The Twizzle Rig can be set up by one man on the foredeck and another crew in the cockpit tending the sheets. It took about fifteen minutes to rig at sea.

To Set the Twizzle (Twistle) Rig -

Unfurl the twizzle jibs a bit

Rig the downhaul block and strop at the bows and release the twizzle sheets and outhauls from their stowed position on the pulpit.

Attach the universal joint to the uphaul and downhaul and leave slack on the deck by the mast.

Unfurl the jibs a turn or two to make sure the jibs are the correct side and sheets/outhauls clear. Lead the sheets to the sheet winches.

pole end with outhaul tensioned and sheet lead aft

Take the first pole.
Clip outhaul into pole end fitting and run pole out to the clew. The bowline on the outhaul will prevent the pole going right to the clew but will be near enough. Make off outhaul to the cleat on the inboard end of the pole.

Clip pole to universal joint. Rest end on deck and lightly lash to mast. Depending on the length of the poles, the universal will usually be aft of the mast at this stage.

Repeat for the other jib and pole. Both poles are now fore and aft.

the universal joint and poles

Raise the universal joint and tension the downhaul till the universal joint is clear ahead of the mast and at a height above the level of the clews. To allow this to be done, the furling line may need to be eased again to allow the jibs to unfurl some more.

Loosely make off the universal joint preventer.

Haul in on the jib sheets evenly while easing out the jib furling line. This is really a two man job. With both jibs spread, the twizzle rig is now set.

Trimming the twizzle rig

The poles should be sloping down and veed forward to the clews.

The jibs set well up to 60 degrees each side of a dead run. Just ease the windward sheet and harden the leeward sheet a foot or two as one would do with a spinnaker.

You will see how the surface of the sea is dappled by the downforce off the jibs. This indicates a good lifting force

to the bows.

It has been written that the twizzle rig stops **all** rolling. This is **not true**. What it does stop is the dreaded continuous 'death rolling' of a twin jib or main and jib goosewinged rig. The yacht **will** roll as it drops off a cross swell but the twizzle rig dampens it after three or four swings with the universal joint swinging across the deck spilling some wind from one jib and then the next. However, we did find that at exactly 4.8 knots on the log the rolls would continue far longer - up to 15 or so 'pendulums'. Many a happy hour was spent trimming the rig to prevent this but without success. It was as though the rig, hull, sea state and wind strength had reached a harmonic state and one of the 'ingredients' had to change to break out of it. At 5 knots the problem would cease.

As the wind freshens, the jib sheets can be eased and the jibs rolled up. No adjustment is required to the up/downhaul - the poles simply vee more. Reefing can continue from the cockpit till just a pair of 'ears' are showing, veed downwind like a dart which gives excellent directional stability.

Striking the twizzle rig

Basically the opposite of setting the rig.

Ease sheets and roll up the jibs from the cockpit till the poles are roughly fore and aft.

Go on deck and lower the universal joint to the deck. Lightly lash to the mast to stop the poles rolling about.

Release one pole from the universal, let off the outhaul and run the pole aft. Unclip the outhaul from the pole end and stow the pole. Sheet in a bit to stop the jib 'ear' flapping. Repeat for the other pole.

Ease sheets and fully roll up the twizzle jibs.

Go to the bows and clear away the downhaul. Coil up the sheets and outhauls and stow on the pulpit port and starboard.

Make fast the uphaul and stow the universal joint with the downhaul and preventer.

For Windward Work

If she has two jib furling gears then the fore or outer gear can carry the twizzle jibs and the inner gear the genoa.

If she has one furling gear, there is an alternative to changing sails on the foil on a frisky foredeck. The twizzle jibs can be sheeted as one. However, with a high cut twizzle jib, it is difficult to reach the furled clews to change sheets. On *Alma* I could just reach them when standing on the pulpit but that was rather hairy on a plunging deck. On a bigger craft it may be a bosun's chair job to reach the furled clews - no joke in 6m / 20 foot swells.

On *Alma*, the clews could just be reached so the twizzle sheets and outhauls were removed. A short rope strop with a block running on it was made fast to each clew. A pair of jib sheets were tied to the base of the block and run port and starboard. The block running on the strop equalised the tension on each clew. As the sails were not quite the same size, the clews were in different positions when sheeted in and this method gave a good enough set to sail 'full and bye' and certainly close winded enough to claw off a lee shore. We only used this in practice just to prove its value as *Alma* had a genoa and the twizzle jibs on their own dedicated furling gear foils.

On a larger craft, or where the clews are cut so high they cannot easily be reached, another method can be employed using the twizzle sheets and outhauls.
Make the twizzle jib sheets as long as a normal sheet. Bend on some extra line to make each outhaul as long as each sheet. Lead the sheet of the port jib though the sheet block to the port sheet winch as normal and pair with the 'outhaul/lazy sheet' of the starboard jib run also to the port side but not using a sheet block if none spare, and

vice versa.

On the wind on port tack, the port jib is sheeted hard in on the winch while the starboard jib lays over the port jib and is held in place by high wind pressure and some tension on the 'outhaul come sheet' but not needing the winch or a sheet block on a car for sail shape.

Going about, let off the 'outhaul' on the 'lazy' starboard jib first, then the port jib sheet as she goes past the wind. Haul in on the starboard jib sheet with the winch then smooth in the port jib, now the 'lazy jib', resting on the starboard jib and tensioned a bit by its 'outhaul come sheet' direct to a spare cleat.

The equipment required to set up a Twizzle Rig is very 'low tech' and readily available from chandlers or can be home made. The following list of items were used on *Alma* with comments on their design / selection criteria.

