

Sakai, Stacie

From: Sheikh, Abdul *inn*
Sent: Tuesday, November 22, 2011 10:51 AM
To: Sanchez Santiago, Elba
Cc: Hoang, Dan; Manoly, Kamal; Sakai, Stacie
Subject: Questions for the Conference Call

There are several documents (summary report, new calculation 056) that have different assumptions and approaches. I did not have enough time to review the calculation (196 pages). However, the basic questions are as follows:

1. What is the actual condition of the concrete 20 feet below the spring line based on field verification.
2. Calculation C-CSS-089.20-056, page 5 states in the assumption section that, "because the bond strength of reinforcement with laminar cracking next to it cannot be quantified, outside face hoop reinforcement in these regions is treated as ineffective --- for ultimate strength calculations." If this assumption is correct only 3-4 inches of the concrete on the inside face can be used in the structural analysis. In the response to the questions, the applicant stated that, "Since we assume that outside reinforcement is to be treated ineffective in carrying any additional stress beyond 12.4 ksi, under accident thermal loads that may cause stresses in excess of what the rebar can carry (assumed 12.4 ksi), the reinforcement is assumed to detach itself from the outer section of the shell." These statements seems to be contradictory. In addition, I am concerned that the concrete will fail in this region due to bending in this region even under small loads.
3. Lap splice issue. ACI 318-63, section 805 (b) states that, "---however, length of lap for deformed bars shall be not less than 24, 30, and 36 bar diameters for specified yield strength of 40,000, 50,000, and 60,000 psi, respectively."
4. At places in the licensee documents, it is stated that due to staggered lap rebar splices, only 50 percent of the rebars are considered effective. If this is the assumption, stress used for lap splice calculation should account for 100 percent increase in the stress.
5. The licensee justification for ignoring the dead (DL) and normal thermal (To) in calculation of rebars splice does not appear to be justified. The stresses due to dead load and thermal loads will be locked in the rebars and cannot be ignored.
6. The licensee considers the allowable stress in the rebar to be 60 ksi and ignores a phi factor (0.9) in his evaluation for lap splice. In addition, the licensee has not accounted for any additional uncertainty due the field conditions.
7. Licensee response to question 1 states, "On a conference call with Drs Darwin and Sozen both indicated that the capacity of the reinforcement steel after the concrete is cracked (in the 5-10 mil range) is still 20 to 30%. This is based on pull tests of straight bars under tensile loads." I am not aware of any pull tests carried out with a crack in the plane of the rebar. Can the licensee provide any documentation for this statement.
8. The licensee is using numerous assumptions in his summary report and calculations that are not described in the UFSAR and ACI 318-63, and still calls it a design basis calculation. Can the licensee provide justification for this approach.