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API 8C, 5th Edition WI 5304: Paragraph changes to Section 5.5 and Section 9.8.3

The text in green has been added

The text above in red/strike-through has been deleted

5.5 Alternative Design Verification Test Procedure and Rating

Destructive testing of the test unit may be used, provided an accurate yield and tensile strength of the material used in the equipment has been determined. This may be accomplished by using tensile-test specimens of the actual material in the part destructively tested and determining the yield-to-ultimate strength ratio. Each component of an assembly shall be qualified under the most unfavorable loading configuration. Components may be qualified using either of the following methods:

- a) The ratio T_R shall be computed for each component in the assembly. The smallest of these ratios shall be used in the equations.
- b) Each component may be load tested separately if the holding fixtures duplicate the loading conditions applicable.

The ratio is then used to rate the equipment as shown in Equation (6) and Equation (7):

$$R = L_B \frac{T_R}{SF_D} \quad (6)$$

$$T_R = \frac{YS_m}{TS_a} \quad (7)$$

where

SF_D is the design safety factor (see 4.7);

YS_m is the minimum specified yield strength;

TS_a is the actual ultimate tensile strength;

L_b is the breaking load;

R is the load rating.

Since this method of design qualification is not derived from stress calculations, qualification shall be limited to the specific model, size, size range and rating tested. Additionally, if elevators are tested that could be used to cover various bore sizes, then the tested configuration should be the one that resulted in the highest stresses.

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9.8.3 Slip-type Elevators and Slip-type Spiders Testing

9.8.3.1 Design verification testing of slip-type elevators and slip-type spiders shall be carried out with the slips/inserts in place. Production-load testing may be carried out without the slips/inserts installed, using a tapered mandrel designed to simulate the actual loading conditions.

9.8.3.2 The slips' activating mechanism shall be functionally tested on each production unit, demonstrating full compliance with design requirements.

9.8.3.3 Inserts are exempt from mechanical testing and traceability requirements.

9.8.3.4 Primary load-carrying components of elevators shall meet the impact testing requirements of 8.4.4. An exception to this are elevator slips which shall be made from materials possessing a minimum impact toughness (average of three tests) of 33 J (25 ft-lb) with no individual value less than 26 J (19 ft-lb) at a maximum test temperature of $-20\text{ }^{\circ}\text{C}$ ($-4\text{ }^{\circ}\text{F}$).

9.8.3.5 The manufacturer of the equipment shall provide, in the documentation delivered with the equipment (see 11.3c), frequency of inspection and acceptance criteria for NDE of slip-type elevator setting rings.

9.8.3.6 Proof load testing, as described in 8.6, shall apply. Additionally, the following shall apply:

- a) replacement hinge pins and latch pins shall meet or exceed the original manufacturer's specifications;
 - b) ~~replacement~~ hinge pins or latch pins manufactured from wrought material are exempt from proof load testing requirements.
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