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The Work of Ron Holland, Specialist Yacht Designer

by

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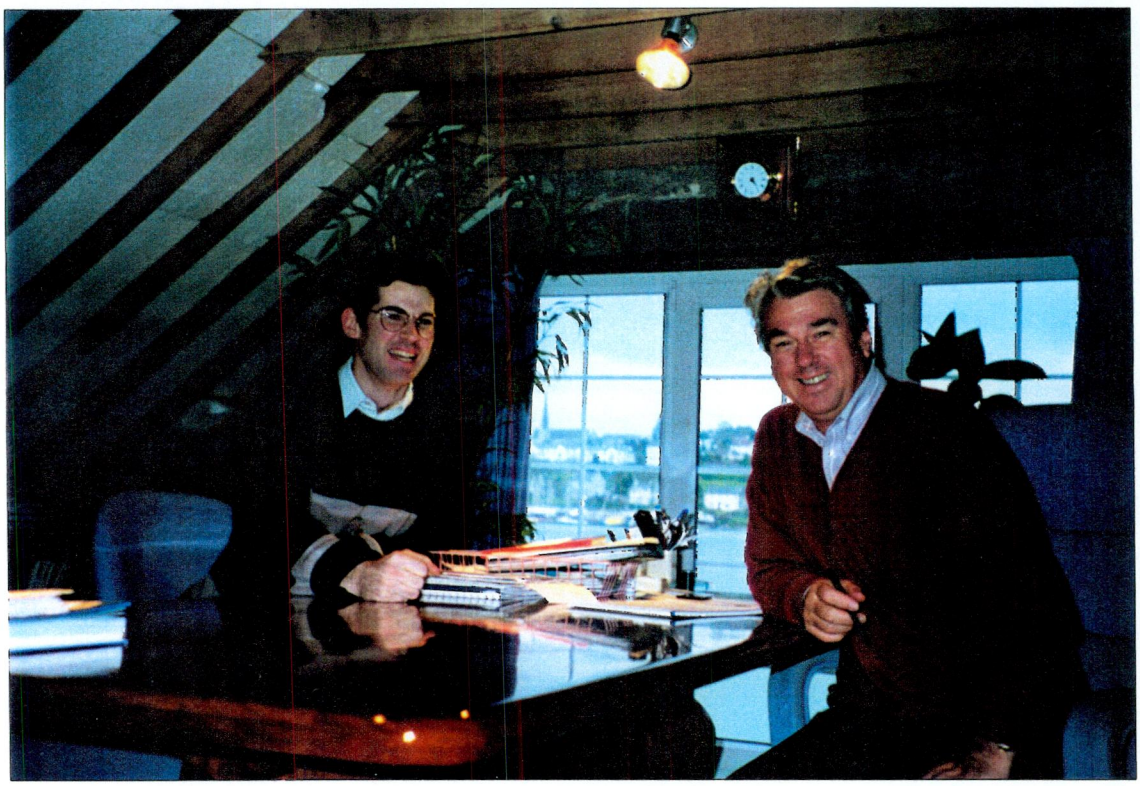

Brian Jennings (on left) with Ron Holland at his studio in Cork.

LIST OF PLATES.

The evolution of a superyacht from the very first dream in the owners imagination to the final gleaming example of pure luxury is a unique process. The advent of computer technology in all its facets be it a calculator, a facsimile, or a mainframe computer has utterly changed the face of specialist yacht design, helping a designer to be the very best in the world from any location. This technology combined with the traditional skill of the yacht designer striving to find the perfect lines to complement nature facilitates the creation of yachts hitherto inconceivable.

This thesis will endeavour to examine the work of specialist yacht designer Ron Holland. There will be a discussion on the significance of Holland's successful racing designs and how he adapted his talent in this area to benefit his cruising designs. The thesis will assess the very important designer client relationship and the impact of the brief on the final design. There will be an analysis of the uses of Auto-CAD, the effect of technology on yacht design, and the fact that location is no longer of vital importance. The thesis will investigate the need for the co-operation and team work which is required to create a superyacht of the highest possible standard. The design of the yachts and how they accomplished their briefs will be examined, and finally the conclusion will preview how Holland sees his talent develop and outline why his designs have enjoyed such success.

Creating a superyacht of the highest standard is possible only through a collaboration of the very best in each required specialist field. Traditionally a yacht designer would chose a builder by the criteria whoever was nearest or cheapest. The interior design may have been done by the most junior member of the team, fresh from college, the sails made in the local fishing net loft, and the equipment selected from stocks available in the nearest chandlers. Nowadays creating a prestigious yacht requires the very best talents available regardless of where they are located.

The extraordinary developments in every field of yacht design be it the material that the hull is made from, the special ropes, or

even just the paint, require the designer to enlist the help of numerous specialists. Most importantly the owners requirements dominate the design no matter how unorthodox they may be. Briefs can vary greatly from project to project, one client may specify absolute privacy from both crew and the outside world. Another client may wish to conduct business from the boat be it in the Indian Ocean or in port at Southampton. Some may require accommodation for eight guests, some may only want two guests accommodated, such is the variety of tastes.

Many of these clients quite reasonably expect the same sort of standards of luxury and comfort as you might find on a motor vessel. This is all the more difficult to achieve when you remember that a sailing yacht usually has only one deck, leans over when under way and is prone to getting wet. These three factors plus countless others make the task of matching motorboat luxury a difficult one indeed.

However it is the successful completion of this task that has in the past and will in the future continue to lure people, in ever increasing numbers to the joys of a luxury sailing yacht when they might have otherwise have chosen a motorboat.

CHAPTER 1. THE RACING PEDIGREE

PART 1. RON HOLLAND

Ron Holland was born in 1947 and grew up in Auckland, New Zealand. He started sailing at the age of eight when his father gave him a present of a small dinghy. He left school at sixteen to start a boat building apprenticeship while studying yacht design by night at the Auckland Technical Institute (Holland, interview, 1993).

Three years later the yard decided to send him to America aboard a cargo ship with one of their yachts that needed rigging and fitting out once she arrived. He stayed in San Francisco for six years rather than the couple of weeks intended and became involved in the local racing scene where he quickly made a name for himself as a promising young helm. This led him to secure his first job as a yacht designer (Holland, interview, 1993).

While working in the United States Holland designed a ¼ Ton yacht which he then built in his own back yard. He sailed this boat to victory in the 1973 ¼ Ton World Championships in England. Following this success he was invited to Ireland by Corkman Hugh Coveney (Coveney, interview, 1992) to design his new yacht and this project prompted him to set up his design studio in Currabinny, County Cork (fig. 1). Currabinny is a tranquil setting directly opposite the Royal Cork Yacht Club which was founded in 1720 making it the oldest yacht club in the world. Cruising and racing yachts from all over the globe come to visit Cork, constantly reminding Holland what his organisation is all about, the full enjoyment of life afloat.

Over the next decade his reputation grew as his designs consistently won international events at the highest levels of the sport. In the past few years he has turned his attention towards the field of luxury cruising yacht design and many of todays foremost craft of this class are products of Holland's drawing board.

As with many success stories of this nature a combination of pure talent and a number of well judged opportunities provided Holland with the opportunity to become the worlds best specialist yacht designer.

PART 2. THE RACING YACHTS

The sport of yacht racing has become very complex and competitive in recent years and most certainly will become more so in the future. The new enthusiasm has led to considerable progress and development in the shape and construction of hulls, sails, and all the rigging and fittings that comprise a modern racing yacht.

Prolonged racing is the supreme test of a boat and her crew's ability not only to withstand but to conquer and harness the elements to their advantage. However, no matter how expert the crew, how competent the builder, or how talented the designer no boat is guaranteed to win, such is the unpredictability of nature. Poorly designed boats fall by the wayside, retiring through gear failure or just plain lack of speed. The average boat is just that, it will go out and perform but it will almost never win. Only a very well designed and carefully thought out boat can give its crew the very best possible chance of consistently winning races.

These yachts by their very nature require more attention to detail than their cruising counterparts. Exhaustive testing of hull shapes, specialist equipment designing, hundreds of hours tuning and a comfortable budget are required. Designing a fast racer involves trade-offs between weight and strength, speed and control, comfort and racing practicality. The successful racing yacht designer will encounter and manipulate materials technology, fluid dynamics, stress loading, weight distribution and ergonomics for efficiency, to mention but a few.

Racing success carries with it, honour, acclaim, respect, and most importantly reputation. This was the stepping stone that helped Holland to break into the lucrative world of prestigious cruising yacht design, or "superyachts" as they are affectionately known.

As was stated in part 1, Holland's first racing success was of a ¼ Ton yacht which he designed while living in America and built himself in his own backyard. With this boat he won the American ¼ ton championships and, as first prize, an all-expenses-paid entry to the

1973 World Championships in England (Horncastle, 1990, p3). It was winning the World Championships that led to his being invited to Ireland to design the One Ton Cup boat "Golden Apple" for Hugh Coveney in 1974 (Coveney, interview, 1993). Holland was soon joined by his Technical Director Butch Dalrymple-Smith whom he had first met during the 1971 One Ton Cup in New-Zealand.

