

International Conference on Fast Reactors and Related Fuel Cycles: Next Generation Nuclear Systems for Sustainable Development (FR17)



Contribution ID: 446

Type: **POSTER**

DESIGN VALIDATION OF PFBR FUEL SUBASSEMBLY TRANSPORTATION CASK WITH MOCKUP TRIAL RUN

Wednesday, June 28, 2017 5:50 PM (1h 10m)

In the case of Indian Prototype Fast Breeder Reactor (PFBR), which is in an advanced stage of commissioning, the fuel pins along with other parts of fuel subassembly are stored in an Interim Fuel Storage Building (IFSB). The final assembling of subassembly is carried out in IFSB and the IFSB is located far away from PFBR site. It is essential to demonstrate safe transportation of the fuel assemblies to PFBR site. Hence, as a part of PFBR pre-commissioning activity, mock-up trial runs have been carried out for full scale representative dummy fuel subassemblies along with cask on transportation trailer from the IFSB to PFBR fuel building. The purpose of this trial runs was to demonstrate that the vibration and shock seen by the cask during transportation are lower than the values considered for the design of the cask as per the NUREG/CR-0128 guidelines.

The maximum acceleration measured at the top of the cask during the transportation in the onward trip from IFSB to reactor site was 8.9 m/s², which was due local disturbance. Neglecting this driving scenario, the peak acceleration found at the top of the trailer due to the unevenness in the road condition was 5.3 m/s² (along the transverse direction). The same measured during the return trip was 3.3 (along the transverse direction). Similarly, the peak acceleration along the longitudinal direction measured in the return trip at the top of the trailer was 4.3 m/s² at the top of the cask. These values are traced to be due to the unevenness in the road conditions. All the above values are lower than the acceleration values used for the cask design. As per the NUREG guideline, the permissible values of acceleration are 29 m/s² along the longitudinal direction and 13 m/s² along the transverse direction. Thus, the measurements carried out during trial runs have demonstrated the safe transportation of fresh fuel subassemblies from IFSB to reactor site. The full paper would present the details of instrumentation adopted, measurement locations, spectrum of spectrum of shock and vibration data and their acceptability

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Session Classification: Poster Session 2

Track Classification: Track 2. Fast Reactor Operation and Decommissioning