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Service Life Extension Techni ques for Cold-Rolling Rolls

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Synopsis :
Research on the various types of rolls in the cold rolling process has been underway to develop materials and surface reforming te chniques that can meet the needs for higher-quality sheet steel and surface-treated steel sheets, and improve productivity by extending the periodical repair intervals. No nwoven-fabric rolls that excel in rigidity, wear resistance, and corrosio n resistance were developed as wringer rolls based on a theoretical elucidation of a wringing mechanis m. For bridle rolls th at control the strip tension on the production line, surface reforming techniques were developed to improve the slip resistance. These include thermal spra ying of WC type cermet to maintain the optimal surface roughness and shape, platin g, and roughness preparation techniques. Developed for conducto r rolls was a coating formation me thod in which a WC-containing self-fluxing alloy is plasma sprayed and fuse d to obtain dramatic corrosion and wear resistance. These actions produced highly re liable rolls with a long service life for the cold rolling process.

The body can be viewed from the next page.

picking and alkali-rinsing lines. Therefore, the roll sur-

face requires high rigidity to optimize the wringing function on the sheet surface, and suitable elasticity to prevent the solution from wrapping around both edges of the strip.

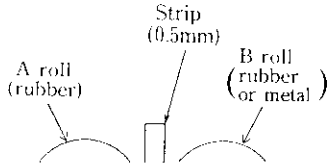
When high pressure is applied to increase the wringing function, the edge of the strip develops partial wear[1] and cuts; hence wear resistance and cutting resis-

within a suitable range for a long period, and abrasive wear resistance are both required. In the past, Cr-plating has been applied, but this showed insufficient abrasive wear resistance.

The conductor roll, which becomes an electrode in the manufacture of electrogalvanized sheets, must be made of a material with good electric conductivity. This

3 Extending the Service Life of Wringer Rolls

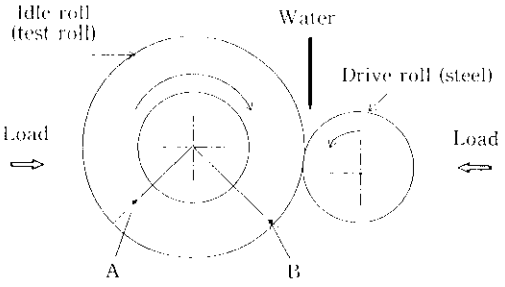
3.1 Examination of the Wringing Properties



Material	Hardness* H_s (JIS A)	Elastic coefficient (N/mm^2)	Temperature of heat resistance (°C)
Nonwoven fabric	95	1000	375
Rubber (CR)	75	4	120

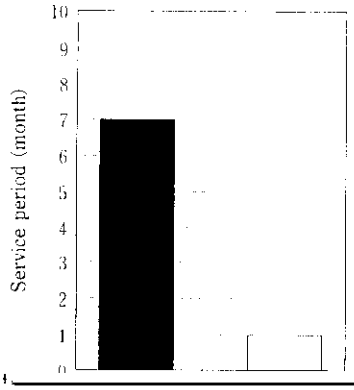
* JIS K6301

steel sheet when a high-rigidity material is used on one side only under the same line pressure. From these results, it can be seen that, in order to improve the wringing properties, the roll rigidity must be increased and in order to obtain the same wringing properties with a high-rigidity roll, the line pressure can be reduced.



A, B : a position of thermo couple

Fig. 6 Schematic diagram of measurement of the temperature of wringer roll



fabric rolls rolls

tion coefficient drops to less than 0.2. This is in compar-

0.24.

Therefore, in order to produce a surface roughness profile similar to that of the Cr-plated roll, two times buffing was necessary.[12,13] In addition, Cr-plating was

5.1 Selection of Covering Materials and Thermal Spraying Methods

The conductor roll requires corrosion resistance and

6 Conclusions

supply of high-quality cold-rolled steel products and more stable plant operation. The authors would like to express their deep appreciation for kind and valuable