Following the success of "Golden Apple" Coveney commissioned "Silver Apple" (fig. 2) in 1975, "Big Apple" in 1977, and "Golden Apple of the Sun" in 1979 (Coveney, interview, 1993). Holland designed a boat called "Golden Shamrock" in 1975. "Golden Shamrock" became the prototype for a production boat called the "Shamrock" and 100 were built a large number of which can be seen in yacht clubs around Ireland and Britain. Holland designed two more production boats, the "Eygtheen 24" of which 200 were built, and the "Rush 30" which was designed for the French boat building giant Jeanneau of which 1000 were built. In 1977 American businessman Dave Allen's Holland designed "Imp" was top points scorer in the Admirals Cup (Horncastle, 1990, p3), perhaps the world's most prestigious yacht racing event. She proved that an emphasis on off-the-wind speed did not compromise winning potential in England's famous Solent racing waters and also that a more scientific approach to lightweight structures had a positive effect on boat speed. Holland together with Lars Bergstrom and "Kiwi Boats" in Florida created a significant precedent with the building of "Imp". During the following years Holland designed many famous boats such as "Golden Dazy", "Big Apple", "Marionette", "Regardless", "Manzanita", and "Morning Cloud" which was designed for the Rt. Hon. Edward Heath, MBE, MP.

Holland's breakthrough into the world of maxi yachts came when he designed the eighty footers "Kialoa IV" (fig. 3) in 1980 and "Condor" in 1981. Requiring a crew of twenty five athletic sailors, maxi's are the largest racing yachts in the world. "Kialoa IV" dominated the class for several years and pioneered the composite construction that has become the most accepted method for achieving the lightweight structures that can nevertheless withstand the incredible forces generated by rigs over 100 feet tall.

During 1987 Holland collaborated on an ambitious and exciting project, the designing of the New Zealand America's Cup Challenger "Kiwi-Magic" (fig. 4). This was a remarkable boat in many ways. Previously all America's Cup boats were made from steel, "Kiwi-Magic" broke new ground by being the first boat of this design to be built entirely from fibreglass (Holland, 1988, P24). This was an innovative and radical solution not without an element of risk. She proved a fabulous success winning thirty six of her first thirty seven races. However "Kiwi-Magic" did not win the cup. Dennis Conner, their formidable and vastly experienced rival realised that he would need extra performance to match the speed of the New Zealanders. Connors won, and by doing so returned the cup to America.

This project involved using research methods which had not previously been applied to yacht design. Wind tunnel and tank testing (figs. 5&6) techniques to study underwater flow characteristics and sophisticated computer programmes to compare different designs under simulated race conditions. Although "Kiwi-Magic" did not win the America's Cup it is interesting to note that much of the design evolved from ideas and concepts which originated in the remote location of County Cork, Ireland.

The "Kiwi-Magic" project had served to reunite Holland with the specialised world of racing yacht design. As a result of his involvement in the project new opportunities in this area were to come his way. However rather than return to the confused arena of America's cup design, Holland chose to design a new yacht to challenge for the Whitbread Round the World Race. This project became known as "Sail Ireland" and the boat was named "NCB Ireland" as its main sponsor was National City Brokers and a team of businessmen led by Howard Kilroy and Dermot Desmond (Holland, 1988, p25). The design process involved a new approach. Holland consulted various sources from weather analysts and inshore maxiboat skippers to research facilities such as Southampton University's Wolfson tank testing unit and the famous Dutch designer Peter Van Oossanen. In similar fashion the construction of the yacht was spared no technology or expense.

Although it may seem to the observer that the aims and

objectives of a Maxi yacht or an America's Cupper are far removed from the goals of a luxury cruising yacht this is not the case. If we compare this relationship to that of a formula one racing car and a normal passenger car.

Most car companies reinvest a large proportion of their profits in Research and Development. A major part of this budget is spent developing high performance racing cars and nearly all of these companies regularly compete against one another on the racing tracks with non standard cars. Why would they do this if they never intended to sell these specialist racers? The answer is simple. The lessons learned from developing the concept cars are carefully scrutinised and the conclusions form the basis for the incorporation into their production cars of features and characteristics which ultimately lead to more sales. One particularly good example is the "Lancia Delta".

Lancia are now world famous for their rally cars. For years they have consistently been updating and improving their range of production cars, and in particular the "Delta", in light of the developments and advances made by the rally cars. Combined with an intelligent advertising campaign this policy produces more sales as a result of the buyers confidence in the reliability and performance of the cars. In exactly the the exact same way, yacht designers incorporate the lessons learned from racing yachts into their cruising yachts.

Holland successfully uses his expertise in the field of racing yacht design to develop fast efficient luxury cruising yachts. His designs perform efficiently but do not compromise the owners comfort, are structurally very strong yet remarkably light, and are both luxurious and practical.

Although most of Hollands work these days involves designing large cruising yachts, he at all times maintains an interest whether practical or theoretical in racing yachts.

Fig. 1. Ron Holland's House and studio in the foreground.

Fig. 2. "Silver Apple".

Fig. 3. "Kialoa IV".

Fig. 4. "Kiwi-Magic".

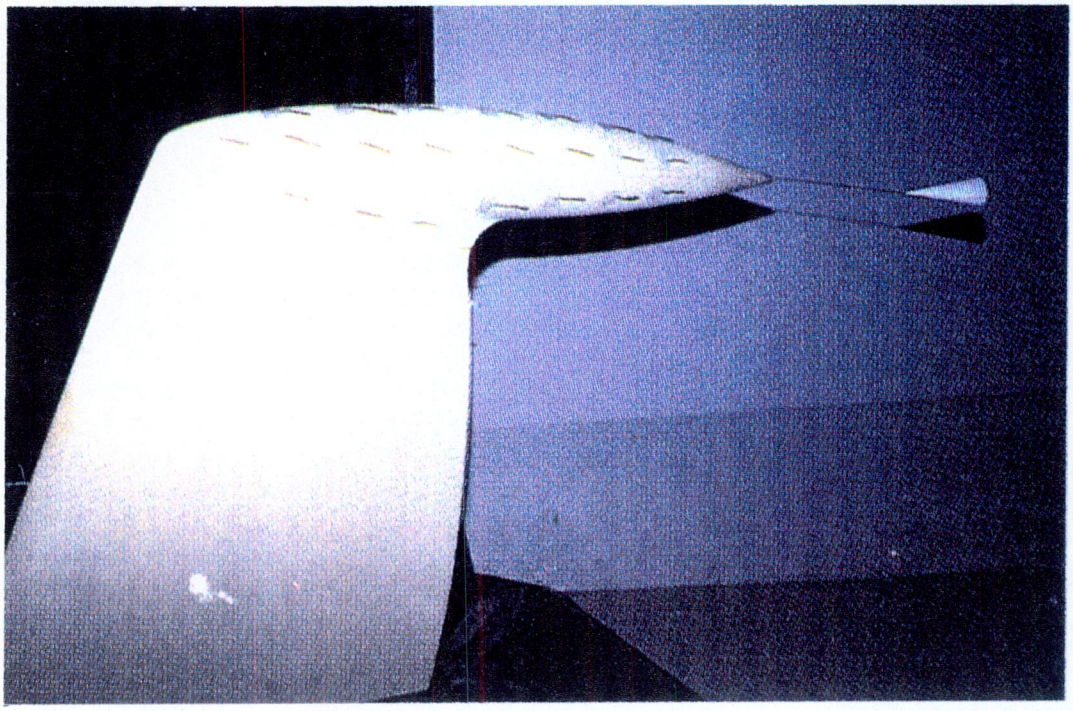

Fig. 5. Wind tunnel testing.

