The Arrow 1500

Study Plans

Schionning
DESIGNS

Design Overview

Arrow 1500

SPECIFICATIONS	
LOA	14.95 Metres
BOA	8.00 Metres
DRAFT	0.500 Metres
DISPLACEMENT (Loaded)	8000 Kilograms
B/DECK CLEARANCE	800 Millimetres
PAYLOAD	2800
MAST HEIGHT	19.00 Metres
FUEL CAPACITY	350 Litres
WATER CAPACITY	500 Litres
HEADROOM	Full Standing
SAIL AREA (MAIN)	87 sqm
SAIL AREA (S/TACK JIB)	40 sqm
MOTORS	30-40hp Diesels (Shaft)

Introducing the Arrow 1500—the fourth and biggest design to join the new Arrow Series that have been causing a stir around the world. The modern angular 'stealth' styling, 100% flat panel construction and the convenience of a fully pre-cut kit all combine to create a very attractive package for anyone looking to get on the water in comfort and style. With 5 Arrow 1200 designs currently under construction, along with 2 Arrow 1360 designs—the Arrow 1500 is definitely joining the ranks of one of the most popular cruising ranges on the market.

The Arrow 1500 shares the slim hull lines and generous rocker of her siblings, giving her the speed when light but

good payload when crossing oceans fully-laden, capable of running down the trades at an effortless 250 miles a day, or more.

The new 1500 has excellent power to weigh ratios and yet a somewhat conservative rig height, this is because she is so easily driven making a very safe platform. Daggerboards give excellent windward performance, perfect balance downwind and fully retract for beaching and lying to a sea anchor in extreme conditions. Kick-up rudders are our preferred option for this design and are well worth the effort for beaching and areas with fish traps and floating debris.

The accommodation is plentiful aboard the new 1500, with four separate Queen size cabins with complete privacy, and access to their own head and shower. Split stairways lead down into the hulls, leading both forward and aft to each secluded cabin. Dual entry to both heads amidships allow guest access if entertaining without guests walking through a cabin, retaining maximum privacy. Private head and shower ensuites for the two forward cabins are spacious and feature a vanity. Wide stairs lead up to each berth with hanging lockers, shelving and storage areas positioned practically.

The galley is positioned on the bridgedeck, and is very spacious and usable with a dinette directly outside in the cockpit, simply pass food through the fully drop-down window as a serving hatch. There is abundant locker storage space, and has excellent position for your fridge, freezer and stove. The saloon features a large usable table with wrap around seating, and smaller stools can sit under on the opposite side. The nav station seat can also be used facing backwards to provide another seat for when you've got a crowd

Arrow 1200—South Africa

aboard. A pop-up flat screen in the opposite locker top makes the perfect cinema seating for movies or your favourite TV shows.

Outside is a large comfortable cockpit with plenty of seating plus the corner dinette. The port side offers enough space for a few deck chairs, steering can be one wheel on the bulkhead or preferably two wheels set outboard, one each side. These are set up at seat level giving an excellent view forward with either a seat or protective rail set behind the wheel for safety. The winches are in easy reach of the helm

Design Overview

Arrow 1500

making for easy single handing. All lines run aft with furlers and daggerboard lines along the side decks, the main sheet and traveller controls are double ended and used from either side. The main halyard and single-line reef 1 and 2 exit mid seat back and run to the winches either side. No need whatsoever to go forward for sail control.

The side decks are wide and flat with life lines going forward for safety, the forward decks are flat with the trampolines on the same level and a sheltered deck area forward of the mast. This makes a comfortable forward cockpit area with a few big cushions. The bulkhead at the mast has big opening hatches at full width offering plenty of fresh air into the saloon which is perfect for the tropics. To port are big deck lockers for the serious world traveller, watermaker, genset etc offering easy service access to essential equipment. There is more deck storage in the deck locker forward of the shower to port.

Black water tanks are set behind the daggerboard cases on each side with easy plumbing from the heads.
The composite forward beam and prodder control the forestay and screecher, the big tramps are ideal for lounging on and with a big mesh size safely dump any waves breaking over the bows. Fuel is set in a single vertical 350 litre tank just forward of the mast, the water tanks are set in the saloon seating and have a capacity of 500 litres split into two tanks of 300 and 200 litres each. Aft steps are large for easy stepping aboard or transferring shopping from the dinghy. The cockpit seat runs full width giving a far safer protected cockpit in rough conditions and the duckboard offers a safe secure rest for the dinghy at sea.

