



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

Overview of dangerous goods reportable situations and incidents 2011

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Overview of 2011 reportable situations and incidents

This report describes dangerous goods and explosives incidents that occurred in 2011. The report also compares the 2011 incident data with comparable data collected since 1992, and provides some statistical analysis of incident data for that period.

The quantity of dangerous goods being stored, handled and transported across the State continues to increase with economic activity. Unfortunately, there was one fatality attributed to dangerous goods in 2011, as well as a number of minor injuries.

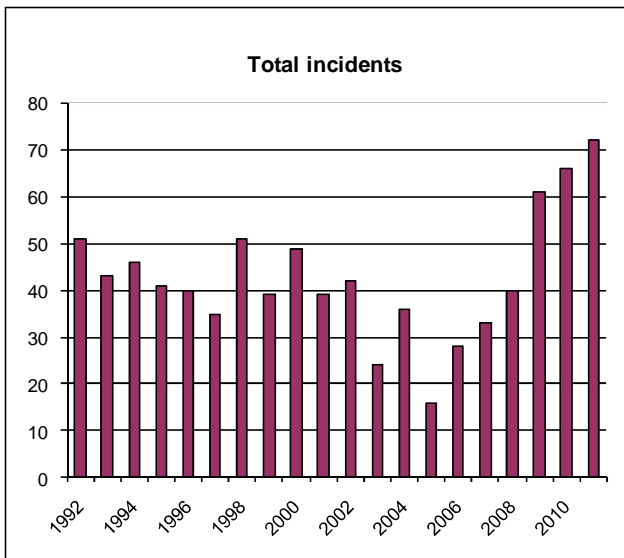
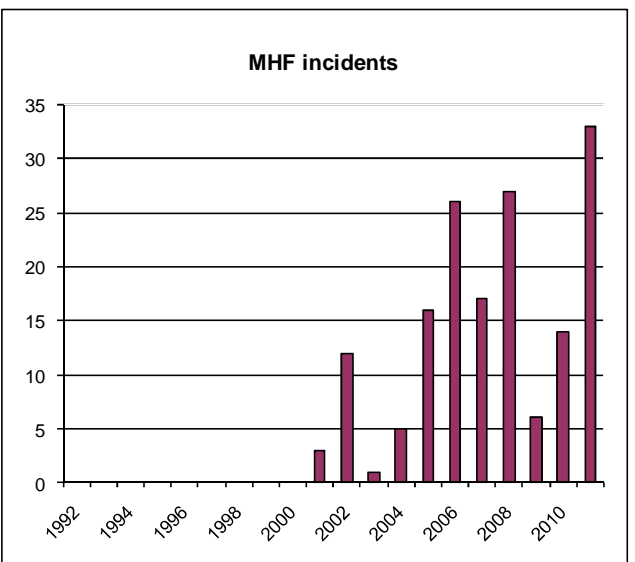
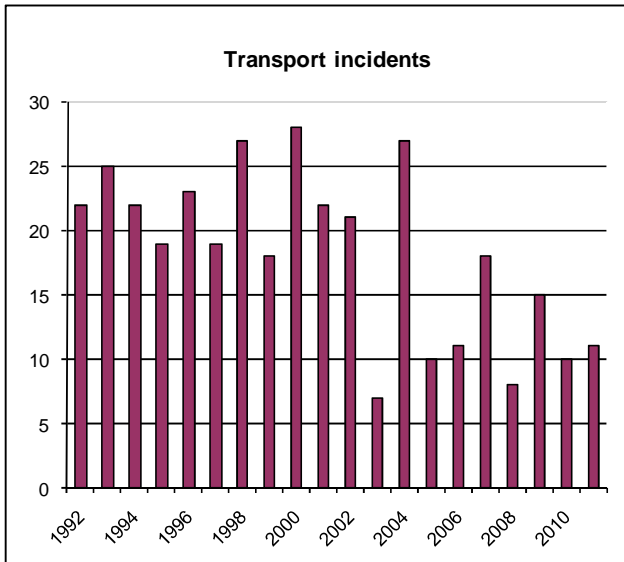
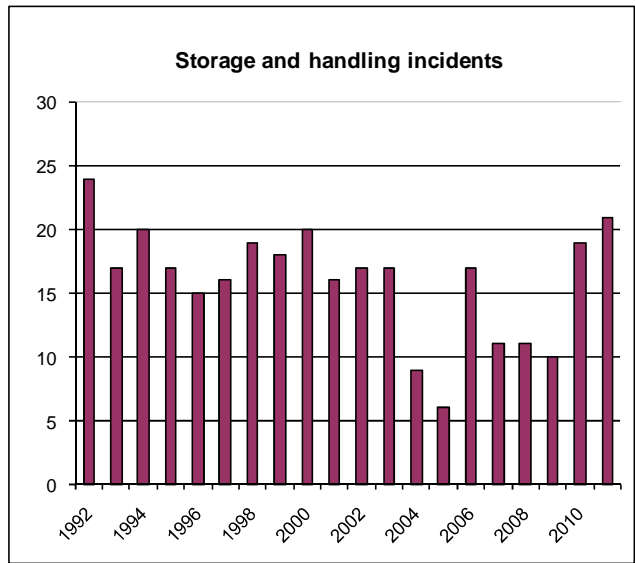
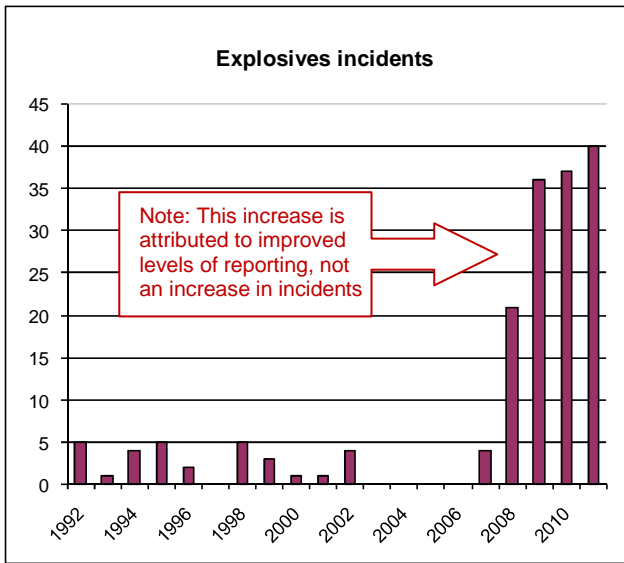
Looking at 20 years of data, the total number of reported incidents, excluding major hazard facility (MHF) incident reports, has remained relatively constant over the period. It is acknowledged that the actual number of incidents is likely to be greater than the number reported, so year-to-year variations should not be over-interpreted. For example, the significant increase in explosives incident reports since 2008 is probably more attributable to increased awareness of reporting responsibilities by mining companies.

