KAWASAKI STEEL TECHNICAL REPORT No. 29 November 1993

Characteristics and Strengthening Mechanism of Alloyed Steel Powder "KIP SIGMALOY 2010" for Ultra High Strength Sintered Materials*



Synopsis:

The chemical composition of Ni- and Mo-containing composite-type alloyed steel powder was optimized for the production of high strength sintered components via com-

heat treated compacts of a composite alloyed steel

affecting density enhancement was effective in improv... hardness of compacts sintered at 1,523 K are shown in

ing strength. The drop in density which occurred during presintering was attributed to volatilization and loss of the lubricant.

The respective effects of Ni and Mo content on the

Figs. 3 and 4. The hardness of the sintered compacts rose to over HRB 90 when Ni exceeded 2% and when Mo exceeded 1%.

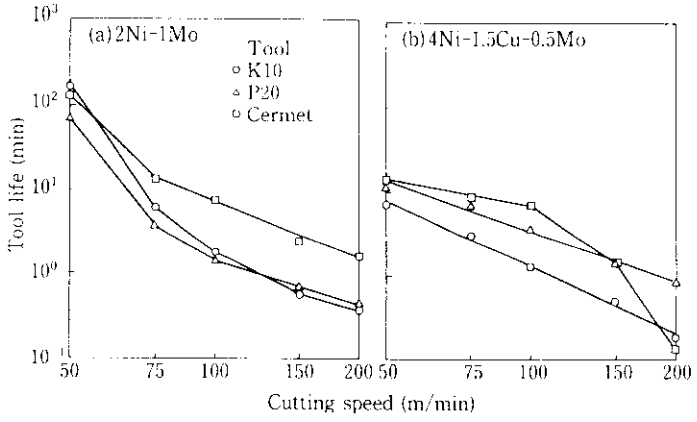
From these results it was concluded that ... it

alloyed steel powder with a 2%Ni-1%Mo composition

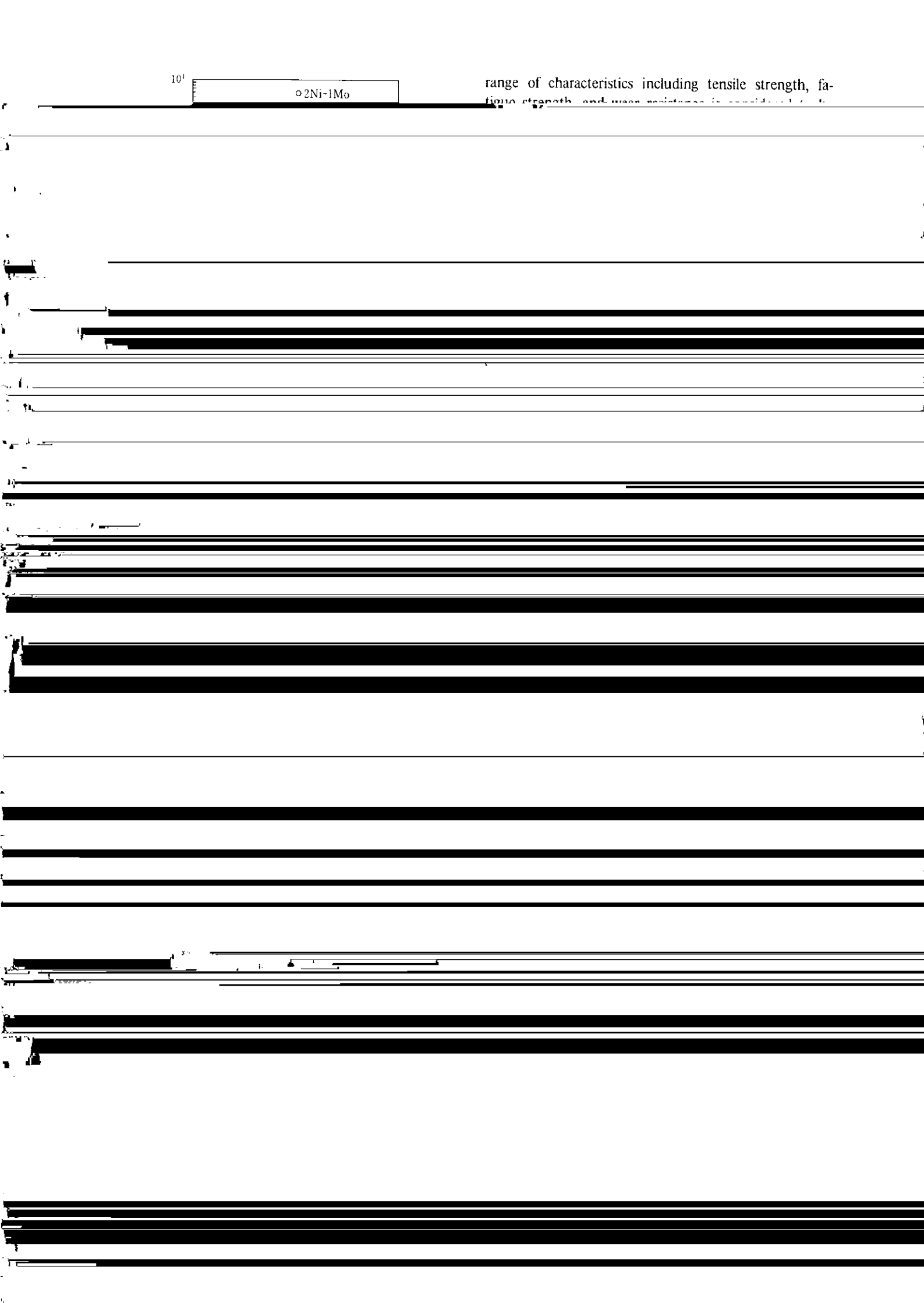

2000
1800
kth (MPa)
o 2Ni-1Mo
△ 4Ni-1.5Cu-0.5Mo
2000
1800
1600
kth (MPa)

The results described above make it clear that sin- ting conditions, the depth of cut was 1 mm, the feed

tered materials with ultra high strength of 1 920 MPa per revolution was 0.05 mm/rev, and the cutting speed



4%Ni-1.5%Cu-0.5%Mo(b) composite-type alloyed steel powders with 0.6% graphite



range of characteristics including tensile strength, fa-

(5) Using 2%Ni-1%Mo steel powder, it is possible to obtain an endurance limit of rotating bending fatigue strength of 460 MPa and an endurance limit of contact fatigue strength of 2 560 MPa by single-pressing, single-sintering, carburizing and tempering. The high strength features obtained by applying

with the trend toward higher performance and reduced size in automotive engines and drive trains, this newly developed material is expected to find wide application in synchro hubs and other transmission parts. KIP SIGMALOY 2010 will also make it possible to produce mechanical parts which require higher levels of strength