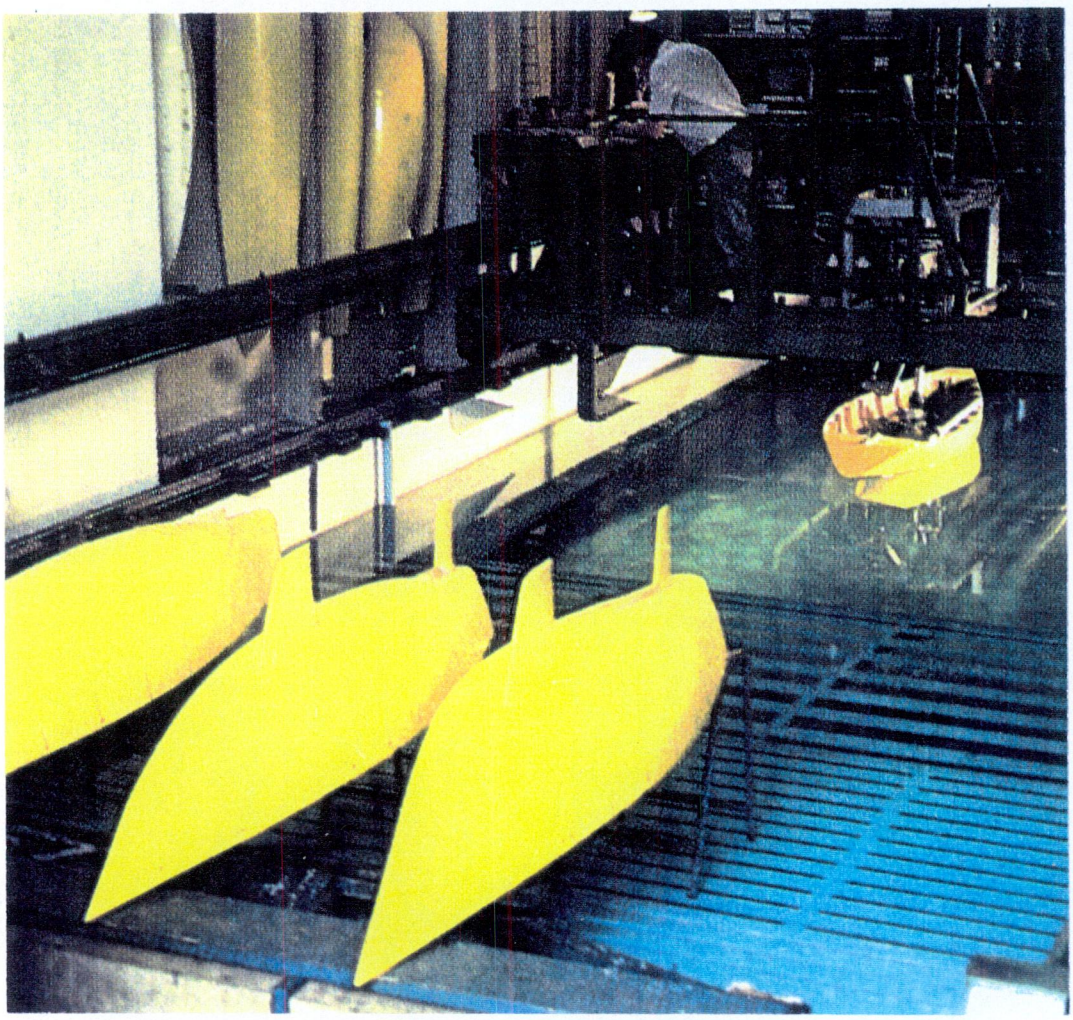

Fig. 6. Tank testing.

The most influential factor in determining the shape and appearance of the final design is without a doubt the owners brief. These can vary from the broadest requests for a modern or conventional 100 foot yacht to an extremely detailed brief specifying such things as sail area, interior headroom, safety equipment and even the number of cutlery place settings required. One of Holland's skills is that of being able to accurately assess the clients requirements. Through a combination of numerous informal discussions and specific design issue meetings (fig. 7) Holland can help the client to create a yacht that will fulfil all his ambitions and dreams.

Throughout the course of the project there are regular meetings between the client and Holland and his team. Shortly after the preliminary formalities the team start to get a feel for what the client really wants his yacht to do. Does he have a conservative style or is he perhaps somewhat adventurous and might opt for a futuristic design, what sizes and spaces he is comfortable with, and does he wish his yacht to be evolutionary or revolutionary.

In the past yacht designers have tended to regard themselves and perhaps the builder as the only judges of what the finished yacht should look like. In general not enough attention was paid to the owners views, this had the net result of not actually satisfying his requirements. Holland on the other hand realised that the true measure of a yacht's success is not so much what she looks like, or what the builders and designers think of the final design but to what extent the owner feels they have fulfilled his wishes (Big Boat Magazine, 1992, p31).

Most clients have a preconceived idea of what the overall length should be. Holland is quick to point out that they should first consider what size interior spaces they want, how much accommodation, what style of deck layout and then with these parameters outlined start to think about an overall length (Tomlinson, 1992, p28). At this stage some conceptual sketches are made for preliminary evaluation. Often the clients have no experienced of

studying drawings, so a lot of time and effort is put in at this stage to produce clear and informative drawings of the concepts (Holland, 1988, p35). A client may choose a yacht that is a small evolution of an existing design in which case it will be easy to visualise, or they may propose something more radical where they will rely heavily on the concept sketches. Holland thinks it worthwhile to invest in computer and 3-dimensional models (fig. 8) to accurately assess the concepts.

He occasionally gets involved in speculative projects where the boat is not being built for a specific owner but as a saleable commodity. The brief in these projects is often much looser than those for owner commissioned yachts. The underwriter will outline the type of client he aims to attract and normally will require the styling to be of a relatively conservative nature (Holland, 1988, p36). This allows a certain element of freedom with the design, and the detailing can be explored by trying ideas that might add to the value of the yacht. The budget for this type of project is very controlled and it must be adhered to. Holland points out that even with large budget projects he endeavours to spend every dollar wisely. Before approving any design feature he always does a value engineering study to assess the costs and explores other possibilities to see if it could be done more cost effectively (Holland, 1988, p36). A 100 foot superyacht costs somewhere in the region of five to seven million dollars so one can appreciate the importance of accurately fulfilling the owners requirements while at the same time introducing him to solutions that he might not have considered. The importance of the designer client relationship cannot be emphasised enough.

Todays client expects to find in his boat all the conveniences of modern living to which he is accustomed at home: Televisions, videos, stereos, and microwave cookers. For example the brief may specify drying facilities so if you put your wet bathing gear into the dryer you have every right to expect it to get dried. If you first have to go to the engine room to turn on the generator the designer has not achieved his objective. The fact that this level of convenience requires accumulators, holding tanks, pressure pumps, watermakers, and generators is the designer's, the builder's, and the skipper's concern not the owner's or his guest's.

Fig. 7. Holland and his team discuss a design.

Fig. 8. 3-D modelling is a useful presentation tool.

Holland has shown the value of a detailed brief which listens to the feelings, establishes the needs, and fulfills the expectations of the client.

If one was asked to select the single most practical, useful, and innovative design tool available today it would be, without a doubt, the computer and in particular Computer Aided Design.

Conventional yacht design involves using pencils, paper, a good set of drawing splines, and an element of flair and creativity. Nowadays C.A.D replaces all but the flair and creativity, however no matter how advanced a computer system, or how technical a design, nothing can completely replace the freedom and expression possible with pencil and paper, at least for the preliminary sketches and concepts.

So how has this affected the design of Ron Holland. Well to start of with Holland was begining to subcontract more and more business to foreign builders because of their reputation for high quality (Holland, 1988, p42). A problem arose though whereby the builders had to make many of the on site decisions about the design, items that were not specified because of the limitations of "paper design" but were not significant enough to to warrant consultation. This had the effect of "dilluting" the design and with the cost of these projects in the region of between five and seven million dollars it was not satisfactory. The market for these superyachts was expanding and Holland was faced with the possibility of taking on more staff than he could personally control. He needed to be able to supply the builder with sufficient detail to foresee many design decisions that he would otherwise have to make himself. The solution arrived in the form of an "Intergraph Computer Aided Design" (fig. 9) system which he bought in 1983 at much expense. This was replaced in 1991 with the latest "Apple Quadra" C.A.D. (fig. 10) system (Holland, interview, 1993).

The following is a precis of an extract from a paper presented by Holland's partner Butch Dalrymple-Smith, at an annual symposium which enables professional yacht designers to keep up to date with current trends and innovations in technology, held in Holland in 1988.

At this point in time the system has been in operation for four years, and we are very pleased with our choice. However it was discovered that it was not possible to dispense with two of the existing computers. These were an "Apple 11E" which is used for weight studies and an "IBM" which is used for accounting. The studio has two plotters, both of which can handle drawings a metre wide and up to fifty metres in length. One is a pen plotter for accuracy and colour, the other is an electrostatic plotter for speed.

The Intergraph system was selected because of it's greater capability than other systems on the market, some much cheaper. The more expensive systems incorporate features such as speed and flexibility which more than compensate for their cost.

A typical project begins with pencil sketches of the hull, deck (Fig. 11), and interior. It is only at the next stage that the computer takes over. The Holland design office has a theory that no-one should sit down at a workstation without knowing reasonably precisely what they want to do (Fig. 12). This is very good advice as any one who has ever used AutoCAD will know.

The computer is then instructed to draw a grid which is quickly plotted. The lines plan of the yacht is drawn almost entirely by hand onto the grid. There are a number of reasons for this, regardless of how useful and adaptable a computer is, nothing can replace the artistic sense of the trained eye. The essential art of the yacht designer is his appreciation of the subtleties of curve which can make the difference between excellence and mediocrity in the finished yacht. Much of this subtlety is lost on a computer by virtue of the fact that the image is represented on a curved screen. To date Holland has found that he prefers to establish the essentials of the hull shape on paper first (Fig. 13).

