

Dalgety Bay Sailing Club Raft Stability Test.

Previous calculations have indicated that the safe working load (SWL) of the raft is limited by its stability. A cautious approach was therefore taken and the user guide recommends a limit of circa 1te SWL.

Test conditions

On 3rd November 2009, whilst the raft was moored in the harbour and under relatively calm conditions, with a slight swell, the following test was performed:

The 2 stern barrels were removed.

Two railway wheel moorings were winched up from the seabed with sufficient depth of water to ensure they were at all times clear of the bottom and hanging freely. The exact weight is difficult to ascertain but it is conservatively estimated that, including chain, the combined load was circa 1.5te. This is within the safe working limit of the winch (1.7te). This weight was lifted by a single person using the winch handle at its full extended length, but required significant effort and it is probable that the safe load of 1.7te is close to the limit a single person is capable of lifting.

At this point the tilt on the raft was such that the water was just lapping over the bows.

Further weight was added to the bows by filling four barrels with seawater. It is estimated that this increased the total bow loading to circa 2.5te. The tilt on the raft was now such that the water reached the handrail stanchion circa 1 metre from the bows. The raft was demonstrably still stable even when the 3 persons on board added their weight to the bows as shown in the following photograph.



Conclusions

There is ample warning of the load increasing toward the recommended safe limit due to the water level advancing from the bows. It is considered unlikely that anyone would continue to try and lift a weight greater than 2.5te with such obvious flooding of the bows.

It is concluded therefore that the raft is stable, with a suitable margin of safety, at the maximum safe working load of the winch (1.7te) even allowing for some swell. The raft should not be used in any case if there is a significant sea running as this risks unnecessary wear and tear on the structure.

Should multiple weights need to be lifted as described in the guidance, then lifting should cease before the water level at the bows reaches the second handrail stanchion. Further stability can be gained by filling the stern barrels which are secured at the aft end of the raft and thus counterbalance part of the raised load to reduce flooding at the bows. It is good practice to keep these barrels two thirds full at all times.

The club guidance should be amended accordingly.

JC Spruce.