



Department of Consumer
and Employment Protection
Government of Western Australia

Resources Safety 

Dangerous Goods Safety Significant Incident Report No. 01-07

Ammonium nitrate storage facility bucket elevator fire

Incident

On 22 November 2006, ammonium nitrate was being transferred into a silo storage facility at a mine site by means of a belt-driven bucket elevator.

During the transfer operation, a ram solenoid valve failed to fully reposition a diverter gate used to direct ammonium nitrate between silos. This led to ammonium nitrate backing up, then falling down the elevator shaft and bogging the bucket elevator.

The drive pulley of the belt-driven bucket elevator continued to rotate even though the elevator was bogged, resulting in slippage and the generation of sufficient heat to cause the belt to catch fire.

The facility was promptly shut down, the fire extinguished and the area cooled with water.

Causes

- A ram solenoid valve on the diverter gate was defective and failed to fully reposition the diverter gate.
- The under-speed detector on the belt was linked only to an alarm and not to a system designed to automatically shut down the facility.
- Due to nuisance tripping, the facility was being operated in 'manual mode', intended to be used only during testing and commissioning activities. In this 'manual mode', all alarms are overridden.

Recommendations

- Facility inspection and maintenance programmes must ensure the reliable operation of all items that either directly or indirectly play a role in maintaining safe operations (e.g. solenoids, level gauges).
- A shut down system should be in place and operate in the event of belt under-speed.
- There should be controls to prevent safety features, such as alarms, being improperly overridden.
- When operating a facility in 'manual mode', the operation should be attended at all times.
- Training provided to facility operators should cover safe facility operation, and require an appropriate understanding of its safety features.
- Operating procedures should require the clearing of ammonium nitrate bucket elevators, augers and other transfer equipment immediately after use.

Malcolm Russell
CHIEF INSPECTOR

26 September 2007