The Intergraph system incorporates a very useful reference file facility. Any of the work stations can display up to thirty two reference files including the one it's presently working on. This enables the same file to be displayed on several different workstations. A designer working on the interior can display the

construction layout as a reference file and make sure his interior takes full advantage of the space available between structural elements. Furthermore, if any changes are made to the reference file by another user they will appear on his screen as they are made.

This enables several designers to all work on the same project, each person being immediately aware of any changes or developments made by another member of the team. This gives everyone the opportunity to put an intense burst of work into a project to meet a deadline, and makes straightforward the process of integrating all the facets of the design into one final coherant presentation.

The question of scale on a computer does not arise. All designs are full scale, and can be defined to an accuracy of a hundredth of a millimetre over a length of up to forty two kilometres. While this is in fact far beyond the needs of "Ron Holland design", the precision afforded by this means that as a matter of course, we can assure that a yacht is buildable, that a spanner will fit over a particular nut, or that there is sufficient clearance between a generator and the insulation around the engine room. The flexibility of a C.A.D system is such that a designer can zoom in from the overall view (Fig. 14) of the yacht to the slightest detail, allowing custom components can be designed in situ, ensuring that the finished unit will fit the space available.

We have found that the more information we can give the builder, the more chances he has of making accurate quotations and controlling costs. The builders appreciate the knowledge that they can have drawings produced at any scale ranging from full size plans, to a small A4 drawing for advertising purposes. C.A.D systems have a facility whereby the designer can call pre-loaded drawings of nearly all components such as winches, rope cleats, engines, or even sinks and toilets. These can then be placed in a design at the touch of a button.

When we initially bought our Intergraph CAD system we were told that we would still be finding out new things we could do with it in four years time, and it's potential would be limited only by our own

imaginations. Although we refused to accept it at the time this remark has proved very true. I do not expect we will ever "know it all", but every improvement in accuracy, convenience, presentation, efficiency and technique brings closer the day when one would no more think of designing a yacht without CAD than without a calculator (Dalrymple-Smith, 1988).

Holland's office changed over to the "Apple Quadra" system in 1991 and in doing so halved the electricity bill for the studio. The "Intergraph" system needed an air conditioned room in which to house the main computer and the maintenance costs were beginning to become prohibitive(Holland, interview, 1993). In terms of performance there are a number of differences. The memory of the "Quadra" system is unlimited and it can be enlarged to whatever size the user desires, all it requires is the addition of a small piece of extra hardware. The "Intergraph" system on the other hand had a limited memory size and as such it was quite possible to fill the memory thus rendering the system inoperable. The "Quadra" system operates at a much faster speed than the previous system thus eliminating the need to wait while the computer regenerates a drawing. It takes up less space in an already crowded studio and is more user friendly with improved human interfaces (Small, interview, 1993). Apart from these points the facilities and characteristics of the two systems are very similar making it easy for the operators to change over.

The flexibility of a C.A.D system is such that a designer can successfully work anywhere in the world as long as he has an electricity source. It really is that simple. Holland is a perfect example, located in a remote part of southern Ireland his organisation can produce fully detailed, top quality designs, on their in house C.A.D system and then bring the plans to the very best builders in the world wherever they are located.

The net result of operating a C.A.D system is an increase in productivity which enables a small team to produce more designs in finer detail, faster than previously possible; to explore more design options and portray them more accurately. Freed from much of the frustration of expressing themselves through paper and pencil, the

designer can concentrate on the substance of his designs. Why should he have to spend time drawing both sides of a symmetrical object when a computer can mirror one half instantly? Why should it be necessary to laboriously rescale off a general layout before getting down to a detail drawing? Computer drafting cuts through all this and makes the designers time more productive, more satisfying, and ultimately leads to better yachts.

The application of C.A.D to specialist yacht design, when combined with artistic talent, can increase productivity, it is fast so there is no interruption of the creative flow, its flexibility allows the designer to explore his concepts, and it can significantly reduce costs as its potential for improved detail permits more accurate planning, closer budgeting, and an optimum construction programme.

Fig. 9. "Intergraph" C.A.D System.

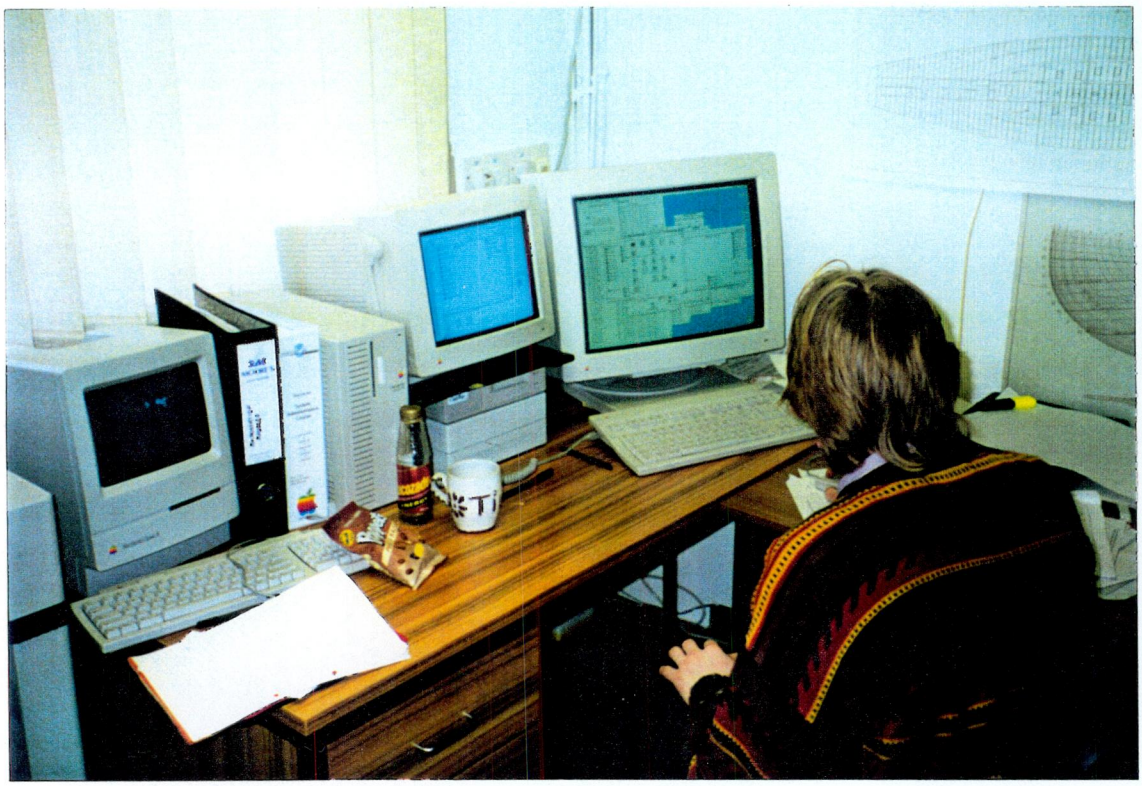

Fig. 10. "Apple Quadra" C.A.D System.