Simon Ridge

CHIEF DANGEROUS GOODS OFFICER

11 April 2012

Number of reportable situations and incidents for 1992–2011



Explosives reportable situations in 2011

There were 40 explosives incidents reported to Resources Safety in 2011, seven of which were reported to the mines inspectorate, with the balance reported to the dangerous goods inspectorate.

The number of reported incidents was consistent with 2010.

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

None of the reported incidents caused a fatality or serious injury, although a few caused minor injuries and damage to equipment.

Date	Location	Goods	Incident details
12/01/2011	Munster	Booster and detonator	A live booster and detonator were found in a shipment of coal.
19/01/2011	Mine site, Worsley	Booster	A booster was lost while charging a blast.
06/02/2011	Mine site, Goldfields	Explosives	A loaded explosives ute, travelling on an unsealed road in the wet, lost traction and rolled over. There were no injuries or damage.
11/02/2011	Mine site, Pilbara	Detonator	A detonator was lost on the shot.
21/02/2011	Mine site, Pilbara	Explosive, detonators and boosters	Explosives were temporarily misplaced but later recovered.
27/02/2011	Collie region	Detonator	A detonator was found in a consignment of coal at a coal plant.
04/03/2011	Mine site, Pilbara	Detonator	A detonator was unaccounted for on a shot.
04/03/2011	Mine site, Pilbara	Boosters	On inspection, a box of boosters was found to be two short when the previous shift had recorded it as full.
14/03/2011	Mine site, the Kimberly	Explosives	An excavator set off residual explosives from a perimeter hole. There were no injuries or damage.
15/03/2011	Kalgoorlie	Detonators	A box of detonators was unaccounted for after a stock take.
05/04/2011	Perth	Explosives	A vehicle drove over a loaded shot.
07/04/2011	Mine site, Pilbara	Explosives	Security of a magazine was compromised.
07/04/2011	Mine site, Laverton area	Detonator	An excavator set off a misfired detonator from a face hole. There were no injuries or damage.
08/04/2011	Mine site, Perth area	Explosives	A vehicle ran over charged holes following a brake failure.
11/04/2011	Kalgoorlie	Explosives	A length of detonating cord was used to secure empty packages on a vehicle.

Date	Location	Goods	Incident details
12/04/2011	Mine site, Goldfields	Explosives	A machinery operator initiated misfired explosives and suffered minor cuts and bruising.
21/04/2011	Mine site, Pilbara	Explosives	Keys for an explosive magazine were left unattended. They were later secured and all explosives accounted for.
26/04/2011	Mine site, Pilbara	Booster	A booster was unaccounted for following loading of a shot.
10/05/2011	Mine site, Pilbara	Booster	A booster was unaccounted for following loading of shot.
22/05/2012	Pilbara	Explosives	Explosives were incorrectly secured.
23/05/2011	Menzies area	Detonators	A vehicle transporting detonators rolled onto its roof. There were no injuries.
07/07/2011	Mine site, Goldfields	Boosters	Three boosters were found missing from a packing case. An investigation determined an error at manufacture.
09/07/2011	Mine site, the Kimberly	Explosives	Fly rock from a blast caused considerable damage to mining equipment. There were no injuries.
18/07/2011	Mine site, Pilbara	Detonators	A box of detonators fell from the explosives bomb ute as it was driving on the mine site. The detonators were recovered undamaged.
19/07/2011	Mine site, Pilbara	Booster	A stemming vehicle drove over and crushed a booster. There were no injuries or damage.
27/07/2011	Mine site, Goldfields	Explosives	A fuel truck drove over a loaded shot and 11 detonator leads. There were no injuries or damage.
06/08/2011	Mine site, Goldfields	Explosives	A blast threw two rocks outside the 500 m exclusion zone. There were no injuries or damage.
30/08/2011	Mine site, Pilbara	Booster	A booster was unaccounted for following loading of shot.
02/09/2011	Mine site, Kalgoorlie	Explosives	Six 20 kg bags of ANFO were unaccounted for.
28/09/2011	Mine site, Laverton area	Detonator	A detonator was unaccounted for following a magazine stock take.
12/10/2011	Mine site, Murchison area	Explosives	A manufacturer sealed carton of emulsion explosives was found to be two cartridges short.
29/10/2011	Mine site, Pilbara	Explosives	A number of personnel were inside a blast exclusion zone at the time of initiation. There were no injuries or damage.
03/11/2011	Mine site, Pilbara	Explosives	A detonator and booster were unaccounted for.
12/11/2011	Mine site, Pilbara	Detonator	A detonator lead was found to be missing during a stock take.

Date	Location	Goods	Incident details
14/11/2011	Mine site, Murchison area	Explosives	A manufacturer-sealed carton of emulsion explosives was found to be one cartridge short.
21/11/2011	Mine site, Pilbara	Explosives	Fly rock from a blast caused damage to an evacuated building.
22/11/2011	Mine site, Pilbara	Explosives	Two workers in a light vehicle were 34 m from an eight-tonne development pattern when it was initiated. There were no injuries but the vehicle sustained minor damage.
01/12/2011	Mine site, Pilbara	Explosives	A shottirer and assistant were within the 600 m exclusion zone on initiation of the blast. There were no injuries.
20/12/2011	Mine site, Pilbara	Detonator	A detonator was unaccounted for following the loading of a shot.
26/12/2011	Mine site, Pilbara	Explosive	A train, within the exclusion zone of a blast, was damaged by fly rock. There were no injuries.

