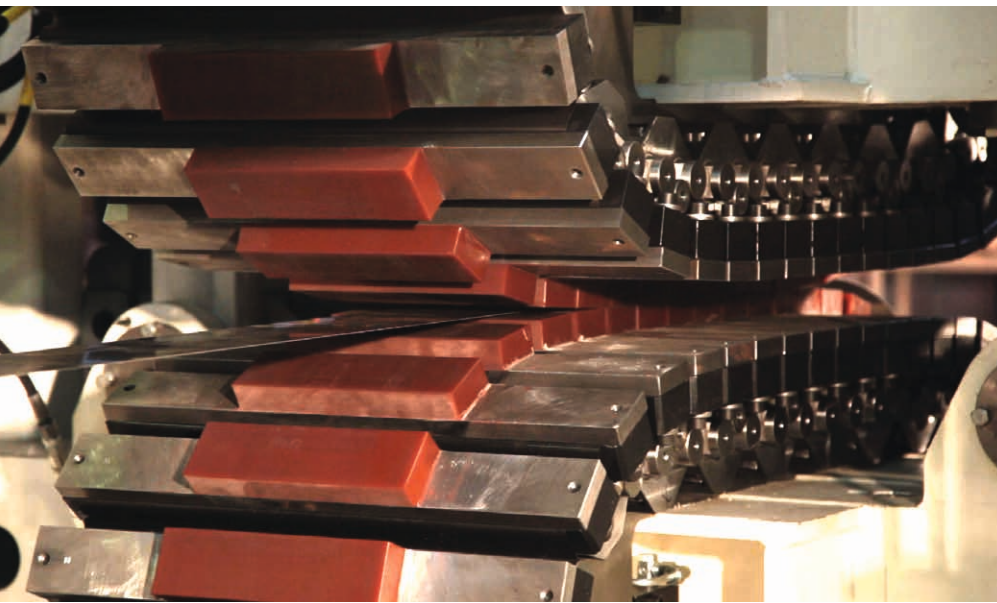


# Steel Dynamics Inc. to revamp push-pull pickle line at the Columbus, MS (USA) works

BTU Bridle Technology is going to design, construct and supply three Umlauf Bridles for a revamp of a push-pull pickle line operated by Steel Dynamics Flat Roll Group (SDI). After the revamp that pickle line will be the first in the world to use exclusively Umlauf Bridles to transport the strip through the line



The elastic padding of the crawler apply high forces without damaging the surface of the strip (© Pictures by courtesy of BTU Bridle Technology)

BTU Bridle Technology has received an order from SES Engineering covering the design, construction and supply of three Umlauf Bridles for a revamp of a push-pull pickle line at the Columbus, Mississippi (USA) site of SDI Flat Roll Group. SDI expects from the pickling line revamp in Columbus/Mississippi, for which SES acts as general contractor, above all a solution capable of producing very high strip tension in the line. Therefore SES chose the Umlauf Bridle technology from BTU. Thanks to their special design, Umlauf Bridles of the latest 3.0 generation are able to apply

much higher forces onto strip in processing lines than conventional bridle roll units. What is more, Umlauf Bridles distribute the strip tension extremely uniformly across the complete width of the strip. The bridles build up a strip tension high enough to ensure that also thick-gage and high-strength strip will leave the pickle line leveled.

The first of the three Umlauf Bridles will be arranged directly behind the pay-off reel. There it will immediately bite the very first centimeters of the head of the up to 13 mm thick and up to 1,880 mm wide strips and guide them into the stretch-leveler. (The stretch-leveler will be supplied by SES.) In connection with the second Umlauf Bridle arranged behind the leveler, strip tensions of up to 1,250 kN can be reached during stretch-leveling. A very intensive scale breaking ef-

fect will result from the thus achieved elongation rates of 0.5 to 1.0 percent. This will make it possible to operate the line at speeds of up to 150 m/min. As the strip is actively pulled through the leveler by the Umlauf Bridle, no roller drive equipment is required in the leveler. This reduces investment and maintenance costs and prevents roller slipping.

The second Umlauf Bridle pushes the leveled strip into the pickling tank, and the third one will be arranged at the run-out to bite the head of the pickled strip and guide it into the recoiler. At the same time, it creates the strip tension needed to produce exactly wound coils.

Daniel Cullen, Senior Sales Manager of SES Engineering, explains the reasons for choosing the Umlauf Bridle technology: “The most important aspect for us was to find a technology that would be able to reach very high strip tension and allow us to control that strip tension in a very precise way. Apart from that, the simplicity of the Umlauf principle convinced us: we will be able to set the right strip tension exactly where in the line we need it – without any conventional bridle rolls, driven rollers in the leveler or an additional braking unit. Moreover, in future stretch-leveling will require less strain energy as there is no bending of strip in the Umlauf Bridles.”

