Impact Limiter Attachment Design

Overview
AREVA TN wishes to utilize one of its storage cask designs, the TN-32 as a transport cask. To do this, they need to secure impact limiters to the cask in order to comply with NRC guidelines, part 71.73 which lists various hypothetical accident conditions that the assembly must endure. AREVA TN currently has a design in mind that they wish for us to compare against in order to determine the ideal design.

Objectives
Our goal is to design an attachment method to compare against their currently used design in order to determine its feasibility.

Approach
- The design team and the sponsors agreed upon taking into account only the slap-down test from out of all the testing conditions.
- The design team came up with conceptual designs which are eventually narrowed down to 2 using sponsor feedback.
- The force imposed on the structure due to impact is determined.
- The corresponding load and stresses on the support structure is also determined.
- Key regions where stresses play a large factor in are identified.
- Based on the loads, the sizes and the number of key components are updated correspondingly in order to bear the stress without failing.
- Further materials analysis were carried out using Solidworks’ FEA.
- Both of the final designs were ranked against AREVA TN’s original concept design using an AHP table.
- The final design chosen was 6 brackets and 2 wire ropes.

Outcomes
- The team managed to do a rough design of an attachment system that is faster to install compared to the previous one.
- Extensive future work will have to be carried out in order to implement this design as it utilizes simple assumptions which may or may not hold true in the future based on customer needs.