

Flat Carbon Europe



ArcelorMittal

# update

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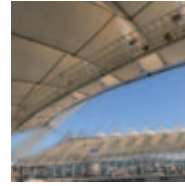
## 04 A new world, a new approach



'We cannot assume that everything will soon be as it was before the financial and economic crisis,' warns Kris Notebaert, Supply Chain Manager

of ArcelorMittal Flat Carbon Europe. 'We are in a different world now; the rules of the game have changed and the old formulas no longer work.'

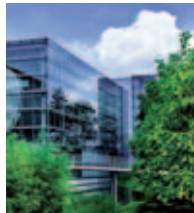
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'If sports stadiums are the cathedrals of this age, then steel has contributed much to that sensation. The sheer enormity of this project and its success

as a symbol of Africa will boost the image of South African skill and expertise for generations to come.' Discover the most impressive football stadiums for the World Cup 2010 South Africa.

## 08 Steel for green building solutions



It has been calculated that by 2050, energy savings in construction could easily have a greater impact on global CO<sub>2</sub> emissions than the combined environmental efforts

of the entire transport sector. As a major supplier, ArcelorMittal is determined to play a key role in the 'green revolution' of the building industry.

## 18 FutureSteelVehicle



In the search for affordable, safe and alternatively powered vehicles, WorldAutoSteel, the automotive group of the World Steel

Association, has launched a three phase vehicle development project, known as the FutureSteelVehicle programme. At the present stage of the FutureSteelVehicle programme, it has become clear that steel continues to be the material of choice for manufacturing lightweight, safe and environmentally friendly vehicles.

### Cover

Borit sandwich panels: Tailored Blanks tapping into new industries (Jeroen Op de Beeck)

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## The crucial factor

Forgive me if I start on a personal note this time but this is the last edition of *Update* that will be published under my responsibility. After a full and rewarding career in this fascinating industry, it is time for me to take my leave. And it gives me great satisfaction to note that this edition of *Update* reflects very clearly what it is all about at ArcelorMittal, and always will be: you, our clients. You are the crucial factor that everything hinges on in our company.

These are not just empty words. Take a look at the interview with Kris Notebaert in this number. As Supply Chain Manager of ArcelorMittal Flat Carbon Europe, he makes a sharp analysis of our company's performance over the past months of the economic crisis. The essence of his analysis is that ArcelorMittal has been focusing more than ever on its clients, so as to join forces with them to overcome the effects of the financial and economic crisis. *Update* staff who have been with us since the early days will confirm that this is yet another candid interview showing how we are constantly working to improve the service we offer.

The article on steel for enamelling for the construction industry and the piece about coatings for the hi-fi industry also testify to our focus on the client, as does the article on boron steels and other high strength steels for the manufacture of machines for agriculture and other sectors.

The same goes for the articles on our Innovation Days, the new Tailor Welded Blanks applications, the Global Product Portfolio and the 'FutureSteelVehicle'. The client's interests always come first.

*Update* has been well-placed to observe the consolidation movement that has swept through the steel industry over the last few years. And there will undoubtedly be more fundamental changes to come as well. I cannot see into the future but I do know that ArcelorMittal Flat Carbon Europe is ready for it. The editorial team at *Update* will be here to report to you in detail on all new developments as they arise. After all, you are the crucial factor in everything this company undertakes.

I hope you enjoy reading this issue of *Update* and all those to come.

Cecile Van den Hof

*P.S. You have probably noticed that this Update was not delivered in the usual paper envelope but wrapped in plastic. Plastic – not very environmentally friendly, you might think? Don't worry, we opted for a biodegradable compostable foil. Dump it in water and it will dissolve completely in just half a day. Simple and good for the environment.*

# A new world, a new approach

## ArcelorMittal focuses more than ever on the client

The pressure on businesses is easing slightly and the economy appears to be picking up. This has had a noticeable effect on ArcelorMittal Flat Carbon Europe (FCE). Demand for steel is rising fast and a number of blast furnaces are being started up again after a 12-month shut-down. 'But we cannot assume that everything will soon be as it was before the financial and economic crisis,' warns Kris Notebaert, Supply Chain Manager of ArcelorMittal FCE. 'We are in a different world now; the rules of the game have changed and the old formulas no longer work.'

**Demand for steel was slack in the second half of 2009 and it did not get much better in the first quarter of 2010. Hardly a comfortable situation for a Supply Chain Manager?**

**Kris Notebaert.** No indeed. It was due to the economic crisis of course, but that's not the whole story. The crisis was deep and far-reaching and it hit the Supply Chain particularly badly. Before the crisis, we supplied an average of 7 to 7.5 million tonnes of steel per quarter. From August 2008 onwards, demand dropped by about 200 000 tonnes every week until 15 weeks later, we were selling just 4 million tonnes of steel per quarter.

**That represents a shortfall of 12 million tonnes in one year. A blast furnace produces about half a million tonnes of steel per quarter, so in those three months, demand dropped by an amount equal to the total output of 6 blast furnaces.**

**Kris Notebaert.** Exactly. The economic crisis forced us to shut down 14 of our 25 blast furnaces in Europe, which is a big step with far-reaching consequences. What we call the warm phase of production covers all the phases from melting the ore and casting the steel up to and including hot rolling. These are all slow processes that are not very flexible. The crisis also forced us to drastically reduce our stocks of iron ore, semi-finished and finished products. Together with falling demand, this meant that production lines were operating at less than 50% of capacity. Naturally, our clients

also started to deplete their stocks, and together with the slump in consumption, this explains why demand dropped so dramatically. It also aggravated the impact of the crisis on our supply chain because it meant that the volume of steel we were asked to supply was even less than what the market actually required. While stocks were still being run down, we did not need to produce much extra.

**That can't be good for customer service.**

**Kris Notebaert.** No. During the crisis, we spread our production over a smaller number of mills. Consequently, clients were suddenly supplied from mills where they had no contacts and sometimes even where people spoke a language they did not understand.

And while the economy in Europe and the US shrank, the new economies in the East continued to grow. Raw materials suppliers therefore began to focus more on China than on Europe and a steady stream of better quality raw materials is now going to China. We in Europe have been obliged to adjust our raw materials mix accordingly, which has had a further destabilising effect. The lower quality meant that a further 8 to 10% of our production capacity is lost.

**But then came the upturn...**

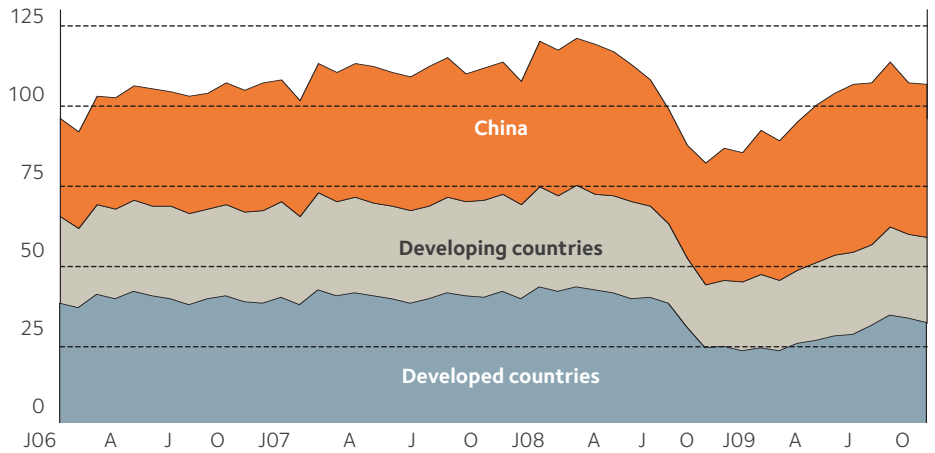
**Kris Notebaert.** In 2009 we had 12 and later 13 blast furnaces in operation. In the third quarter the market rallied and it is now picking up fast, almost as fast as it



slumped in 2008. Demand is growing by some 150 000 tonnes per month. And again, we are confronted with the lack of flexibility in the warm phase of production. For example, it takes three to eight weeks to start up a blast furnace. But we learned a lot during the crisis. We worked on our forecasting and our technical teams managed to make our blast furnaces operate more flexibly. Before the crisis we drew up monthly forecasts but now we do that on a weekly basis and per market segment, based on input from clients and various economic indicators.

