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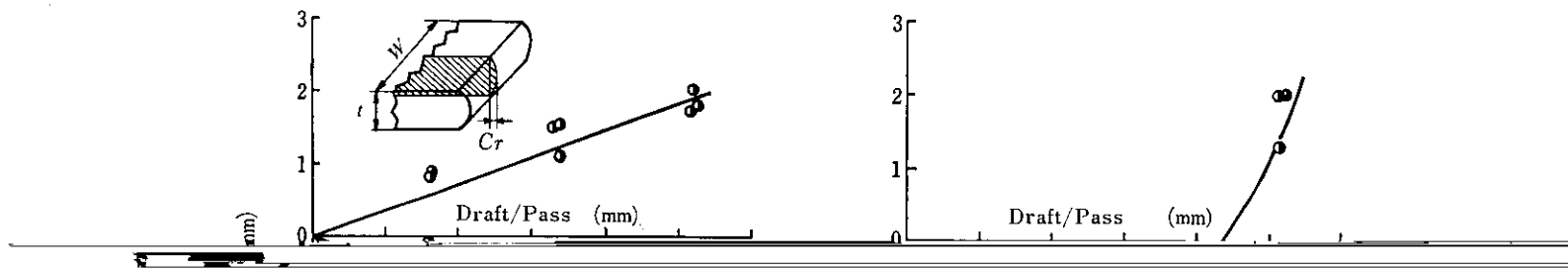
Rectangularity in Slab Rolling*

Shohei KANARI** Kenji KATAOKA** Kichizaemon NAKAGAWA**
Minoru MATSUZAKI*** Yasuo OGAWA*** Yoshio NAKAZATO***
Hideaki YOSHIMURA****

Overlap

Table 1 Experimental conditions


3
2
1
0
W
t
Cr
Draft/Pass (mm)
3
2
1
0
Draft/Pass (mm)

shown in (a) and the leading portion of an ingot, then

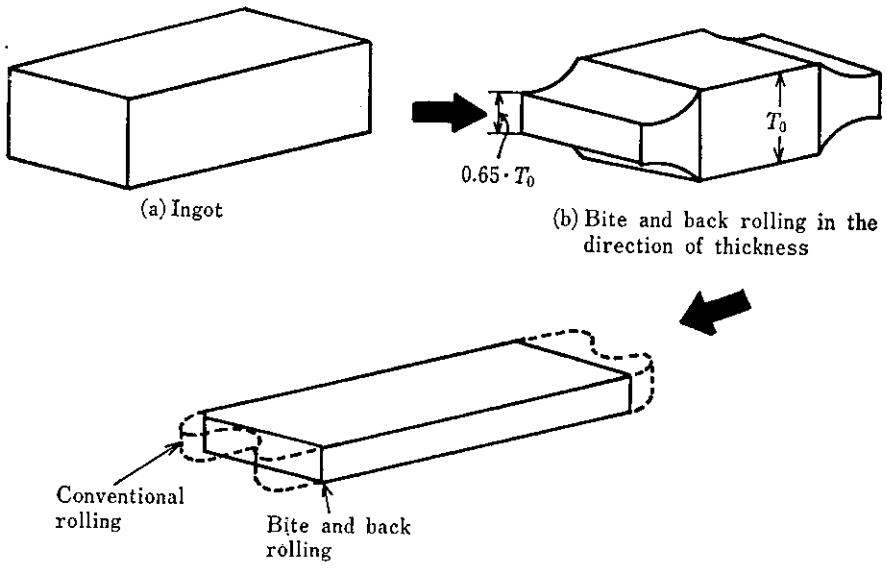
From the experimental studies mentioned in Chap-

material to make recessed portions. Then, shift rolls

rectangularity have been obtained:

(1) In view of the fact that crop length in the thickness direction at the center of the width direction be-

(b). Set rolls at a proper gap (T_2) and roll the portion not yet rolled in the reverse direction as shown in (c) so that the hatched areas ηA_1, ηA_3, A_4, and A_5, which



(a) Ingot

(b) Bite and back rolling in the direction of thickness

(c) Plan view pattern of slab

$$2(1-\eta)\Delta H_1^{3/2} - 3\Delta H_0 \cdot \Delta H_1^{1/2} - (1+2\eta) \times \Delta H_0^{3/2} = 0 \quad \cdots\cdots(7)$$

Here, numerical calculation is made under conditions of no swelling or no sagging of metal, that is, $\eta = 0$, and draft at the proper recess, ΔH_0, is approxi-

$$\Delta H_1 \fallingdotseq 1.866 \Delta H_0 \quad \cdots\cdots(8)$$

In order to prove the validity of eq. (8) by model

Proper biting-stop length, Ld, is obtained by eq. (10):

$$Ld = (2R \cdot \Delta H_1)^{1/2} \quad \cdots\cdots(10)$$

On the basis of this calculation result, succeeding model experiments and mill experiments were con-

actual-mill experiments was obtained as follows: Assuming that $R = 610$ mm and rolling reduction from the reverse direction $\Delta H_0 = 60$ mm, proper rolling reduction at the recess $\Delta H_1 = 62$ mm, and proper

3.2 Confirmation Experiments by Using a Model

Prior to actual mill rolling, model experiments were conducted for confirming the effectiveness of "Bite and Back" rolling.

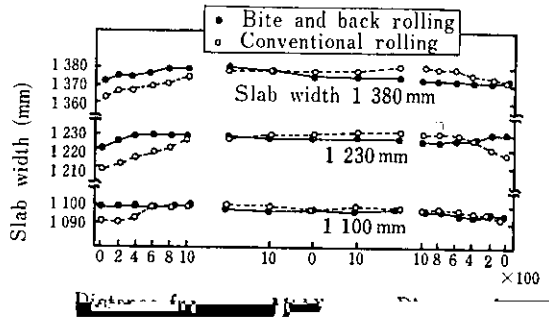
As the first step, efforts were made to clarify the effects of draft per pass and the number of "Bite and Back" rollings exercised upon the slab end rectangu-

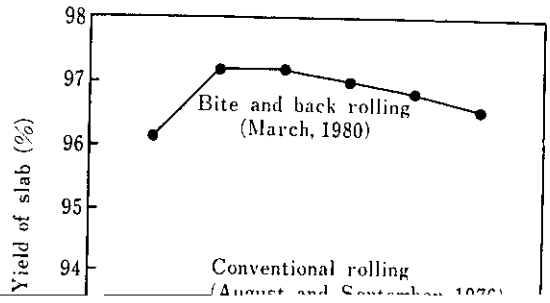
50 mm in thickness. Crop shapes on the width sides will give concave shapes under all conditions. These concave crops can be corrected if "Bite and Back" rolling in the width direction is properly incorporated in the "Bite and Back" rolling in the thickness direction.

As the second step, a rolling schedule was prepared which embodied the idea of the above

3.3 Mill Experiment

shows the rectangularity of the slab resulting from the rolling schedule of **Fig. 9**. **Photo. 3** proves that com-


• Bite and back rolling
○ Conventional rolling
Slab width (mm)
1 380
1 370
1 360
1 230
1 220
1 210
1 100
1 090
Slab width 1 380 mm
1 230 mm
1 100 mm
0 2 4 6 8 10
10 0 10
10 8 6 4 2 0
×100


Yield of slab (%)
98
97
96
95
94
Bite and back rolling
(March, 1980)
Conventional rolling