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Deformation of Slab under Heavy Reduction of Width by Sizing Press

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Kawasaki Steel Corp. and Hitachi Ltd. have developed the slab sizing press for the first

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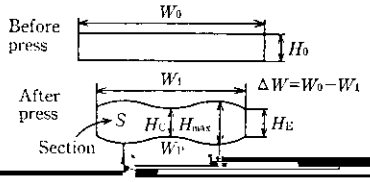

Before press
W_0
H_0
After press
W_1
$\Delta W=W_0-W_1$
S
H_C
H_{max}
H_E
Section
W_C

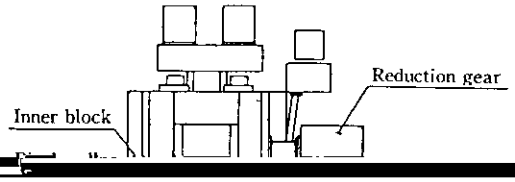
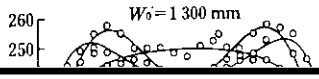
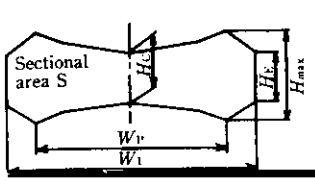
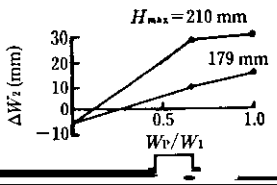
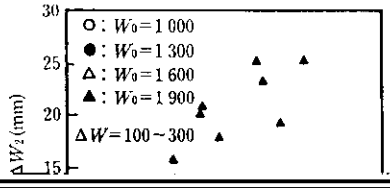

Reduction gear
Inner block

Table 1 Experimental conditions (1/10 model)




Sectional
area S
H_1
H_2
H_{max}
W_P
W_1


H_{max}=210 mm
179 mm
ΔW_2 (mm)
30
20
10
0
−10
0.5
1.0
W_P/W_1


○ : W_0=1 000
● : W_0=1 300
△ : W_0=1 600
▲ : W_0=1 900
ΔW=100～300
ΔW_2 (mm)
30
25
20
15

$$\Delta W_d = W_0 \left\{ \left(\frac{H_0}{H_2} \right)^{\beta} - 1 \right\} \cdots\cdots\cdots\cdots\cdots\cdots (5)$$

$$\beta = a_3 \left(\frac{W_0}{\quad} \right)^{a_2} \exp\left(a_3 \cdot \frac{H_0}{\quad} \right)$$

