SSAB EcoUpgraded

Together with our customers, SSAB continually upgrades steel and equipment designs. SSAB EcoUpgraded saves CO₂ both in steel production and during the full lifetime of the machine.

From the CO₂ payback time and onwards, every extra hour brings additional savings.

www.ssab.com/ecoupgraded
SSAB EcoUpgraded

CO₂ SAVINGS IN TOTAL = LESS STEEL PRODUCED + LONGER SERVICE LIFE + LOWER WEIGHT + HIGHER CAPACITY

CO₂ PAYBACK TIME = SERVICE LIFE TIME × (CO₂ EMISSIONS FROM PRODUCTION - CO₂ SAVINGS FROM LESS STEEL PRODUCED)

CO₂ SAVINGS FROM LONGER LIFETIME + CO₂ SAVINGS FROM LOWER WEIGHT + CO₂ SAVINGS FROM HIGHER CAPACITY

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SSAB EcoUpgraded

CO₂ SAVINGS IN TOTAL = LESS STEEL PRODUCED + LONGER SERVICE LIFE + LOWER WEIGHT

- With wear-resistant high strength steel, the machine can last longer. IMPACT: Extended lifetime results in reduced impact of CO₂ emissions from production. If the lifespan is doubled, CO₂ emissions over the product lifecycle is only half.

- With high strength steel, the machine can be designed lighter. IMPACT: Every ton less iron ore-based steel saves approx. 2 tons CO₂.*

- With lower weight, the machine will need less fuel for the same work. IMPACT: Every 1000 liters of fuel not used saves 3 tons of CO₂.

- When a vehicle is lighter its payload can be increased, resulting in fewer trips for the same transported load. IMPACT: Every percent of increased load results in the same percentage of fuel and CO₂ savings.

*) This calculation excludes upstream data before iron and steel production. It has, however, no significant impact on the total savings results.

CO₂ PAYBACK TIME = SERVICE LIFE TIME × CO₂ EMISSIONS FROM PRODUCTION - CO₂ SAVINGS FROM LESS STEEL PRODUCED

CO₂ SAVINGS FROM LONGER LIFETIME + CO₂ SAVINGS FROM LOWER WEIGHT + CO₂ SAVINGS FROM HIGHER CAPACITY

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“Less is more – higher load in every trip”

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TRAILER
In this scenario 1,050 kg of Strenx 700 high strength steel replaces 1,500 kg of conventional 355 MPa steel. This means a weight reduction of 30% for the upgraded parts. The maximum allowed total vehicle weight is 40 tons, and with this upgrade the load capacity is increases by 2%, from 26 tons to 26.5 tons, reducing the fuel consumption per transported ton of cargo.

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<table>
<thead>
<tr>
<th>SSAB EcoUpgraded</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel consumption, fully loaded</td>
<td>0.39 L/km</td>
</tr>
<tr>
<td>Fuel consumption, unladen</td>
<td>0.24 L/km</td>
</tr>
<tr>
<td>Vehicle usage per year</td>
<td>100,000 km/year</td>
</tr>
<tr>
<td>Weight critical transports</td>
<td>50%</td>
</tr>
<tr>
<td>Service lifetime</td>
<td>12 years</td>
</tr>
<tr>
<td>Steel saved by increased wear resistance</td>
<td>0 kg/lifetime</td>
</tr>
<tr>
<td>Weight reduction</td>
<td>450 kg</td>
</tr>
<tr>
<td>Total weight upgraded parts</td>
<td>1,050 kg</td>
</tr>
<tr>
<td>Gross weight*</td>
<td>14,000 kg</td>
</tr>
<tr>
<td>Total payload*</td>
<td>26,000 kg</td>
</tr>
<tr>
<td>Maximum weight*</td>
<td>40,000 kg</td>
</tr>
</tbody>
</table>

*) Valid for the whole tractor-trailer vehicle.

“Lift your payload”

SSAB EcoUpgraded
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TRUCK WITH LOADER CRANE
In this scenario 1,125 kg of Strenx 700 high strength steel replaces 1,500 kg of 500 MPa steel in a loader crane. In addition 1,275 kg of 500 MPa steel replaces 1,500 kg of 355 MPa steel in the truck chassis. This means a weight reduction, for the upgraded parts, of 25% in the crane and 15% in the truck. In total a weight reduction of 600 kg is achieved, which increased the load capacity, resulting in higher fuel efficiency and transport efficiency.

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“Articulated savings”

ARTICULATED HAULER

In this scenario 2,250 kg of Strenx 700 and Hardox 400 high-strength steel replaces 3,000 kg of conventional steel with 355 MPa strength, reducing the weight of these parts by 25%. In addition we also upgrade the liner package of approximately 1,500 kg from a 400 HBW steel to Hardox 500, which doubles the time between replacements to 8,000 hours.

