



Government of **Western Australia**
Department of **Mines and Petroleum**
Resources Safety

Overview of dangerous goods incident reports 2009

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Overview of 2009 incident reports

This report describes dangerous goods and explosives incidents that occurred in 2009. The report also compares the 2009 incident data with comparable data collected since 1991, and provides some statistical analysis of incident data for 2001 to 2009.

Looking at nearly 20 years of data, the total number of reported incidents, excluding major hazard facility (MHF) incident reports, has remained relatively constant over the period. It is suspected that the actual number of incidents is greater than the number reported, so year-to-year variations should not be over-interpreted. For example, the significant increase in explosives incident reports is probably more attributable to increased awareness of reporting responsibilities by mining companies.

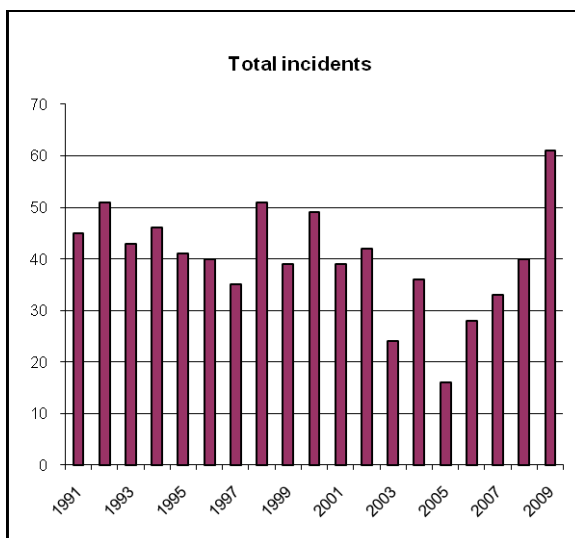
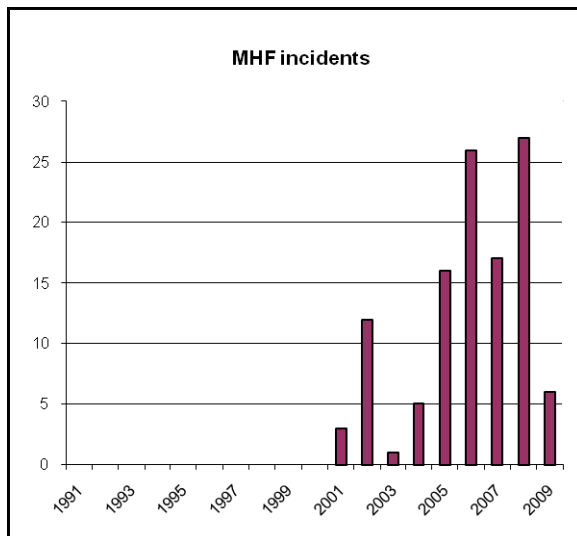
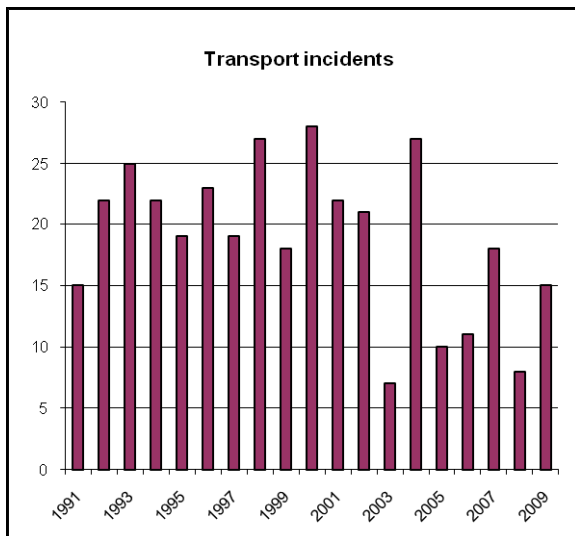
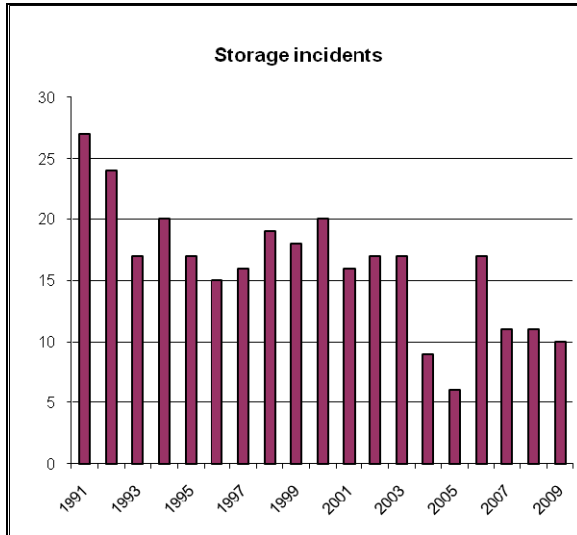
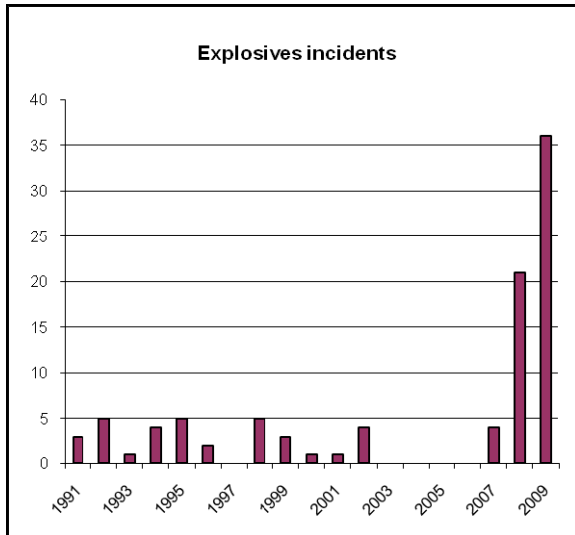
There was only one serious injury and, fortunately, no fatalities as a result of a dangerous goods incident in 2009.

