



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

Overview of dangerous goods incident reports 2010

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Contents

Overview of 2010 incident reports 3

Number of dangerous goods incidents for 1991–2010 4

Explosives incidents in 2010 5

Dangerous goods storage and handling incidents in 2010 8

Dangerous goods transport incidents in 2010 10

Major hazard facility incident reports in 2010 11

Statistical analysis of incident data for 2001–2010 12

Overview of 2010 incident reports

This report describes dangerous goods and explosives incidents that occurred in 2010. The report also compares the 2010 incident data with comparable data collected since 1991, and provides some statistical analysis of incident data for that period.

Looking at 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 acknowledged 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 one very serious and one serious injury and some minor injuries arising from dangerous goods incidents in 2010, but fortunately no fatalities.

As a direct result of increased economic activity, the quantity of dangerous goods is increasing over time. More and more people, many of them inexperienced, are coming into contact with these products.

Overall, the statistics indicate that the controls established over the manufacture, transport, storage and use of dangerous goods in Western Australia are succeeding.

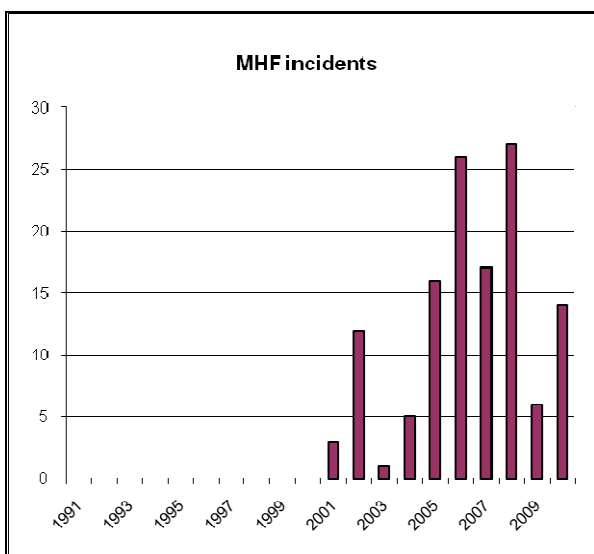
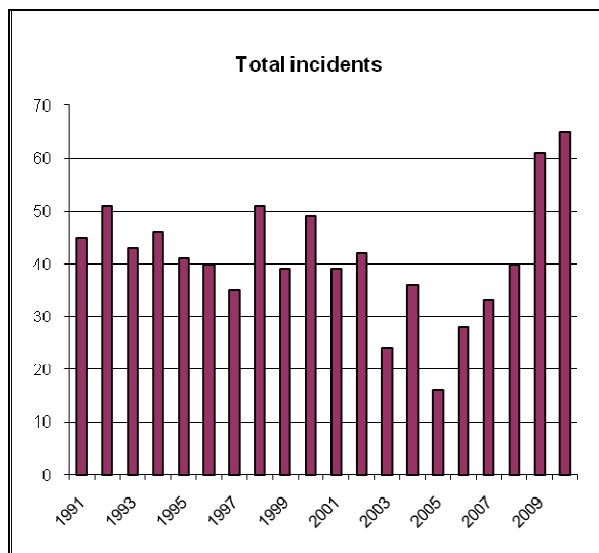
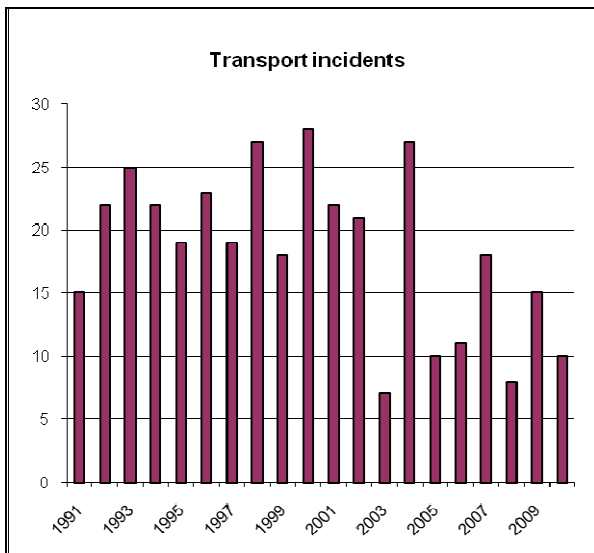
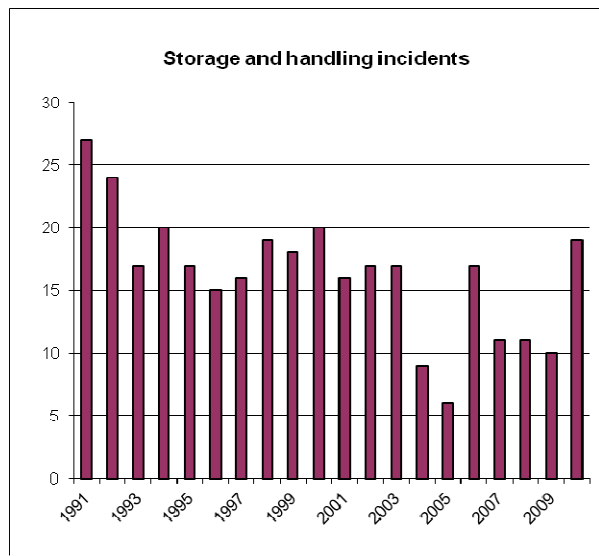
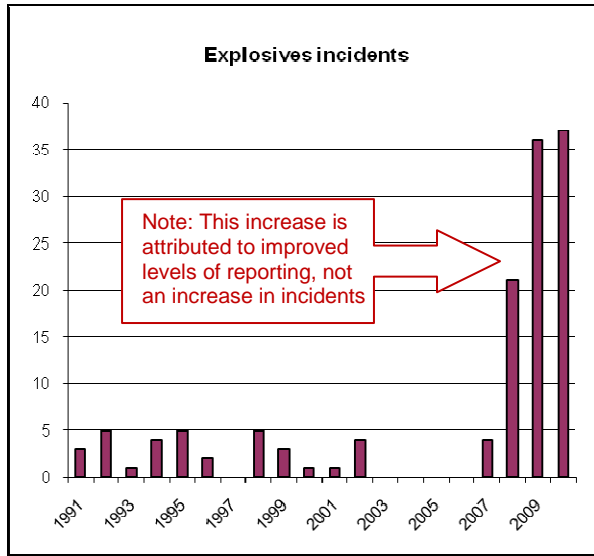
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CHIEF DANGEROUS GOODS OFFICER