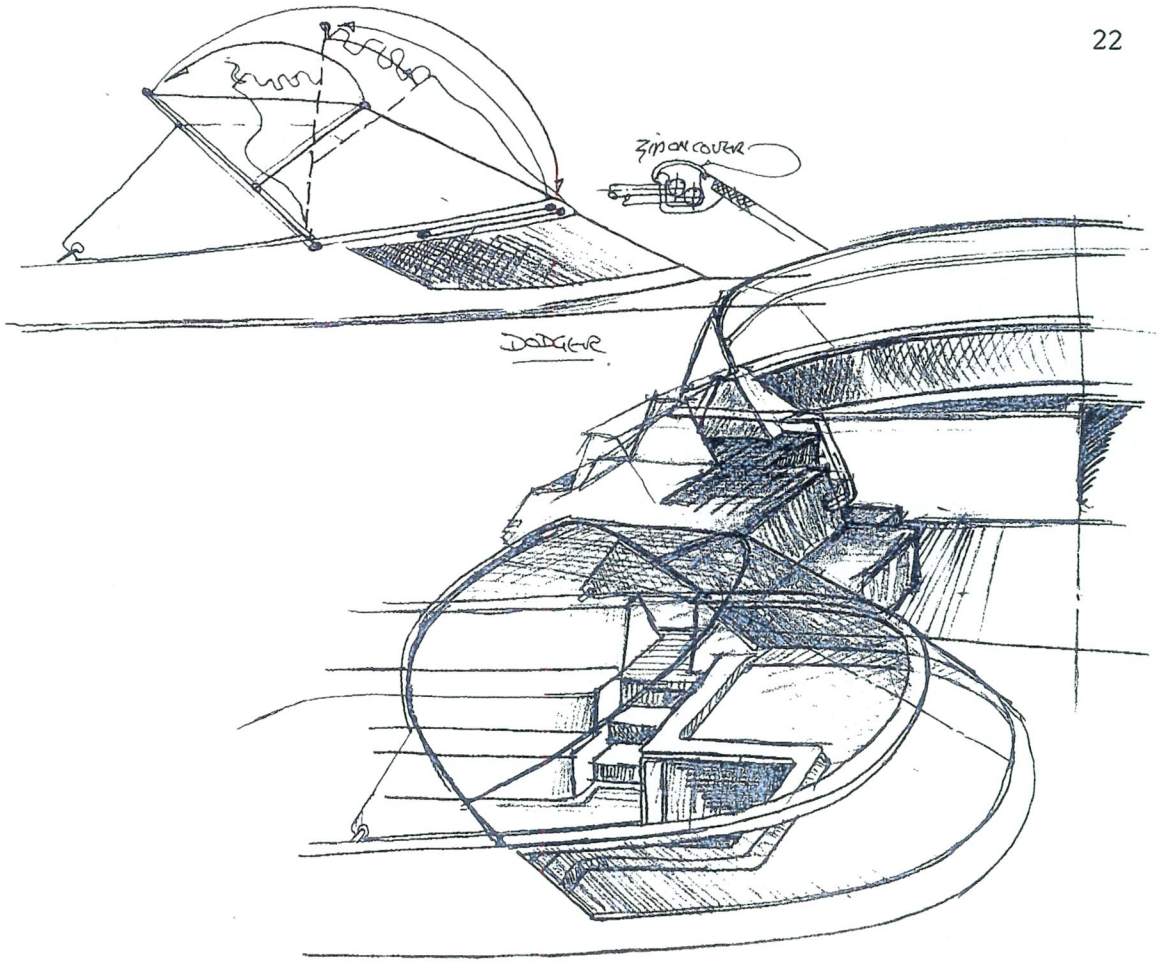

Fig. 11. Freehand sketches of a deck detail.

Fig. 12. It helps to know reasonably precisely what you want to do before sitting down at a terminal.

Fig. 13. Holland prefers to outline the shape of the yachts by hand.

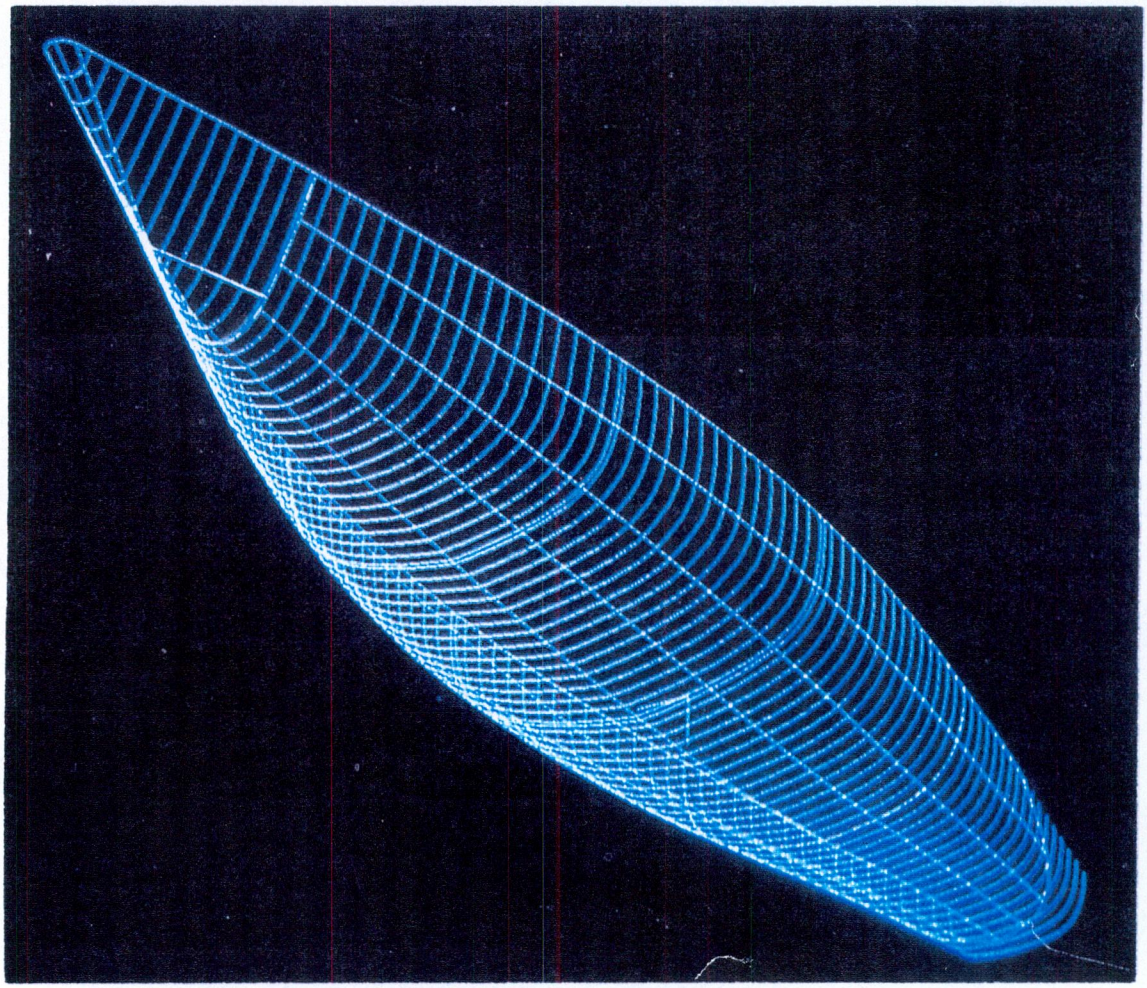

Fig. 14. Overall computer view of the Hull.

CHAPTER 4. CO-OPERATION AND THE SPECIALISTS

Creating a prestigious yacht of the highest standard is possible only through a team effort. The standards and levels of perfection required for todays generation of superyachts is so high that the designer must call on the help of specialists to assist him in his task.

In much the same way as medicine is divided into general practitioners and specialists, so too in yacht design to do the very best job possible, it is necessary to enlist the support of specialists such as interior, graphic, fabric, and industrial designers. The skill and emphasis of the designer is now directed towards managing a whole project and not solely as the yacht designer.

The first task is to select a builder. This is done at an early stage in the Holland design process (Holland, 1988, P50). There is a lot of emphasis put on the builders reputation which depends as much on his organisational skills as the workmanship and talent of his workforcece. His experience is also important because builders are known for their particular skills at handling certain materials and are selected in the light of this knowledge.

> When developing the final structural design of the yacht I keep in mind the builders strengths, experience and his preferred building methods. Close communication during the early stages of the design achieves a more harmonious, cost-effective and punctual building programme.
> (Holland, 1988, P50)

The builder is often more familiar with the most up-to-date equipment developments because he is a regular buyer. He can use the preliminary specification given by the Holland design team to select the correct winches, ropes, windows, engines, and other related components.

In recent times there has been significant advances in the area

of boat building materials. Sheet steel, aluminium, fibreglass, kevlar, carbon fibre, and nomex are just some of the newer materials available to todays builder and most can be combined to produce very strong structures (Fig. 15). Until relatively recently wood was the most popular material for boat building and in some cases such as dinghies it is still the preferred material because of its low cost and ease of use.

The technique of shielding an arc weld in an atmosphere of inert gas made it possible to weld aluminium and this material is very suitable for large cruising yachts. "Royal Huisman Shipyard" and "Kees Cornelissen" both in Holland, and "Sensation Yachts" in New Zealand are generally regarded as the best aluminium builders in the world. According to Holland, aluminium alloys of marine grade are now accepted as the most efficient material for large cruising yachts. They offer accuracy, quality, speed of building, and the durability appropriate for yachts of the highest quality (fig. 16).

In recent times the most successful racing boats have had composite hulls. This technology is now being used to build large cruising yachts. Composites can achieve excellent levels of strength to weight, sound and thermal insulation, panel stiffness, impact resistance, and durability. However they can be difficult to work with requiring very careful atmosphere control and specialised skills which are often not available in existing shipyards. Therefore there is a restricted number of builders that can construct a composite hull to the exacting standards required. Holland says he is most comfortable working with "Belliure" in Spain and "CCYD" in Italy when building a composite yacht.

The aluminium used in the construction is brought into the factory, whereas the composite yachts are constructed from materials that are created in the factory from rolls of Kevlar, Carbon Fibre, and Fibreglass combined with an epoxy resin. The fibres and weaves used in a composite look like any average roll of cloth before being applied to the mould. They are laid into the female mould or onto the male mould (depending on the method of construction) and then painted over with the epoxy resin which hardens into an extremely stiff and

strong surface over a period of six to seven days (fig. 17). In fact some bullet-proof vests are made in much the same fashion using the same materials.

