

Cold Moulding and the Construction Rules

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Summary. Peter Wilson, who wrote the 1977 cold-moulded rule, reviews the background to the Dragon construction rules and argues for opening up the permitted building methods, noting that only five builders had supplied the British fleet since 1970 against 59 in all. He compares conventional planking, strip planking and cold moulding, and estimates that a cold-moulded Dragon takes about 1,200 hours but can be built about 20% more cheaply than a planked boat. He then proposes a three-skin hull of two 3 mm veneers over 14 mm strip plank (20 mm, about 12 kg per square metre), saving at least 200 hours and about £1,750 per boat.

Peter Wilson discusses construction methods and proposals for cold moulded hulls.

If we are going to consider changing the construction rules to ‘Anything goes’ then I believe that we should first of all look at the background to the present rules.

When the Dragon was designed there was, effectively, only one way of building a boat of this nature and the Rules were formulated around the designer’s original specification. As long as this method of building remained the norm with only minor variations such as glued seams and the use of hardwood planking the only substantive rule changes have concerned rig and measurement, mainly in respect of the fore end of the keel. Construction rules for double diagonal planking were included for a number of years although I have never found a Dragon thus built.

In the late sixties it became apparent that conventionally built wooden boats were becoming prohibitively expensive and if the Class were to survive then it would have to turn to G.R.P. construction and to this end rules were formulated with the assistance of Lloyds and Borresen which produced a boat that is comparable to the wooden boat in weight distribution and stiffness.

In order to build a boat to comply with the G.R.P. construction rules it is necessary first of all to invest very heavily in the requisite tooling of plugs and moulds.

The number of builders willing and able to invest in this manner is plainly very few and whereas the total number of builders represented in the British Dragon Class is 59, believe it or not this is not a misprint, since 1970 only five different builders have been represented in the fleet.

When I formulated the rule for cold moulded boats in 1977 it was with the intention of making it possible to build a boat with a lower level of shipwright’s skill and less expensive materials. In so far as I built the boat as an amateur I do believe that I succeeded in my aim; it is however a very labour intensive method and therefore, unless one has low wage labour available for the more unskilled work, then it will be expensive.

If we wish to free the Class from the constrictions of too few builders and/or too high cost then I believe that we have to open the available construction methods. One would hope that the vested interests of the existing G.R.P. builders would not prevent this from being possible.

Cold Moulded Construction

Wood is a material that is strong in both tension and compression along the grain but across the grain although strong in compression it is relatively weak in tension and thus, when subjected to stress in this direction it will try and split.

In a conventionally planked boat the frames or ribs to which the planks are attached look after the stresses across the grain whilst the planking gives a large proportion of the longitudinal strength of the boat.

In strip plank construction very narrow planks are edge nailed and glued to each other. The edge nailing is usually done with barbed nails which are very resistant to being pulled out and they considerably strengthen the wood across the grain and make it possible to reduce the number of frames to half or even less of the usual number.

Cold moulded construction carried out with several layers of veneer laid diagonally to each other and glued together has equal strength in both directions when laid at 45 degrees to each other. This makes it possible to leave out the frames altogether although in practice one would usually put some in at major stress points. By varying the relative angles between the veneers it is possible to alter the relative strengths making it a very versatile form of construction. The other main advantages of cold moulding are the relatively low skill requirement for most of the work and the economy in the use of veneers as opposed to the long timber used in conventional building. The disadvantages are the necessity of a well built plug to build off and the large number of hours spent in pulling staples. It takes about 1200 hours to build a Dragon in this manner and taking into account the lower skill requirement and material costs I believe that a cold moulded boat can be built about 20% more cheaply than a planked boat.

If we wish to really get the best of all worlds I suggest that we look at the possibility of a three skin moulded boat. The thickest veneer that we can bend through the tight curves in the tuck by the keel is about 3 mm. We therefore have to think in terms of combining the virtues of strip planking and cold moulding. We have a further advantage with strip planking that it is not necessary to have a substantial plug but only normal moulds.

In order to achieve a similar skin weight to other forms of construction of 12 kg per sq. metre we would need to have a skin thickness of 20 mm made up with two 3 mm veneers and 14 mm of strip plank. The strip planks are laid up over the moulds which can incorporate any frames wanted in the hull. Unless these frames are at about 600 mm centres then about 25% of the skin thickness should

run diagonally. If non ferrous staples are used in the moulding process they could be left in. The hull would then of course have to be painted and not varnished. Assuming that all the staples are removed and the hull is varnished there would still be a time saving of at least 200 hours as compared to a Dragon built in accordance with the present rule and this, together with the savings in glue and staples, should reduce the cost of a boat by about £1,750 in this country and bring the cost of a wooden moulded boat much closer to that of a G.R.P. boat.

— *Peter Wilson*

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