## Impact on steel production

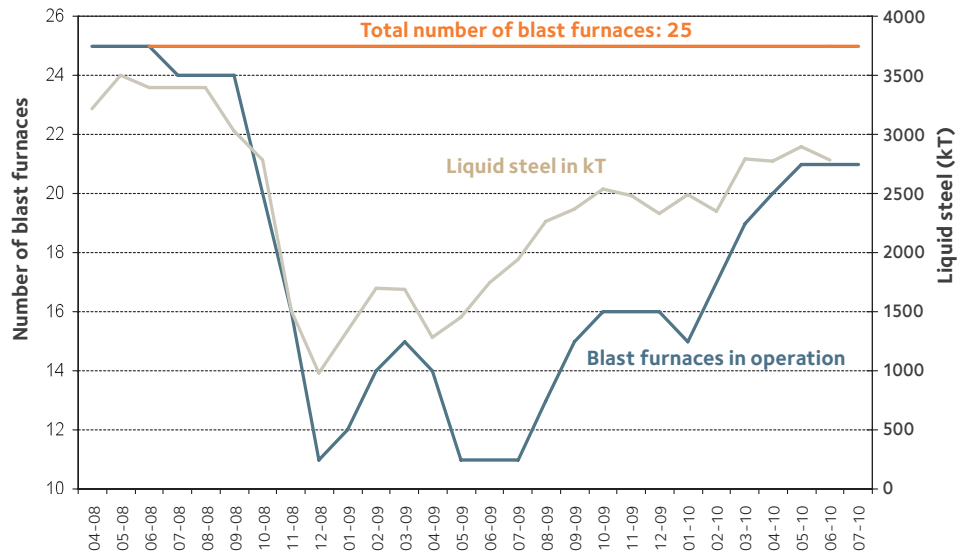
Global monthly steel production (million tonnes)



We have woken up in a new world where our focus will be what makes the difference.

China's steel production is up 28% compared with December 2008, whereas global steel production without China is still 27% lower than the peak level.

## Restarting FCE's blast furnaces in line with market demand

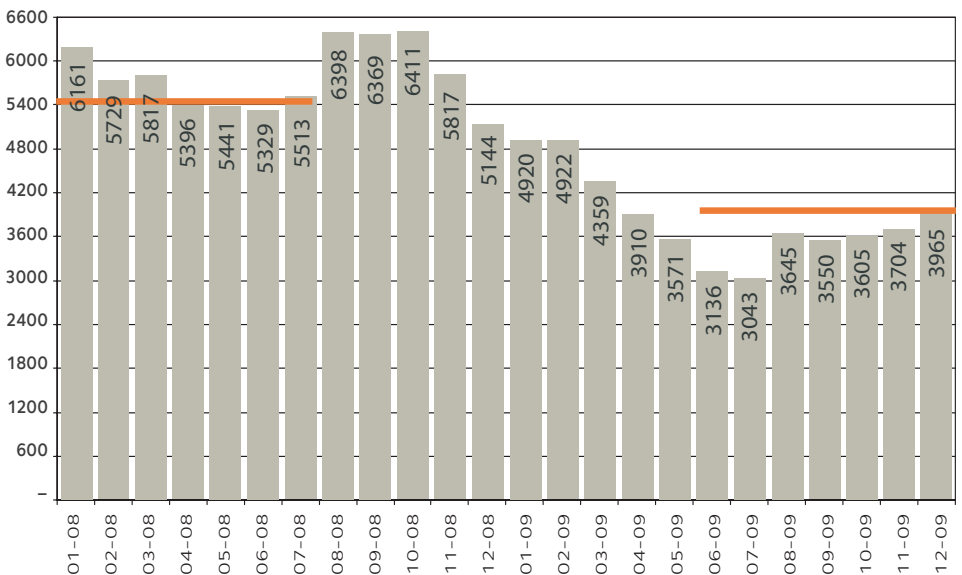


### Can you keep up with demand?

**Kris Notebaert.** We have no choice. We can't let our clients down and we have to keep pace with their requirements if we are to maintain our market share. But it is impossible to predict whether demand will continue to rise, and our clients do not know either. The crisis is not over yet. Our answer is to take a more pragmatic, differentiated approach. Depending on specific circumstances, we adapt our order management to the client's requirements. And at the same time, we are making more active use of SteelUser, our e-business platform. Before the crisis, we offered one streamlined service model. Today, we listen very carefully to signals from the market and offer different service models that match the specific needs and wishes of individual clients and segments more closely. We have woken up in a new world where our focus will be what makes the difference. Here in the Supply Chain we use 'FoCus' as an acronym for 'For the Customer'.

## Low stock levels

Metals (in MT)



FCE's stock of semi-products and finished products for metal inventories was structurally down 35% between January 2008 and December 2009.



# Automotive Innovation Days

## Strengthening the partnerships between carmakers and ArcelorMittal

**If the mountain won't come to us, we must go to the mountain. This was the logic behind the decision to stage Innovation Days on location at our automotive customers. The economic crisis forced us to cancel the biennial Automotive Symposium in Cannes that was to be held in the first half of 2009. As it turns out, the impact of the alternative solution actually beats the original.**

### The real stars

The automotive Innovation Days are a tailor-made conference and/or exhibition presenting steel parts, posters and movies. Visitors can just walk in and out at their leisure, without travelling as the event takes place just a few steps away from their daily workplace. The objective is to give our automotive customers an update on the latest steel innovations. The real stars are the most innovative products and solutions.

The advantage of holding separate Innovation Days for each customer is that the content of the events can really be tailored to the needs, challenges and priorities of each customer. People from our customers' various departments, including purchasing departments, get the opportunity to interact with and challenge ArcelorMittal's steel experts – design and technical specialists – as well as people from our customers' purchasing departments. These Innovation Days prove they can really drive our automotive business development, shifting even the most mature partnerships into a higher gear.



Our steels drive automotive solutions around the world



People from various departments get the opportunity to interact with and challenge ArcelorMittal's steel experts.

'Sometimes the most animated debates took place around the posters presenting our ideas for lightweight design! It proves that even though we are not car designers, we are expected to be a "solution provider" as well as a supplier of materials.'

Jean-Luc Thirion,  
responsible for the Automotive global R&D portfolio

Successful Innovation Days have already been held recently in the USA, South Korea, France and Italy. Subsequent events with other carmakers, for example in Germany, will be scheduled as from October 2010. We asked Jean-Luc Thirion, who is responsible for the Automotive global R&D portfolio, to share his impressions.

#### What impressed you the most during these Innovation Days?

**Jean-Luc Thirion.** The most visible evidence of the success of these events was the large attendance at each of the events, peaking at over 700 people at Hyundai-Kia in South Korea. Furthermore, the participation of VIP delegations taking time to visit the exhibition and ask questions has also been a positive sign of our customers' interest in ArcelorMittal's innovative ideas and solutions. Last but not least, we have achieved our goal of meeting people we don't normally come into contact with.

#### What was on the agenda?

**Jean-Luc Thirion.** Numerous in-depth discussions between experts took place so that people could fully understand the products and design solutions that were

presented. The principal topic of interest was of course lightweight solutions, since carmakers experience huge pressure for the reduction of CO<sub>2</sub> emissions. In this respect, we observed once again that ArcelorMittal is undoubtedly considered to be the global leader in hot stamping technology. We have recently extended our offer with new coatings, new levels of mechanical properties, and tailored blanks solutions, and it is clear that hot stamping will be playing an increasingly important role in the future.

Furthermore, our conventional offer of Advanced High Strength Steels (AHSS), with the success of 1000 MPa and 1200 MPa grades and also the Dual Phase grades for closures, attracted a lot of interest. Sometimes the most animated debates took place around the posters presenting our ideas for lightweight design! It proves that even though we are not car designers, we are expected to be a 'solution provider' as well as a supplier of materials.