Malcolm P Russell

CHIEF DANGEROUS GOODS OFFICER

15 March 2010

Number of dangerous goods incidents for 1991–2009



Explosives incidents in 2009

There were 36 explosives incidents reported to Resources Safety in 2009. Most were reported to the mines inspectorate but there were also incidents reportable under the *Dangerous Goods Safety Act 2004*.

The number of reported incidents was much higher than in previous years, and this is mostly attributed to greater awareness in industry to report all incidents, including near-misses. The reports cover a wide range of incident types with no particular pattern or cause for Resources Safety to undertake any targeted education or enforcement action.

Fortunately, none of the reported incidents involved any serious injuries or fatalities.

Date	Location	Goods	Incident details
20/01/09	MINE SITE	Blasting explosives	A Getman vehicle caught fire, which led to detonator initiation.
08/02/09	MINE SITE	Blasting explosives	Fly rock from a toe blast smashed the window of a parked loader at a nearby workshop and landed only 10 m from an electrician working on the wash pad.
12/02/09	MINE SITE	ANFO	A blast crew member noticed a loaded hole and some spilled ANFO on the surface smouldering due to a reaction with some reactive ore. As the shot was already tied in, the pit was immediately evacuated and the shot initiated.
02/03/09	MINE SITE	Explosive	A loader operator was bogging a development cut when he heard an explosion. Two pieces of "profiler" (a perimeter control product) were found in the waste stockpile.
14/03/09	MINE SITE	ANFO	A Normet driver heard a loud noise when operating the vehicle. Investigation showed that the ANFO kettle, which was about three-quarters full at the time, had broken from the chassis and was lying on the ground.
26/03/09	MINE SITE	Explosive	While pushing broken rock through a mill, an operator observed a flash and loud noise from the ROM bin followed by dust and mild explosives gas emissions.
31/03/09	MINE SITE	Detonator lead	One case of detonating cord was reported missing. An investigation and several stock takes identified that a case of explosives was located in another section of the magazine and had been overlooked.
19/04/09	MINE SITE	Detonator lead	An unknown vehicle breached a blast exclusion zone and drove over detonating cord.
04/05/09	MINE SITE	ANE, acetic acid and sodium nitrite	While an MPU was operating, the emulsion loading hose became blocked. Additives that were still being injected into the emulsion reacted to produce NOx fumes.

