The Design and Development of the Nicholson 31

Reproduced from original paper of 2006 compiled by Allan Trelford with amended text on ballast details and the addition of an Appendix.

The Nicholson 31 story started at Camper & Nicholsons Ltd in 1975 when the senior management decided a replacement was needed for the Nicholson 32. At that time C&N had three inhouse design offices, the Motor Yacht Design Office, the Sailing Yacht Design Office (SYDO) and the Studio which handled interior design and decoration. Nearly all yacht design was undertaken inhouse and a quick glance at a contemporary Lloyds Register of Yachts would show that all yacht designs were attributed to Camper & Nicholsons Ltd. Designing a yacht involves more than one person so this policy engendered good team spirit.

The Design Phase

In 1966 Peter Nicholson had approached Ray Wall to come and work with him. Ray who had previously worked for Robert Clark was by now designing some handsome yachts under his own name on the East Coast. After joining C&N in addition to designing ocean racers, Ray was responsible for the design of all GRP production sailing yachts and headed the SYDO where the task of designing a replacement for the Nic 32 was undertaken.

Ray Wall recollects the start of the project:

> *"It is extraordinary to think it is almost 31 years since the 31 design was started. To delve back into the past, I burrowed into my box of old memorabilia and found a print of the Proposed General Arrangement Drawing, which carries the date 9 July 1975. This is the concept drawing that I had drafted in response to a brief from the Gosport team - Tony Taylor, Jeremy Lines, Ivor Coleman, and Chris Clode.*
>
> *The brief described a true cruising yacht to succeed the Nicholson 32 which was thought to be nearing the end of its commercial life. In actual fact we redesigned the 32 deck and modified the interior layout, and it took on a new lease of life and ran successfully with the 31, which appealed, I think, to the more serious cruising minded owner. Before joining Campers I had had four designs of transom sterned cruisers built in wood (see the Appendix for details). They influenced my thinking on the 31, though I wanted to retain some traditional style I thought it right to take advantage of the moulded form in the coachroof and cockpit.*
>
> *The Proposed General Arrangement Drawing was the beginning of the process that all GRP production yachts went through at Campers - the brief, the proposal, then the critical examination of the proposal by the originators of the brief. I can tell you that they were much tougher to deal with than the most pernickety of custom build owners. They had the technical knowledge and experience to question every facet of the design and build process. After we had thrashed through all the foreseen problems and the Gosport team were satisfied that the proposed design would fill the perceived market, I would be given the go ahead to start the full design. In this a team of young designer draughtsmen - John Holness, Stephen Morley, Clive Dent, Robert Brasted, Stuart Roy and Ray Harvey assisted me. We made up the Sailing Yacht Design Office, based at the Northam yard, above the company's main drawing office. We were housed in the attic of the Victorian era main office block that originally had been the J. G. Fay & Co. yard, taken over by C&N in 1912. Attic is not a fair description; it was certainly in the roof, but it was lined throughout with tongue and groove wood panelling painted white. There were enormous dormer windows, the whole very light and airy, a true studio.*
>
> *In addition to the Proposed General Arrangement Drawing I would draft out the Lines Plan and Sail Plan, then hand them and the remaining design work over to the design team. There could be many drawings for a production yacht as well as calculations and estimates. I would keep in close touch with the Gosport team, especially Jeremy Lines, the Technical Manager, who had significant input into the details and development."*

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The Proposed General Arrangement Drawing was approved by "senior management" enabling Ray to pass the project over to the SYDO. The records indicate that the first production drawings were completed in July and August of 1975.

One of the team members, John Holness, remembers the period when both the Nic 31 and Nic 39 were being designed at the same time:

> *"It was not C&N policy to name names for boats designed inhouse. We did not even put our names on any of the drawings. This could be a nuisance if you were trying to identify who had done the drawing, you relied on recognising the style!"*

The Hull Construction Plan set out how the major mouldings were assembled, and John was responsible for this drawing as he was for most of the GRP yachts.

