



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

## **Overview of dangerous goods reportable situations and incidents 2012**

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## **Overview of 2012 reportable situations and incidents**

This report describes dangerous goods and explosives incidents that occurred in 2012 and are required to be reported to the Resources Safety Division of the Department of Mines and Petroleum under the Dangerous Goods Safety Act 2004 and associated regulations. The report also compares the 2012 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. Looking at 22 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, rather than indicating an increase in the number of incidents, the significant increase in the number of explosives incident reports since 2008 probably reflects an increased awareness of reporting responsibilities by mining companies and users.

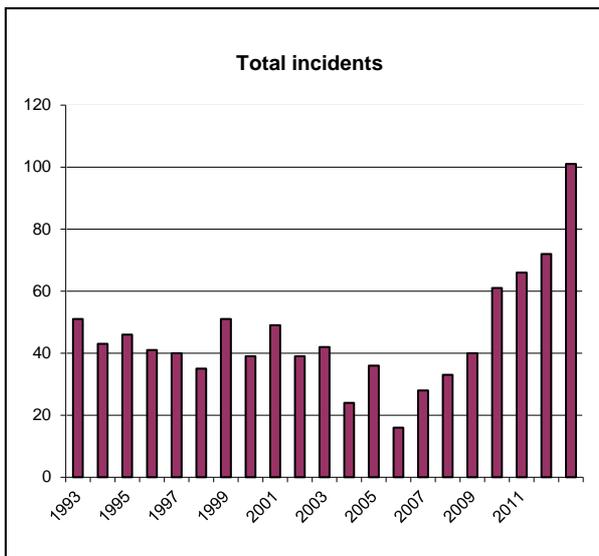
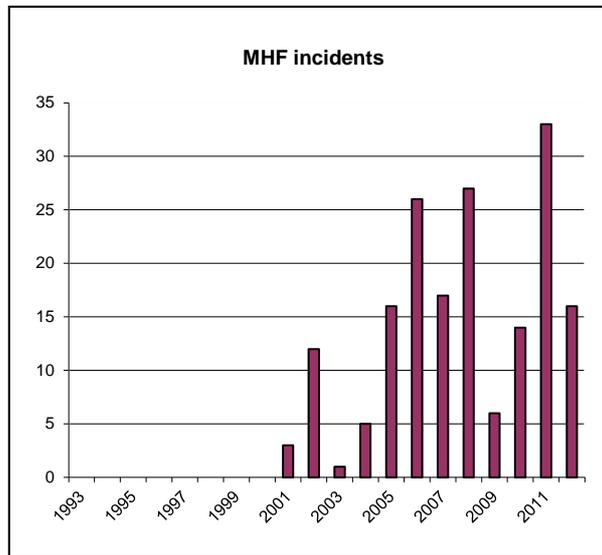
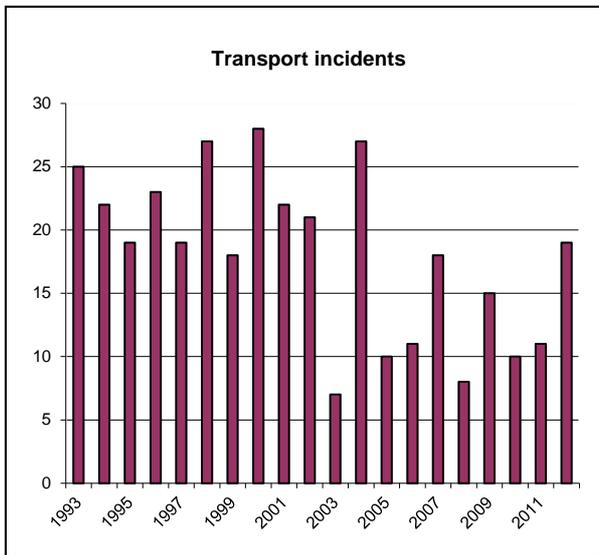
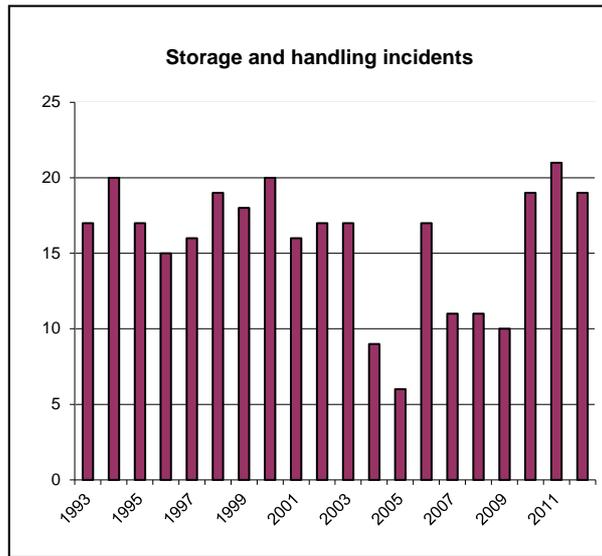
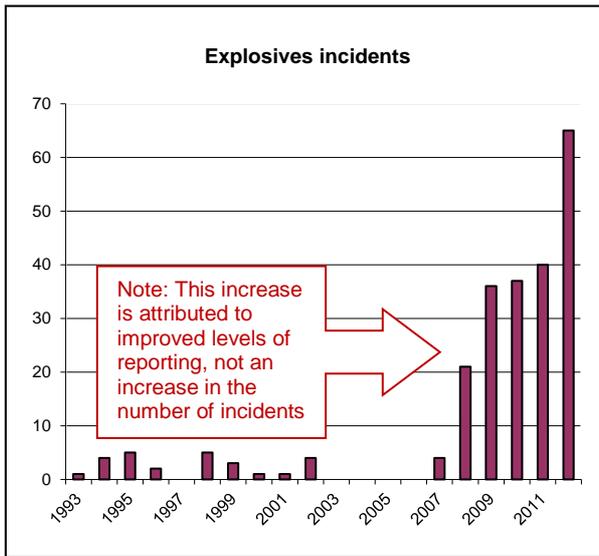
Unfortunately, there was one fatality in 2012 attributed to a dangerous goods storage and handling incident. There was also a fatality following a vehicle crash involving dangerous goods transport, but the death was not caused by the dangerous goods. Any injuries received were mostly minor but there were several that were serious.

