
DOMEX®
DOCOL®
DOGAL®
Train
Lighter
Stronger
Safer
SSAB
SWEDISH STEEL

Railway wagons that are lighter, less costly to maintain and more durable – that's what using high strength steels can achieve. High strength steels will also be vital to the safety of locomotives in the future. Crash absorbers manufactured from high strength steels have been developed that greatly improve safety for the locomotive driver.

Advanced high strength steels have several advantages that can be put to effective use in railway wagon and locomotive designs. High strength and better wear resistance contribute towards making the wagons lighter and more durable. As a result, the wagons can carry more load, are easier for operatives to handle, and incur lower maintenance costs. An added advantage is that with light weight construction the environmental impact is less.

Higher payload

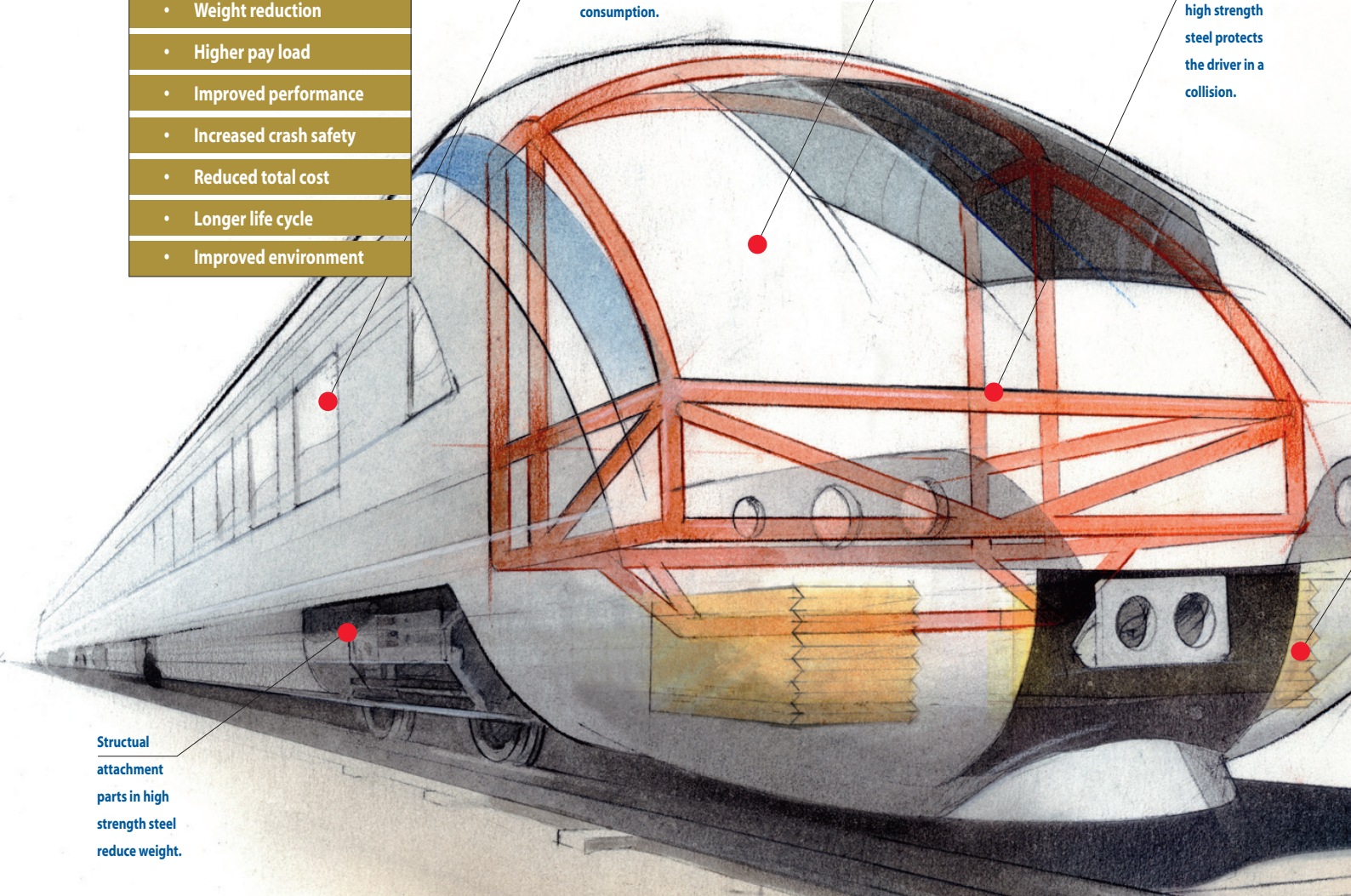
The whole railway industry – manufacturers, owners and operators – as well as transport customers can benefit from an increased use of high strength steel in all types of rolling stock and locomotives.

