



XVIII SAFEX Congress (2014), Warsaw Best Practice & Standards in Explosives & Ammonium Nitrate Logistics

Brian Devaraj

May 2014

Background

Our Approach

Best Practice & Standards

Successes and Challenges

Appendices – Congress Paper Excerpts



CONFIDENTIAL: Information contained in this document is strictly confidential.

- Increasing Security Risk & Rapid Globalization
- Increasing demand for resources = Demand for Explosives & Ammonium Nitrate(AN)
- Deferring environments across Varying Countries creates a unique logistics challenge
- Underlying expectation of “Zero Risk” from the explosives industry
- Explosives & AN Logistics entails exposure to external threats on Road, Sea and Air
- Continued Prevalence of Transport Incidents across the Globe

Our Approach



- Establish base line (Global) standards for Hardware (trucks, ships, warehouses etc)
- Establish base line (Global) standards for Process(Guidelines, Standards, SOP's, Driver Training etc)
- Global Standards based on Hierarchy of Controls
- Ship Standards – IMO, SOLAS, IMDG
- Warehouse Standards – Local Legislation & Orica COP
- **Truck Standards – Basis of Safety Design Principles**



- **Hierarchy of Controls Principles applied to truck design and transportation processes**
- **28 Design Principles developed and applied**

Examples:

Vertical & Horizontal air gap on trucks between cargo body and vehicle cabin / mechanical equipment

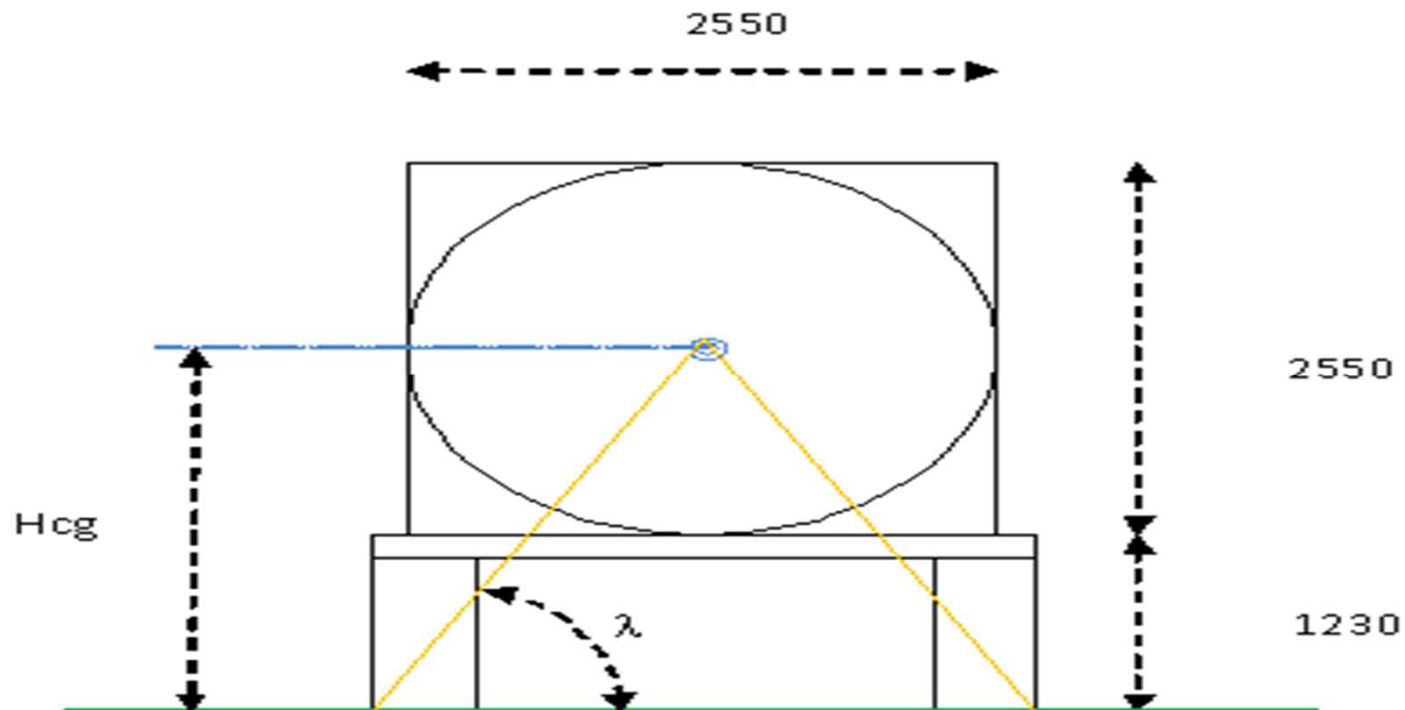
Fuel Tank protection including fusible / vented caps, shut off valves, static foam cells where practical.