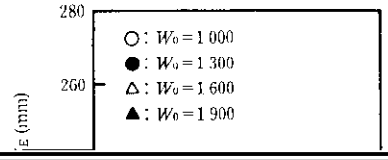


Table 3 Conditions of actual press test

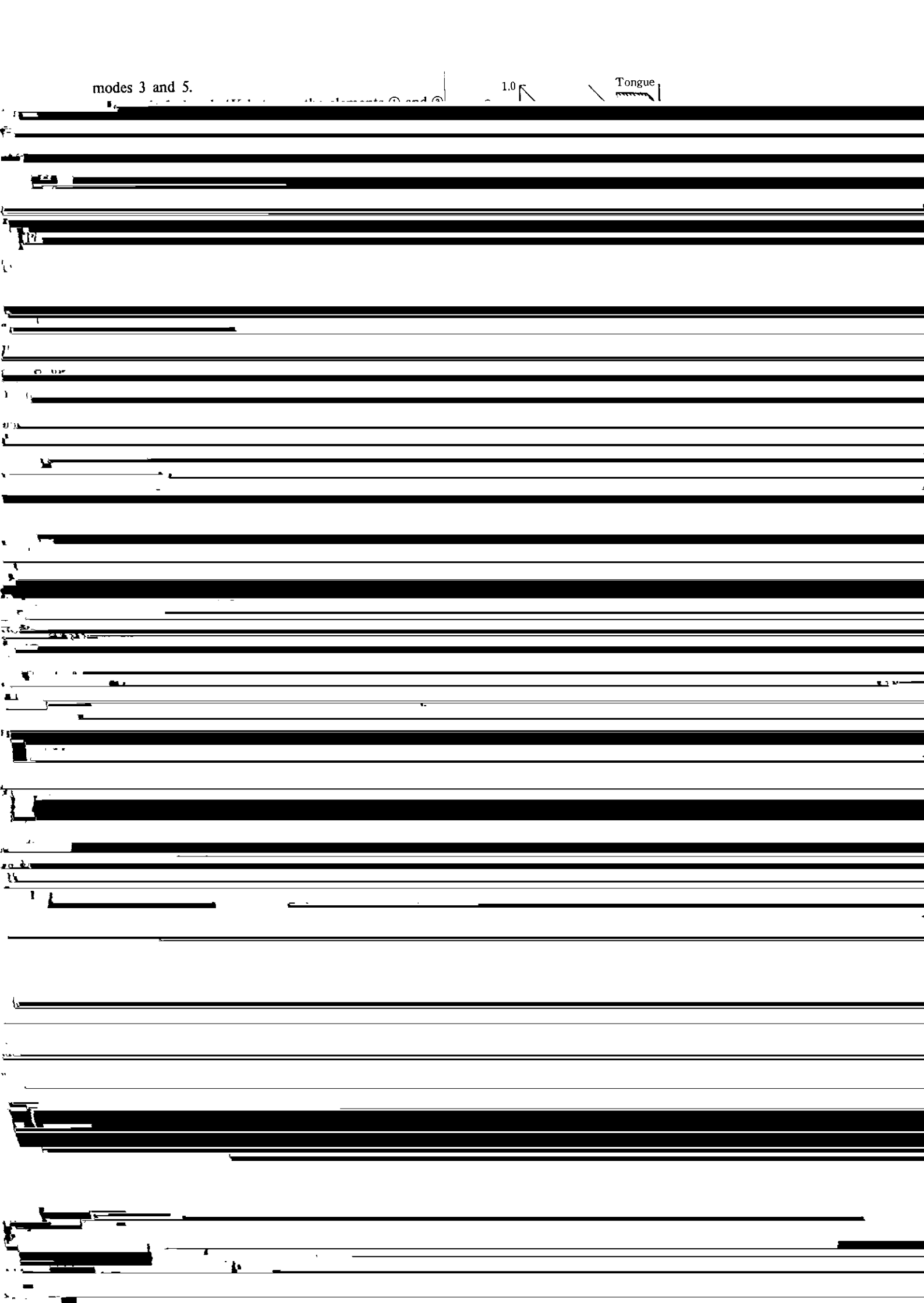
Specification	Amplitude	100 mm
	Anvil frequency	0.7 Hz
	Entrance angle of anvil	13 degree
	Exit angle of anvil	19 degree
	Parallel length of anvil	450 mm
	Material	Ultra low carbon~high

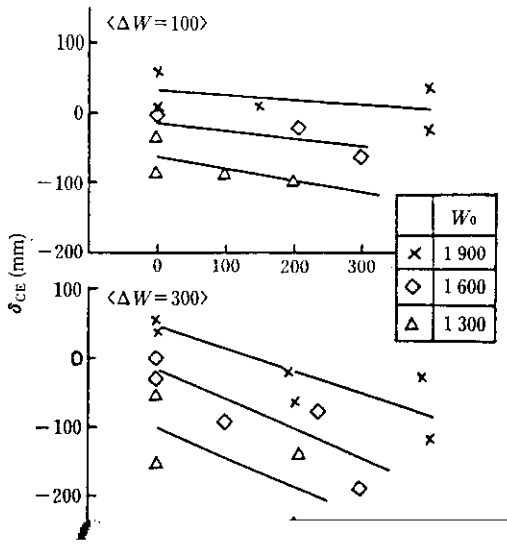
The above-mentioned equations are used in the process computer for sizing press setup at the actual mill.

4 Deformation of Nonsteady Portions of Slab

Parameters for the preforming of the leading and tail ends of the slab are the reduction and contact length in preforming. The former is closely related to the width

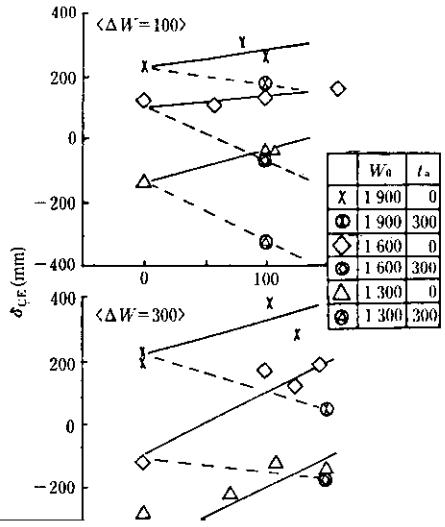
modes 3 and 5.





(mm)

Fig. 13 Effect of pre-press condition at slab leading



Quantity of pre-press reduction at slab tail end, ΔW_T (mm)

Fig. 14 Effect of pre-press condition at slab tail end