Another of the team members Stuart Roy recollects:

> *"The proposal drawing had the outboard profile, general arrangement plan, and styling all done in principle and this was passed to the design team who realised the design. We checked all the ratios and parameters, worked out the hydrostatics and stability, all with a desk calculator the size of a telephone directory! We also calculated the structures to Lloyds before completing all the production drawings.*
>
> *It was a great joy for me to work on the lines drawing. After completion, the lines drawing and the offsets drawing went up to the Mould Loft on the same site to be drawn out full size in chalk lines on the floor. A week or so later the lofting was nearly done, and the profile and frame templates were being made for the plug."*

The interior design was handled by Stephen Morley greatly aided by his background in Industrial Design & Art rather than Naval Architecture. Stephen recalls the period:

> *"Our office was subject to the vagaries of the weather and it was rather uncomfortable in the blisteringly hot summer of 1975 when I remember salt tablets being issued on demand!*
>
> *I liaised with John whilst I prepared the drawings for the two large internal mouldings, the Forward &Toilet Module and the Saloon & Galley Module. When glassed in place these modules added greatly to the hulls stiffness. A useful feature was the additional dry storage provided by moulded locker bins located under the bunk cushions.*
>
> *We had by then developed a house style so the final design and choice of materials was left to the SYDO with Ray always offering advice and encouragement. Some of the joinery work would be left to the shop floor, but for major items such as the navigation station, a drawing would be issued to the Joiners Shop where they would loft out the details to check final sizes and assembly details."*

The deck layout was undertaken by Ray Harvey who had recently joined the SYDO after completing his C&N Apprenticeship and University studies. Ray recalls those "balmy days":

> *"My first job was developing the Styling and Geometry for the decks of the Nic 31 and 39. Armed with a scale rule, pair of dividers, adjustable set square, office weights and splines pencils and eraser I set about this complex task. No sophisticated 3D computer modelling in those days! The aim was to produce a modern classic by integrating interesting and unique details into the deck shape, the edge moulding detail, the rope tail - foot hold moulding around the mast base, the hand rails, and the curved cockpit seats and stowage. The final drawing scaled at 1 inch to 1 foot was sent to the Mould Loft where full size templates were created for all the sections of the deck at 1 foot intervals and sent to the Pattern Makers to create the deck plug. As this was finalised, I remember a meeting around the plug attended by senior management who all had a turn sitting in the cockpit after which its ergonomics were approved. It was quite a race to get everything finished on both the Nic31 and 39 in time for the London Boat Show".*

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The Production Phase

As the SYDO issued the drawings the production process commenced as Jeremy recollects:

"Robert Ives (Boatbuilders) Ltd of Christchurch were selected as suppliers for all the GRP mouldings. However, the Nic 31 was unusual in that we built the Hull Plug at Gosport, normally they were built by outside contractors. It was also the first time that we built a hull plug with centre line and section moulds and then made it all in foam before glassing it over. This gave a very stable plug over which to mould the Hull Mould.

The deck plug was wood framed and ply skinned and being a lot more complex in detail it was built in the Southampton yard where Ray Wall could keep an eye on it as it progressed.

All the other plugs were made in Gosport, many made inside the first hull, and then shipped down to Ives to have the moulds and then the subsequent mouldings made and sent back to Gosport for assembly. The plug for the toilet module was made and sent to Ives early on as this moulding with its two bulkheads had to be fitted to the first hull to stiffen it before the hull could be sent to Gosport

The ballast keels were all made by Henry Irons in Cornwall and sent to Ives for bedding into the hull mouldings and over-laminating before the tanks and toilet units were fitted.

The first boat, hull 31/01 TRENARTH, was destined for the 1976 Boatshow where a certain Mr. R.C. Hope signed the order form, with delivery being affected on 1st May 1976. In between times on the 15th March 1976 the second boat, hull 31/02 BELLE ILE was put on a load loader and exported to Holland. Travelling via Felixstowe on the GAELIC FERRY she was delivered to our Dutch Agent, Ted Peek at Jachthaven Aqua Delta in Bruinisse. A few days later I drove over there and took for the first sail, also the first sail for the class, and we had a chase boat for the photographs. Everything went well and I remember taking many notes.!

