Building the Richter Recker

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This long rocket is great value for money at only £25. The kit contains 5 body tubes, motor mounts, a couple of sheets of balsa for the fins and a turned balsa nose, plus the usual decals sheets and plastic parachutes. The instructions are comprehensive and easy to follow.

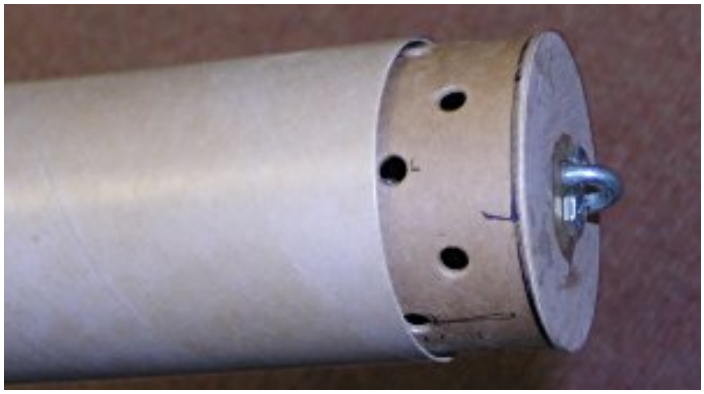
As always, construction started with putting the motor mounts together. The RR flies on a cluster of 3 D or E motors, but the kit as supplied includes D-sized retaining clips. These are too short to take an E motor, so the mount was modified. The motor tubes are grouped together inside a larger tube, leaving a small gap down the centre. A length of M3 stud was epoxied into this gap, and the motors are retained by a washer and nut, allowing both lengths to be accommodated. The instructions also specify crumpling some tissue and soaking it in PVA glue to block the gaps between the 3 tubes, to prevent ejection gases escaping. Instead, a piece of card was cut to blank off the top end of the motor mount assembly.

Modified shock-cord mount and cable

Because the rocket is so long, it separates completely for recovery, the 2 halves coming down on separate chutes. An upgrade kit was purchased with the kit, providing some Nomex re-usable wadding, 2 nylon parachutes, Kevlar harness and swivels. At £20, it cost almost as much as the rocket, but it's a good investment. However, I like piston eject systems, as they protect the parachute from motor gases and can be configured to give protection against zippers if the separation is early or late - separation at high speed snaps the tube round quickly, and this can drag the recovery harness through the side of the airframe tube, unzipping it. If the piston is arranged so that it doesn't completely leave the airframe tube, the tube is supported over a wide area, reducing the chance of it being damaged.

Finally, because there are 3 motors pushing hot ejection gases into the tube, it was decided to use stranded steel cable instead of Kevlar or nylon cord. The bottom end of the cable was fitted to an eyebolt epoxied into the top of the motor mount, using a short piece of aluminium tube crimped on and a Quicklink. The tube needs to crimped tightly, using a vice and plenty of grunt. A piston was made up from a short piece of cardboard tube, with a plywood crown epoxied on. The piston skirt was vented to allow the ejection gases to escape once the piston has done its job, and small U bolts were attached either side, for connection to the recovery harness.

Piston assembly - note vents in skirt



Maximum extent of piston travel

This arrangement causes a small problem - that of access to the lower section of the airframe for inspecting or repairing the cable. Since the motor mount is fitted inside the tube, and normally glued into place, another modification was made to allow removal. A shallow ring was glued inside to take the thrust loads, then the mount was installed with 3 plastic rivets. To service the steel cable, the rivets are removed, then the mount can be slid out of the aft end of the airframe. After disconnecting the Quicklink, the piston and cable can be withdrawn from the forward end. A piece of masking tape wrapped around the Quicklink (see picture) stops it getting tangled.

Removable nose and payload bay

Having completed the motor mounts, the next stage was to assemble the airframe tubes. Two of the 5 tubes were joined with couplers to form the aft airframe, and 3 for the forward section. The turned balsa nose was covered in carbon-fibre cloth,

epoxied on to give it some protection - not primarily from flight, but because the rocket will be used a lot for display purposes. A ply bulkhead was also added near the forward end, with a captive nut. Rather than glue the nose in place, a piece of M3 stud was added, allowing the nose to be unscrewed, which then provides an electronics bay. Finally, 3 holes were punched through the tube in this bay to allow the pressure to equalise.

Fins attached to airframe

The design uses 4 fins - 2 large and 2 smaller. However, the balsa supplied is big enough to cut 4 of the larger fins, so this was done. Once they were sanded and profiled, they were covered in glass-fibre, again for durability, and glued to the airframe with PVA glue. Once set, generous fillets of epoxy were applied either side. Finally, the joints between the tubes were grooved and filled with a mixture of PVA glue and micro-balloons, then sanded smooth.

The next stage is to apply a paint job, which is ongoing.

There's one more twist to this tale - since beginning the build of this rocket, a G-class Sky Ripper hybrid motor has been acquired. This is 29mm diameter and about 300mm long. Since the RR has a removable motor mount, an alternative mount is being made to take the Sky Ripper, giving the opportunity to make our first hybrid flights on this rocket.