



Department of **Consumer
and Employment Protection**

Resources Safety Division



Overview of dangerous goods incident reports 2007

November 2008

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Overview of 2007 incident reports

This report covers dangerous goods incidents reported under the *Explosives and Dangerous Goods Act 1961* and *Dangerous Goods (Transport) Act 1998*.

It is the first summary report of dangerous goods incidents produced since 2000 and:

- compares the 2007 incident data with data for the period 1991 to 2007,
- provides some statistical analysis of incident data for 2001 to 2007, and
- provides descriptions of incidents that occurred in 2007.

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 incidents is greater than the number reported, so year-to-year variations should not be over-interpreted. This is particularly true for explosives incidents, which are mostly on mine sites and are therefore reported to the mines inspectorate, Resources Safety. For example, 109 explosives incidents were reported to the mines inspectorate from 2001 to 2005, while only six incidents were reported to the Chief Inspector Dangerous Goods, Resources Safety.

The MHF incident numbers increased markedly in the period 2005–07. This is attributed to greater awareness among operators about reporting obligations rather than a significant increase in the number of incidents.

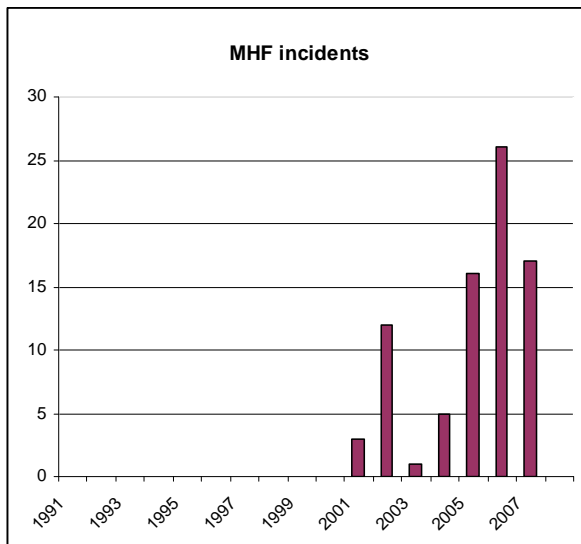
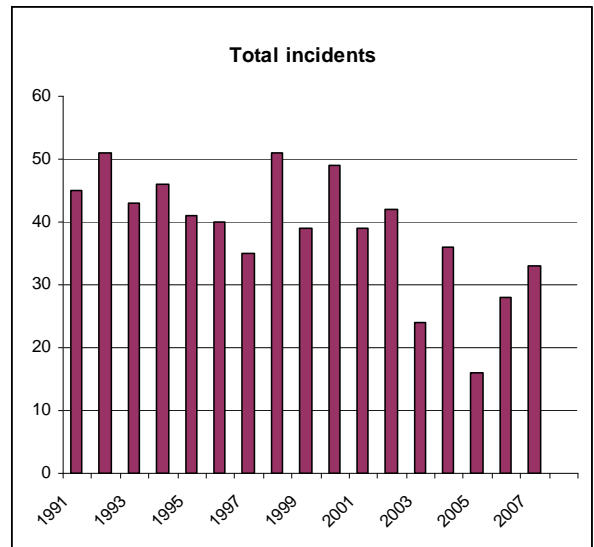
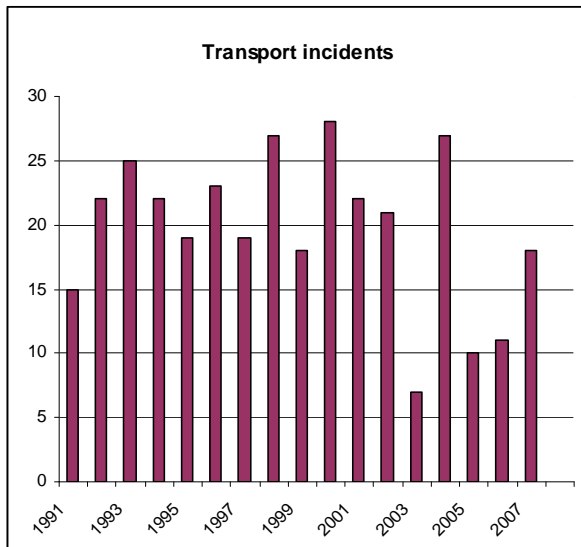
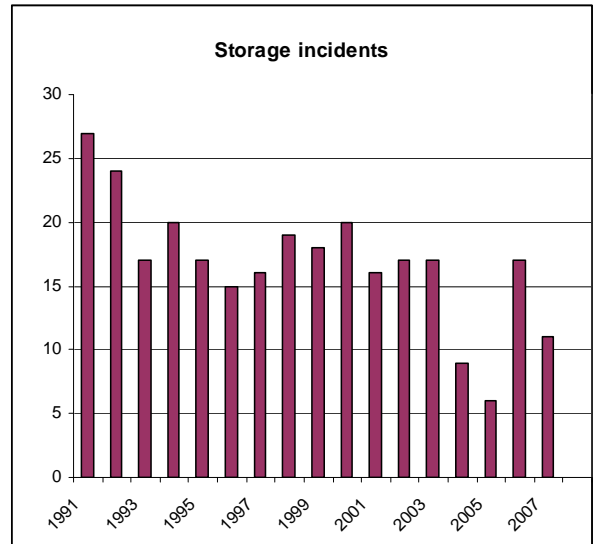
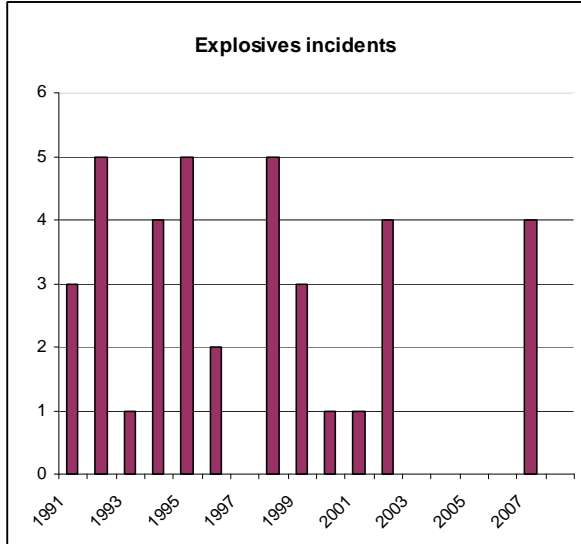
The *Dangerous Goods Safety Act 2004* and associated regulations came into force on 1 March 2008. The reporting obligations under this Act are expected to result in a significant increase in the number of reported incidents, particularly for dangerous goods storage sites. This report therefore represents the last of a series for incident data operating under the old legislative regime.

