

**KAWASAKI STEEL TECHNICAL REPORT**

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Development of Diagnosis Tech

# Development of Diagnostic Techniques for Hot Strip Mills\*



## Synopsis:

*Kawasaki Steel Corp. has developed the diagnostic techniques for the purpose of the failure prediction and performance assurance of device in hot strip mill of Chiba and Mizushima Works. Main diagnostic techniques are (1) performance diagnosis and diagnosis of bearing by AE*

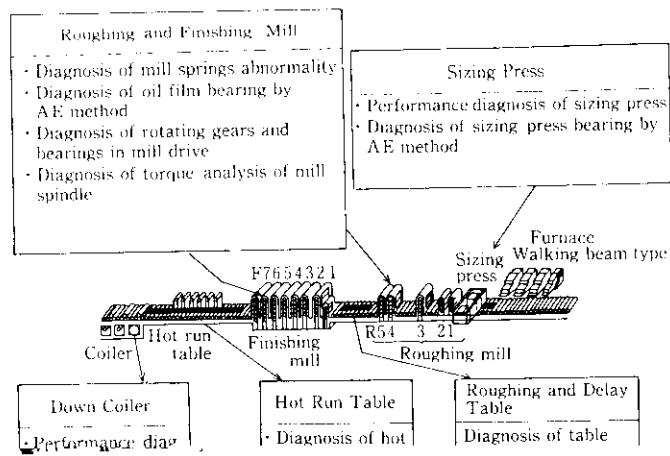


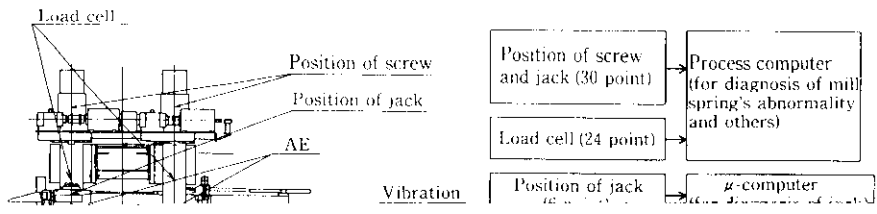
Fig. 1 Layout of hot strip mill and items of main diagnosis technique

in product quality, thereby enhancing both quality and cost competitiveness.

(2) The width reduction mechanism consists of a reciprocal mechanism using an eccentric shaft, and the bearing is subjected to an excessive load

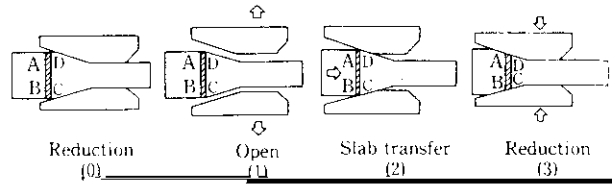
Table 1 Purpose of diagnosis in hot strip mill and its measurement techniques

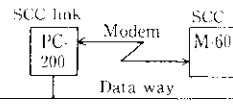
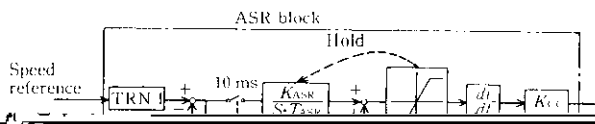
Furnace		Heat efficient			△	
		Press control			⊙	
Sizing press		Gear & bearing		○		
		Crank bearing		⊙		
Mill	Drive device	Rolling torque			○	
		BUR bearing		○		
		Gear & bearing		○		
	Screw down device	Cross bearing (UJ spindle)				△
		Mill spring	· Screw down · Pressure block			⊙
		Response of Jack	· Servo valve · Jack		□	
TR		Alignment	· WR shirt		△	



### 3 Performance Diagnosis Techniques for the Sizing-Press

#### 3.1 Features of Sizing-Press Control<sup>6)</sup>





ing press

No.	Output item
1	Press load
2	Impact drop value with main moter
3	Value of buckling
4	Pressure of anti-buckling roll
5	P

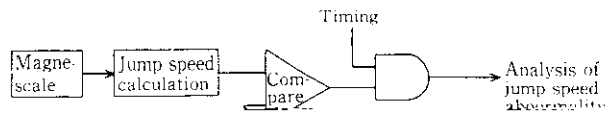
and feed-back of the transfer system when press load is generated during the operation of the constant press, the collision of the slab and the anvil can be predicted at an early stage. If, at this time, the current of the transfer system is not normal and when the current at the non-load time is on the increasing trend, it can be judged that some abnormality exists in the transfer system. In addition, if the pinch-roll pinching pressure has



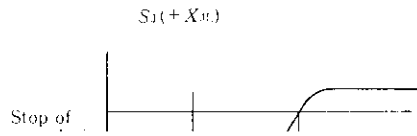
spring model as shown in Fig. 12. If the screw down

Therefore, the spring modulus of both-side screw- which shows no abnormality. Figure 13 (b) corresponds

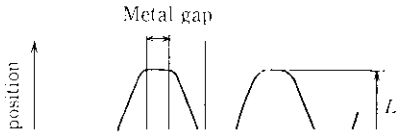
When normal AJC is not carried out at the AJC coiler due to partial wear of the mechanical unit or a slight response delay of the hydraulic servo valve, qual-



problems in the next process. In addition, since this AJC coiler forms highly-complicated mechatronic unit, it is considered difficult to maintain and control it in a technically normal state using conventional inspection



Metal gap =  $L \times A_c / 4B$



oped and applied by the authors with beneficial results, techniques used in the sizing press, rolling mill, table and coiler, i.e. the main facilities of the hot strip mill have been reviewed in this paper.

(1) Sizing press performance diagnosis techniques analyze width reduction and transfer of metal.