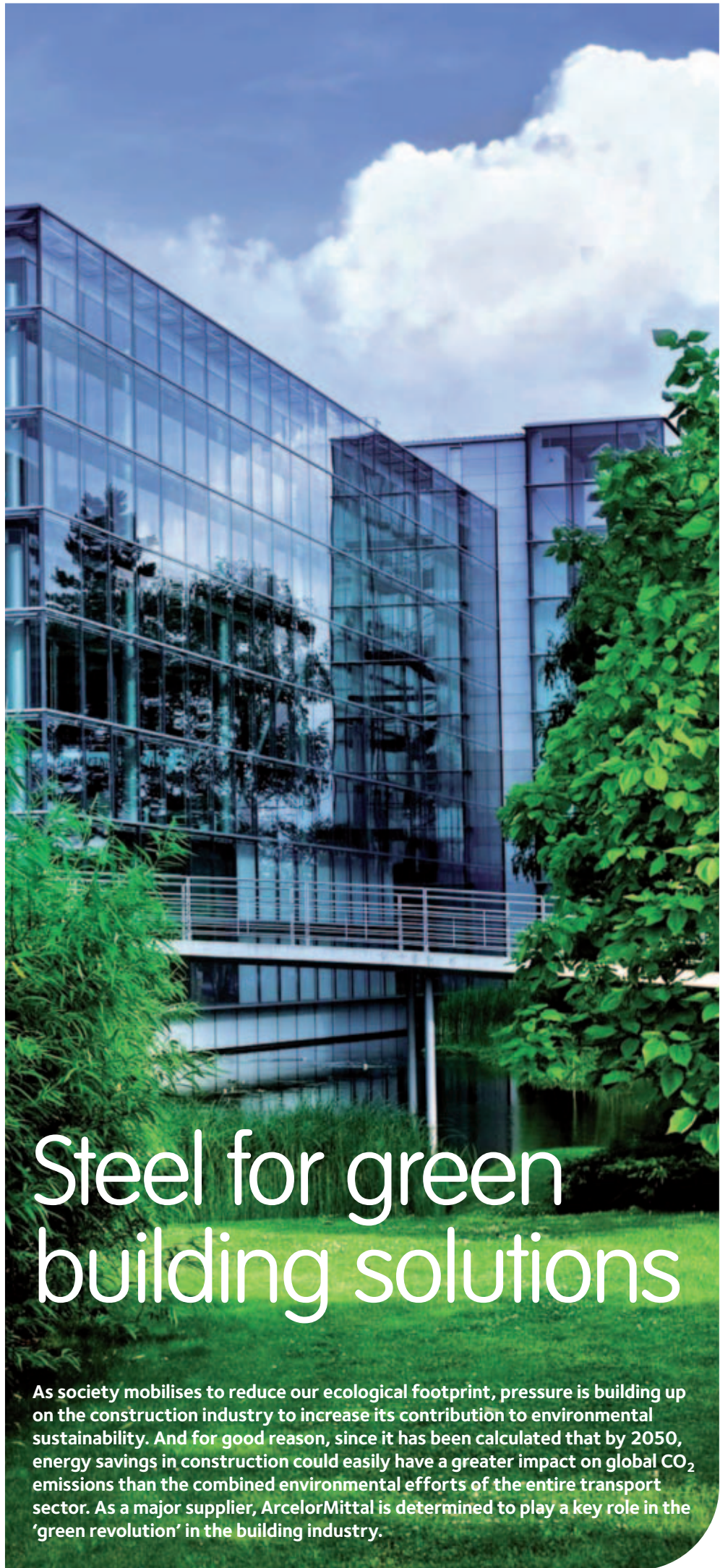
#### What about future developments?

**Jean-Luc Thirion.** During the Innovation Days, we had the opportunity to present some brief key points of our breakthrough

programmes – without disclosing technical know-how of course. The boldness of some objectives was really welcomed by the car makers: reducing density, improving stiffness, improving service properties and increasing strength up to 2000 MPa.

#### How would you summarise the benefits the Innovation Days bring?

**Jean-Luc Thirion.** We have received confirmation that the technical objectives we defined are perfectly in line with market requirements. Our customers appreciate our surprisingly innovative ideas. We should therefore continue our efforts to market differentiating products. The follow-up will now be organised by the customer teams, so as to pursue the topics that were covered during these fruitful events.



# Steel for green building solutions

As society mobilises to reduce our ecological footprint, pressure is building up on the construction industry to increase its contribution to environmental sustainability. And for good reason, since it has been calculated that by 2050, energy savings in construction could easily have a greater impact on global CO<sub>2</sub> emissions than the combined environmental efforts of the entire transport sector. As a major supplier, ArcelorMittal is determined to play a key role in the 'green revolution' in the building industry.

Over the years, ArcelorMittal has continued to reduce the ecological impact of its steel manufacturing processes by drastically restricting waste generation, water use, greenhouse gas emissions and energy use. For example, ArcelorMittal has dropped its CO<sub>2</sub> emissions by more than 20% since 1990. As described in the article about the ULCOS programme in the November 2009 issue of *Update*, ArcelorMittal is making a substantial contribution to the development of breakthrough technologies designed to reduce CO<sub>2</sub> emissions from steelmaking by 30-70% by 2050.

The use of prefabricated steel elements also speeds up construction while reducing the risks of accidents, pollution and neighbourhood nuisance on the construction site. Thanks to steel's high strength-to-weight ratio, steel construction requires less material than traditional building technologies and contributes to reducing a building's environmental impact, directly or through secondary savings (e.g. less foundations).

Last but not least, steel can make buildings more energy efficient, less costly and more comfortable. Hence, ArcelorMittal has very little doubt that steel has a key role to play in today's move towards zero energy buildings.

## Focusing on the use phase of buildings

The amount of energy required for lighting, heating and air conditioning a building over time far exceeds the energy used to build it. That is why ArcelorMittal is now concentrating on new technical solutions for reducing energy use over a building's lifetime.

A high proportion of energy use is devoted to heat control, by artificially heating or cooling the building. The combination of a steel structure with insulation drastically



reduces energy losses. Combined with double skin systems and/or sandwich panels with pre-painted technology, it is possible to create a thermally efficient envelope, meeting the strictest energy standards. In addition, the outstanding airtightness of steel cladding and roofing systems eliminates air leakage that contributes to energy waste.

### Reflecting the sun

One of ArcelorMittal's more recent developments aimed at improving the energy efficiency of buildings is the introduction of a large range of colours and finishes in the form of organic, metallic or even reflective coatings suited to all climate models. The most recent addition to ArcelorMittal's product offer is Granite® Comfort, a new type of organic coated steel sheet that greatly improves the thermal comfort in buildings. Used as a roofing and cladding material, it reflects considerably more sunlight and absorbs less heat than most competing materials. With Granite® Comfort the roof and façade stay relatively cool and the amount of heat transferred to the structure beneath is greatly reduced. The use of Granite® will help keep the inside temperature of a building 5 to 10°C cooler on sunny days, without resorting to the use of an air conditioning system.

Inversely, the thermal performance properties of Granite® Comfort allow the thickness of the foam layer in the underlying insulating sandwich panels to be reduced by 1 cm while maintaining constant insulating efficiency and comfort for the inhabitants. Consequently, the use of Granite® Comfort roofing material also leads to lower heating costs and decreased CO<sub>2</sub> emissions.

Depending on various parameters, including the purpose, the location and the design of

the building, the use of Granite® Comfort can contribute to savings of up to 15% on the total energy bill.

### Longer and healthier lives for buildings

ArcelorMittal supplies many types and grades of steel which are ideally suited for making buildings more energy efficient. Sun breakers with automatically adjustable steel blades effectively reduce the solar heat entering a building. Steel can also be used for making green roof systems, which prolong roof membrane life and provide better acoustic and thermal insulation. In addition, ArcelorMittal has developed a complete range of products capable of producing energy, such as solar absorbers for hot water production or photovoltaic cell systems for electricity generation.

Finally, steel makes it much easier to adapt buildings to new and innovative uses. A steel building characterised by the absence of load bearing walls is intrinsically more versatile and flexible than other types of structure. With its prefabricated, lightweight and fast-to-erect components, steel construction means buildings can easily be updated to new construction standards. Steel gives buildings a longer, healthier life. In other words: it helps the construction industry to pursue sustainability.

## Good to know...

The environmental advantages of steel as a building material are well documented and widely recognised. Steel is 100% recyclable, indefinitely and without quality loss. Typically, 98% of steel beams and 65% to 70% of reinforcement bars used in construction are recovered and reused.



## The social and environmental footprint of the building industry

Today, the building industry provides 5% to 10% of employment worldwide and generates 5% to 15% of the global Gross Domestic Product. It also accounts for 40% of energy consumption, 40% of CO<sub>2</sub> emissions, 30% of the consumption of natural resources, 30% of waste generation and 20% of water consumption. From this we may safely conclude that the social and environmental aspects of the construction industry are equally important. In recent years the ArcelorMittal product and service offer for clients in construction has evolved to provide more and more environmentally friendly solutions to meet the needs of today's and future generations. More generally, ArcelorMittal is committed to the United Nations Global Compact 'Caring for Climate' declaration.

# Further extending the global

The automotive market has globalised at a rapid pace. As a result, all major carmakers who sell their car models in various markets throughout the world need to have very similar steel grades at their disposal in all their production plants, irrespective of where they are located. Fulfilling this need is a key objective of ArcelorMittal's strategy for the automotive market and issuing an update of the online Global Product Catalogue is a new step towards achieving that objective.



Global vehicle production has more than doubled since 1975, from 33 to nearly 68 million in 2008. In 1975 seven countries accounted for about 80% of world production; eleven countries accounted for the same share in 2005.

