KAWASAKI STEEL TECHNICAL REPORT No. 44 June 2001

Ironmaking and Steelmaking Technologies as Fundamentals for the Steel Production*

Synopsis:

Recent R&D activities of ironmaking and steelmaking technologies at Kawasaki Steel are reviewed and the prospect for the 21st century is discussed. In the ironmaking field, efforts to utilize more inexpensive raw

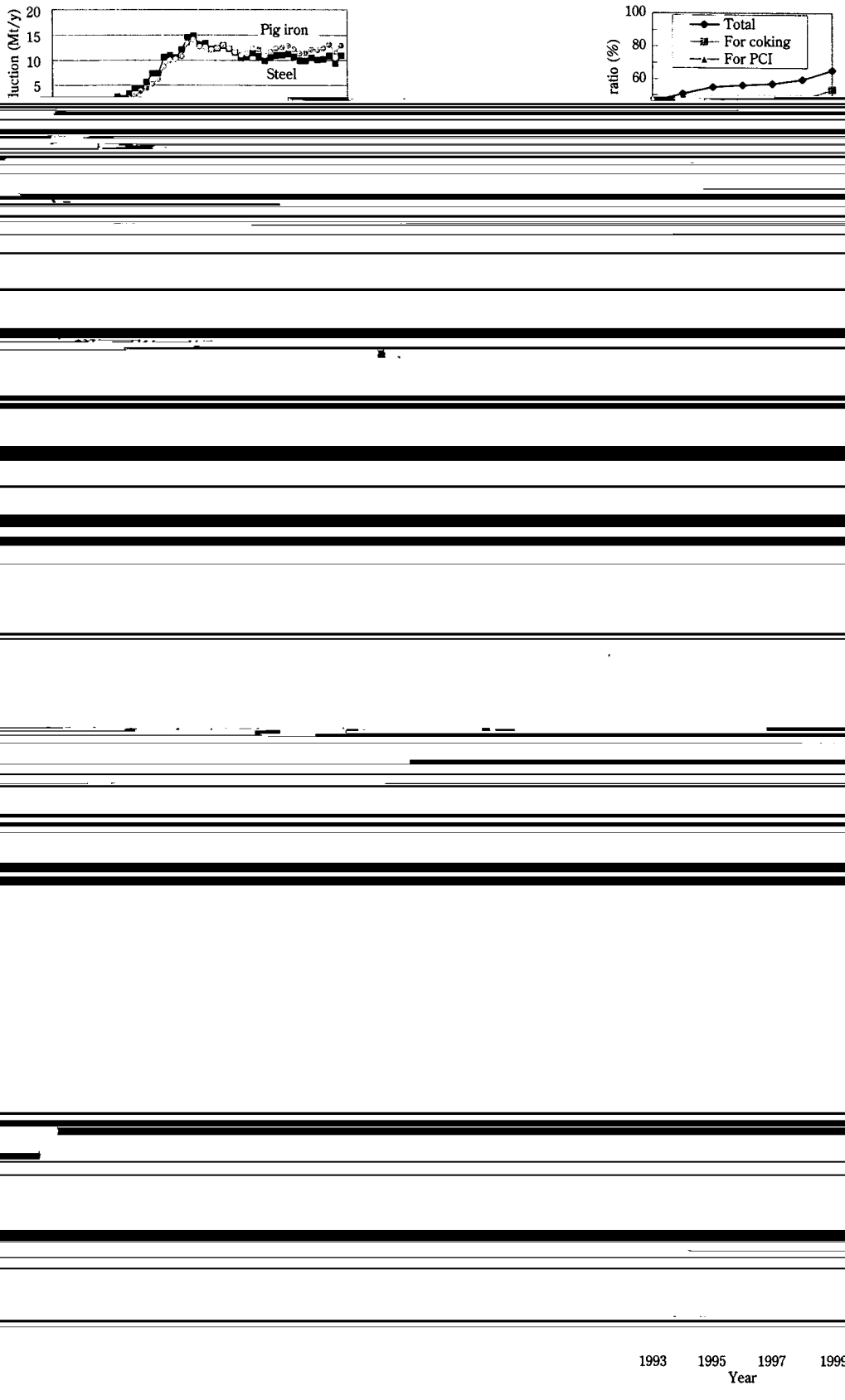
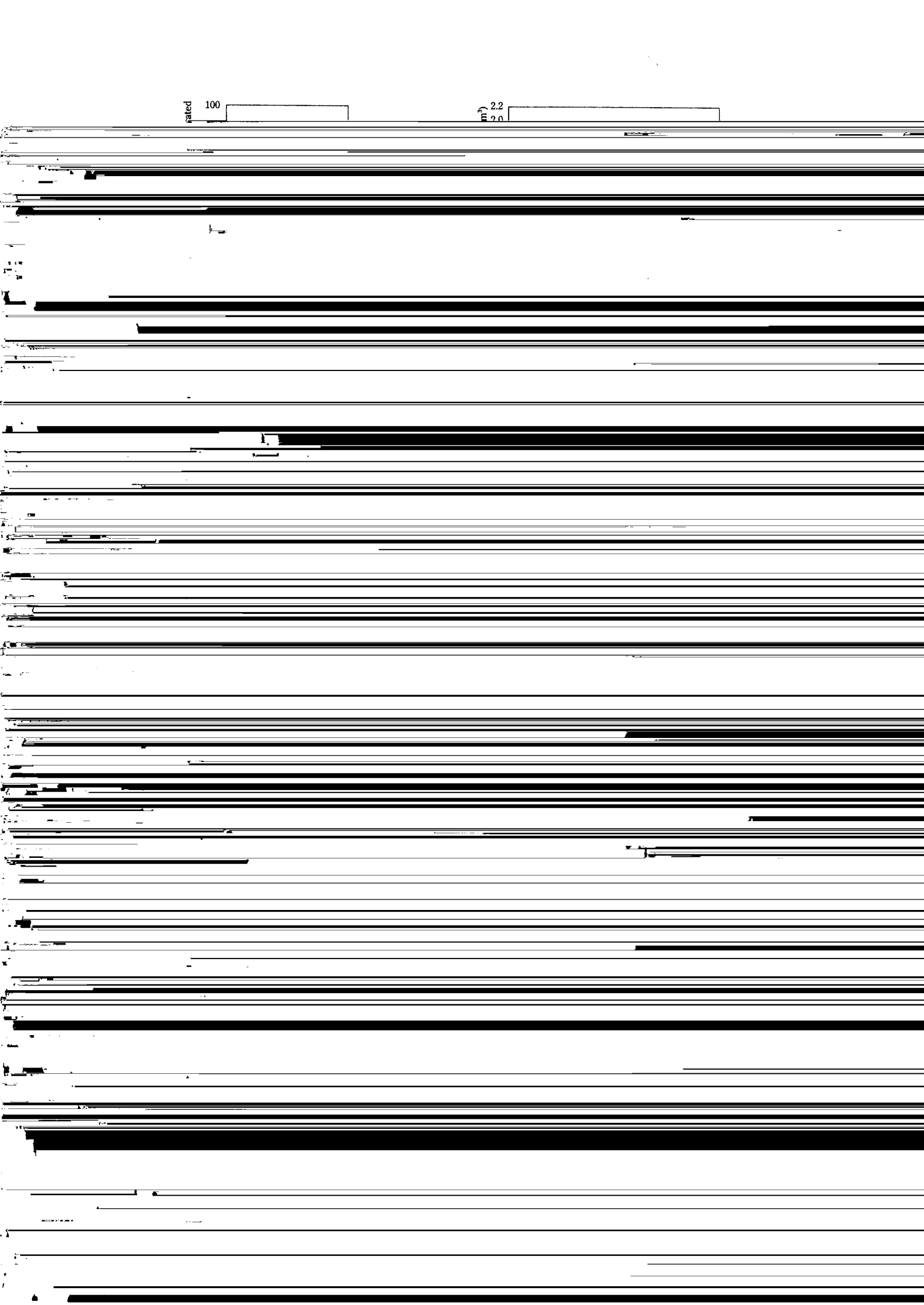
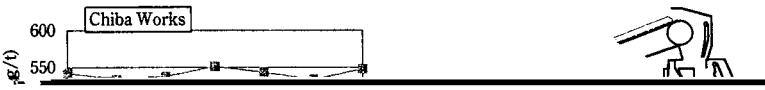