Date	Location	Goods	Incident details
04/05/09	MINE SITE	Blasting explosives	An overland conveyor belt, located outside the blasting exclusion zone, tripped out due to a piece of fly rock hitting the trip wire.
13/05/09	AIRPORT	HE and PE4	Small samples of high explosives used for sniffer-dog training went missing.
17/05/09	KARRATHA	Blasting explosives	Two workers were in a transport yard when a shot was fired at a nearby quarry. They were not noticed on two pre-blast siren runs or on the final siren run. This had happened previously. It was found that the blast notification mailing list was inadequate.
20/05/09	MINE SITE	Explosives	A water truck turned onto a road where a shotfirer had commenced tying-in to two shots. Bunting had been erected at all the main access roads except this track.
01/06/09	MINE SITE	Various explosives	During an inspection of a mine under care and maintenance, it was noticed that the decline entrance gates and the high explosives magazine gates had been opened. It is believed that five bags of Isnol, one case of Powergel and one case of stope boosters were stolen.
08/06/09	MINE SITE	Powergel and detonator	Diamond drillers drilled through a misfired hole that contained five sticks of Powergel and an uninitiated detonator.
17/06/09	MINE SITE	Booster and Detonator lead	An employee observed a booster with detonator lead attached on a coal feeder belt. The booster case was intact but did not contain explosives. The booster and lead were from an undetected misfire at a nearby mine.
26/06/09	MINE SITE	Boosters	The door of an explosives box on a shotfirer's vehicle was left open and 17 boosters rolled out onto the haul road. All haul trucks were stopped immediately. The area was secured and all boosters were collected and disposed of.
16/08/09	MINE SITE	Boosters and detonators	A shotfirer ended his shift loading blast holes on a bench and left two boosters and two detonators in a box on the mudguard of an MPU. The next shift noticed the box during the pre-start.
16/08/09	MINE SITE	Explosives	Fly rock from two shots landed near two groups observing the blast. One group was authorised to observe, but there was no barricade to prevent other people from entering the exclusion area. Both groups were within the established site exclusion zones.
22/09/09	MINE SITE	Detonators	Six cartons of detonators were consigned to a mine. One carton went missing and was eventually found at another location.

