



Explosives Inspectorate | Alert | No.117 V 1 | 10 October 2024

Ammonium nitrate emulsion tanker explosion

What happened?

A B-double combination carrying ammonium nitrate emulsion (ANE) travelling on the Bruce Highway collided with another vehicle near Bororen, left the roadway, caught fire and after burning for some time, exploded. Following the accident an exclusion zone of 2.5km radius was established by emergency services and residents within the zone were evacuated.

The explosion created a crater of about 20m diameter and 3m deep. The highway was damaged and remained closed for four days for necessary repairs. Houses within several kilometres of the explosion sustained damage including to, doors, windows and roofs.

How did it happen?

Following the collision the truck and trailers ran off the road, collided with a tree and caught fire. This fire burned for a few hours and resulted in a quantity of the ANE detonating. Before detonation, some portions of the top and bottom of the aluminium tanker melted due to the intense heat, and ANE was observed burning on the ground and in the tanker with orange flames and white fume. From previous ANE tanker explosions, it is known that burning ANE can transition to explosion under certain circumstances.

RSHQ is investigating the regulated explosives activities linked to this transport incident. This will examine how the explosion happened and make recommendations about preventative controls to avoid incident recurrence. RSHQ has completed a crater survey and debris collection from the accident site. Further details will be shared as the investigation outcomes become available.

Key issues

The transport of AN and ANE on Queensland roads, as highlighted by the approximately 1.5 million tonnes moved annually, poses significant risks. Given the sheer volume of trucks transporting these materials (about 100 truckloads per day), safety concerns should be heightened.

The recent explosion incidents—one in Western Australia in October 2022 involving an ANE tanker, and another in Queensland's Angellala Creek in 2014 involving a truck carrying AN prill—underscore the hazardous nature of these substances. Both AN prill and ANE can detonate when exposed to intense heat over prolonged periods under certain circumstances, such as in the event of tyre fires, vehicle collisions, or other causes like diesel spills or electric sparks.

These incidents highlight the need to follow stringent safety measures that are in place to mitigate risks associated with transporting explosive materials. They also highlight how important it is to enhance preventive systems in vehicles carrying such dangerous goods, if strong systems are not already in place.

Recommendations

This incident is still under investigation, however matters that can contribute to this type of event occurring and should be noted by those involved in AN related dangerous goods manufacturing and transport include:

- 1. Routine maintenance and inspections:** All vehicles, especially those transporting hazardous materials, must undergo routine checks to ensure they remain safe. This includes verifying the proper functioning of fire detection and suppression systems, vents, and valves, and emergency notification systems.
- 2. Early detection technology:** Advanced technologies like temperature sensors can monitor critical parts (e.g., wheel bearings, tyres, and brakes) for early signs of overheating, helping to prevent potential fires.
- 3. Fire suppression systems:** Installing systems that can respond rapidly to fires is crucial. Operators must be trained to use these systems efficiently to minimize delay and the risk of losing control of the fire.

4. **Driver training and licensing:** Drivers must not only have proper licensing but also specific training to handle fire suppression systems and emergency notifications, especially when dealing with hazardous materials.
5. **Route selection:** Companies must transport explosives under Australian Dangerous Goods Code and select routes which impose less risk to general public.
6. **ANE/AN product classification:** ANE or AN prill must pass UN tests to ensure they are appropriately classified for transport under Queensland's dangerous goods regulations as Class 5.1.
7. **Quality assurance (QA) systems:** Establishing QA systems ensures that the explosives and precursor materials conform to the required specifications, reducing the risk of transporting unstable or out-of-spec materials.

These points align with safety and regulatory best practices for transporting dangerous goods like explosives.

Investigations are ongoing and further information may be published as it becomes available. The information in this publication is what is known at the time of writing.

We issue Safety Notices to draw attention to the occurrence of a serious incident, raise awareness of risks, and prompt assessment of your existing controls.

References and further information

1. **Queensland Explosives Act 1999** (<https://www.legislation.qld.gov.au/view/html/inforce/current/act-1999-015#:~:text=A.%20Minister:%20Minister%20for%20Resources%20and%20Critical%20Minerals.%20Agency:%20Resources>).
2. **Queensland Explosives Regulation 2017** (<https://www.legislation.qld.gov.au/view/whole/html/inforce/current/sl-2017-0150#:~:text=This%20regulation%20may%20be%20cited%20as%20the%20Explosives%20Regulation%202017.>).
3. Australian Standard 2187.2
4. **DMIRS WA Incident investigation report on Ammonium nitrate tanker trailer explosion** (https://www.dmp.wa.gov.au/Documents/Dangerous-Goods/ANETankerExplosion_Report.pdf#:~:text=Incident%20investigation%20report%20Ammonium%20nitrate%20emulsion%20.%20tanker%20trailer).
5. **The Australian Code for the Transport of Dangerous Goods by Road & Rail (ADG Code)** (<https://www.ntc.gov.au/sites/default/files/assets/files/Australian%20Code%20for%20the%20Transport%20of%20Dangerous%20Goods%20by%20Road%20%26%20Rail%20-%20Edition%207.9%20%28Volume%20I%20%26%20II%29.pdf>).



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All information on this page (Ammonium nitrate emulsion tanker explosion - <https://www.rshq.qld.gov.au/safety-notices/explosives/ammonium-nitrate-emulsion-tanker-explosion>) is correct as of time of printing (Oct 15, 2024 12:47 pm).