

KAWASAKI STEEL TECHNICAL REPORT

No.13 (September 1985)

Revamping of Billet Mill for a Continuous and Synchronized Operation

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Synopsis :

A modernization program for billet, bloom and shape products was established at Mizushima Works generally aiming at streamlining the complicated crisscrossing of in processes from the two continuous bloom casters to the succeeding rolling mills. A new billet mill, which was a significant part of this modernization, was brought into operation in February, 1984. The billet rolling facility has the "roll-chance-free" function in order to realize continuous and synchronized production between the continuous casters and the new billet mill. This new factory has realized drastically laborsaving and rationalization of handling and transporting by several new techniques, such as the highly computer controlled vehicle (HCCV) system, quick roll changing system, and automatic shipment system for round billets. Operation and information processing are fully computerized over the entire process from steel making to billet shipping. Operation of the new billet factory has brought much benefit in energy and laborsaving, high yield, higher productivity, and so on.

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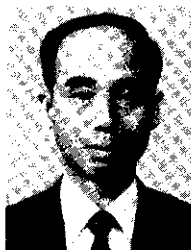
The body can be viewed from the next page.

Revamping of Billet Mill for a Continuous and

Synchronized Operation*



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1 Introduction

Manufacturing Department, Mizushima Works

Table 1 Product specifications

Materials	C.C. blooms	Thickness	Width	Length
		270 mm × 340 mm × 4	500~12	600 mm
		300 mm × 400 mm × 4	500~12	600 mm
		400 mm × 560 mm × 4	500~12	600 mm
	Ingot	5~25 t		
Product dimensions	Round billet	110~450 mm		
	Square billet	82~500 mm		
	Beam brank			
Capacity	First stage	120 000 t/month (at 270 t/h)		
	Second stage	150 000 t/month (at 310 t/h)		

* Mill capacity depends upon continuous casting capacity

- 1 HCCV
- 2 Continuous reheating furnace
- 3 Soaking pits
- 4 Roughing mill (BD mill)

- 13 VH hot saw
- 14 Automatic stamper
- 15 Cooling beds
- 16 Automatic labeller
- 17 Automatic labeler

- 19 Automatic press
- 20 Shot blast
- 21 Surface defect detector
- 22 Automatic conditioning device

- 6 Shear
- 7 BD hot saw
- 8 Turn table
- 9 Hot surface defect detector
- 10 Finishing mill (VH mill)
- 11 Roll changing device
- 12 Profile meter

18 Debaring machine

24 Shipping device

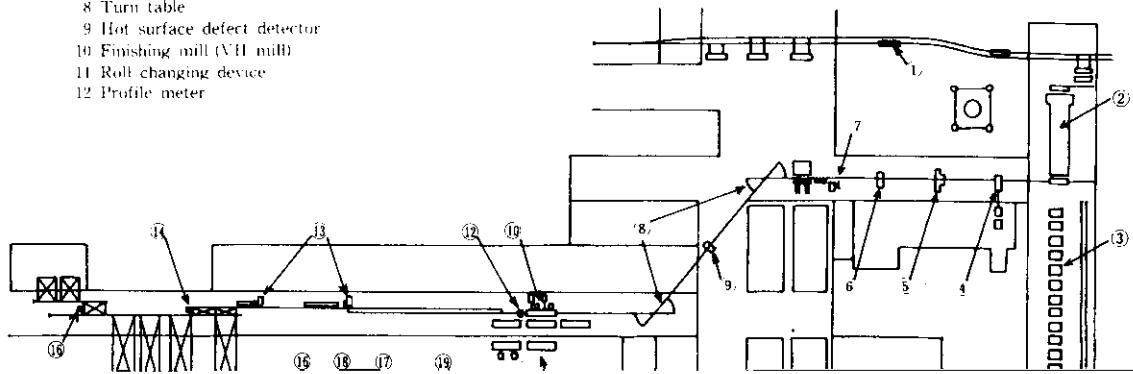


Table 2 HCCV specifications

Equipment	Maker	Unit	Specifications
HCCV	Toshiba	6	Type : Motor car of bogie type



- (1) The automatic positioning accuracy of screwdown was improved from ± 1.0 mm to ± 0.2 mm by applying digital control to the screwdown motor.
- (2) A preload motor was installed to permit roll gap calibration at a low speed of 0.5 mm/s. The preloading

adjustment function for each size to be rolled.



Table 6 Conditioning line facilities

Equipment	Maker	Unit	Specifications
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[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

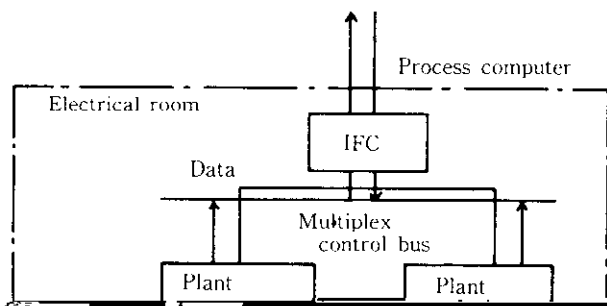
(1) Application of DDC by total adoption of plant standard.

(2) Adoption of wide-range speed controlled AC motor controllers. A vector control function was given

of high performance and high reliability. Some characteristics as DC motors were

equipment is concentrated in order to improve maintainability. In this mill, control equipment is

gathered in four electrical rooms. Signals are collected in each control room, achieving substantial economics in process input/output signal cables. The signals are transmitted to the plant controller by



remote I/O to increase efficiency.

3.10 Outline of Total System Configuration

In the new billet mill, product identification and quality assurance for each billet must be realized at high operation cycles while achieving synchronized and continuous operation in coordination with the continuous casters. To this end, it is necessary to meet the contradictory requirements presented by processing immense

rection implements in real-time. As a result units at the ... ing the progress of the start-up of the new billet mill

... parameter level or lower can perform process

tion, effective system development can be expected

occurred in large-section round bars in the initial

by setting enough period of time for debugging in trial operation.

stages of production. However, improvements have been made following a review of groove shapes and