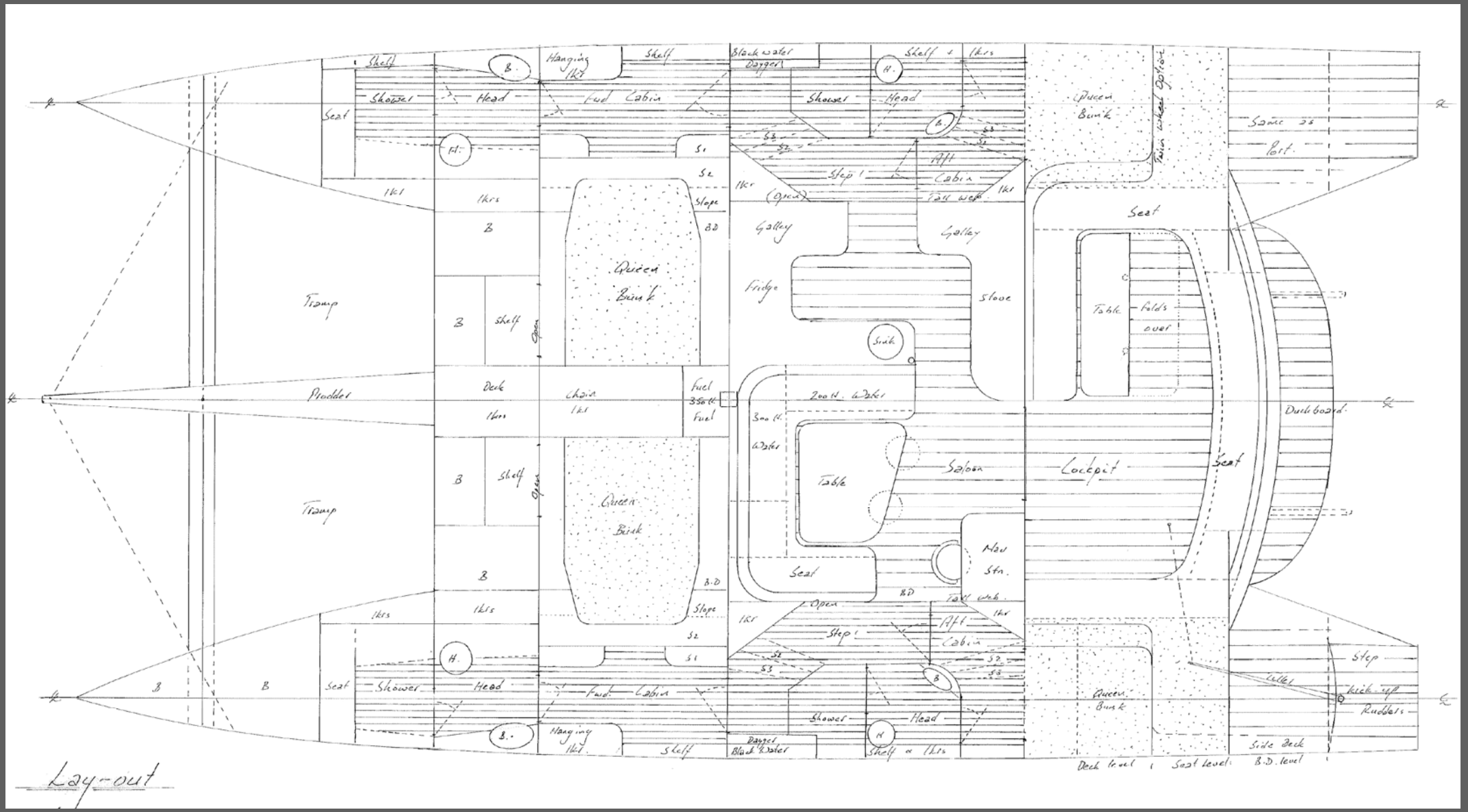
If you are looking for a cutting edge catamaran design with stunning looks to sail the world, this perfectly balanced stealth Arrow offers exciting performance if pushed or safe, ocean crossing ability. She is sure to put a smile on your face every day!

Fun and easy to build so just do it!

