

**From:** Mahendra Shah  
**To:** Adelaide Giantelli; Antonio Dias; Bernard White; Charles Interrante; Christopher Bajwa; Daniel Huang; Elaine Keegan; Robert Shewmaker; Ron Parkhill; Stephanie Bush-Goddard  
**Date:** 1/10/03 10:42AM  
**Subject:** Re: Unperformed calculations

Bernie:

Attached please find the suggestions for the analyses. I have been talking to Jeff and have send e-mails to Jeff and Sandia on some of the details.

Can we postpone our today's call to Sandia, to Monday afternoon? Thanks.

Mahendra

>>> Bernard White 01/09/03 04:40PM >>>

Please provide me a list before lunch of any calculations that we have asked Sandia to perform and they have been reluctant to for the large plane evaluation. Remember we have the money, but more than anything we want their honest technical opinion.

Thanks  
Bernie

**CC:** Earl Easton; Jack Guttman

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E/81

Suggestions to Sandia for Analyses

Mahendra J. Shah, 1/10/2003

**AIRCRAFT IMPACT:****CTH analyses:**

It appears that the program cannot handle the friction between the cask and pad. However, we do have a CTH case (CTH\_MIX3.V2\_side), where the bottom corner of the cask away from the aircraft impact is precluded from moving, and the cask rotates about this corner with the ( ) Since the friction is an insignificant portion of the total impact force, we can assume that the impact force time-history (TH) for this case is a reasonable approximation for the real case.

Ex 2

We can use the results of this analysis to determine the orientation of the cask sliding at the velocity, conservatively based on the case with the impact at the center of the cask and no friction at the cask base. Based on the force TH, we can determine the time at which the force is equal to the maximum friction force. Knowing the time at which the force is equal to the friction force, we can then determine the rotation of the cask about the corner. **This would be the orientation of the cask which can be assumed to slide at the velocity, which varies with time and the distance traveled, and not the C.G. over the corner.**

**PRONTO Analyses:**

1. Revise the model to include the MPC in a simplified manner (shell, lid and the baseplate). The fuel basket mass should be included with the MPC shell. Rerun the two cases we are having problems with, one for the cask to cask impact, and the other for the landing gear impacting the lid.
2. For the cask-to-cask impact to the adjacent cask at any angle to the impact direction, we should reduce the velocity based on the angle of the cask travel to the impact direction.
3. For the potential case of the cask tipping over due to aircraft impact, analyze the case for the impact on the concrete pad, with a radial velocity based on the CTH analyses results.

Ex 2

Analysis

Currently, we are using the CTH computer code to analyze for the ( ) and to determine if the MPC breach would occur. Since the CTH cannot predict the strain values in the MPC with a reasonable accuracy, **we must use the pressure loads from the CTH analyses, and then use the PRONTO analysis for the Cask with the MPC, to determine the strains, and determine if the MPC would be breached.**

Ex 2

Portions Ex 2