'In this context, ArcelorMittal has put in place a global organisation to serve automotive manufacturers, sub-contractors and equipment suppliers all over the world,' says Jean-Luc Thirion, who is responsible for the Automotive global R&D portfolio.

## What's in it for carmakers?

The new 'global catalogue of ArcelorMittal's automotive product offer' will be issued in June 2010. It is drawn up by a specialist team headed by US-based Debanshu Bhattacharya and Europe-based Dominique Cornette, both from the global R&D organisation. They work in close and constant collaboration with representatives of the production plants on the four continents where ArcelorMittal operates.

What information does the new catalogue provide? Jean-Luc Thirion: 'First of all, the catalogue is a complete survey of the comprehensive ArcelorMittal product range, comprising everything from mild steels for deep drawing to Advanced High Strength Steels. It demonstrates the worldwide availability of a large number of widely used products. The global catalogue is also an overview of the ongoing projects aimed at further increasing the worldwide availability of ArcelorMittal's product offer.'

# automotive product range

According to Jean-Luc Thirion, the new catalogue was specially designed for the engineers who design new vehicles and organise their subsequent production. 'Most new cars are designed in one place and produced and sold in several other places. This catalogue makes it easier to decide where, how, and with which materials new cars must be built. It was never meant to replace the face-to-face contacts between carmakers and their ArcelorMittal partner, quite on the contrary. The catalogue provides guidance for the technical discussions between the carmaker's engineers and ArcelorMittal's resident engineer and global technical co-ordinator.'

## Cloning steel

ArcelorMittal is strongly committed to further extending its global offer. 'One way of increasing the global availability of a steel grade is by cloning it,' Jean-Luc Thirion explains. 'This involves close collaboration between R&D teams in different countries and on different continents to transfer chemical recipes and production processes from one steel mill to several others.'

A recent and successful example of this 'steel cloning process' is what has been achieved with Usibor® 1500P steel. This

high strength steel grade plays a key role in the weight reduction of many new bodies-in-white and has long been produced exclusively in Europe. In 2009 Usibor® 1500P was finally 'cloned' in Indiana Harbor (USA) for the North American market.

'Extending the global availability can also be achieved by developing new products on different continents simultaneously,' Jean-Luc Thirion continues. 'The great advantage of thinking and working globally from the very beginning of the product development process is that it enables us to take into account the particularities of each and every mill where the new product will be manufactured. New product development projects are therefore led by global R&D and operations teams on different continents.'

## Looking beyond the new catalogue

ArcelorMittal offers undisputed assets: a worldwide presence in emerging and developed markets, an efficient and optimised supply chain network (steel service centres and stampers), leading R&D centres proposing up to date steel solutions and a comprehensive product offer which includes tailor welded blanks and tubular products.

'And it is our ambition to make all of these assets available to more customers all over the world,' Jean-Luc Thirion concludes. 'That is why we are already looking beyond this new global product catalogue. Even as we speak, we are preparing the autumn issue of our catalogue. In the years to come, we will be publishing more issues and updates per year. And with the support of all the ArcelorMittal production plants, our customer teams are working out a system of tailor-made proposals for global vehicle projects. Our automotive customers have a lot to look forward to.'

To view the updated catalogue, see: [www.arcelormittal.com/automotive/](http://www.arcelormittal.com/automotive/) > Introduction > Worldwide product availability

Grade	Coating											
	Uncoated				Extragal®				Galvannealed			
■ HSLA 320	■ EUR	■ NAM	■ SAM	■ RSA	■ EUR	■ NAM					■ NAM	
■ HSLA 360	■ EUR	■ NAM	■ SAM	■ RSA	■ EUR	■ NAM					■ NAM	
■ HSLA 420	■ EUR	■ NAM	■ SAM	■ RSA		■ NAM					■ NAM	
■ HSLA 460	■ EUR	■ NAM	■ SAM	■ RSA	■ EUR							
■ HSLA 500	■ EUR	■ NAM	■ SAM	■ RSA								
■ HSLA 550	■ EUR	■ NAM										

■ Available in non-visible part quality ■ Undergoing customer testing ■ Under development ■ Available in visible and non-visible part quality (Z)  
 EUR: Europe Region – NAM: North America Region – SAM: South America Region – RSA: South Africa Region  
 ■ Hot rolled substrate ■ Cold rolled substrate

Usibor® 1500P steel, a high strength steel grade that plays a key role in the weight reduction of many new bodies-in-white, has long been produced exclusively in Europe. But since it was 'cloned' in 2009, it has also been available on the North American market.



# High-performance coatings for the hi-fi market

## ArcelorMittal introduces Estetic® High Tech & Estetic® Conductive

**Until recently, manufacturers of brown goods tended to favour plastics for the housing of hi-fi equipment. But today, steel is again the preferred material of the world's leading manufacturers for the production of casings and other critical components. There are several sound technical reasons for doing so and two of them are Estetic® High Tech and Estetic® Conductive. Both are organic coatings recently developed by ArcelorMittal.**

'In the last decade, television sets have become ever thinner while screens have become larger and larger. Steel has intrinsic advantages over plastic for new LED and LCD television set designs with very thin screens because of its high rigidity and formability. LED and LCD build up static electricity while they are playing,' says Bernard Bausier, key account manager at ArcelorMittal Steel Coat Europe in Alleur, Belgium. 'If the static electricity is not dissipated, it gradually accumulates and people touching the television set may experience an electrical shock caused by a sudden discharge, which is unpleasant, but not harmful. What is more, the accumulation of static electricity may cause irreparable damage to certain electronic components and other elements like semi-conductors. But these problems can easily be solved by the use of steel coated with Estetic® High Tech and Estetic® Conductive paints. In addition, customers also value steel's recyclability – a clear advantage over plastics – more and more.'

### Three layers of advantages

The development of the Estetic® High Tech range was actually triggered by an enquiry from Samsung about the supply of blanks for the back panel of its television sets. Like all other Asian manufacturers of hi-fi equipment, Samsung had until then relied exclusively on Korean and Japanese steel suppliers for the casing material of its products. This was far from ideal, given the company's ambition to step up production in Europe. 'That is indeed what prompted us to develop a solution to the problem, confirms organic coated market manager Chantal Bretton.

Performance requirements were stringent. ArcelorMittal was to supply blanks that are highly conductive on the backing coat (1 mΩ maximum) and would be suitable for severe deep drawing. The outside layer of paint has to meet the tightest colour



Today, steel is again the preferred material of the world's leading manufacturers for the production of casings and other critical components.

specifications and because of the deep drawing, elasticity and adhesion have to be extremely high. In addition, the painted surface has to be exceptionally scratch resistant. 'These are demands that are very hard to combine,' Bernard Bausier emphasises.

'We started with a DC06 steel grade, which is extremely drawable and has one of the lowest yield strengths in our entire product offer,' Chantal Bretton continues. 'This sheet was first electrogalvanised to make it fully corrosion resistant and to guarantee an ideal surface appearance. Then we applied a primer and the black Estetic® High Tech coating on the outside surface, while the inside surface only received the transparent Estetic® Conductive coating. The development of this organic coating technique took us about two years and we needed three consecutive trials to attain our final objective. All this time, we worked in close collaboration with our coating plant based in Ramet near Liège (Belgium) and our industrial paint supplier. The Estetic® High Tech and Conductive coatings were finally launched in September 2009.'

### Tough enough to take rough treatment

As explained, the recent evolution in TV design has led to the use of ever thinner steel gauges. 'Nevertheless our steel has to endure increasingly rough treatment,' Bernard Bausier says. 'The transformation of blanks into back panels involves very severe stamping and punching operations. In addition the back panels have to resist very aggressive chemicals, degreasers and cleaning fluids, such as methanol and ethanol, which can be very harmful to paints. We are proud to say that the Estetic® High Tech range can take a beating.'

Today, ArcelorMittal supplies its Estetic® High Tech and Conductive coated blanks to

several stamping works. 'In 2010 we expect to supply several thousands of tonnes of blanks,' Bernard Bausier says. 'In two to three years' time our deliveries may triple.'

### The human factor

The development of the new coatings took place in turbulent times. The financial and economic crisis forced ArcelorMittal to streamline its entire organisation but this had no adverse effect on the collaboration with Samsung and the other companies involved in the project.

Chantal Bretton: 'This was the most challenging development we have tackled over the past ten years. We knew that all our proposals would constantly be compared with those of our Korean and European competitors. However, from day one we established excellent working relationships with Samsung and all other partners. And thanks to these very good contacts between technicians, researchers and the marketing departments on both sides of the table, we made quick progress on this project. In fact, projects like these prove that ArcelorMittal is really keen and able to develop new high-performance solutions in close partnership with its customers.'