G-Force 1400 “Bulletproof”

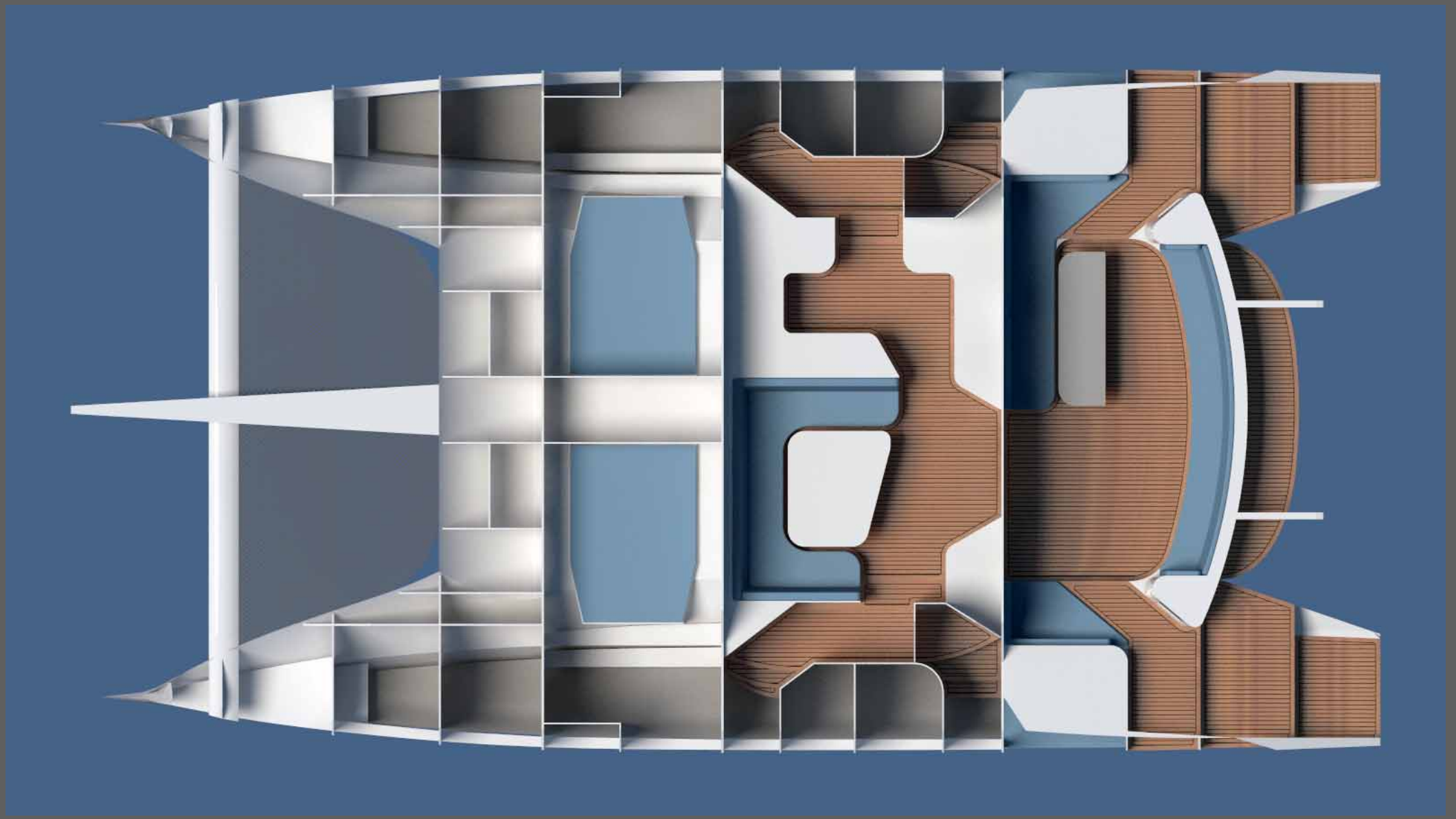
Internal Layout (Hand Drawn)

Arrow 1500



Internal Layout (CAD)

