

The experts examine marine accidents from a number of angles and produce reams of statistics. This document collates some of this data so that safety can be very well managed with common sense, discipline, consistency and thoroughness.

Geez; we are supposed to be having fun so let's keep it that way.

- Take this data 'onboard'.
- Read and understand the Safety Manual and behave in a safe way.
- Think safety, observe, identify & act on dangerous situations.
Your safety, crew safety, boat safety, third party safety.
- Do practise / drills, test safety gear.
- Avoid collisions, bad weather, and very hazardous waters.

Most deaths by far are MOB. Flooding and swamping is next so **watch dinghy usage.**

Most injuries are collisions with a recreational vessel, **fixed objects also feature** frequently.

Wearing life jackets is a very important factor.

Biggest primary cause of death is alcohol, but **improper lookout, operator inattention, and lack of experience** cause most injuries.

Human factors far outweigh those of nature.



Table 1 • 2011 EXECUTIVE SUMMARY

TOP FIVE PRIMARY ACCIDENT TYPES				
Accident Rank	Accident Type	Number of Accidents	Number of Deaths	Number of Injuries
1	Collision with Recreational Vessel	1002	40	669
2	Flooding/Swamping	501	89	157
3	Collision with Fixed Object	460	58	382
4	Skier Mishap	436	14	456
5	Falls Overboard	359	205	157

TOP TEN KNOWN PRIMARY CONTRIBUTING FACTORS OF ACCIDENTS				
Accident Rank	Contributing Factor	Number of Accidents	Number of Deaths	Number of Injuries
1	Operator Inattention	583	58	363
2	Improper Lookout	514	31	391
3	Operator Inexperience	364	43	255
4	Excessive Speed	349	28	321
5	Machinery Failure	319	18	120
6	Alcohol Use	296	125	243
7	Hazardous Waters	258	88	122
8	Weather	235	54	114
9	Rules of the Road	214	6	186
10	Force of Wave/Wake	201	6	183

LIFE JACKET WEAR BY TOP FIVE KNOWN CAUSES OF DEATH					
Known Cause of Death Rank	Cause of Death	Number of Deaths	Life Jacket		
			Worn	Not Worn	Unknown if worn
1	Drowning	533	84	415	34
2	Trauma	116	34	61	21
3	Cardiac Arrest	34	12	19	3
4	Hypothermia	10	4	6	0
5	Carbon Monoxide Poisoning	4	0	2	2

Risks - Primary Accident Type

Type	Avoidance (-Flingtime)
Capsizing	Watch true and apparent wind, reef early, control speed, avoid bad weather, watch hull tilt and water levels bow and stern. Breaking waves are the most serious threat.
Gassing	Gas discipline. Detectors and solenoid fitted
Collision - Fixed object	Operator error. Use eyes and nav aids, RADAR, AIS (nav beacon), searchlight, radio
Collision - Submerged object	Be alert ..., radio
Collision - Other vessels	Operator error. Use eyes and nav aids, AIS, RADAR, horn, show correct nav lights, radio Follow the RULES (law)
Falls overboard, or ejected	MOB prevention, use safety gear life jackets, harnesses, jack lines, watch your crew mates. Piss overboard very carefully and tell a crewmate first. MOB response; Life Tag alarm, dan buoy, pole, throw ring, MOB on chart and plotter, AIS R10. Procedure drills
Falls in vessel	Identify hot spots, use arms when not looking directly, hand holds, head room, watch ropes, deck obstacles,
Fire, explosion	Prevent and respond. Know sources of risk and remedy.
Flooding, swamping	Know bilge pumping procedures
Person struck by vessel or prop	Safety awareness and operator vigilance.
Sudden medical condition	First aid, get help fast.
Grounding	Operator vigilance
Electrocution	Unlikely but watch 240v in port

	or the stand-alone generator if in-use.
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Second events in accidents are surprisingly high, even third events make the statistics.

