Fire in an ammonium nitrate storage shed

Summary of incident

In October 2021, a fire occurred in an ammonium nitrate (AN) storage shed in Western Australia.

During normal operations, AN was being moved by mobile plant within the designated storage shed when there was a loss of fuel from the mobile plant, which sprayed fuel towards the hot turbo and exhaust system. The fuel caught fire and the burning fuel pooled on the concrete floor. The driver immediately manually activated the engine bay fire suppression system, exited the vehicle and used a local fire extinguisher to douse the fuel pool fires.

The impact of the fire was mitigated by the driver's quick and decisive actions in following the emergency response processes of the site operator. Without these appropriate actions, and sufficient emergency response capacity and planning, the situation could have escalated significantly.

No one was injured during the incident and the AN was not affected by excess heat.

Contributing factors

- AN dust is highly corrosive and will corrode any bare metal components and electrical connections in mechanical plant.

  The mobile plant had insufficient corrosion protection on all components including sub components that could result in a fuel release.

- The mobile plant or its components were not considered as safety critical, resulting in less rigorous checks on the mobile plant, including corrosion protection.

- The plant was not included in the maintenance management system as it was being managed through a system for light vehicles, not plant equipment, resulting in limited traceability of maintenance history.

- The engine bay fire suppression system did not activate automatically.

  Due to the location of the fusible loops within the engine bay, they did not melt as quickly as anticipated due to the location of the fire. Consequently, the automatic fire suppression system did not activate and was manually triggered.

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Actions required

To ensure similar incidents do not occur with potentially far reaching consequences, the following actions are recommended for all operations involving mobile plant within storage areas where AN dust is present.

- Ensure high quality inert corrosion protection is used (noting that galvanising is not permitted) on all components susceptible to corrosion within the mobile plant, including at least an IP65 rating for electrical equipment.
- Treat all mobile plant within AN storage sheds as safety critical, requiring:
  - detailed and thorough vendor specifications
  - detailed and thorough procurement inspections
  - scheduled and traceable maintenance and inspections.
- Ensure mobile plant fire suppression systems are appropriate for all potential fire scenarios.
- Ensure mobile plant is not left unattended in AN stores.
- Review competency of personnel and periodically test emergency response within AN storage sheds.
- Periodically perform internal audits for compliance to the Code of Practice for the *Safe Storage of Solid Ammonium Nitrate*. See Section 7 for Powered Transfer Equipment.

Further information

Department of Mines, Industry Regulation and Safety, Code of Practice - Safe Storage of Solid Ammonium Nitrate

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