Arrow 1500



Arrow 1500

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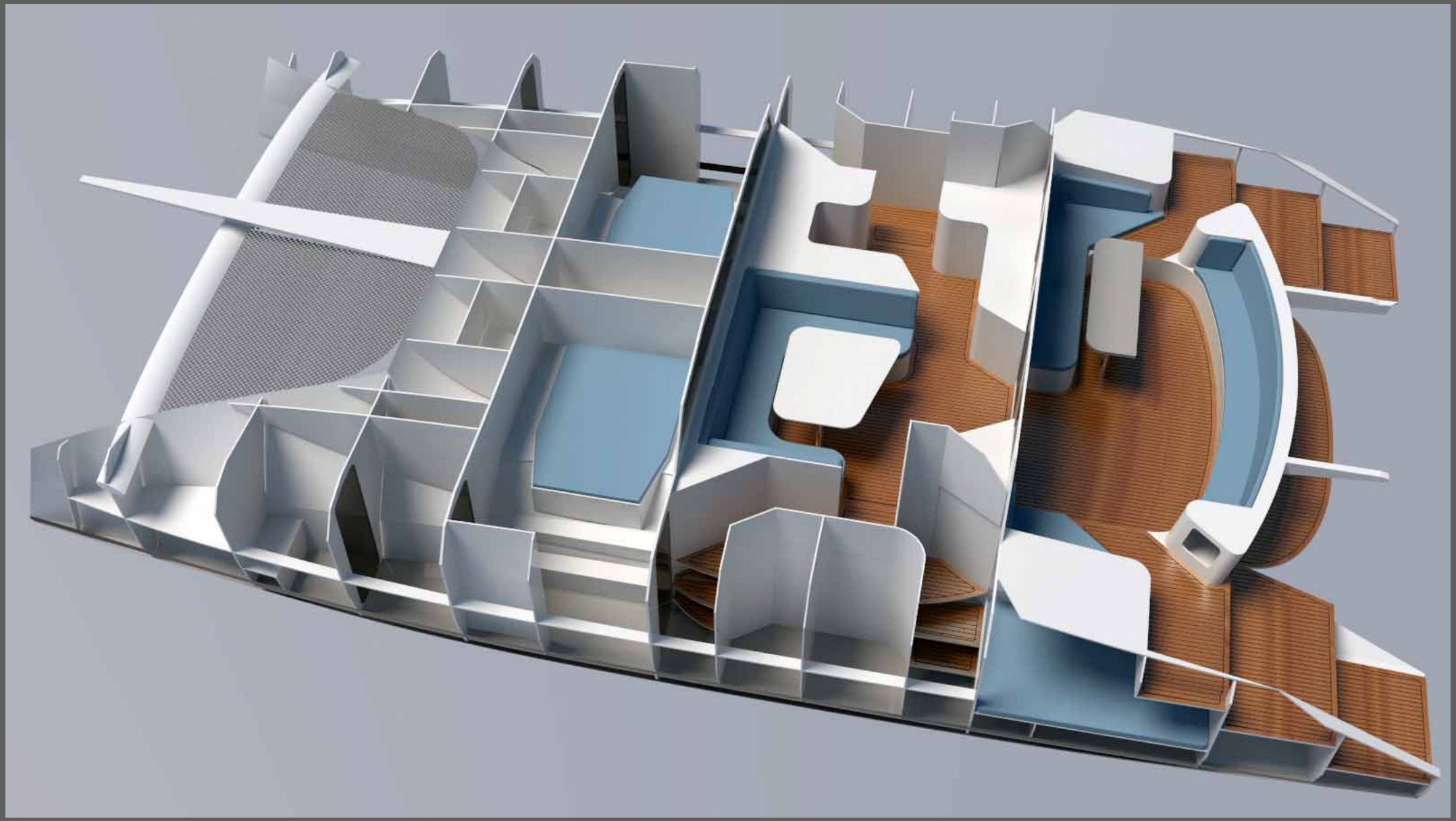
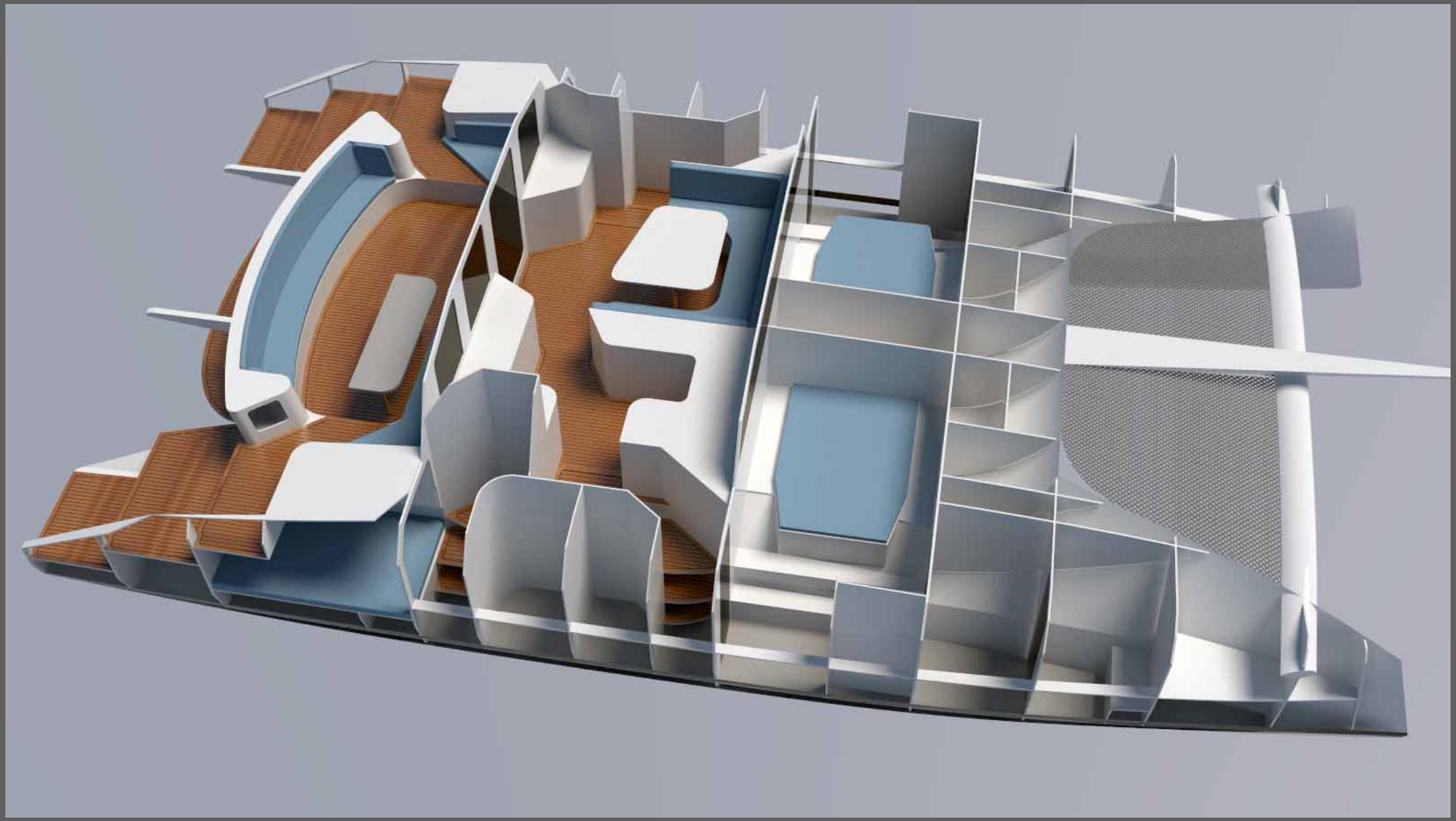