Weather conditions: majority of accidents are in calm waters and light winds, good visibility, day time, 12:31 to 20:30 timeframe, peaking in the period 14:30 to 16:30

Vessel operation at time of accident:-

Highest to lowest frequency

Cruising, Changing direction, Drifting, Changing speed, Docked/Moored, at Anchor, Docking/Undocking

Accident Causes (sailboats only) (many low frequency items not shown) for year 2011 USA.

Cause	Frequency	
Weather	16	
Operator inattention	10	
Operator inexperience	7	
Improper lookout	6	
Improper anchoring	4	
Rules of the road broken	3	
Hazardous waters	3	
Unknown	2	
Overloading	1	
Sudden medical condition	1	
Missing or inadequate nav aids	1	
Restricted vision	1	
Alcohol use	1	
Equipment failure	1	

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Sunk Without a Trace - by Paul Gelder, is his second book ('Total Loss' was earlier) and recounts 30, mostly small, vessel losses, including a few multis.

In reading through the multihull incidents one can identify many detailed actions and good seamanship discipline and actions in order to be better prepared, either by avoiding the situations in the first place, or when facing such situations.

He identifies 7 deadly causes:-

1. Collision
2. Gear failure
3. Stress of Weather
4. Faulty Navigation
5. Fire
6. Crew failure
7. Exhaustion

'The tales provide gripping if sometimes unsettling reading and many valuable lessons.' - Cruising World

'Sure, you can learn from your own mistakes, but wouldn't you rather learn from theirs?' - Sailing

Review

'The moving, emotionally charged descriptions of shipwrecked sailors abandoning their yachts at sea will have you on the edge of your seat. But these accounts are more than just gripping tales of disaster - they carry valuable lessons, which the survivors have been able to pass on to all who go to sea for pleasure.' All at Sea (April 2010) 'inspirational tales of human survival' Yachting Monthly (2010) '...these are accounts of superb seamanship that prevented any loss of life...read this book.' The Little Ship Club (Winter 2010) 'offers up lots of experience for skippers to prepare for a long voyage at sea' Ontario Sailor Magazine (Aug/Sept 2010) 'While these accounts are not of the travails of working vessels, they are instructive nevertheless...The similarities between yachts and work boats make it worth reading this interesting little book.' Ausmarine (March 2011)

About the Author

Paul Gelder is editor of *Yachting Monthly* magazine, and is the author of several books, including *The Loneliest Race*, and has edited others, such as the bestselling *Total Loss*. He has sailed a wide variety of yachts, from ocean racers to family cruising yachts to the famous *Gypsy Moth IV*; he currently sails a Telstar trimaran.

(JM comments) Most serious incidents are in fact a cascade of events and each and every one could have been different ...if only....

The US studies attempt to dissect the cascade to some extent and there are lessons all the way along the line. The world is nowhere near perfect and there are practical limits to the time and money that can go into preparation.

There are literally thousands of decisions to be made from start of boat construction, on-going maintenance, improvements, passage planning, and during a passage, any one of which might make a large or small difference under specific circumstances.

However, the Skipper believes that applied safety consciousness and good seamanship are as important as a well founded vessel. Human factors*Boat*Weather that is the mix.

When faced with complex problems, and there are so many factors involved, safety-at-sea is a complex problem, a useful planning tool is *scenario analysis*.

Replaying someone else's scenario contributes a lot if one mentally swaps boats and crew (+overlays local geography) and thinks what actions or equipment might have avoided the situation or would improve prospects once the situation is reality.