Between 1976 and 1986 we built a total of 120 Nic 31s, but the build numbers were not always in sequence. Sometimes for example, the boat may have been completed in the Autumn but the owner would not want the boat until the coming spring."

Year	Boat Number
1976	1 to 20
1977	21 to 58 excluding 54
1978	54, 59 to 87
1979	88 to 104 excluding 102
1980	102, 105to110
1981	Nil
1982	111 to 118 excluding 117
1983	Nil
1984	117 & 119
1985	Nil
1986	120

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The Development Phase

From the start, Camper & Nicholsons offered a range of options for the Nic 31. This included a choice of colour for both hull and deck mouldings, and also for the upholstery, curtains and blinds. Between 1976 and 1986 the design evolved through four marks MkI, MkII, MkIII, & MkIV. Jeremy remembers how the specifications evolved:

> *"Looking back at the various Specifications, I see we first had a Preliminary Specification, and this was followed for real in 1976 with a Mark 1 Standard Specification and a Mark 1 Super Specification.*
>
> *The Standard was very simple with a Yanmar YS12G 12 HP engine with no table and few lockers. It also had only three Gibb stainless steel winches and a three-inch Gibb roller reefing gear. The Super had the Yanmar 2QM20 engine and all the lockers and linings. All the Mark 1 boats had a cast bronze stemhead fitting with a three-leg pulpit. The saloon sole comprised a GRP moulding with recesses to take four sole boards in white seamed Plydeck. A forehatch was specified and a sliding GRP hatch in the Saloon. I am sure we never built a boat to the totally standard Mark 1 Standard. The boats were all custom built and we would fit a wide range of extras depending on the owner's requirements.*

The original ballast keel was all lead with a designed weight of 2170 kgs. Installed from 31/001 to 31/044. As a result of the rising price of lead in 1977 a combined lead/iron ballast keel was installed from 31/045 onwards.

> *"I also note that boat 31/35 was the first Hurth gearbox."*
>
> *"I believe the Mark II specification came in for 1978 and I note 31/61 was a Mark II. These boats had a fabricated S.S. stemhead fitting with a four-legged pulpit, four Lewmar winches and a 4inch Gibb roller reefing gear, and a saloon skylight was also fitted. Boat 31/67 was the first boat with the modified toilet moulding.*
>
> *The Mark III had a lot of minor mods including the key start being moved to inside the hatch and the cooker being changed to a Flavel B7000C with a flame failure device."*

On the subject of changes to the ballast weight, John Holness remembers being involved with comparative inclining experiments on 037 LADY JANE and 073 TALADH:

> *"Inclining experiments are carried out in order to find the VCG (vertical centre of gravity) which is rather difficult to estimate. Not normally done for sailing yachts with a significant amount of ballast, but always done for ships, either new or after modifications. You heel the boat to a small angle, not more than 2 - 3 degrees, by moving weights across from one side to the other. The relationship between moved weights, the distance through which they are moved, the resulting angle of heel and the characteristics of the hull form, enables you to calculate the position of the VCG. The formula works only for small angles of heel. We did it for the 31 as a starting point for estimating the effect of increasing the weight of ballast."*

Jeremy continues:

> *"The Mark VI Specification for 1981, I think from boat 31/107, had a considerable number of modifications. This included the YANMAR 3GMD 3 cyl. 22.5 H.P. engine, slab reefing, a sprayhood, additional lockers, a fiddley grating in the toilet, curtains and hatch blinds, a Flavel Vanessa cooker, a roll bar for the batteries, bolts for both hatch and washboards etc etc ."*

The construction of the hull and deck mouldings changed on later boats in order to use 'Fabmat', a trade name for a combination cloth consisting of CSM stuck or stitched to woven roving.