Malcolm P Russell

CHIEF DANGEROUS GOODS OFFICER

3 November 2008

Number of dangerous goods incidents for 1991-2007



Explosives incidents in 2007

There were four explosive incidents reported to Resources Safety in 2007 as listed below.

Date	Location	Goods	Incident details
26/01/07	SWAN RIVER	Explosives/ fireworks	During and after the Perth Skyworks 2007 fireworks display, small fires broke out on four of five barges. The fires were extinguished during the display but some re-ignited afterwards. The fireworks company's safety procedures and policies were followed. There were no injuries. The possible cause of the fire was strong and dry wind and hot conditions. Changes are proposed by the company for next year's fireworks display (e.g. fire fighting equipment, main control centre).
02/02/07	KALGOORLIE	Booster in explosives device	A remotely fired Quickdraw set-up exploded prematurely in the mortar. The mortar was blown to pieces, but nobody was hurt. The cause was a misaligned well for the impact fuse detonator, which forced the detonator hard up against the booster.
22/05/07	DAMPIER	Detonators, detonating cord and powermite	Flyrock from a blast smashed the rear window of a grader that was parked too close to the blast area (< 40 m). There was a breakdown in communication between the shotfirer and other operator in the area, and the shotfirer was not aware of the proximity of the grader.
12/09/07	DAMPIER PORT	Booster, detonator cord and HMX charges	An explosives magazine holding product arrived at Dampier Port after use in the North West Shelf and was off-loaded at the wharf onto a truck ready for transport. Port management found the magazine unlocked and the door ajar. An inventory check confirmed there were no explosives missing and the product was transferred to other storage. The investigation found that the magazine locking mechanism allowed shank or key removal without fully engaging the locking mechanism.