8 March 2011

Note: This report was amended in 2012 to include the storage and handling incident on 27 July 2010.

Number of dangerous goods incidents for 1991–2010



Explosives incidents in 2010

There were 37 explosives incidents reported to Resources Safety in 2010, most of which were reported to the mines inspectorate but were also incidents reportable under the *Dangerous Goods Safety Act 2004*.

The number of reported incidents was consistent with 2009. This is mostly attributed to greater awareness in industry of the requirement to report all incidents, including near-misses.

The reports cover a wide range of incident types. Of some concern is the number of incidents involving losses of detonators or boosters. Mine sites are expected to improve their reconciliation processes to eliminate this problem. Apart from this issue, there was no particular pattern to the incidents that would cause Resources Safety to undertake targeted education or enforcement actions.

One of the reported incidents involved a serious injury, and a few caused minor injuries. Fortunately, there were no fatalities.

Date	Location	Goods	Incident details
4/01/2010	Abandoned mine shaft near Ravensthorpe	Explosives and detonators	A cache of explosives was found at the bottom of an abandoned shaft. They were collected by a shotfirer and safely destroyed.
14/01/2010	Mine site, Goldfields	Detonators	Four unexploded detonators were found on an old waste dump at the mine along with some safety tube and previously destroyed detonators. All were made safe and disposed of by a shotfirer.
30/01/2010 - 02/02/2010	Swan River foreshore, Perth	Fireworks	Four unexploded aerial shells were recovered following the 2010 Skyworks.
5/02/2010	Mine site, Pilbara	Booster	One booster was unaccounted for on a shot.
6/02/2010	Geographe Bay, Busselton	Fireworks	Fireworks were illegally fired on the beach at a campsite.
8/02/2010	Hovea	Explosives	A fire in a shed at a residential property caused detonation of a small quantity of stored explosives. One man was seriously injured by shrapnel and another suffered minor injuries.
15/02/2010	Mine site, Goldfields	Booster and detonator	A primer was left in a box in the charge basket of the loading arm for an integrated telehandler.
11/03/2010	Mine site, Goldfields	Explosives	The A and B trailers on a B-double road train carrying explosives uncoupled while cornering.
5/04/2010	Mine site, Goldfields	Booster	A Quickdraw booster detonated inside a cannon. There were no injuries.
6/04/2010	Mine site, Pilbara	Detonator	A detonator was unaccounted for on a shot.
18/04/2010	Mine site, Goldfields	Explosives, detonators, boosters	Loaded explosives initiated during a severe thunderstorm. There were no injuries.
20/04/2010	Kalgoorlie	Explosives	Explosive were found in a magazine being auctioned following a bankruptcy. They were removed and destroyed by a shotfirer.