Simon Ridge

**CHIEF DANGEROUS GOODS OFFICER**

8 March 2013

# Number of reportable situations and incidents for 1992–2012



## Explosives reportable situations in 2012

There were 65 explosives incidents reported to Resources Safety in 2012. Nineteen of these were reported to the mines inspectorate, with the balance reported to the dangerous goods inspectorate.

The number of incidents reported for 2012 is notably higher than for 2011. Much of the increase is attributed to the improved reporting of incidents involving misfired explosives. At every opportunity, dangerous goods safety officers have been reminding industry of the reporting requirements in accordance with the Act and regulations.

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

None of the reported incidents resulted in a fatality but there was one serious injury, and some caused minor injuries as well as damage to mine equipment, vehicles and plant.

Serial	Date	Location	Goods	Incident details
1	4/01/12	West - Midwest	Explosives	Plant was hit by fly rock from a blast.
2	8/01/12	Pilbara	Booster and detonators	A primer and two detonators were unaccounted for after a shot was loaded.
3	10/01/12	East Pilbara	Detonator	A detonator was unaccounted for after a shot was loaded.
4	15/01/12	Goldfields	Powergel cartridges	Four powergel cartridges were unaccounted for after a shot.
5	20/01/12	Pilbara	ANFO	A fire in the tail shaft bearing of a mobile processing unit (MPU) was extinguished before it affected the vehicle's contents.
6	25/01/12	The Kimberley	Explosives	Misfired explosives were found when digging waste material.
7	27/01/12	Pilbara	Explosives	A shot failed to fire because the lead-in line had been cut by a previous blast.
8	31/01/12	The Kimberley	Explosives	A misfire was found during production digging.
9	17/02/12	Kwinana	Fireworks	An operator burnt his hand when he inadvertently touched a firework.
10	18/02/12	Pilbara	Booster	An unexploded booster was found in the pit.
11	25/02/12	North East Goldfields	Booster and detonator	Explosives were found on a charge-up vehicle brought to the surface for servicing.
12	12/03/12	Kalgoorlie	Detonators	A magazine key was lost.
13	12/03/12	Pilbara	Explosives	A service truck entered a shot area while a shot was being loaded.
14	17/03/12	Pilbara	Booster and detonator	A booster and detonator were unaccounted for after a blast.

Serial	Date	Location	Goods	Incident details
15	22/03/12	East Pilbara	Booster	A booster was left unsupervised in an MPU basket.
16	23/03/12	Pilbara	Explosives	There was a fire on an MPU while loading a shot. The MPU was removed from the blast area and the fire extinguished.
17	24/03/12	West - Midwest	Explosives	A mining vehicle entered a loaded shot area prior to blasting.
18	26/03/12	Pilbara	Boosters and detonator	A damaged charge basket was welded while still containing a detonator and boosters.
19	1/04/12	East - South	Explosives	A misfire was found during development digging.
20	7/04/12	Pilbara	Detonator	A detonator was unaccounted for after a shot was loaded.
21	7/04/12	West - Midwest	Explosives	Fly rock damaged two buildings and overpressure dislodged a parked vehicle's window.
22	9/04/12	Pilbara	Explosives	A misfired detonator, booster and emulsion were found during a routine pit inspection.
23	4/05/12	Mundaring	Explosives	Explosives were stolen from a locked magazine.
24	4/05/12	South West	Detonator	A detonator was unaccounted for after a shot was loaded.
25	12/05/12	Pilbara	Explosives	A stocktake identified the supply of incorrect explosives.
26	15/05/12	Goldfields	Detonators	Two detonators were unaccounted for after a stocktake.
27	20/05/12	Pilbara	Explosive	Charge column separation led to several misfires during a blast.
28	27/05/12	Pilbara	Detonator and booster	A misfire was discovered when bogging out a stope.
29	29/05/12	Pilbara	Explosives	A 10-year-old misfire was found when descaling part of a decline.
30	30/05/12	Pilbara	Explosives	Fly rock travelled outside the blast exclusion zone.
31	1/06/12	Pilbara	Explosives	A blast guard standing too close to a blast was badly injured by flyrock.
32	17/06/12	East Pilbara	Booster	A booster was unaccounted for during a shot.
33	20/06/12	Pilbara	Booster	A booster was unaccounted for.
34	21/06/12	Kalgoorlie	Ammonium nitrate	1.5 kg of ammonium nitrate was found in a bulk bag and returned to the supplier.

