

rate has fallen from 342.5 to its present level—an aggregate fall of 6.4 per cent or 1.6 per cent per annum (see Figure 2). This suggests that there has been a significant improvement in boating safety in Queensland over the past decade.

Vessels involved

In 2010, 1003 vessels were involved in reported marine incidents of which approximately 49 per cent were recreational, 39 per cent commercial and 12 per cent were commercial hire and drive vessels. While the number and proportion of recreational and commercial vessels involved in incidents

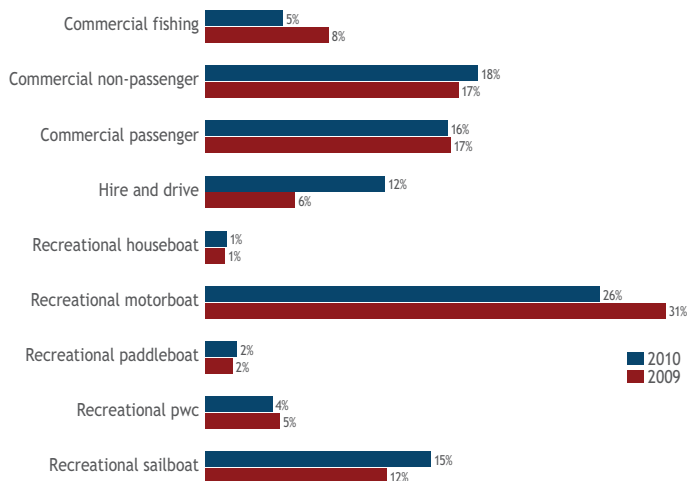
incidents (26%) followed by commercial non-passenger vessels (17%), commercial passenger vessels (16%) and recreational sailing vessels (14%) (see Figure 3).

The largest increase in the proportion of vessels involved in reported incidents was among hire and drive vessels (5.7%) and recreational sailing vessels (2.5%) while the largest falls were among recreational motorboats (5.3%) and commercial fishing vessels (3.3%).

Fatal marine incidents

In 2010, 14 marine incidents each resulted in a single fatality. Eight of these incidents were reported as

Figure 3 Vessels involved in incidents, 2010 v. 2009



Source: Caseman, marine incident case management database, 2010

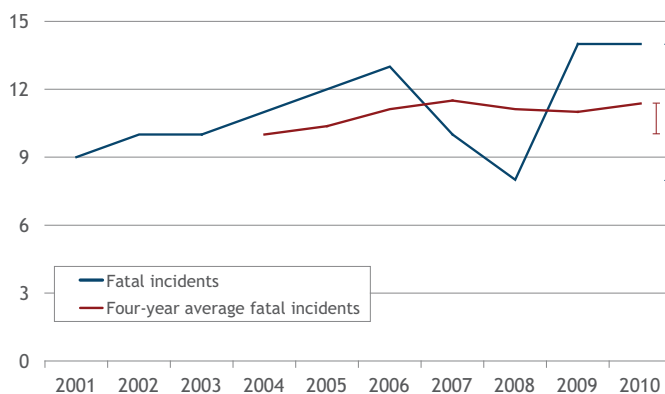
in 2010 fell marginally when compared with previous years, the number of hire and drive vessels involved doubled from 60 in 2009 to 118 in 2010. This increase was largely the result of a substantial number of hire and drive vessels being torn from their moorings during Tropical Cyclone Ului on 21 March 2010.

In line with previous years recreational motorboats had the highest level of involvement in reported

person overboard incidents, two as capsizing incidents, two involved collisions between ships, while swamping or flooding accounted for the remaining two incidents.

Eleven (78.5%) of the fatal incidents involved vessels being used for recreational activities, while the other three incidents (21.5%) involved vessels being used for commercial activities. There were no fatal incidents involving registered hire and drive vessels, even though

Figure 4 Fatal marine incidents—annual toll v. FYA*



Source: Caseman, marine incident case management database, 2010

* FYA represents the four-year average

they recorded a marked increase in involvement in marine incidents in 2010.