Date	Location	Goods	Incident details
01/10/09	MINE SITE	Detonators	The blast crew had not fully evacuated the mine when the detonators were fired when test firing a PED firing system using detonators only.
09/10/09	QUARRY	High explosives magazine	There was an attempted break-in of a high explosives magazine using an angle grinder, drill, jemmy bar, and 4WD and chain to try and wrench off the magazine door. The magazine was empty at the time.
09/10/09	MINE SITE	ANFO	An underground fitter was working in front of an ANFO kettle when it was accidentally discharged by the charge up operator. The fitter fell backwards due to the force of the discharging ANFO and was showered with high pressure ANFO.
21/10/09	WELSHPOOL	Detonators	A person was observed welding on a semi-trailer loaded with a freight container of 1.4S detonators.
23/10/09	MINE SITE	Detonator and booster	A loader operator noticed a detonator and booster in the ore being loaded onto road train.
25/10/09	MINE SITE	Blasting explosive	A pallet of sixteen cases of explosives consigned to a mine went missing but was later found on the vehicle as the driver had forgotten to unload it.
29/10/09	KALGOORLIE EXPLOSIVES RESERVE	ANFO	An explosives transfer truck cut a corner on the reserve, hit a concrete marker and lost a portion of its load. Several IBCs of ANFO fell from the vehicle and broke open.
07/11/09	MINE SITE	Explosives	A preloaded blast hole prematurely detonated. The pit area was evacuated at the time due to a lightning storm and the fired hole was not detected until the following morning.
21/11/09	MINE SITE	Primer	A 400 g primer and attached detonator was discovered on an ore stockpile.
25/11/09	MINE SITE	Detonator	One of 280 detonators was reported missing. It was assumed to have fallen down a blast hole.
28/11/09	MINE SITE	Booster and bulk product	An excavator operator dug into an unidentified misfire or a column of explosives. In the subsequent explosion, several vehicles were damaged by fly rock, one person was hit by a small piece of fly rock but was uninjured, and several people were treated for ringing in their ears.
03/12/09	MINE SITE	Boosters	An MPU was reversing up a ramp to access a shot to be charged when the rear off-side tyre ran over a booster placed near a hole in preparation to prime. The shotfirer discovered the squashed booster when priming the holes.

Date	Location	Goods	Incident details
06/12/09	MINE SITE	Explosive	A longhole drill rig was being used to clean out a hole blockage when the driller noticed emulsion product coming out of the hole with the water return. The drill hole had intercepted a downhole drilled from the level above that was charged with explosives.
14/12/09	MINE SITE	Blasting explosives	Three blast guard personnel were found within the site-determined safe blasting radius during blasting operations.
18/12/09	MINE SITE	Bomb utility	There was a near-collision between a bomb utility and a haul truck due to dusty conditions.
30/12/09	MINE SITE	Detonator lead	A contractor's service truck drove past blast cones and "keep out, blasting" sign and over detonating cord connected to a loaded pre-split shot. Potentially damaged cord was re-looped.

Dangerous goods storage and handling incidents in 2009

The number of reported dangerous goods storage and handling incidents in 2009 (10) was again low compared with the annual average for the last 20 years (16) but consistent with the last five years.

Five of the incidents apparently resulted from human error, and three from mechanical failure. One concerning issue was the three accidents involving filling of containers at service stations where the containers were not placed on the ground as required to prevent static discharges causing fires. Resources Safety is considering how best to alert the general public to the danger of this practice.

Unfortunately, one of the storage and handling incidents resulted in a severe injury and another could easily have been more severe.

In addition to the two spill incidents listed below, a total of 279 spill incidents (involving 1 kL or more and contained on-site) was reported for 2009 for three operations that are particularly prone to loss of containment. Prior to March 2008 these had not been considered or reported as dangerous goods incidents. The 2009 result is a significant improvement on the 325 spills reported for the last nine months of 2008.

Date	Location	Goods	Incident details
28/01/09	MADDINGTON	LP gas	An operator drilling holes into an empty 4 kg LP gas cylinder suffered first degree burns following an explosion.
04/02/09	MORLEY	Ammonia	About 60 kg of ammonia vapour was released, in bursts, from a pressure relief valve. Three people on a neighbouring site needed medical attention.
17/02/09	KWINANA	Corrosive liquid, basic	A pipeline was holed at a spool and about 6 kL of residue slurry discharged onto unsealed ground.
24/03/09	NORTHAM	Cyclohexanone	A warehouse at a pesticide formulating plant burnt down following a fire in process equipment.
18/05/09	KEWDALE	LP gas	During work on street lights, contact was made with the overhead powerlines causing a small fire near an LP gas tank.
01/06/09	BUSSELTON	Flammable liquid vapour	An old above-ground pipe was being cut with an angle grinder. The pipe was attached to a disused underground tank system containing flammable liquid vapour that exploded.
11/09/09	KARDINYA	Petrol	A fire occurred during the filling of a container at a service station. The container was lifted off the ground during the filling process.
13/09/09	FORRESTFIELD	Petrol	A fire occurred during the filling of a container at a service station. The container was lifted off the ground during the filling process.
23/12/09	WAGERUP	Sodium hydroxide and sodium aluminate	A valve failed shut on a process tank and 1.3 ML of caustic solution overflowed into a bund, with 5 kL overflowing the bund onto unsealed ground.
24/12/09	SOUTHERN RIVER	Petrol	A fire occurred during the filling of a container on the tray of a utility vehicle at a service station.

