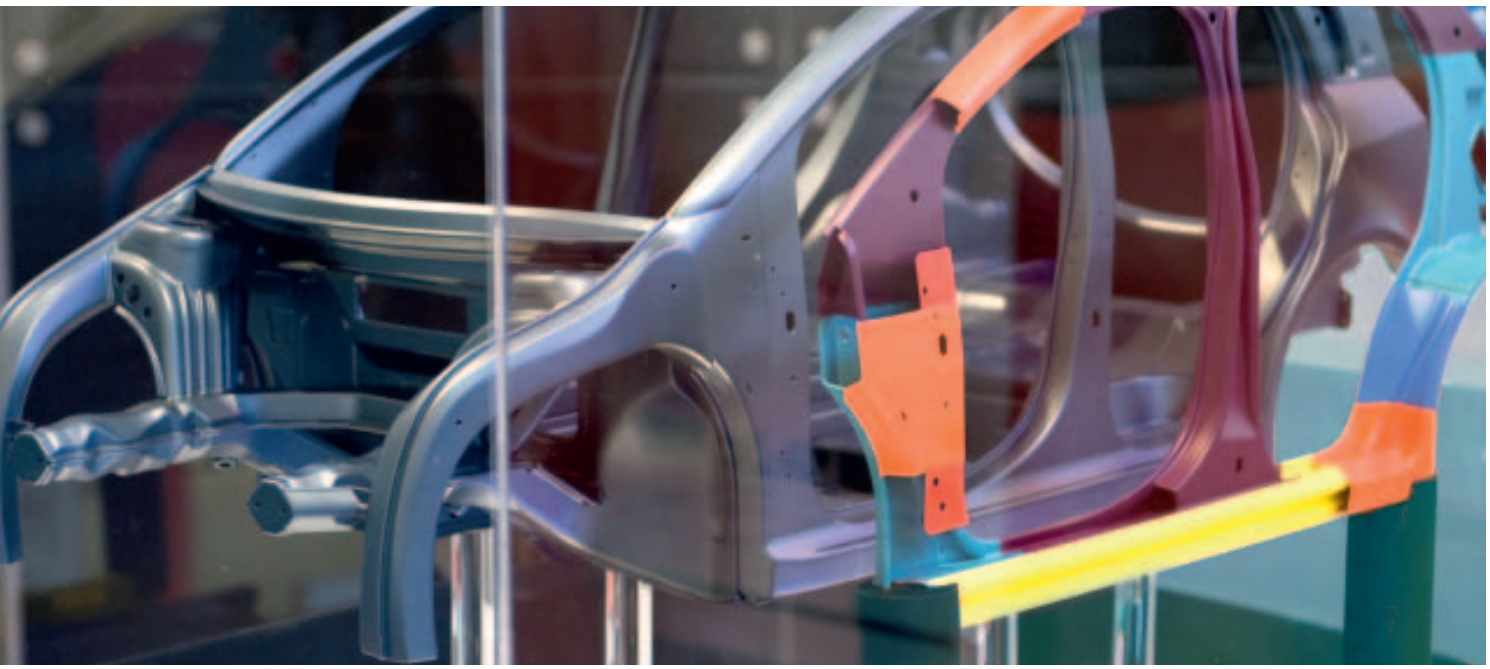
Christmas time: thin sheet for baking trays

Advent is here, the candles are burning – and mouth-watering scents waft through the house. Christmas time isn't just about snacking: crispy legs of goose and juicy roast turkey also pamper the palate. One essential ingredient if this seduction in the kitchen is to succeed is the baking tray. The Cooper Coated Coil company of Wolverhampton in the UK makes baking trays with a non-stick coating that are used in many households in Europe. The material the baking trays is made from is hot-dip aluminized thin sheet from ThyssenKrupp Steel Europe. Its high aluminum content, of 89-92%, makes the plate outstandingly heat resistant up to 700 °C. This material is made in Duisburg, ThyssenKrupp's Steel Service Center in Mannheim processes around 1000 t of this material to make split strip for Cooper Coated Coil alone. Our British customer coats the strip, their sister company then forms it. In this way, none of the tasty and tempting Advent delights stays stuck to the tray.

www.coopercoated.com

Photo: Rainer Kaysers

Research and development reborn
ThyssenKrupp Steel Europe is thinking the future of steel



A promising research project: the FutureSteelVehicle provides answers to the hot topic of the day: how much lighter can all-steel bodies get?

The IAA 2011 in Frankfurt was the stage for the world premiere of environmentally friendly innovations on which part of our mobile future will be based: StreetScooter, InEco and FutureSteelVehicle (FSV). To push ahead with these and other ground-breaking inventions, ThyssenKrupp Steel Europe has reorganized its research and development (R&D).

Dr. Klaus-Peter Imlau (left) has worked for ThyssenKrupp Steel Europe for 29 years. He joined Thyssen's research and development arm straight from college after gaining his doctorate at the Friedrich-Alexander University in Erlangen. He became director of the Materials Competence Center in Duisburg in 2002. Seven years later, under his management, the former independent areas of the Materials Competence Center, DOC [Dortmund Surface Center] and Application Engineering were merged to form today's research and development base. Dr. Imlau handed over the keys to his successor Prof. Hans Ferkel on 1 October, and will be retiring at the end of March 2012.

The StreetScooter may go into small scale series production in 2012, and the four-seater electric car would be on the road in 2013. What made this possible? A team of researchers at the RWTH Aachen and industrial companies – including ThyssenKrupp Steel Europe as sole steel partner. Because the StreetScooter's body hides a lot of high-strength steel. This is extra-strong lightweight structural steel which also plays a starring role in another promising research project that premiered at the IAA: InEco – developed by the Institute for Lightweight Construction and Plastic Technology (ILK) of the TU Dresden and the Saxony Lightweight Construction Center, assisted by ThyssenKrupp Steel Europe. InEco uses an ultra-light mix of materials comprising carbon fiber-reinforced plastic, or CFP for short, laminated with extra-

strength steel from Duisburg. This is pre-competitive research, which means it is available for a wide range of industrial applications, in cars, rail vehicles and aerospace.

These two ground-breaking innovations are based on a think tank of good ideas and the material of steel. And, to make sure ThyssenKrupp Steel Europe doesn't run out of good ideas, the Innovation team was created in the new research and development arm. Together with colleges, institutes and partner companies, the think tank of 20 experts spotted and analyzed social trends in protecting the environment and resources, until at the end of a long development chain we had cutting edge innovations like the StreetScooter and InEco.

The bar in innovation is set high. The trend is towards ever lighter and hence more environmentally efficient products that have to be affordable and safer at the same time. This calls for a visionary approach to research. And ThyssenKrupp Steel Europe has responded magnificently. The company has given its research and development arm, headed by Prof. Hans Ferkel, a new, dynamic, consistent face. It bundles all its R&D activities under a single director, replacing the old organization with its three different units, from materials competence and the whole of process technology, finishing and developing surfaces through to application engineering specifically for customers. Which puts Ferkel's directorate in a special position amongst steel manufacturers worldwide. The benefit here is that the 700 or so specialists can swap their expertise day in day out and so all pull together: thinking the future of steel. Together they are developing today's steels, hybrid solutions and functional surfaces even faster and more efficiently than before, as well as working closely together to test production methods and optimize complex concepts for customers.

It's not just knowledge we're bringing together, though: high-tech laboratories, expensive computer simulations and complete mini-scale pilot production are just some of our R&D tools. We use them hand in hand today, and find out what customers want and what could be the reality tomorrow. We are constantly optimizing processes and materials in a coherent approach until they meet the high expectations of our customers and, ultimately, the demands of society. Not only that, but research and development also acts as a competent, state-of-the-art service provider to our own companies. This broad-based directorate assists businesses with its comprehensive technical services. Innumerable chemical analyses are carried out every day, materials are analyzed and technologies and methods are tested: all with the aim of not just meeting standards but being the driver behind progressive developments like the StreetScooter and InEco. Or another project in the long list of innovations in steel – the FutureSteelVehicle (FSV). The global World Auto Steel association is studying the really hot topic of how much less all-steel bodies can weigh so our mobile future optimizes its CO_2 emissions and uses non-oil-based fuels. The answer has already been presented at the IAA, and once again the developers at ThyssenKrupp Steel Europe have made a decisive contribution: steel bodies weighing less than 200 kg, and at attractive prices, too. And there is still more potential here too, getting this across to the customer, that's the challenge our developers are facing.

Christiane Hoch-Baumann

High-tech equipment like this laser in a tensile test machine test and check precisely what customers want and could be reality tomorrow

Rolling out the red carpet: Federal Chancellor Angela Merkel – talking here with StreetScooter head Prof. Achim Kampker – seemed to be impressed when she toured the IAA in Frankfurt. She was really interested in innovations in green e-mobility.

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Prof. Hans Ferkel
"Ideas are our business"

Prof. Ferkel, it's only through innovating that we can live tomorrow: state-of-the-art products that protect resources, involve the latest technology, offer outstanding quality and are totally economical into the bargain. What's driving development in steel right now?

No doubt about that, it's lightweight construction, and steel still has a great deal of potential here. Today, lightweight construction means hybrid materials. We're moving away from purely steel products to a balanced hybrid construction. This competition is something we as one of today's steel companies must and want to face. Which is why we've opened a new pilot production for lightweight plate at our site in Dortmund, where we make innovative sandwich plates, combining the attributes of steel covering plates with a polymer core, giving a strong, lightweight and rigid laminate material with extra functions. We aim to use this and other products to establish ourselves as blank suppliers with our customers.

You aren't just thinking of automotive customers here?

No. With InEco and its stable mates, we may have found prominent examples here, but we're researching, developing and testing our new products for all industries. Lightweight construction also plays an important part in the engineering business and domestic products: think of lightweight, easy-to-use machinery and equipment. Our state-of-the-art sandwich plate isn't just lightweight, though; it's also a world champion in insulation, makes for pleasant noise levels in kitchen appliances and protects buildings reliably against heat and cold. Even with heavy plate, lightweight construction is becoming increasingly important: in extensive offshore installations, every ounce saved means less money spent, because these gigantic installations can have their weight reduced and rest on much smaller foundations, so saving on other valuable resources in turn: a virtuous circle that will become ever more important in our society in future. Which is why we opened our own heavy plate welding lab in Duisburg for our new wear-resistant steels in the summer, which examines the welding and joint attributes of our latest high-strength heavy plate in depth.

Just what benefits do steel customers get from your multi-faceted research and development activities?

