KAWASAKI STEEL TECHNICAL REPORT
No.9 (March 1984)

A Low (C+N)-13 Cr Martensitic Stainless Steel, RIVER LITE 410DB, for Brake Disk of Motorcycle

Keiichi Yosioka, Shigeharu Suzuki, Bunryo Ishida, Masayoshi Horiuchi, Makoto Kobayashi

Synopsis :
Medium carbon martensitic stainless steels widely used for the manufacture of motorcycle brake disk have some shortcomings such as the indispensability of strictly-controlled quenching for heart treatment of the disk and the deterioration of corrosion resistance due to tempering. RIVER LITE 410DB, newly developed to solve the above problems, is characterized by a high Mn content and an adequate low level of (C+N) content. The high Mn content is aimed to enlarge temperature range in which fully austenitic structure exists at quench temperature, and the control of (C+N) content is to obtain a suitable hardness of martensite formed on quenching. The steel can readily obtain hardness suitable for the brake disk by only quenching without strict control of the conditions for heat treating and is superior to conventional steels in toughness and corrosion resistance.

The body can be viewed from the next page.

and chemical composition: the amount of austenitic phase at high temperature becomes larger with an

former, so that the hardness of martensite formed by the subsequent quenching will be controlled by the

from 0.045 to 0.081%. These ingots were hot rolled into 6 mm thick plates and heat-treated at 725°C for 10 min. The plates were heat-treated in an electric fur-

Figure 2 shows the relation between (C + N) content and hardness obtained by quenching from the temperature range of 925°–1 050°C. Hardness

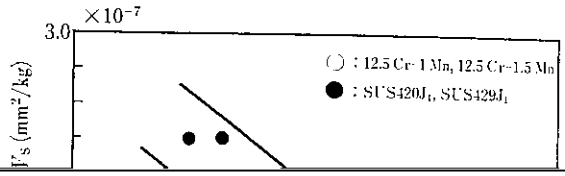
nace at 900°–1 050°C for 10 mm followed by quenching with the cooling rate of 30°C/s, or heat-treated by induction heating at 900°–1 050°C for 15 sec followed by quenching with cooling rates of 5–30°C/s. These heat-treated specimens were subjected to hardness measurement, microstructure observation, Charpy,

taining 1%Mn, the quenched-in hardness suddenly decreases when the (C + N) content is as low as 600 ppm, while the quenched-in hardness of 1.5%Mn containing steels is linearly proportional to (C + N) content. The microstructures as quenched from 1 000°C are shown in **Photo 1**. The microstructure of

ferrite and martensite. So, the deviation from a linearly

550

In general, hardness has a tendency to decrease with a decrease of cooling rate, which is especially noticeable in 12.5%Cr-1%Mn steels. In 12.5%Cr-1.5%Mn steels, the tendency is extremely small above the cooling rate of 10°C/sec. Their optical microstructure,



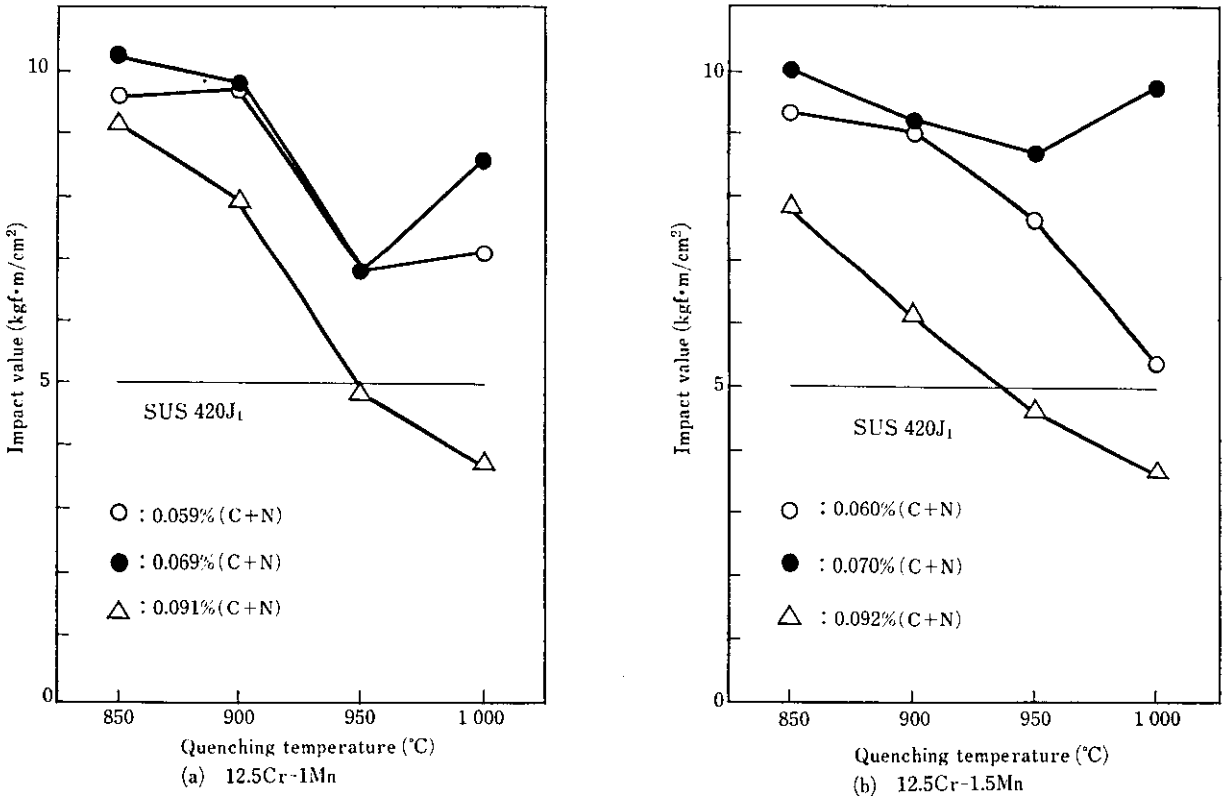
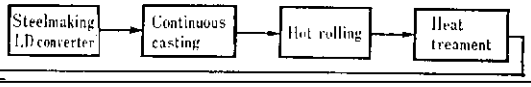
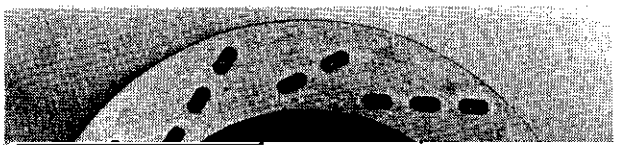


Fig. 7 Charpy impact value at 20°C for plates quenched at the cooling rate of 20°C/s after

2.8 Rust Resistance

Salt spray test was carried out for 12.5%Cr-1%Mn






A5 2.4h


B5 2.4h