Serial	Date	Location	Goods	Incident details
35	24/06/12	Pilbara	Detonators	A detonator was unaccounted for after a shot.
36	30/06/12	Goldfields	Explosives	15 explosive cartridges were unaccounted for during a stocktake.
37	2/07/12	Kalgoorlie	Explosives	Half an explosives cartridge was found in a bulk bag and returned to the supplier.
38	11/07/12	Goldfields	Detonators	Three detonators were unaccounted for after a shot was loaded.
39	23/07/12	Pilbara	Detonators	Two detonators were unaccounted for during a stocktake.
40	29/07/12	Pilbara	Booster	An un-fired booster and detonator were found after a shot. They were destroyed in a production blast.
41	5/08/12	Pilbara	Boosters	A loaded shot was unguarded overnight.
42	8/08/12	Goldfields	Booster	A booster was unaccounted for after a shot.
43	21/08/12	West - South West	Explosives	An unattended MPU rolled about 40 m.
44	22/08/12	Goldfields	Booster	A booster was unaccounted for after a shot.
45	24/08/12	Ballajura	Firework	A firework was set off inside a residence.
46	26/08/12	Meekatharra	Explosives	There was a fire in the engine compartment of an MPU. The fire was extinguished.
47	28/08/12	West - South West	Explosives	A vehicle was damaged by fly rock.
48	31/08/12	Pilbara	Detonator	A detonator was unaccounted for after a shot was loaded.
49	31/08/12	Pilbara	Detonator lead	A detonator lead was unaccounted for after a shot.
50	9/09/12	Pilbara	Explosives	A light vehicle entered a shot-delineated area.
51	13/09/12	Pilbara	Explosives	A service truck entered a shot-delineated area.
52	30/09/12	The Kimberley	Detonator	A detonator was found in the rear tray of a vehicle.
53	15/10/12	Goldfields	Explosives	Out-of-date explosives were found in an old magazine. They were destroyed.
54	19/10/12	West – Midwest	Explosives	Misfired explosives were found during the excavation of a shot.
55	30/10/12	Pilbara	Booster and detonator	A misfired booster and detonator were discovered when clearing a blast site.
56	31/10/12	Goldfields	Booster	A booster was unaccounted for when preparing for a shot.

Serial	Date	Location	Goods	Incident details
57	3/11/12	Pilbara	Detonators	A magazine door was left unlocked. There was no loss of explosives.
58	4/11/12	West – Midwest	Explosives	Misfired explosives were found during the excavation of a shot.
59	12/11/12	Goldfields	Booster	A booster was unaccounted for during a stocktake.
60	26/11/12	Pilbara	Explosives	A misfire of 13 holes was not identified for several hours.
61	28/11/12	Collie	Explosives	Two workers breached a blast exclusion zone.
62	30/11/12	Meekatharra	Detonator	An unfired detonator was found on an ore pad.
63	10/12/12	Kalgoorlie	Detonator	A detonator was unaccounted for during a stocktake.
64	24/12/12	Pilbara	Detonator	A down-hole lead was unaccounted for during a shot.
65	31/12/12	Pilbara	Detonator	A detonator was unaccounted for during a stocktake.

## Dangerous goods storage and handling reportable situations in 2012

There were 19 reported dangerous goods storage and handling incidents in 2012, a slight reduction on the previous year.

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

Three operations within the State are particularly prone to loss of containment and these operations reported a further 250 spill incidents that involved 1 kL or more; all losses were contained on-site. Before March 2008, such incidents had not been considered or reported as dangerous goods incidents. The 2012 figure is higher than that reported in 2011 (178). In response to this ongoing problem, a range of preventative actions is being undertaken.

Unfortunately, one storage and handling incident resulted in a fatality. Others caused mostly minor injuries.

Serial	Date	Location	Goods	Incident details
1	3/01/12	Bayswater	Chromic acid	Chromic acid solution sprayed over two workers during a vessel-to-vessel transfer. No one was injured.
2	13/01/12	Christmas Island	Diesel	3-4 kL of diesel spilled into a bund when a tank was overfilled.
3	20/01/12	Kwinana	Liquid oxygen	600 m <sup>3</sup> of oxygen leaked from a tank valve that was not properly closed.
4	9/02/12	West Perth	Hypochlorite Solution	2 kL of solution spilled into a bund from a dosing pump. 500 L leaked from the bund.
5	17/02/12	Greenough	LP Gas	LP Gas leaked from a tank damaged by contact with a backhoe.
6	12/03/12	Fremantle	Ammonium nitrate	4 kg of prill leaked inside a container from a damaged flexible IBC.
7	29/03/12	Balcatta	Diesel	200-500 L of diesel leaked from a faulty flexible pipe into a bund.
8	24/04/12	Osborne Park	Diesel	Diesel spilled from a cut pipe.
9	17/05/12	Fremantle	Diesel	100 L of diesel leaked into the Swan River from a pinhole pipeline leak.
10	12/06/12	Fremantle	LP Gas	A sea container fell onto a 2.5 kL LP Gas tank during a storm. There was no loss of product.
11	30/06/12	Kwinana	Diesel	520 kL of diesel spilled into a limestone bund. 160 kL was recovered immediately. A large recovery and remediation program was initiated.
12	2/07/12	Wagerup	Sodium hydroxide slurry	616 kL of caustic slurry spilled from the residue pipeline within a pipeline corridor.
13	2/07/12	Kwinana	Sulphuric acid	2 kL of acid leaked from a pump valve into a bund.

