



## Helping our customers remain competitive

Timken is committed to providing our customers with value-added solutions that improve operating efficiency and lower maintenance costs. We offer a range of products, services and programs to help solve our customers' problems.

In addition to our full line of bearings, we offer services including chock and roll repair, chock bearing maintenance programs, bearing repair, reliability services and condition monitoring systems.



**TIMKEN**  
Where You Turn

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Precision Components • Seals •  
Lubrication • Industrial Services •  
Remanufacture and Repair

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## Flatten Mill Expenses with Roll Overlay Services



- New and repaired rolls for industrial applications
- Increase roll life up to five times compared to a standard newly manufactured roll
- Save up to 60 percent versus the cost of new rolls



## Increase Productivity and Lower Costs

Timken provides new and remanufactured rolls for steel and paper mills and other industrial applications. Through our dedicated roll facility, we remanufacture cast, forged-fabricated and weld-overlaid rolls up to 20 tons in weight and 21-feet long.

Timken's roll repair and overlay operations deliver high-quality, reliable and cost-effective solutions to maximize roll life while keeping downtime and repair costs to a minimum. When original rolls are worn down to a minimum diameter, roll overlays can save up to 60 percent compared to the cost of scrapping them and buying new.

## Ensure Roll Precision and Durability

Timken takes pride in delivering high-quality new and remanufactured rolls to our customers. We use a submerged arc weld and closely control and monitor the roll throughout the entire process. To ensure the integrity of the welds, the entire roll repair process is automated and microprocessor controlled. To maintain the proper metallurgical properties of the resulting welds, preheating temperatures, interpass temperatures and post welding tempering cycles are carefully monitored.

**Our overlay and remanufacture process takes the following steps:**



1 The roll is cleaned and degreased.

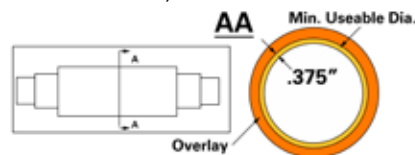


2 Dimensional measurements are taken and visually inspected for wear and cracks.

3 Spectro-analysis is conducted on the roll material. Other inspection techniques are also utilized, as necessary.

4 If the roll was previously hardened, the roll body is annealed.

5 The roll body is undercut by up to .75 inches (.375 inches per side) under minimum usable diameter and prepared for overlay. There is no limitation of thickness for the weld overlay.



6 The roll body is preheated and overlaid with the appropriate material.



7 The roll body is furnace tempered to desired hardness. The hardness is maintained during the weld deposition.

8 Material is inspected for stock thickness, machined, checked and recorded for hardness.

9 Roll body is re-machined to specified diameter and journals are polished or machined as required.



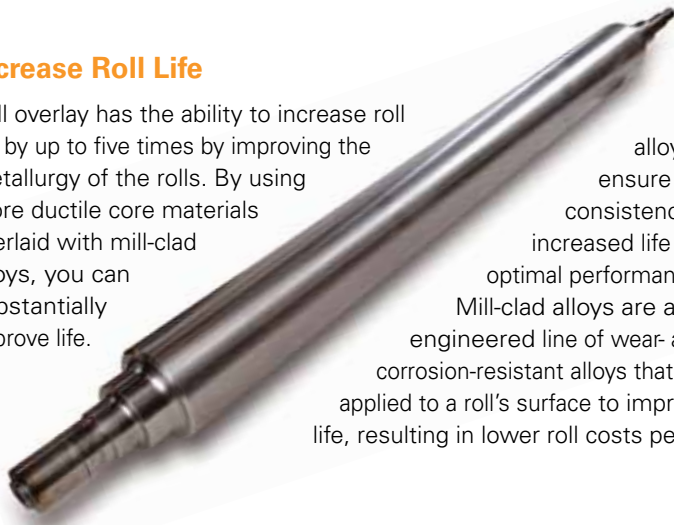
10 All edges are deburred, surface is painted and final inspection is completed.

11 The roll is preserved and prepared for shipment.



## Increase Roll Life

Roll overlay has the ability to increase roll life by up to five times by improving the metallurgy of the rolls. By using more ductile core materials overlaid with mill-clad alloys, you can substantially improve life.



Mill-clad alloys help ensure metal consistency for increased life and optimal performance. Mill-clad alloys are a highly engineered line of wear- and corrosion-resistant alloys that are applied to a roll's surface to improve life, resulting in lower roll costs per ton.



## Typical Overlay Selections

Clad Number	Hardness	Typical Applications
#3 Stainless	40/45 HRC	High-heat areas, caster rolls
#4 Tool Steel	50/60 HRC	Down-coiler pinch rolls, straightener rolls, wrapper rolls, pulling & leveling rolls
#8 or #9 Stainless	48/56 HRC	Leveller rolls, table rolls, edger rolls, shelled caster rolls
#17 Tool Steel	50/60 HRC	Down-coiler pinch rolls

## Wheeling-Pittsburgh Rolls Smoothly with Timken Solution

From reheat to down coilers, quality is imperative during every stage of the steelmaking process. If any part of the process is weak, it can plague production and be detrimental to quality and the bottom line. Faced with the high frequency of maintenance-related issues and costs of its coiler pinch rolls, Wheeling-Pittsburgh's hot strip mill easily identified this area as a trouble spot.

As the last step in forming the steel to coils, the coiler pinch rolls are critical for achieving quality and proper shape. Although two sets were in place to enable the mill to run faster, the cast-iron rolls in the coiler-pinch-roll position of both the mill's down coilers needed to be changed every one to two weeks due to excessive wear

Familiar with the application, Timken had a design in mind with a special steel overlay to combat the chronic wear problem of the rolls. When it offered the mill an alternative roll that would provide 200 to 300 percent improvement in the roll life, Wheeling-Pittsburgh was a bit skeptical, but agreed to a trial of the proposed steel-clad rolls.

Within a few months, two sets of test rolls were in place. Dressed with Timken's mill-clad alloy overlay, the rolls ran for 12 weeks before being removed for evaluation. After 12 weeks of operation, the rolls were checked for wear. The bottom rolls were worn just 0.034 inch and 0.050 inch while the top rolls showed no significant wear. Compared to the previous wear of

0.1 inch and 0.12 inch in one to two weeks, the solution succeeded in providing the mill with longer service life.

The rolls can be redressed after being worn to predetermined minimum diameters. With the wear diminished, rolls now can last approximately 16 to 20 weeks before being redressed and years before being reoverlaid. When required, the rolls are reoverlaid at a significant savings versus buying new.

"We have our own fires to put out day in and day out at Wheeling-Pittsburgh," said the process manager of the hot strip roll and bearing shop. "Having a partner who contributes in such a way is invaluable."