Stability of our Trucks is one of the major concerns

- Bulk Liquids
- Solids

Stability of tank containers

- 4.9.2 (1) A tank container which is transported on a road vehicle must be placed on the vehicle so that the height of the centroid of the tank cross section at tank half length falls within an isosceles triangle having:
- (a) a base length at ground level equal to the overall width between the outside walls of the outside tyres of the main load bearing axle groups, and
 - (b) base angles not exceeding 64 degrees.
- (2) It is sufficient compliance with sub-clause (1) if the distance between the ground and the load bearing surface of the loaded container's bottom corner casting does not exceed 1100mm.



Bulk Liquids Transport Stability



➤ Roll Over Prevention:

L

Roll-over prevention: a) the centre of gravity (C of G) of loaded compartment must comply with local regulations; b) recommended that the ratio of the distance from the outside tires to the height of the center of mass should not be less than 0.9

1. The centre of gravity (C of G) of loaded compartment must comply with local regulations

1. Recommended that the ratio of the distance from the outside tires to the height of the center of mass should not be less than 0.9

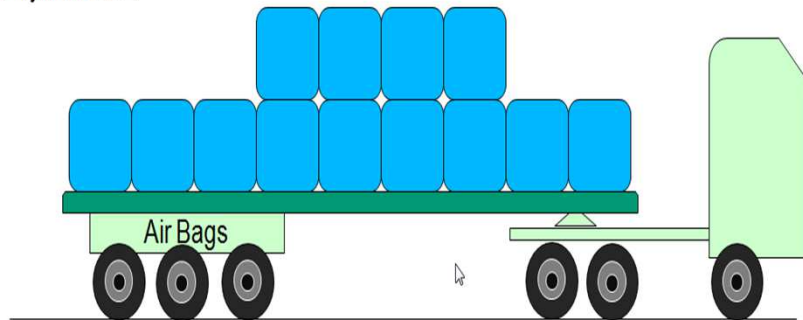
- Static Roll Over Threshold (SRT) is the best measure for Solid Transport Stability
- A minimum SRT value of 0.35g is recommended but not a guarantee against rollovers in the wrong circumstances
- The higher the SRT, the greater the room for driver error
- Some OECD countries recommend SRT value of 0.40g for Dangerous Goods and 0.45g for Bulk Liquids

SRT Examples



Load Type One

Load ANDP @1250kg/bag
Upper layer 8 off
Lower layer 18 off
Payload 32.5t

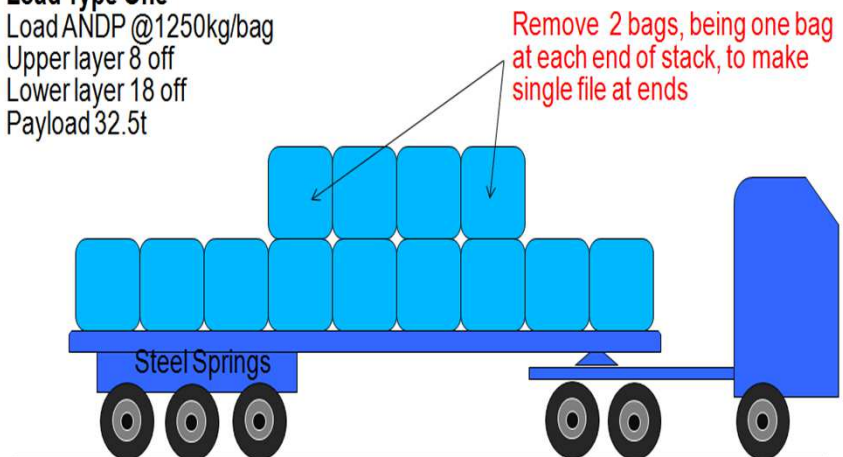


Case A1 = Calculated SRT = 0.39g

Conclusion, OK with normal driving margins

Load Type One

Load ANDP @1250kg/bag
Upper layer 8 off
Lower layer 18 off
Payload 32.5t



Case B1 = Calculated SRT = 0.32g = FAIL!

Recommendation: To achieve 0.35g, Reduce the upper layer to 6 Bags only
Revised Payload 24 bags @ 1.25t = 30.0t

Engineering Controls

GPS as a “pro-active” tool
In Cab Cameras
Infra Red Temperature Monitors

Administrative Controls

Route Risk Assessments
Lights On At All Times
Monthly Safety Flyers
Incident Newsflashes & Safety
Bulletins
Marine Vetting Standards
Driver Passports
Pre-Start Checklists
SC Checkpoint Audit Tool
Transport Emergency Response
Plan

- Global versus Country Specific Standards drives a baseline on safety
- Partnerships with Carriers
- Engagement with the Regulator – Containerisation in India
- Third Party Carriers coupled in an “external” environment

Thank You !
Dziękuję !