Some scenarios; -Flingtime specific; *planned items**

Senario	Planning, avoidance, actions	Comments, factors	Equipment available
Collision	Maintain a good watch. Be alert, cover all bearings, have a mental watch for list, in case of doubt get second opinions, use all the tools at your disposal, watch yourself as well (fatigue). Confirm navigation from second source. Don't make then rely on assumptions. Identify and track threats.	Depends on accurate navigation. <u>See (& hear):</u> Eyes, binoculars, look around visual obstacles (jib, mast, other boats etc.), night vision maintenance; AIS, RADAR as aids, Radio warnings. Glasses, sunglasses... <u>Be seen (& heard):</u> Don't use Tricolour lights near urban areas. VHF Radio warnings broadcast if we become an obstacle, disabled. Fog horn.	Nav lights, Tricolour light, personal glasses/sunnies. binoculars with compass (night light), handbearing compass (night light), saloon night lights, powerful spotlight, AIS, RADAR, VHF radio, Fog horn, ***white flares, ***RADAR reflector Smartphone AIS info. marinetraffic.com
Gear failure -General (see specific failure mode scenarios)	Good maintenance. <u>Constant detailed checking</u> of every little thing that crew interact with for telltale signs of degradation, deformation, looseness, breakage or loss. Backup/redundancy or alternatives, jury rig potential, substitution possibilities. Minimum time to bypass or fix.	Standing rigging (replaced 4Q-2012) Running rigging (mostly replaced 4Q-2012) New mainsail, jib (4Q-2012) New LED lighting (2012) Motors serviced (1H-2012) Dinghy replaced (1Q-2012) Stop cocks replaced (1Q-2012) Torches to LED (4Q-2012) Anchor replaced (4Q-2012), anchor chain reversed, swivel removed. ***Bilge pump capacity massively increased (1Q-2013) Mainsheet system replaced (4Q-2012) Note e.g.: old mainsheet shackle pin very loose, fell out when system replaced	***service inflatable life jackets *** new inflatable jackets ***test jacket lights, whistles Comprehensive tool kit, spares, useful stuff for running repairs, jury rigging.
Senario	Planning, avoidance, actions	Comments, factors	Equipment available
Stress of weather	Be very aware of situation, including potential wind and current (tide) interaction, e.g. bar crossing. Avoid bad weather, screw fixed schedules, wait in a safe place for weather to change. Relocate anchorage if weather	When you first think of an adverse weather or wind situation might develop, pre-emptively act on that thought.	VHF radio, RADAR Barometers (2) (one in VHF radio), Smartphone for weather info., Seamanship - observation and deduction,

	threatens. Log basic weather data. Reduce sail area early. Deploy drogue early. Rig storm jib early.		Mainsail reefing gear, storm jib, hatches, bilge pumps, <u>motor</u> , Drogue with rode, anchors, warps
Faulty navigation	Maintain full manual backup for power failure scenario. Paper charts, compass etc. Log updated hourly. Cross check instruments, manually or with alternatives. e.g. RADAR confirms Chart Plotter, AIS confirms RADAR, AIS(nav point) confirms Plotter.	Check assumptions, particularly when fatigued or near port, second person check. Keep handheld (water resistant) Chart plotter charged and ready for use. ***update #3 GPS charts	Charts and plotting gear; Compasses (4); Chartplotter GPS, #2 GPS to VHF display, #3 handheld Chart plotter, #4 smartphone Chart plotter
Fire	Gas usage discipline, proper bottle storage, gas detectors, fire extinguishers (2), fire blanket, no smoking, good ventilation, petrol handling care.		Gas detectors in each hull, fire extinguishers (2), fire blanket Electrical fusing, isolation. Reverse portable bilge pump usage as fire hose. Buckets metal and cloth.
Crew failure	Skills development, training. Practice, hands-on. Cross checking by other crew	Crew mentoring, mutual support. Schedule practice time. Passage preparation ahead of time.	On-board reference material. Personal equipment
Exhaustion	Plan to avoid weather stress and exhausting situations. Short hops. Enough sleep, enough food and drink, comfort, clothing. Watch system is appropriate. Manage sea-sickness. Manage boat speed and motion. Avoid gear breakage. Run for cover when necessary. Maintain some reserve.	Careful resource scheduling, Watch system and situational adjustment, 'hot planning'. Skipper's leadership.	Sea-sick pills, crew supporting one another for recovery. Bedding, warmth, personal clothing and gear, emergency meals, hot drinks