

A Discussion on the Secure Stowage of Packages

Panel 326

PATRAM
7th October 2010

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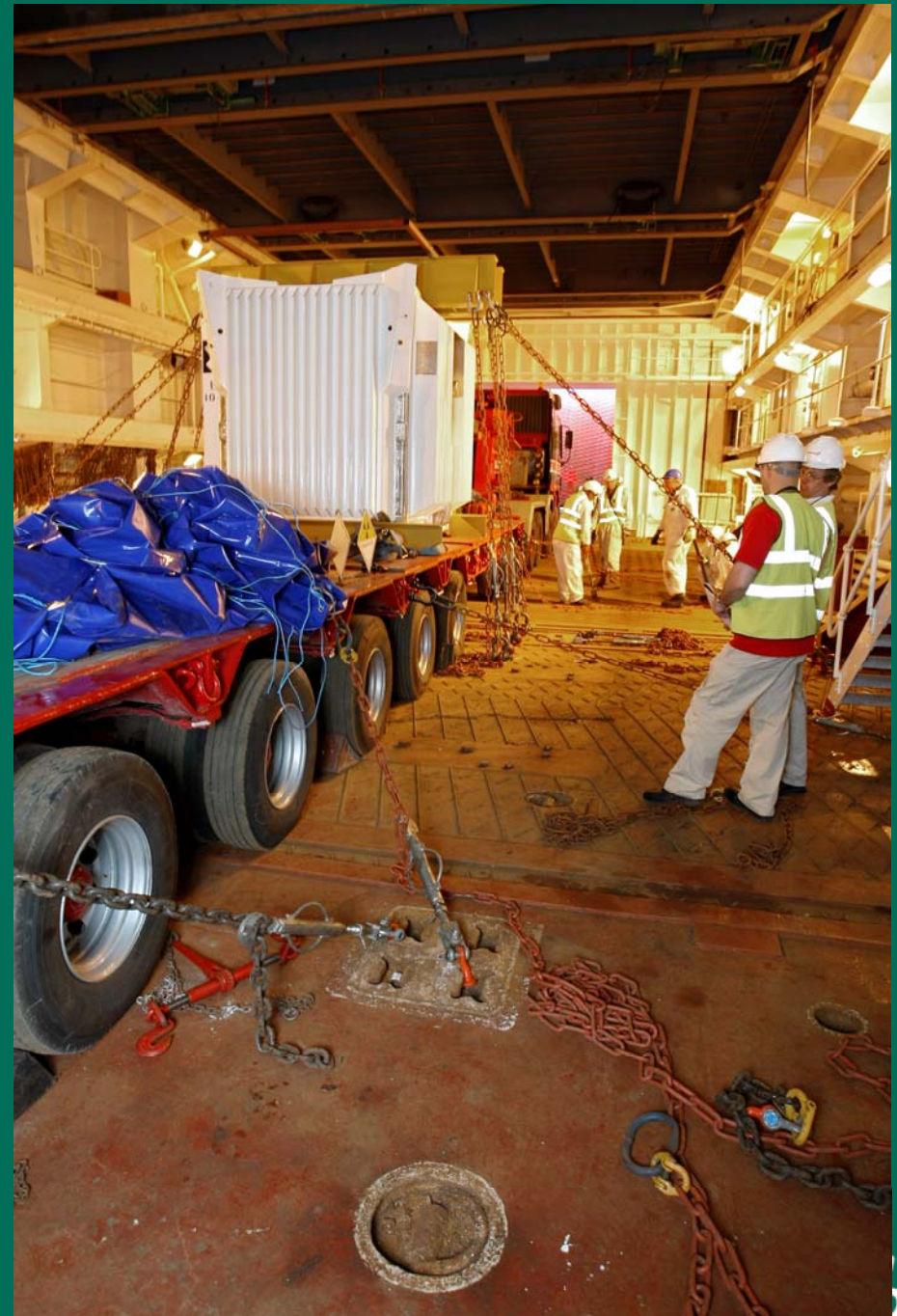
Consignments Shall be Securely Stowed TS-R-1 [565]

- Other relevant regulations:
 - [606] ; [612] (+ TS-G-1.1 Table IV.1); and [636].
- The above regulations and advisory material are what must be interpreted in order to inform our judgement on what is a secure load.

