Keeping Europe on the road

ArcelorMittal's high strength steels offer lighter, stronger and safer solutions for road safety barriers.

The N2-type safety barrier standard

N2-type safety barriers are typically located along highways and at the exits of motorways. Under the new EN 1317 standard, N2-type safety barriers must contain a car with a mass between 900 and 1,500 kg in the event that it runs off the road.

Mieres Tubos also designs their N2-type safety barriers so that a vehicle will decelerate smoothly when in contact with the safety barrier. This prevents the vehicle's occupants from being violently shaken. The safety barrier also acts to help the driver regain control of the steering, reducing the chance that the car will return to the flow of traffic in an uncontrolled manner.

In 2011, a new standard for safety barriers came into force across the European Union. Focus shifted to performance-based standards which enable safety barrier makers to innovate and introduce new designs in order to improve performance and reduce costs. ArcelorMittal Flat Carbon Europe recently partnered with Mieres Tubos (Grupo Condesa) to develop a new N2-type safety barrier (see text box). The project demonstrates how a simple change in material choice can make a big difference to safety, performance and cost.

Mieres Tubos is a Spanish company which develops simple, safe and reliable safety barriers that are easy to install and integrate with other systems. The company approached ArcelorMittal with the goal of developing a new N2-type safety barrier which met its design considerations, and which also offered significant weight and cost reductions.

Switch to high strength steel

Following consultation with ArcelorMittal's Global R&D researchers and engineers, the co-engineering team decided to replace the existing hot rolled structural steel (grade S235JR) with a new high strength steel (HSS).

Through S-in motion and other projects, ArcelorMittal has already demonstrated that HSS provides significant weight reductions while increasing the safety of vehicles thanks to its high tensile strength. The higher strength means that less steel is required, leading to lower weight and a reduction in CO_2-equivalent emissions. In this case the switch to the HSS grade resulted in the new safety barrier being more than 25% lighter. Performance was also improved dramatically and manufacturing costs were lowered.

The high strength of the new grade also made it possible to double the distance between the posts which secure the safety barrier in place. Instead of 50 posts per 100 metres of safety barrier, only 25 posts are needed. Together with the weight saving from the change to HSS, this simple design change has enabled transportation and installation costs to be reduced by at least 25%.

European safety standards met

The new N2W4A safety barrier successfully passed two crash tests conducted by an

In the first few months after its launch, more than 25 kilometres of Mieres Tubos (Grupo Condesa) new N2-type safety barrier were installed in Spain.

external certification body in the first quarter of 2012. The safety barrier now carries the CE marking, meaning that it meets the EN 1317 standard and can be utilised across Europe.

Thanks to the reductions in weight, installation time, and lower raw material and manufacturing costs, the new N2 safety barrier is opening many opportunities for Mieres Tubos. It has also led to environmental benefits as CO_2-equivalent emissions are reduced during production, transportation and installation. Society also benefits from improved road safety at a lower price. With the implementation of the N2 safety barrier now complete, Mieres Tubos has sought ArcelorMittal's help again to create a new safety barrier with an even higher containment level.

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Magnelis® coating offers long-term protection

Road safety barriers are subject to wear and tear from bumps and atmospheric corrosion. To ensure the safety barrier can last for an expected life of up to 25 years, ArcelorMittal's high strength steels can be either batch or continuously galvanised. Both methods meet the EN 1317 specification and provide protection for the life of the safety barrier.

However, ArcelorMittal customers can now utilise our Magnelis® coating which offers up to ten times the protection of batch galvanisation. Magnelis® utilises 3.5% aluminium and 3% magnesium to create a stable and robust layer of protection across the entire surface of the steel. The edges of the Magnelis® coating will even self-heal if they suffer damage – a property that other coatings cannot match.