

HSLA has been used for decades to reduce component weight by gauge reduction, offset by increased strength of the steel. This trend started in the 1970's with the automotive industry and continues today with more advanced product offerings. The HSLA steels are now available with yield strengths around 40 ksi to 100 ksi, and are available in many steel product lines. In the hot roll-based, HDG product line at WI Delta, HSLA Grades up to 80 ksi have routinely been provided. Grade 90 is readily available and Grade 100 is available on a trial basis. Lighter gauge, cold roll-based versions of all three grades may also be available on a trial basis if required.

A typical cost savings scenario is shown in the following example of replacing Grade SS 50 with HSLA 80, a 60% increase in strength. This shows the increase in coil length due to a 40% decrease in thickness, theoretically offset by the increase in strength. (This would have to be verified by customer's engineering staff.)

Gauge Reduction Calculation

$$\text{Weight (lbs.)} = \text{Gauge}'' \times \text{Width}'' \times \text{Length}'' \times .283 \text{ lbs./cu in,}$$

$$\text{For 10,000 lbs. : Coil Length } L'' = \frac{10,000 \text{ lbs.}}{\text{Gauge}'' \times \text{Width}'' \times .283 \text{ lbs./cu in,}} \times \frac{L''}{12} = L \text{ Feet}$$

Hypothetical Example

Current size = .147" x 47" x coil
Linear footage for 10,000 lbs. = 426'

New size = .0882" x 47" x coil
New linear footage for 10,000 lbs. = 710'

New coil length is **66.6%** longer

Cost Analysis based upon theoretical 20% increase in cost \$/lbs. of HSLA over SS 50

Current cost of 426' coil length:
 10,000 lbs. coil at \$X/lbs.
 \$Y/linear foot

New cost at 426' coil length:
 6000 lbs. coil at \$1.2X/lbs.
 \$0.72Y/feet, 28% lower cost/foot

New cost per linear foot is **28%** lower and **40%** less steel tonnage is required

The customer now purchases only 426' of the lighter gauge steel to meet their requirements. This provides a 28% reduction in material cost despite a theoretical 20% increase in \$/lbs. The initial material requirement of 10,000 lbs. (426' coil length) is replaced by ~ 6000 lbs (426' coil length), a 40% decrease in steel tonnage required. This is the same as the reduction in gauge in this example. Other cost savings will accrue, such as lower freight, packaging and handling. Handling of lighter weight components is also easier for employees.