Flask on a Rail Wagon



Flask by Road and Sea



Gale Force winds!



BEAUFORT FORCE 8
WIND SPEED: 34-40 KNOTS

SEA: WAVE HEIGHT 5.5-7.5M (18-25FT), MODERATELY HIGH WAVES OF GREATER LENGTH, EDGES OF CREST BEGIN TO BREAK INTO THE SPINDRIFT, FOAM BLOWN IN WELL MARKED STREAKS ALONG WIND DIRECTION.



BEAUFORT FORCE 9
WIND SPEED: 41-47 KNOTS

SEA: WAVE HEIGHT 7-10M (23-32FT), HIGH WAVES, DENSE STREAKS OF FOAM ALONG DIRECTION OF THE WIND, WAVE CRESTS BEGIN TO TOPPLE, TUMBLE, AND ROLL OVER. SPRAY MAY AFFECT VISIBILITY.



Hurricane Force winds!!!

BEAUFORT FORCE 12
WIND SPEED: 64 KNOTS

SEA: SEA COMPLETELY WHITE WITH DRIVING SPRAY,
VISIBILITY VERY SERIOUSLY AFFECTED. THE
AIR IS FILLED WITH FOAM AND SPRAY

CA and Enforcement regime within the UK

- Competent Authority: Department for Transport (DfT)
- Design and Shipment Certificates: DfT
- Enforcement by Road: DfT
- Enforcement by Rail: Railways Inspectorate of the Health and Safety Executive
- Enforcement by Sea: Maritime and Coastguard Agency
- Enforcement by Air: Civil Aviation Authority.

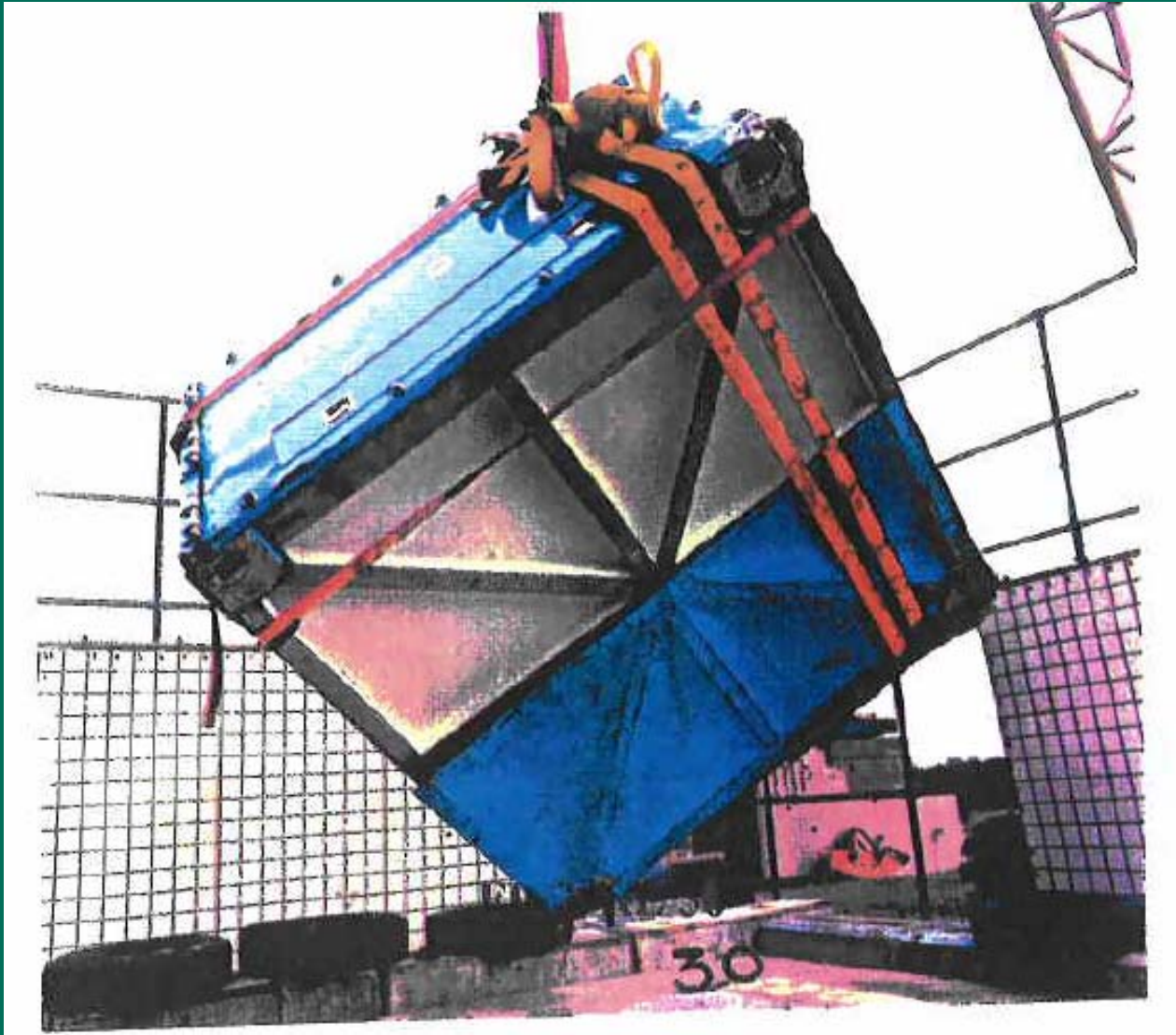
Excepted and Type A packages?