A great deal, because ThyssenKrupp Steel Europe is continuing our strategy of not just developing steels for the market but also giving our customers more reasons to use them. In its new structure, our research and development has created a hitherto unseen interchange between all projects and process chains, aimed at tailoring our products and applications even more precisely to what our customers need in future. Keeping the benefits of steel as a material firmly in sight, we consider it from all sides and with all its possibilities. On the one hand, we stress its characteristic attributes; but, on the other hand, we also look at the functionality of its coatings and ways of processing it through to specific applications. Which means that, today, we can give today's steels characteristics that would have been unthinkable before. We combine rigidity with flexibility, and lightness with great strength. Our vision is unbounded: it extends as far as intelligent steel applications that have built-in sensors to alert their users to hazards. We work on these and other projects jointly with our customers at regular workshops.

A broad field …

That's right. Once a new grade of steel is born and given the right functional surface, we have to work out the right jointing and forming options. That means having the right software to simulate how the new steels will behave during forming, or in a crash. That's the only way we can give our customers reliable predictions and offer them the right tools and solutions to go with the products. Of course, we have to take account of both our own production processes and those of our customers and ask ourselves how the new steels will affect our plant and theirs too. We may even need to make adjustments to achieve top quality.

So each individual idea has significant repercussions for you and your customers. How do you keep coming up with new ideas again and again?

Ideas are our business. Research and development is primarily about providing services to ourselves. We are very closely involved in ThyssenKrupp Steel Europe's everyday production, and draw important ideas from it for our projects. From them, we develop initial solutions, which we then feed back to our businesses.
It's like a kind of ping-pong game. Long-term projects, on the other hand, are something we develop with a newly founded innovation team that deliberately researches into trends. The team tracks what the market will be wanting in the next 15 years and beyond, and gets things moving today with its eyes firmly on this goal. We need to know as far as we can just what our customers' customers will expect of products tomorrow.

That definitely means thinking outside the (steel) box.

Precisely. That's nothing new as far as we're concerned, however. We're not in the proverbial ivory tower, but engage in lively, scientific exchanges with colleges, institutions and partner companies to look into the future together. Even within the ThyssenKrupp group, we work together side by side very successfully. The key word here is InCar®. Our Group-wide research program has been so successful that we're now onto InCar® plus. When I look at what the Group as a whole knows, I also see many other promising collaborations, though: what would be interesting, for instance, is to clad our high-tech lifts with the latest coated steels from our company onto which films or images could be projected, keeping passengers informed or even just making time go by faster. There are no limits on the imagination here.

That makes you look forward to tomorrow, and doesn't sound at all old-fashioned – an image which steel still finds it hard to get rid of, unfortunately. How do you keep this creative urge going in your area and hence at ThyssenKrupp Steel Europe?

Our steels are becoming ever more state of the art and more intelligent. And to develop them, we need clever heads, open, flexible young people with knowledge and imagination. Alongside our conventional doctorate program, we've set up a special recruiting and promotion program for research and development together with our HR department, which we use as a framework today for offering many new positions in special projects.

High-flyers then work on their specific problems for three years, looking for innovative solution approaches. And, finally, staff then move, with the expertise they have learned, to business areas or subsidiaries of ThyssenKrupp Steel Europe, where they continue what they are working on specifically in practice. This is how we penetrate and network our steel company with our research, and our specialist expertise, and so make our projects more likely to succeed. By these means, we are guaranteed to retain a forward-looking, successful stream of ideas for ThyssenKrupp Steel Europe.

Speaking with Christiane Hoch-Baumann

Prof. Dr. Hans Ferkel is head of the Research and Development directorate at ThyssenKrupp Steel Europe. Before that, he was head of Technology Planning and Development at Volkswagen in planning and diemaking. The 50-year-old father and family man studied physics at Göttingen University in the 1980s. From 1988 to 1991 he studied for his doctorate at the Max-Planck Institute for Fluid Dynamics in Göttingen. In the 1990s, Ferkel continued his academic work at institutions such as the University of Southern California in Los Angeles (USA) and TU Clausthal, where he ultimately qualified in materials science. During this time he was a corporate consultant. In 2004, he moved to become head of the Materials Research and Production Processes area at Volkswagen's Group research arm.

From an idea to series production readiness
Developing creatively and methodically

Longitudinal member made from TPN®-W 780: Dr. Thomas Heller (back), Oliver Hoffmann and Dr. Brigitte Hammer of R&D worked on developing this new material. The common thread in the development was the product development process.

The Research and Development Directorate under Prof. Hans Ferkel is the locomotive of innovation at ThyssenKrupp, taking ideas and turning them into sophisticated series production materials.

"There are many incentives," explains Dr. Thomas Heller, head of Development and Optimization. "For one thing, what we deal with is what our customers are actually concerned about." And Oliver Hoffmann, head of Application Engineering continues: "And, second, we aim to use our own observations of the market to offer intelligent solutions for the steel applications of the future." As with the material TPN®-W 780, it is easier to form without sacrificing strength, which makes it stand out from other high-strength hot rolled strip steels.

The new multi-phase steel with its three-phase structure and hardening particles in the nanometer range was tailored specifically to meet the needs of the automotive industry. Around 100 specialists from different areas worked together at ThyssenKrupp Steel Europe on the project. Externally, the staff at Duisburg also worked with Japanese steelmakers JFE. Why this strategic partnership? Customers are international and want materials available worldwide. "Our TPN®-W 780 is now ready for series production, and is designed to be used in bodies and chassis," says Dr. Brigitte Hammer, who led the development for Steel Europe. "Now the steel can be made in both Germany and Japan."

Looking back, it always starts with looking for a new approach to a solution. "If we know what characteristics steel should have," says Hammer, "we can think about how to make it."
For their initial ideas, they go back to existing experience from series production, their own research and professional literature. Even at this stage, they need to be open to unusual ideas. "Experience is also important," she explains, "And in this case even that of specialists from two steel companies." The actual new steel product itself is then developed in accordance with a prepared master plan. "The product development process, or PDP for short, is our constant thread that runs through and documents the whole project, from the initial idea through to series production."
What is important is that ideas must be practical. So the first step is to set up pilot production in the laboratory. "This is a steelworks in miniature that offers more possibilities than a full-scale production plant," Heller explains. The company invests regularly in its laboratory production facilities: the simulation systems, for example, are constantly being modernized – in this case for hot-rolling high-strength innovations like TPN®-W 780. The pilot production samples are then analyzed in different R&D areas, with the metallography/metal sciences team studying the material's microstructure, for example.

Even this early on, we can tell what mechanical characteristics we can expect, and Hoffmann's team gets to work. At the same time, strategic marketing kicks in, setting the market development process (MDP) in train. Once the right product marking has been found, the trademark registered and product development completed then sales and marketing start launching the product on the market. In this end phase, again, Hoffmann's experts assist sales and customers n all application issues. In the beginning there is examination: application engineering tested the TPN®-W 780 to see how it would perform specifically in ThyssenKrupp's InCar® innovation product. And it soon emerged that the hot-rolled strip had to be as thin as possible in order for the potential attributes of the steel to be used later to the full – important information for works trials.

Once the laboratory phase is complete, the full-scale rollout follows. Hammer explains: "We sit down with the production managers and think about how we could run the works trials." Whichever variant promises to be the most successful is selected. "From the application engineers, I already knew that the hot-rolled strip should go down to as far as 1.6 mm," she adds. "Such trial production runs, which are rather as if a customer had ordered them, comprise 250-350 t. In between individual stages, the material is tested, which may raise new questions."
If everything runs optimally, the research departments can call on a large quantity of material from industrial production for further testing. The experts now test the new steel's product and processing characteristics using the PDPs. Heller: "For this, the research and application engineering test departments have a wide range of cutting edge devices and equipment for simulating typical industrial processing situations." And Hoffmann adds: "What really matters at this stage is to generate material data for simulated process studies. We need this, and later our customers do too, for the virtual development of optimum weight and functional solutions." As part of the InCar® project, a virtual longitudinal member was developed from the TPN®-W 780 that saved 27% weight compared with the comparable solution using conventional DP-W® 600 steel. "As soon as we've analyzed the new steel comprehensively and process-tested it, we will be sending samples out to the first customers," Hoffmann continues. "They can then use them to conduct their own potential analyses and processing studies. As Hammer stresses, "This is the decisive phase for our new product, so we're right beside our customers and totally committed to them at this time."

If the overall results from their own technical studies, customer feedback and market research are positive, they run more works trials to ensure that the steel is finally ready for series production. "At present, we are helping two major customers get ready to use our TPN®-W 780 in series production," Hammer reveals. As this typical path the new steel has taken at ThyssenKrupp Steel Europe shows: to get ideas to the series production stage, we need to combine expertise and teamwork. "And the ultimate reason why our work is so successful is we're creative and practically oriented," Heller and Hoffmann stress finally.

Daria Szygalski

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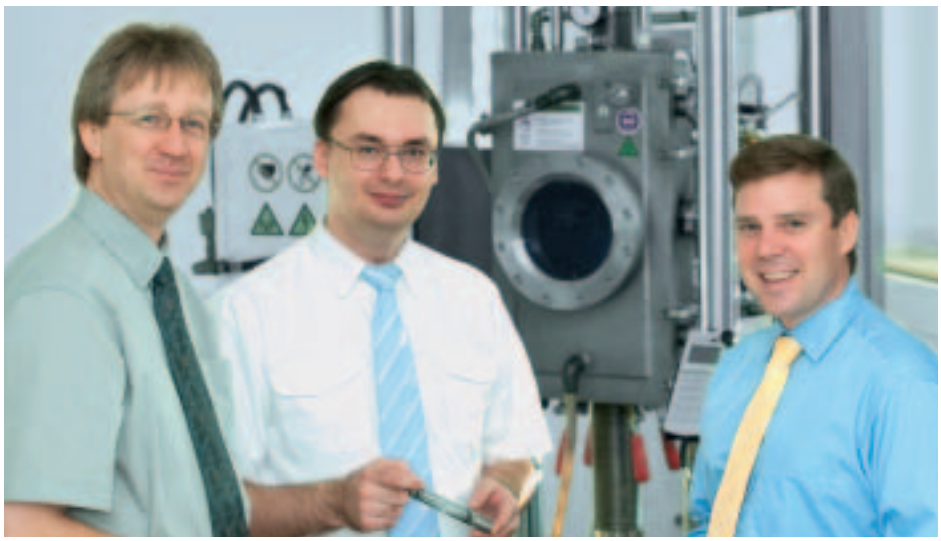
Łukasz Mieszczak is a doctorate student in the materials modeling team and simulation of the R&D directorate. Originally from Poland, he is passionate about researching into precipitation patterns in high-manganese, micro-alloyed steels". His dissertation project is part of a public pan-European EU assisted project on precipitation in high-manganese steel.

