



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

Overview of dangerous goods reportable situations and incidents 2013

March 2014

Level 1, 303 Sevenoaks Street (cnr Grose Ave), Cannington WA 6107
Postal address: Mineral House, 100 Plain Street, East Perth WA 6004
Telephone: (08) 9358 8002 Facsimile: (08) 9358 8000
ResourcesSafety@dmp.wa.gov.au
www.dmp.wa.gov.au www.wa.gov.au

Contents

Overview of 2013 reportable situations and incidents 3

Number of reportable situations and incidents for 1994–2013 4

Explosives reportable situations in 2013 5

Dangerous goods storage and handling reportable situations in 2013..... 9

Dangerous goods transport reportable situations in 2013 11

Major hazard facility reportable situations in 2013 12

Statistical analysis of incident data for 2004–2013..... 15

Overview of 2013 reportable situations and incidents

This report describes dangerous goods and explosives incidents that occurred in 2013 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 2013 incident data with comparable data collected since 1994, 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 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, rather than indicating an increase in the number of incidents, the significant increase in the number of explosives incident reports since 2008 most likely reflects an increased awareness of reporting responsibilities by mining companies and other users.

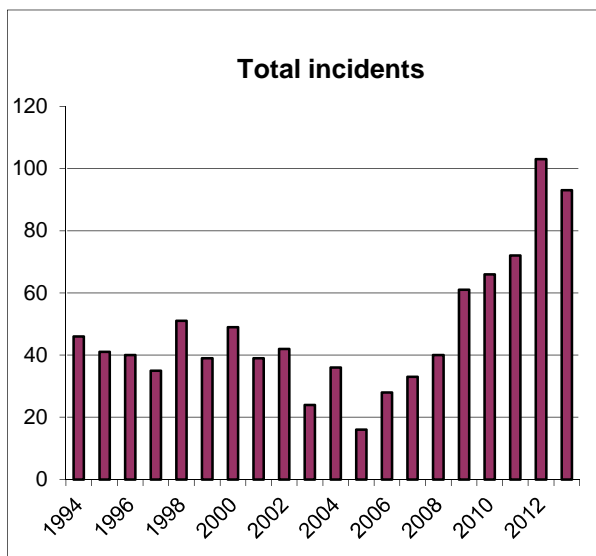
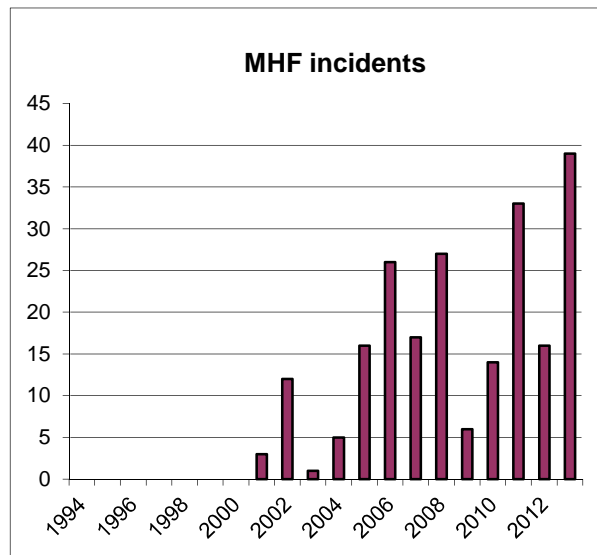
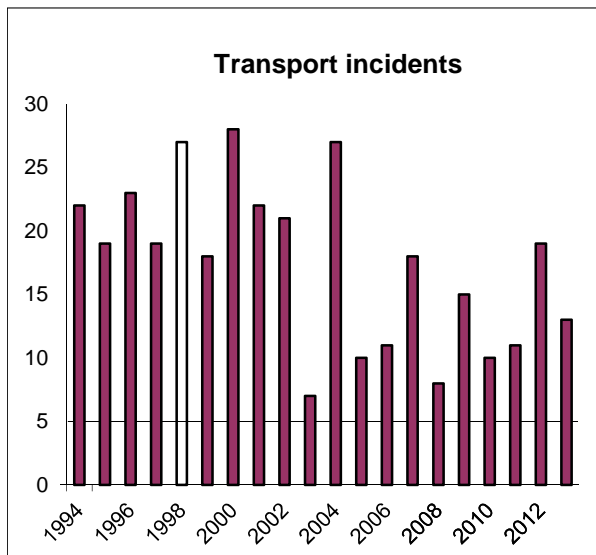
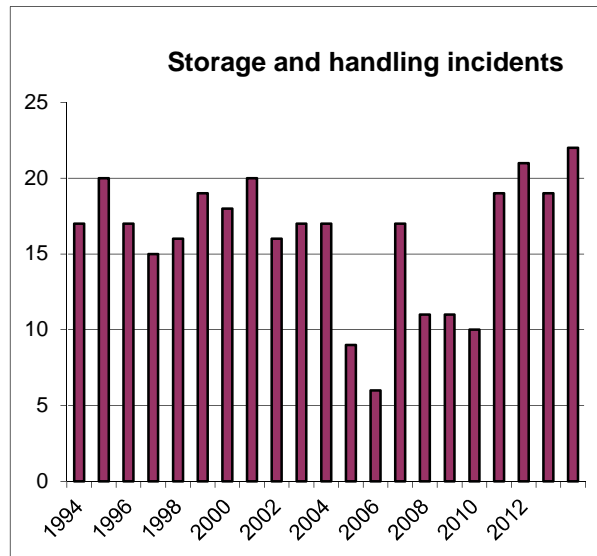
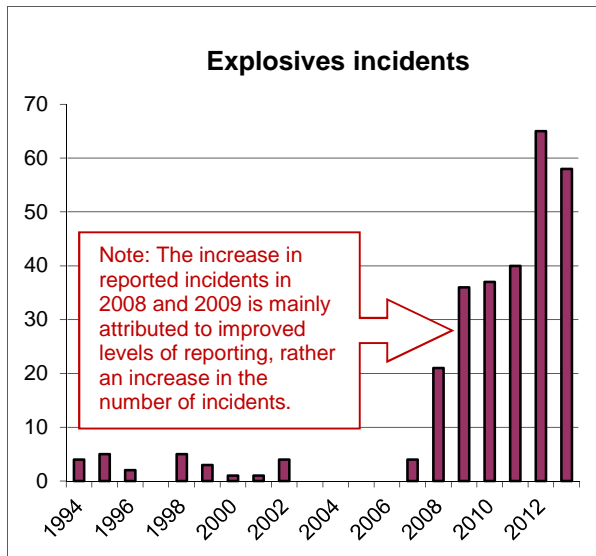
Unfortunately, there were two fatalities in 2013 following a vehicle crash involving dangerous goods transport, but the deaths were not caused by the dangerous goods. Most injuries received were minor but there were several that were serious.