Dangerous goods storage incidents in 2007

The number of reported dangerous goods storage incidents in 2007 (11) was relatively low compared with the annual average for the last 20 years (17). This low number makes interpretation of the data difficult.

Four of the incidents appear to have resulted from human error, while five apparently resulted from mechanical failure, but there were no recurring themes in the accidents.

Fortunately, none of the storage incidents resulted in injury.

Date	Location	Goods	Incident details
19/01/07	DONNYBROOK	UN 1789 Hydrochloric acid UN 1791 Hypochlorite solution	Hydrochloric acid was inadvertently mixed with sodium hypochlorite in a dosing tank, resulting in the evolution of chlorine gas.
22/02/07	VARIOUS SERVICE STATION SITES	UN 1075 LP gas	A procedural error resulted in nine autogas tanks being supplied with unodourised butane.
11/04/07	WELSHPOOL	UN 1950 Aerosols	A fire occurred at a hardware warehouse. Thousands of aerosol cans exploded in the fire and were propelled hundreds of metres in various directions. FESA allowed the fire to burn out because of the danger of exploding aerosol cans, and sprayed water around the edges of the warehouse to prevent the fire from spreading to adjacent premises.
20/03/07	JOONDALUP	Diesel fuel, C1 combustible liquid	A recovery tank was overfilled by about 1 kL during pumping from diesel fuel recovery bores. Spillage was limited to within the bunded area surrounding the tank and an adjacent bitumised area.
21/05/07	PERTH	UN 1075 LP gas	Gas odour was detected following the delivery of domestic exchange LP gas cylinders at a service station. FESA attended and applied water to the cylinders. The cause of gas leak was unclear although a loose cylinder fitting was identified.
19/06/07	WATER TREATMENT SITE VIA COLLIE	UN 1778 Fluosilicic acid	Failure of a chemical dosing system led to a person being sprayed with up to a litre of fluorosilicic acid.
21/06/07	PERTH	UN 1075 LP gas	A gas leak was identified as coming from the turret of an underground tank at a service station. FESA attended and shut down the site, with the LP gas shutdown system being activated. It was identified that the hydrostatic relief valve in the vapour return line was leaking liquid. The valve was replaced.
02/11/07	EAST VICTORIA PARK	UN 1791 Hypochlorite solution	There was a major spill of hypochlorite at a swimming pool complex when a pipe gasket joint failed (incompatible gasket), releasing the contents of the tank into the bund. A seal around a pipeline through the bund wall also failed, releasing the hypochlorite solution into a plant room and onto the street.
13/11/07	FALCON (MANDURAH)	UN1203 Petrol	Testing of the underground fuel system at a petrol station detected two leaking fuel tanks. The estimated volume lost was 8,500 L. The tanks were emptied and taken out of service.

Date	Location	Goods	Incident details
23/11/07	AUSTRALIND (BUNBURY)	UN1824 Sodium hydroxide solution	An aluminium plate was placed in a caustic soda bath for cleaning. The metal plate reacted with the solution producing hydrogen gas, which self-ignited. Personnel were evacuated. FESA allowed the reaction to complete in a controlled manner before removing the plate from the solution.
28/11/07	ARMADALE	UN1075 LP gas	A pipe gasket joint failed, releasing LP gas into the atmosphere. FESA closed Albany Highway and evacuated nearby residents. The gas was turned off at the outlet valve from the tank. The pipe gasket joint was replaced.