Using high strength steel can lower the deadweight of goods wagons substantially, which will lead to increased payload and thus reduced freight costs. The greater number of journeys, the greater the savings will be.

Advanced high strength steel f

Major advantages with high strength steel

- Weight reduction
- Higher pay load
- Improved performance
- Increased crash safety
- Reduced total cost
- Longer life cycle
- Improved environment



for trains

Less damage with high strength steel

Many goods wagons are subjected to hard wear, which rapidly results in damage, dents and other defects because the material used for the wagons is not of sufficient strength.

Many of the wear and damage problems can be eliminated by the use of high strength steels. The reduced maintenance requirements and better utilisation of the wagons bring significant economic benefits to both wagon owners and transport customers.

Open box wagons, such as those used for scrap transport, are improved when high strength steel is used for the base and sides.

They become much more resistant to the heavy wear caused by scrap and other abrasive loads. The advantages are obvious: fewer repairs and a longer lifespan.

Another recent development is freight wagons for iron ore, where maintenance costs are also substantially reduced when using high strength steel in the body.

Easy handling

Several European manufacturers of railway wagons have recently begun using high strength steels for vital parts of goods wagons.

One typical example is a wagon for carrying steel coils that has been upgraded; its new lightweight arms for locking the coils are made of high strength steel. This has made the work easier and quicker and the injury problems suffered by personnel have virtually disappeared. A similar example is light weight stakes for timber wagons.

Closed goods wagons utilising high strength steel are also being developed. Walls and sliding partitions manufactured from high strength steel, make the wagons light and strong and better able to meet the market demands for strength, safety and ease of handling.

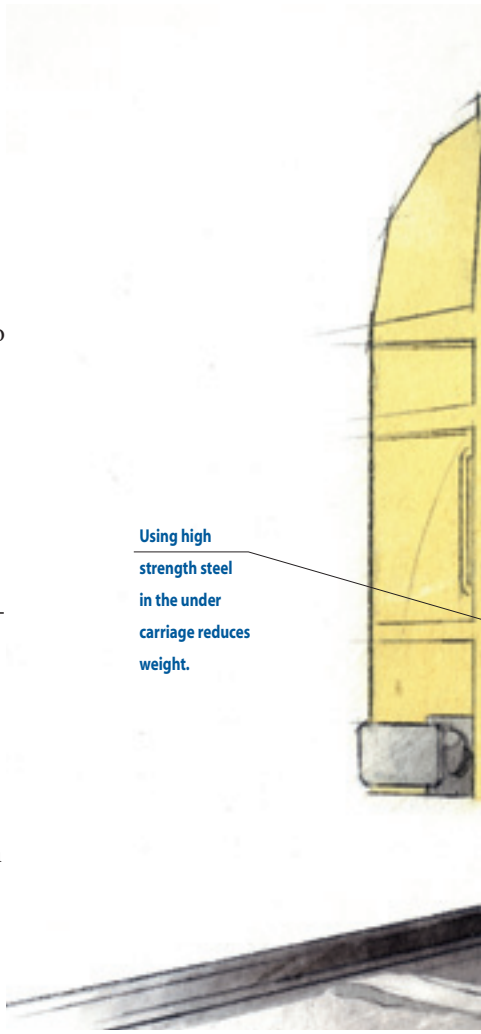
Increased safety

High strength steels are also finding applications in locomotives. New regulations have led to the development of high strength steel crash absorbers for locomotives. High strength steels are also increasingly used to make safe and lightweight seats for passenger trains.

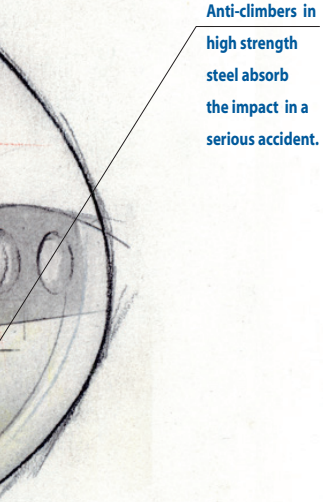
When it comes to safety, the experience gained in the automotive industry is very important. The crashworthiness of cars has been substantially improved by the use of advanced high strength steels.

A world leader

SSAB Swedish Steel is a world leading producer and a pioneer in high strength steels. The experience we have gained from other applications such as containers, truck bodies and heavy construction equipment can immediately be put to use in the railway industry. We are also heavily involved in the development and production of safety impact beams and safety cages for cars and trucks.