Doctorate student Łukasz Mieszczak
"What I love about my work is the creative freedom"

It's 8.30 in the morning: at ThyssenKrupp Steel Europe, Research and Development, Łukasz Mieszczak switches his computer on and pours himself a glass of cola. "My other drinks today will be water," he stresses, a Pole who has been studying for his doctorate as part of the materials modeling and simulation team since spring 2011. Candy is his only vice; otherwise, the forming engineer with German and Polish degrees s modest and extremely tidy. Apart from the cola bottle, something else that stands out in the office are little paper bags. "Those are my samples," the 26-year-old explains. "They are the first phase of my doctorate work, and what it's based on."



Exchanging ideas is important when you're working for a doctorate. Mieszczak (center) discusses how his tests are going and what to do next with project manager Georg Paul (r.) almost daily. The 26-year-old presents his results to Dr. Thomas Pretorius, Team Leader, Materials Modeling and Simulation. Pretorius checks the data can also be incorporated in models and used by other teams accordingly. Every three months or so, Mieszczak meets his doctorate supervisor at TU Freiberg, one of ThyssenKrupp's many partner universities.

The working title of his project is "Precipitation patterns in high-manganese micro-alloyed steels." Mieszczak's doctorate in turn is part of a public, pan-European, EU-subsidized project on "Precipitation in high-manganese steels". He supplies some of the data needed by his project partners at institutions, universities and companies in Finland, France, Scotland, Spain and Sweden – and the partners provide the rest. As the project arose out of a question by ThyssenKrupp Steel Europe's steel designers – they wanted stronger crash-critical car parts with higher yield strengths – Mieszczak's project is also important to materials development and application engineering at ThyssenKrupp Steel Europe's new research and development arm. The timeframe is preset and tightly timed. Mieszczak must be finished in three years, because that's when the doctorate program comes to an end, as will the EU project in mid-2015. That doesn't worry him, though: he reads his e-mails and thinks about further tests. Then he goes next door, and discusses his ideas with project manager Georg Paul and earns an approving nod. "The pressure of time and to succeed doesn't worry me so much, rather, I love the creative freedom of what I do," he stresses. Even so, he has meetings with Paul just about daily, and presents his results to Dr. Thomas Pretorius, the team leader of materials modeling and simulation, on a regular basis. Pretorius keeps an eye out to ensure the results can also be reflected in models accordingly and be used by other teams. Four times a year, Mieszczak meets with his doctorate supervisors at the TU Freiberg, one of many universities ThyssenKrupp works with.

Mieszczak applied to Duisburg as soon as he graduated from the Technical University of Katowice and Freiberg. He found the ad on the Internet. "I already knew of ThyssenKrupp Steel Europe from their presentations at Freiberg University," says the young man, who hails from Upper Silesia. Regular events at colleges have been the norm for ThyssenKrupp for many years. "Well-trained new talent in science and technology is getting ever harder to find," Pretorius knows. "Which is why we deal with talented students from their first semester." Which made him all the happier that Mieszczak met the requirements and could start immediately.

Deep in thought, Mieszczak turns off into the maze of laboratories and into a room with a small furnace. "First we dissolve the niobium-vanadium precipitations at 1250 °C," says the doctorate student in detail. "In step two, I then look to see how the precipitations, which manifest themselves as small black dots when examined under the microscope, behave." Whether with the furnace or a dilatometer, it's qualified colleagues who run his tests. Mieszczak raves, "They're a great support to me, and help me find solutions if things are not working." Working well with other areas is one of the benefits of studying for a doctorate at ThyssenKrupp Steel Europe, not forgetting the extensive technical library, the practical orientation and continuing development opportunities.

The tests are running, and it's lunchtime – time to swap ideas with colleagues. There are also other opportunities to meet other professionals, through meetings with project partners abroad – in English only. Mieszczak takes his leave. "Then I'll have the carbon footprint of the samples examined," he says. Time for some scientific reading at home.

Daria Szygalski

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Pilot plant for new sandwich material
Steel bodywork made easy

"Six months to build, 30 m long, 8 m wide, 6 m high, around 10,000 t capacity a year": that's all product coordinator Oliver Kleinschmidt will say on the new pilot plant ThyssenKrupp Steel Europe has opened at Dortmund. He still won't say precisely how it works either. After all, the Duisburg steel makers are on the right track to stealing a march on the competition when it comes to innovative laminated steel materials.

The plant makes a steel-plastic sandwich with two steel sheets enclosing a polymer core. This material is intended to reinforce steel's position in car making even further, especially when it comes to large interior and exterior body panels. With the external panels, the focus is on roofs, engine hoods and trunk lids or tailgates. Typical applications inside cars are the floor pan, seat components and parcel shelves. The competition with aluminum is particularly fierce in these areas right now, one of the main reasons being, when it comes to roofs, that it is not possible simply to make the steel sheet thinner to compensate for the lighter but more expensive aluminum. The sheets would dent too easily or start flapping at high speeds.

That's where the new steel and plastic sandwich comes in: "The two outer layers are so thin, at 0.2 and 2.5 mm respectively, so they save enough weight. The 0.3-1 mm thick polymer core ensures the material is rigid enough." A module made of this laminated material should cost around 30% less than a comparable aluminum solution while being no more than 10% heavier. The potential market is big: the average vehicle could use up to 80 kg of sandwich material, ThyssenKrupp Steel Europe estimates.

A number of customers are already trying out the new laminate intensively. The pilot unit aims to pave the way for full-scale production. It is designed so it can make not only prototype components but also small scale production. And the developers at ThyssenKrupp Steel Europe want to use the unit to make sure the production process is right and to develop test parameters for a wide range of lightweight sheet options. "The material can be designed to suit individual component requirements, such as roof panels of different grades or thicknesses," Oliver Kleinschmidt explains. "Rigidity can be adjusted through varying the polymer filling." And the sandwich laminate as a whole is only slightly thicker than the simple steel sheet used for skin panels to date. To show just how promising the optimized-rigidity sandwich material is, let's take a practical example: a skin panel made of steel sandwich sheet 1.05 mm thick offers a 33% weight saving on a steel-only component 0.75 mm thick. And the sandwich sheet has proved to be so rigid that we could even do without using one of a number of roof beams in some cases, increasing the sandwich module's weight advantage to 38%. And this optimized-rigidity material also reduces body noise, so we could also save more weight on a car's acoustic package.

As well as high lightweight construction potential at low cost, the laminate also offers other benefits: it is totally suited to cataphoretic electrodip coating at temperatures up to 210 °C. This means what ThyssenKrupp Steel Europe is developing is set apart from other sandwich materials on one important point: customers can paint this material in-line without problems, that is, when it is installed in the vehicle. As a result, painting offline and then assembling are not required.

The sandwich material is easy to form, and with four layers of zinc in all it offers outstanding corrosion protection. It also behaves well in terms of thermal expansion over the whole working temperature range from -40 to +90 °C. The rigidity-optimized sandwich material has characteristics similar to those of monolithic steel, and needs no special adjustments when fitted to bodies. Last but not least, it is particularly environmentally friendly compared with aluminum, plastics or carbon over the whole product lifecycle, including production, use and recycling.

Bernd Overmaat

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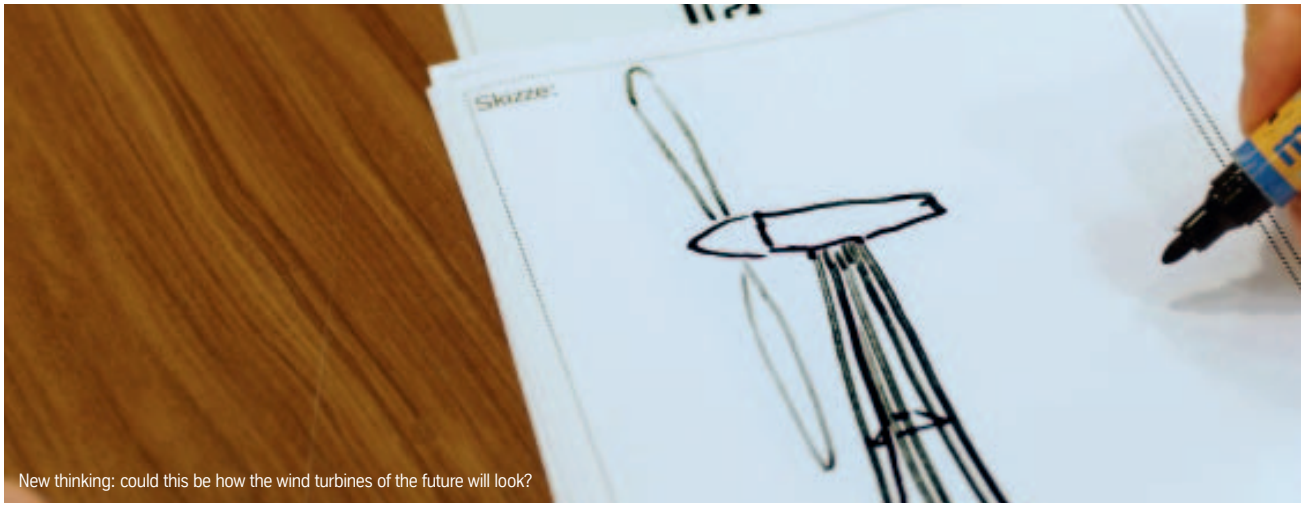
Innovation area
Provides ideas for research and development



New thinking: could this be how the wind turbines of the future will look?

What will the wind turbines of tomorrow, or better still, the day after tomorrow, look like? Will they have three legs, or be made from thick bundles of tubes? Either way, creative solutions are needed if we are to face up to one of the major wind power trends which studies show could peak in the 2020s: onshore repowering.


Deep in planning (from l to r): Dr. Lothar Patberg, ThyssenKrupp Steel Europe, Dr. Christoph Wecht of the BGW Management Advisory Group in Sankt. Gallen, Austria, Dr. Rainer Fechte-Heinen, ThyssenKrupp Steel Europe.

Looking at such trends, and seeing the opportunities they offer ThyssenKrupp Steel Europe at an early stage is the aim of the ten-person Innovation team established in January 2011. Team coordinator Dr. Lothar Patberg: "We help decide what direction medium to long-term research should take by understanding what customers will need in the future early on and using this as the basis for ideas for new developments." Onshore repowering, for example, is about replacing onshore wind farms with more powerful wind turbines. Instead of 80 m, the towers will be more than 120 m tall, because the higher winds at this altitude mean more power is generated. This in turn puts new demands on design and materials. Even today, the tower segment diameter is touching on the maximum limit of 4.3 m just permitted for transport by land.