Chantal Bretton and Bernard Bausier showcase the high-performing back panel that was developed for Samsung's television sets.



More information about Estetic® High Tech and Estetic® Conductive is available on our website, see: [www.arcelormittal.com/fce](http://www.arcelormittal.com/fce) > Products & Services > Product document centre Industry > Estetic®

# Steel at the World Cup 2010 South Africa

## Transforming tomorrow's football stadiums



Cape Town Stadium

**The Southern African Institute of Steel Construction puts it this way: 'If sports stadiums are the cathedrals of this age, then steel has contributed much to that sensation. The sheer enormity of this project and its success as a symbol of Africa will boost the image of South African skill and expertise for generations to come.'**

More than 100 days away from the World Cup 2010, all the stadiums were completed and have been pronounced up to standard by FIFA, the international federation of football associations.

According to 2010 organising committee chief executive Danny Jordaan, all the stadiums were completed six months before kick-off and all the other infrastructure is in place. Without smooth delivery and quick processing of steel in these huge stadiums, this would not have been possible. As a result, most of the work to be done in the last months could focus on fine-tuning operations, beautification of the stadiums and upgrading infrastructure around the stadiums.

Steel also played a crucial role in bringing the architects' visions to life. An estimated 80 000 tonnes, much of it supplied by ArcelorMittal South Africa, have been used in the ten World Cup stadiums. The new stadiums are the most spectacular in the world and together they can seat almost 564 000 spectators.

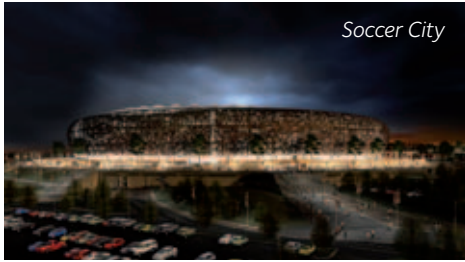
### The three most impressive stadiums

- **Cape Town Stadium** has been built on the edge of the city centre and behind the famous V&A Waterfront, only a few hundred metres away from the coastline. The stadium is the only one in the world with a glass ceiling. Enwrapped by a façade of woven fibreglass, coated with

Teflon, it looks like a rose-coloured bowl floating on a base, when lit up at night. The roof design and construction are unique, with a basic structure resembling a bicycle wheel, open in the middle. Some 72 cables linking the outer and inner rings of the circle were slowly tightened to raise the roof from ground level to its present height.

- The **Moses Mabhida Stadium** in Durban has a steel arch 105 m above the middle of the pitch and a cable car giving spectators a stunning view of the Indian Ocean. The stadium, named after a former political activist, takes its design inspiration from the South African flag, with its grand arch representing the

## South Africa's 2010 World Cup stadiums

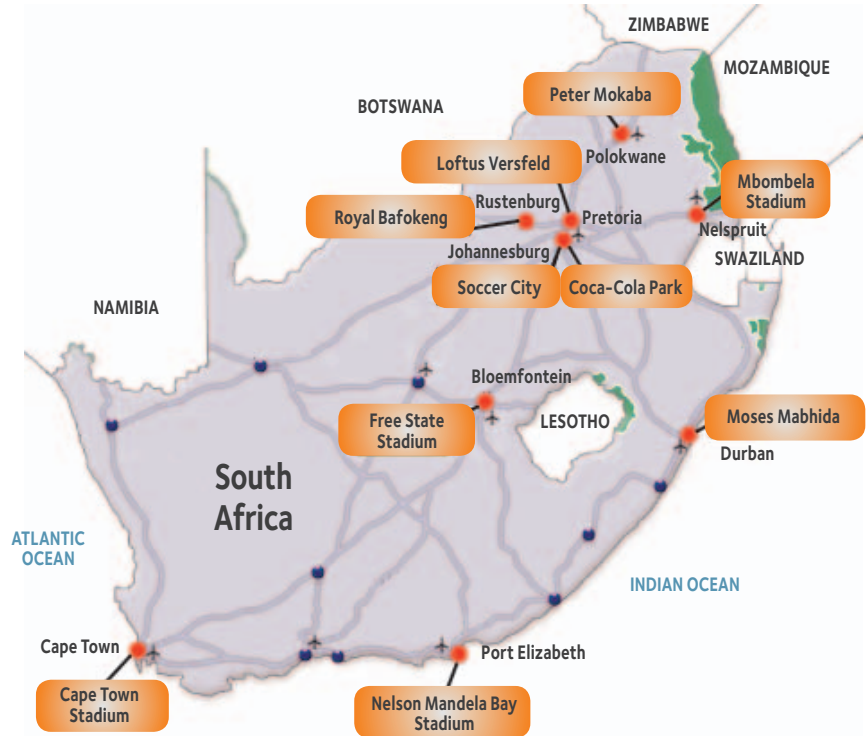


Soccer City

Stadium	Location	Capacity	Construction/upgrade cost	Completion date
Coca-Cola Park	Johannesburg	62 000	US\$ 67.5 million	June 2008
Free State Stadium	Bloemfontein	46 000	US\$ 41.2 million	February 2009
Cape Town Stadium	Cape Town	68 000	US\$ 600 million	December 2009
Loftus Versfeld	Pretoria	50 000	US\$ 12 million	January 2009
Mbombela Stadium	Nelspruit	43 500	US\$ 140 million	November 2009
Moses Mabhida	Durban	70 000	US\$ 450 million	November 2009
Nelson Mandela Bay Stadium	Port Elizabeth	48 000	US\$ 270 million	April 2009
Peter Mokaba	Polokwane	46 000	US\$ 150 million	November 2009
Royal Bafokeng	Rustenburg	42 000	US\$ 45 million	March 2009
Soccer City	Johannesburg	89 000	US\$ 440 million	October 2009

unity of this sport-loving nation. The two legs of the arch on the southern side of the stadium come together to form a single footing on the northern side, symbolising the new unity of a once-divided country.

- Soccer City**, situated just outside Soweto, Johannesburg, will host the opening game and the final. The stadium takes the form of a calabash, a traditional African drinking vessel. The outer skin area spans 43 000 m<sup>2</sup> and will be constructed from wholly natural energy-efficient material. It is the biggest stadium in Africa, seating almost 90 000 people.



Moses Mabhida





# Let enamelled steel brighten your day

**For many years enamelled steel has mostly been associated with cooking pots and pans, bathtubs and shower trays. There are indeed very few materials around that can rival enamelled steel for durability, cleanliness and hygiene. That may explain the relatively new interest of architects and property developers in this material for architectural façades, hygienic wall cladding, tunnel walling and interior decoration. And at ArcelorMittal we have no doubt that in the years to come, more and more colourful, glossy enamelled steel will be brightening up our everyday surroundings.**

The extraordinarily attractive characteristics of enamelled steel for the construction industry result from the properties of its two constituent elements: steel and enamel. Steel contributes mechanical strength and formability, while enamel provides durability and a beautiful glossy appearance. The production process entails applying one or more layers of enamel to the prepared surface of an appropriate grade of steel and then firing it at a temperature between 780°C and 850°C.

## Everlasting splendour

Tests conducted by the Porcelain Enamel Institute have shown that enamelled panels could go for thirty years without any signs of corrosion on the metal substrate. Rain, atmospheric pollution (sulphur dioxide, nitric oxide), salt-laden marine atmospheres, ultraviolet radiation and sudden changes in temperature will not lead to any changes in the appearance, colour or gloss of the enamelled surface.

Enamelled surfaces have no pores or cracks in which bacteria can collect and breed or dust may accumulate, making them easy to clean. And if defaced by graffiti, all commercially available solvents can safely be used for cleaning purposes.

Finally, enamelled steel surfaces are also extremely resistant to scratching, abrasion, impact and wear. And thanks to their vitreous nature, they have excellent temperature stability from -60°C to 500°C. Exposure to flames and other sources of heat will cause no damage. In addition, enamel will not give off any toxic fumes. The fire resistance of enamelled panels is classified as A1.

All the above features make enamelled steel panels a first-rate material for numerous applications in the construction industry. They can be used for cladding buildings and tunnels and for decorating



the interiors of public places, such as airports and train and metro stations.

### From a building perspective

Enamelled steel comes in an almost infinite range of colours, patterns and textures with a gloss, semi-matt or matt finish. Since only natural mineral pigments are used, the colours are not sensitive to UV and display considerable stability over time. These features make enamelled steel panels particularly suited for the production of signs and posters, and the reproduction of works of art and photographs.