Dangerous goods transport incidents in 2007

There were 18 reported dangerous goods transport incidents in 2007, which is close to the annual average for the last 20 years. Given the significant increase in the amount of dangerous goods being transported over this time, this is a relatively good result. Similarly the number of accidents involving dangerous goods vehicles is below the average for heavy goods vehicles generally.

Fourteen of the 18 incidents can be attributed largely to human error, and most of these incidents were traffic accidents that involved dangerous goods, rather than the dangerous goods causing the incident. Two incidents were caused by mechanical failure.

Unfortunately, four deaths and one serious injury resulted from these incidents.

Date	Location	Goods	Incident details
16/01/07	MUCHEA	UN 1263 Paint thinners, small quantity of corrosives	Packages of dangerous goods fell off a truck and burst, following the rollover of a double semi-trailer. FESA attended. The road was blocked for over 6 hrs.
24/01/07	30 KM SOUTH OF GERALDTON	UN 1270 Petroleum fuel	A petrol tanker failed to negotiate a bend, resulting in the rollover of the prime mover and semi-trailer tanker. Negligible fuel lost, but the driver was killed.
31/01/07	MARRIOT RD, KEMERTON	UN 1824 Sodium hydroxide solution	During tanker loading, the driver spilled some solution into the coaming box at the top of the tanker. As the driver was leaving the site, about 15 L spilled out through the run-down tube and onto the driveway because the valve on the tube was left in the open position. Product was cleaned up and there was minimal disruption.
05/02/07	MALCOLM SIDING	UN 1005 Anhydrous ammonia	During the loading of a rail tanker, there was loss of ammonia from the loading arm caused by the high temperature (~50°C).
14/02/07	NORTH FREMANTLE	UN 1203 Flammable liquid	A petrol tanker failed to negotiate a left hand corner and rolled. Negligible fuel was lost. FESA attended. The roads were blocked for several hours while product was transferred to another tanker.
18/03/07	KEWDALE	UN 3018 Organophosphorus pesticide	There was a small leak of pesticide from a package at a rail terminal. FESA attended and cleaned up the spill.
20/03/07	MURDOCH	UN 1779 Formic acid	Acid spilled from a 200 L drum on a rigid vehicle onto the road. The spill was neutralised and the faulty drum placed into an overdrum. A very small amount of the spillage entered a nearby drain.
28/03/07	ALBANY	UN 1075 LP Gas	A vehicle carrying 12 kL of LP gas in cylinders failed to negotiate a bend, left the road and rolled. The driver was killed and a fire, which started in the cabin, destroyed the truck and the load.
01/04/07	BINDOON	UN 1942 Ammonium nitrate	A B-double-dog trailer combination moved to the left to avoid a car heading in opposite direction near the centre of the road. The rear trailer clipped the edge of the road, then rolled and the coupling and dolly rolled. The load of 35 tonne of ammonium nitrate spilled. Subsequently, a car hit the rolled trailer and a passenger was injured. FESA attended. The spill was cleaned up.