Using high strength steel in the under carriage reduces weight.



Anti-climbers in high strength steel absorb the impact in a serious accident.

Advanced high strength steels from SSAB Tunnplåt

DOMEX®

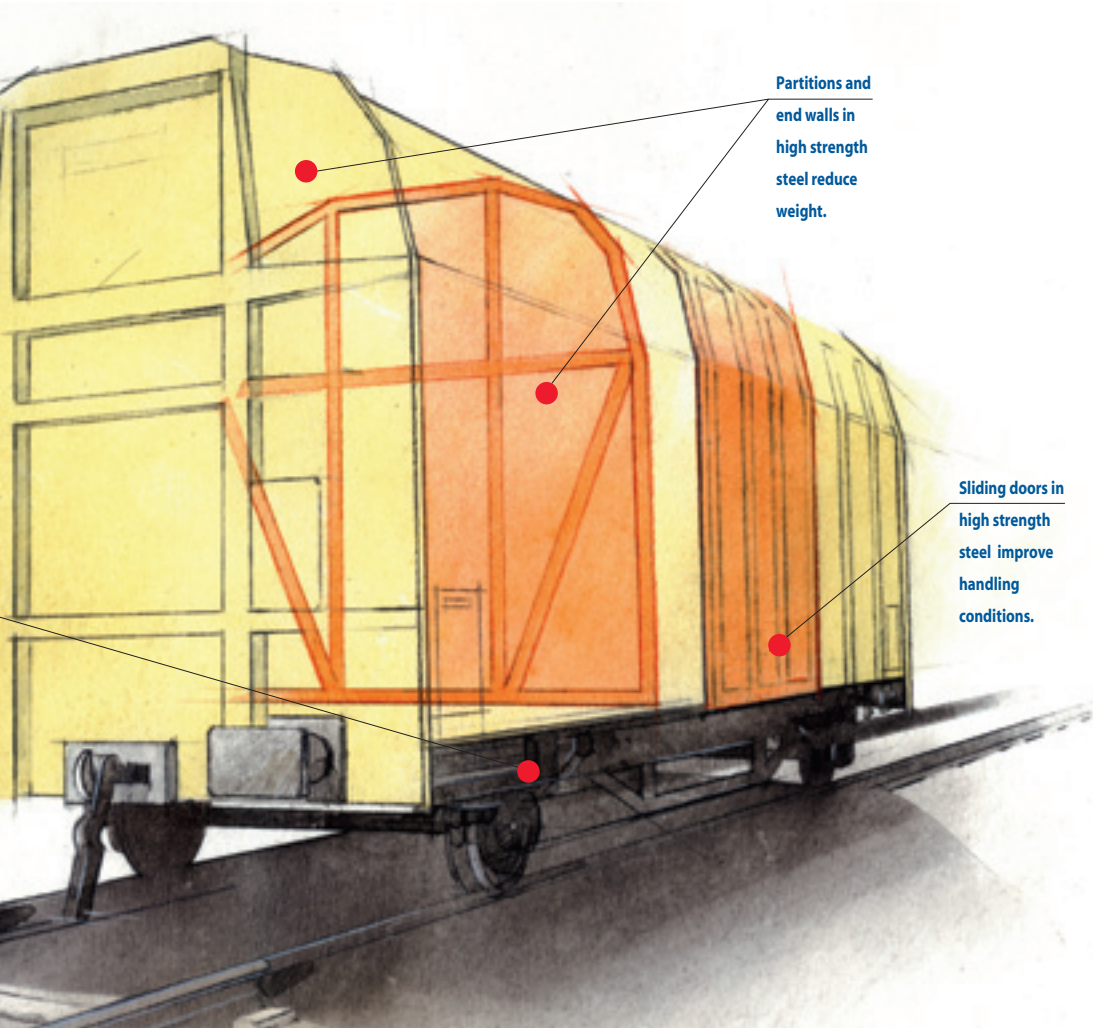
Hot-rolled, cold-forming steels with yield strengths of up to minimum 700 MPa and even higher for ultra high strength steels. Produced in thicknesses between 2.0 and 10.0 mm for extra high strength steel and between 3.0 and 6.0 mm for ultra high strength steel. Also available as Domex Wear wear-resistant steel and Domex Weather Resistant corrosion-resistant steel.

DOCOL®

Cold-reduced steels with minimum guaranteed tensile strengths of up to 1400 MPa. Produced in thicknesses between 0.4 and 2.0 mm. Also available as Docol DP/DL dual-phase steels, Docol Wear wear-resistant steel, and Docol Weather Resistant corrosion-resistant steel.