Fatal incident trends

The number of fatal marine incidents in 2010 remained unchanged at 14. Historically there has been a good deal of year-to-year variation in the number of fatal marine incidents and as a consequence, the number of people fatally injured in those incidents. Time-series analysis indicates that whatever factors combine to produce a higher or lower than normal number of fatal incidents in one year tends to balance out in the subsequent years. This can be seen in the four-year average which captures the long-run

trend in the number of fatal incidents, which has, in step with the trend in reported incidents been relatively flat since 2007 (see Figure 4).

Fatality rate

The annual marine incident fatality rate (per 100 000 registered vessels) fell from 8.4 in 2009 to 5.8 fatalities in 2010. This improvement in the annual fatality rate is due to the absence of any multiple fatality marine incidents during the year. While in 2009 and 2010 the same number of fatal marine incidents was recorded, five of the 2009 incidents involved multiple fatalities. The 2010 fatality rate is below the four-year average fatality rate and is indicative of a

Figure 5 Fatalities per 100 000 registered vessels



Sources: CASEMAN, marine incident case management database; TRAILS, recreational registration and licensing database; CIRMS, commercial vessel registration database.

* Fatalities per 100 000 registered vessels

small, but continuing long-run decline in the annual fatality rate (see Figure 5).

Serious injuries

The number of marine incident-related serious injuries, defined here as those that required admission to hospital, fell slightly from 29 in 2009 to 28 in 2010. While this fall is not statistically significant, the number of reported serious injuries is below the four-year average. Among the 28 individuals who were seriously injured, 11 were injured in the course of commercial boating activities while the other 17 people were seriously injured while participating in recreational boating activities.

Incident characteristics

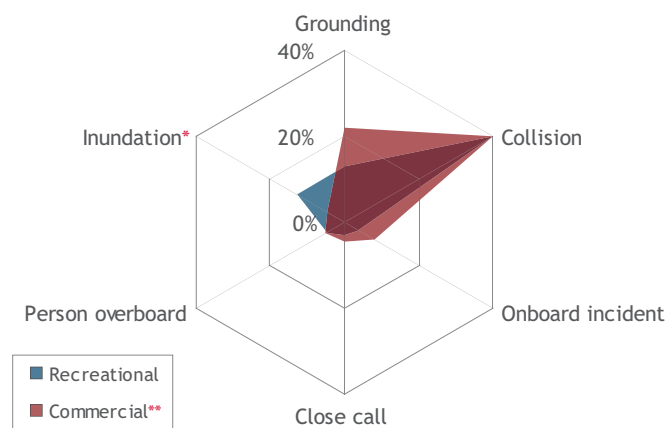
In line with previous years, the vast majority of 2010 marine incidents took place in favourable boating conditions: 76 per cent took place with fair or good visibility, 53 per cent in clear weather and 54 per cent on smooth waters. In fact all three of these favourable boating conditions were present in 27 per cent of reported incidents in 2010

and in 14 per cent of the fatal incidents.

These findings are corroborated by investigation of the contributing factors assigned to 2010's marine incidents. This analysis determined that environmental factors represented just 31 per cent of the identified contributing factors, compared with the 53 per cent of contributing factors identified as human factors—typically navigational or operational error, inattention or insufficient planning. Material factors represented only 16 per cent of all identified contributing factors.

The breakdown of incidents in 2010 by incident type was generally comparable to previous years. Again this year, collisions were the most commonly occurring type of incident (36%), then grounding incidents (19%), followed by inundation incidents which include swamping, flooding and capsizing incidents (16%), then onboard incidents (7%) and finally person overboard incidents (5%). The inundation incidents reported in 2010 predominantly

Figure 6 Marine incidents by type



Source: Caseman, marine incident case management database, 2010
 * Inundation incidents include swamping, flooding and capsizing incidents
 ** Commercial incidents include commercial hire and drive incidents

involved recreational vessels (see Figure 6).

It is worth noting here the significant difference in the incident type profile for fatal incidents when compared with the all incidents profile shown in Figure 6. Fifty-seven per cent of the fatal incidents in 2010 were person overboard incidents.

