



Contractor management and employee awareness in transportation of explosives and hazardous raw materials

- SAFEX Open Day -

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Contractor management and employee awareness

- The transport of hazardous and explosive material is a field with multiple facets where hazards are brought in by parties directly and indirectly involved
- Based on two incidents, the challenges are discussed and approaches on contractor management and on improvement of employee awareness are demonstrated



Incident 1 (also see SAFEX IR 874)

MMA leak during unloading process

- Liquid MMA is unloaded from tank trailers and transferred into storage tanks. MMA is highly flammable and toxic.
- The operator detected a leak after the interrupted process (due to high level in the storage tanks) had been restarted.
- The tank trailer (third party ownership) had been on repair prior to that delivery of MMA.
- The joint of an internal stabilizer bar had to be rewelded.
- The tank had been properly prepared for welding, but not sufficiently cleaned afterwards.
- Slag particles remained inside close to the outlet and contaminated the connection/coupling valve.
- The gasket sprung a leak.
- The operator did not strictly follow the operating instruction that required the transfer hose to be disconnected when unloading was stopped.



Pictures



Picture 1: MMA unloading area with tanks and unconnected discharge hoses



Picture 2: Tank trailer discharge valves (one for each chamber)



Picture 3: Hose coupling





Picture 4: Dismantled gasket showing slag particles that contaminated the Teflon sealing



Incident 2

Box with boosters punctured during transportation

- During a transport of packaged explosives from Costa Rica to Panama, a box containing 1 # boosters was punctured by 4 screws.
- The screws were exposed on the back door of the transportation truck.
- Truck and trailer are owned by a long term third party contractor.
- The booster boxes were placed in the last row behind 1.5 D product.
- During hauling the upper booster boxes started to shift and slide towards the back door.
- One box fell to the trailer bottom and became jammed between load and back door.
- One wing of the trailer back door had been repaired and a steel plate at the bottom had been fixed with screws/bolts that protruded to the inside.
- The protruding screws punctured the box and damaged the booster shells.



Pictures



Incident 2

Additional facts

- Personnel in charge of arranging the loads with more than 10 years of experience.
- Driver of the Transportation Company with over 15 years on service and up-to-date certificates and training record.
- Loading Procedures for trucks in place, but do not include specific instructions for securing.
- No comments on the inspection report (check list) regarding or mentioning the protruding screws.
- No maintenance report from FASOL (transport company) on the change made to the door.



Discussion

- On site, the containment and control of chemical and explosives hazards is preventing from loss events and with this incidents and consequences/impacts.
- Safeguards are in place that bring deviations back under control or mitigate the consequences.
- Manufacturing and storage facilities are designed and operated in a way to ensure this and equipment and employees are under control of the legal entity.
- Situation changes when hazardous or explosives materials are transported from A to B and third party contractors are entering the scene and materials are exposed to an environment that is influenced by other parties such as on public traffic roads.



Discussion

- Also the interfaces, where third party equipment for loading/unloading is brought in, and handover of material between different parties need to be carefully looked at.
- The investigation of these two incidents reveals maintenance and repair procedures not being adjusted and taking care of the specific hazards of the materials involved.



Discussion

- Lack of knowledge when it comes to explosives Basis of Safety (BOS) rules.
- A lack of proper maintenance also applies to truck and trailer chassis and parts exposed to high wear and tear such as tires, particularly in lowly regulated countries and/or a lack of road traffic control and surveillance.
- Both incidents also reveal that – looking at the interfaces loading/ unloading and use of checklists – handovers between different parties and their employees can only be as good as they are supervised, inspected and audited.



Discussion

- In the first incident, checks required by the operating instruction were not verified or properly conducted.
- Transport company is experienced in the transportation of dangerous goods.
- Trailer tanks used here are exclusively for the transport of MMA.
- It was agreed that future repairs on tank trailers will be announced and an independent inspection of the repair will be conducted prior to customer's authorization for re-use.



Discussion

- In the second incident, the protruding bolts where either overlooked or not identified as a hazard or ignored (complacency).
- Costa Rican entity agreed with forwarding agency to review maintenance procedures and report forms.
- Training in explosive BOS principles for transportation was conducted.
- Trailers used in transportation of explosives were inspected at the sites of all contractors and audits were conducted.
- In cooperation with the transportation companies an agreed norm on trucks and trailers for transportation of explosives material was developed.
- This can be used as a practical guidance (good and poor practices).



Norm for Transportation Vehicles for Explosive Material

 <p>AUSTIN POWDER INTERNATIONAL</p>	<p>Industriales Austin de Costa Rica S.A. Km 101 Interamericana Norte. Esparza - Puntarenas, Tel:(506) 636-4330 ,Fax :(506) 636-4131</p>
<p>Normativa para Vehículos de Transporte de Explosivos y Materias Primas</p>	<p>Página 1 de 11 Elaborado: Agosto 2013</p>



Poor Practice - Tires

Ejemplos de Malas prácticas



Llanta con rajaduras



Llanta de repuesto con desgastes en huellas



Llanta con huecos



Llanta desgastada de forma no uniforme



Poor Practice - Electrics



Instalaciones electricas fuera de uso



Cables con reparaciones improvisadas



Cables empatados y pelados



Cableado pelado



Poor Practice – Trailer Interior



Laminas de plywood levantadas



Laminas de metal en paredes de furgón



Conclusions

- Third party contractors can introduce hazards.
- Control measures for third party equipment should be part of the company's inspection plan.
- Audits on forwarding agencies should include maintenance, inspection and qualification.
- At the interface loading/unloading, poor practices sneak in over time without countermeasures.
- Clear definition of responsibilities and the 'power to stop' loading operations.
- Line management and supervisors should be critical in inspection of third party equipment.

