



**In Deep**  
with  
**Brian Poole\***

# Cockpit Design For Trailable Monohull Craft

**A** recent event resulting in the untimely deaths of 6 persons (the *Malu Sara* accident in the Torres Straits - Ed) has drawn the boat building industry's attention to small craft design, and in particular, to cockpit design.

This article will attempt to explain good practice and compliance requirements as it affects cockpit design in what must be described as 'small craft'.

Right at the start it must be stated that there are fundamentals that **MUST** be understood and **ACCEPTED** by the builders. Many builders are skilled tradesmen and business managers, but untrained in the fundamentals of engineering, naval architecture and standard and regulatory compliance.

**The first fundamental** is that you must design to a standard right from the start. You can never satisfactory retro fit at a later date to comply with some mandatory requirement such as commercial survey, or Australian Builders Plate requirements.

**The second fundamental** is that standards and survey requirements are **minimum requirements**. Meeting the requirements of a standard should be no big deal.

As the 2007 Boat Show Season gets underway, "family boating safety" is fast becoming the keyword for an industry under pressure to build safer boats than it has ever produced before. In this special report, Brian explains, in layman's terms we can all understand, some of the safety fundamentals we all 'need to know' that will directly impact on the boat(s) you are contemplating purchasing . . .

Big powerful cats like this NoosaCat 2600 usually have block foam wrapped in plastic and placed in the hulls, or poured 'poly' foam - depending on the State and the Survey standard involved.



Certainly, it should be nothing to crow about in advertisements. "Hey fellas - we are the greatest because we actually build to, and no more than, the minimum standard!" Terrific, but when am I going to see an advertisement that says "We

build in excess of AS1799 and ABYC requirements"?

**The third fundamental** concept is that the craft should be designed to reduce, to the greatest possible extent, the risk of capsize. However the risk of capsize, particularly when offshore in adverse weather

conditions, is always a possibility. The boat should be designed to increase to the greatest possible extent, survival if capsized.

**The fourth fundamental** is that you cannot sink a cork. Watertight integrity, adequate freeboard, and internal flotation material,

are minimum requirements for small commercial craft, and for pleasure craft less than 6.0 metres. Watertight integrity in such a craft is not, by itself, adequate integrity, because of the risk of impact damage, structural failure, poor maintenance or defective design. This point has been proved time and time again yet is not always accepted.

**The fifth fundamental** is that the safety features designed into a craft should, to the greatest extent possible, be adequate for a

production run. You might say that this is all too much, but I challenge you to find any authoritative textbook on design that will not give these points as basic and fundamental concepts. When a major defect or disaster happens, it is often because of defective design.

A problem occurs when owners or Government departments request quotations with a technical statement of requirements that are nothing more than a wish list. The originators have little idea of correct

requirements. I explained to her that the builder who won the contract, just supplied what was asked for, so the fault was as much with the Department for specifying a lead balloon.

Her problem was that everyone in her Department was blaming the builder.

The cockpit is the work floor of the whole boat. The boat exists to provide a platform for the safe and efficient work activities, be they commercial or pleasure. The safety of a craft can never be

**A deck** is defined as the area of a boat that can be walked on.

**A self draining cockpit** is a cockpit that is watertight to the hull interior and drains overboard through scuppers or freeing ports

**A fully enclosed boat** is a boat capable of being closed up to become watertight.

**An open boat** is a boat not protected from the entry of water by means of a complete weather deck or a partial weather deck and a weather tight or watertight cabin.

**'Watertight'** is to provide effective protection against water seepage when closed and exposed to continual driving rain and waves.

Fundamental to all this is the term 'fully enclosed boat'. One of the problems with a smaller fully enclosed boat (as defined) is the height of the self draining cockpit deck and the resultant height of the persons standing in the cockpit and any free surface effect from a rogue swamping wave.

This means that a self draining deck is not the best design option on conventional craft under about 5.5 metres. The safest option is definitely a non-self draining cockpit floor with under floor and side flotation material and if possible, a centreline baffle.

This will eliminate 90% of free surface effect and the weight of the water in the bilge will lower the resultant CG of the boat. Water can be cleared by a high capacity gusher pump such as a manual Jabsco double acting bilge pump of 136 litres per minute, which will pump out the trapped water in a 6.0 metre boat in under 5 minutes

In a well-designed craft over six metres in length, with a weight-conscious owner, the cockpit height



whole of life expectancy of 20 years on a well maintained craft.

**The design concept and associated process must therefore cover fitness for purpose, owner or market specific requirements, regularity and standard compliance and a formal or informal risk analysis.**

Mandatory outcomes should be continually audited and reviewed, again either formally or informally, during the design, build and trial processes.

Good design is a continual series of small improvements and the review process will continue throughout the life of the

small craft design processes or of the possibility of achieving the required configuration in an acceptable and safe craft.

I once received a phone call from a senior staff member of a Government Department. She was very confused and was trying to get some sense about what had happened with a boat her Department had bought, which had proved to be unsatisfactory. The craft apparently was floating with its cockpit deck too close to the water line when fully loaded. It turned out that the boat's operator had included long distance tanks, lots of fresh water, powerful outboards, a large cabin, and a diving compressor and associated equipment in the

compromised to maximize cockpit area or by not complying with the minimum and well-documented standards. Design is all about melding all requirements into a complying outcome. **THIS CANNOT BE DONE IF THE REQUIREMENTS OF COMPLYING STANDARDS ARE NOT KNOWN TO THE DESIGNER OR BUILDER**

## Definitions

I shall refer to AS1799 Small Pleasure Boat Code. A cockpit is defined as an exposed recess in a weather deck, and the cockpit deck as the weather deck of the cockpit.