Dangerous goods storage and handling reportable situations in 2011

The 21 reported dangerous goods storage and handling incidents in 2011 is an increase compared with the previous four years.

There was no general pattern to the incidents, with causes ranging from mechanical equipment failure to human error.

Unfortunately, one storage and handling incident resulted in the death of an individual and others caused mostly minor injuries.

Three operations within the State are particularly prone to loss of containment and these operations reported a further 198 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 2011 figure is significantly lower than the 328 spills reported for 2010 and this reduction is attributed, in part, to the considerable investment in spill reduction measures undertaken at those facilities.

Date	Location	Goods	Incident details
11/01/2011	Shenton Park	Diesel	A diesel day tank was overfilled causing about 4,000 L to spill into the bund. The bund drain valve had been left open.
17/01/2011	Denmark	Hydrochloric acid and hypochlorite solution	An operator inhaled chlorine gas when hydrochloric acid was accidentally mixed with hypochlorite solution.
08/02/2011	Kwinana	Dimethylamine, aqueous solution	A drum was punctured with a forklift tine while being removed from a vehicle. About 75 L spilled, but was contained on site and recovered for disposal. A worker was admitted to hospital for observation.
15/02/2011	Picton	Diesel	Diesel leaked into the ground following failure of a flexible hose under a fuel dispenser. About 22,000 L of diesel was lost over a one-and-a-half month period.
23/02/2011	Welshpool	LP Gas	A leaking 9 kg cylinder was placed within 1.5 m of a water heater with a naked pilot light. The LP Gas ignited and the fire resulted in property damage and second degree burns to operator's arms and legs.
06/03/2011	Meekatharra	Diesel	Fuel filter split during a diesel engine service, causing a spill of diesel into a containment area.
08/03/2011	Forrestfield	Diesel	Bolts holding a breakaway flange for a refuelling standpipe partially failed, resulting in the opening of the fuel line and discharge of fuel under pump pressure.
15/03/2011	North Fremantle	Bitumen	Bitumen spilled during a storage tank to receiving tank transfer. Most of the bitumen was contained within a bund, but some spilled onto road and adjacent premises.
19/03/2011	Barrow Island	Hydrochloric acid	A forklift tine pierced an IBC, causing a spill of about 800 L of acid.

Date	Location	Goods	Incident details
21/04/2011	Nedlands	LP Gas	LP Gas escaped while a customer was filling their car, causing cold burns to their upper arm.
22/4/2011	Kwinana	Sulphuric Acid	28 kL of 98% acid overflowed from a mixing tank when an isolation and a control valve were left in the open position. The spill was contained.
29/06/2011	Forrestfield	Phosphine	A person received minor injuries when a phosphine fumigation system exploded at a grain silo.
13/07/2011	Girrawheen	Flammable liquid	There was an explosion when an empty 200 L drum was cut with an angle grinder. One person suffered very serious burns and subsequently died.
14/07/2011	Binningup	Sodium metabisulphite solution	A loss of 1,300 L from a 15,000 L storage tank was contained in the chemical building.
08/08/2011	Menzies	Diesel	About 8 kL of diesel was lost when a self-bunded tank pump was left running overnight and the primed hose connection failed.
25/08/2011	Bunbury	Liquefied chlorine	A chlorine leak from the drum was noticed during servicing of a regulator.
31/08/2011	Kwinana	Liquid oxygen	An oxygen tank leaked after filling because the fill valve was not closed completely.
16/09/2011	Meekatharra	Diesel	A vehicle with two 10 kL diesel fuel transport tanks (being used as a storage facility) caught fire and was completely destroyed. The driver sustained minor injuries.
24/09/2011	Leederville	Hypochlorite solution	Failure of pipe work resulted in a spill of hypochlorite into the spill compound, which then leaked due to an ineffective compound seal.
29/09/2011	Laverton	Hydrochloric acid	A ladder fell on a tank valve arrangement causing a spill of 20 kL into a bund. There were no injuries.
08/11/2011	Albany	Petrol	A customer and their vehicle were sprayed with petrol from a damaged dispenser at a service station. There were no injuries.