Material Overview

Arrow 1500

Schionning DESIGNS

Our designs are based on cored composite construction techniques using epoxy resin and knitted fabrics. But given the range of today's composite technologies, which solution works best for catamarans and why?

Resin Choices

We use West System, Gurit and other good quality epoxy resins for their high strength, adhesive values and higher (HDT) heat distortion values. It also fully protects the boat against water absorption and it can't develop the dreaded Osmosis. Having worked closely with the ATL Composites team and their products for many years, we recommend their materials and service highly.

Cloths

We recommend Colan brand Australian made cloths for their excellent quality being easy to work with and having low resin absorption but prices can be quite high. Be aware that cloths vary a lot in the way they are made, some cheaper cloths use more resin to wet out and make it hard work, and they can be difficult to layout around corners and curved areas. This may not seem important but when working with a material for an extended period of time, the small things make all the difference.

CORES - Which one to use?

The core choice is usually quite confusing. Cores have different capabilities and properties, and their benefits I feel are utilized fully in our catamaran designs. A quick look at their abilities:

Balsa end grain (150 kg/cubic metre) has exceptional qualities including very high compression strength, extremely good sheer capabilities and fantastic sheer stiffness. Compressive strength is the resistance to collapsing when pressure is applied perpendicular to the surface as when pushing directly onto the material with the point of your finger. Balsa is far stronger than Foam (80kg/cubic metre) in compression. Foam is stronger than honeycomb type cores, both the paper and the plastic.

Balsa is also far better than foam or honeycomb in sheer. This is when the core sample is held flat between your hands, one hand slid one way and the other slid the opposite way, when the core tears through the middle the core has failed in sheer. The amount of stretch you feel before the core shears is shear stiffness. To compensate for sheer weakness the core is made thicker. So 13mm Balsa may be equal in sheer to 19mm Foam.

