KAWASAKI STEEL TECHNICAL REPORT
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Artificial Intelligence and Wire Rods and Steel Bars

Application of AI Techniques to Blast Furnace Operation

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Synopsis :
The No. 3 blast furnace of Mizushima Works applies artificial intelligence (AI) techniques in its thoroughly re-modernized plant control system. AI has been applied in the blast furnace operation to diagnose the blast furnace condition and control furnace heat (a diagnosis type of expert system), to control hot stove heat by fuzzy theory, to plan the material hopper arrangement (a planning type of expert system), to control the distribution of granulated slag (a control type of expert system in real-time), and to control the feed speed of material by fuzzy theory. These functions have greatly contributed to a high degree of automation and efficient operation of the furnace.

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[illegible] of AI Techniques to Blast Furnace Operation*

volging three kinds of forms (liquid, solid and vapor) of materials being very difficult to describe in any

microcomputer, which constitutes part of the PLC system, and the functions properly select the hardware to

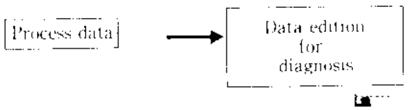


Table 1 Scale of the knowledge base

	Number of	Number of	Execution

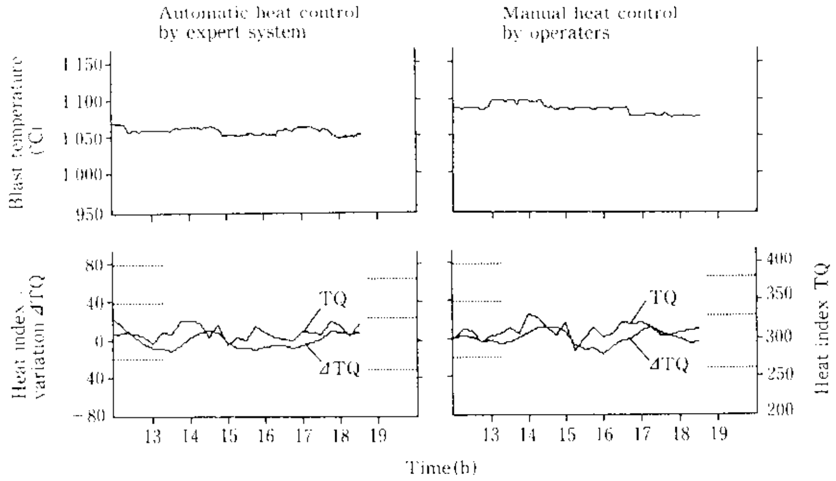
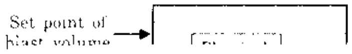


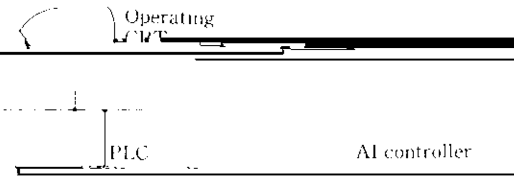
Fig. 5 Results of the automatic blast furnace heat control

is provided by tracing back to the rule that was used to

Blast furnace


Set point of blast volume


Estimation by the fuzzy inference
Particle size classifier


Operating CRT
PLC
AI controller

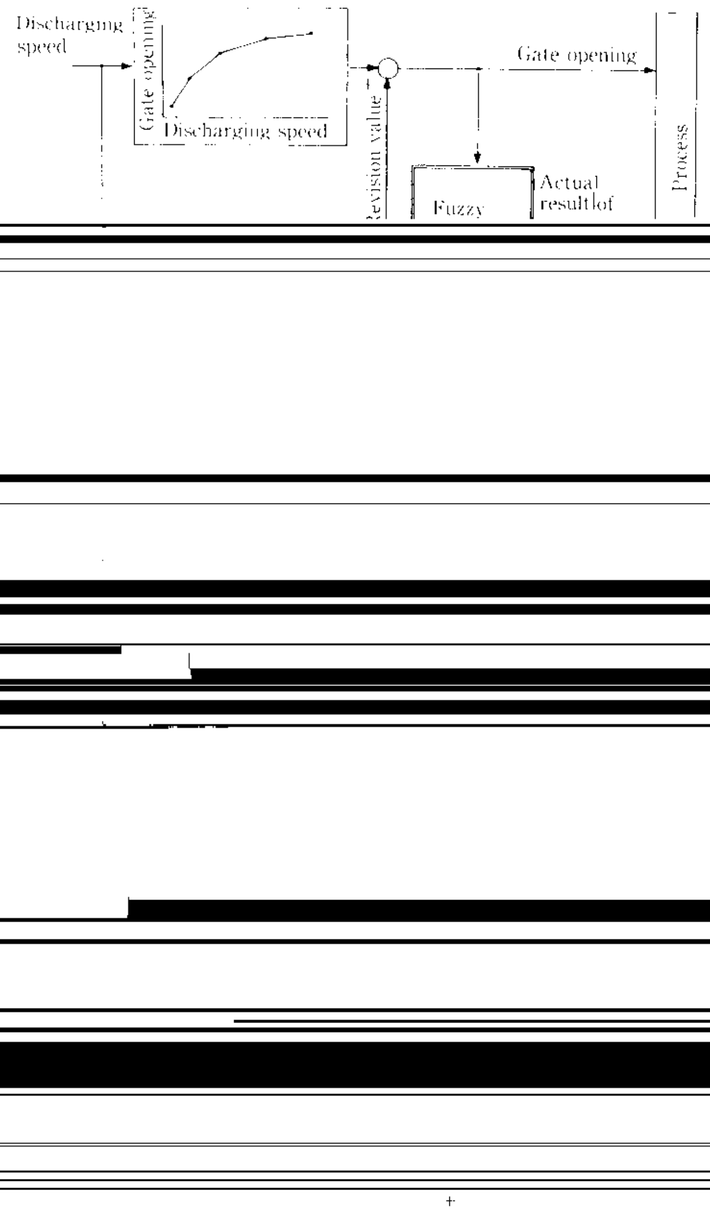


Fig. 12 System block diagram of fuzzy control for grains (adaptive control for revision value of gate opening)

(2) Hot stove combustion control is by a combination