Mechanical Assessment within Type B Packages Approval
The Application of Static and Dynamic Calculation Approaches

Test Procedures

Type B(U) - Accident Conditions of Transport (Mechanical Tests)

1m Puncture Bar Drop Test → Sequence → 9m Drop Test

Demonstration of Compliance

- Full-scale model
- Previous demonstration
- Small-scale model
- Calculation

Mechanical assessment

Requirements for Type B(U) packages

IAEA Safety Standards
Regulations for the Safe Transport of Radioactive Material (TS-R-1)

In Practice:
Combination of methods

Dynamic Calculation (1m Puncture Bar Drop Test)

1m drop test (half-scale model) → Numerical analysis → Verification and safety assessment

Dynamic and Quasi-Static Approaches (9m Drop Test)

Calculation methods

Full dynamic analysis

Combined method
First Step: Calculation of rigid body deceleration

Second Step: Quasi-static numerical calculation

Verification!
1. Impact limiter deformation
2. Rigid body deceleration

Conclusions

1m puncture bar drop test
- Reliable dynamic calculation is possible due to local character of interaction zones
- Verification process by using experimental results

9m horizontal drop test
- Reliable dynamic calculation is not easily possible due to the complexity of the interaction between collision partners
- Experimental verification of rigid body deceleration
- Dynamic factor for quasi-static approach