

Transition Dinghy

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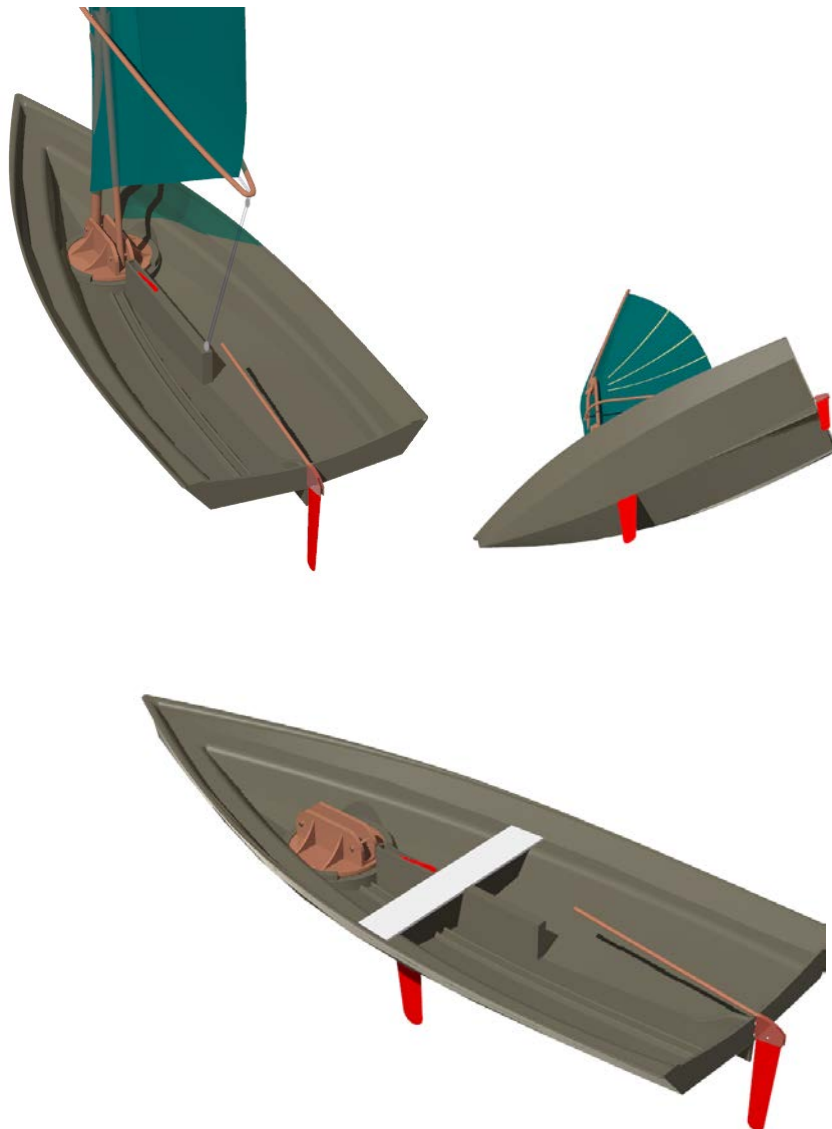
Introduction

This is a simple to use, easy to rig and easy to transport sailing dinghy. It is aimed principally at newcomers to sailing and recreational sailors who are looking for enjoyment and practicality. However, it can be upgraded to a higher-performance specification for sailors wishing to develop their skills. The most notable feature is a folding rig that can be quickly raised (or lowered) without the need to assemble or dismantle any components. A single strut is moved towards the mast foot to raise the rig and tension the sail. The movement of the lower end of this strut is guided by a reinforced channel moulded across the floor of the boat. The rig can be raised or lowered while standing next to the boat on land, or from within the boat when on the water. When the rig is fully extended, the strut locks into position in the mast base and the entire rig is then free to rotate, allowing it to take the correct position for sailing. Thus, rigging the mast and sail can be achieved in seconds rather than minutes, increasing the amount of time that can be spent actually sailing. With its unstayed and fully-rotating una rig, the dinghy will be simple to sail single-handedly, but at the same time sufficiently buoyant to carry additional crew with a combined weight of up to 160 Kg. The all-up weight of the empty craft (hull + rig) would be in the range 58 to 65 Kg, and the maximum all-up weight on the water (including crew) would be 225 Kg. The dinghy can be transported on a road trailer pulled by a vehicle in the conventional way, or on top of a vehicle if there are sufficient people to assist with safely lifting the craft and inverting it. As well as being made available as a ready-to-sail product, the structure of the Transition Dinghy is simple enough for it to be home-built from plans or kit.

