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Development of Anti-SSC OCTG and Collapse Resistant OCTG

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Synopsis :
An increasing energy demand has stimulated a considerable development of high strength oil country tubular goods (OCTG) with superior resistance to sulfide stress corrosion cracking (SSC) and/or collapse failure in hostile environments. The experimental trials of modified Cr-Mo steel casing have proved that addition of Mo up to 1.0%, Nb and B to 0.2-0.3% C steels, product 90 ksi(63.3kgf/mm2) yield strength pipe with superior SSC resistance. Multiple regression analysis has been conducted to estimate the effects of various factors concerning the collapse of casing pipe and it has been demonstrated that residual stress of finished pipe is one of the most significant factors. This report summarizes some metallurgical aspects in the manufacturing process of these special grades of OCTG.

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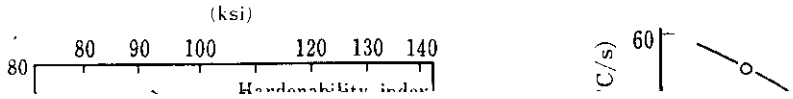
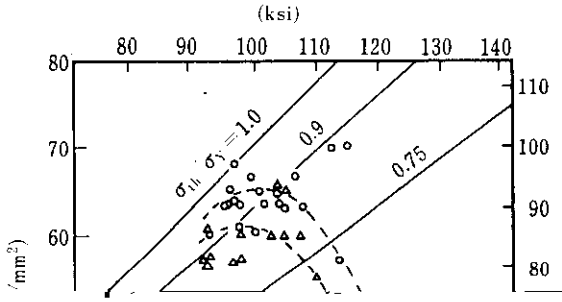

(ksi)
80
80
90
100
120
130
140
60
C/s)

steels. SSC tests were carried out according to the

Tempering temperature (°C, 1 h)

... and the maximum stress which was

60



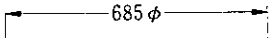
high temperature tempering, the uniform distribution of hardness, refined austenitic grains, and good SSC resistance have been obtained.

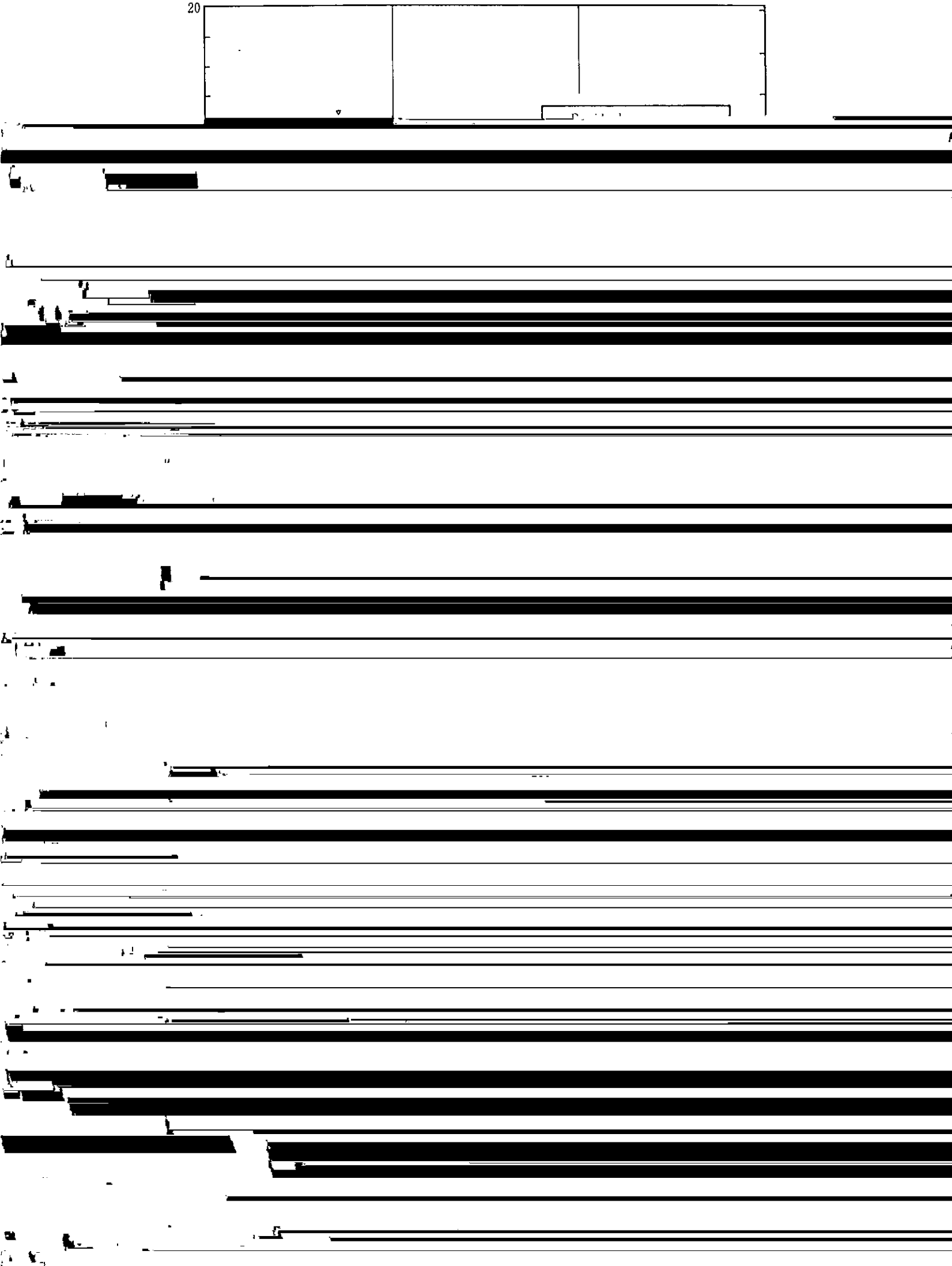
3 Development of OCTG with High Collapse Resistance

The resistance of steel pipe to external pressures, that is, collapse resistance, is one of the important

3.1 Collapse Tester

Fig. 7 shows the cross section of the collapse tester. The specimen is 1,143 mm (45 in.) long, and both its

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formula and measured values. The table indicates that, of the factors of collapse resistance, D/t, σ_Y, and σ_R

Equation (1) : $p = a_1 + a_2 \ (D/t)^{-1} + a_3 u + a_4 \varepsilon + a_5 \sigma_Y + a_6 \sigma_R$

p : Collapse strength (psi)

Pipe dimension	Chemical composition (%)		Tension testing	
			Yield strength	Tensile strength

4 Conclusion

In developing OCTG for special use having excellent SSC resistance, an investigation was made on their metallurgical factors, and it has been found that Cr-Mo-Nb-B steel is the most suitable in terms of chemical composition to ensure quench hardenability and

References

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