CHAIRMAN Resource

From: Tom Gurdziel <tgurdziel@twcny.rr.com>
Sent: Friday, April 13, 2018 10:08 PM
To: CHAIRMAN Resource
Cc: qainfo@nsr.go.jp; Screnci, Diane; Bridget Frymire; Bavol, Rochelle; Holden, Tammy L:(GenCo-Nuc); Lyon, Jill:(NMP); 'Ed Stronski'
Subject: [External_Sender] Primary Containment Structural Considerations (for Severe Accidents)
Attachments: Attachment.pdf; New Jersey EIT.pdf

Good morning,

In a general sense, how can we attempt to avoid structural failure?

1. Determine the (minimum) load at which the structure's material(s) start failing.
2. Appreciably reduce that load. Call this the "Design Load".

For example, in the 1960's, a commonly used steel was A7, which has a certain stress upon yielding. (The stress at a specified amount of yield would be considered the failure stress.) Using the AISC, (American Institute of Steel Construction), code in force at that time, you would be allowed to use up to .6, (six tenths), of that yield stress at failure.

To summarize, (and realize that I am talking only the simplest case), you start out with the failure load and reduce it to get a comfortable margin away from failure. This is called the Design Load.

In Japan, the Tokyo Electric Power Company, Inc., (now called the Tokyo Electric Power Company Holdings, Inc.), did not do this. They did not start with the failure load and reduce it: they started from the Design Load and increased it. Let's see how much they could have increased the Design Load, using A7 steel as an example, before reaching failure at Fukushima Dai ichi.

See the Attachment

Note that failure can be expected to occur at 1.67 x Design Load (in this approximation.)

Tokyo Electric Power Company, Inc. corporate management required their operators to reach 2.0 x Design Load before venting. Doesn't it seem that they inadvertently failed their (probably otherwise suitable) primary containments with this instruction?

(One reference to this "two times" value is on page 16, line 14 of INPO 11-005 Addendum, (this is not INPO 11-005 Special Report), where the words "maximum operating value" are, I believe, referring to "Design Load".

A second reference would be the last two lines of text on page 77 of "The Fukushima Daiichi Accident", Technical Volume 1/5, Description and Context of the Accident" by IAEA. Here you will find the words: "twice the design".)

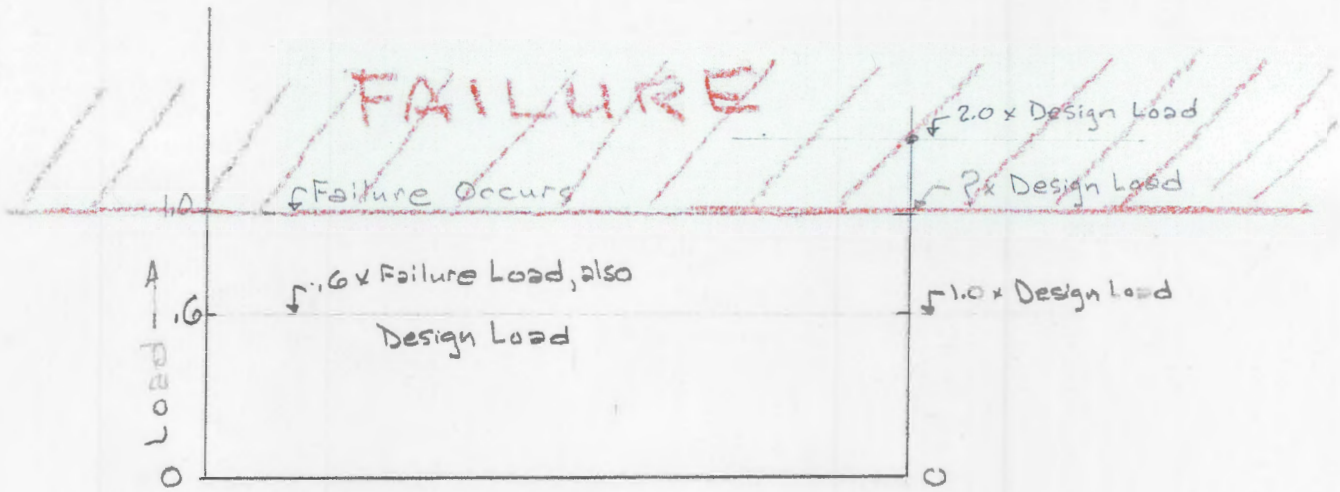
I am mentioning this now at 7 years & 1 month in a period of quiet so that a little thought could again be applied to the need to successfully vent primary containments to outside the secondary containment during severe accident conditions. (And just let me add here that successful venting probably will require operator-controllable, or bypass able rupture discs.)

Thank you,

Tom Gurdziel

The yield stress of A7 steel I remember to be 33000 psi.

Attachment



$$\frac{1.0}{.6} = \frac{?}{1.0}$$

$$? = 1.67$$

Failure occurs at 1.67 Design Load

T.G. 4-13-2018

State of New Jersey

DEPARTMENT OF LAW AND PUBLIC SAFETY

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Thomas John Gurdziel

having submitted satisfactory evidence of his qualifications in engineering fundamentals, technical subjects, mathematics, and basic sciences, is hereby issued this Certificate of Registration as

Engineer-in-Training

as provided by Law.

Issued and attested by the Seal of the State Board of Professional Engineers and Land Surveyors this [illegible] day of January [illegible]

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[illegible] remain in effect for a period of ten years from date of issuance