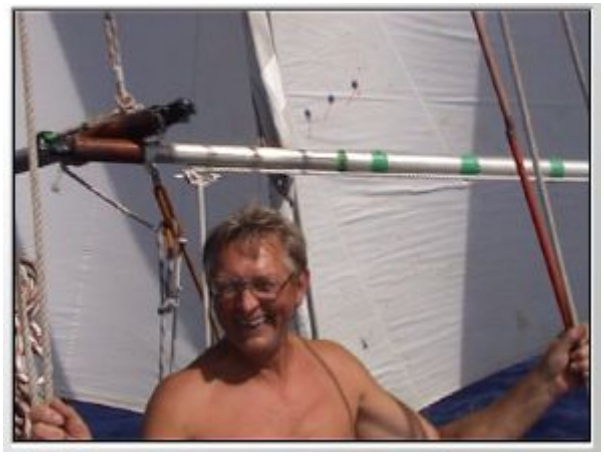
Twin Jibs

Alma's #1 jib was in good condition and rarely used and luckily, another second hand jib of almost identical size was bought from Seateach UK . A sailmaker sewed them together with a common luff tape.

'Bigger the better' but size is limited by the length of poles that can be easily stowed and handled.

The clews need to be cut fairly high to avoid them catching the seas on a roll and for forward visibility.

the twin poles



The length of each pole should be 80% (as on *Alma*) to 100% of the length of the mitre of each jib. Being too long is better than being too short but stowage is often a limiting factor. Stow on side decks or up shrouds.
The diameter of the end tubes were selected to fit the Harken pole end fittings. The middle section of the pole was a snug fit over the outer pole sections and pop riveted together. The poles were not anodised or painted and still fine 4 years later. The green insulating tape was to cover the pop rivets and stop snagging. The thickness of the tubes is quite heavy, about 3mm, like ally scaffolding.
The inboard ends of the poles were leathered to prevent chafe.

A nylon cleat is fitted near the inboard end to make off the clew outhaul. Not very heavy loads on the poles.

the best universal joint (version 2.0)

Made from 12mm Marlowbraid (polyester braid on braid). Not huge loads involved but essential that the pole ends can flex angularly and axially.
A simple knotting of clove and half hitches. The soft eyes sewn up then finished with a plain seizing.
The rope is blackened where it rubbed on the uncoated ally poles and oiled leather for 24 days.
The green insulating tape was added from new, in case there was chafe from the pole end fittings, but in the event it was not needed. Good for many more ocean crossings. Easy to stow and replace.

The shackle attaches the up-haul while the down-haul is bent on with a bowline.

Orange downhaul over the winch and hatch. Outhaul falls and preventer hanging down.

running rigging (on 40' ketch)

uphaul - 12mm diameter. Used the existing spinnaker pole uphaul shackled to the top eye of the universal joint. Long enough for the universal joint to lay on the deck.

downhaul - 14mm dia.(ex. sheet used but could be approx 12mm dia.) From the bottom eye of the universal joint, forward to a block on a strop near the bows, then back to a cleat on the mast. Strop allows the fall to lead aft clear above the anchor winch, fore hatch and other deck gear.

outhauls - 10mm dia. From the jib clew cringle, through the pole end fitting, and along the pole to a cleat fastened to the inboard end of the pole. Not big loads.

sheets - 16mm dia. From the jib clew cringle, aft to the jib sheet car, to the sheet winch. Big loads here - the biggest size that the sheet block/self tailer will take.

preventer - spare 10+mm dia. Hung loose from the universal joint to the base of the mast. Prevents the universal from popping forward with the poles veed aft instead of forward. Leave plenty of slack for the universal to swing port and starboard in normal operation. We also used a very long tail from the bowline of the downhaul as a preventer. Not big forces involved.

the twizzle universal joint v1.0

The original stainless steel universal joint the skipper had made up in the Canaries was based on an old magazine article - the rope work was added later.

Originally the poles clipped onto the bolts but it was quickly realised that this resisted torsional loads which ended up bending the pole end fittings.

The rope 'soft eyes' were quickly added and overcame that problem

the twizzle universal joint v1.1

As the joint rotated in the vertical axis and the pole ends crossed over, which is the natural way, the bolt ends chafed the poles badly and wore a hole right through the aluminium.

The green insulating tape was added to resist chafe of the rope but in use, there was little rope chafe after several thousand miles.

close-up of the final rope universal joint v2.0

Even when the stainless universal joint v1.1 was inverted so clearing the ends of the bolts, the heads of the bolts still savaged the leather after a few hundred miles as seen on the left of this shot.

This picture also shows the angle that the jaws of the end fitting take up naturally when allowed to rotate. The original universal bolts of v1.0 forced the pole ends into an unnatural alignment and the fittings protested.

pole end before leathering

Here the poles are doing their second essential job of supporting the awning in harbour. Life in the tropics is a lot easier with a good awning and side screens.

The chafe mark from the stainless universal joint v1.1 can be seen near the end fitting. The original poles were found to be too short but another, longer, end section was slid inside the centre section and pop riveted home. A simple job.

The poles are stowed on the side decks with the fore end fitting clipped to the base of a stanchion. Width and curvature of the side decks govern the length of the poles.

- **forward visibility**

The tack of the twizzle jibs was initially made off to the furling drum with a short lanyard.

As there was plenty of room left at the head of the foil a strop was added below the tack which raised the twizzle jibs about 600mm / 2ft.

This made a marked improvement in forward visibility with no bad side effects. Even with this height of clew, severe rolls dipped the clew into the seas. The ability of the pole to swing over prevented damage from the immersion.

The mizzen was set all the time and a mizzen staysail used in broad reach winds below about 20 knots and during daylight hours.