KAWASAKI STEEL TECHNICAL REPORT No. 20 June 1989

Development of Drive Roller Shoes in the Cross Helical Rolling Mill for Seamless Steel Pipe*

Synopsis:

In the hot-rolling process of seamless steel pipe by the helical rolling mill using fixed guide shoes, there are some problems due to galling between the shoes and pipe such as (1) occurrence of outside surface defects of pipe, (2) lowering of the operation rate, and (3) a decrease in shoe life. To solve these problems, unique drive roller shoes were developed and applied to the elongator in our

2 Features of Various Kinds of Guide Shoes

Schematic diagrams of the conventional fixed shoe and disk shoe[8] and the recently developed drive roller

comparison of the relative velocity of the hot shell and the respective guide shoes in elongator rolling.

While the fixed shoe is in contact with the hot shell at a high sliding friction, the drive roller shoe is subject

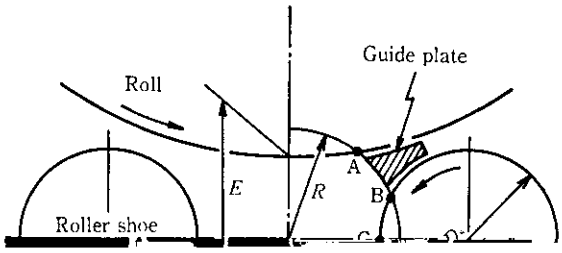
decrease in sliding friction. This is because friction in

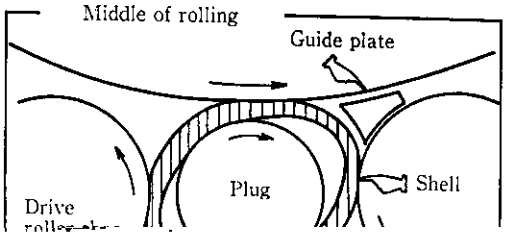
the circumferential direction, which accounts for the greatest part of sliding friction, has been markedly decreased. Further, since the contact surfaces between

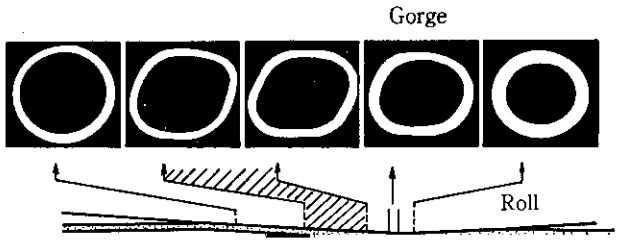
sizes 7″ to 16 3/4″ at the Medium Diameter Seamless Pipe Mill, are 195, 260, 350 and 425 mmϕ, based on the following three points:

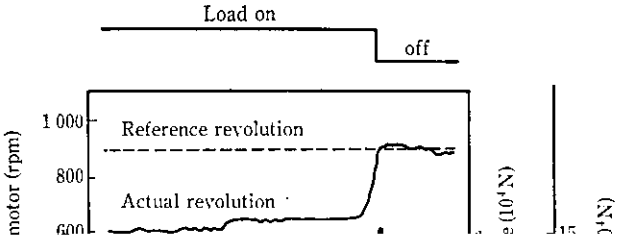
the hot shell and chrome steel work with the

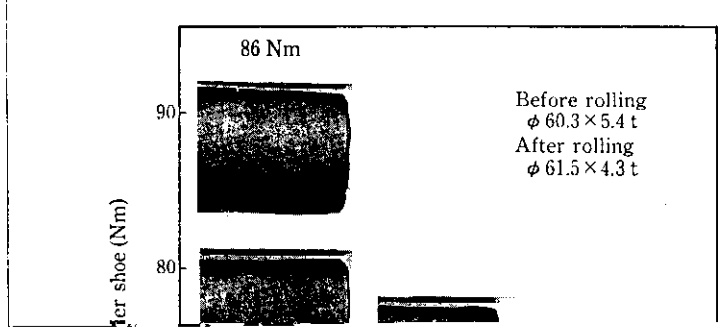
(1) Wh

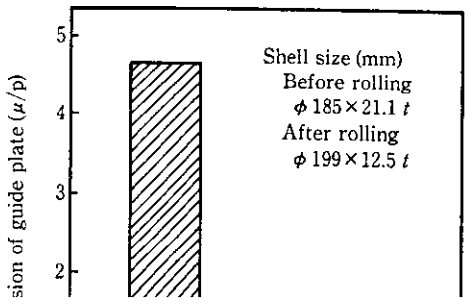

Roll
Guide plate
A
B
E
R
Roller shoe

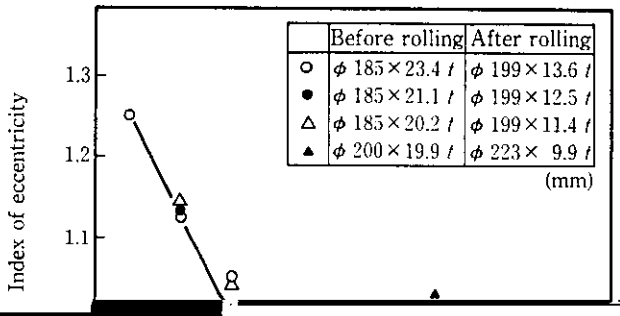

Middle of rolling
Guide plate
Plug
Shell
Drive


Gorge
Roll


Load on
off
1 000
800
600
Reference revolution
Actual revolution
motor (rpm)


86 Nm
90
80
Before rolling
φ 60.3×5.4 t
After rolling
φ 61.5×4.3 t


5
4
3
2
Shell size (mm)
Before rolling
φ 185×21.1 t
After rolling
φ 199×12.5 t



7 Conclusions

To solve problems arising from scoring of the fixed shoes used in the cross helical rolling mill, a drive roller type guide shoe (DRS) has been developed and applied at the Medium Diameter Seamless Pipe Mill at Chita Works. The results of this development are summarized below.

(1) The drive roller shoe consists of driven roller shoes,