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High Speed Production Technology for ERW Stainless Steel Pipes  
without Lubrication

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Synopsis :

In order respond to the tendency of using stainless steel for automotive exhaust pipes, a technology of manufacturing high quality ERW stainless steel pipes has been needed. Roll marks and penetrator defects of welded seam due to formation of oxides easily occur during the manufacture of ERW stainless steel pipes because the physical properties of stainless steel are different from those of carbon steel. In the conventional forming process, lubrication is necessary to prevent roll marks. However lubricant is a cause of deterioration of welded seam quality. Kawasaki Steel developed a mill using a new forming process. It is the CBR (chance-free bulge roll) forming mill that can manufacture high quality ERW stainless steel exhaust pipes with excellent formability. It has achieved high quality of welded seam in welding with a speed as high as 110 m/min and the suppression of roll marks without lubrication.

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# High Speed Production Technology for ERW Stainless Steel Pipes without Lubrication\*



*Synopsis:*

*In order respond to the tendency of using stainless steel for automotive exhaust pipes, a technology of man-*

This enabled ERW stainless steel pipes of excellent

Edge

Center bend roll

Fin pass roll

This reports describes the high-speed tube production



$\sigma_1$ : Stress in longitudinal direction  
 $\sigma_2$ : Stress in circumferential direction

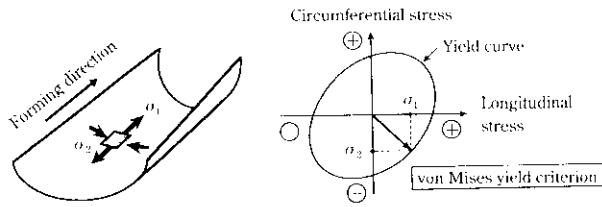


Fig. 6 Mechanism of decrease in strip width in cage roll forming zone

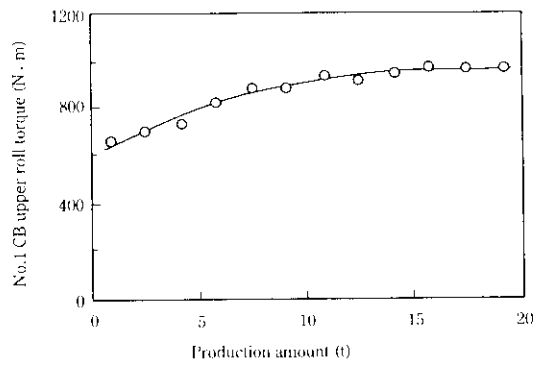


Fig. 7 Effect of pipe production amount on roll

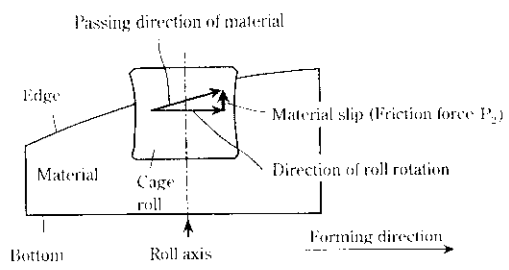
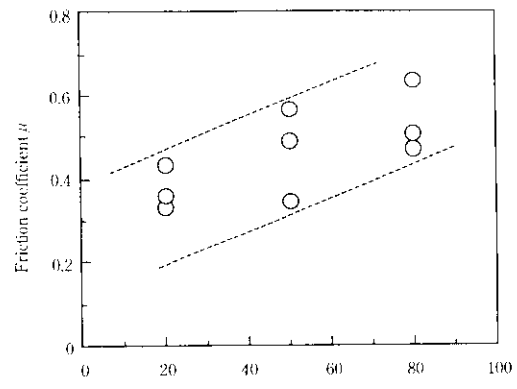


Fig. 9 Formation mechanism of friction force acting on cage roll









tems that must provide high formability, a high-speed stable tube production technology without the lubrication

that has various excellent characteristics as mentioned above

tion of forming rolls was established, and the quality characteristics of product pipes were investigated. The following results were obtained:

(1) The formation of roll marks was suppressed by cage roll forming and bulge roll forming and the preven-

#### References

- 1) K. Asakura: *Metals & Technology*, **62**(1992)11, 2
- 2) H. Ishikawa: *CAMP-ISIJ* **A0199136**, 1760