The way that working on an interdisciplinary basis produces new ideas is shown by the Open Innovation Workshop that the Innovation area organizes jointly with the Heavy Plate business area: customers, research institutions and companies in wind power from the ThyssenKrupp Group looked for creative solutions in Ratingen recently. Working in groups with selected creative technologies, delegates let their imagination run wild. The stakes were high – after all, this is something everyone in the market is keen on.

"We assessed the ideas the workshop came up with against a range of graduated criteria," is how Adrian Paton, the Team member in charge of maturing and evaluating ideas, describes what happened next. "We develop the most promising ideas into viable concepts, and then assess them to see if they're commercially viable and feasible too."

The area is also involved in trend and technology analysis, recorded in a regular scouting newsletter, and a scouting exchange, which invites experts to give lectures. It's always about building bridges between future trends, current research, what customers want and possible innovative applications for ThyssenKrupp Steel Europe.

Bernd Overmaat

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Growth market in India

ThyssenKrupp enjoys an excellent reputation

India is one of the winners as far as globalization is concerned. The country has been the second fastest growing in the world, after China, since the millennium began. The subcontinent recovered from the economic and financial crisis surprisingly fast, the government is increasing its investment, and private consumption also supports the economy. The economy boomed in 2010, up nearly 9%, although this is expected to have tailed off to 7.6% in 2011 and 8.2% in 2012.

ThyssenKrupp has eight local companies representing it in India today, with some 5,400 staff earning sales of around EUR 717 m in the financial year 2010/2011. Dara Damania, the German group's representative in India, looks optimistically to the future: "ThyssenKrupp's Indian companies all have outstanding technology and are highly competitive. They have been working successfully with their customers for years, as their loyalty and order book levels show. The Group enjoys an excellent reputation here as a price-conscious, reliable business partner. But we are also facing intense competition, of course – including from foreign suppliers."

The reason ThyssenKrupp is so successful in India, he says, is that it knows the market well, and has well-trained, highly motivated staff; and the company gives the resulting benefits back, as individual companies are heavily committed to social areas. Damania has been working for ThyssenKrupp in the country since 1957, after Mahatma Gandhi led it to independence in 1947, and sees the main market opportunities in infrastructure, energy, the automotive industry, steel, oil, gas, petrochemical products and synthetic fertilizers. "These are all areas in which demand is set to increase, be it through government investment or private consumption. Which will benefit ThyssenKrupp too."

Bernhard Steinrücke, Director in Chief of IGCC India, agrees. He believes the country will be one of the main growth markets in the world for German companies by 2020. "There is virtually nothing to stop the subcontinent's economy from growing. All goods and services are in demand here, because they have the youngest population in the world, and incomes are rising. Anyone who hasn't got on board so far has failed to recognize these developments, and has made a big mistake," he says, having known India for years. With its population currently standing at 1.2 billion, India is expected to be the most heavily populated country in the world by the middle of the century, and – so the estimates say – in third place in terms of gross domestic product, or GDP, behind China and the USA. Steinrücke believes the 1,000-plus German companies involved in India could even increase their share of the market. "Small and medium companies have been called on to seek their fortunes even more so than before. There are already many SMEs here, but there could be more, beyond the 20 or 30 new companies we at the Chamber set up each year," he says. The Chamber of Commerce representative is not bothered that German companies tend to hold back when considering India as a place to invest

India is one of the winners of globalization. It has the youngest population in the world, and will also be the most heavily populated by the middle of the century. All goods and services are in demand here.

directly abroad: "Many German companies let themselves get caught up in the idea that the Chinese market is simple. India may not glitter, but companies are earning gold. And they won't get caught out afterwards by nasty system-induced surprises. Most companies' investments pay for themselves with the results they achieve," says the IGCC's Director in Chief. He says ThyssenKrupp is 'in an outstanding position', and that the German company, which has had business dealings with India as far back as 1860, is one of the German pioneers.

Foreign investment in India has soared in recent years. As profits are largely re-invested, it stood at around USD 30 bn in the financial year 2010/2011, or 2% of GDP. There are restrictions on foreign investors entering the market in some sectors, especially in retail, agriculture, banking and insurance, transport, mining and some areas of the energy business. Many experts estimate India could be one of the economic winners if the Doha Round reaches a balanced outcome, including through more potential exports for its agriculture and industry in less skilled jobs; but it would have to give up its defensively oriented trade policy still further*. So far, the country has continued to use protectionist measures to protect its domestic industry, like setting import taxes and export quotas, and a 'buy Indian' tendency can also be seen when it comes to bidding for public sector contracts.

In its industrial policy, the Indian government is pursuing a strategy of increasing the share of added value domestically and creating as many jobs in production as possible. For this, it needs, first, to integrate better in worldwide networks and, second, to embark on an innovation and quality offensive to offset all the capital goods and intermediate products it needs to import. Its industrial output was rising in double-digit growth rates until recently, but has tailed off in recent months, and growth rates have approached the average level of the pre-crisis years. The Indian industry association, CII, expects productive growth to fall off further to less than 7% in 2011, but with an upturn to 8% in the medium term. The forecasts are clear: India is one of the winners of the future when it comes to globalization.

Dr. Bettina Wieß, financial journalist

http://indien.ahk.de

http://www.thyssenkrupp.com/en/asien/indien/index.html

* "Doha or Dada. World Trade at the Crossroads", Deutsche Bank Research, May 2011, p. 19

Heavy plate from Duisburg

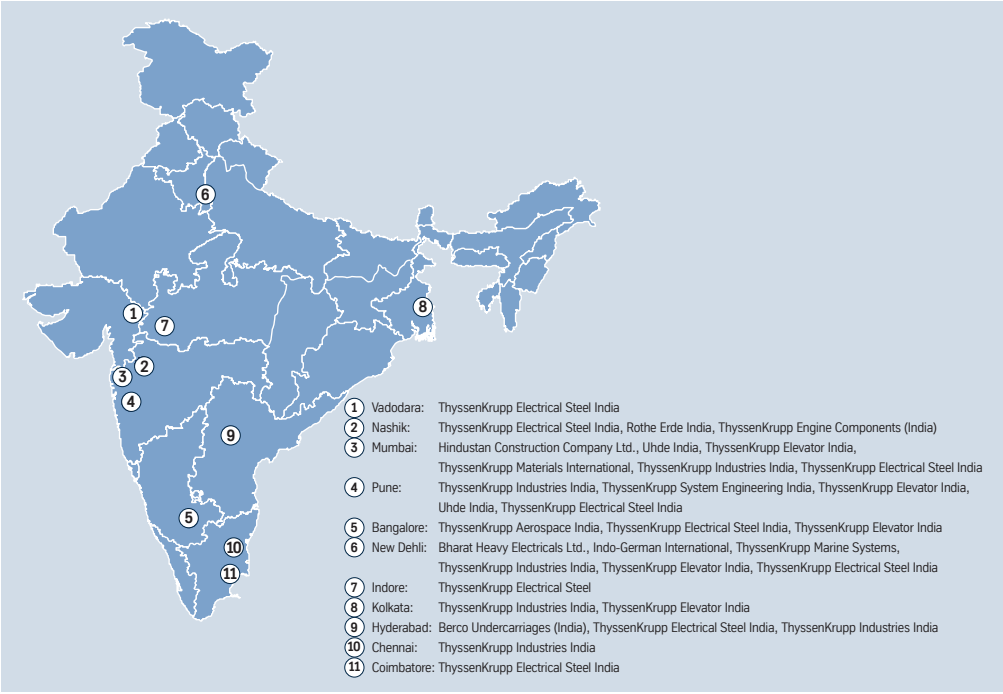
Quality steel enhances the Indian power station industry

India's infrastructure and energy supplies can't keep up with the nation's breakneck economic growth, increasing population and urbanization: so the government will be pushing to modernize and expand these areas in the coming years. It is expected to invest around a billion US dollars in expanding transport routes, seaports and airports, the telecommunications network and improving its energy and water supply by 2017. One aim is to increase the current generating capacity of Indian power stations well beyond the 170 GW at present, especially through building coal and gas-fired power stations; but generating electricity from renewable sources should also benefit.

"For us, the energy India needs means we are dealing with a sales market of the future on the subcontinent in the energy industry," says Peter Selbach, CEO of the Heavy Plate business unit at ThyssenKrupp Steel Europe CEO. For three years now, the Duisburg company has once again been offering different grades of heavy plate on the Indian market. Products in high-grade boilerplate grades for making tanks, boilers and pressure vessels are particularly in demand. Their main customers are local power station suppliers Bharat Heavy Electricals Ltd. (BHEL) in New Delhi and Hindustan Construction Company Ltd. (HCC) in Mumbai.

BHEL is India's number one designer and producer of energy and infrastructure-related industrial plant and projects. The company is one of the few in the world capable of making products at all levels of the power station equipment business. It is mostly owned by the state (67%), which also explains how it dominates the development of Indian power supplies: BHEL itself says its stations account for nearly two-thirds of all capacity installed and around three-quarters of all energy generated. The company increased its sales by 26.9% in the last financial year. In all, 75% of the orders for its 46,700 staff were for power stations. ThyssenKrupp Steel Europe supplies BHEL's works at Tiruchirappalli in the south of the country, which mainly makes high-pressure vessels for power stations. The company is not just aiming to increase its capacity, but also, increasingly, to improve the quality and hence the performance of its plant. "We supply BHEL with our special steels, high-quality boilerplate grades," emphasizes Roland Riesbeck, in charge of the Heavy Plate business unit's exports. As the Indian government is also looking increasingly to renewable energies, in this case hydroelectric, there is an increasing market for water-quenched steels

For Kashang hydroelectric power station, on the Kashang and Kerang tributaries of the Satluj River in the Federal State of Himachal Pradesh, ThyssenKrupp Steel Europe has supplied around 3,000 t of high quenched and drawn heavy plate for water pressure pipes.

