

Hernandez, Pete

From: Hernandez, Pete *mark*
Sent: Friday, November 04, 2011 9:35 AM
To: Sanchez Santiago, Elba
Cc: Zimmerman, Jacob; Mahoney, Michael
Subject: Questions about Davis Besse Shield Building Report from DORL

Elba, here are the questions I had about the report from Davis Besse. The calculations were a bit out of my range but, I had questions about their general methods. The Tech folk should have their questions over to you this morning also.

Thanks,

Pete

Questions about Davis Besse Shield Building Report

C-CSS-099.20.054

Objective or Purpose (paragraph 3): In this calculation the structural integrity of the SB is evaluated considering the presence of an interfacial/circumferential crack between the SB structural concrete shell (i.e., the 30" thick reinforced concrete SB) and each architectural flute shoulder (16 flute shoulders in total), as described in Attachment B.

This description makes me think that they are looking at a single crack going in a circle. From what I understood the crack is pervasive along the entire surface, spidering in all directions, similar to a pane of tempered glass breaking. The description in Attachment B addresses only the crack at the opening and assumes that the crack is right along the rebar line. The core bores have shown that the cracks are at different depths so this doesn't seem to capture the current situation. Throughout the calculation, the word Crack, singular, is used. They also mention that the extent of the crack is only 10'-12'. This seems to greatly downplay the issue.

Scope of Calculation/Revision (bullet 4): Maximum concrete crack width under flexure is calculated and compared with the allowable value (Section 7.5). Note that this maximum crack width evaluation only applies to the structural concrete (i.e., the 30" thick reinforced concrete SB shell). In particular, the width of any cracks in the 16 nonstructural architectural flute shoulders is not addressed.

At this point core bores of only the shoulders have been taken. So the only crack widths we are aware of are those in the shoulders, which are not being addressed. How can an analysis be done on the structurally credited concrete if no data from that area, in the form of core bores, has been taken? Shouldn't the structural integrity of the shoulders be calculated as well?

Section 3.0 Methodology (last sentence): Thus, this calculation focuses on the structural integrity of the reinforced concrete within and around the RCVH/SGs construction opening, once it is restored.

This seems to say that they are just doing calculations for the new concrete that is and ignores the rest of the building altogether. Is that right?

Section 3.1 Construction sequence (page 6, second paragraph): However, the vertical reinforcement next to each flute (i.e., in a vertical strip approximately 10 ft wide) is conservatively ignored for evaluating the structural integrity of the SB under mechanical loads...

This says to me, that they are ignoring the shoulders, if they are ignoring all that concrete, it seems to be the opposite of conservative for evaluating the mechanical loads.

C-CSS-099.20.055

Objective or Purpose: The purpose of this calculation is to demonstrate that during a seismic event, with the development of the crack in the architectural flute shoulder, the capacity of rebar(s) can still provide adequate anchorage thus prevent cracked concrete piece from falling, and therefore Seismic II/I condition can be maintained.

I think the greater concern is will the SB stay standing and not whether or not the decorative concrete will fall off.

Because the licensee has not performed core bores to see if there is cracking in the credited concrete, do they have a basis to say that the structural concrete will maintain a Seismic II/I condition?

This use of singular terminology also discounts this calculation because it seems that they are looking at only 1 crack and 1 shoulder or 1 flute. Because cracks have been found through multiple core bores, shouldn't the appropriate calculations account for the combined effects of cracks in all the shoulders and not just one by the opening and not just individually?

Section 6.2 (page 7): Based on Impulse Response testing, the actual crack length is 10 to 12 feet long.

From what I understand, IR mapping is only an indicator, but must be validated by core bores. Does basing all the calculations on a length of a 12 foot crack discount the calculations altogether, because we have indications of cracks at distances greater than 12 feet. This also seems to assume that there is only 1 crack and not many as the core bores seem to prove. Isn't IR mapping only useful at a limited depth too, so that using it to evaluate a 48" thick piece of concrete is not realistic?