He has also worked with builders "Brooke Yachts" in England, "Windship Yachts" in Florida, "Mediterranea" in Italy, "Palmer-Johnston" in Wisconsin, "Southern Wind" in Cape Town, "Lürssen" in Germany and "Gouwerok-Supership" in Holland. (Holland, interview, 1993).

As is often the case with modern technological developments a material that one day represents the most advanced and technically superior available is the next day superseded by a new type. It is difficult to keep pace with the rapid advances in the field of material development so an expert needs to be consulted. S.P. Systems of Cowes, England (Fig. 18) is a supplier who specialises in sophisticated materials for yacht construction. They offer a comprehensive consultancy service which involves impeccable attention to detail such as analysing small samples of the hull after construction by spectroscope (Holland, 1988, p53). This can tell the observer if the resin has cured fully or if any impurities are present which might affect the structural integrity of the yacht. A report is then produced which may recommend particular heat treatment to complete the curing process.

At this stage it is time to involve the marine equipment consultants. One such consultant is Jens Cornelson who by virtue of the specialist nature of his expertise can keep up to date with all the new developments available (Holland, 1988, p76). Cornelson has a wide range of contacts among the builders, skippers, repair yards and designers of specialist yachts and he uses this depth of experience combined with his own knowledge of life at sea to get an overview of the performance and reliability of every unit he specifies. A piece of equipment which looks beautiful but fails to perform satisfactorily is of no use to the owner, so an incredible attention to detail is required on the part of the designer.

Winches are perhaps the most important item of equipment on any

yacht as they can considerably reduce the amount of labour and personnel required. The larger the yacht the more important they are as most boats greater then twenty five feet in overall length cannot be sailed without them. Lewmar Winches of England can take much of the credit for the development of winches as we know them today. In the 1930s' Lewmar designed the winches for the gracefully enormous J-Class yachts sailed by the likes of Sir Thomas Lipton in contention for the America's Cup (Illingworth, 1968, P49). The current trend is to make winches as inconspicuous and fully automatic as possible and Lewmar still leads the field with their very advanced designs.

Handling and manoeuvring these yachts is an art unto itself but the task has been made much easier by the development of bow thrusters and variable pitch propellers. Richfield of Poole have developed hydraulically retractable thrusters which can provide the convenience of thruster power and manoeuvrability without any disadvantage to performance (fig. 19). They developed a 75 horsepower unit specifically for the Holland designed 140 foot "Cyclos III" which is equipped with one at either end (Big Boat Magazine, 1992, p33). Naturally the most important requirement of propellers is reliability and the Hundested models, developed over many years in tugs and fishing boats, have stood the test of time and proved themselves the best.

The loads and pressures generated by these yachts exceed even those of an America's cup racing yacht (the strain on the ropes can be as much as fifteen tons) so its not surprising that equipment of this scale is made by only a few companies. A Dutch man by the name of Wolter Huisman saw a gap in the market and decided to set up a subsidiary, Marquip, to supply all the specialist equipment. Under the now famous Rondal brand name, he set about designing and making superior quality products (Fig. 20). He was quick to realise that the requirements of cruising yachts were different to those of their racing counterparts and successfully combined reliability, performance and appearance appropriate to this level of luxury.

The boats power is derived from it's sails backed up by auxiliary engines. However nobody likes the laborious process of

rigging and derigging a boat. In response to this problem Hood sailmakers (Fig. 21) designed an internal furling mainsail. This has revolutionised the world of cruising by considerably reducing preparation times. At the touch of a button the mainsail actually rolls into the mast for storage ready to be rolled out with ease. Previously the procedure was to slowly let the sail down while folding it onto the boom, this required at least four people on a large yacht. Hood sailmakers have been instrumental in the development of large cruising sails. They took advantage of their extensive research and development in the field of racing multihull sail design, and in particular fully battened sails, and applied this knowledge in the development of high performance cruising sails.

New Zealand company Maxwell Nilsson, influenced by the great popularity of yachting in Auckland have produced a world-class anchor and ground handling system. By balancing practical and engineering requirements they have designed windlasses (Fig. 22) which are considered the best available.

Traditionally the interior of a yacht was a rather dark uncomfortable place certainly devoid of fresh air or heat. Now it is normal for todays superyachts to have both air conditioning and heating (fig. 23). Such apparent luxury is taken for granted on yachts of this size but it is an indication of the advances that have been made in cruiser interior design. Clients who might normally have chosen a motor yacht often opt for the grace and splendour of a sailing yacht and can reasonably expect no compromises in comfort.

Holland has developed a highly successful working relationship with Australian yacht and interior designer Jon Bannenberg. The yacht "Garuda" is an example of their collaborative efforts. Bannenberg has been a innovative designer for over twenty years combining a creative talent with an essential ability to communicate his ideas to the client.

Andrew Winch is another of Holland's consultant specialists. Winch has carved out a successful career in the area of interior design and collaborated with Holland on the design of "Sensation"

(Figs. 24&25) for which he created an interior which reflects the owners preference for modern, simple styling throughout the yacht. Holland has also worked with interior designers Peter Sijm, Pieter Beeldsnijder, Tomaso Spandolini, Laura De Gorga Beldoni, Antonio Minniti, Ken Freivokh, and Elmer Meurer. (Dunne, interview, 1993)

The superyacht interior incorporates features such as telephones, fax, computers, televisions, videos, washing machines, dishwashers, dryers, microwave cookers, jacussis, and sockets to plug in any desired appliance. There are more than 1000 light fittings, numerous dimmer switches, soft halogen lights in living areas, fluorescent lights in the galley and engine room, deep pile carpets, and luxurious upholstery (Figs. 26&27).

> I used to claim that these yachts are as comfortable as any home ashore, but my aim now is to give the owner the feeling that he is roughing it ashore rather than when he is afloat (Holland, 1988, p90).

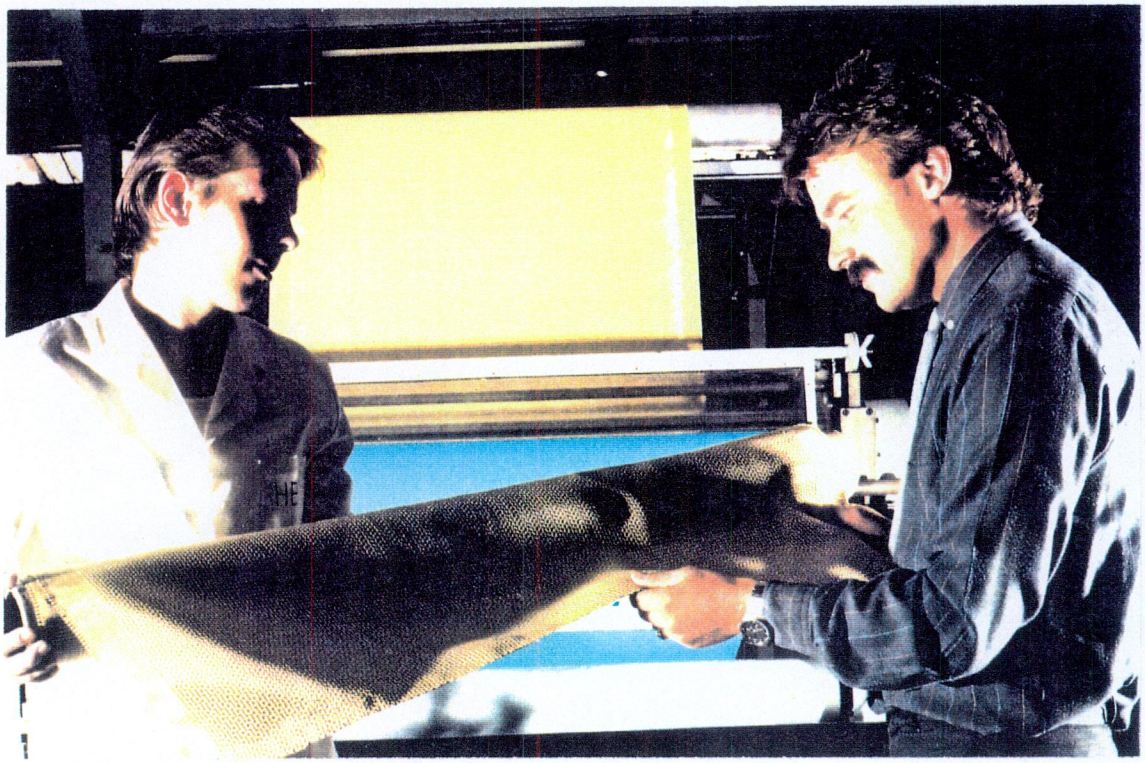

Fig. 15. Composite material selection.