Date	Location	Goods	Incident details
20/04/07	80 KM NE PORT HEDLAND	UN 3375 Ammonium nitrate emulsion	A triple road train rolled over on a floodway. The second trailer and second dolly came to rest on their side. About 430 kg of product spilt from the hatch and vent pipe.
21/04/07	PORT HEDLAND	UN 2426 Ammonium nitrate solution	A triple road train moved to the left to avoid another truck heading in the opposite direction. The rear tanker clipped the edge of the road and rolled. The tanker ruptured and a few hundred litres of hot solution were spilled. The road train was carrying 3 x 35 kL of product. There were no injuries.
02/05/07	MT MAGNET	UN 1072 Oxygen UN 1001 Acetylene UN 1710 Trichloroethylene	A triple road train left the road with the second trailer overturning. Gas cylinders were in the third remained intact.
11/05/07	SAWYERS VALLEY	UN 1268 Petroleum distillates UN 1203 Gasoline	A dolly eye broke and the tanker trailer uncoupled. Product was transferred into another tanker.
24/07/07	MUCHEA	UN 1977 Nitrogen, refrigerated liquid	A car turned from North West Coastal Hwy onto Great Northern Highway and crashed into a double road train carrying 4 x 7,000 L ISO containers of liquid nitrogen. The rear trailer rolled onto its side and was dragged on the road for 100 m. The ISO containers on the rolled trailer were structurally damaged but did not leak. The two people in the car died.
10/08/07	BROOME	UN 1972 LNG	A LNG barrel was gouged by the vehicle's turntable during the connection of prime mover. There was no loss of product. Procedures for coupling this new type of turntable had not been developed fully in consultation.
28/08/07	10 KM EAST OF SOUTHERN CROSS	UN 1263 Paints UN 1044 FFE (Fire fighting equipment) UN 1760 Corrosive liquids NOS	A road train left road and the lead trailer rolled. Paint, resin and corrosive liquids leaked onto the road verge. Southern Cross Works Department organised soil removal.
19/09/07	BUSSELTON	Non DG diesel fuel	About 6,800 L of diesel fuel was spilled during unloading from a bulk tanker at a tank depot due to incorrect manifold valve settings. About 2,250 L was recovered from bund and the balance cleaned up.
22/10/07	WEST KALGOORLIE	UN 1791 Hypochlorite solution	On arrival of a train at West Kalgoorlie, it was noticed that hypochlorite solution was leaking from an ISO container onboard. The ISO container was taken from the train and moved into an isolation bund prior to removal of its contents. The train was cleaned to remove hypochlorite residue and the ISO container, after removal of all product, was transferred to Victoria for detailed examination.
18/11/07	15 KM SOUTH OF CATABY	UN 1267 Crude oil	A B-double combination travelling south between Dongara and Kwinana rolled over, causing the two tankers to rupture. Nearly all of the 80,000 L of product from both tankers spilled onto the road and adjacent land. The driver was seriously injured. While trying to avoid hitting the damaged truck and tankers, another truck heading in the opposite direction slid on crude oil on the road and hit a truck parked in an adjacent truck bay. The contaminated soil was cleaned up in consultation with the Department of Environment and Conservation.

Major hazard facility incident reports in 2007

A critical point about major hazard facility (MHF) incident reports is that they are a combination of reports of incidents that involve:

- injury or damage;
- incidents with no injuries or damage; and
- near misses.

The number of MHF incident reports in 2007 (17) was lower than the number in 2006 (26) but comparable to that in 2005 (16). It is suspected that there is considerable under-reporting of incidents from MHFs and therefore it is not possible to draw firm conclusions from the incident data except that very few incidents result in injury, and there were no serious injuries or fatalities at MHFs during the year.

Date	Location	Goods	Incident details
11/01/07	OIL REFINERY KWINANA	RCU blower trip	The main air blower on the residue cracking unit tripped unexpectedly, resulting in large emissions of catalysts from regenerator stack.
19/03/07	FERTILISER MANUFACTURER, KWINANA	UN 1005 Ammonia	Two operators received cold burns after being exposed to ammonia gas (< 1 m ³), emitted while disconnecting the ammonia loading arm from a rail ISO container.
05/04/07	FERTILISER MANUFACTURER, KWINANA	UN 1017 Chlorine gas	Chlorine gas was released from a hypo production facility.
16/04/07	FERTILISER MANUFACTURER, KWINANA	UN 1935 Sodium cyanide solution	A licensed wastewater tank overflowed into the bund after heavy rainfall.
03/06/07	FERTILISER MANUFACTURER, KWINANA	UN 2426 Ammonium nitrate solution	90% ammonium nitrate solution leaked from the bonnet of an AN recirculation heater/cooler into a 90% AN tank bund.
14/06/07	CHEMICAL MANUFACTURER, KWINANA	UN 1935 Sodium cyanide solution	During a solids plant shutdown, water entered a pipeline with cyanide residue to scrubber. The fan blew cyanide solution up the stack. The affected area was treated with bleach, ferrous sulphate and hot water to make it safe.
22/06/07	CHEMICAL MANUFACTURER, KWINANA	UN 1824 Caustic soda solution	While dilute caustic was being drained from an absorber during a shutdown, a person tripped and received a splash to the face.
06/06/07	FERTILISER MANUFACTURER, KWINANA	UN 1942 Ammonium nitrate prill	7.7 t of ammonium nitrate prill spilled from a truck entering the site to load ANSOL into an ISO container on the front trailer. The front tipper door opened, allowing the loss of AN prill onto the road. The container apparently had no seal on the front tipping door, which allowed the locking handle to open when the truck braked at the security gate. The driver was unaware of the problem and drove into the site, depositing AN on the roadway for about 50 metres before being noticed.
10/08/07	GAS PLANT, KARRATHA	UN 1972 LNG	A major process upset occurred at the plant after the loss of hot water system to the fractionation units, which resulted in the fractionation columns being filled with flammable liquids.