Suggestions:

- Should the IAEA regulations define secure stowage in the same way as e.g. a rigid target is defined?
- Should there be a graded approach to secure stowage that reflect reality?
- Could the technical guidance/requirements for secure stowage be rationalised across all modes and a common template used?
- What are the CA models in other countries for certification and enforcement – what is best practice?

And one last point...



Successful FEA of tie-downs

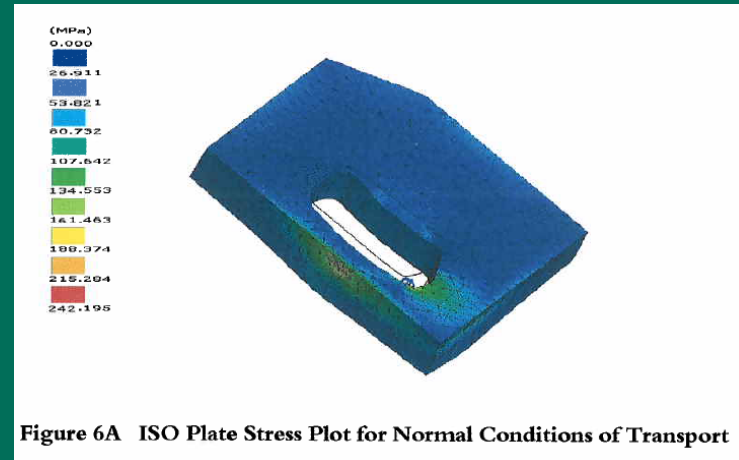
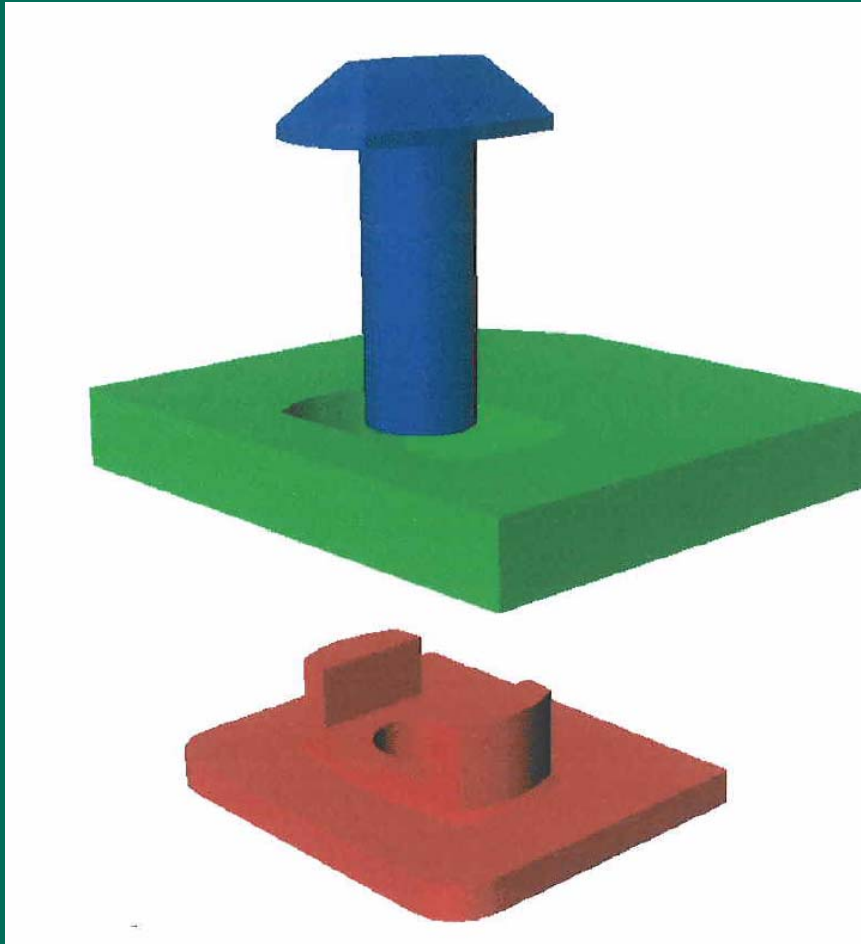