The panels can be installed in any climate in the world since they are insensitive to outside temperature. Due to this excellent colour stability – which can be guaranteed for an extremely long period – enamelled panels can easily be replaced when a building is being renovated or extended without any noticeable difference in colour between the old and the new panels.

### Wilhelm Schmidlin AG: time to leave our comfort zone

Wilhelm Schmidlin AG, the Swiss manufacturer of steel bathtubs, shower trays, wash basins and bowls clearly shares ArcelorMittal's conviction that there is a bright future for enamelled steel in the building industry. 'In Switzerland we have several hundreds of kilometres of tunnels which all need to be lined with durable materials,' says Simone Stalder, marketing manager at Wilhelm Schmidlin AG. 'Enamelled steel is particularly suited for this, because its hard vitreous surface is graffiti resistant and easy and cheap to clean. It also ensures better illumination because it reflects more light, which means that less investment in lighting is required. And last but not least, it improves fire resistance.'

'Ever since it became possible to use enamelled steel panels for this application, Switzerland has been buying panels abroad,' she continues. 'We consulted

architects and property developers and soon discovered there is a lively interest in this building material among designers. Consequently, we decided it was time for us to leave our comfort zone and start making enamelled steel panels for the construction market. We first produced white boards, door claddings and panels for the new façade of our own laboratory and testing centre, but we will soon be supplying enamelled panels to several construction companies. I am sure this is opening new perspectives for our company.'

'Enamelling has been our speciality for many decades,' Simone Stalder of Wilhelm Schmidlin AG concludes. 'But producing perfectly flat enamelled steel panels requires different skills and techniques from those needed for manufacturing bathtubs. We find it very exciting to venture on this new business opportunity, but at the same time it is reassuring to know we can rely on the technical support of ArcelorMittal.'



### The advantages of computational simulation

ArcelorMittal has accumulated considerable know-how in the enamelling of different grades of steel. Temperature is a particularly critical factor. Over the years we have developed powerful computational tools to simulate the vitreous enamelling process.

Computer simulation techniques are especially useful for defining the right shape and thickness of panels (thickness reduction and size optimisation being vital to avoiding defects). They are equally useful for establishing the best method of hanging panels in the furnace and for determining the optimum enamel thicknesses, firing temperature and line speed.

*ArcelorMittal is the leading European manufacturer of steels for enamelling. Manufacturing this type of steel requires perfect mastery of every stage of the process. For more info about ArcelorMittal's complete range of steels for enamelling, see: [www.arcelormittal.com/fce](http://www.arcelormittal.com/fce) > Products & Services > Product document centre Industry > Steels for enamelling*

# FutureSteelVehicle

## Electrifying prospects for the automotive industry



**Dwindling oil reserves and global pressure to reduce CO<sub>2</sub> emissions are behind the urgent need for affordable, safe and alternatively powered vehicles. This has prompted WorldAutoSteel, the automotive group of the World Steel Association, to launch a three phase vehicle development project, known as the FutureSteelVehicle (FSV) programme. The first phase, which consisted mainly of an engineering study, was completed in November 2009. The second phase is now focusing on concept designs and is to be concluded in 2010. The third and last phase should be devoted to implementing the new technologies. At the present stage of the FutureSteelVehicle programme, it has become clear that steel continues to be the material of choice for manufacturing lightweight, safe and environmentally friendly vehicles.**

In the first phase, the FutureSteelVehicle technical team considered four options for vehicles that are likely to be launched between 2015 and 2020. The first option was an electric battery-powered car for four passengers. The second and third were plug-in hybrid electric vehicles for four and five passengers respectively. The last one was a fuel cell vehicle for five passengers. Each of these options was evaluated by the engineering team and powertrains were selected based on performance, production feasibility and cost.

### Set back by the economic crisis

'Early in the first phase of the FutureSteelVehicle programme it became clear that fuel cell technology was not really ripe yet,' Philippe Antoine says. He is head of the advanced engineering department for Automotive and one of ArcelorMittal's representatives in WorldAutoSteel. 'We won't see any fuel cell vehicles in our streets before 2020-2025, so we decided to focus our attention on battery electric and plug-in hybrid electric vehicles.'

Phase one examined different types of batteries as well as crash resistance criteria and various other technologies, such as the use of low friction tyres. 'The new powertrain systems that finally emerged from the study may radically change the structure of future vehicles,' Philippe

Antoine concludes. 'Consequently, phase one provides valuable input for the phase two design concepts we are now working on.'

But phase two didn't get off to a flying start. 'We set out to determine the new vehicles' architecture and had just begun defining the critical parts and manufacturing processes, when the financial crisis struck and several participants had to readjust or even slash their research budgets. As a result, we further narrowed our scope to the battery electric vehicle.'

### Ambitious weight reduction targets

In phase 2, which is due to be completed by the end of 2010, the FutureSteelVehicle team is developing detailed design concepts and a radically new body structure for the battery electric vehicle. In addition, it will also identify structural changes to accommodate the plug-in hybrid electric and fuel cell vehicles and powertrain variants.

The main challenge in phase 2 was to increase the range of the purely electric vehicle. 'The problem lay with the weight of the car and the powertrain,' Philippe Antoine explains. 'Today's small electric cars have an operating range of 150 to 160 kilometres. So we set out to find ways to decrease the weight of the body-in-white

and the electric powertrain without compromising safety. To achieve our ambitious weight reduction targets, we used engineering design optimisation and advanced steel technologies and managed to extend the range to 250 kilometres, even with five passengers on board.'

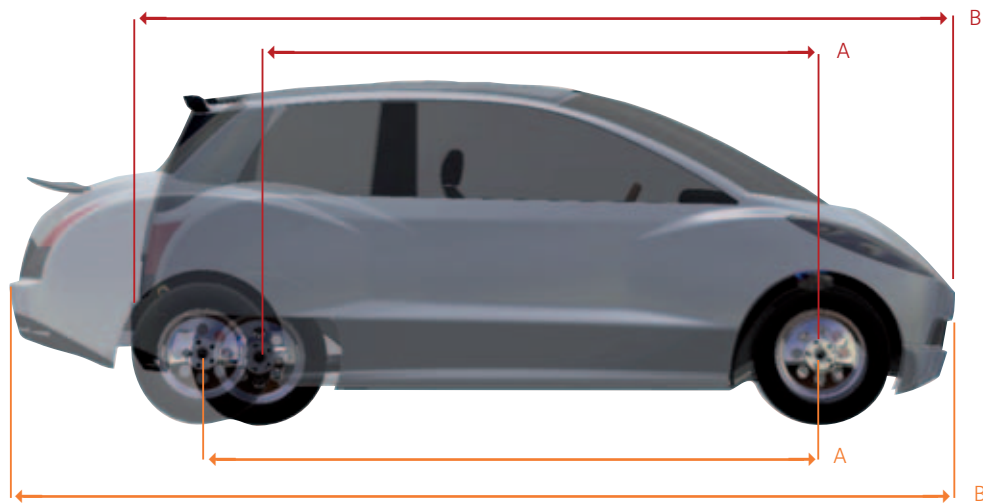
'Up till now, electrical components were often considered to be peripheral by car makers,' Philippe Antoine concludes. 'But that is about to change radically. At ArcelorMittal we have extensive experience with the use of steel in industrial electrical applications. I am referring here both to structural steels and electrical steels. So I trust we will soon be teaming up with a growing number of car makers to find innovative steel-based solutions to many technical challenges on the way towards the final breakthrough of electric cars.'

**FutureSteelVehicle will combine alternative powertrains and advanced high-strength steels to significantly reduce the carbon footprint of the vehicle life cycle.**

## Some initial styling proposals



FSV1 is a 4+ passenger vehicle with a 2524 mm (A) wheel base and 3700 mm (B) overall length.



FSV2 is a 5-passenger vehicle with a 2800 mm (A) wheel base and 4350 mm (B) overall length.



Two powertrain alternatives are being considered: a plug-in-hybrid electric vehicle and a battery electric vehicle.

## (Hybrid) electric vehicles come in various shapes and sizes

A **hybrid electric vehicle** combines an internal combustion engine with an electric powertrain, which helps achieve either better fuel economy or better performance. Modern hybrid electric vehicles have efficiency-improving technologies built into them, such as regenerative braking, which converts the vehicle's kinetic energy into battery-replenishing electric energy.

Many hybrid electric vehicles reduce emissions by shutting down the internal combustion engine when idling and restarting it when needed. This is known as a **start-stop system**. A hybrid electric vehicle produces lower emissions than a comparably-sized petrol or diesel car, as its internal combustion engine is usually smaller than the one found in conventional fossil-fuel vehicles.

