RYA Research into Dinghy Entrapments

March 2005

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Introduction

Over recent years, public awareness regarding the risk of getting trapped has grown. In addition there have been a few well-publicised 'near misses' and one or two incidents involving foreign sailors. Whilst the statistical risk appeared to be very small, no clear records of this type of incident appeared to exist.

In response the RYA has logged incidents through the RYA website. Air gap tests have been carried out under a range of boats, and a range of techniques for rescuing a trapped sailor tested. As well as holding discussions with the major dinghy manufacturers, the RYA has looked for good ways to prevent or reduce the problem.

Summary of findings

There are no clear patterns in the cause of incidents, which occurred in a wide range of conditions and boats. Neither the experience of the sailors nor the equipment used suggest a single dominant factor in the incidents recorded.

The statistical risk to a dinghy sailor of becoming dangerously trapped is tiny, but sailors should be aware that these incidents can happen. Rescue can be difficult in the time available and staying calm contributes to the chance of escape.

Incident records

Incidents were logged over two seasons via the RYA website, following publicity to all affiliated clubs and centres: it is impossible to judge what proportion of those which took place were recorded, and how many were missed.

No historical data appears to exist, so it is difficult to tell if incidents of this type are more frequent in recent years.

Despite the low statistical risk, there is sufficient range of incidents to suggest it is worth making sailors aware of the problem. Of the incidents reported, only a small proportion required medical treatment, but over one third were serious i.e. potential threat to life.

The biggest risk results from complete inversion of the boat with the sailor tangled or stuck underneath. The probability of an incident seems unaffected very much by the conditions, since a number of incidents were recorded in light winds. The speed of inversion can increase the risk: some designs invert faster than others, but most will invert quickly if capsized to windward whilst sailing downwind.

While approximately a quarter of sailors recording a problem were in their first year of sailing, approx a quarter had sailed the class of boat less than 5 times. There was a similar figure for those who had sailed the class more than 3 years.

The incidents were spread fairly evenly across recreational sailing, racing and coaching/training. A very wide range of boats were involved.

The vast majority of recorded incidents occurred without a spinnaker.

Approximately one third of incidents involved ropes caught around the sailor.

Just over one third involved other fittings or equipment, and one third involved trapeze equipment.

There is no doubt that the ability to stay calm under water enabled a number of people to clear themselves.

Equipment Design

The bulk manufacturers of modern dinghies were involved in discussions and all contributed ideas. Design considerations leading to inversion are extremely complex, with a number of significant trade-offs to be taken into account.

Sealed masts do appear to have some effect in reducing the speed and likelihood of inversion. Some manufacturers have made masthead buoyancy available as an option.

Most modern designs have a raised cockpit floor to enable self-draining. An inverted boat of this type will therefore have a lower ‘ceiling’, and a smaller air void. In the case of sailors trapped in the cockpit, most self draining boats have no useful air void, though there may be an air void if the water is calm. In larger waves, neither traditional nor self-draining boats were found to have a useful air void. (It is worth noting that self draining boats are probably less prone to multiple capsizes, and therefore arguably safer.)

New trapeze equipment is becoming available but its reliability is untested: Several manufacturers have releasable hooks available and one system dispenses with the hook and ring entirely. It is essential that a trapped sailor can find the release mechanism instantly by feel.

Prevention

It is clear that untidy boats with unnecessarily long or tangled control lines increase the risk. Good housekeeping reduces the risk.

The best defence amongst sailors is probably widespread awareness of the issue.

Masthead flotation may be useful in training centres, or when learning to sail a new high performance boat. A great deal of time and energy can be saved if the boat will not invert, but will float on its side while the crew recover. 30 – 40 litres of air at the masthead appeared to prevent inversions in a range of boats and conditions during trials, with no evidence of masts breaking. The impact on sailing performance is minimal for basic training and coaching. Undoubtedly significantly less buoyancy would be effective in many boats, but a fast windward capsize can result in very rapid inversions. 20 litres was insufficient on many classes.

Sailors are therefore advised to:

- Keep control lines short and tidy and maintain elastic so it does its job
- Carry a very sharp, easily accessible, preferably serrated knife
- Practice good housekeeping

If RYA recognised Training Centres feel there is a significant risk due to the nature of the boats, the students, or the conditions on the day, they may use masthead flotation for certain tasks. It is not mandatory or normal practice on courses involving beginners. If it is employed on such courses, the instructor should remove the buoyancy and demonstrate inversion to the course members.

Ordinary good practice, such as competent group control and setting tasks appropriate to the group, make the sport as safe for learners as it has always been.