Date	Location	Goods	Incident details
1/05/2010	Mine site, South West	Explosives	A detonator left on the blast site was unsupervised in an office for over six hours.
8/06/2010	Mine site, Pilbara	Explosives – suspect booster	A dozer clearing the pit floor hit an unexploded booster. The operator suffered a suspected perforated eardrum.
11/06/2010	Mine site, Pilbara	Explosives	A grader entered an area of unfired holes adjacent to blast.
13/06/2010	Mine site, Pilbara	Explosives	A booster was unaccounted for on a shot.
9/07/2010	Mine site, Goldfields	Explosives	An employee gained unauthorised access to the underground magazine. No stock discrepancies were reported.
15/07/2010	Mine site, Goldfields	Explosives	An excavator severed a detonator. There was no initiation of explosives or injuries.
30/07/2010	Mine site, Goldfields	Ammonium nitrate	An employee entered the bin of a mobile manufacturing unit to free ammonium nitrate from the walls with a metal shovel while the auger pump was in use.
6/08/2010	Northam	Ground fireworks	A ground cake malfunctioned sending a clay base plug into the safety zone. A spectator received minor injuries.
28/08/2010	Mine site, South West	Detonator cord	A light truck drove through blast signs and over loaded blast holes.
2/09/2010	Mine site, Pilbara	Detonators	Suspected loss of detonators, but all found after investigation.
6/09/2010	Mine site, Goldfields	Explosives	An underground pattern initiated prematurely. There were no injuries.
22/09/2010	Mine site, Koolan Island	Explosives	An excavator set off a misfired explosive. The windows of the cab shattered, causing lacerations to the driver.
22/09/2010	Mine site, Koolan Island	Explosives	A drill fitter's utility drove through the blast cones onto a loaded shot.
2/10/2010	Mine site, South West	Detonators	Two detonators were unaccounted for following the loading of a shot.
6/10/2010	Mine site, Pilbara	One 400 g cast booster explosive	An excavator driver found a booster near a window.
11/10/2010	Mine site, Pilbara	Explosives	A lead was dislodged during stemming, causing the primer to fall down the blast hole.
24/10/2010	Mine site, Pilbara	Explosives and detonators	A digger unearthed an unfired blast hole during a cutback operation. An entire row of explosives on the bench had not initiated.

Date	Location	Goods	Incident details
26/10/2010	Mine site, Pilbara		Fly rock smashed the windscreen of a bomb-ute 440 m from pattern. There were no injuries.
5/11/2010	Mine site, Pilbara	Missing booster	A 450 g booster was lost.
23/11/2010	Swan River Bassendean	Explosives	12 Powergel cartridges were found in the river. Police recovered them and arranged destruction.
23/11/2010	Mine site, Pilbara	Missing boosters	Two 400 g boosters were lost.
24/11/2010	Mine site, Pilbara	Explosives	ANFO and shot tube were found in drill cuttings.
7/12/2010	Kalgoorlie Nickel Smelter	Magnum plugs	10 out of 204 plugs were lost.
14/12/2010	Mine site, Murchison	Fire	A rag in the engine of a charge vehicle caught fire. There was no serious damage.
17/12/2010	Mine site, South West	Detonator cord	A Caterpillar D10 dozer pushed rock over a bund wall into a loaded blast area.

Dangerous goods storage and handling incidents in 2010

The number of reported dangerous goods storage and handling incidents in 2010 (19) was consistent with the annual average for the last 20 years (16) but more than the number for the three previous years.

Eleven of the incidents apparently resulted from human error, and seven from mechanical failure, but there was no general pattern to the incidents.

Unfortunately, one storage and handling incident resulted in a very serious injury, and another in a serious injury.