Figure 6A ISO Plate Stress Plot for Normal Conditions of Transport

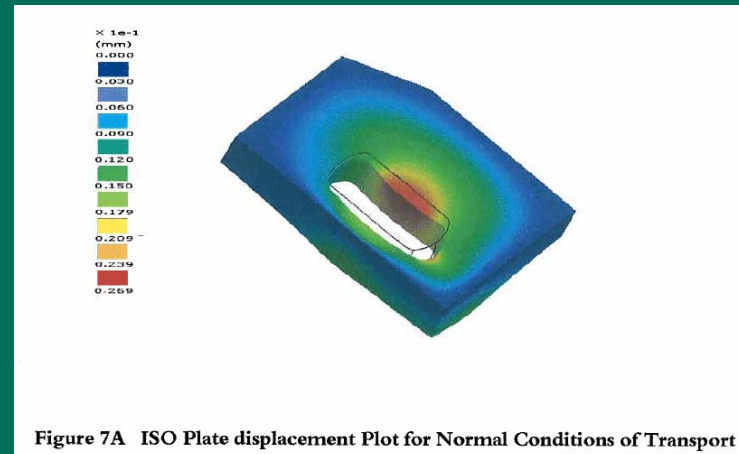
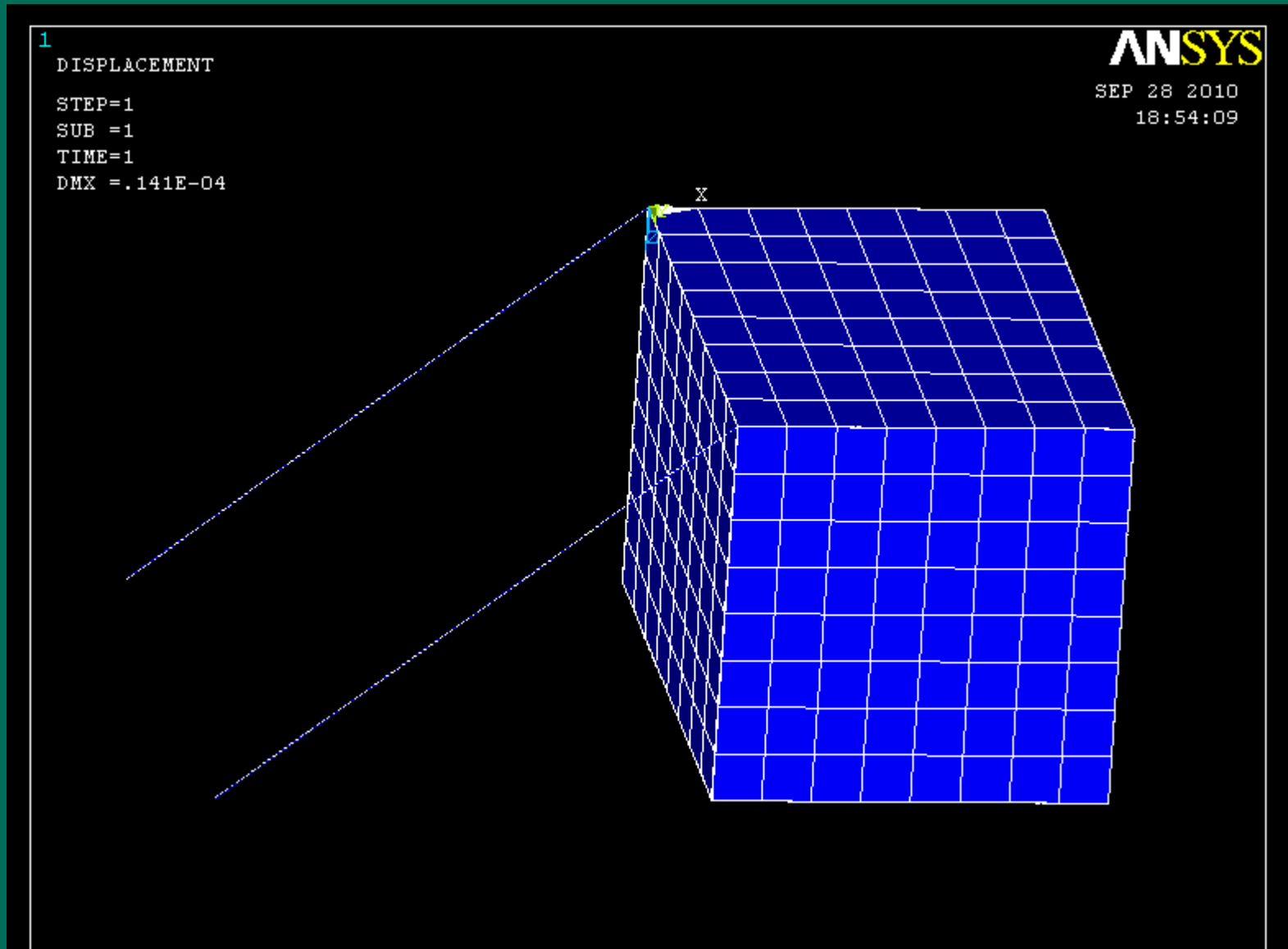


Figure 7A ISO Plate displacement Plot for Normal Conditions of Transport

Even a Regulator could do it!



Suggestion 5

- Finite Element Analysis (FEA) is routinely used to supplement or even replace physical testing for the 9m drop, punch and thermal tests. There is a reluctance to use FEA to prove the tie-down system – perhaps guidance could be up-graded to provide help in this matter?

Thank You



Don't worry – these are NOT dangerous goods!