Simon Ridge

CHIEF DANGEROUS GOODS OFFICER

14 March 2014

Number of reportable situations and incidents for 1994–2013



Explosives reportable situations in 2013

There were 58 explosives incidents reported to Resources Safety in 2013. Fifteen of these were only reported to the mines inspectorate, with the balance reported to the dangerous goods inspectorate.

The number of incidents reported for 2013 is slightly lower than for 2012.

The reports cover a wide range of incident types. The number of incidents involving losses of detonators, primers or boosters at mine sites remains 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 some caused minor injuries as well as damage to mine equipment, vehicles and plant.

Serial	Date	Location	Goods	Incident details
1	02/01/13	Mid-West	Booster and detonator	Unfired explosives were found during a production dig.
2	09/01/13	Southern Cross	Booster	A booster remained unaccounted for after loading the shot.
3	14/01/13	Goldfields	Explosives	A manufacturer-sealed box of detonating cord was found to be one roll short.
4	19/01/13	Mid-West	Explosives	300 g of unfired explosives was found on the ROM pad.
5	30/01/13	Goldfields	Explosives	An unfired detonator was found at the crusher plant.
6	02/02/13	Pilbara	Booster and detonator	A booster was unaccounted for after charging a shot.
7	04/02/13	Southern Cross	Booster and detonator	A rock dislodged and slid from a wall face onto a blast pattern. No explosives were struck.
8	09/02/13	Pilbara	Explosives	A primer was unaccounted for after loading a shot.
9	19/02/13	Goldfields	Explosives	Flyrock damaged a vehicle parked inside the blast exclusion zone. Ten people were in the vicinity of the vehicle. There were no injuries.
10	03/03/13	Pilbara	Blasting explosives	There was an unexpected blast after two nearby shots were fired.
11	06/03/13	Pilbara	Blasting explosives	Unfired blasting explosives were discovered in a stockpile check.
12	12/03/13	Pilbara	Snap Lines	A number of surface snap lines were unaccounted for during the weekly stocktake.
13	17/03/13	Pilbara	Detonator	A detonator was unaccounted for after a shot was loaded.
14	19/03/13	Northern Goldfields	ANFO	A discrepancy was discovered during a stocktake of explosives.

Serial	Date	Location	Goods	Incident details
15	22/03/13	Pilbara	Explosives	Unexplainable damage was found to the fence of an explosives compound.
16	24/03/13	Goldfields	Blasting explosives	On receipt of explosives from a manufacturer, a discrepancy was discovered.
17	19/04/13	Kalgoorlie	Blasting explosives	A discrepancy was found during a stocktake of explosives.
18	21/04/13	Pilbara	Blasting explosives	Unfired explosives were found during a production dig.
19	25/04/13	Mid-West	Detonators and primers	Rock slipped from the north end of a pit while the shot was being prepared. Twelve detonators and primers were lost.
20	28/04/13	Kimberley	Detonators	During pre-start checks on a crushing magnet, a number of misfired detonators were found.
21	04/05/13	Wheatbelt	Detonators	A vehicle carrying 200 detonators rolled over on a mine.
22	05/05/13	Pilbara	Blasting explosives	Unfired explosives were found during a production dig.
23	08/05/13	Pilbara	Boosters	Boosters fell from a shotfirer's vehicle when returning explosives to the magazine on a mine site.
24	16/05/13	Pilbara	Booster and detonator	During charging, it was noticed that a booster and detonator were unaccounted for.
25	20/05/13	Pilbara	Booster and detonator	A booster and detonator were discovered on a waste dump.
26	07/06/13	Pilbara	Booster and detonator	A booster and detonator remained unaccounted for after loading a shot.
27	14/06/13	Pilbara	Blasting explosives	A misfire was found during production digging.
28	18/06/13	Pilbara	Explosives	An unfired primer was found on the surface after a blast.
29	21/06/13	Pilbara	Booster and detonator	An unexploded detonator and primer were found after the blast.
30	23/06/13	Pilbara	Booster and detonator	An unexploded detonator and primer were found after a blast.
31	04/07/13	Pilbara	Booster and detonator	Unfired explosives were found during production digging.
32	04/07/2013	Pilbara	Detonator	An unfired detonator was found after a blast.
33	06/07/13	Pilbara	Explosives	A worker gained unauthorised access to a magazine.

Serial	Date	Location	Goods	Incident details
34	12/07/13	Pilbara	Booster and detonator	An unexploded booster and detonator were found after a blast.
35	16/07/13	Pilbara	Booster and detonator	An unfired booster and detonator were found during digging operations.
36	18/07/13	Pilbara	Booster and detonator	An unfired booster and detonator were found when conducting routine digging operations.
37	27/07/13	Kalgoorlie	Explosives	Four misfires from a previous shot were found.
38	28/07/13	Newman	Booster and detonator	An unfired booster and detonator were found in the dig face.
39	03/08/13	South West	Explosives	An unsuccessful attempt was made to break into an explosives magazine.
40	30/08/13	Kimberley	Explosives	An underground explosives transport vehicle carrying explosives was struck by a loader.
41	02/09/13	Mid-West	Explosives	An unfired electronic detonator was found on the ROM pad.
42	01/10/13	Pilbara	Two boosters and detonators	Two boosters and two detonators were found while excavating broken ground.
43	02/10/13	Northern Goldfields	Explosives	A detonation occurred as a digger cleared a face. There were no injuries. Minor damage was sustained by the digger.
44	07/10/13	Kimberley	Booster	An unfired booster was recovered from the toe of a stockpile.
45	10/10/13	Pilbara	Booster and detonator	An unfired detonator and primer were found during production digging.
46	15/10/13	Goldfields	Booster and detonator	A booster and detonator remained unaccounted for after loading the shot.
47	19/10/13	Northern Goldfields	ANFO	An ANFO loading hose came into contact with a charging vehicle exhaust and caught fire.
48	31/10/13	Pilbara	Booster and detonator	After loading a shot, a booster and detonator remained unaccounted for.
49	30/10/13	Pilbara	AN/ANE	A mobile processing unit (MPU) fuse box caught fire while the MPU was being washed.
50	03/11/13	Mid-West	Explosives	Unfired explosives were found when washing down a face.
51	05/11/13	East-South	Explosives	Fly rock landed in close to personnel outside the blast exclusion zone.
52	17/11/13	Pilbara	Explosives	Multiple misfires were found during a production dig.