Serial	Date	Location	Goods	Incident details
14	14/07/12	Wagerup	Sodium hydroxide slurry	191.5 kL of bauxite slurry overflowed from a bunded area onto open ground.
15	16/07/12	Welshpool	Petrol	A worker was killed by an explosion while axle-grinding a disused petrol tank.
16	30/07/12	Collie	Corrosive liquid	A process tank overflowed and filled the containment bund, which also overflowed.
17	8/08/12	Bunbury	Sodium hydroxide solution	Solution spilt during the unloading of a caustic train.
18	19/08/12	South of Port Hedland	Diesel	Diesel spilled from a generator when an automatic pumping system failed.
19	15/11/12	Serpentine	Fluosilicic acid	A worker received minor burns from an acid spill.

## Dangerous goods transport reportable situations in 2012

Nineteen dangerous goods transport incidents were reported in 2012. This is an increase on the 2011 figure of eleven but there was also a significant increase in the quantities of dangerous goods being transported throughout Western Australia in 2012.

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. Unfortunately, there was one fatality, although dangerous goods were not the cause, and some serious injuries from these incidents.

Serial	Date	Location	Goods	Incident details
1	6/01/12	Near Kalbarri	Methanol	20 L of methanol spilled from a portable tank.
2	9/01/12	15 km east of Merredin	Various dangerous goods	A trailer loaded with various dangerous goods caught fire. There were no injuries.
3	15/01/12	Goldfields	Ammonium nitrate solution	A fire on the rear axle of a double road train trailer was extinguished before it affected the load.
4	31/01/12	Upper Swan	LP Gas	A 6 tonne LP Gas vehicle lost control and rolled after the brakes seized. The driver received minor injuries.
5	10/02/12	50 km north of Meekatharra	Ammonium nitrate emulsion	29.5 tonnes of emulsion spilled from a ruptured tanker after it overturned. There were no injuries.
6	2/03/12	Near Kojonup	Petrol	Petrol leaked from a cracked fuel tanker.
7	9/04/12	15 km east of Madura	Cyclohexylamine, paint	A trailer burned following a wheel fire.
8	11/05/12	Upper Swan	Ammonium nitrate	A person attempted to illegally sell ammonium nitrate.
9	16/05/12	2 km west of Bulla Bulling	Ammonium nitrate emulsion	20 tonnes of emulsion was spilled in a tank trailer roll-over. There were no injuries.
10	22/05/12	Kalgoorlie	Ammonium nitrate	100 kg of ammonium nitrate was spilled in a bulk container roll-over. There were no injuries.
11	30/05/12	Tonkin Highway, Armadale	Sodium cyanide solution	A car collided with a road train tank trailer. There were no injuries or loss of product.
12	9/06/12	Newman	Ammonium nitrate	Ammonium nitrate spilled from a trailer during unloading.
13	12/06/12	Derby	Hydrochloric acid and calcium hypochlorite	Acid and hypochlorite mixed in the back of a utility, damaging the packaging.
14	9/07/12	Pemberton	Hypochlorite solution	Chlorine was generated when aluminium sulphate was accidentally pumped into a hypochlorite tank. There were no injuries.