As highlighted in past years' reports, the consequences of person overboard, inundation and similar in-water incidents were again disproportionate

and severe in 2010.

There were 167 such in-water incidents during the year. While these represent only 24 per cent of all reported incidents, 12 people died (86 per cent of the year's fatalities) and 6 people were seriously injured (21 per cent of the serious injuries) in these in-water incidents. Put simply, in 2010, one in every 14 in-water incidents resulted in a fatality.

Fatalities analysis

In 2010, 14 people died in 14 separate marine incidents; six fewer fatalities than last year. This fall in the total number of fatalities was the result of the fortunate absence of any incidents in which multiple fatalities occurred.

The objective of this analysis is to shed light on the fatal marine incidents that occurred in 2010, discern patterns and determine what can be done to prevent similar incidents and injury in the future.

This analysis drew on a variety of sources of information. Queensland Police Service, Maritime Safety Queensland or both investigate fatal marine incidents that

occur in Queensland waters. The final reports from those investigations, along with original marine incident reports, Coronial reports, incident scene and vessel inspection reports, autopsy, toxicology and forensic reports, and witness statements where available, were examined.

Overview

In almost all the boating activities leading to a fatal marine incident there was no reason to consider there was anything adventurous or overtly risky about the activities. It is the sheer ordinariness of the circumstances surrounding these potentially avoidable tragedies which is most striking.

The vessels involved ranged from a large commercial barge, to commercial fishing trawlers through to a surf ski. Similarly, the activities in which those involved in a fatal incident were engaged at the time were unexceptional. These included fishing, personal transportation, participation in organized water sport events, vessel cleaning and even everyday recreational boating.

Neither operator licence status nor operator experience appears to have had any direct bearing on the occurrence of the 14 fatal marine incidents. With a single exception all of the masters of vessels involved held the appropriate marine licence, where one was required. Likewise the length of time these masters had held a marine licence,

which ranged from one to forty years, appears to have had little effect on the probability that their vessel would become involved in an incident which resulted in a fatality.

In 2010 eight of the fourteen people who perished were masters of the vessels concerned, three were passengers and three were members of the crew. As in previous years fishing was the most common boating activity to end in tragedy accounting for the loss of five (36%) lives. After fishing came four fatal incidents involving recreational boating. One of these incidents occurred while sailing, another while motoring, a third while paddling, while another vessel flooded and sank while at anchor. Three further incidents involved water sports—one occurred during an organized competition, another during the high-speed trialling of a vessel for competition and a third while training. The two remaining fatalities involved vessels being used as transportation—in one instance a passenger fell overboard while travelling and in another a crew member fell overboard while working on the deck of a stationary barge.

Contributing Factors

In the 14 fatal incidents, 21 people ended up **in the water**. 14 (67%) of these 21 people perished—one from every incident. Only two of those who perished were wearing a **personal flotation device** (PFD). These two individuals were engaged in adventuresome sporting activities for which the wearing of a PFD is requisite and the risks of death or injury are appreciated.

Another person was fatally injured while engaged in a sporting competition, the rules of which prohibit the wearing of a PFD. Three more individuals—fishermen—could reasonably have anticipated the need for and understood the merits of wearing a PFD, but died in the water without one—not surprising when culture and practice within the fishing industry implicitly if not explicitly discourages PFD use while fishing.

Of the remaining eight fatal marine incidents the circumstances and reason should have dictated the wearing of a PFD by the individuals concerned. Investigations reveal that a PFD was not worn in six of these eight incidents. Investigators have not yet been able to establish whether a PFD was worn in the remaining two fatal incidents, but it appears unlikely given the known incident circumstances.

While the exact cause of death is still to be determined in the majority of cases, the cause of death in three of the fatal incidents has been established as drowning. Two other people remain missing at sea and can be presumed to have drowned. It is known that lifejackets were not being worn in any of these five cases.