Rescuing a Trapped Sailor

If someone is actually under water there is very little time for rescue, with or without a safety boat. A wide range of approaches and boats were tried over several sessions in several locations.

The fastest reliable rescue technique which worked for all boats was found to be two heavy sailors aboard the inverted boat, pulling on the centre board. Nearly all boats could be righted consistently inside thirty-five seconds in a range of conditions.

This can also be achieved using a RIB tow or push, which immediately increases the risk to the trapped sailor (whereabouts usually unclear) from the propeller. A variety of new and established methods involving the powerboat were tested. A number of established techniques failed in some circumstances, and no technique was faster than the basic one using leverage from sailors to right the boat.

Instructors and safety boat crew have shown a tendency to dive under the boat to attempt to free the casualty. This may or may not involve a knife. This is a risky approach which has no guarantee of quick success. It would be better to right the boat as quickly as possible.

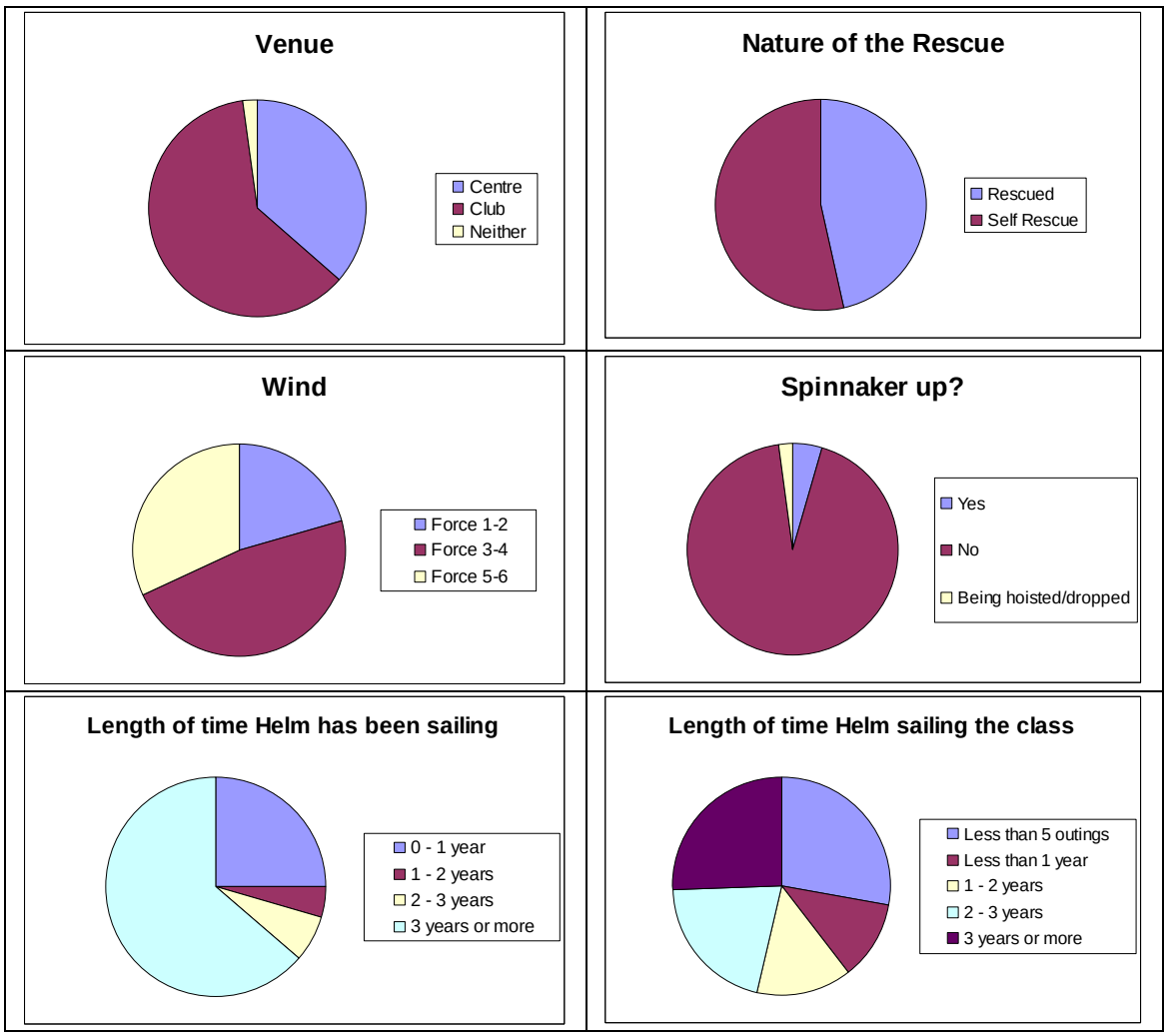
While an air gap can be created by picking up one end of a light boat (e.g. Feva, Topaz, Pico) it is important that the rescuer know which end to pick up, otherwise the casualty may be forced deeper. There is a significant risk of injury to the safety crew in attempting to raise one end of heavier boats, particularly from an unstable platform such as safety boat in waves. This is therefore not recommended.