Dangerous goods transport incidents in 2009

There were 15 reported dangerous goods transport incidents in 2009, which was below the annual average of 19 for the last 20 years. Given the significant increase in the amount of dangerous goods being transported over this time, this is a good result. Similarly, the number of accidents involving dangerous goods vehicles was below the average for heavy goods vehicles generally.

Most of the reported incidents can be attributed largely to human error, with just over half being traffic accidents involving dangerous goods, rather than the dangerous goods causing the incident.

Fortunately, no serious injuries or fatalities resulted from any of these incidents.

Date	Location	Goods	Incident details
06/01/09	NEAR STIRLING RANGES	Petrol	A rigid tanker-dog trailer vehicle combination rolled over when the driver swerved to avoid a sand pothole on a narrow gravel road. About 100 L of product leaked from the dip caps.
23/01/09	O'CONNOR	Petrol	A tanker was slowing down to turn when a car failed to stop at T-junction, hit the rear of the road tanker, and damaged its bumper. No product spilled and there was no damage to the tanker shell.
30/01/09	EAST OF KALGOORLIE	Ammonium nitrate Lead monoxide	A train had 21 out of 33 wagons derailed. About 3.3 tonnes of ammonium nitrate was spilled but there was no loss of containment of lead monoxide.
20/02/09	NORTHAM	Hydrogen peroxide	A semi-trailer loaded with pallets of hydrogen peroxide (300 L in 5 L packages) caught fire and the trailer was extensively burnt.
23/02/09	NORTHAM	Petrol	A driver overfilled a ground-level storage tank while discharging fuel from a road tanker vehicle. The storage tank was not dipped to check the level before filling up.
26/03/09	KALGOORLIE- ESPERANCE HIGHWAY, GRASS PATCH	Bitumen	A burnt out heater tube on an elevated temperature bitumen tanker caused an explosion.
04/05/09	GREAT EASTERN HWY, CUNDERDIN	Ammonium nitrate solution	A punctured tyre on the rear left hand side of a prime mover caused the vehicle combination to swerve off the road. No product spilled.
15/05/09	MADDINGTON	Petrol	A driver was unloading petrol into two underground tanks at a service station when a fire started in the fill point area. The fire escalated to involve the tanker tyres and two of the compartments ruptured, resulting in a large fireball that destroyed the service station.
03/06/09	300 km NORTH OF KALGOORLIE	LNG	A pipe cracked off the pressure building coil on a road tanker travelling on a heavily corrugated gravel road, resulting in the loss of about 15 tonnes of LNG.

Date	Location	Goods	Incident details
17/08/09	GREAT EASTERN HWY, 20 km WEST OF CUNDERDIN	LNG	An empty LNG tanker veered off the road and rolled over.
21/09/09	ALBANY HWY, 90 km NORTH OF ALBANY	LP gas	A road tanker rolled over, resulting in a minor release of LP gas from damaged pipe work.
03/10/09	GREAT EASTERN HWY, 45 km EAST OF SOUTHERN CROSS	Ammonium nitrate, liquid	A car veered onto the path of a road train. The prime mover was damaged in the collision, but the tankers were not damaged and no ammonium nitrate solution was lost. The driver of the car sustained injuries.
09/11/09	GOLDFIELDS HIGHWAY, 60 km SOUTH OF LEINSTER	Ammonium nitrate emulsion	There was a fire near the rear tyres of a prime mover B-double vehicle. The prime mover was decoupled from the trailers and no product was involved in the fire.
18/11/09	NORTH OF WORRAMEL ROADHOUSE VIA CARNARVON	Ammonium nitrate emulsion	An ISO tank of ANE came off the rear trailer of a double road train as the driver attempted to correct the positioning of the trailer on the road. No product spilled.
18/11/09	KARRATHA	Cylinder gases	A semi-trailer moved off the main road and when corrected, the rear trailer hit a culvert and cylinders and pallets were thrown off the trailer. Some of cylinder valves were damaged and product leaked.