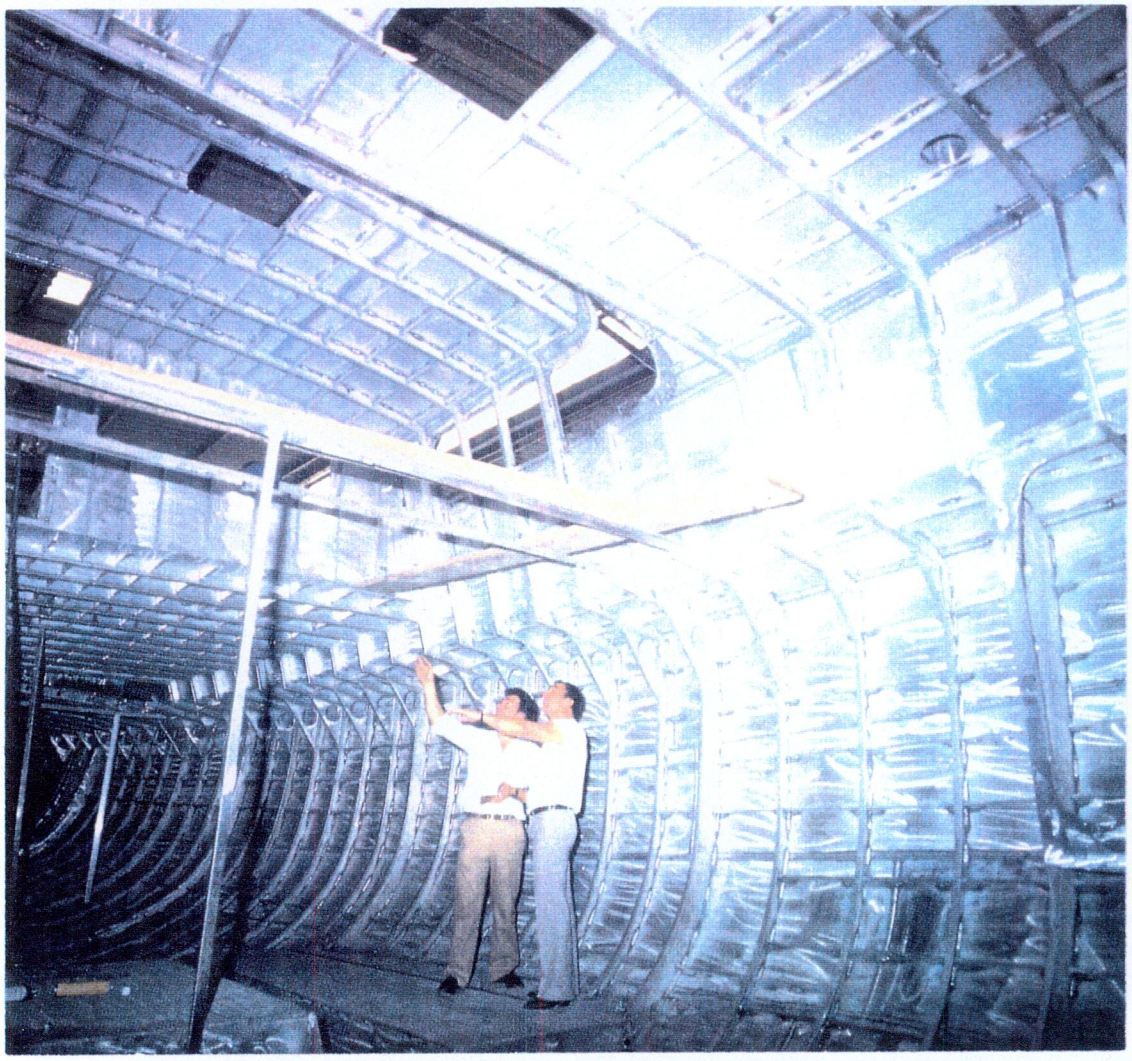

Fig. 16. Inside the bare aluminium hull prior fitting out.

Fig. 17. Building "NCB Ireland's" composite hull.

Fig. 18. Testing hull samples at S.P. Systems.

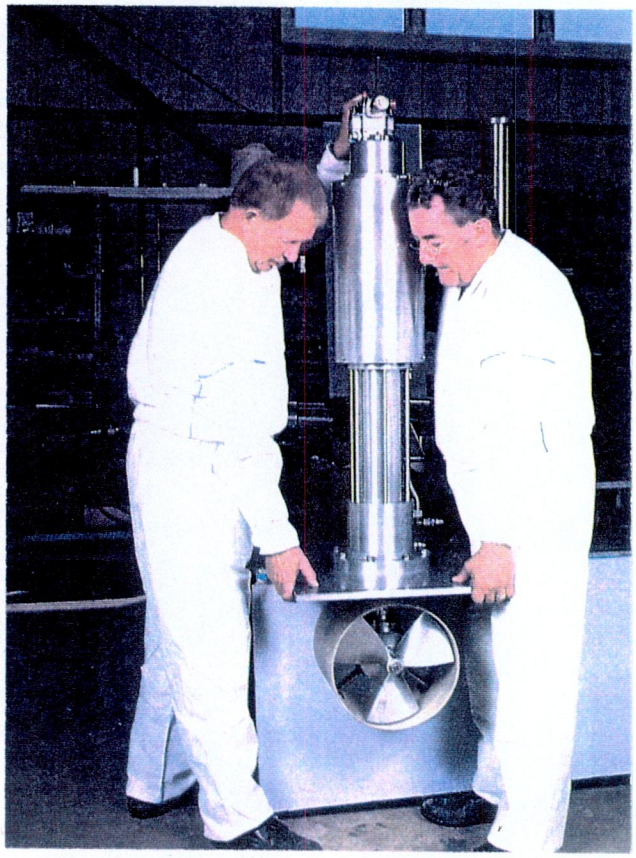

Fig. 19. Hydraulically retractable bow thruster.

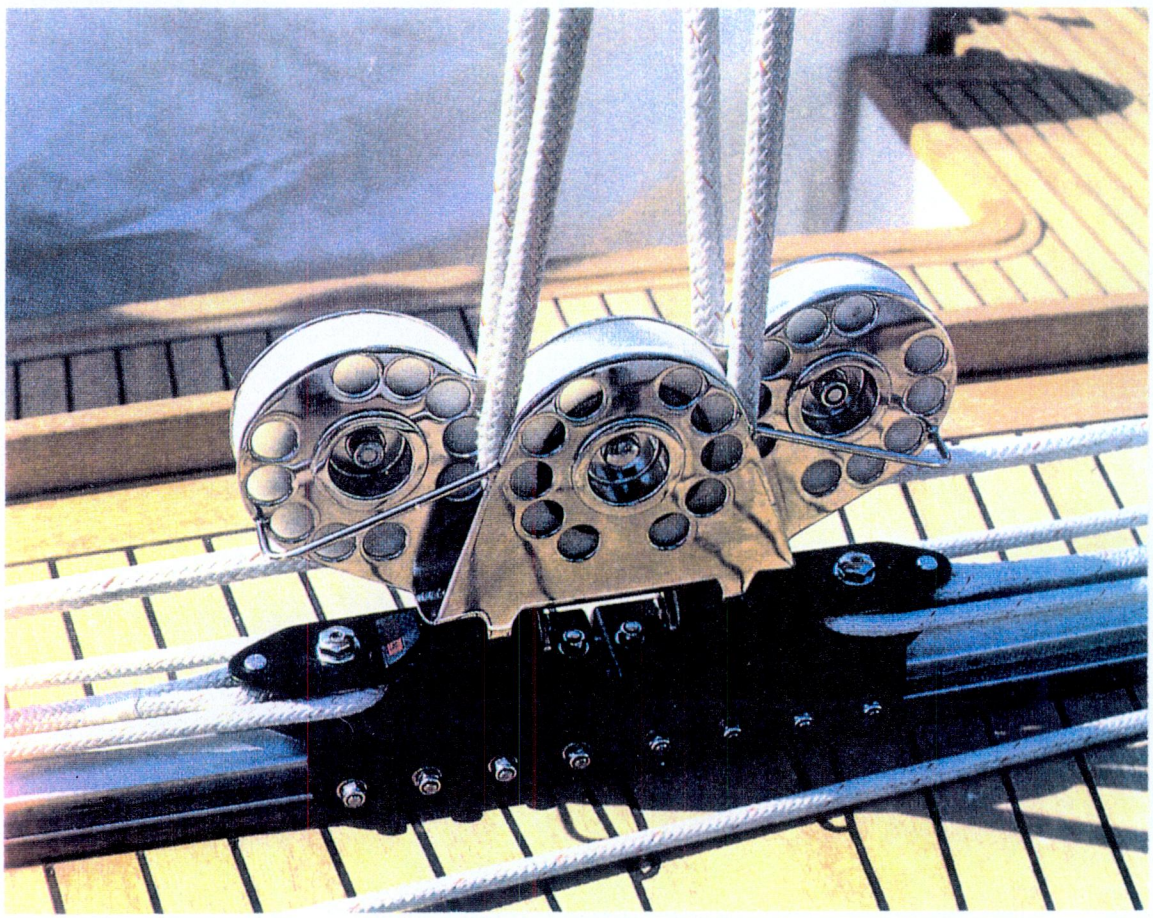

Fig. 20. "Rondal" specialist equipment.