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“High strength climate contribution”

For a smaller vehicle the savings are smaller. In this scenario, 170 kg of Docol 800 high strength steel replaces 200 kg of 500 MPa material in the chassis. And in the crash components, 85 kg of Docol 1400 steel replaces 100 kg of 1,000 MPa material. This means a total weight reduction of 15% for the upgraded parts, i.e. 45 kgs, which reduces the car’s fuel consumption by approximately 1.3%.

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**Savings on CO₂**

SSAB EcoUpgraded

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---

**CAR**

<table>
<thead>
<tr>
<th></th>
<th>SSAB EcoUpgraded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel consumption, fully loaded</td>
<td>0.07 L/km</td>
</tr>
<tr>
<td>Fuel consumption, unladen</td>
<td>0.07 L/km</td>
</tr>
<tr>
<td>Vehicle usage per year</td>
<td>15,000 km/year</td>
</tr>
<tr>
<td>Weight critical transports</td>
<td>0%</td>
</tr>
<tr>
<td>Service lifetime</td>
<td>15 years</td>
</tr>
<tr>
<td>Steel saved by increased wear resistance</td>
<td>N/A</td>
</tr>
<tr>
<td>Weight reduction</td>
<td>45 kg</td>
</tr>
<tr>
<td>Total weight upgraded parts</td>
<td>255 kg</td>
</tr>
<tr>
<td>Curb weight</td>
<td>1,200 kg</td>
</tr>
<tr>
<td>Total payload</td>
<td>N/A</td>
</tr>
<tr>
<td>Maximum weight</td>
<td>N/A</td>
</tr>
</tbody>
</table>

690 10 200

“High strength climate contribution”

“CO₂ emissions payback in 3 months”

SSAB EcoUpgraded
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TIMBER TRAILER

The longitudinal beams of the trailer were upgraded from yield strength 310 MPa to Strenx 700, saving 350 kg of weight, or 37%, of the upgraded parts. The total weight of the timber trailer could be reduced by an additional 150 kg through changes in design in other parts of the chassis. In total, the trailer’s load capacity was increased by 500 kg.

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“22 tons of CO₂ savings”

**TIPPING TRAILER**

In this tipper body, the hardness of the abrasive-resistant steel plates was increased from a 400 HBW steel to Hardox 450, saving 1.3 tons of weight – equivalent to a weight reduction of 30% for the upgraded parts. This means an increase in the trailer’s load capacity from 27 tons to 28.3 tons, or about 5%.

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“Heavy metal getting lighter”

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**MINING TRUCK BOX**

This heavy-duty mining truck was redesigned and upgraded using Hardox 450 in the tipper body. The weight of the tipper body was reduced by 22%. This reduced the weight by 2.5 tons, which increased the load capacity. In addition to this, the life-time of the body is now three times longer than the original, decreasing overall steel consumption and reducing the need for lengthy overhauls.

**SSAB EcoUpgraded**

<table>
<thead>
<tr>
<th>CO₂ SAVINGS</th>
<th>CO₂ PAYBACK TIME</th>
<th>FUEL REDUCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,005 TONS/LIFETIME</td>
<td>2 MONTHS</td>
<td>317,000 L/LIFETIME</td>
</tr>
</tbody>
</table>

**Fuel consumption:**
- Fully loaded: 220 L/h
- Unladen: 120 L/h

**Vehicle usage per year:** 7,300 h/year

**Weight critical transports:** 50%

**Service lifetime:** 10 years

**Steel saved by increased wear resistance:** 24,500 kg/lifetime

**Weight reduction:** 2,500 kg

**Total weight upgraded parts:** 8,600 kg

**Curb weight:** 69,000 kg

**Total payload:** 91,000 kg

**Maximum weight:** 160,000 kg

“Skip every 10th trip”

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SEMI-TRAILER SCRAP BOX
This semi-trailer scrap box was designed to become super light, using laser welded sidewalls with integrated top beam and floor made of Hardox 450. In addition, Strenx 700 material was used in the trailer chassis. This means a total weight reduction of 3 tons compared to similar solutions of standard design. This increases the load capacity by approximately 10%.

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“Winds of change — less drag, more load”

SSAB EcoUpgraded
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From the CO₂ payback time and onwards, every extra hour brings additional savings.

