

KAWASAKI STEEL TECHNICAL REPORT

No.22 (May 1990)

*Advanced Technologies of Iron and Steel,
Commemorating the 20th Anniversary
of the Technical Research Division*

Stress Analysis of Premium Threaded Connection "FOX" by Finite Element Method

Ken-ichi Yamamoto, Kunihiro Kobayashi, Tatsuro Maguchi, Katsuo Ueno

Synopsis :

The principal feature of the premium threaded connection "FOX" is the introduction of a pitch change concept to the thread design. The thread has three different pitch areas. One area in the center is of identical pitch, and the others are of increasing clearance between loading flanks towards both ends in the hand tight state. Hence, the extremely high level of contact pressure, which is inevitably caused on the loading flanks of the end threads in the conventional thread design, is significantly reduced, and the central perfect threaded area shares loads, thereby realizing a more even load distribution in both the mode-up and the tensile loaded states. Finite element analysis (FEA) and a micro computer were effectively combined in the development of the FOX design. FEA shows that the FOX connection has good advantages, such as anti-galling property, leak resistance, and improved joint strength, because of the even contact pressure distribution along the threads. The pitch change criteria were discussed by varying the amount of pitch change in the FEA models, and the current design was proven to be best among those in the trials.

(c)JFE Steel Corporation, 2003

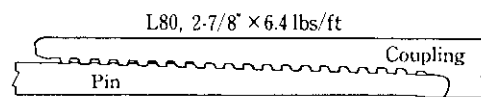
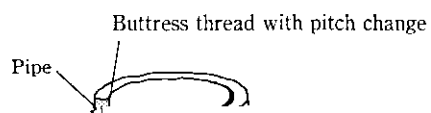
The body can be viewed from the next page.
--

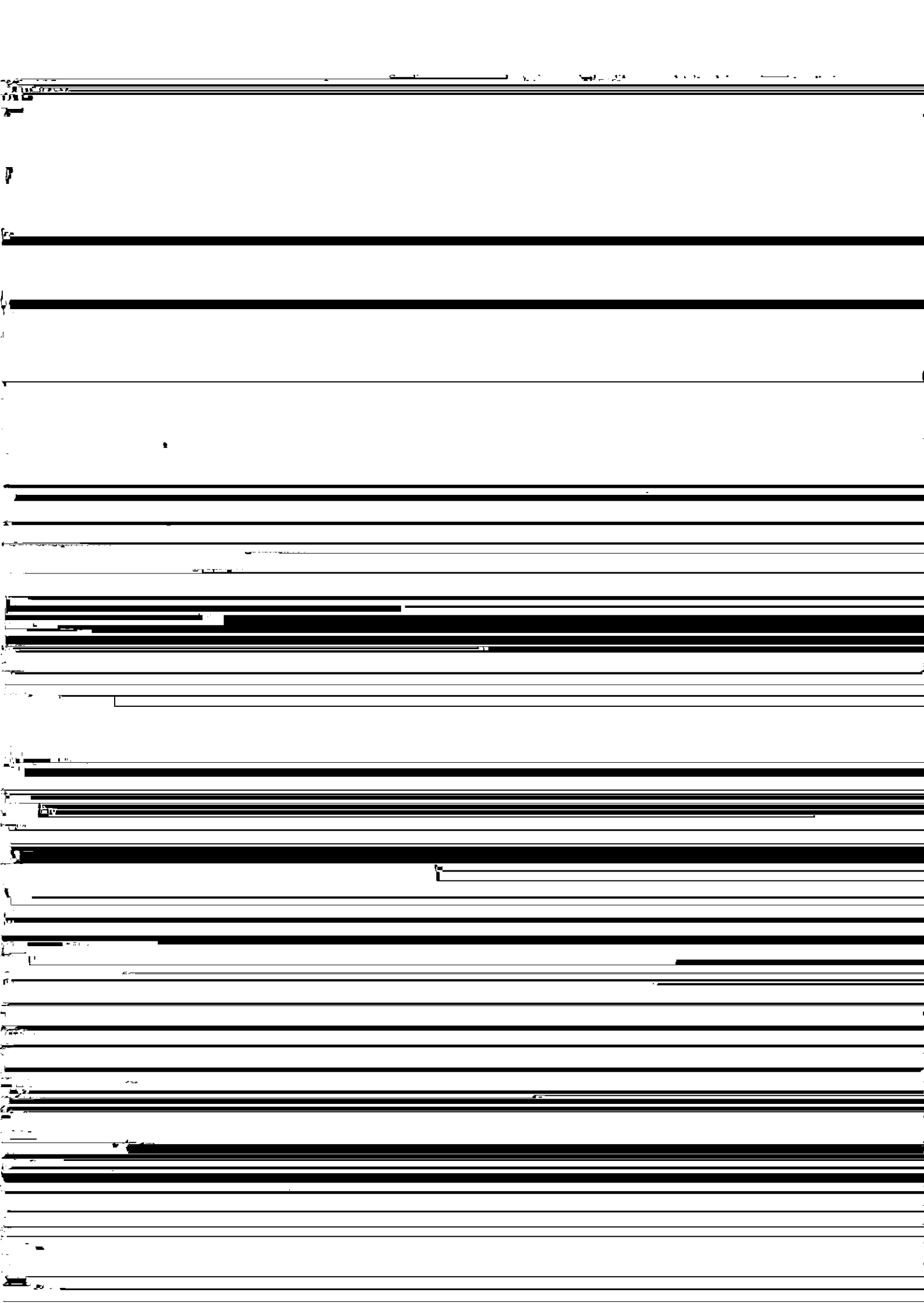
Stress Analysis of Premium Threaded Connection "FOX" by Finite Element Method*