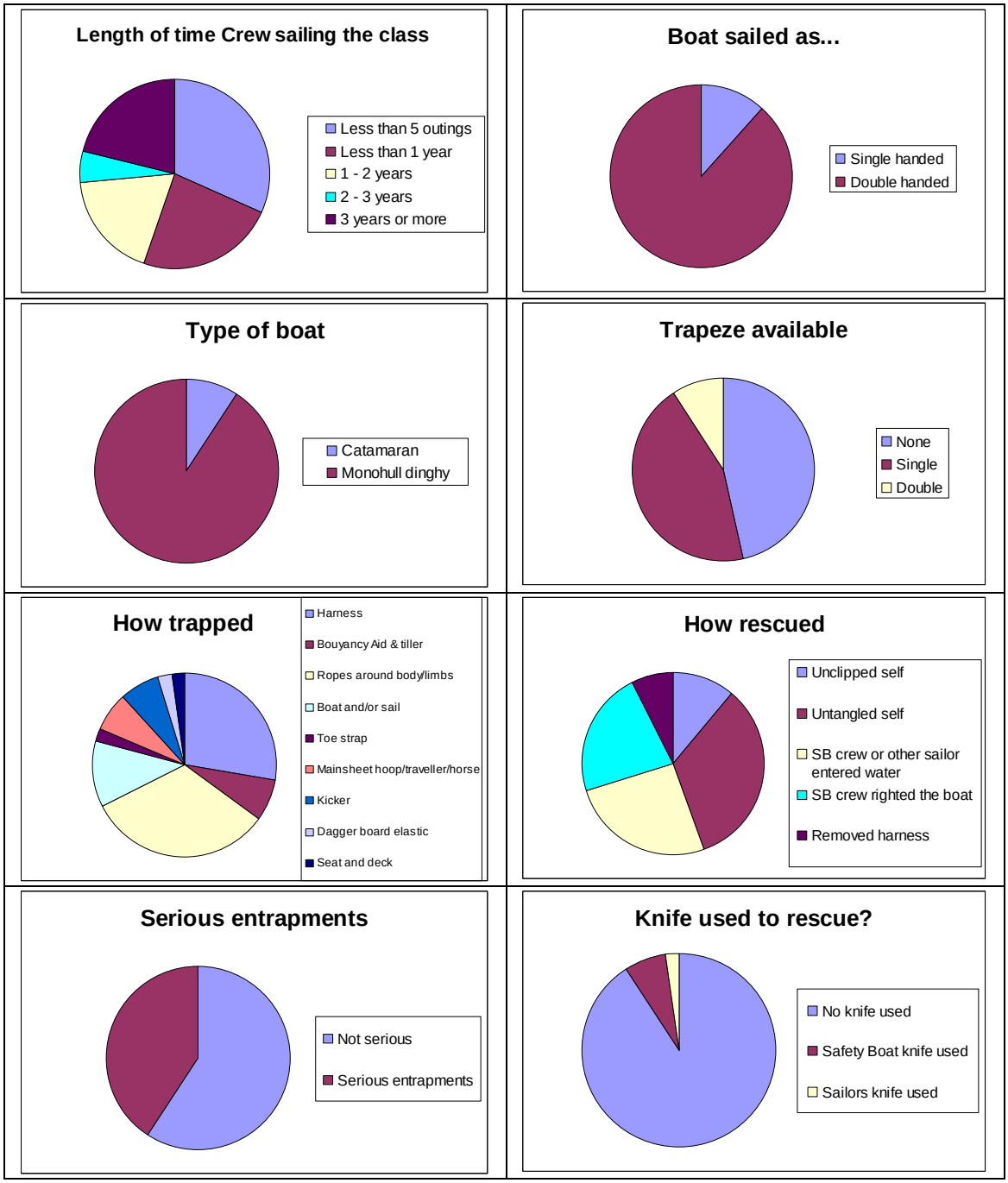
There have been cases of sailors entangled above water but under a boat, who were forced under water as the safety crew stepped onto the hull to right it.

A sharp, serrated knife was used in some rescues; this is now a requirement for safety boats in RYA recognised Training Centres.

Survey results

In total, 44 incidents were logged during 2003 and 2004. 18 of these could be regarded as very serious, with crew or helm being trapped under water for a period.





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