Serial	Date	Location	Goods	Incident details
53	17/11/13	Pilbara	Boosters and detonators	Post blast, 33 unfired holes were found on the trim of the blast.
54	26/11/13	Pilbara	Detonator	A detonator was unaccounted for after a blast.
55	11/12/13	Kimberley	Explosives	Misfired explosives were found when digging a face.
56	13/12/13	Goldfields	Explosives	A roll of detonating cord was left unsecured.
57	21/12/13	South West	Explosives	Explosives were left unsecured.
58	21/12/13	Pilbara	Explosives	A single hole detonation occurred during a lightning storm.

Dangerous goods storage and handling reportable situations in 2013

There were 22 reported dangerous goods storage and handling incidents in 2013, a slight increase 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 212 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 2013 figure is lower than that reported in 2012 (250) but still higher than the figure reported in 2011 (178). In response to this ongoing problem, a range of preventative actions are being undertaken.

Serial	Date	Location	Goods	Incident details
1	02/01/13	Joondalup	Chlorine	Chlorine leaked at a swimming pool.
2	09/01/13	Canning Vale	Maleic anhydride	Polymer resin caught fire after a process upset.
3	11/02/13	Australind	Hydrochloric acid	A pipe failed and acid leaked onto the ground. Leak was contained on site.
4	11/02/13	Hamilton Hill	Petrol	An arsonist set fire to petrol at a service station, burning a customer.
5	14/02/13	Merredin	Sodium hydroxide solution	Solution leaked from a dosing line for pH adjustment. Leak was contained on site.
6	18/02/13	Williams	Hypochlorite solution	Pipework from a storage tank ruptured and 200 L of solution spilled onto the ground.
7	18/02/13	Crawley	Liquid oxygen	An explosion occurred with a mixture of oxygen and activated charcoal in a stainless steel cryogenic purifier.
8	26/02/13	Mt Keith	Sulphuric acid	Acid leaked from the base of an air regulator on to an acid dosing system at a mine site.
9	07/03/13	Burswood	Hypochlorite solutions and sulphuric acid	A pump was not washed out properly and the products mixed when refilling day tanks.
10	14/03/13	Kalamunda	Chlorine gas	Chlorine gas leaked from a regulator.
11	20/03/13	South West	Hydrogen peroxide	Chemical spill resulted in minor burns.
12	03/04/13	Bunbury	LP Gas	A 7.5 kL above-ground tank was hit by a motor vehicle. Minimal loss of LP Gas and no injuries.
13	08/04/13	Wanneroo	Hypochlorite solution	A worker sustained minor injuries when splashed with hypochlorite solution.
14	16/04/13	Donnybrook	Petrol	Petrol leaked from an underground fuel storage tank at a service station.