Dangerous goods transport reportable situations in 2011

Eleven dangerous goods transport incidents were reported in 2011, which is consistent with the annual average for the last 20 years (10). Given the significant increase in the quantities of dangerous goods being transported over this time, it is considered a good result for the State. Continuing on from last year, the number of accidents involving dangerous goods vehicles remains below the average for heavy goods vehicles generally.

About half of the reported incidents can be attributed largely to human error, with no dangerous goods loads being the causal factor in any incident. Fortunately, there were no serious injuries or fatalities resulting from any of these incidents.

Date	Location	Goods	Incident details
08/02/2011	Near Albany	Aviation fuel	Drums containing Jet A1 fell from a trailer. All were damaged and about 300 L of fuel was spilled.
07/03/2011	Near Leonora	Zinc sulphide concentrate	A kibble restraint mechanism vibrated loose, resulting in zinc sulphide concentrate falling onto the road shoulder. The contaminated soil was removed.
11/07/2011	Fitzroy Crossing	Flammable liquids	The middle trailer of a triple road train carrying fuel rolled over. All fuel was safely recovered.
20/07/2011	Aubin Grove	Sodium hypochlorite solution	A vehicle collided with a light pole. There was no loss of product.
28/07/2011	Near Minilya Roadhouse	Aviation fuel	The rear trailer of a road train rolled over, causing a major fuel leak.
22/08/2011	Myalup	LP Gas	An LP gas tanker rolled over and some LP Gas leaked through the rotogauge.
24/08/2011	Near Minilya Roadhouse	Ammonium nitrate	The second trailer of a B-double rolled over, spilling about 7 t of ammonium nitrate.
05/10/2011	Near Port Hedland	LP Gas and oxygen	Some cylinders fell from a trailer and vented.
11/10/2011	Fremantle	Ammonium nitrate	About 800 kg ammonium nitrate spilled from a freight container.
24/11/2011	Meckering	LNG	The rear trailer of a road train rolled, causing some product to vent.
29/11/2011	Near Telfer	Ammonium nitrate	The rear trailer of a double road train carrying ammonium nitrate prill rolled over, spilling 20 t of the 30 t load.

Major hazard facility reportable situations in 2011

Major hazard facility (MHF) incident reports and reportable situations are a combination of those involving injury or damage and near misses.

There were 33 incidents reported in 2011, compared with 14 in 2010, There was only one major incident during the year and this resulted in property damage only. All others incidents were minor.

Date	Location	Goods	Incident details
06/01/2011	Northern Goldfields	Sulphuric acid solution	Acid leaked into a bund, causing minor injury to a worker who knowingly entered the bund.
13/01/2011	Kwinana	Petrol	A spillage of a small amount (<100 L) of fuel.
23/01/2011	Karratha	LNG	An LNG storage tank leaked.
07/02/2011	Kwinana	Liquified anhydrous ammonia	A release of liquified ammonia resulted in a worker receiving cold burns to the chest.
08/02/2011	Kwinana	Fuel	Intense flaring resulted in a small grass fire in the surrounding area.
15/02/2011	Kwinana	Hydrochloric acid	Between 4,000 and 5,000 L of acid was released into a bund. A worker was injured by acid spray.
21/02/2011	Kwinana	Sodium cyanide	A small amount of sodium cyanide powder spilt on the ground.
04/03/2011	Bunbury	Sodium hydroxide	A worker inhaled caustic fumes.
04/03/2011	Perth	Anhydrous ammonia	Two over-filled drums were detected during a site inspection.
17/03/2011	Kwinana	Fuel oil	A spill of 4,300 L of fuel oil was contained in a bund.
08/04/2011	Kwinana	Chlorine	Chlorine was released during a plant shutdown.
21/04/2011	Kwinana	Slop oil	About 500 L of oil leaked into a bund.
23/05/2011	Kwinana	Hydrogen	A hydrogen leak resulted in a localised flame.
28/06/2011	Karratha	Process Gas	An explosion and jet fire occurred during plant start up. There was damage to adjacent equipment but no injuries.
29/06/2011	Kwinana	Chlorine	Process gas containing chlorine was released from a sample point.
02/07/2011	Northern Goldfields	Hydrogen	A pocket of hydrogen in a cooling water line was ignited during cutting with an angle grinder. The worker sustained minor injuries.

