Development of Lime-based Powder Reagent for Injection Desulfurization of Hot Metal in Torpedo Car*

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Lime-based reagent with fine grain size and improved fluidity has been developed for hot metal desulfurization using the torpedo car (top) injection method. With the optimiza-

hot metal down to low sulfur concentration[3,4], and can be a cheap desulfurizing reagent; but because of its slow reaction rate, lime, hitherto, was never used widely as a desulfurizing reagent on an industrial scale. Particularly in the top injection desulfurization, reagents mainly comprising quick-reacting carbide

were frequently used. The present studies were aimed at developing a low-cost injection desulfurizing reagent by accelerating the reaction rate of lime. This objective was successfully accomplished within about two years,

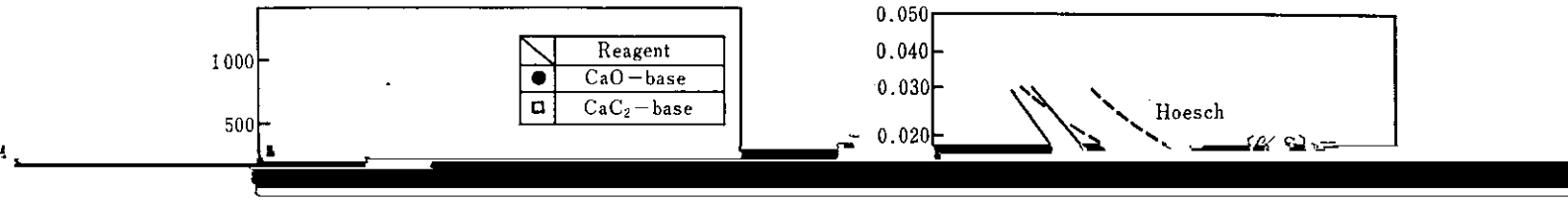
is a typical surface active agent. For the addition of MHPS, there is an optimum value, and if it is exceeded, the angle of repose will increase.

Desulfurizing reaction by lime is said to progress at the diffusion-controlled rate in the solid phase[5], and therefore, the sulfurizing reaction of lime powder

will be accelerated if addtive X is added to lime powder to form low melting portions on the surface layer of lime[3]. To select the ingredient X which would be the most suitable for this purpose, a desulfurization test

those for Hoesch method[6]

	This work	Hoesch
Desulfurizer	CaO,$CaCO_3$,CaF_2,C,Surfactant	CaO
Hot metal	260 · 340 t	150 t
[illegible]	[illegible]	[illegible]


1 000
500
Reagent
CaO－base
CaC_2－base
0.050
0.040
0.030
0.020
Hoesch

Temperature drop by lime desulfurization was 17°C, [illegible] was only 10°C

0.002% resulfurization occurred when hot metal after [illegible] was charged from the torpedo car to the charging ladle, whereas no such resulfurization occurred in the case of lime desulfurization heats.

3.2 Changes in S Concentration during Hot Metal Transportation

When hot metal was charged to the torpedo car, resulfurization of 0.012% occurred in the case of [illegible]

Fig. 7 shows the transition of S concentration, when hot metal of [%S] = 0.040 at BF tapping is charged into the converter at [%S] = 0.015. The figure indi-[illegible]

$$\left(1.15 - \frac{6\,888}{T}\right) + \log C_{\mathrm{S}} = \frac{1}{2}\log P$$

calculation, it is found that a 0.002% desulfurization

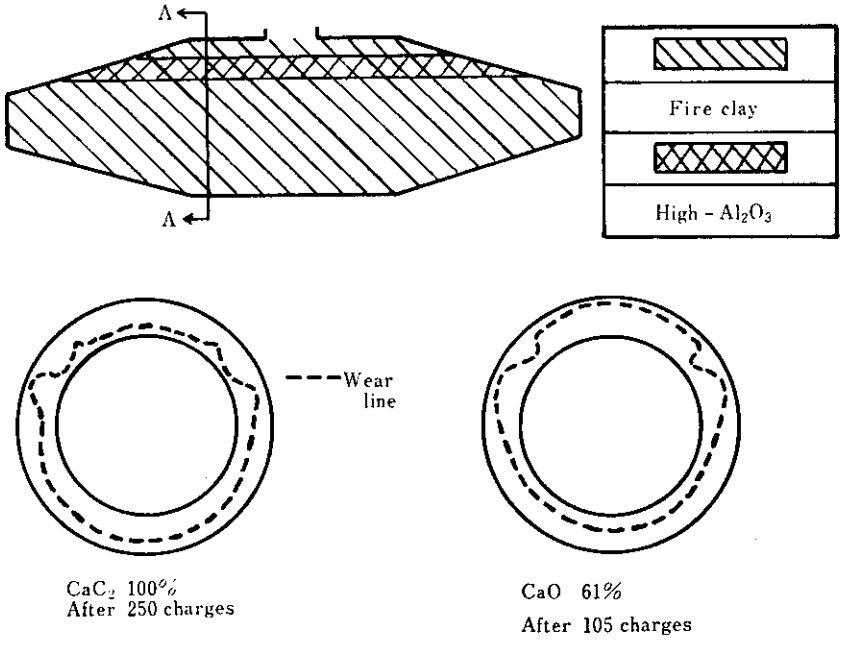
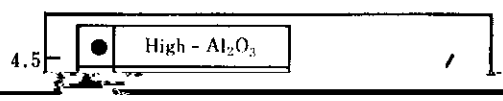
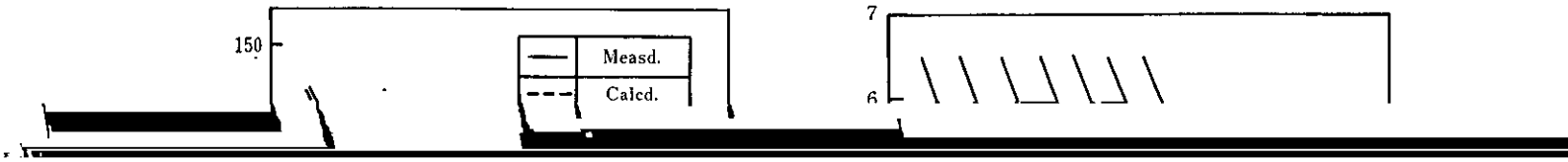


Fig. 9 Wear line contour of lining of a torpedo car used for lime (61%) and carbide (39%) desulfurizations



repairs. Then, Al_2O_3-SiC bricks were used for the hot metal stagnating zone and the hot-metal-ceiling


150
Measd.
Calcd.
7
6

desulfurizing from [%S] = 0.045 to [%S] = 0.015. Through this conversion, it was possible to cut the