Alcohol consumption was not a contributory factor in either of the incidents where a PFD was worn. Nor was it a factor in the fatality that occurred during the competitive sporting event. Significantly alcohol consumption may have been a contributing factor in a number of the fatal incidents where a PFD was not worn or was not known to have been worn.

At the time of printing the majority of the fatal incidents which occurred during 2010 were still under investigation. Consequently, some specific details are yet to be established with certainty. In particular the absence of finalised toxicology reports leaves unanswered the question of just how many of those who perished may or may not have been intoxicated under the legal definition or affected by alcohol at the time of their deaths.

On the basis of the investigations that have been completed, it is known that at least four of the deceased were drinking immediately prior to either falling overboard, or in one case, being fatally injured in a collision between vessels.

Given the physiological and psychological effects of alcohol it seems likely that its consumption not only increases a person's chances of being involved in a marine incident and entering the water, but having done so, is also likely to reduce their capacity to rescue themselves or survive the effects of exposure to the elements.

Presently four (28%) of the 14 people who perished in 2010 are known to have consumed alcohol immediately prior to the incident in which they lost their lives. This level of alcohol involvement is a persistent theme in fatal marine incident analyses and suggests that alcohol consumption may in fact be a more significant risk factor when boating than when travelling in a motor vehicle.

The other main factors which contributed to the occurrence of fatal incidents in 2010 were overwhelmingly human in nature rather than material or environmental.

Environmental factors were identified as contributing to only two of the fourteen fatal incidents—one involving poor

visibility, the other involving a vessel being operated in hazardous waters. Material, mechanical or structural factors were also infrequent contributors to the fatal incidents in 2010. In one incident a vessel was swamped as a consequence of apparent over-loading while in another, a seemingly unseaworthy vessel flooded as a result of a structural failure of the hull. Leaving these aside it was human factors that were most frequently cited by investigators as having contributed to the occurrence of the most serious of marine incidents.

These **human factors** could be summarised as risk management-related and fall into three distinct groups—**trip planning, situational awareness and risk responsiveness**. Some of the more significant human contributing factors identified included inattention in the form of not keeping a proper lookout (particularly when operating a vessel in darkness), excessive speed for the prevailing conditions, and failure to appreciate and respond to changing weather and boating conditions. In short, poor judgements by masters in relation to vessel seaworthiness and onboard safety management were more likely to result in a fatal incident than simple misfortune or unforeseen or unavoidable accidents.

Lessons to be learned

While in two of the fatal incidents the people involved did just about everything they could have to protect themselves, in each of the other twelve incidents better trip planning, situational awareness and more appropriate responses to emerging circumstances would almost certainly have reduced the risk of the incident occurring or lessened the likelihood of a fatal outcome.

The lesson is obvious—no matter how benign the situation may appear to be, no matter how experienced a mariner you are, no matter where or when you are on the water, no matter the type of vessel you're on—**proper planning, preparation and operational vigilance** are essential.

Maritime region profile

Regional statistics

Of the 779 reported marine incidents in Queensland during the year, 31 per cent occurred in Brisbane region, 22 per cent in Mackay region, 14 per cent in both Gladstone and Gold Coast regions, 11 per cent in Cairns region and 8 per cent in Townsville region.

Looking at regional incident rates per 10 000 registered vessels, Brisbane, Gold Coast, Gladstone and Townsville regions reported incident rates from 25.6 to 26.8 incidents—all below the state incident rate of 32 reported marine incidents per 10 000 registered vessels (see Table 1).

Mackay region recorded 92.3 incidents per 10 000 registered vessels—significantly over-represented when compared with the state wide incident rate. Cairns region also reported a higher than average rate of 39.3 marine incidents. In all likelihood, these above average incident rates are a consequence of significant concentrations of tourism-related commercial boating activities in both of these regions in addition to the impact of tropical cyclone Ului in Mackay region in March 2010.

Type and location of incident

Brisbane region reported 237 marine incidents which included collisions between ships (16%), grounding incidents (15%), and inundation incidents (18%). The region also recorded 18 person overboard incidents (8%), nearly half of all reported person overboard incidents in Queensland. This region's seven fatalities were the result of five person overboard incidents, one capsized incident and a collision between ships.