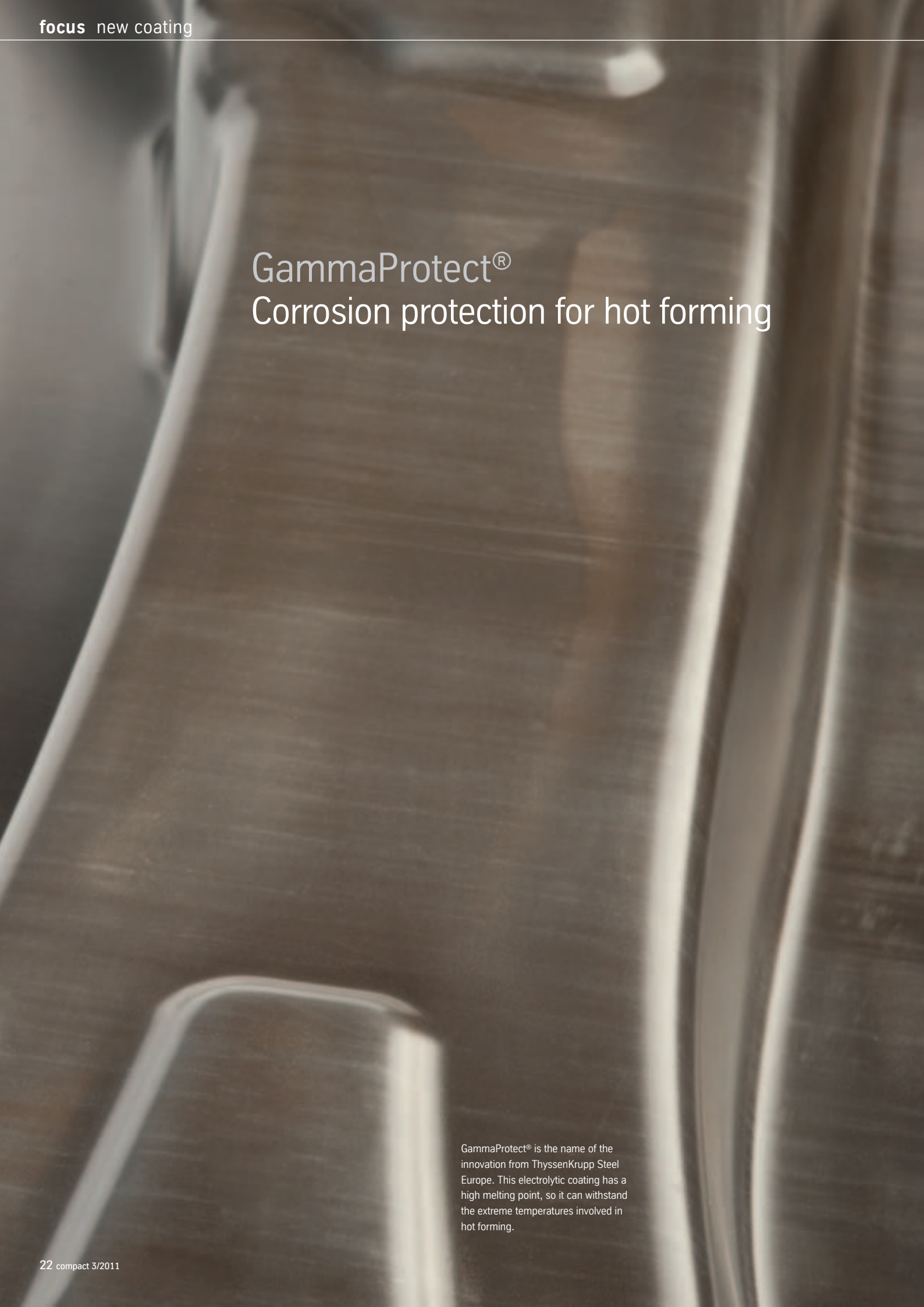


for pressurized pipes in hydroelectric power stations – and HCC is one of India's leading constructors in this field. The company itself says it increased its sales by 7.3% on the previous year in the financial year 2010/2011 (which ended on 31.03.) Hydroelectric and water supply orders accounted for 43% of the total order volume, the main customer being the Indian state, with 63%, while 37% of orders were from private investors.

Projects also include commitments in the Himalayas. HCC alone has completed nine projects in this geologically challenging region to date. As the company stresses, it has carried out more than 90 km of tunneling work, making it a world leader in tunnels. HCC covers the whole gamut of hydroelectric plant: dams, barrages, locks and water pressure pipes. ThyssenKrupp Steel Europe has supplied around 3,000 t of steel for the Kashang hydroelectric power station, on the Kashang and Kerang tributaries of the Satluj River in the Federal State of Himachal Pradesh. These pipes are now made out of heavy plate on site. The power station should be ready in 45 months and supply 195 MW of energy in all. This Federal State is currently expanding to be the 'No. 1 in hydro power' in India. Himachal Pradesh is one of the most highly electrified of all Indian states, at 99%. This is very highly developed by Indian standards, and has even benefited the Dalai Lama, whose residence in exile is in the city of Dharmshala in the west of the state.

Heavy plate from Steel Europe will also be helping expand the infrastructure India urgently requires in future. The commercial vehicle sector and construction equipment industry will be more important again in the next few years, and with it the market for ThyssenKrupp Steel Europe. Then the focus will be on wear-resistant high-strength steels: "As the ThyssenKrupp brand has made a good name for itself through the successful activities of the lifts and conveyor systems sides, with Uhde as design service provider and ThyssenKrupp Electrical Steel, moving into the heavy plate market has gone well, as we thought it would," says Riesbeck, summarizing the situation. Even so, ThyssenKrupp Steel Europe faces intense competition, mainly from international suppliers. "The quality of our products and services we offer together with our partner UnionStahl through processing and stockholding even smaller quantities is decisive here." And the increasing demand for steel with international companies like Caterpillar, Komatsu, Volvo and Liebherr moving in means the demand for quality steel products in India is set to keep rising.

Dr. Bettina Wieß, financial journalist



GammaProtect®
Corrosion protection for hot forming

GammaProtect® is the name of the innovation from ThyssenKrupp Steel Europe. This electrolytic coating has a high melting point, so it can withstand the extreme temperatures involved in hot forming.

Permanently corrosion-proofed car parts are made of galvanized steel strip: that may be trite, but it only applies to cold worked components. With hot forming, and in particular with particularly economical direct hot forming, on the other hand, corrosion proofing was a far more difficult issue, until now at least: with GammaProtect®, ThyssenKrupp Steel Europe has now developed a new surface finish that keeps rust out, even with hot-formed components.

"GammaProtect® is an electrolytic coating with a high melting point that withstands the extreme temperatures hot forming involves," explains product coordinator Dr. Franz-Josef Lenze. "As well as protecting against scaling, it also offers active cathodic corrosion protection like conventional galvanization for cold-formed steels: so this surface finish extends the areas in which hot forming can be used to parts in wet body areas particularly at risk from corrosion."

Because hot forming can be used to meet both stringent safety and also lightweight construction requirements, this technology is experiencing a boom in car making. GammaProtect®'s strengths stand out in particular in direct hot forming. This starts by heating steel sheet to around 900 °C and then forming it in a special forming die immediately to give the component required, while cooling it quickly at the same time. The rapid cooling results in components with strengths of up to 1,650 Megapascals, so components can be thin walled and weight-saving.

Zinc melts at a relatively low temperature of 419.5 °C, and so liquefies in the heating phase of the hot forming process. With direct hot forming, this is a risk: when forming hot sheets, liquid zinc can attack the material structure, causing cracks in the finished parts. With indirect hot forming, this phenomenon is less pronounced, as here the cold sheet is formed to make the parts first and is only then strengthened by being heated and cooled, that is, without any further forming stresses; but this takes more time and is more expensive than direct forming. Now, for the first time, GammaProtect® lets car makers use the benefits of cost-effective direct hot forming without having to do without active corrosion protection.

"GammaProtect® has a composition that raises the coating's melting point to over 870 °C," is how Maria Köyer of the surface development team explains the new coating she helped design. "And it has enough zinc in it to prevent the cathodic corrosion-proofing protection from being affected." The coating is so resistant that it can handle fluctuations in the production process over time and makes for stable processes. GammaProtect® protected sheet can also be heated up much faster, so sheet dwell times in the oven can be reduced by up to 20% compared with current series production.

As hot forming is being used to make more and more parts in rapidly growing volumes, shorter cycle times are an important aim in developing the process. New heating technologies like induction and infra-red radiation can be used to bring hot forming steels up to the temperatures required up to 100x faster. Even under these conditions, ThyssenKrupp Steel Europe's new coating remains stable and provides lasting corrosion protection.

The GammaProtect® coating has already been tested under quasi-series production conditions and has shown that it is suitable for all typical automotive processing purposes. Gluing and resistance spot welding can be used for making joints just as much as MIG/MAG welding. Its corrosion-proofing potential has been shown in extensive standardized tests.

The new coating is also suitable for the innovative tailored tempering technology, which can be used to make hot-formed parts of varying local strengths and expansion characteristics. And the surface also makes it easier to make tailored blanks designed for oriented loadings as used in hot forming, known as hot form blanks. With GammaProtect®, ThyssenKrupp Steel Europe is expanding its range in hot form steels. The company also meets different customers' needs with an uncoated version and an aluminum-silicon surface that prevents scaling and provides passive corrosion-proofing.

Bernd Overmaat

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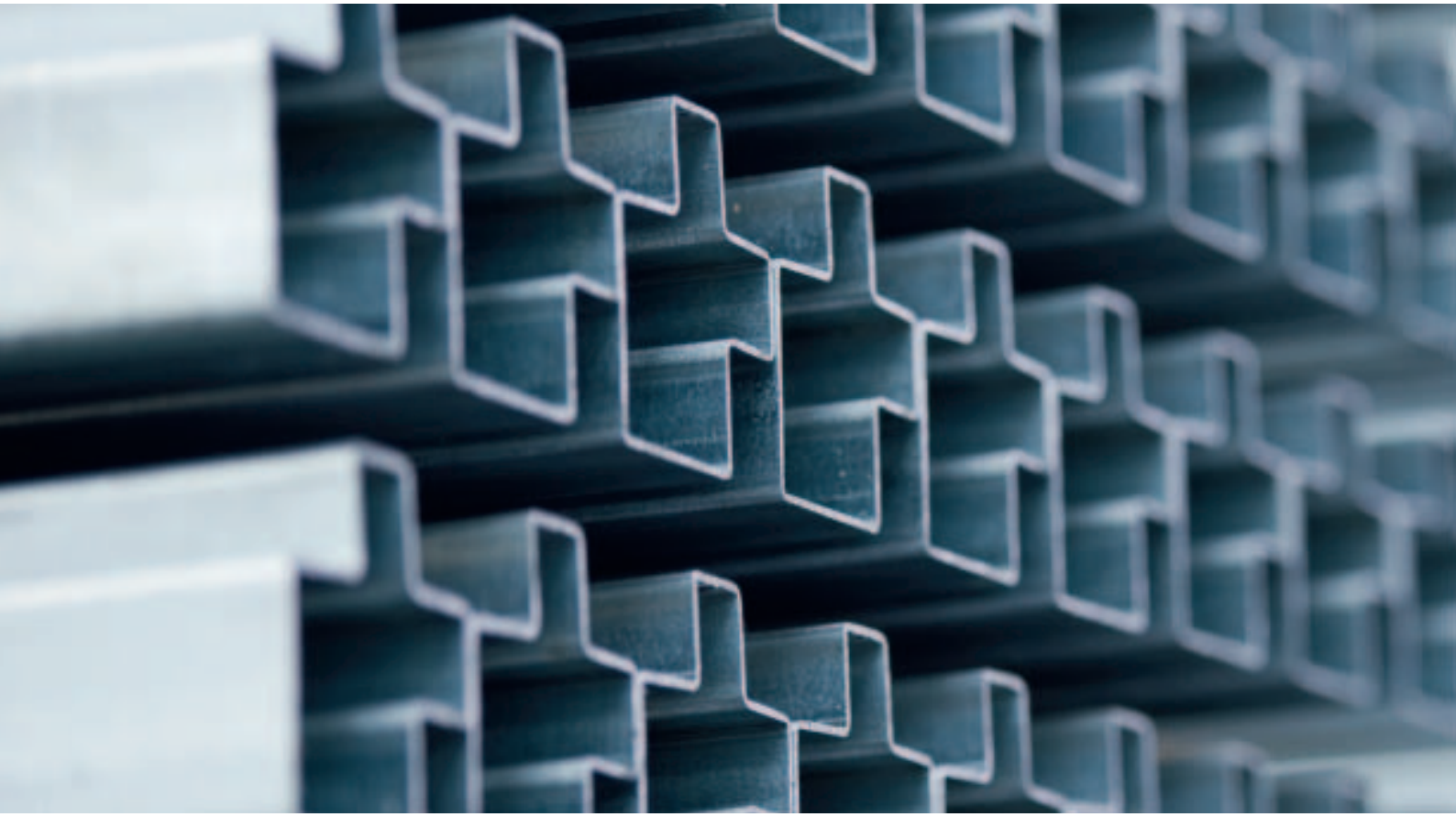
PVG Kaltprofile Verarbeitungstechnik

