

## SAFETY AND STABILITY ON HANSA SAILBOATS

A sailing dinghy has a centreboard to give it directional stability, while on a keelboat the centreboard can be fixed or locked down, with a lead ballast counterweight at the bottom which then acts to resist the force of wind in the sails, so also gives righting moment, which is resistance to capsize.

Because the removable board on a Hansa must always be locked fully down to provide the required stability, it is called a keel and not a centreboard, and the boat is a keelboat, and not a dinghy. These are very important distinctions which define the safety and security of any sailboat, considering the purpose for which it was designed.

The actual hull form also adds to stability, and if you took a flat bottom barge as having X stability, give that barge a V bottom and you would need to add some ballast to bring it back to the inherent stability of the flat bottom. Take that V to the extreme of a round bottom, like a bottle which is a longitudinal hemisphere, or a cone, well these shapes have zero inherent form stability and if used on a keelboat would need to get all their righting moment from the ballast on the end of their keel.

It then follows that if you give the hull a concave or hollow bottom you are actually creating a shape with increased inherent or form stability, which is tempered of course by the hull not being flat longitudinally but having rocker and a point on the front which gives it the shape to move forward through wind and waves.

All the little Hansa Keelboats are based on a concave hull form which gives them excellent form stability as a starting point. Then there is the keel which contains the ballast, it contains it so the keel is easily detached from the hull so for launching and retrieving the bottom is clear and without an obstruction under the hull like a bulb presents.

The function of the keel and its ballast works just like a seesaw, as the boat heels over the lead weight swings out and the further you heel the more effective is its righting force. However, on the other end of the seesaw is the mast and sails being pushed by the wind, but the further the boat heels the less sail is presented to the wind, so an equilibrium is reached, until in a very strong wind the boat is nearly on its side, the ballast is nearly horizontally out to windward where it is delivering the maximum righting moment, and the wind is spilling from the near horizontal sails.

So in theory a keelboat should not get knocked flat with the mast and sails in the water, it should have reached its equilibrium, but this seesaw safety equation can go awry if the sailor's weight comes into the equation, which can happen if sailors are strapped into seats. If the sailors are sitting high enough their weight can actually negate the ballast and the boat goes past its presumed equilibrium, it fails to self-right, and then the wind blowing on the vertical wall of the hull bottom can cause it to turn upside down.



This highlights the need to keep the sailor's weight as low as possible in the boat, which is one reason we do not encourage the modification of the sling seats used in the 2.3 and 303. We also don't advise sailors be strapped into seats in the 2.3 or 303 wide seat models. The Liberty, 2.3 and 303 single models have wide high side decks and big buoyancy chambers which do 2 things, they provide the buoyancy to support the boat and keep a sailor in the seat safe, and the buoyancy along the cockpit coaming moves the centre of buoyancy away from the keel, which adds to the lever and increases the effective righting moment provided by the ballast.

These are all important safety considerations backed by subtle design features which aggregate to produce sailboats which, despite their small size are intuitive and safe because they tend to sail themselves out of trouble, presuming 3 basic commonsense rules are followed. These are always wear a life jacket, ensure the keel is always fully down and secured to prevent it retracting in the event of a serious knockdown, and reef the sails to suit the conditions and the sailors ability.

In highly controlled programs where sailors are taken for a short sail by an experienced volunteer, in calm and protected waters, generally using 303 Wide Seaters, then these 3 rules will be standard procedure and ensure there are no accidents. The next level of adventure, which is highly recommended, is people with a disability are encouraged to sail on their own, and ultimately compete solo or as helm or crew on a 2 person sailboat, as it is here that unexpected things happen which lead to growth and excitement, but also means extra vigilance and adherence to the three golden rules.



Here are some perspectives we should all be aware of.

1. Life jackets must be worn, everyone knows that, but do not presume that they will always turn an unconscious or immobile sailor onto their back so their mouth and nose are above the water. It has been shown that many approved jackets don't work with many people, which says the possibility of a severely disabled sailor being tossed out of a knocked down sailboat must be reduced to the absolute minimum, and the sailor should be secured deep in their seat so their body weight won't shift and cause another problem, which is act to counter the righting moment of the hull and it's ballast.
2. The keel must be secured in its fully down position when sailing. Never should a strapped in sailor be left unattended or assisted to go sailing without the lock down pin in place. If the boat is launched down a ramp with the sailor aboard, the boat must be carefully managed and controlled until the keel is lowered and the lock down pin inserted. The Long Keel Pin is the standard lock down device on a 2.3, 303 and Liberty. To ensure the pin stays properly inserted there are procedures to follow. A shock cord stop is recommended as an added safety device. We have also produced a secondary lockdown strap which is now available from our website and will be with our distributors over the next few weeks. Refer to doco "Keel Lockdown Options" for a description of the keel lock down procedures and photos of the shock cord stop and the secondary lockdown strap.
3. The roller furling reefing system is a unique feature on all Hansa mini keelboats. Many boats reef, but none as efficiently and easily as a Hansa, so the system should be set up and maintained to work properly, and the sailor shown how to use it. If a sailor cannot reef themselves then the boat should be reefed for them, several turns for a novice sailor, unroll as they gain confidence. One turn is often enough as it flattens and therefore works to de-power the rig. Strapped in sailors obviously cannot reef themselves, but consult an experienced sailor before reefing their sails, and keep the boat under surveillance and reef more if requested or if it is obviously needed.