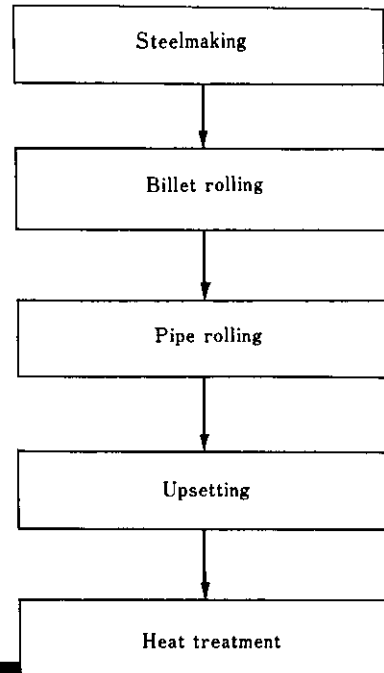
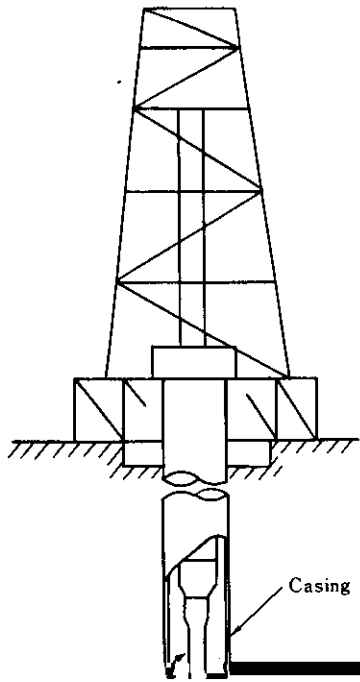


The Manufacture of Drill Pipe and Its Properties*

Manufacturing and properties of drill pipes of API 5A E, 5AX X95, 5AX G105, and

Table 2.1

Outer dia. (in)	Grades					Total	
	D	E	X95	G105	S135		Others
2 3/8	326	262	89	371	30	313	1 391
2 7/8	635	2 889	238	1 893	605	868	7 128



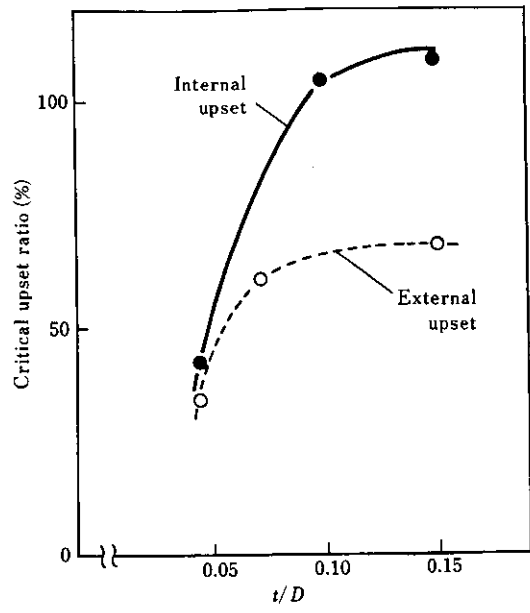
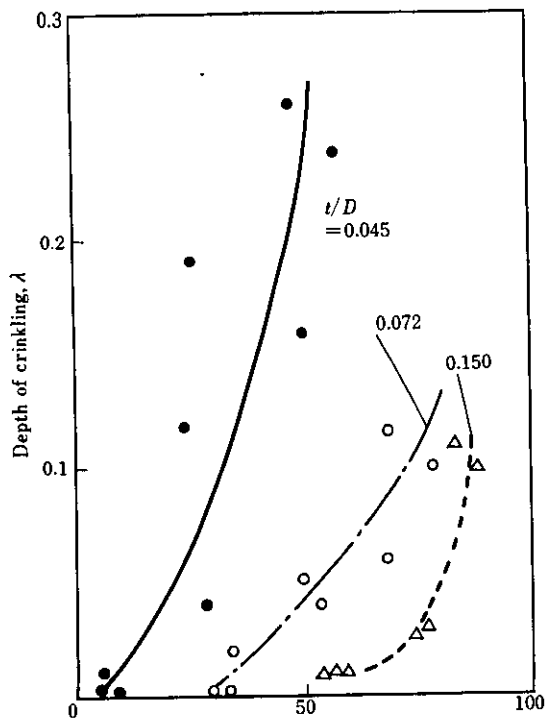