Major hazard facility incident reports in 2009

Major hazard facility (MHF) incident reports are a combination of reports of incidents that involve injury or damage, incidents that did not, and near misses.

The number of MHF incident reports in 2009 (five) was considerably lower than in 2007 (27) and reflects improved safety management at these facilities.

Date	Location	Goods	Incident details
27/05/09	GAS PLANT, KARRATHA	LNG	A filter seal leaked 150 kg of LNG. The leaking filter was isolated.
11/06/09	OIL REFINERY, KWINANA	Crude oil	During maintenance, a floating tank roof leg failure allowed the roof to drop on the east side. Undrained or standing water on the roof after a heavy downpour undermined the tank integrity and initiated the failure.
05/07/09	CHEMICAL MANUFACTURER, KWINANA	Sulphuric acid	A valve failed on a 2,000 L bulk sulphuric acid tank and the contents of the tank discharged into the tank bund.
17/11/09	PIGMENT MANUFACTURER, KWINANA	Sodium aluminate	A sodium aluminate tank ruptured, and the contents spilled into the bund and surrounding area. Part of the adjacent steel structure and pipe work sustained damage leading to leaking of potable water.
31/07/09	PIGMENT MANUFACTURER, KWINANA	Hydrochloric acid	A false tank level reading caused an isolation valve to open and close intermittently and the tank to overflow. More than 10 m ³ of acid eventually spilled into the bund and adjacent unsealed area.

Statistical analysis of incident data for 2001–2009

The following table summarises storage and handling and transport incident data for the period 2001 to 2009. The data have been analysed to identify the proportion of incidents nominally caused by mechanical failure or human error, and whether loss of product, serious injuries or fatalities were involved.

Of the 110 *storage and handling incidents*, 47% were caused by mechanical or design failure and 45% by human error. However, the overall rate of incidents involving serious injuries or fatalities during the nine-year period remained very low.

Of the 139 *transport incidents*, 35% were caused by mechanical or design failure and 60% by human error. For the purposes of this analysis, incidents such as truck roll-overs were classified as being due to human error on the assumption that the main cause was driver inattention, excessive speed or both, although it should be noted that, in some cases, other drivers were at fault. While over the period, unfortunately, there were four incidents resulting in serious injuries and three involving fatalities, there were no serious injuries or fatalities during 2009.

For both storage and handling and transport incidents, there was a wide variety of mechanical failures involved that do not show any consistent pattern.

Further analysis of the transport data showed that 46 (32%) incidents involved double or triple road trains and most were roll-overs. In addition, several other incidents involved standard single tanker vehicles. This is indicative of the extensive use of these vehicles for dangerous goods transport and the inherently greater risk of driving these vehicles, particularly where long distance transport is involved. The data suggest that dangerous goods transport companies need to pay more attention to ensuring road trains do not speed, and that drivers are well trained and provided with adequate rest breaks to optimise their alertness.

Storage and handling and transport incident data 2001–2009

	Total number	Material or design failure	Human error	Loss of product	Serious injury	Fatality
Storage and handling (number of incidents)	110	50	49	80	3	0
		47%	45%	73%	3%	0%
Transport (number of incidents)	139	49	83	102	4	3
		35%	60%	73%	3%	2%