Abridged version

KAWASAKI STEEL TECHNICAL REPORT
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"Developed Machinery Maintenance Technology
in Steelmaking Plant"

Development of Life Prolongation Technology for Crane Wire Rope

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Synopsis :
The standards for crane wire rope disposal are stipulated by law for determining the disposal by judging from the breakage of material wires and the reduction in diameter by abrasion of the wire rope. Since the standards, however, are not for the judgement for evaluating quantitative strength, wire ropes tended to have been prematurely replaced for safety sake. Under said circumstance, by studying the correlation between the calculated length of life span and the remaining strength of sample wire ropes after use, a technique of determining remaining life span by using the correlation equation has been established. When the technique was adapted to crane wire ropes at Kawasaki Steel, the span of usable life of wire ropes was extended 1.6times than estimated before. Further, it was found through the technique that a wire rope for use in hoisting a ladle and so forth to high levels had shorter life span when compared with the life span the wire rope originally had, and on the basis of this finding, a wire rope having a long life and thus overcoming the above-mentioned problems has been developed.

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The body can be viewed from the next page.

for Crane Wire Rope*

Synopsis:

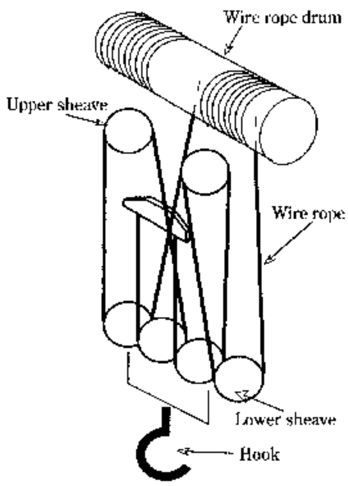
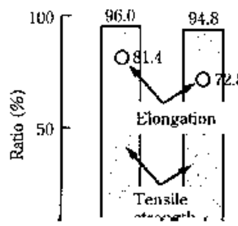


Fig. 1 Operation condition of crane wire rope



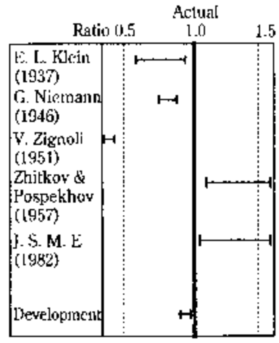
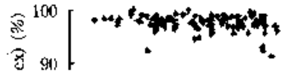


Fig. 3 Comparison between actual rope breakage and calculation

Table 1 Coefficient of configuration, b

	Ladle crane	Other crane
Round wire $6 \times Fi\ (29)$	0.9	1.1
Profile wire $6 \times Fi\ (29)$	1.0	1.4

ropes which were replaced due to the occurrence of wire breakage. Various analyses were made on whether or not



about 50% for both types of cranes.

As is clear from the table, the major difference for

Table 3 Influence of wire rope life caused by rotation

	Round wire		Profile wire	
	Crane A 180° rotation	Crane B A few rotation	Crane A 180° rotation	Crane B A few rotation
×1 000 times*[1]	93.1	142.1	128.8	252.7
Ratio	1.0	1.53	1.0	1.96

*[1] Number of bending at 10% wire breakage

Table 5　Contact pressure[6,7]

	IWRC 6 × Fi (29)	IWRC 6 × P · Fi (29)	IWRC 8 × P · Fi (29) (Developed rope)
Contact pressure (kN/mm²)	4 391 (1 764)	1 741	1 672
Ratio	1.0	0.40 (0.99)	0.38 (0.95)

Table 6　Moment of inertia of area

[illegible]			
Ratio	1.0	1.17	1.34

longed to 2.35 times that of conventional wire ropes [illegible] 2.35 [illegible]