DOGAL®

Corrosion-resistant hot-dip galvanized steels with tensile strengths of up to 1000 MPa. Produced in thicknesses between 0.5 and 2.0 mm. Available as Dogal YP microalloyed cold-forming steel or Dogal DP dual-phase steel.



A winning concept to increase profitability for all parties

Rail transport customers benefit from:

- Lower transport costs
- Higher availability
- Improved working conditions

Wagon owners benefit from:

- Less maintenance
- More attractive product
- Higher profit

Wagon and train manufacturers benefit from:

- More attractive product
- Better competitiveness
- Higher profit

Rail operators benefit from:

- Crash safety
- Lower maintenance costs
- Less energy costs when travelling empty

Local support

Our in-depth knowledge of the opportunities offered by high strength steels is readily available to all our customers. Technical support is provided through our own application engineers who are available to our customers at short notice anywhere in Europe. Our specialists in design, forming and joining can assist you in putting high strength steels to maximum use in various industrial applications and operations.

We educate and keep customers updated on our products at regular seminars and meetings, during which we also focus on the economic and competitive advantages of our steels, as well as on efficient production and manufacturing methods.

Efficient logistics

Cooperation with our customers involves not only putting technical opportunities to best possible use, but also creating efficient logistics solutions tailored to the specific needs of each customer.

Customers in Europe are serviced by regular shipments from our European main stock in Rotterdam or from Sweden, providing short lead-times for most steel grades. We always strive to provide the perfect mix of steel, service and logistics.

This wagon for carrying steel strip coils is manufactured almost entirely in Domex extra high strength steel. The deadweight has thus been reduced with one ton and working conditions when loading and unloading have been improved.

Open box wagons benefit from lower manitenance costs and a longer life cycle when advanced high strength steels are used in vital areas.

SSAB has the answers to all your questions about advanced high strength steels

Our Knowledge Service Center and the web-based information service SSAB Direct have been developed to meet the needs of the growing numbers of customers who specify high strength steels to make their products lighter, stronger and safer. Here we put our extensive knowledge of high strength steels and how they are best employed att the disposal of all our customers.

SSAB Direct

Instant information

The Knowledge Service Center provides indepth knowledge and facts concerning high strength steels through personal contact with our application engieneers and materials experts. Through our helpdesk or e-mail, you can get assistance and technical support with a all types of machining, working and design matters.

Instant support around the clock is available on the web at www.ssabdirect.com. This is a very comprehensive information database containing detailed product facts, downloadable auxiliary programs, material graphs and other information that simplifies analysis and design work.

All you need to know

For those how want printed matter and manuals, these can be ordered from the Knowledge Service Center or directly via **www.ssabdirect.com.**

Our manuals – the Sheet Steel Handbook, the Sheet Steel Forming Handbook and the Sheet Steel Joining Handbook – contain a wealth of information on all aspects of design and manufacture with avdanced high strength steels. The handbooks provides information on which type of high strength steel is suitable for a certain application and how the steel is best formed and joined to fully take advantage of the unique properties of our steels – in order to provide you with competitive benefits.

All three handbooks can be ordered via **www.ssabdirect.com**

The Sheet Steel Handbook

- Choice of materials and design philosophy
- Product range and material properties
- Design practice
- Structural design
- Fabrication

The Sheet Steel Forming Handbook

- Material Properties
- Size Shearing
- Plastic Forming
- Formability and material behaviour
- Tooling materials, surfaces and tribology
- Surface treatments and coatings

The Sheet Steel Joining Handbook

- SSAB Tunnplåt products
- Fusion welding
- Resistance welding
- Mechanical joining
- Adhesive bonding
- Soldering and brazing
- Fatigue-comparison between different joining methods
- Joining to other materials

SSAB Tunnplåt AB is the largest Scandinavian sheet steel manufacturer and a leader in Europe in the development of high strength, extra-high strength and ultra-high strength steels.

SSAB Tunnplåt is a member of the SSAB Swedish Steel Group, has a turnover of SEK 12 billion, and has around 4200 employees in Sweden. The company produces about 2.6 million tonnes of sheet steel annually.

Our environmental policy involves continual improvements to the efficiency of production processes and environmental care plants, and development of the environmental properties of our products from the life cycle perspective.

We produce the following steels in our modern, high-efficiency production lines and rolling mills for strip products:

DOMEX® hot-rolled steel sheet

DOCOL® cold-reduced steel sheet

DOGAL® metal-coated steel sheet

PRELAQ® prepainted steel sheet

Registered trademarks of SSAB Tunnplåt AB

We assist our customers in selecting the steels that are best suited for improving their competitiveness. Our strength lies in the quality of our products, our reliability of supply, and our flexible technical customer service.

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