Three operations are particularly prone to loss of containment. In addition to the two refinery incidents listed below, these operations reported a further 328 spill incidents that involved 1 kL or more and were contained on-site. Before March 2008, such incidents had not been considered or reported as dangerous goods incidents. The 2010 figure for the three operations is slightly higher than the 325 spills they reported for 2009, despite the considerable investment in spill reduction measures being undertaken. A significant improvement is expected in 2011.

Date	Location	Goods	Incident details
1/02/2010	Wickepin	Diesel	About 12 kL of diesel leaked from an underground tank during filling. The spill entered a nearby creek.
2/02/2010	Canning Vale	LP Gas	A person suffered cold burns when there was a release of LP Gas while refuelling a vehicle.
11/02/2010	Newburn	Nitric and hydrochloric acid	A spill of waste acid (10%) was contained in a sump.
16/02/2010	Refinery, South West	Sodium hydroxide solution	130 kL of caustic solution spilled from a pipeline on to a road verge while being dismantled.
25/02/2010	Australind	Sulphuric acid	Four people were injured by acid, one very seriously, after a valve failure.
6/03/2010	Rottnest Island	Diesel	A diesel day tank was overfilled during transfer process due to a closed valve. The spill was contained in a bund.
22/03/2010	Refinery, South West	Sodium hydroxide solution	About 100 kL of process liquor overflowed from a tank. About 50 kL of the liquor mixed with rainwater and overflowed from the containment system onto soil.
23/03/2010	Yalgoo	Sodium hydroxide solution	About 1,300 L leaked from an intermediate bulk container (IBC) into a bund.
20/04/2010	Mine site, Goldfields	Sodium cyanide solution	Due to a sensor failure, 35 kL of cyanide solution spilled into a tank compound during product transfer between two storage tanks.
9/05/2010	Mine site, Goldfields	Sodium hydroxide solution	An operator was seriously injured when he walked into a bund containing hot caustic solution and received burns to his feet and shins.
12/05/2010	Halls Creek	Diesel	A filter housing on a storage tank failed, allowing diesel to spill into the tank compound. About 11 kL leaked outside the bund on to soil.

Date	Location	Goods	Incident details
1/07/2010	Mundaring	Sodium hydroxide solution	A storage tank system drain valve was left open and the contents emptied into the tank spill compound then a nearby creek.
27/07/2010	Mine site, Pilbara	Diesel	Fuel spraying from an over-pressurised self-bunded tank that had been incorrectly installed was ignited by a nearby power supply. The delivery driver received minor burns.
15/08/2010	Mine site, Goldfields	Hydrochloric acid	A jet of acid leaked from a pipe through a corroded plug.
29/09/2010	Yacht club, Perth	Petrol	Due to a corroded valve, 10,000 L of petrol leaked from the base of an onshore petrol bowser. The underground plume reached the Swan River (the Department of Environment and Conservation is following up).
20/11/2010	Waroona	Diesel	An incorrect return line setup between a pump and a storage tank resulted in diesel-contaminated water spilling out of the spill compound into an earthen sump.
6/12/2010	Crawley	Sodium hydride, hexane and N,N-dimethyl formamide	Fire involving sodium hydride. A researcher was burnt on both hands and arms.
11/12/2010	High Wycombe	Diesel	A customer, car and dog at a self-serve service station were showered with diesel from a bowser damaged in an earlier drive-off.
13/12/2010	Landfill site, Henderson	Ammonium nitrate	10 kg of technical grade ammonium nitrate was found at a landfill.

Dangerous goods transport incidents in 2010

Ten dangerous goods transport incidents were reported in 2010, which is the annual average for the last 20 years (10). 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 is below the average for heavy goods vehicles generally.