Fig. 2 Soft coal ratio in purchased coal

from quantitative expansion in the years before 1973 to technology-based, low cost mass production of high quality steel today. In such an environment, production costs and product quality depend highly on iron- and

index from coal mix condition and coke oven operation

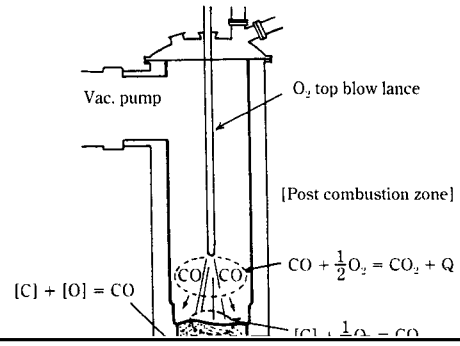

rated
100
m³)
2.2
2.0

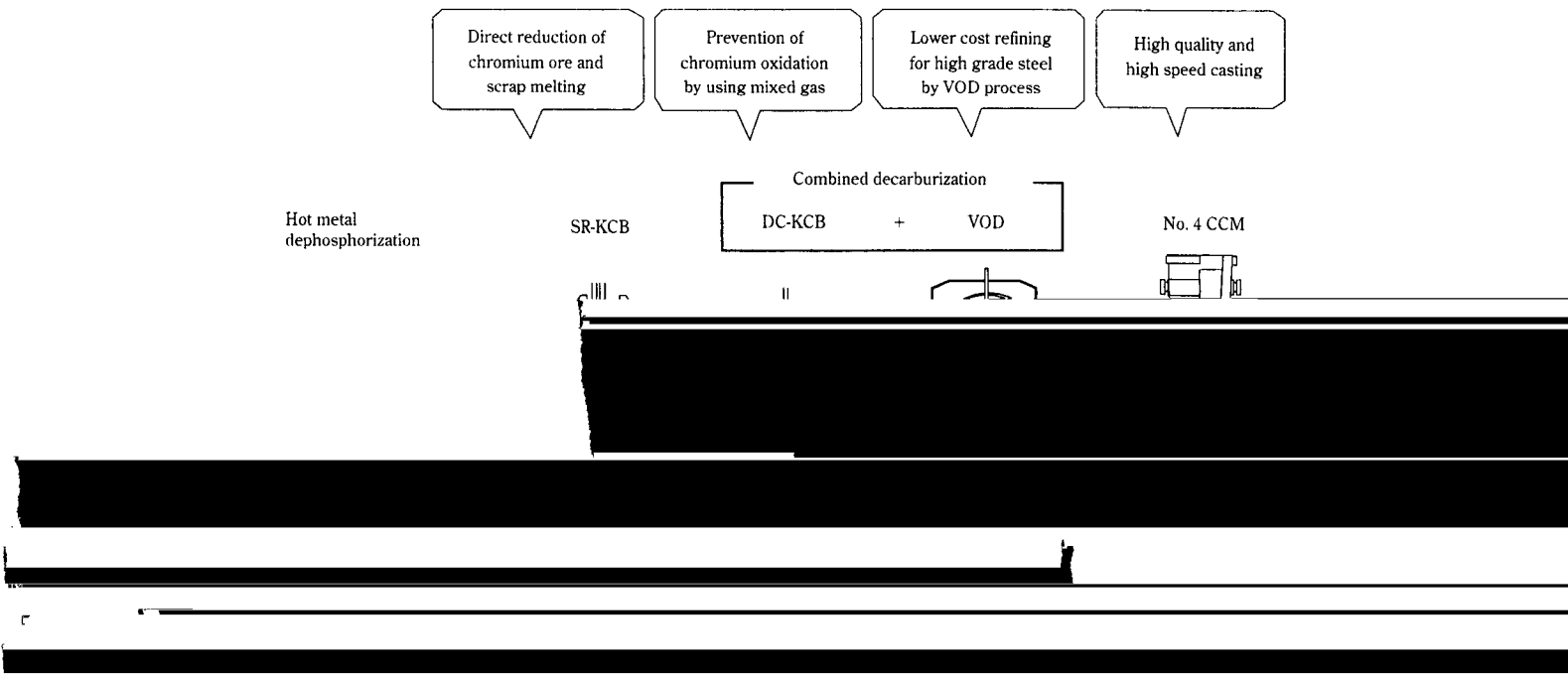

Chiba Works
600
550
(g/t)
Top bunker

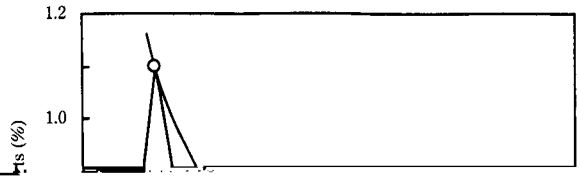
furnace is a plant that directly smelts the stainless refi

4.2 BOF Refining

Kawasaki Steel introduced a bottom-blowing converter at Chiba Works in 1977 based on its belief that the key technology of refining is "molten metal stirring".[25,26] Around the world, BOF refining technology has since developed remarkably, driven by the technological development in our company. It was anticipated that the bottom-blowing converter would surpass top-blowing converter in the aspect of reactivity. However, at that time, its furnace life was a mere 500 heats.




Direct reduction of chromium ore and scrap melting
Prevention of chromium oxidation by using mixed gas
Lower cost refining for high grade steel by VOD process
High quality and high speed casting
Combined decarburization
Hot metal dephosphorization
SR-KCB
DC-KCB
+
VOD
No. 4 CCM



face and inner cracking and with low non-metallic inclusion content by applying multiple bending points, shortening of roll pitches, mist secondary cooling which can adjust spraying width, and improvement of submerged entry nozzle shape. Also

industry by supplying raw materials to the downstream processes are summarized. The future technological development in ironmaking and steelmaking will be aimed at stably producing large amount of products of

6) S. Watakabe, Y. Hara, K. Takeda, H. Itaya, and H. Suginobe: *CAMP-ISIJ*, **10**(1997), 154
7) S. Watanabe, H. Kamano, and T. Matsumoto: *CAMP-ISIJ*, **10**(1997), 158