Serial	Date	Location	Goods	Incident details
15	24/04/13	Baldivis	Oxidising Liquid	About 2000 L of product leaked onto the ground after a hose failure during an ISO-to-ISO transfer of Hex AN solution.
16	12/06/13	North Perth	Petrol	Petrol spilled at a service station when a motorist drove away with the dispensing nozzle still attached to the vehicle.
17	10/09/13	West Perth	Liquefied chlorine gas	Chlorine gas leaked from a regulator.
18	13/09/13	Mundaring	Fluorosilic acid	Storage facility was damaged by pressure during product transfer. Thirty three persons evacuated from site.
19	08/10/13	Newman	Sodium hydroxide solution	A sodium hydroxide dosing line failed. An emergency responder received minor injuries.
20	17/10/13	Worsley	Corrosives liquid	Corrosives liquid spilled during the draining of a process line. Spill was outside a containment area.
21	10/12/13	Port Gregory	Hydrochloric acid	Hydrochloric acid leaked from a blank flange into a contained area.
22	13/12/13	Binningup	Sulphuric acid	A worker was splashed with dilute sulphuric acid.

Dangerous goods transport reportable situations in 2013

Thirteen dangerous goods transport incidents were reported in 2013. This is a reduction on the 2012 figure of 19.

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 were two fatalities, although dangerous goods were not the cause, and some serious injuries from these incidents.

Serial	Date	Location	Goods	Incident details
1	11/04/13	Newman	Diesel	A self-bunded tank was overfilled, spilling about 1500 litres of diesel.
2	12/04/13	Meckering	Various dangerous goods.	A dangerous goods truck driver lost control of his vehicle and collided with a water pipeline.
3	29/04/13	Beckenham	Sodium hydroxide solution	A motorcyclist was sprayed by solution while following a road tanker.
4	22/05/13	Wubin	Ammonium nitrate (AN) and diesel	A ute collided with a truck carrying 72 t of AN. The truck overturned and a fire resulted. Diesel spilled from the vehicle fuel tanks. The driver of the truck and the passenger in the ute were killed.
5	12/06/13	Leinster	Sodium hydrosulfide	Product leaked from an isotainer.
6	14/07/13	Goldfields	Ammonium nitrate emulsion (ANE)	The tyres on a trailer carrying ANE in an isotainer tanker caught fire. There was no product loss or injuries.
7	30/07/13	Kwinana	LNG	LNG was released from a road tanker.
8	03/09/13	Kalgoorlie	Ammonium nitrate prill	A vehicle carrying AN rolled over and spilled product.
9	09/10/13	Mount Magnet	Bitumen	The second trailer of a double road train rolled over, resulting in hot bitumen being spilled on the road.
10	15/10/13	Newman	Ammonium Nitrate Emulsion (ANE)	A spill occurred during transfer of product. About 2-3 tonnes of ANE was lost.
11	11/11/13	The Lakes	Various dangerous goods	Two trucks collided. A number of packages split and leaked.
12	06/12/13	Warmun	AN / ANE	A triple road train rolled over. There were no injuries and minor loss of product.
13	27/12/13	Port Hedland	Diesel	Diesel leaked during product transfer due to mechanical failure.

Major hazard facility reportable situations in 2013

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

There were 39 incidents reported in 2013, compared with 16 in 2012. All incidents were minor and there were no injuries.

Serial	Date	Location	Goods	Incident details
1	14/01/13	Karratha	Natural gas	Gas from a leaking gasket ignited, resulting in a jet fire. There was minor plant damage but no injuries.
2	22/01/13	Karratha	Chlorine	An incorrectly installed plug resulted in a release of chlorine at an unmanned water chlorination plant. Detectors automatically activated the scrubbing system.
3	24/01/13	Kwinana	Sodium hydroxide solution	A tank overflowed at a sewerage and waste water treatment plant.
4	24/01/13	Kwinana	Aqueous ammonia	An open drain valve passed ammonia solution into a bund.
5	25/01/13	Kwinana	Hydrogen sulphide	A minor release of gas due to failure to follow procedure.
6	25/01/13	Goldfields	Sulphur	A minor solids fire due to poor housekeeping near a heat source.
7	04/02/13	South West	Chlorine	Failure of a gas detector resulted in a small gas release to atmosphere.
8	15/02/13	Kwinana	Flammable gas	Maintenance activity ignited a small pocket of gas.
9	16/02/13	Kwinana	Hydrogen	Maintenance activity ignited a small pocket of gas.
10	23/02/13	Kwinana	N/A	An automotive electrical fault caused a minor engine fire on a road tanker prime mover waiting to load.
11	25/02/13	Kwinana	N/A	Safety critical equipment was not reinstated after testing.
12	28/02/13	Karratha	Flammable Gas	A gas line booster compressor's suction pipework was over pressurised.
13	11/03/13	Kemerton	Hydrogen	A fire occurred in a gas vent line.
14	16/04/13	Kwinana	Titanium tetrachloride	Chemical burns to wrist during preparation for maintenance.
15	26/04/13	Karratha	Methane	A hairline crack on a process vessel resulted in a gas release.
16	26/04/13	Kwinana	Diesel	A tank overflowed into a bund.