Our hull skin thickness is quite thin, we therefore find the core works harder and it's stiffness is noticed in the finished structure (sheer stiffness). Generally a balsa or WRC shell is noticeably stiffer than a foam boat using equivalent laminates. Balsa has very good values and we can produce a shell using a very light laminate. It will be very stiff and very resilient to fatigue.

There are many boats sailing that are built from foam so even with its poorer values it works well as a core. Initially one would expect this cat shell to be lighter as it is ½ the weight of Balsa. We do have to compensate for its weaknesses by adding at least double the reinforcement on the outside to spread that compression load over more core and we need a tri-axial type of cloth weave to compensate for the veneer content that runs fore and aft on the Durakore. Secondly, we need to increase the Core thickness to compensate for the shear value, usually neutralizing the weight advantage. Thirdly, foam absorbs a lot more resin into the open surface cells than timber and so increases weight. Fourth, foam is an inert type material tending to follow the surface and not naturally stay fair, fairing usually uses more bog and again adds weight. Fifth, because of the inert characteristics, foam requires a much more complex mould for control during construction, this takes more time and is slightly more expensive.

Western Red Cedar has all the advantages of strip Durakore, but has a real weight penalty because of its higher core weight.

Paper Honeycomb Featherlight (50kg/cubic metre) is very efficient and lighter than other core choices. This can be used for external use but needs extreme care to prevent water penetration so we don't recommend this. Ideally it is used for internal furniture. Should water get into the core you lose 50% of its values. It can be suction dried and restored back to full strength, though this can be a long process. Paper Honeycomb has similar strength and sheer ability in the vein lines and about 80% across the veins compared to Foam.

Foam Core (60kg/cubic metre) Featherlight Panels We recommend this for our interiors. It is light, has no water absorption issues and when backfilling cut-outs doesn't absorb as much filler and resin as the Paper Honeycomb Featherlight. The foam Featherlight is slightly more expensive than the paper honeycomb Featherlight.

These are the reasons we prefer Durakore and Duflex Panels for our home built designs. The price in Australia of balsa panels is less than foam. For a technical engineering comparison and more information on the foam/balsa core choice, see a document in "Resources" on our web site or email us.

Kit Overview

Arrow 1500

The Arrow 1500 is built using a Pre-Cut Duflex Panel kit which can be supplied from Australia or Germany.

Duflex panels are 1200mm x 2400mm and come with scarf joins on the long edges. The panels are made with either foam or end grain balsa cores, and 1 x 600gm Biaxial cloth with epoxy resin on each. After removing the peel ply and resin sealer coating has been applied, you glue the scarfs together in the required order. When glued, you'll see the full size boat parts are cut but left in place in the panels held by tags which when cut release all the parts which are now ready for assembly.

The two hulls are built separately and upside down

over bulkheads which are set in place on a strongback. The strongback material is not supplied in the kit.

Once the hulls are joined and fully taped and any additional glassing underwater is done, the hull bottoms are faired and then turned. You then align and level the hulls before fitting the major cross bulkheads, bridgedeck and forward beam, voilá a catamaran! Well not quite but you're well on your way. After this furniture, cockpit and cabin continue the construction until the shell is complete. The cabin is also built with Duflex and is assembled separately over temporary frames which are supplied in the kit, then fitted on the boat.

Construction plans are detailed and we supply a building manual that although has been written around our original Wilderness design kits, it has all the information you need from basic how to use the materials, what tools you need to tips on fairing, fittings, doors, everything and with loads of photo's too. As well as this, we are available via email or skype/phone support if you get stuck with anything or want to be sure.

Shed size needs to be 2-3m wider than the boat, 4m longer and ideally, the height should be 2.5m plus the boat height.

For more information on construction and kits, see our web site www.schionningdesigns.com.au and look for "Our Kits" tab.

www.catbuildingblog.com is the site by Christian Loehr showing his Arrow 1200 construction in Germany.

"Our kit is coming along very well and I'm glad to say we have all the port side bulkheads up and 5 side panels are all dry fitted and will be glued in place in the next few days. The kit is fitting together very well".