Serial	Date	Location	Goods	Incident details
15	9/07/12	Bunbury	LP Gas	A gas delivery driver re-lighting a gas hot water system was burnt by a flashback.
16	3/09/12	Katanning	Petrol and diesel	A driver was killed in a collision with a fuel tanker. Fuel was spilled but did not ignite.
17	17/12/12	Pinjar	Zinc concentrate	Concentrate spilled from a road train when it rolled over. There were no injuries.
18	20/12/12	3 km from Sunrise Dam	LNG	An LNG tanker rolled over. There were no injuries or loss of product.
19	22/12/12	75 km west of Coolgardie	Various dangerous goods	5 L of sodium cyanide solution spilled when a B-double carrying various dangerous goods rolled over. There were no injuries.

## Major hazard facility reportable situations in 2012

Major hazard facility (MHF) incident reports and reportable situations cover circumstances involving injury, damage or near misses.

There were 16 incidents reported in 2012, compared with 33 in 2011. All incidents were minor in nature and no-one was injured.

Serial	Date	Location	Goods	Incident details
1	17/01/12	Kwinana	Sulphuric acid	1.6 tonnes of acid leaked from tank pipework into a bund.
2	24/02/12	Kwinana	Liquid hydrocarbon	A release of burning droplets of liquid hydrocarbons resulted in a grass fire.
3	4/03/12	Goldfields	Sulphur	There was a small sulphur fire above a sulphur furnace.
4	13/03/12	Goldfields	Sulphur	There was a small sulphur fire in a hopper.
5	20/03/12	South West	Hydrochloric acid	31 m <sup>3</sup> of acid leaked from an open valve into a bund.
6	23/03/12	South West	Titanium tetrachloride	Gas was released from a hole in pipework.
7	27/03/12	Kwinana	Flammable gas	1.4 m <sup>3</sup> of gas was released from a loose valve.
8	29/03/12	South West	Hydrochloric acid	5.1 m <sup>3</sup> of acid overflowed from tank into a bund.
9	11/04/12	Karratha	Flammable gas	A flange leaked during start-up of an LNG train.
10	27/04/12	Kwinana	Diesel	A tanker was overfilled. The spill (<1 kL) was contained on-site.
11	28/05/12	Kwinana	Titanium tetrachloride	A small quantity of gas was released from a heat exchanger.
12	5/06/12	Kwinana	Diesel	2.3 kL of diesel spilled into a bund during tanker unloading.
13	7/06/12	Kwinana	Flammable gases	Gas was released when a compressor seal failed.
14	11/07/12	Kwinana	Sodium hypochlorite solution	Solution leaked from a fractured pipe into a bund.
15	3/08/12	Goldfields	Sulphur	There was a sulphur fire in the sulphur melting pit.
16	18/11/12	Karratha	Hydrocarbons	Gas was released from a leaking flange on a cryogenic heat exchanger.

## Statistical analysis of incident data for 2002–2012

The following table summarises storage and handling and transport incident data for the period 2002 to 2012. The data have been analysed to identify the proportion of incidents nominally caused by mechanical failure or human error, and whether there was loss of product, serious injuries or fatalities.

Of the 169 *storage and handling incidents* over this period, 43 per cent are assessed as being caused by mechanical or design failure and 47 per cent by human error. Unfortunately, in 2012, as well as some incidents resulting in minor injuries, there was a fatality. However, over the eleven-year period, the incidence rate for serious injuries and fatalities has remained low.

Of the 179 *transport incidents*, 34 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 vehicle drivers were at fault. Unfortunately, over the eleven-year period, four incidents resulted in serious injuries and four involved fatalities.

For 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 62 incidents (35%) 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 negotiate poor roads more carefully. Vehicle drivers should be well trained and provided with adequate rest breaks to maintain their alertness.

### Storage and handling and transport incident data 2002–2012

	Total number	Material or design failure	Human error	Loss of product	Serious injury	Fatality
Storage and handling (number of incidents)	169	73	79	129	6	2
		43%	47%	76%	4%	1%
Transport (number of incidents)	179	60	107	130	4	4
		34%	60%	73%	2%	2%