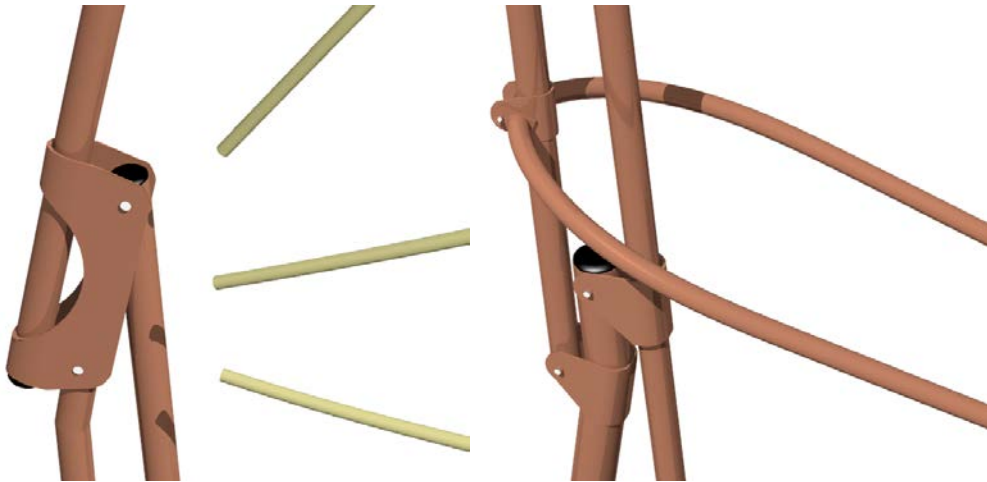


Construction

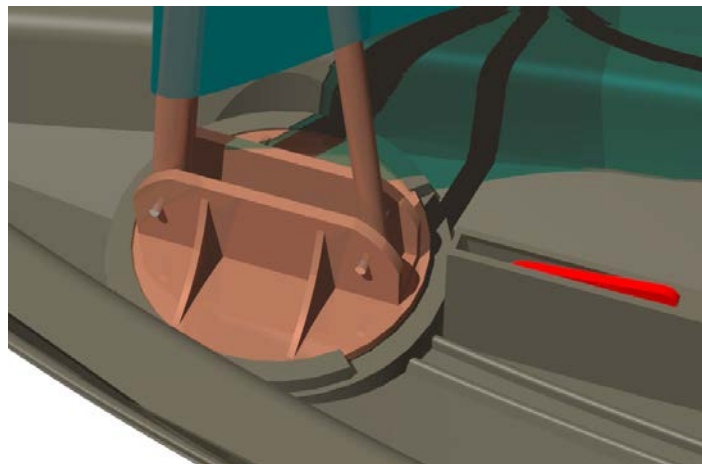
The hull has a simple hard chine shape reminiscent of the popular Mirror dinghy. The bow is tapered to a conventional stem while the aft of the dinghy has a more skiff-like shape, being somewhat wider and flatter than the Mirror. However, a reasonable degree of rocker is retained to give the dinghy tolerant handling qualities. The hull has a sandwich construction, with the outer surfaces made from epoxy resin reinforced with glass-fibre cloth, and an inner core of lightweight plastic foam. The thwart is removable, and is dropped into place when the dinghy is to be rowed. The finished hull weight will be in the range 50 to 55 Kg. The pivoting centreboard and lifting rudder are of foam/GRP construction like the hull. The centreboard is reinforced internally by stringers to ensure that it is strong enough to provide a righting lever for the crew to apply their weight to if the dinghy capsizes.



The mast is a jointed structure, and therefore more complex than a standard dinghy mast. However, it is constructed from simple materials that can be shaped with standard DIY tools, and as with the hull, this puts construction of the mast within reach of people who would prefer to make it for themselves rather than buy completed. The main struts are made from aluminium alloy tubing, and the joint components are cut from aluminium alloy sheet folded around the struts. The pivots for the joints can be made from standard stainless steel bolts. The two halves of the wishbone boom are also made from aluminium alloy tubing curved over a former. At the front end, they are pivoted on a rotating sleeve on the mast, and at the back end connected by a U-shaped alloy tube.



The rotating mast base is the most highly-stressed component of the rig, and has to be sturdily constructed. It can be fabricated from a plywood core reinforced with overlaid composites, or provided as an aluminium casting. It rests on the bearing surface provided on the floor of the hull, and rotates around a short centrally-placed pivot tube. The mast base is prevented from dislocating by a retaining ring attached to the hull.



The 6 sq m sail is unusual in two main ways: it is made from elastic materials, and it has a double skin. Elastic sailcloth is required because the sail must accommodate dimensional changes during raising and lowering – conventional sailcloth would tear during these operations. The double skin is required, particularly in the lower half of the sail, to allow the mast segments to move freely between folded and extended states. They do this by sliding between the two sail membranes.

Since recent research into sailcloth has focused on reducing stretch in order to achieve a stable sail shape under load, it may seem surprising that a stretch material is proposed here, and a few words of explanation are required. Over the last 15 years I have experimented with prototype variable geometry rigs that take inspiration from the wings of birds and bats. An initial Patent for the underlying concept was granted in 1992 (GB 2225760). A second Patent regarding the application of the idea to free-standing rigs and the control systems required was applied for in 2000 and published this year (GB 2368829). In 2000 I was awarded funding for one year by NESTA, the National Endowment for Science, Technology, and the Arts, to develop the concept and carry out market research. (The progress of this project is summarised on the Transition Rig website:

www.transitionrig.com) I believe that resilient rigs have qualities that are of interest to recreational sailors – they provide the convenience of a folding rig and they have a ‘softer’ feel in use and depower effectively during gusts. A half-scale test rig was made to confirm that the design proposed here works in the way required, and photographs are shown below.



Enhancing the performance

The efficient una rig envisioned for this dinghy will be simple to use and provide adequate sailing performance for beginners on all normal points of sailing. However, as their skill level improves, it will be possible to enhance the dinghy's performance by adding an asymmetric spinnaker and racks at the side of the boat. This could be achieved by the provision of upgrade kits, and would enable sailors to prepare for more advanced craft.

