Trailtech lightens the load

The next generation road trailer chassis has arrived

Freight transport by road is becoming more costly as fuel prices rise and emissions targets for vehicles become more restrictive. While a lot of attention is paid to the motor that transports the trailer, little has been done to lighten the trailer itself.

With payloads expected to become heavier and bigger in the coming years, the transport sector is actively seeking a lighter chassis which will enable them to carry heavier loads and reduce the cost of empty trips. ArcelorMittal's Trailtech project was started in response to a request from one of our clients who wanted to create a new lightweight chassis for their transportation trailers. Their goal? To develop a chassis that was 30% lighter than the reference structure and that saved at least 20% on production costs.

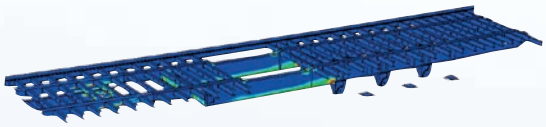
The result is Trailtech, a generic lightweight solution for trailer chassis applications. Trailtech utilises a combination of high strength low alloy (HSLA) steel grades which enables operators to reduce trailer production and operating costs significantly.

Thinner, stronger steels lower costs

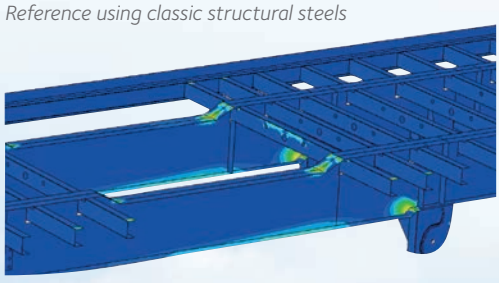
The Trailtech solution is principally constructed using two high strength low alloy steels: **Amstrong® 500MC** and **Amstrong® Ultra 700MC**. The carbon-manganese steel S275JR is also used for the wheel base. By contrast, the reference trailer is almost completely built with S275JR, a classic structural steel.

Both **Amstrong® 500MC** and **Amstrong® Ultra 700MC** combine high strength, good formability and guaranteed low temperature toughness. The high yield strength of both grades makes it possible to achieve a significant decrease in thickness. For example, by utilising **Amstrong® 500MC** it was possible to reduce the thickness of the bottom cross-beams of the chassis from 8.6 to just 4 mm. Grade **Amstrong® Ultra 700MC** was used for the exterior beams where thickness was reduced by half. With their high tensile strength, ArcelorMittal's high strength low alloy grades are an excellent choice when saving weight is a priority. The thinner high strength low alloy steels result in lower processing costs as thinner steel can be welded faster. The cost of transporting the lighter finished trailers is also reduced.

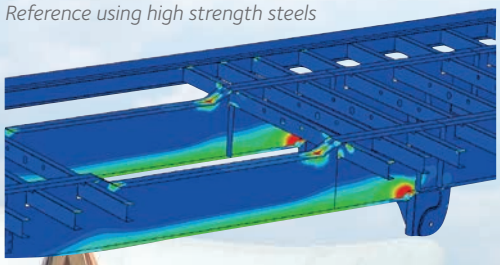
Higher stresses are possible with more advanced HSLA steel grades



Reference using classic structural steels



Reference using high strength steels



Load cases – scale 100-400 MPa

Lighter solutions bring economic advantages

High strength low alloy steels offer the potential for significant economic savings for both manufacturers and users.

The savings are possible because:

- **Less steel** is needed for each application.
- **Welding is simplified**. There are fewer welds, less welding wire is used, and less time is needed for welding.
- **Payload** on the finished application is **increased**, meaning fewer trips are required to transport the same load.
- Applications have **a longer life** as they **resist wear better**.
- Stronger steels **reduce maintenance costs** over the life of the application.

Using ultra high strength steel (UHSS) grades such as **Amstrong® Ultra 700MC**, **weight savings of up to 40%** are possible compared to classic structural steels.

Results demonstrate Trailtech benefits

Overall, ArcelorMittal's engineers were able to reduce the weight of the Trailtech chassis by 39% compared to the reference chassis (see table). Material costs were 29% lower as less steel was used to create the new chassis. The high-end Trailtech solution has the same technical performance as the reference chassis, but with improved fuel-economy and better environmental performance.

	Reference	Trailtech	Savings
Weight	2.4 t	1.5 t	-39%
Cross-beam thickness	8.6 mm	4 mm	-53.5%
Exterior beam thickness	4 mm	2 mm	-50%
Material costs	Reference	-29%	-29%

Trailtech offers outstanding savings compared to traditional chassis solutions

ArcelorMittal estimates fuel savings of between 0.4 and 0.6 litres per 100 kilometres can be achieved. Assuming the trailer travels an average of 150,000 km each year, that equates to around 700 litres of fuel savings.
Based on average use, CO_2-eq emissions are reduced by 900 kg each year. Overall, operators will save around € 4,500 a year in operating costs by utilising the Trailtech solution.

Wide range of applications can benefit from advanced steels

Trailtech has demonstrated that ArcelorMittal's high strength low alloy steels can dramatically reduce the weight of transport trailer chassis. The knowledge and experience gathered during the development of the Trailtech solution can be easily applied to lighten other transport applications and yellow goods.
ArcelorMittal's high strength low alloy steels have already been applied to rail freight wagons and yellow goods such as earth movers and agricultural equipment. Why not contact us to see how ArcelorMittal's expertise and our unparalleled range of high strength low alloy steels can be combined to lighten your application?

ArcelorMittal support from co-engineering to production

ArcelorMittal's research centres have the skills and tools needed to facilitate the development of a lightweight concept and to help you bring it to production. By balancing suitable high strength steel grades with an optimised design, significant weight and cost reductions are possible for many applications.

ArcelorMittal's experienced teams can help you with issues such as tension, compression, bending, torsion, stability and crash properties. We provide support at all stages of the process, from the early stages of co-engineering to the translation of the design into production specifications, and even in the production process itself. Contact your local ArcelorMittal representative to find out how we can help lighten the load!

Do you want us to start up a new co-engineering project together with you?

Contact us at
flateurope.technical.assistance@arcelormittal.com

Or contact your local account manager or technical representatives.

Find out more

For more information on our **Amstrong®** high strength and Amstrong® Ultra superior ultra high strength steel product range please consult our online product catalogue (data sheets A20 and A22)
or our product document centre on industry.arcelormittal.com

Credits

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