Half of the reported incidents can be attributed largely to human error, and four were 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
16/01/2010	Rivervale	Petrol	A flash fire occurred around a petrol station fill point just after filling. The driver suffered minor burns.
25/03/2010	Welshpool	LP Gas	An LP Gas cylinder was being filled from a tanker vehicle when it was overfilled.
23/04/2010	Carnarvon	Hydrochloric acid	Due to a loose lid, about 200 L of acid leaked from a container.
27/04/2010	Kwinana	Crude oil	A tanker vehicle (pocket double) rolled over but the tanks remained intact with no loss of product. There were no injuries.
13/06/2010	Bindi Bindi	Ammonium nitrate	The third trailer of a combination vehicle rolled over resulting in a spill of 35 t of ammonium nitrate. There were no injuries.
16/09/2010	Near Moorine Rock	Ammonium nitrate, liquid	The rear trailer of a combination road vehicle rolled over resulting in a minor spill of product. There were no injuries.
18/09/2010	Brand Hwy, near Dongara	Crude oil	A crude oil tanker vehicle (pocket double) rolled over and spilled its entire contents.
23/09/2010	Hazelmere	Medical air	Two poorly restrained 15-cylinder manifold packs fell off a trailer resulting in some loss of gas.
30/09/2010	South of Kumarina	Ammonium nitrate	The axle bearings on a truck overheated and caught fire. No product was lost or ignited.
2/11/2010	Wangara	Sulfuric acid	Acid leaked from a tanker vehicle while in transit. Some of the acid spilled onto a car's bonnet.

Major hazard facility incident reports in 2010

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

The number of MHF incident reports in 2010 (14) was greater than that reported in 2009 (6) but still considerably lower than the number reported in 2008 (27). All incidents were relatively minor, and none involved injuries, reflecting improved safety management at these facilities.

Date	Location	Goods	Incident details
15/03/2010	Refinery, Kwinana	Hydrogen gas	Gas leak from absorber tower.
15/03/2010	Chemical plant, Kwinana	Chlorine/ titanium tetrachloride	Minor release of chlorine/titanium tetrachloride. There were no injuries.
22/03/2010	Refinery, Kwinana	Petrol	Minor petrol leak during ship unloading.
23/03/2010	Refinery, Kwinana	LP Gas	Leak of about 2 t of LP Gas. There were no injuries.
28/03/2010	Gas plant, Karratha	LNG	Release of LNG during ship loading. A crew member suffered cold burns.
7/04/2010	Chemical plant, Kwinana	Ammonia	Release of ammonia vapour when a manual pressure relief valve was left open.
27/04/2010	Petrol terminal, Kwinana	Unleaded petrol (ULP) and diesel slop mixture	Due to operator error, about 750 L of ULP and diesel slops overflowed from a tank into a bund.
7/05/2010	Chemical plant, Kwinana	Sulphur (liquid)	A carryover of sulphur from a reactor caught fire as it left the flare causing spot fires on the ground. There were no injuries.
1/06/2010	Chemical plant, Kwinana	Sodium cyanide solution	Release of weak sodium cyanide solution.
29/06/2010	Chemical plant, Kwinana	Sulphuric acid	Spill of acid from a failed hose fitting. The operator received slight burns.
6/07/2010	Refinery, Goldfields	Hydrogen sulphide	Release of up to 30 cubic metres of hydrogen sulphide.
3/08/2010	Chemical plant, Kwinana	Ammonia solution	An autoclave over-pressured during a descaling cycle. The relief valve failed to operate so the vessel was depressurised using a manual drain valve.
22/09/2010	Chemical plant, Kwinana	Nitric acid	Acid spill from a pump.
9/10/2010	Refinery, Goldfields	Sulphur waste Class 4.1	Small sulphur fire at the waste disposal facility.

Statistical analysis of incident data for 2001–2010

The following table summarises storage and handling and transport incident data for the period 2001 to 2010. 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 129 *storage and handling incidents* over the this period, 44 per cent were caused by mechanical or design failure and 47 per cent by human error. Unfortunately, there were two incidents in 2010 resulting in serious injuries. However, over the ten-year period, the incidence rate for serious injuries and fatalities has remained low.

Of the 149 *transport incidents*, 34 per cent were caused by mechanical or design failure and 59 per cent by human error. For the purposes of this analysis, incidents such as truck roll-overs were classified as due to human error on the assumption that the main cause of the incident was driver inattention, excessive speed or both, although it should be noted that, in some cases, other drivers were at fault. Unfortunately, over the ten-year period four incidents resulted in serious injuries and three involved fatalities. However, there were no serious injuries or fatalities during 2010.

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 50 incidents (34%) 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 take corners more carefully, and drivers are well trained and provided with adequate rest breaks to optimise their alertness.

Storage and handling and transport incident data 2001–2010

	Total number	Material or design failure	Human error	Loss of product	Serious injury	Fatality
Storage and handling (number of incidents)	129	57	60	96	5	0
		44%	47%	74%	4%	0%
Transport (number of incidents)	149	51	88	108	4	3
		34%	59%	72%	3%	2%