A **plug-in hybrid electric vehicle** is a hybrid vehicle with batteries that can be recharged by connecting a plug to an external electric power source. It shares the characteristics of both hybrid electric vehicles, having an electric motor and an internal combustion engine, and of **battery electric vehicles**, since it also has a plug to connect to the electrical grid.



*The new boron steel grades are ideally suited for heavy applications such as agricultural discs.*

# Going from strength to strength

## New wear resistant steels for machinery and equipment

**Like all other businesses, ArcelorMittal Flat Carbon Europe (FCE) faces the challenge of meeting or even exceeding market expectations. That is why we confer with our customers every step of the way to ensure that their needs are met. Machinery and equipment manufacturers give us valuable information which we can then use to develop new steel grades.**

First, let's take a look at a practical application of wear resistant steel. We are on the farmlands of Henri Bertrandie in central France, where new agricultural discs, made by Forges de Niaux, are being tested. ArcelorMittal developed and supplied a special new grade of boron steel to give the discs a longer lifespan. Henri Bertrandie owns 250 hectares of grain fields, 50 hectares of which have very rocky and abrasive granitic soil. 'The lifespan of an agricultural disc is directly linked to the type of soil it is used in, but

today the speed of traction has become the essential factor in the longevity of a disc,' Henri Bertrandie explains. 'We use a harrow with 40 discs pulled by a 285 horsepower tractor. With the new discs, we have seen much less wear, although we work at speeds of 10 to 12 kilometres per hour. The old discs only allowed us to work at 7 or 8 kilometres per hour. In addition to the productivity gain which the new discs deliver, we noticed a significant drop in fuel consumption and a sharp rise in efficiency.'

After the large ploughing machine has come to a halt, Henri Bertrandie kneels down to inspect the discs. 'Well, we hit quite a few heavy stones,' he says, 'but everything seems intact.' Then, picking up two pieces of rock: 'These discs really have no difficulty in smashing up stones.'

### **Boron steel: excellent resistance to wear and breakage**

'This is a good example of what can be achieved with the new grades of boron



In addition to the productivity gain which the new discs deliver, we noticed a significant drop in fuel consumption and a sharp rise in efficiency.

steel we are now developing,' says Claudia Liedl of our Technical Client Team. 'For the Niaux 200 agricultural disc, we used a recently developed new grade of boron steel. Meanwhile, we have been developing several new grades of boron steel, which are to be supplied in coils: the 26MnB5, 27MnCrB5 and 33MnCrB5.'

In February 2010 ArcelorMittal produced the first casts of 26MnB5 boron steel for the automotive industry and soon this particular grade of steel will also be made available for machinery and equipment manufacturers. 'The other two grades are still undergoing a viability study, but there is a good chance that they will become available later in 2010,' Claudia Liedl continues. 'They will be ideally suited for agricultural discs. Boron grades are also used for cement mixer drums.'

'The obvious advantage of boron steel is its high tensile strength,' emphasises Patrick Pauwels, who is also a member of the Technical Client Team. 'And what's more, even in an unquenched state all our upcoming grades will show very good resistance to wear and breakage.'

#### UHSLA steels: wear resistance and weldability

After the market research that was conducted last year, ArcelorMittal also decided to launch new Ultra High Strength

Low Alloy steels (UHSLA), namely the S700MC grade in heavy gauges and the S960MC. The numbers embedded in the grade names refer to the yield strength, expressed in MPa. They are more readily weldable than boron steels by virtue of being a low alloy steel.

'The S700MC grade steel will be available in thicknesses of up to 12.7 mm, which makes it a viable alternative to quarto plates, often used for making trucks' and tippers' crossbeams and floor plates,' Patrick Pauwels comments. 'Its toughness will be fully guaranteed down to -40°C.'

'We are also looking at the possible launch of the S960MC grade,' adds Christophe Degand of the Global R&D Product development team. 'We ran production tests in March 2010 and the results were promising. This new grade is very wear resistant and ideal for the manufacture of mobile crane booms.'

#### Specialty wear resistant steels

Wear resistant Fora 450, Fora 400, Creusabro 4800 and Creusabro 8000 grades have always been in high demand for the manufacture of truck bodies. Traditionally, these products were always supplied as plates. Together with ArcelorMittal Industeel, ArcelorMittal FCE is now developing thinner gauges which can be supplied as coils.

'The development process is well advanced,' Christophe Degand affirms. 'Before 2012 we will be able to supply these products in a wide range of thicknesses. ArcelorMittal FCE has a comprehensive product offer ranging from basic hot rolled coils to various high strength steels, laser-welded sheets and prepainted materials. And we are now in the process of extending our offer with a new range of special and technical grades designed to meet our customers' constantly evolving needs.'

You can find more information about our range of boron steels in our online product catalogue – see [www.arcelormittal.com/fce](http://www.arcelormittal.com/fce) > Product catalogue for industry applications

# Breaking new ground with Laser Welded Blanks

## Tapping into new industries

**Laser Welded Blanks (LWB) have long proved their worth for the automotive industry. In just over a decade they have become indispensable tools in carmakers' quest for body-in-white weight reduction and crash resistance. At ArcelorMittal we are convinced that many more industries will embrace LWB technology once they have gained a better understanding of its great versatility and many advantages. ArcelorMittal Tailored Blanks division will therefore rolling out its technology to five new branches of industry.**

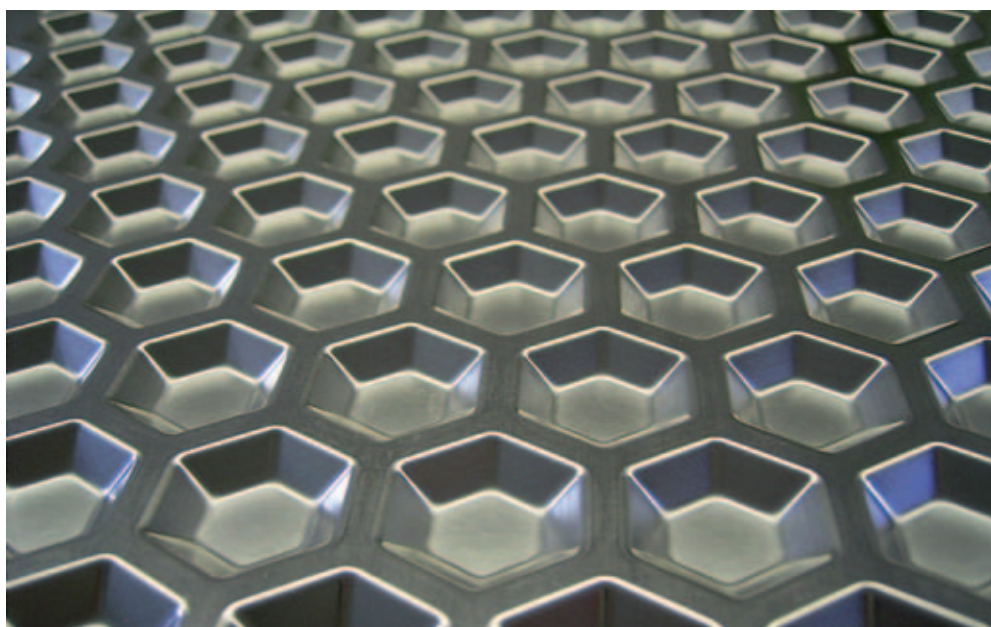
### Railway industry

Side panels for railway carriages do not require the same strength and stiffness over their entire surface. LWB technology enables railway equipment manufacturers to use different steel grades and thicknesses in different sections of these side panels. Local or larger reinforcements can be added by combining laser butt welding with laser stitch welding, (e.g. to strengthen window corners or add horizontal or vertical stiffeners for large panels).

Because we are dealing with large dimensions, distortion generated by heat

can be a significant issue in maintaining overall product integrity. Here too, laser technology can alleviate this problem, since it generates much less heat during the welding process. This eliminates re-working operations and can significantly reduce the complexity of the part and the need for reinforcements, which will yield weight and cost savings. Laser stitch welding also allows manufacturers to reduce the overall thickness of side panels due to the fact that heat input is much lower than with traditional welding methods. Lower heat input means there is less risk of distortion and less or no need for costly reworking of visible areas.