Serial	Date	Location	Goods	Incident details
17	05/05/13	Kwinana	Aluminium chloride	A bulk bag spillage occurred.
18	08/05/13	Kwinana	Sodium hydroxide	A leak from a small pipeline spilled into bund.
19	04/06/13	Kwinana	Alkylate	A loss of flammable liquid from a wash-water column leaked into a cooling water tower.
20	12/06/13	Karratha	Liquefied natural gas	A leak occurred in instrument tubing.
21	15/07/13	Kwinana	Hydrochloric acid	On start-up, an open line leaked into bund.
22	25/07/13	Kwinana	Chlorine	A release of gas from effluent stream affected several workers.
23	28/07/13	Kwinana	Chlorine	A leaking blower released gas to atmosphere.
24	28/07/13	Karratha	Liquefied natural gas	A minor release occurred from a leaking valve.
25	12/08/13	Karratha	Liquefied natural gas	A minor release occurred from a leaking valve.
26	20/08/13	Kwinana	Methane	A process upset released gas through a vent stack.
27	23/09/13	Kwinana	Hydrochloric acid	A tank overflowed into a bund.
28	07/10/13	Karratha	Ammonia	A process upset resulted in a gas release affecting several personnel.
29	16/10/13	Karratha	Ammonia	A gas release occurred from leaking valve.
30	23/10/13	Kwinana	Flammable liquid	A process upset resulted in droplets of ignited liquid falling to the ground, causing a grass fire.
31	24/10/13	Kwinana	Caustic	An operator sustained a chemical burn during maintenance activities.
32	01/11/13	Kalgoorlie	Sulphuric acid	A valve leaked, spilling contents into a bund.
33	12/11/13	Kwinana	Flammable liquid	A process upset resulted in droplets of ignited liquid falling to the ground, causing a grass fire.
34	05/11/13	Kwinana	Caustic	A drain valve was left open, resulting in a spillage into a stormwater drain.
35	22/11/13	Kwinana	Diesel	A pinhole leak in a transfer pipeline spilled liquid into the sea for several hours.
36	26/11/13	Kwinana	Chlorine	A process upset resulted in gas being released and activation of several site gas detectors and alarms. No personnel affected.
37	28/11/13	Kwinana	Diesel	Hot work on a tank ignited a combustible residue.
38	18/12/13	Kwinana	Flammable liquid	A process upset resulted in droplets of ignited liquid falling to ground, causing a grass fire.

Serial	Date	Location	Goods	Incident details
39	25/12/13	Kwinana	Liquefied natural gas	An inadvertent release of gas occurred from pressure relief valves on plant start-up.

Statistical analysis of incident data for 2004–2013

The following table summarises storage and handling and transport incident data for the ten-year period between 1 January 2004 and 31 December 2013. 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 142 storage and handling incidents over this period, 42 per cent are assessed as being caused by mechanical or design failure, and 52 per cent by human error. Unfortunately, in 2013, as well as some incidents resulting in minor injuries, there was a serious injury sustained. However, over the ten-year period, the incidence rate for serious injuries and fatalities has remained low.

Of the 141 transport incidents, 31 per cent are assessed as being caused by mechanical or design failure and 61 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 ten-year period, five people have been seriously injured and there were five 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 51 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 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 2004–2013

	Total number	Assessed cause			Loss of product	Serious injury	Fatality
		Material or design failure	Human error	Other causes			
Storage and handling (number of incidents)	142	59	73	9	107	8	2
		42%	52%	6%	75%	6%	1%
Transport (number of incidents)	141	44	86	11	95	5	5
		31%	61%	8%	67%	4%	4%