KAWASAKI STEEL GIHO
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# 2-1/4 3Cr-1

# High Strength 2-1/4 and 3%Cr-1%Mo Steels with Excellent Hydrogen Attack Resistance

(Jun-ichi Shimomura)

# 耐水素侵食性にすぐれた高強度の2¼ [illegible] 鋼の開発

# High Strength 2¼ and 3% Cr-1% Mo Steels with Excellent Hydrogen Attack Resistance

## 要旨

[illegible]

Table 1 Chemical compositions of laboratory steels used (mass %)

| Steel | C | Si | Mn | P | S | Cr | Mo | V | Nb | Ti | Al | B | REM* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | 0.13 | 0.05 | 0.52 | 0.004 | 0.001 | 2.37 | 1.09 | 0.25 | 0.021 | — | 0.03 | — | — |
| B | 0.13 | 0.06 | 0.52 | 0.004 | 0.001 | 2.37 | 1.09 | 0.31 | 0.021 | — | 0.03 | — | 0.004 |
| C | 0.13 | 0.06 | 0.53 | 0.003 | 0.001 | 2.43 | 1.10 | 0.35 | 0.021 | — | 0.03 | — | 0.006 |
| D | 0.13 | 0.06 | 0.51 | 0.003 | 0.001 | 2.33 | 1.07 | 0.30 | 0.021 | 0.010 | 0.03 | 0.0019 | 0.004 |

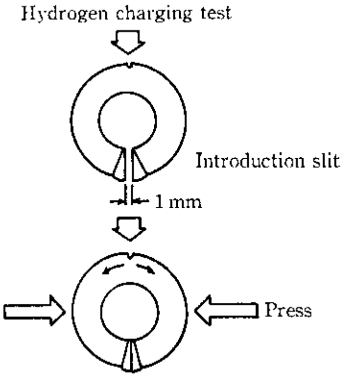
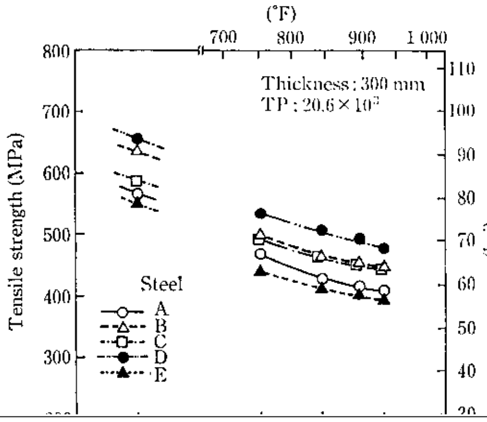
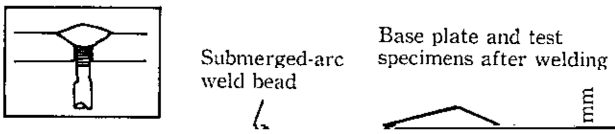


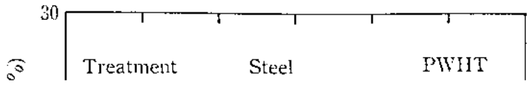
Fig. 1 Hydrogen attack test using cylinder type restraint crack-ing specimen (IHI¹⁾)





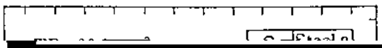
steel

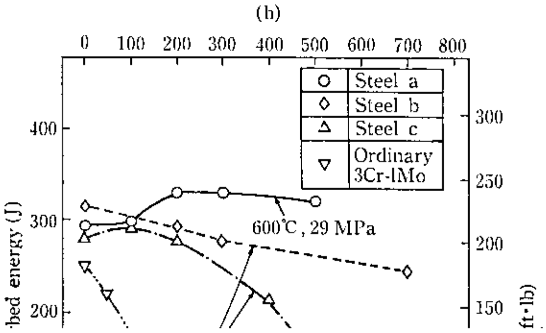
Cr-1 Mo 鋼（鋼 E），3 Cr-1 Mo 鋼（鋼 F）はいずれも短時間の暴露により水素侵食を受け，${}_{v}E_0{}^*/{}_{v}E_0$ が大きく低下する。両者の比較では 2¼ Cr-1 Mo 鋼の方が 3 Cr-1 Mo 鋼に比べ，${}_{v}E_0{}^*/{}_{v}E_0$ の低下が短時

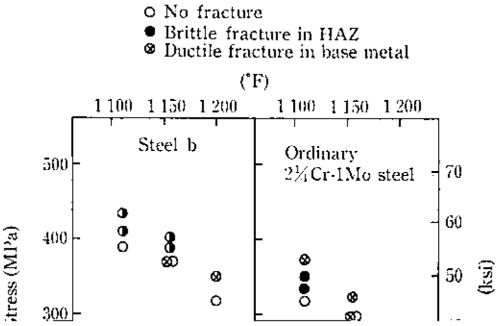


[illegible]

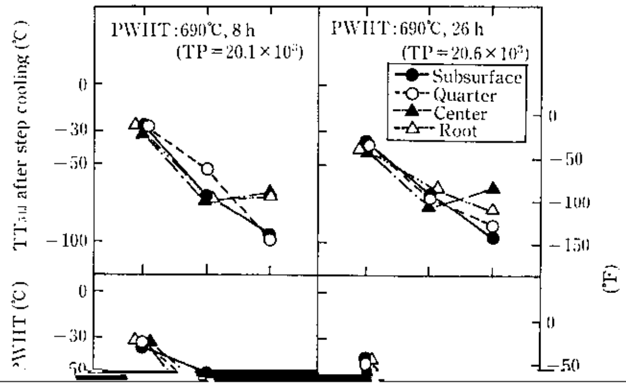
Tempering parameter, $T$(R)[20+log $t$(h)]×$10^{-3}$

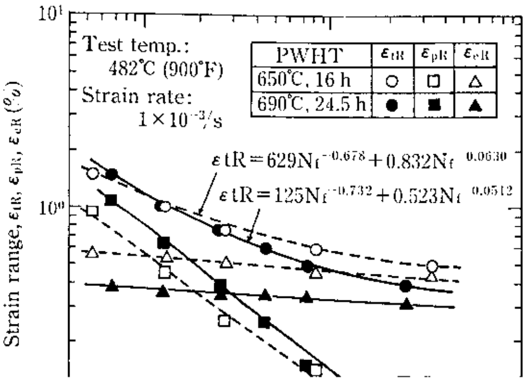



(b)
0
100
200
300
400
500
600
700
800
Steel a
Steel b
Steel c
Ordinary 3Cr-1Mo
400
300
200
bed energy (J)
300
250
200
150
ft・lb)
600℃, 29 MPa


○ No fracture
● Brittle fracture in HAZ
⊗ Ductile fracture in base metal
(°F)
1 100
1 150
1 200
1 100
1 150
1 200
Steel b
Ordinary 2¼Cr-1Mo steel
500
400
300
tress (MPa)
70
60
50
(ksi)

[redacted]





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