D. Moore, Arrow 1200 (Malaysia)

Construction (Various Designs)

Arrow 1500

Arrow 1200 Kit Construction

Arrow 1500

Arrow 1200 Kit Construction

Arrow 1500

A Note From The Designer

The success of our designs I feel, stems from the practical common sense approach of a boat builder, coupled with many years of live aboard experience and over 100,000 nautical miles in some of the worst conditions in the world. This experience makes one aware of the power of the sea and the need for a boat to be able to survive these conditions, protect her crew physically and psychologically as well as being a fast comfortable vehicle for all the good times. I am sure you will find our designs reflect our sailing and live-aboard experience and will give you the offshore confidence to sail safely anywhere in the world. Multihulls are '*beautiful, safe, cruising boats'*. We hope you find them as exciting as we do.

WHAT MAKES A GOOD MULTIHULL?

Choosing a design can be difficult so we hope that this introduction helps clear the way a little.

Cat design is not just a matter of two hulls floating a cabin above the water. Only in fairly recent years have the basic elements of design and an understanding of their effect on the use and performance of the finished boat been properly understood.

The basic principles of good design should ALL be present in the boat you're considering building or buying. These will blend together to produce an excellent and safe multihull.

THE BASICS ELEMENTS OF A GOOD DESIGN:

Good Engineering Our boats are well proven. With over 400 Schionning cats on the water, and many performing under extreme stress whilst racing, we proudly claim we have never had a structural engineering failure of any sort in our designs. We work with some of the best Aerospace engineers in the composite industries to achieve this.

Flat Decks The flatter deck lines have a number of advantages. Secure footing while reefing, anchoring and in rough conditions. Life lines should be at a sensible protective height instead of set down a level. A flat deck is great for socializing, sunbathing or as a kids playground too.

Buoyancy Buoyancy distribution is the placement of buoyancy in the hulls. Our designs have between 50 and 60 separate sealed buoyancy tanks built into every shell so they are almost unsinkable. Most old designs hobbyhorse (rock fore and aft), this makes them uncomfortable and inefficient. Modern designs have the buoyancy pushed towards the hull ends damping down the hobby-horsing tendencies and giving a lot more safety downwind where the buoyant hulls stop nose-diving. Coupled with a lot of reserve buoyancy higher up in the forward hulls this adds an enormous amount of safety and gives you confidence when sailing off the wind.

A soft 'V'd entry, quickly picking up reserve buoyancy with lots of reserve higher up is an ideal combination.

Good Bridgedeck Clearance High Bridgedeck Clearance is essential. A short cabin length with long hull overhangs is a good safety feature. Good clearance on a cruising cat is 600mm – 800mm, a Performance cat 700mm – 900mm and a Racing cat 800mm – 1000mm. Chamfer panels add high reserve buoyancy and need less clearance than a similar cat without them. They also reduce wave slamming and add strength.

SAILING ABILITY AND PERFORMANCE

Power to weight ratios show how well a cat will sail in light conditions. As wind strength increases, one reefs the power to stay at safe acceptable speeds (this is different for different people).

The Bruce Number is a commonly used value and very useful in comparing cats, displacement is not always reliable and will vary with load. A Bruce Number = 1 is very slow, 1.3 – 1.4 is a good cruising value, 1.5 – 1.9 reflects a very fast cat. Boats like the French 60' Tri's and "Club Med" are running to extremes like 2.3.

A light and efficient cat can often sail out of trouble and outrun severe weather patterns, shorten passage times and avoid bad weather by getting there in the existing weather window. Most good designs will tack through 90 degrees at a speed of 8 – 10 knots while reaching at 10 - 13 knots comfortably with Main and No. 1 in 15 knots of wind.

Daggerboards are efficient and allow very shallow draft for beaching. With a strong reinforced bottom and with kick up rudders, it's easy to beach our cats. Should you want shallow keels to protect inboard motors, then a combination of shallow keels and fixed rudders are a good option, daggerboards would still be fitted as usual.

Low Drag is a good characteristic. Slim hulls reduce drag and are efficient. A good cruising cat would have a Waterline beam to length ratio of 11.5 to 12.5:1. A performance cruising cat 12.5 to 14:1 and a racing cat 14 to 20:1.

It is important to note that *ALL* these elements must be present in a design to make any of them valid. For example, a design can be really good looking, have high bridge-deck clearance,

A Note From The Designer

a powerful rig and sail plan and be built reasonably light and show a fair displacement, but then have an 8:1 Beam to Length ratio. She'll be a good looking, powerful boat but it will be impossible to go forward, except slowly!