Synopsis:

The principal feature of the premium threaded connection "FOX" is the introduction of a notch change concent





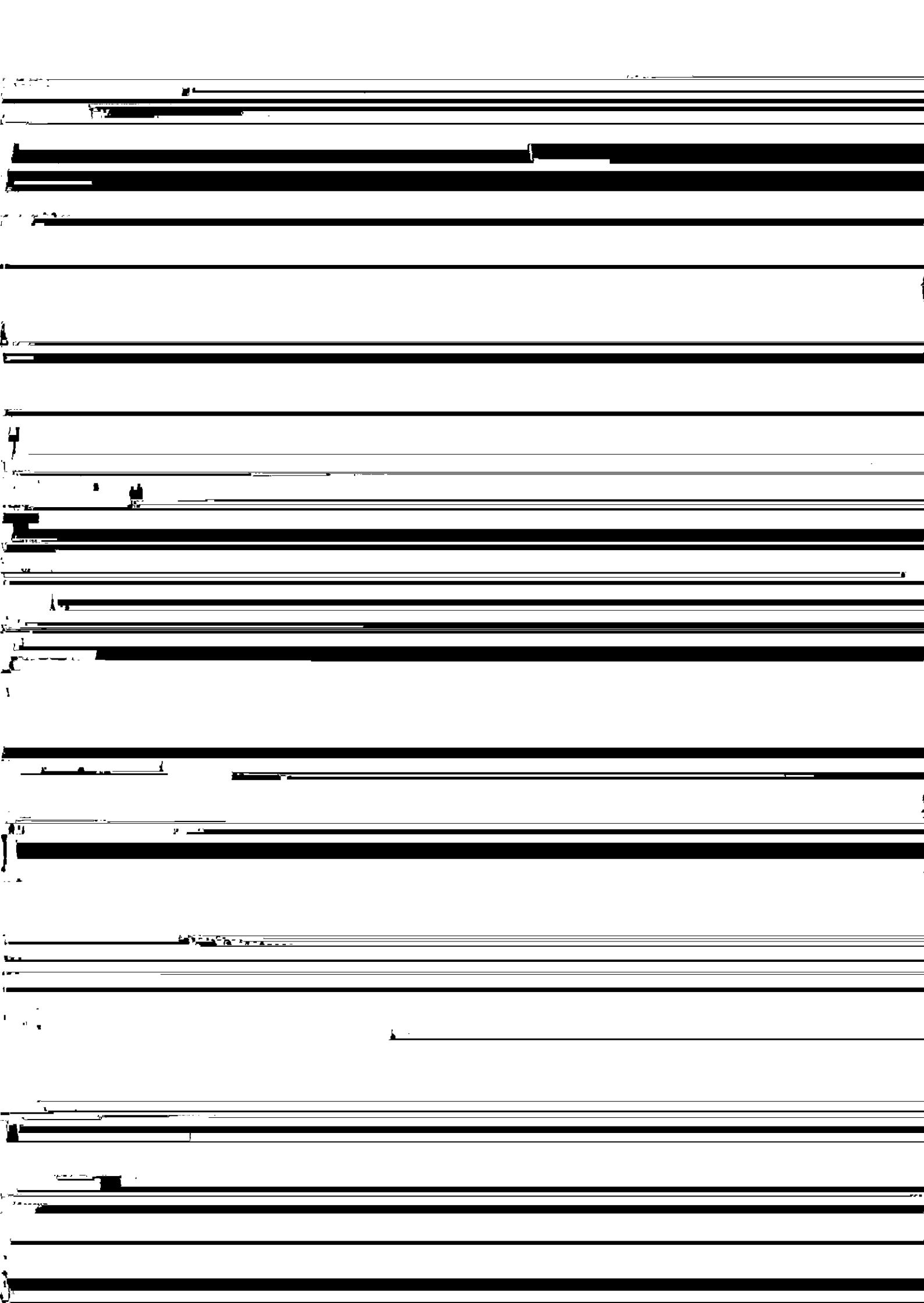
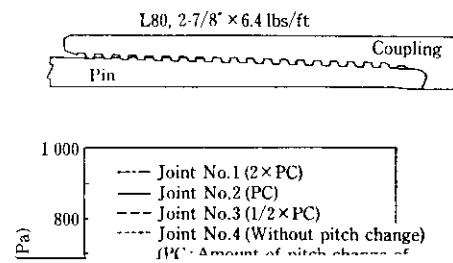


Table 2 Conditions of FEA on the joints of API L80 carbon steel ($2\text{-}7/8'' \times 6.4 \text{ lb/ft}$, yield strength 552 MPa)

Joint type	Amount of pitch change
1	$2 \times \text{PC}$
2	$1 \times \text{PC}$



L80, 2-7/8" x 6.4 lbs/ft

Coupling

Contour level

L80, 2-7/8" x 6.4 lbs/ft

Coupling

Pin

200.00 0.00 0.00

200.00

200.00

Table 3 Full scale tensile test data on the joints of AISI 1.80 carbon steel (2-7/8" x 6.4 lb/ft

Coupling L80, 2.7/8" x 6.4 lbs/ft

[illegible]