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subject: Errata for NUREG/CR-0779 - SAND78-2347 Fracture Toughness of PWR Component Supports, June, 1979.

On Page 33 the equation proposed by Sunamoto et. al. is incorrect as printed. The correct version is:

$$T_{shift} \text{ (in } ^{o}\text{F)} = 1.8 \exp(5.6 - .019\ \sigma_{ys})$$

The entries in Table 4.1 on Page 34 are correct, however.

In Table 4.4 (Page 37), the heading between the NDT and NDT + 1.3σ columns was omitted. It should be "σ" (the standard deviation).

Also in Table 4.4 under "Cast Steels," the second line of data under A-27, A-216 (heat treated condition) refers to >1" thick material. The ">" sign was omitted.

Also, the graph in Fig. 4.4 is incorrect; and as a result some modifications to Section 4.9.4 and Table 4.9 must be incorporated.

These, however, do not change the conclusions of this section.

The corrected Fig. 4.4 (Page 69), section 4.9.4 (Page 58), and the appropriate part of Table 4.9 (Page 64) are appended. The corrected text materials are underscored where changes were made.

GAK:5833:ao

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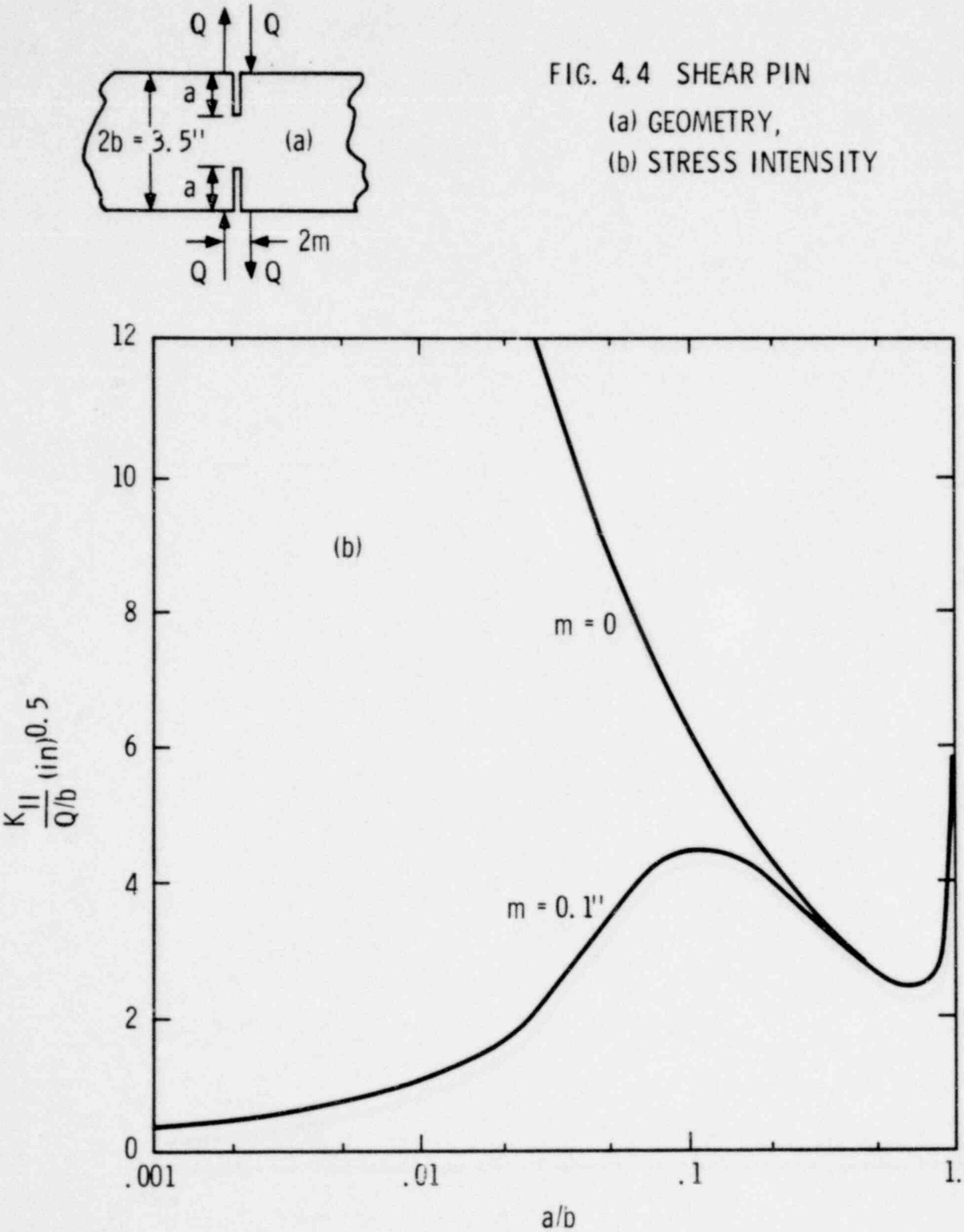

FIG. 4.4 SHEAR PIN
(a) GEOMETRY,
(b) STRESS INTENSITY

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Shear pin (3.5" diameter) approximation

$\sigma_{ys} \times 1.68$	$\sigma_{ys}/2 = \tau_{ys}$	.035"
$\sigma_{ys} \times 0.35$	$\sigma ys/2 = \tau ys$	.00175"
$\sigma_{ys} \times .17$	$\frac{\tau_{ys}}{2}$*	.00175"

*This requirement translates to:

56 ksi $\sqrt{in.}$ for 330
yield maraging steel
26 ksi $\sqrt{in.}$ for low
alloy steel heat
treated to 150 ksi yield

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4.9.4 Shear Pin

This geometry simulates a clevis shear pin (a relatively common geometry in all the structures, especially for snubber attachments and other lateral restraints) or the main load-bearing members in pin-column structures. It is a two-dimensional approximation to a cylindrical geometry, and is probably more conservative because of this, due to added restraint. Figure 4.4 illustrates the geometry, and reasonable choices of a and b of .030" and 1.75" ("a" corresponding to some local surface decarburization perhaps), leads to a/b of 0.02 with m = 0.1". This implies that $K_{II}/Q/b$, is 1.68. Assuming the yield strength in shear is 1/2 that in tension, for a unit width of 3.5" deep material under yield level loading: $Q = \frac{\sigma_{ys}}{2} \times 1 \times 3.5 = \frac{3.5}{2}\sigma_{ys}$ lbs. Letting σ_{ys} = 150,000 and 330,000 psi (simulating shear pins of hardened materials) this results in Q/b = 150,000 and 330,000. With a/b = .02 this implies a necessary toughness (see Fig. 4.4b) of 1.68 x σ_{ys} ksi $\sqrt{in.}$, which is not attainable in these high strength materials. Even if a/b = .001 a toughness of 0.35 σ_{ys} ksi $\sqrt{in.}$ is necessary, which is possible for 150 ksi yield material, but not for a 330 ksi yield material. These K's are K_{IIc}, but evidence indicates that $K_{IIc} \sim K_{Ic}$ (Ref. 4.18, 4.19). Such materials apparently deserve close scrutiny. If the loads are reduced to about half of yield, the toughness requirement is halved also, but the ultra-high strength steel would still have trouble meeting a necessary K_{IIc} of 58 ksi $\sqrt{in}$ (without even considering stress-corrosion effects).