Company developing itself as special section manufacturer



PVG Kaltprofile Verarbeitungstechnik is a dynamic company that is developing successfully in response to customers' needs as a maker of cold-rolled special sections. For its new direction, it relies on the steel and expertise of ThyssenKrupp Steel Europe.

Customers of PVG Kaltprofile Verarbeitungstechnik (PVG), part of the REMAG group of companies, are happy all round, and they show it in the 2011 survey: on the school report scale, they rate the company mainly at A to A plus. "We do a lot to keep our customers satisfied," says director Elvira Behrendt. Regular surveys are just one of the many methods the company uses to keep developing and succeeding in the market. In the last six years, REMAG has invested heavily in its subsidiary at Anröchte in eastern Westphalia. The parent company divided € 14 m between two investments: PVG built warehouses and bought two new profiling units. Now they have eight machines they can use to make open sections from 0.7 to 6 mm thick and welded sections from 0.7 to 5 mm thick out of steel and stainless steel. "We also rely on our motivated, qualified staff," Behrendt explains. HR development is paramount at PVG: the 140 staff get further and continuing training on a regular basis.

Why all this dynamism? "We are developing from a conventional to a specialist section manufacturer," says Behrendt. "Building on our tried and tested values." PVG started out in 1981, as a small section-making workshop. "Even then, our specialists were playing around with ideas and machines," she says, having been with the company for

Left PVG is developing into a successful cold-rolled steel section manufacturer through giving their customers what they need. In the last five years, special section sales have doubled, sales were € 45 m in 2010 and the survey in 2011 showed customers were satisfied all round.

Top PVG wants to expand in renewable energies. Elvira Behrendt (second from right), director of PVG, and Claus Koerdt (second from left) purchasing manager of PVG, discuss the cutting-edge steels this calls for with Jenny Breidenbach, technical customer advisor at ThyssenKrupp Steel Europe and Martin Metzing, team leader for industry sales ThyssenKrupp Steel Europe.

28 years. “We sat round a table with our customers and found the best way in both technical and financial terms.” Then, as now, the company is about customer satisfaction through innovating and being reliable. And the section works also offers a one-stop service, from design through construction and tooling to production and supply.

PVG’s customers are numerous small and medium-sized enterprises throughout Europe, in a range of industries, such as vehicles and mounting systems, windows, escalators and solar energy. “We’re stepping up our operations in renewable energy,” Behrendt explains. For the sections which are used as the base for solar power panels made by one of the ten largest and most innovative solar companies in Europe, PVG uses steel from ThyssenKrupp Steel Europe. “We supply 6,400 t of coils and hot split strip a year of hot rolled and hot dip galvanized design, with special and high zinc coatings to meet exceptional corrosion proofing requirements,” says Jenny Breidenbach, technical customer advisor at Steel Europe. “But it’s not just the quality of the materials we value, it’s also the wide range of products and the expertise,” notes Claus Koerdt, purchasing manager at PVG. ThyssenKrupp Steel Europe is one of their strategically important suppliers: the eastern Westphalians have been using steel from Duisburg for around 20 years, and they have been buying directly from Duisburg since 2007, but what they want above all is to use new steels for renewable energies. “To work with special materials, we need competent technical advice,” says Koerdt. Consequently, Breidenbach holds information events at Anröchte, telling the section works’ customers what steel grades can do. Working as partners benefits both parties: “For us, PVG is a partner with whom we can keep on developing ourselves and our products,” says Martin Metzing, team leader for industry sales at ThyssenKrupp Steel Europe. Breidenbach agrees.

The new direction is a success, as not only the customer satisfaction, but also other figures show: special section sales have doubled in the last five years, and sales were € 45 m in 2010. That’s not the end of the story, either: PVG intends to continue investing and expanding..

Daria Szygalski

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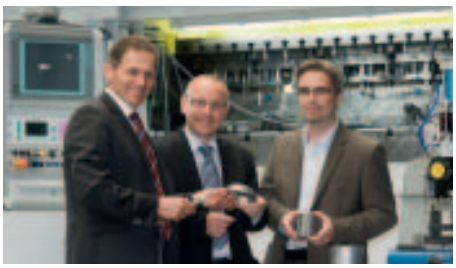
Keeping the sparks flying
Grau punches and packetizes electric strips



Business is booming at Erich Grau GmbH: Günther Grau (l.), his sales manager Markus Mann (r.) – with Robert Prim, key account manager at ThyssenKrupp Electrical Steel.

Erich Grau GmbH is a leading specialist in high-precision punching and packetizing electric plate. Its products make sure energy is flowing correctly in good old transformers and electric motors, but also in innovative hybrid drives, using the latest state-of-the-art electric strip from ThyssenKrupp Electrical Steel.

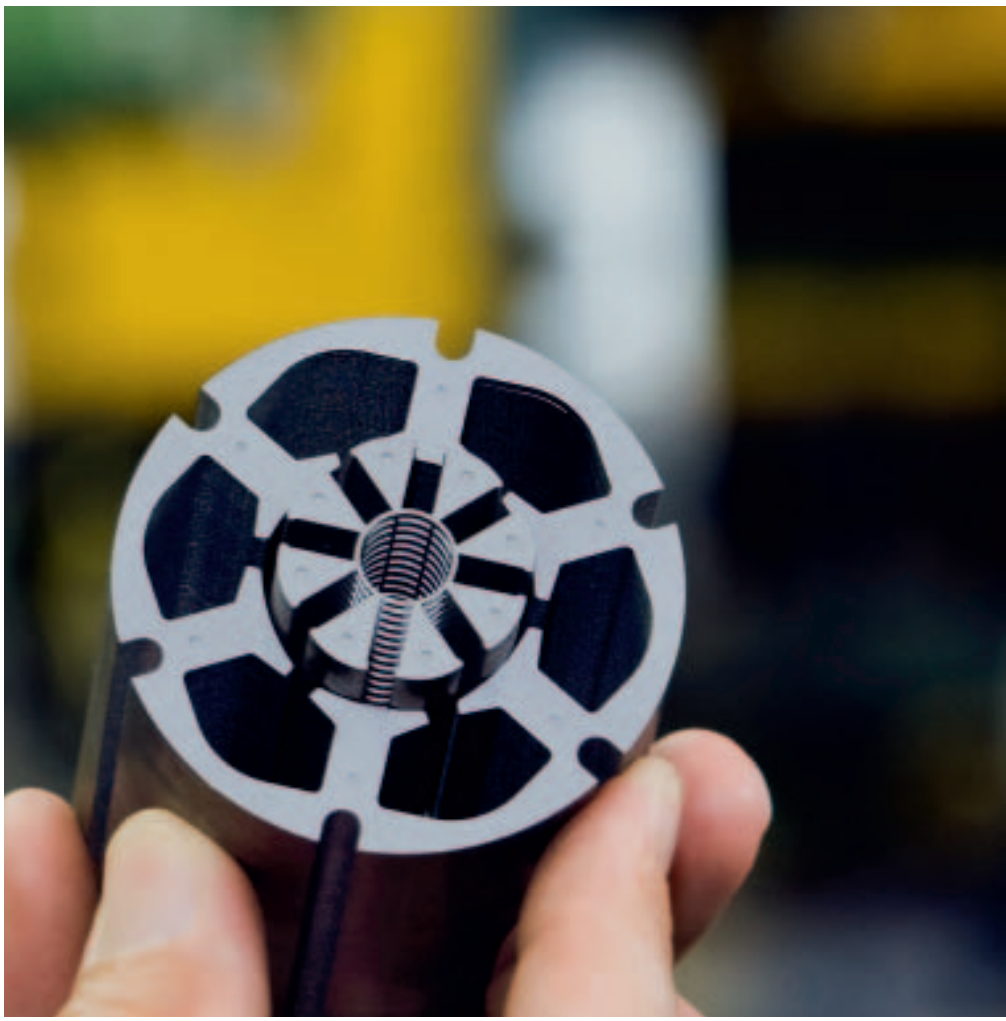
The noise level on the shop floor is enormous. Knocking, clacking, humming. The workers wear ear protection, as they should. A lot of noise about nothing, the layman might say: because one of the machines is spewing mini-components out continuously – hardly bigger than a pinhead. The expert knows, though: these little things are what it's about. "They're made of electric strip, and ensure the flow is right in magnetic sensors that tell whether power is flowing or not," explains Günther Grau, Director at Erich Grau GmbH at Sersheim near Stuttgart. "The mini-magnets are 4 x 4 mm, and are currently our smallest product." And it's the sort of delicate work that we know from watchmakers.