According to Michael Umlauf, Commercial Manager of BTU Bridle Technology, by moving the strip exclusively in a linear way the Umlauf Bridles are superior to bridle rolls in several respects: “Using Umlauf Bridles in connection with stretch-levelers means that leveling is performed primarily by stretching and only to a minor degree by bending. Actually, up to 90 per-

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cent of the leveling work comes from the stretching effect.”

The pickle line is scheduled to come back on stream after the revamp in January 2019.

**The Umlauf principle**

Umlauf Bridles consist of two crawler-type units covered with an elastic coating. One unit is arranged above and one below the strip. They guide and transport the strip linearly, i.e. without any deflec-

strip head. This significantly increases the usable coil length, in other words the yield. In certain strip processing lines this may lead to a plus of 20 meters per coil.

Umlauf Bridles can be rotated very precisely through their vertical axis, for example, in order to reduce strip camber during leveling or adjust the strip position during side trimming. At cut-to-length lines, they position the strip edge perfectly perpendicular to the shear. The advantages of this solution: perfectly rectangular cut-to-length strip.

winding of the strip and wind the strip with the correct tension. As Umlauf Bridles can be rotated through their vertical axis, the position of the strip in the recoiler can be adjusted within a tolerance of ± 1 mm. Moreover, Umlauf Bridles are able to apply virtually any required tension onto the strip.

As Umlauf Bridles are able to apply very high tension in a precisely controlled way, it is possible to adjust the tensile and compressive forces as re-



The first unit is arranged directly behind the pay-off reel; the second one pushes the leveled strip into the pickling tank



The third Umlauf Bridle, arranged at the run-out, creates the back-tension needed to produce exactly wound coils

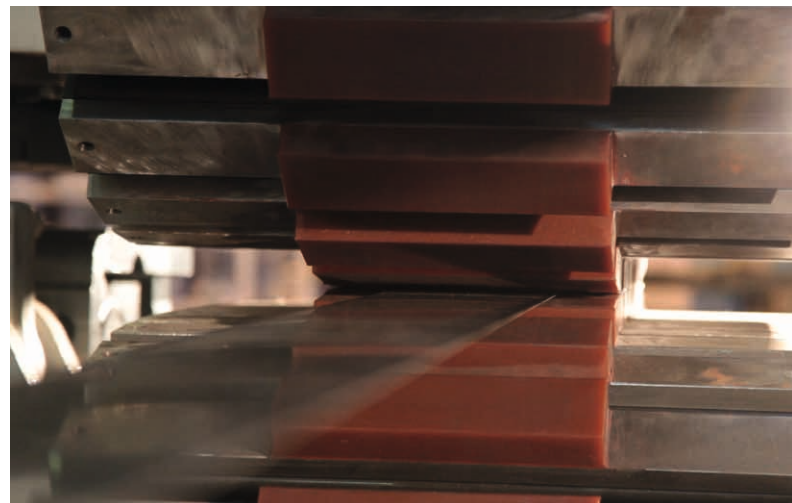
tion, at different positions within strip processing lines. Thanks to their extreme compactness, they can be arranged at virtually any position in the line.

By applying the force over an area – and not concentrated in one point – any local concentrations of forces or relative movements between the crawler unit and the strip surface are prevented. Therefore, the risk of surface damage is ruled out, making this technology highly suitable for delicate strip surfaces.

A single Bridle unit may be used to apply large forces to the strip, for example, in order to pull it through side trimmers, slitting shears or levelers. This aspect is of particular interest especially when processing thick strips. The unit may also be installed to decouple the strip tension of a line section from upstream processes or even reduce the strip tension to “zero”. By this means, an Umlauf Bridle makes it possible, for example, to measure the flatness of the strip without any interfering effects.

As the Umlauf Bridles are arranged within the strip processing line, they build up strip tension before the coiler bites the

An Umlauf Bridle consists of a pair of crawler-type units covered with an elastic coating



**Last but not least: perfectly wound coils**

Umlauf Bridles ensure high-precision strip steering and high strip tension to produce straight-edged, tightly wound coils. An exactly wound coil is an indicator of good quality.

The most critical aspects in strip coiling is to achieve straight-edged

quired within wide ranges. The extremely uniform distribution of the linear tensile forces also make for a better rolling result. Also, Umlauf Bridles perform other important functions along strip production and processing lines: They provide high process safety, increase the plant throughput and simplify the plant layout. ■