NEWS VIEWS

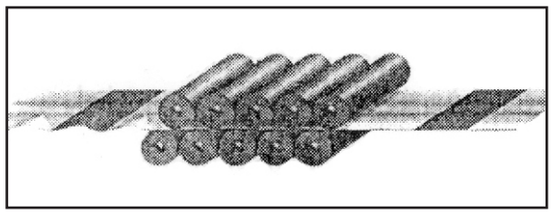
No. 24 (a) w.e.f.: 01/03/2011

Determination to Establish Excellence
Through Efficiency and Expertise

ISO-9001:2000

LEVELLER / STRAIGHTNER ROLLS

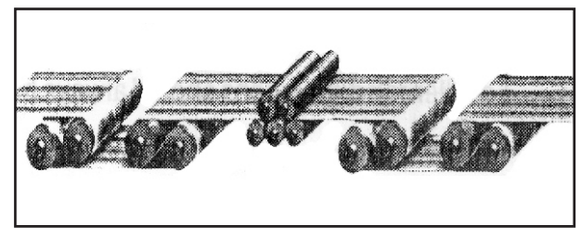
Levellers are meant for levelling strip. The process of levelling has two purpose. First, to make the surface flat and second, to neutralize hidden internal stresses, causing shape defects i.e. center buckle, edge wave, cross bow etc. Levelling is achieved by precisely bending metal strip back and forth as it is passed through a series of small-diameter offset rolls. A leveller uses adjustable pressure points called flights, under the rolls, to raise and lower them to a precise position. Mainly, there are three types of levellers named after their method of shape correction in the process.



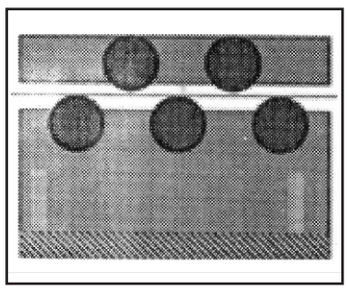
Levellers used in roller levelling shape correction method are called **Roller Levellers**. They operate at moderate speed. Roller levellers can be used for a certain amount of shape correction. Roller leveller can not change camber in a strip.

Levellers used in shape correction are called **Tension Levellers**. In tension levelling, the shape correction process is performed under tension. The tension is accomplished by establishing a speed differential between the entry and exit bridle rolls. Tension levelling equipment typically has several bridle rolls before and after the bending rolls, as shown in figure-1.

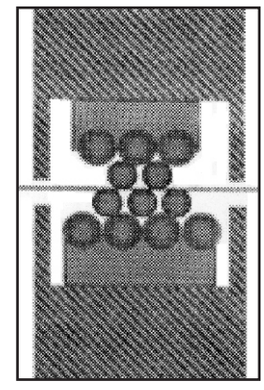
Stretch Levellers are normally used for stretching sheets and plates.



The roll configuration depends upon the type of levelling machine used for required shape correction. In simplest roll configuration, generally five to nine rolls are spread over center equally, which are supported by their end bearings. No back-up roll support is required in these type of machines. These rolls are generally large in diameter.



Where shape correction in terms of length and width is required, back-up rolls are also supported. Here the rolls are smaller in diameter and closer. They are generally 11 to 19. They are usually driven. There can be four high, five high and six high leveller configurations depending upon the precision levelling application.



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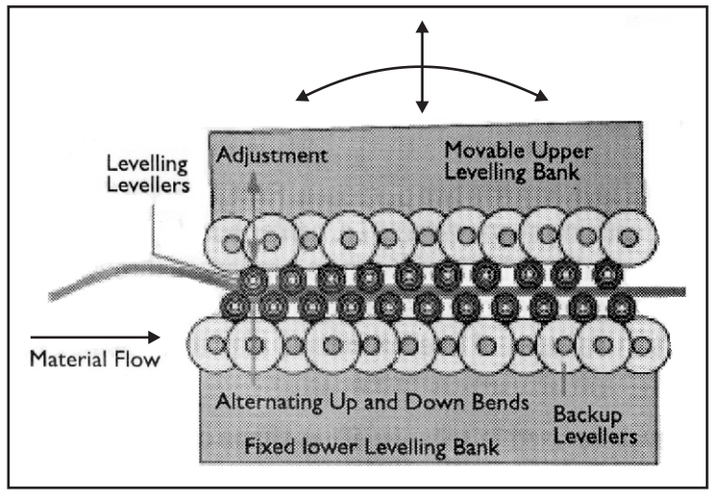

DeeTee makes leveller rolls in SAE-52100/100 Cr 6/1.2067/En-31 material, induction hardened to keep core soft which makes leveller rolls tough to avoid breakage yet having hard skin to resist wear and abrasion. Induction hardened leveller rolls are straighter, harder and more wear resistant than those treated in the conventional heat treatment. Skin hardness is kept 61-63 HRC and depth of hardness is 2/3 mm. The core hardness and depth are very important. Flame or batch hardening is not recommended.

After induction hardening, rolls are tempered twice to achieve well tempered Martensite Matrix. Leveller rolls at DeeTee are passed through center less grinder to get straightness within 0.1 mm.

Leveller rolls should pass through Non-Destructive Testing (NDT) such as magnetic particle testing and ultrasonic testing for detecting surface and sub surface defects. DeeTee conducts both NDTs for producing defect free rolls. DeeTee has facility to supply hard chrome plated rolls as well. A flash chrome of 20 to 30 microns is usually sufficient.

Leveller roll dimensions should always be in close tolerance, i.e. -

- **Cylindricity : 10 Microns**
- **Straightness : 0.1 mm**
- **Surface Finish : 0.4 Ra**

Diameters should be ground as matched set. Regrinding of these rolls require the same expertise as the original manufacturing. Usually 2 to 3 regrinds can be expected from a roll.

Recommended hardness configuration of these rolls is as under :

- **Work rolls : 61-63 HRC**
- **Intermediate rolls : 59 to 61 HRC**
- **Back-up rolls : 54 to 58 HRC**