*An example of very stiff, lightweight structural panels where laser welding offers advantages is the Borit sandwich panel. These panels are interesting for a number of market segments: façades or separation walls in the construction sector, durable industrial packaging, transportation, air freight containers and, looking ahead, shipbuilding applications. Borit nv is a spin-off company from Ocas nv and Borit Leichtbau-Technik GmbH, leveraging the advantages of the innovative hydrogate production technology.*



### Yellow goods

In the yellow goods industry, the advantages of LWB technology vary according to the application. With the use of laser welded blanks, in tippers for example, customers can overcome the width limitation of coils. It also reduces cost, provides a good visual aspect, and minimises the need for reworking and corrosion resistance treatment. These advantages become even more apparent when yellow goods manufacturers combine LWB technology with the use of advanced high strength steels. This combination leads to further thickness, weight and cost reduction. Another great advantage of LWB technology for the yellow goods industry lies in the superior fatigue resistance and stress transfer of laser welded blanks compared with the widely used spot welded parts.

### White goods

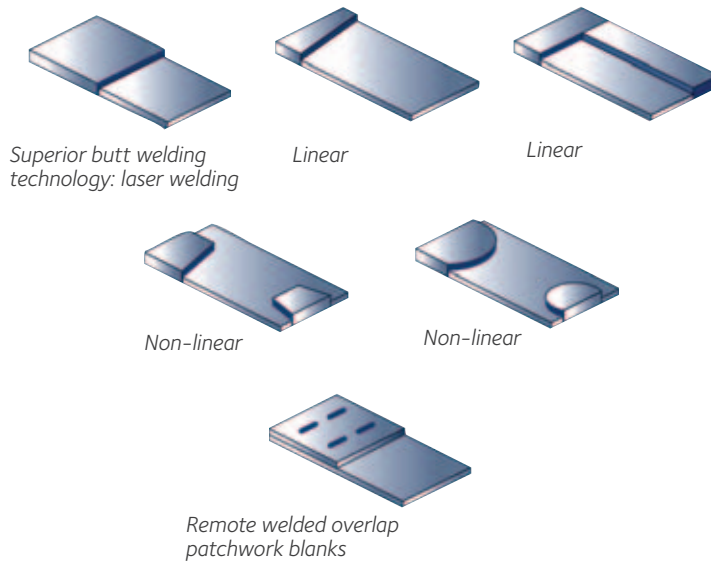
As in almost all other markets, the key objective in the high-volume white goods market is to minimise the total cost of ownership for the customer. That is exactly what LWB technology does best. The idea is to select the optimum steel grades for each component and weld them together into ready-to-use blanks for appliances. These blanks make it much easier to meet both the technical requirements and consumers' expectations at the same time.

### Energy

For applications such as steel plate heat exchangers, the use of laser welding can

## Flexible and productive overlap assembly: laser stitch welding

Stitch welding can be used to join two or more overlapping steel parts by means of continuous or intermittent welds. With discontinuous welding, it is possible to achieve very strong joints. This technique is significantly faster than traditional spot welding. It also reduces the amount of heat applied to the base material, which helps to minimise distortion. The strength and stiffness of a laser welded blank can be optimised by adjusting stitch orientation. An additional advantage is that stitch welding requires laser accessibility from one side only, whereas for spot welding the steel parts need to be accessible from both sides.



result in a significant gain in productivity compared with standard technologies like spot welding. It can also lead to a reduction in the number of components. And for many more applications in this branch of industry – such as the manufacture of boilers and tanks – LWB technology enables manufacturers to combine different grades of material and optimise material usage in order to reduce costs.

### Construction

LWB technology and laser welding technology can be successfully used to manufacture high stiffness panels as well as 'design' panels like Borit structural panels. The technical performance and visual aspect of an end product can be improved by simply welding blanks together. Compared with all other assembly

## Tailored Blanks on the web

ArcelorMittal Tailored Blanks has its own separate module on the web site of ArcelorMittal Flat Carbon Europe. The URL is: [www.arcelormittal.com/tailoredblanks](http://www.arcelormittal.com/tailoredblanks).

The ArcelorMittal Tailored Blanks homepage features four clickable boxes that link directly to the main sections of the web site:

1. 'Tailored Blanks', offering information about the company and its products.
2. 'Steel from the upstream ArcelorMittal mills', explaining the relationship with the ArcelorMittal Group.
3. 'Important advantages of Tailored Blanks', presenting the main reasons for choosing laser welded blanks: weight and cost reduction, safety improvement etc.
4. 'Our global footprint', featuring a world map showing the locations of all our offices and linking to pages containing detailed information about our production sites.

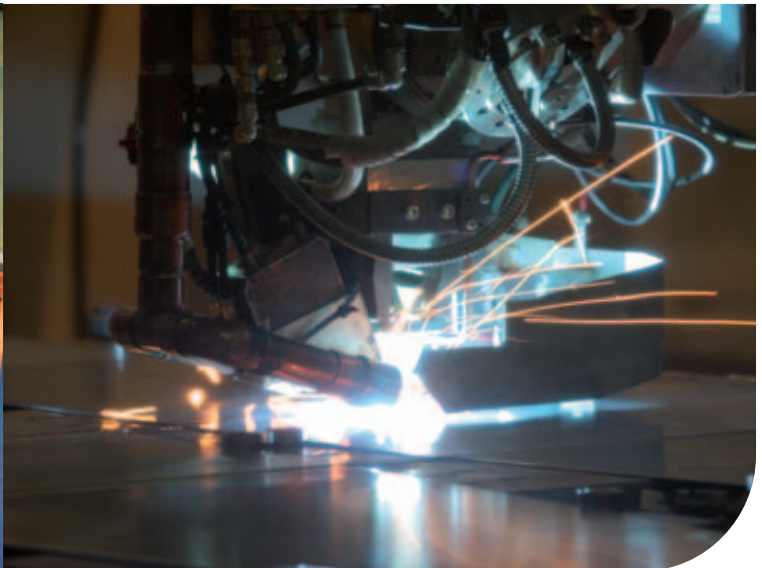
In addition, the conventional menu contains links to in-depth information about 'products', 'innovative solutions' and 'services and media'.

methods, laser welding offers great aesthetic advantages and guarantees a trouble-free, corrosion-free lifespan.

Example of a laser welding machine



A laser beam in action



# ArcelorMittal receives 'Logistics Award' from PSA Peugeot Citroën

On 19 March 2010, PSA Peugeot Citroën invited its main partners to its head office in Poissy, France, for its 'Supplier Day' event. The prestigious Supplier Award in the 'Logistics' category went to ArcelorMittal and was presented to Robrecht Himpe, CEO Flat Carbon Europe, in the presence of Philippe Varin, Chairman of the Management Board of PSA Peugeot Citroën.



This event was the opportunity for PSA to reward 14 suppliers whose cooperation has been recognised as of significant value in 2009. Philippe Varin stressed that these awards are a strong mark of appreciation for valued suppliers in a difficult year.

## Proactive approach – at any time!

Jean-Christophe Quémard, EVP Purchasing at PSA Peugeot Citroën, explained that ArcelorMittal's support in the second half of 2009 had been particularly valuable because it maintained a reactive steel supply in a time of sharply increasing needs: 'We can count on ArcelorMittal, even in

very tough times like 2009, a year with a huge cut in car demand, short-term mill shut-downs and a need for flexible supplies.' In addition, the customer praised ArcelorMittal's proactivity in always providing alternatives when other suppliers fail.

ArcelorMittal was represented by Robrecht Himpe, CEO Flat Carbon Europe, Philippe Aubron, General Manager Automotive Europe, Pierre Fabre, Senior Manager Automotive Europe and Nicolas Rouet, Global Account Manager for PSA Peugeot Citroën.

## Preparing the global future at Automotive Europe

As of 1 February 2010, the organisation of Automotive Europe has changed. Jean-Martin Van der Hoeven, Chief Marketing Officer for Automotive Europe, tells us what has changed and why.



Jean-Martin Van der Hoeven, Chief Marketing Officer for Automotive Europe, acting as the driving force for ArcelorMittal's Automotive Worldwide organisation

## First of all, why the change in the Automotive Europe organisation?

The automotive business has undergone drastic changes due to the crisis. There has been a worldwide shift in actors in the automotive business, which led to a reconfiguration of key players and changed the geographical footprint. We have also seen a shift in product and steel solutions requirements through the development of low cost, hybrid and electrical vehicles. And last but not least, as a result of the first wave of raw material volatility in 2008, relationships with our customers have been turbulent.

## What exactly has changed?

Automotive Europe now has a leaner and more efficient organisation. The top line

structure for Automotive Europe, with Philippe Aubron leading the commercial department and Jean-Claude Caillaud the technical department, will ensure fast decision making and effective communication. The marketing and controlling functions are now integrated within Automotive Europe to enable ArcelorMittal's Automotive Worldwide division to be more reactive and proactive in this fast-changing environment. Moreover, new accounts have been created to ensure market share creation and recovery, in both the emerging and the developed markets.