There is no reason why a good modern design does not have all of these features. If you find some of these lacking it is usually for the wrong reasons. A lot of cats have very little bridge-deck clearance because the designer is concentrating on a low profile cat which looks good or being dictated by interior accommodation and ignoring the fact that the boat will pound badly at sea. This is not only noisy and uncomfortable but can well be the cause of structural problems. Our designs have been developed around these practical elements of good design and then we accommodate personal comforts and lifestyle choices.

WHICH DESIGN...

We have many different design ranges. All incorporate the elements of good design discussed above so choosing a style, size and layout comes next. Layouts and some things like steering position can often easily be changed so don't be put off if you really like a particular design but find a few small elements you don't like, talk to us and we'll see if we can incorporate your choices.

We've taken particular care with the balance of construction methods in our designs, making them light and strong yet easy to build in small sections, most of which are manageable by a group of friends when they need turning over and moving. The blend of strip planking and light flat panels kept in single plane form, makes building easy and quick and produces a finished catamaran of classic good looks which will not date quickly, giving you very good investment security.

CAN I AFFORD TO BUILD?

One of the first steps in changing your dream into reality is figuring out whether you can afford the boat (or more likely, how much money you 'don't' have!). Two realities here are, firstly, two similar sized boats with similar displacement, built of similar materials, will cost much the same to build. Designers' estimates of materials are often inaccurate and sometimes minimized to lead one to believe their design will be cheaper to build. This is definitely not the case, ***similar boat, similar price!*** Your choice should therefore be towards the boat that suits you best and is a good investment. Secondly, we know a lot of people who could not afford their boat at the onset so don't be discouraged. Once you start building it is surprising how you focus your interest, spare time and money into your new project. With our new owner-builders we suggest they start with the smaller items which can be built in the garage, carport, (lounge?) etc. These initial items use very little material and money but use a lot of time, so at the early stages you can get a lot done while you wait for your old boat or car or house etc. to sell. These items are; dagger-boards and cases, motor pod, forward beam and catwalk, cabin roof, rudders, dinghy etc. The experience and confidence gained building these bits speeds up the second stage of larger items and gets the whole project finished much sooner.

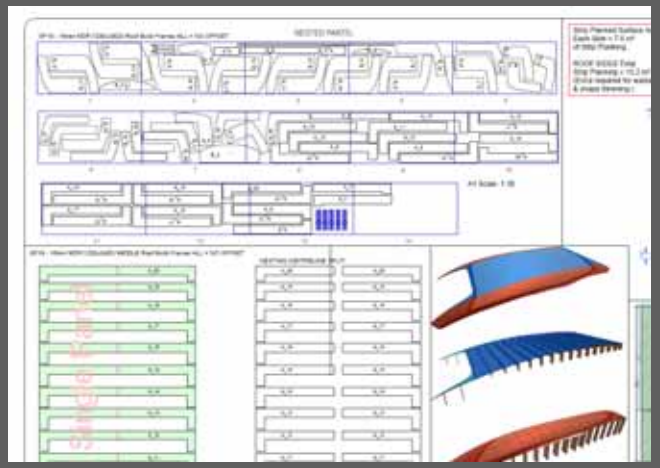
Good luck with your research and project, don't hesitate to contact us should you need further information or a chat about our designs.

Jeff Schionning

Wilderness 1340X

Plans and Ordering

Arrow 1500



Advice is readily available to help with your design choice and various options available.

COST OF PLANS:
The Arrow 1500 Plans are AUD$18,500.00. This includes postage anywhere in the world.

UNLIMITED BACK UP SERVICE: Our back-up service is unlimited, our professional boat builder (Jeff Schionning) will be here to guide you through any problems throughout your entire project. Email and phone support is available during business hours Monday to Friday.

HOW TO ORDER PLANS: We require a signed and faxed or mailed PLAN ORDER FORM with every plan order. This form explains the terms and conditions and plans will not be mailed until a signed order form is received.

PAYMENT: WE ACCEPT: Bank cheques or direct deposit into our bank account. Please email info@schionningdesigns.com.au for our account details. Credit cards are not accepted for plan purchases.

PLAN DELIVERY: Plans are delivered electronically on a USB drive via mail, or the plan files can be downloaded. The plans consist of A1 and A3 plan sheets and the A4 boat building manual, all in PDF format. Other delivery options can be arranged if required.

Building a boat is definitely a challenge but with good plans, our helpful friendly support and the modern materials available, it's never been easier. The investment of time and money is very worthwhile, offering a rich life experience, fun reward when you launch her and financially you can certainly stand to gain substantially.

We look forward to hearing from you again and wish you the very best with your project.

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DESIGNS

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