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Build Evolution

MARK I SPECIFICATION

Mkl Standard Specification

- YANMAR YS12G 12 H.P. Engine
- No table and few lockers.

Mkl Super Specification

- Yanmar 2QM20 Engine
- All lockers and linings

Mkl General Specification - Boats 31/01 to 31/44

- Cast lead ballast keel 2160 - 2180 Kgs
- Water tank capacity 340 litres (75 gallons)
- Stemhead fitting in cast bronze
- Pulpit 3 leg design
- Two sinks bowls in galley
- Saloon sole comprising a moulding fitted with several sole boards in white seamed -
- Plydeck
- Forehatch and sliding GRP hatch
- X3 Gibb winches
- 3 inch Gibb roller reefing gear

Mkl General Specification - Boats 31/45 to 31/60

As above except:

- Lead and iron ballast keel 2418 Kgs 31/45 (2308 Kgs 31/46 to 31/60)
- Water tank capacity 245 litres (54 gallons)

MkII SPECIFICATION - From boat 31/61

- Lead and iron ballast keel 2308 Kgs
- Water tank capacity 245 litres (54 gallons)
- Port and starboard cockpit lockers with gas storage to starboard
- Stemhead fitting fabricated in stainless steel.
- Pulpit 4 leg design
- Single sink bowl in galley with further storage space under.
- Saloon skylight fitted
- X4 Lewmar winches
- 4 inch Gibb roller reefing gear

Mk II - from boat 31/67

As above except:

- Modified toilet moulding fitted

MkIII SPECIFICATION From - Boat 31/102 (possibly earlier boats)

- Key start moved to inside the hatch
- Flavell B700C with flame failure device
- Saloon fitted with single sole board in white seamed plydeck
- Displacement quoted as 6700 Kgs (cruising gear aboard, half tanks, half consumables, no crew)
- Ballast keel increased to 2409 Kgs (probably from Boat **31/90**)

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MkIV SPECIFICATION from Boat 31/107

As Mk III Specification except:

- YANMAR 3GMD 3cyl. 22.5 H.P. Engine
- Mainsail slab reefing
- Sprayhood
- Additional lockers
- Fiddley grating in the toilet
- Curtains and hatch blinds
- Flavel Vanessa cooker
- Roll bar for the batteries
- Bolts for both hatch and washboards

The production run finished in 1986 after boat 31/120 had been built for Jamil Adnan. This boat was built for a circumnavigation, and whilst based on the Mk IV specification there were various modifications.

Acknowledgments

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Appendix

The four Wall Designs that were the foundation of the Nicholson 31 (24" – 2" LWL)

The designs were cruisers, full keel with transom stern and outboard rudder, built in wood.

1960 Design No. 1 Tomahawk 21'- 0" LWL.
Three built by Colne Marine and Yacht Co. Wivenhoe, Essex
Tomahawk sails out of West Mersea and is now owned by the family of the builder.
The other two are in Ireland.

1961 Design No. 8 Calloo 20' - 3" LWL
Built by Colne Marine and Yacht Co. Wivenhoe, Essex
Cruised to Norway in the 70's.

1963 Design No. 18 Senechal 22' - 0" LWl.
Three built, two by Colne Marine and Yacht Co. and one by French Bros, Battlesbridge, Essex. Seneechal and Sausalito were both cruised extensively in the Western approaches, the Baltic and to the Azores.

1963 Design No. 19 Sara 24' - 0" LWl.
Built by Frank Halls & Sons, Essex. Sailed to the US and is now in Mystic, Connecticut.

Further Reading:

1. CAMPER & NICHOLSONS, TWO CENTURIES OF YACHT BUILDING By Ian Dear, published by Quiller Press
2. THE WORLDS BEST SAILBOATS By Ferenc Matey
3. THE PROPER YACHT
   Second Edition by Arthur Beiser, International Marine Publishing

End (Revised - Feb'21)