Fig. 4 Effect of t/D on critical upset ratio²⁾

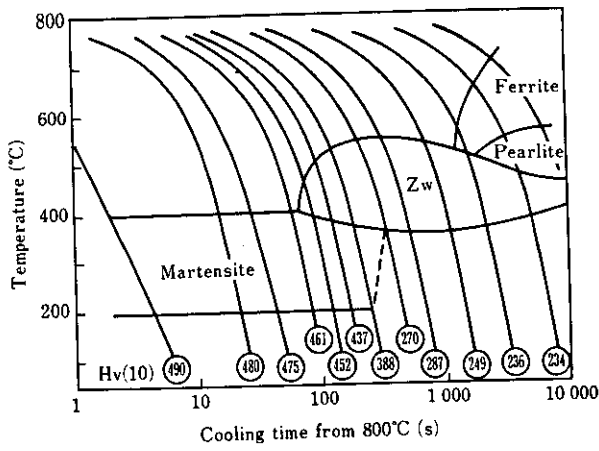


Fig. 5 CCT diagram of steel for S135 drill pipe

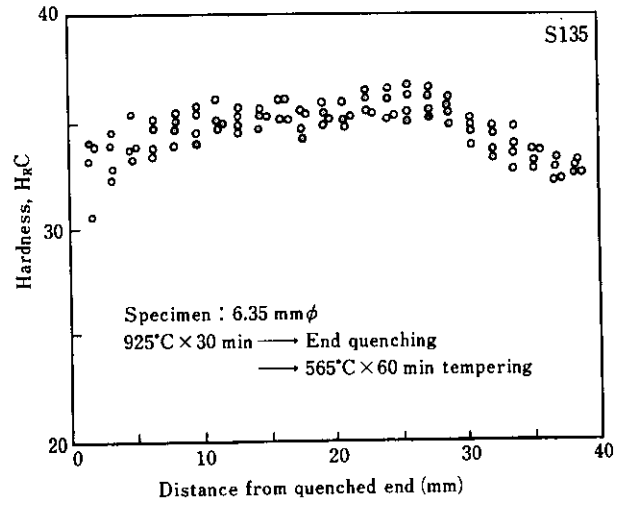


Fig. 6 Hardness distribution in Jominy specimen after end-quenching and tempering (S135 drill)

recognized even at the upset portion.

3.1.3 Cleanliness

The cleanliness of drill pipe of various grades is shown in Table 3. As the content of non-metallic inclu-

3.2.3 Impact properties

The results of Charpy impact test at the middle of pipe body are shown in Table 5, and an example of tran-

Grade	Upset (t/2)	Pipe body (t/2)

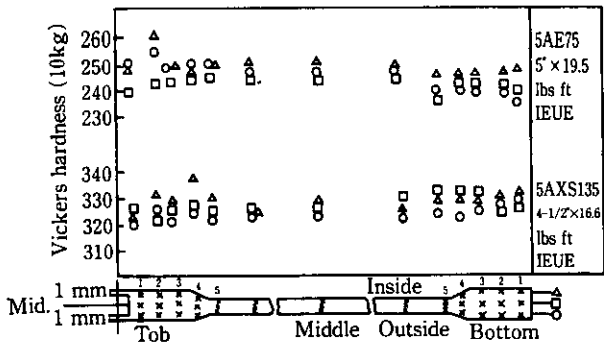
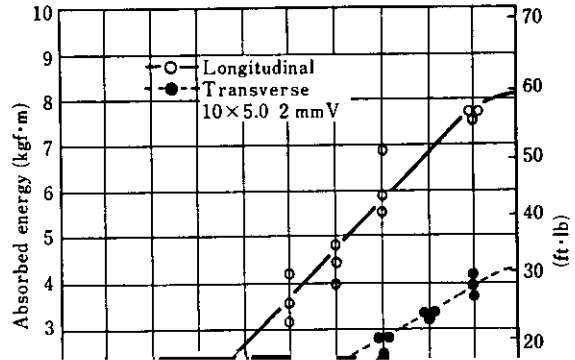
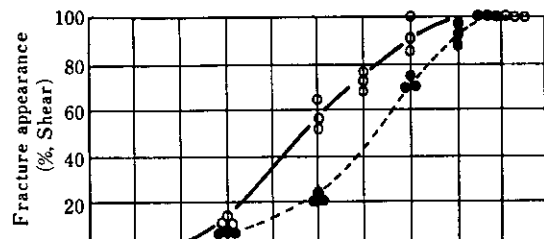


Fig. 7 Hardness distribution in E75 and S135 drill pipes

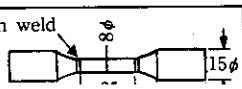
Table 5 V-notched impact test results

Grade	Direction	Specimen size	$vTrs$	vE_{-40}
		mm	$^{\circ}C$	kgf·m
E75	L	10 x 7.5	-128	16.0



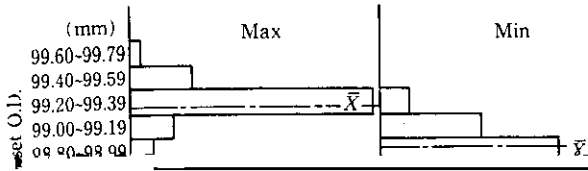
80
70
mm²

Friction weld



Specimen	Stress range (kgf/mm ²)	Number of cycles to failure	Upsetting condition
C1	45	1.21×10^5	Rad

duction process.



4 Production of Drill Pipe

Before starting the commercial production of drill