**ROLL-ON CONTAINERS**

These containers were upgraded from 355 MPa standard steel to Hardox 450, increasing the load capacity by 2,100 kg for the total vehicle with a set of three containers. This allows more payload per trip and also reduces the fuel consumption of the empty vehicle. The removal of stiffeners on the sides also lowers wind drag, which further reduces the fuel consumption.

www.ssab.com/ecoupgraded


**Savings on CO₂**

<table>
<thead>
<tr>
<th>CO₂ SAVINGS</th>
<th>CO₂ PAYBACK TIME</th>
<th>FUEL REDUCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>105 TONS/LIFETIME</td>
<td>1.3 YEARS</td>
<td>33,600 L/LIFETIME</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SSAB EcoUpgraded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel consumption, fully loaded</td>
</tr>
<tr>
<td>Fuel consumption, unladen</td>
</tr>
<tr>
<td>Vehicle usage per year</td>
</tr>
<tr>
<td>Weight critical transports</td>
</tr>
<tr>
<td>Service lifetime</td>
</tr>
<tr>
<td>Steel saved by increased wear resistance</td>
</tr>
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<td>Weight reduction</td>
</tr>
<tr>
<td>Total weight upgraded parts</td>
</tr>
<tr>
<td>Curb weight*</td>
</tr>
<tr>
<td>Total payload*</td>
</tr>
<tr>
<td>Maximum weight*</td>
</tr>
</tbody>
</table>

*) Valid for the whole truck-trailer vehicle.
“Move cargo – not steel”

SSAB EcoUpgraded
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From the CO₂ payback time and onwards, every extra hour brings additional savings.

**SCRAP RECYCLING CONTAINER**

By removing stiffeners and using the high load and lifetime performance of Hardox 450, the weight could be reduced by 35% at the same time as the lifetime doubled from 6 years to 12 years.

<table>
<thead>
<tr>
<th>CO₂ SAVINGS</th>
<th>CO₂ PAYBACK TIME</th>
<th>FUEL REDUCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>88 TONS/LIFETIME</td>
<td>4 MONTHS</td>
<td>25,600 L/LIFETIME</td>
</tr>
</tbody>
</table>

**SSAB EcoUpgraded**

- **Fuel consumption, fully loaded**: 0.34 L/km
- **Fuel consumption, unladen**: 0.26 L/km
- **Vehicle usage per year**: 100,000 km/year
- **Weight critical transports**: 50%
- **Service lifetime**: 12 years
- **Steel saved by increased wear resistance**: 4,020 kg/lifetime
- **Weight reduction**: 1,400 kg
- **Total weight upgraded parts**: 2,620 kg
- **Curb weight**: 12,740 kg
- **Total payload**: 13,260 kg
- **Maximum weight**: 26,000 kg

*) Valid for the truck-container vehicle without a trailer.

“Hooked on savings”

LOADER CRANE

Working on the crane design and moving the longitudinal welds to the neutral layer of the crane arm extension, the yield strength could be increased from 800 MPa to Strenx 1100. Together with a redesign of the stabilizer beam, this saved 114 kg of weight, or around 15% of the upgraded parts. This, in turn, increases the load capacity of the truck, reducing fuel consumption per ton transported.

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“Immediate results”

SSAB EcoUpgraded
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From the CO₂ payback time and onwards, every extra hour brings additional savings.

### Savings on CO₂

<table>
<thead>
<tr>
<th>CO₂ SAVINGS</th>
<th>CO₂ PAYBACK TIME</th>
<th>FUEL REDUCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>220 TONS/LIFETIME</td>
<td>0 MONTHS</td>
<td>67,000 L/LIFETIME</td>
</tr>
</tbody>
</table>

**SSAB EcoUpgraded**

This new body design is made of Hardox 450 and 500, increasing the dumper’s load capacity by about 11% compared to the original design. It is partly due to the redesign and upgrading of wear liners, saving approximately 80% of their weight.

**DUMPER BODY**

- Fuel consumption, fully loaded: 40 L/h
- Fuel consumption, unladen: 20 L/h
- Vehicle usage per year: 2,000 h/year
- Weight critical transports: 60%
- Service lifetime: 10 years
- Steel saved by increased wear resistance: 5,000 kg/lifetime
- Weight reduction: 3,700 kg
- Total weight upgraded parts: 3,500 kg
- Curb weight: 31,000 kg
- Total payload: 32,380 kg
- Maximum weight: 63,440 kg

“It’s all in the details”

CONTROL ARMS
In this pick-up truck, the control arms in the front suspension were upgraded from 340 MPa yield strength to Strenx 700. This reduces the weight of the control arms by 36%, or 2.7 kg. At the same time, static and dynamic as well as fatigue performance was improved – at a lower cost compared to an aluminum solution.

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Savings on CO₂

<table>
<thead>
<tr>
<th>5 KG</th>
<th>35 KG</th>
</tr>
</thead>
<tbody>
<tr>
<td>LESS STEEL PRODUCED</td>
<td>LOWER WEIGHT</td>
</tr>
<tr>
<td>12%</td>
<td>88%</td>
</tr>
</tbody>
</table>

SSAB EcoUpgraded
CO₂ SAVINGS
40 KG/LIFETIME

CO₂ PAYBACK TIME
1.4 YEARS

FUEL REDUCTION
15 L/LIFETIME

Note: Units are in kg.