Date	Location	Goods	Incident details
14/08/07	CHEMICAL MANUFACTURER, KWINANA	UN 1935 Sodium cyanide	100 L of sodium cyanide solution drained to bund from a drain valve during shutdown for routine maintenance.
31/08/07	FERTILISER MANUFACTURER, KWINANA	UN 1005 Ammonia	Excessive heat in a pipe caused insulation to smoulder. No ammonia was released from the pipe.
29/09/07	OIL REFINERY, KWINANA	Petroleum products	A fire occurred on a vacuum distillation unit following the failure of a drain pipe for the pump casing. It is believed the fuel reached its auto-ignition temperature when it discharged from the pump casing. There were no injuries.
12/09/07	FERTILISER MANUFACTURER, KWINANA	UN 1942 Ammonium nitrate solution	The pH dropped below requirement in two AN solution tanks following maintenance shutdown. In one tank, the pH was low for 1.5 hours; in the other, for about 7 hours.
13/09/07	FERTILISER MANUFACTURER, KWINANA	UN 1991 Sodium hypochlorite solution	300 L of sodium hypochlorite solution overflowed its storage tank after the weekly top-up delivery.
29/09/07	OIL REFINERY, KWINANA	Hydrocarbons	A fire occurred in a vacuum distillation unit, and was extinguished in about nine minutes. A secondary release temporarily formed until the source was isolated. There was one minor injury.
21/10/07	FERTILISER MANUFACTURER, KWINANA	Synthesis gas (<50% hydrogen)	A nitrogen purge hose ruptured during pressuring up of the syngas loop.
22/10/07	FERTILISER MANUFACTURER, KWINANA	Synthesis gas (<50% hydrogen)	A small flame was noticed on the syngas loop. The area is covered by lagging, but the source of the leak (2-3 mm crack) was found using UT testing.

Statistical analysis of incident data for 2001-2007

The following table summarises storage and handling and transport incident data for the period 2001 to 2007. The data have been analysed to:

- identify the proportion of incidents nominally caused by mechanical failure or human error;
- determine whether there was loss of product involved; and
- determine whether there were any serious injuries or fatalities.

Of the 89 storage and handling incidents, 51 per cent were caused by mechanical or design failure and 42 per cent by human error. Fortunately, there was only one serious injury and no fatalities during the eight-year period.

Of the 116 transport incidents, 35 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 being due to human error on the assumption that driver inattention, excessive speed or both were the main cause, although it should be noted that in some cases another driver was at fault. Unfortunately, over the period, there were four incidents that involved serious injuries and three involving fatalities.

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

Further analysis of the transport data showed that 38 (33%) incidents involved double or triple road trains and these were mostly 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 that road trains do not speed, and drivers are well trained and provided with adequate rest breaks to maintain their alertness.

Storage and handling and transport incident data 2001-2007

	Total number	Material or design failure	Human error	Loss of product	Serious injury	Fatality
Storage and handling (number of incidents)	89	45	37	62	1	0
%		51	42	70	1	0
Transport (number of incidents)	116	41	68	86	4	3
%		35	59	74	3	3