Date	Location	Goods	Incident details
24/07/2011	Kwinana	Sodium hypochlorite solution	A small quantity of sodium hypochlorite solution leaked into a bund.
03/08/2011	Kwinana	Sodium cyanide solution	A small quantity of sodium cyanide solution leaked from an isotainer.
03/08/2011	Kwinana	Chlorine and titanium tetrachloride	A small quantity of process gas was released.
05/08/2011	Kwinana	LNG	A pressure relief valve opened on a road tanker releasing about 5,000 m ³ of gas.
05/08/2011	Kwinana	Hydrocarbon vapour	Vapour leaked from a storage tank.
23/08/2011	Kwinana	Sodium hydroxide	A tank overflowed into a bund.
28/08/2011	Bunbury	Formaldehyde	There was a spill into a bund.
03/09/2011	Northern Goldfields	Sulphuric acid solution	Acid leaked into a bund, causing minor injury to a worker who knowingly entered the bund.
24/09/2011	Bunbury	Formaldehyde and methanol	An uncontrolled reaction resulted in activation of a pressure relief device.
02/10/2011	Kwinana	Sodium hydroxide	A worker received a corrosive burn following contact with solid sodium hydroxide.
04/10/2011	Karratha	LNG	Gas was released from a leaking flange.
11/10/2011	Bunbury	Hydrochloric acid	2,200 litres of acid spilled into a bund.
15/10/2011	Northern Goldfields	Sulphur	A spot sulphur fire occurred.
17/10/2011	Kwinana	Potassium permanganate and diesel	A sudden release of energy on restarting a reactor resulted in a worker sustaining minor injuries.
20/10/2011	Kwinana	Petrol	A tanker overfill protection device failed, resulting in a contained spillage.
31/10/2011	Kwinana	Hydrogen	A release of hydrogen ignited, resulting in two workers sustaining minor burns.
29/12/2011	Kwinana	Sulphuric acid	A tank overflowed into a bund.

Statistical analysis of incident data for 2002–2011

The following table summarises storage and handling and transport incident data for the period 2002 to 2011. The data have been analysed to identify the proportion of incidents nominally caused by mechanical failure or human error, and if there was loss of product, serious injuries or fatalities.

Of the 150 *storage and handling incidents* over this period, 41 per cent were assessed as being caused by mechanical or design failure and 48 per cent by human error. Unfortunately, there was one incident in 2011 that resulted in a fatality, and there were also a number causing minor injuries. However, over the ten-year period, the incidence rate for serious injuries and fatalities has remained low.

Of the 160 *transport incidents*, 33 per cent are assessed as being caused by mechanical or design failure and 60 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, fatigue, excessive speed or a combination of these, 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 2011.

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 57 incidents (36%) 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 focus on ensuring road train drivers do not speed and that they drive around corners more carefully. Vehicle drivers must be well trained and provided with adequate rest breaks to maintain their alertness.

Storage and handling and transport incident data 2002–2011

	Total number	Material or design failure	Human error	Loss of product	Serious injury	Fatality
Storage and handling (number of incidents)	150	62	72	114	6	1
		41%	48%	76%	4%	<1%
Transport (number of incidents)	160	53	96	119	4	3
		33%	60%	74%	3%	2%