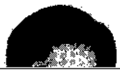
KAWASAKI STEEL TECHNICAL REPORT No. 16 June 1987

Development of Computer Control Techniques for Tandem Mill with Grooved Rolls*


Synopsis:

Kawasaki Steel has recently developed

roll-chance free function permitted by rapid stand

2 Configuration and Aims of the Process

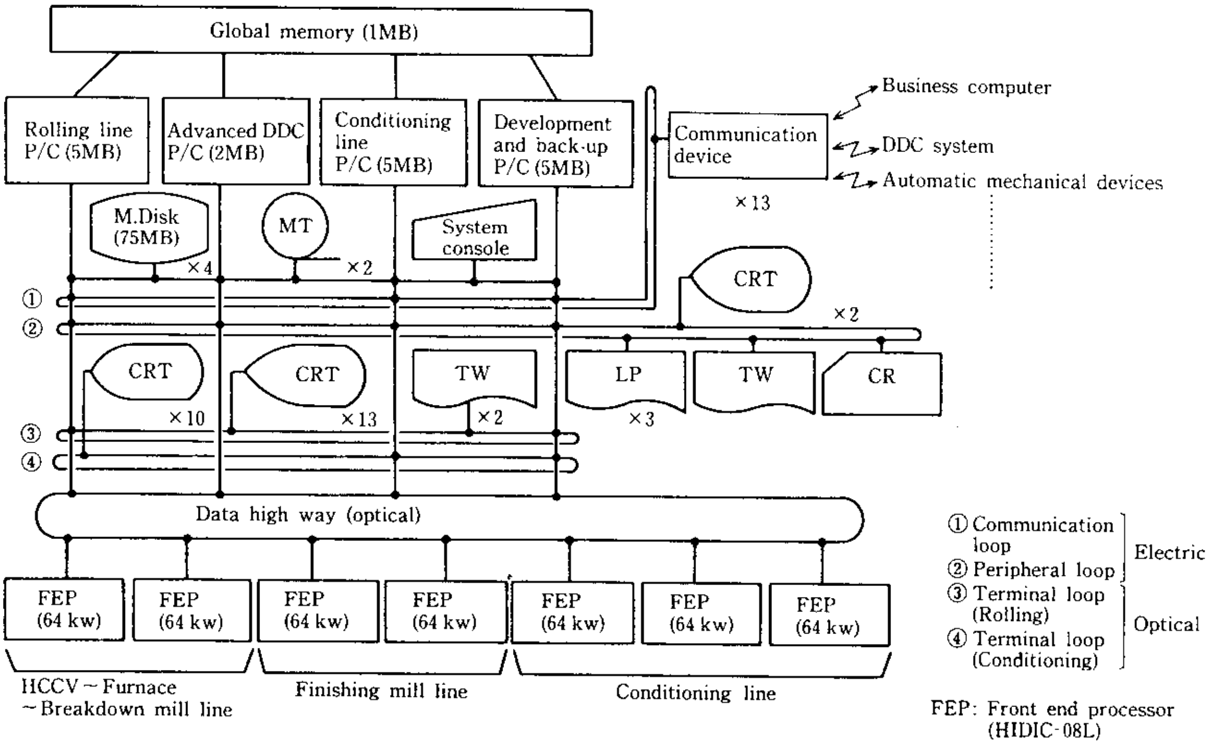
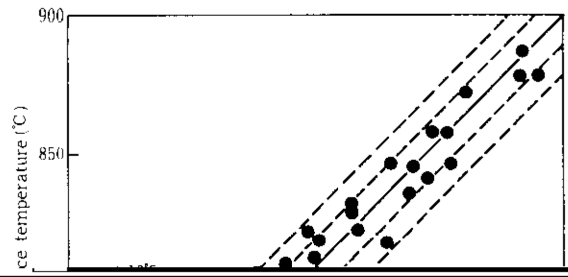


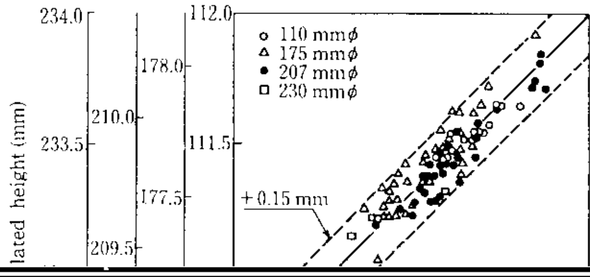
Fig. 2 Configuration of the billet mill process computer control system

Table 1 Specifications of the finishing mill

Equipment	Specifications		
	Maker	:	IHI
	Unit	:	4 × 2

trol after-rolling dimensions to aimed values, regardless of such variables as material temperature, metallurgical composition, and roll diameter. The essential part of the set-up control for this purpose comprises sophisticated mathematical models to precisely predict such rolling


900
850
ce temperature (°C)


234.0
233.5
210.0
209.5
178.0
177.5
112.0
111.5
lated height (mm)
110 mmφ
175 mmφ
207 mmφ
230 mmφ
+0.15 mm

$\overline{l_d}$: mean projected length of contact

α: coefficient dependent on caliber type

actual rolling data.

(5)

Fig. 6, when material temperature is less than about 850°C, width variation characteristics depend on material temperature. Since it can be considered that this temperature dependence is due to the influ-

C: carbon content

ε: strain

B_K: groove width of grooved roll

As shown in **Fig. 7**, the precision of the width spread

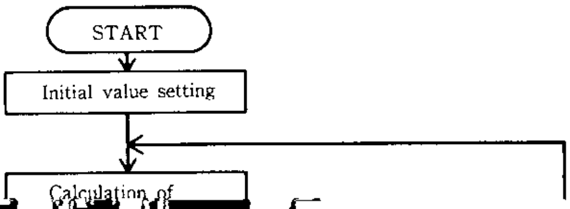
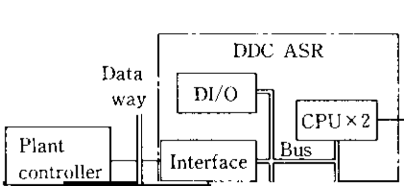
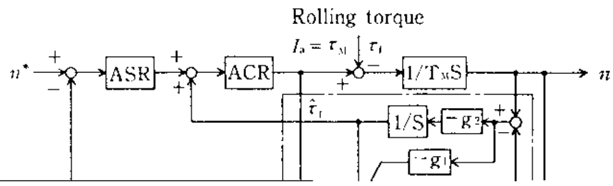


Table 2 Examples of calculated data by set-up control

Case	Stand	Height (mm)	Width (mm)	Temp (°C)	Load (t)	Roll gap (mm)	Roll speed (rpm)
I	V1	115.1	150.1	830	386	9.3	14.90
	H2	122.5	132.5	837	363	7.7	17.81


DDC ASR
Data
way
DI/O
CPU×2
Plant
controller
Interface
Bus
CONV 1
CONV 2
INV 1
INV 2


Rolling torque
$I_a = \tau_M$
τ_l
n^*
ASR
ACR
1/T$_M$S
n
$\hat{\tau}_l$
1/S
$-g_2$
$-g_1$

tension which cause dimensional variations in actual rolling, it is difficult to measure actual tension, and the

roll gap control (i.e., AGC), as used practically in flat rolling, to a V-H tandem mill with grooved rolls.

0.2 mm

the material dimensions and profile actively; in other