The 112 incidents reported on the **Gold Coast** included collisions between ships (26%), grounding incidents (9%), inundation incidents (17%) and person overboard incidents (10%). One of the collision incidents resulted in a fatality. Three serious injuries resulted from person overboard incidents, while a further two people were seriously injured in onboard incidents and one as the result of an explosion.

In **Gladstone** region there were 114 reported marine incidents. The region's predominant incident types included collisions between ships (25%), grounding incidents (19%), and inundation incidents (18%). The region recorded two fatalities—one from a flooding incident and the other a swamping incident.

Mackay region reported 173 marine incidents. While only one of these incidents resulted in a fatality—a person overboard incident—five other people were seriously injured in incidents. The region's predominant incident types included collisions between ships (28%), other collisions (11%), grounding incidents (31%), and inundation incidents (8%).

Townsville region reported 59 marine incidents, one of which resulted in a fatality—a person overboard incident. Two other people were seriously injured in incidents. Nineteen (32%) of the region's reported incidents were inundation incidents, the largest proportion of this type of incident reported by any region.

Cairns region reported 84 marine incidents. Two people died as a result, one from a person overboard incident and one from a capsized incident. The region's predominant incident types included collisions between ships (27%), grounding incidents (18%), and inundation incidents (18%).

Table 1 Marine incidents by region

	Marine incidents	Incident rate *	Serious injury incidents	Fatal incidents
BN	237	26	6	7
CN	84	39	5	2
GL	114	26	2	2
GC	112	27	5	1
MK	173	92	5	1
TV	59	26	2	1
QLD	779	32	25	14

Sources: CASEMAN, marine incident case management database; TRAILS, recreational registration and licensing database; CIRMS, commercial vessel registration database

* Reported marine incidents per 10 000 registered vessels in the region

Vessels in incidents

In **Brisbane** region recreational motorboats were involved in 29 per cent of the region's reported marine incidents. Commercial non-passenger and commercial passenger vessels were involved in a further 18 and 16 per cent of incidents respectively. In contrast 57 per cent of serious injuries were sustained during the operation of PWC while another 29 per cent resulted from commercial fishing vessel incidents. Six of the seven fatal incidents reported involved recreational vessels—two motorboats, two row (paddle) boats, one sailing boat and one PWC. The remaining fatal incident involved a commercial barge.

Predominant among reported incidents in **Gold Coast** region were recreational motorboats (37%), commercial non-passenger vessels (23%) and PWC (13%). Motorboats and PWC accounted for 50 per cent and 33 per cent of reported serious injury incidents, while the single reported fatality involved a surf ski.

In **Gladstone** region recreational motorboats were involved in 35 per cent of marine incidents, recreational sailing boats in 25 per cent, while commercial passenger and non-passenger vessels were involved in 11 and 14 per cent of reported incidents respectively. The region's two recorded fatalities resulted from incidents involving recreational motorboats.

In **Mackay** region reported marine incidents predominantly involved hire and drive and recreational sail boats—accounting for 29 per cent and 14 per cent of reported incidents respectively. Forty per cent of the region's serious injury incidents involved hire and drive vessels while a further 20 per cent occurred during the operation of recreational motorboats. The region's only fatal incident in 2010 involved a commercial fishing vessel.

The bulk of **Townsville** region's reported incidents involved recreational motorboats (42%), recreational sailboats (17%) and commercial non-passenger vessels (17%). The region's only recorded fatality in 2010 occurred in a commercial fishing vessel incident.

In **Cairns** region approximately 70 per cent of incidents involved commercial vessels. In contrast, the two fatal incidents recorded involved recreational vessels—a motorboat and a kayak.

Marine incident barometer—2010



Notes

* % change represents the percentage difference between 2009 and 2010

** FYA represents the prior four-year average

*** 2010 data versus the prior four-year average, 2006 to 2009. For example, there were 486 recreational vessels involved in marine incidents in 2010 compared to the prior FYA of 470.8.



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