Grau are not watchmakers, however, but make punched and punched and bent parts from electric steel supplied by ThyssenKrupp Electrical Steel. The Swabian family firm is one of the world's leading finishers in this business, making a wide range of different sizes and shapes. It punches and packetizes electric steel up to 300 x 300 mm, or larger sizes using laser cutting systems. This specialist's products are used in household products, cars and for transmitting energy in transformers and generators. Grau: "And precisely where it involves making components from electric steel to create the right energy flow through magnetic fields. Only then can drives and the functions they operate do their job, whether it's window winders or vacuum cleaners." solenoid cores for spark plugs are one of the main products of the punching line for electric plate (to use the industry jargon). These use the energy of a magnetic field to ensure that the sparks fly properly, and ignite the fuel-air mix in petrol engines without which cars would, ultimately, go nowhere. Grau says, "We're the European market leader here, supplying leading component suppliers. The company's portfolio also includes rotor and stator packages, that is, the fixed and rotating parts of electric motors. We make them in a range of sizes and designs, as our customers specify. For all their individualism, the high volumes involved mean they're mass-produced products." That also applies to the round solenoid cores for spark plugs. Something else the Sersheim company is expert in are small series runs and prototypes: "We help with development."

The specialist has 140 staff making the 'magnetizing' mass products on 30 high-speed punching machines – applying forces of 40-250 t. "Hence the noise," stresses director Erich Grau, 85, agile and still working every day at the company. This grand old gentleman founded the company in 1952: "I started out repairing agricultural machinery. My father had an agricultural business himself. I was a prisoner of war in France, and when I came back, I helped him get our farm back on its feet again. But I liked fiddling around with machines and working with metal." His son Günther is now the second generation at the helm. Their customers include many leading automotive contractors worldwide; and electric motor and plant makers like Siemens also order their electric plate for their products from Grau.

Grau gets its electric strip mostly from ThyssenKrupp Electrical Steel, in grain-oriented (or GO for short) and non-grain-oriented (NGO) form. The state-of-the-art electric strip is used at all levels of the energy generation business, from generating and transmitting electricity through to distributing and consuming it, by electric motors and other equipment. ThyssenKrupp Electrical Steel makes GO and NGO (a very laborious process), developing their outstanding magnetic characteristics. "Electric strip is a material that can be used in many different ways. It will be a major component in sustainable applications, which will become even more important in future, like hybrid and electric cars, in generators for wind wheels or making transformers even more efficient," says Dr. Peter Biele, Chairman of the Executive Board of ThyssenKrupp Electrical Steel.

Every year, the Ruhr sends several thousand tonnes of electric strip into the country, to the Grau works, in both versions and various thicknesses, mostly rolled up cleanly into coils. Grau uses GO in the tiny sensors and solenoid cores for spark plugs. NGO is used in making laminated plates for hypermodern, highly energy-efficient electric motors – "An attractive future market for us," says Günther Grau. In fact, innovative electric motors are in demand for hybrid drives, and pure e-mobility is on



Precision work and delicate engineering: stacks of whisper-thin plates of the same size are punched clean, stacked and connected to one another. What makes this possible is top grade and quality electric steel from ThyssenKrupp Electrical Steel and processing by Erich Grau GmbH.

everyone's lips for cars and other vehicles. For Erich Grau, "NGO with its low watt loss is the right material for this, as it reduces energy losses enormously. We help engine makers turn their ideas for applications into technical designs and make them, whether e-mobile or hybrid." The mechanical experts don't simply punch shapes out of the electric strip and that's it, though. In fact, most of the components they make are these 'packets' – something else Grau excels in. Packetizing is the name of the process in which numerous whisper-thin plates of precisely the same size are punched out, stacked together and joined. All this calls for high-precision mechanical engineering skills.

The delicate work is not evident at first sight. Robert Prim, Grau's key account manager for NGO at Electrical Steel, says, "Packetizing is highly demanding when it comes to the flatness, evenness and freedom from tension of the electrical strip. The dies are responsible for making the high-precision parts, and that's what Grau does best." And that includes the company's round cores for spark plugs – all packets in which squeaky-clean, permanently bound punched parts line up with one another, not forgetting strips of different widths. Günther Grau says, "We make 70,000 packets a day, including some for which we need to punch 500 individual plates cleanly, position them relative to one another and join them. You can only do that with top-grade, top-quality electric strip like ThyssenKrupp Electrical Steel supplies."

This delicate work calls for precise punching machines and tools. Erich Grau says, "We design and build them all ourselves. That's always been our major expertise." And makes the supplier and their customers highly flexible. "With our mechanical engineering, we can respond to optimizing design or fault analyses fast. It's essential for successful series production. And we use special tools to give customers more and more what they want," the company's founder says. The tools are becoming more and more complex; "Which means the parts we can make are getting more and more complex too," says Erich Grau, always the tinkerer. The company is currently working on a two-meter die for angle resolver packets.

And how are these sometimes delicate packets packetized? As Günther Grau says: "The dies do that too. We make almost invisibly small stubs on the individual plates which we then use to bind them together. Rather like Lego bricks, only much more precise." For special applications, Grau uses laser welding to connect plates, and does this too with excellent expertise and first-class production systems made in-house. "We use these mainly for small series and in large scale production in our solenoid cores for spark plugs."

Another alternative the Sersheim company uses is baked enamel, used to bond electric strip. Here, small stubs or welds would upset the magnetic characteristics of the substrate. Günther Grau: "This ensures the best magnetic results." ThyssenKrupp Electrical Steel, the supplier of the electric steel, has already applied the baked enamel to the substrate. Grau says, "This technology has been used so far in prototypes and small series production, and anywhere it's about that little bit extra and price is not the most important factor." One pleasant side-effect: both options are much quieter, so the workshops in Swabia can be rather more tranquil for once.

Ulrik Wirtz, freelance journalist

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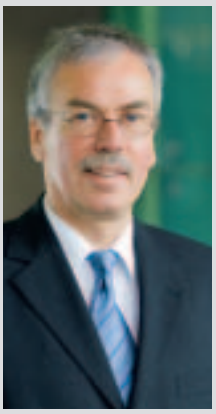
NewsFlash

ThyssenKrupp Steel Europe welcomes two new Board members
Dr. Herbert Eichelkraut and Dr. Heribert Fischer are the new members on the Executive Board of ThyssenKrupp Steel Europe. Eichelkraut will be responsible for the new Metallurgy division from January. Until now, he was a member of the Executive Board of the Steel Americas business area and CEO at ThyssenKrupp CSA in Brazil. Fischer has already been in charge of the likewise new Rolling and Finishing division at ThyssenKrupp Steel Europe since October; before that, he headed the directorate of the same name in Duisburg. Eichelkraut and Fischer will therefore be taking over from Dr. Ulrich Jaroni, who will be alongside advising them both until mid-2012 and then retire from his post after 10 years. Dr. Jaroni was appointed to the Board in April 2002, and has been in overall charge of Technology/R&D since July 2009. With the increasingly complex tasks and projects involved in the company's strategic aim of being 'best in class' the Production division has been divided into the two new units – Metallurgy, and Rolling and Finishing.


Dr. Herbert Eichelkraut


Dr. Heribert Fischer

Worldsteel Association: Hiesinger on Executive Committee
The 45th world convention of the Worldsteel Association in Paris elected the new Board and Executive Committee. The directors of the world steel industry's umbrella association appointed the members of the Executive Committee: ThyssenKrupp's boss, Dr. Heinrich Hiesinger, took his seat on the supreme executive committee of Worldsteel, like Dr. Ekkehard Schulz before him. Behind the scenes at the event in mid-October, he said he hoped European politicians would be able to overcome the uncertainty on the financial markets as soon as possible. Not until the financial market crisis was resolved, he said, would it be possible to make any reliable forecast as to further developments, especially in the core markets, Europe and NAFTA. Hans-Jürgen Kerkhoff, President of the Steel Industry Association, said the economic prospects for the German and international steel markets had dimmed in recent weeks, but no-one expected the upturn so far to do a U-turn. This assessment is in line with the Short Range Outlook of the Worldsteel association for 2012, which says world steel production should rise by 5.4%, China being the main growth driver once again.

Best owner wanted for building activities
ThyssenKrupp Steel Europe intends to sell its building activities at locations in Germany and elsewhere in Europe, and is looking for a best owner. The aim is to make this business more competitive; and find a new owner who will continue the strategic development of the business and invest as necessary to take it forward. The product range includes state-of-the-art lightweight steel construction sections for use in walls, façades, roofs and ceilings of industrial buildings and cool stores.

Steel Innovation Prize 2012: apply now
The competition is open: engineers, architects, craftsmen and women, designers and inventors who live in Germany can now use their ideas to compete for the Steel Innovation Prize 2012. The winner will take away not just prize money totaling € 70,000, but will also get their ideas published. The competition includes a special prize for "Protecting the climate with steel", which will be presented to the idea that uses steel to help save energy and materials, and to reduce CO2 emissions. Dr. Jost A. Massenberg, a member of the Executive Board of ThyssenKrupp Steel Europe and Chairman of the Board of the Steel Information Center S-I-Z, explains what steel means when it comes to innovations: "Steel offers a wealth of possibilities in creating new ideas. And those who design new ideas are making a major contribution to safeguarding the German economy." Entrance forms are available from the S-I-Z; entries must be received by 16 January 2012.

www.stahl-innovationspreis.de

ThyssenKrupp Quarter: Selected Location 2011
The ThyssenKrupp Quarter has won the "Selected Location 2011" award in the nationwide innovation competition entitled "365 places in the land of ideas". That means the ThyssenKrupp's Group headquarters is one of 365 prizewinners the location initiative "Germany – land of ideas" awarded together with Deutsche Bank under the overall chairmanship of Federal President Christian Wulff each year. Being a "Selected location for 2011" is a recognition of transparent, consistent architecture. The open design of the ThyssenKrupp Quarter encourages people to talk to one another and exchange what they know. Not only that, but the Group's headquarters also use up to 30% less primary energy than the law specifies. And the ThyssenKrupp Quarter is a homage to Germany and the Ruhr area.

http://www.thyssenkrupp.com/quartier/en/home/quarter.html

New building with steel
ThyssenKrupp Steel Europe helps design

Deubau 2012, the high point of the building industry at the beginning of the year, opens its doors at Essen Exhibition Center from 10 to 14 January, focusing on building cost and energy-efficiently.

Deubau: Like two years ago, ThyssenKrupp Steel Europe's Color/Construction business unit will be presenting itself at the S-I-Z's communal information center in Hall 3, Booth 253.

"Steel not only meets the highest functional requirements, it is also a highly aesthetic material for the building sector." Dr. Reinhardt Winkelgrund, head of the Steel Information Center S-I-Z, is convinced of this. "Which is why steel is essential to the building industry, and will continue to become more important in the future." And ThyssenKrupp Steel Europe will be back at Deubau, the international building trade show, again. Together with 600 other exhibitors, the steel company will be presenting itself via its Color/Construction business unit. Lightweight steel construction elements, systems and other innovative building solutions will be some of the highlights the business unit will be offering on the S-I-Z's communal booth in Hall 3. This year, Deubau will be giving an idea of which way the building industry will be going in future, focusing amongst other things on sustainable building and energy. Especially in winter time, when it's cold and icy outside, the question is how we can be energy-efficient and sustainable right from when we first put up a building. The show will also be highlighting extending, renovating and modernizing existing building stocks. For the sixth time, no less, the S-I-Z, the Architects' Association of North Rhine-Westphalia and the Hot-Dip Galvanizing Industry association (Industrieverband Feuerzinken e.V.) will be organizing the International Architecture Congress jointly at Deubau on 11 January. This time, leading architects from all over Europe will be presenting their projects under the banner "New building with steel – spans, structures, visions", including Chris Wilkinson with an insight into visionary architecture with far-reaching structures. Hemma Fasch and Jakob Fuchs will be speaking on the liberal design possibilities with steel, and Peter Ackermann on how sustainable the material is. With breathtaking images, always looking to the future, each of the eight speakers will be presenting the design opportunities steel presents and their personal vision as to how the material will change the architecture of the future sustainably.

Johanna Flöter

http://www.deubau.de/en/deubau/index.html

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ThyssenKrupp Steel Service Center
Service creates values

The conventional steel business, that was yesterday, as visitors soon realize when they look around ThyssenKrupp's latest and most state-of-the-art Steel Service Center. It opened its doors near Krefeld a few months back – a local event.

"Steel needs a concept," is how Detlef Schotten, Chairman of ThyssenKrupp Stahl-Service-Center GmbH, describes the new approach. And what he means by that, you can see behind him: a state-of-the-art building the size of five football pitches, part of the € 65 m invested in this new site. At first sight, it looks like a normal works: but look closer, and it's much more – a specialized service company creating new values for its customers.

"Our semi-finishing services will continue to be an important part of our core business," Schotten explains. "We make split strip and cut sections as input stock for a whole host of industries – services that are in demand all over Europe. Above all because we guarantee top quality." The Krefeld plant can semi-finish anything up to 600,000 t of these products and ship them out by road, rail and barge each year. "What is becoming increasingly important are sometimes highly specialized individual services based on them," he stresses. The company calls this commitment Premium Services, and it now manifests itself in many different ways.

"It starts with a customer with clearly defined requirements looking at their supply chain," explains Thomas Wölk, head of Business Development at the group of companies. "We take these requirements and offer answers, such as binding delivery dates, so we can supply materials just in time, even if production is fluctuating wildly, as our customers need them." In practice, this nearly always means savings, says Wölk: "Ideally, the customer can do without warehousing space, which they can then use for an extra production line, for example. But many customers simply benefit from being able to concentrate more on their core tasks. Tying up less capital is then one of the key words here."

When it comes to knowledge transfer, things gets even more exciting. ThyssenKrupp Steel Europe's technical customer advisors see innovation first – after all, they develop them in house. Then there's inter-industry expertise through a lively exchange between advising customers and the Steel Service Center.

"Many of our customers demand top quality. But who says we can't do even better? Making innovative steels and optimizing them for applications can cut costs, simplify production processes and make

ThyssenKrupp's Steel Service Center group is part of the ThyssenKrupp Group's Materials Services business area, which has 500 locations in 40 countries specializing in distribution, logistics and services in unmachined and finished materials, technical services and plant and steelworks services. As well as rolled and stainless steel, non-ferrous metals, special materials and plastics, Materials Services offers services ranging from semi-finishing and logistics through warehousing and stockholding, as well as supply chain and project management. The ThyssenKrupp Steel Service Center Group's biggest input supplier is ThyssenKrupp Steel Europe, with 1 m t p.a.

Wolfgang Wielpütz of TÜV NORD CERT (l.) presents ThyssenKrupp's Steel Service Center with the coveted environmental certificate. Pleased with the award are (from left to right) directors Wilhelm Budéus and Detlef Schotten and Dr. Gerd Gränzdörffer, in charge of quality and environmental management.

better products," is how Roger Hannig, technical customer advisor at ThyssenKrupp Steel Europe, describes how he works with customers, in this case the key account Steel Service Center. "You could say we're the app for all technical developments and new specific material solutions."

Talking with one another, understanding, creating trust – for Detlef Schotten, this is the real key to succeeding together. "We keep our ears close to the ground, not only to our input stock suppliers, ThyssenKrupp Steel Europe, but to the market too, and maintain an intensive dialog with our customers, many of whom we have had lasting partnerships with for years. Where there are opportunities, we'll be there. This is usually the start of a creative, productive process that ends with a solution tailored to the customer." Working with ThyssenKrupp Steel Europe even makes overall product developments under contract to customers possible: "For example, there's the truck cab of a leading manufacturer that the Group as a whole helped to develop," says Wölk. Which is where the concept idea comes in: thinking holistically, implementing specific customers' needs individually.

Trust needs sound foundations, which also includes reference customers, of course, like customers from the automotive components industry for which ThyssenKrupp's Steel Service Center group provides input stock and handles stockholding, based on a SAP solution the Steel Service Center developed itself. That means instead of having two departments dealing with material orders, the Steel Service Center bundles skills around the customer. Coordinating different production sites and works is also part of the portfolio, given also that the ThyssenKrupp Steel Service Center group has a pan-European network with branches and holdings not only in this country but also in France, Spain, Portugal and Poland.

Holistic thinking doesn't forget the environment either. Wilhelm Budéus, member of the management and responsible for the new location, is pleased with how successful the logistics strategy is: "Our Krefeld site has excellent transport links, and above all it is tri-modal: that is, it connects directly to road, rail and the Rhine. As well as the wide range of delivery options available, we can select the optimum mode of transport to use each time, which also helps protect the environment." Only just recently, the TÜV certified ThyssenKrupp Stahl-Service-Center GmbH to DIN EN ISO 14001 for environmental management: a great praise for the team at Krefeld and their colleagues at Radebeul and Mannheim, if you remember just one in a hundred German companies holds this environmental seal.

Wolfgang Kessler, freelance journalist

http://www.thyssenkrupp-stahl-service-center.com/en/

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Agenda

Deubau
10 – 14 January 2012, Essen
The international building industry show will be opening its doors in January 2012. ThyssenKrupp Steel Europe will be represented on a communal booth of the Steel Information Center in Hall 3, Booth 253, with exhibits by our Color/Construction business unit, presenting sophisticated building solutions in steel for building shells. On January the 11th, the Steel Information Center invites you to the 6th International Architecture Congress at the Exhibition Center's Congress Center. The event is entitled: New Building with Steel – Spans, Structures, Visions. Leading European architects will be presenting their projects and ideas of a sustainable architecture with steel. The Congress is organized jointly with the Architects' Association of North Rhine-Westphalia.

R+T
28 February – 3 March 2012, Stuttgart
R+T is the world's leading show for roller shutters, gates and sun blinds, and is held every three years, with more than 100,000 m^2 and around 800 exhibitors from home and abroad presenting their products, trends, innovations and services.
ThyssenKrupp Steel Europe will be there with our Color/Construction business unit in Hall 4, Booth 4B51, showing high-grade finished products and components for garages and industrial gates.

Tube
26 – 30 March 2012, Düsseldorf
Tube – The world's leading show for the tube industry, where international professionals, specialists, innovators and market leaders in the industry can find out about the current state of the art and future trends in plant and machinery for making and working tubes and tube accessories and the tube trade. ThyssenKrupp Steel Europe and other group companies will be appearing on the communal ThyssenKrupp Materials International booth in Hall 3, Booth C28.

European Seafood Exposition
24-26 April 2012, Brussels, Belgium
The European Seafood Exposition in Brussels, Belgium will be opening its doors from April 24-26, with 2000 exhibitors from 22 countries showing visitors the latest processing and packing systems and seafood-related services. Isocab N.V. will be showing applications and technologies for cool and cold stores at the show.

Hanover Exhibition
23 – 27 April 2012, Hanover
With eight leading international shows, the Hanover Exhibition 2012 will be bundling the key technologies in the industry, creating across-the-board horizons that are unparalleled anywhere in the world. The show's strategy of being the platform to bring together all the industries and technologies involved is clear: nowhere else are all areas of industrial wealth creation presented as comprehensively and in as integrated a way as they are here. The main industries will be showing their strengths and using interdisciplinary knowledge transfer to build bridges between related technologies. ThyssenKrupp Steel Europe will be appearing in the "Lightweight construction theme park" in the "Solutions Area" in Hall 6. Under the umbrella of the Steel Information Center, the Duisburg company will be presenting innovative lightweight construction solutions in steel. The exhibition will be accompanied by daily specialist forums on selected topics in lightweight metal construction.

Achema 2012
18 – 22 June 2012, Frankfurt am Main
The 29th Achema international exhibition and congress will be held in Frankfurt am Main in June, with around 4,000 exhibitors. Achema is the world forum for the process industry and the leading technology summit for chemical technology, environmental protection and biotechnology. Nowhere else provides such an overview of comprehensive solutions to problems in all areas of process technology of such breadth, depth and actuality. Isocab N.V. will be there. The company makes products for clean room applications, and will be presenting products for clean room applications and steel solutions for use in hygienic areas.

CWIEME Coilwinding
26 – 28 June 2012, Berlin
CWIEME is the international exhibition and conference show for coil design, insulation and electrical production. More than 500 exhibitors from around 40 countries will be showing electrical equipment, insulation and materials for coil winding and the latest equipment, products and services. For the tenth time, ThyssenKrupp Electrical Steel will be presenting its PowerCore® brand innovations in grain-oriented and non-grain-oriented electric strips to the international professional visitors at Hall 2.2, Booth 3323. ThyssenKrupp Magnetic systems will also be on the booth.

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Echo

German steel industry expects modest growth
"Despite the rather dismal economic prospects recently, the German steel industry remains optimistic (…) The world steel industry believes it will continue to grow in 2012, it estimates at 5.4%, so world steel production could soar to a new record of 1,603 bn t."
VDI news, 21.10.2011

German business leader in World Steel Association
"Hans Jürgen Kerkhoff is taking over as chair of the World Steel Association's Executive Committee for two years. The President of the Steel Association and Chairman of the Steel Institute VDEh (…) is the first German to head the Executive Committee, which is seen as one of the most important executive bodies of Worldsteel."
Die Welt, 21.10.2011

Kita celebrations at ThyssenKrupp Quarter
"Miniapolis will provide space for up to 105 children from four months until they start school. (…) The aim is to get children interested in science and technology from an early age, without neglecting other areas of education – this is particularly important to ThyssenKrupp as an industrial group"
WAZ Essen, 19.10.2011