Fig. 21. Hood sailmaking loft.

Fig. 22. Maxwell Nilsson's windlass.

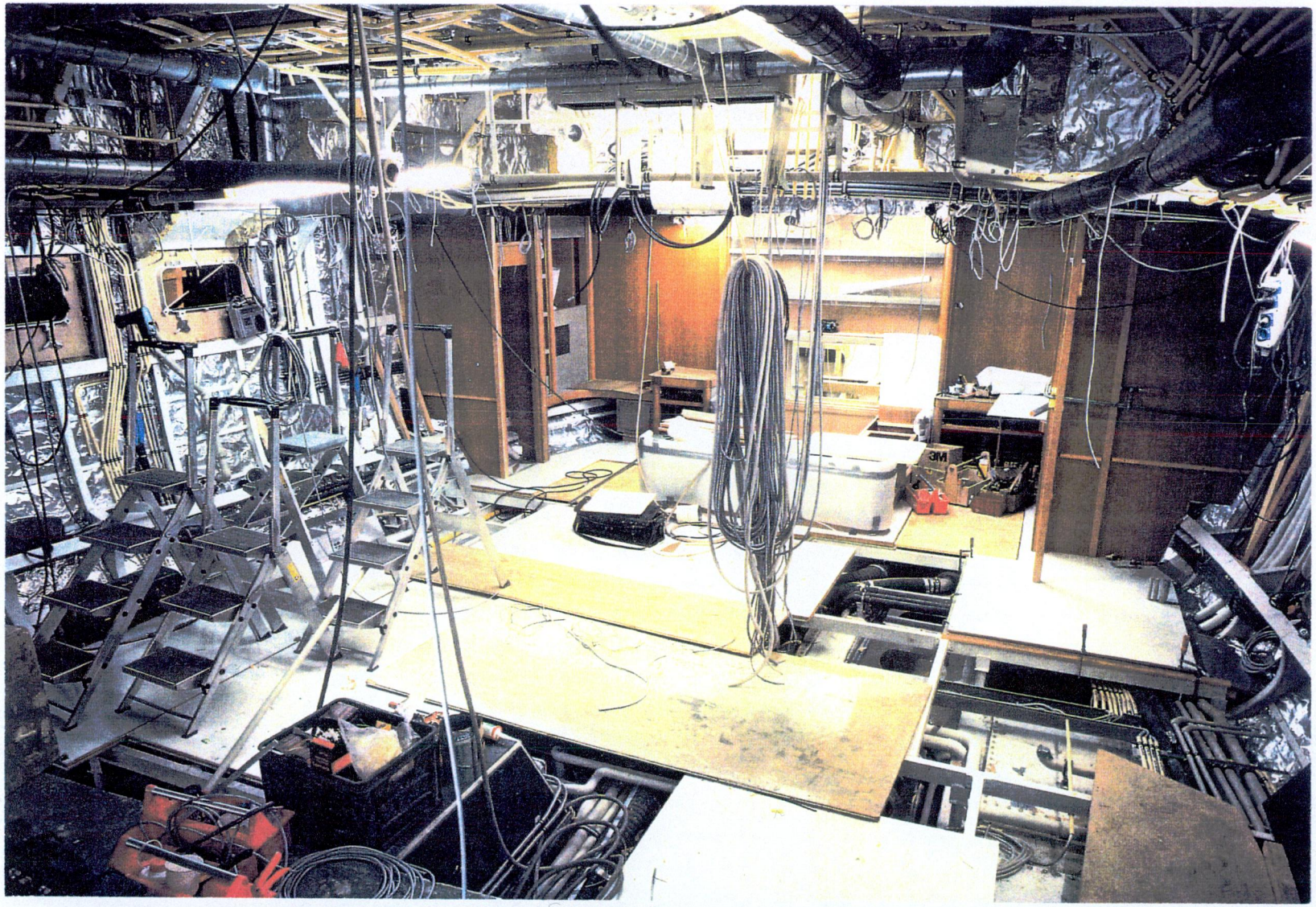

Fig. 23. The owners cabin of "Acharné" at the end of a long days work.

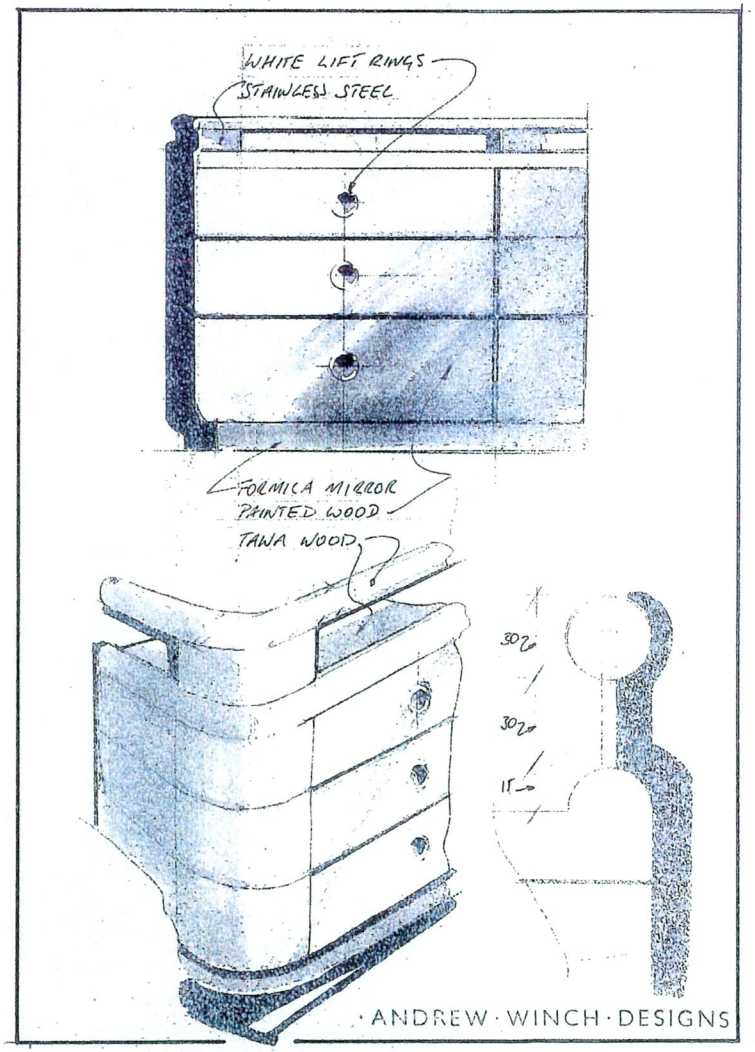

Fig. 24. Detail of Andrew Winch's interior for "Sensation".

Fig. 25. Building and finishing the interior.

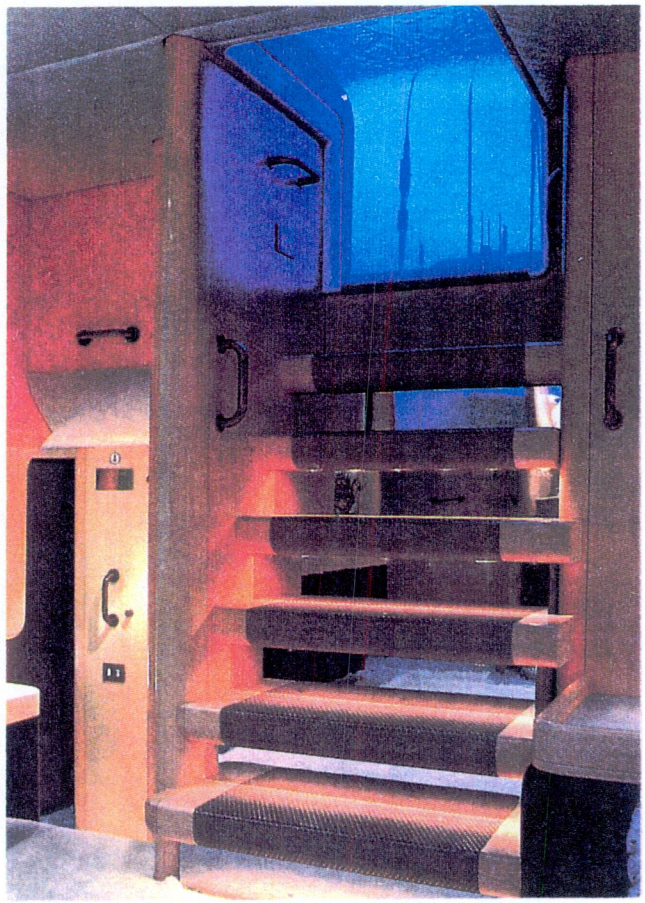

Fig. 26. "Garuda's" stairwell,
deep pile carpets.

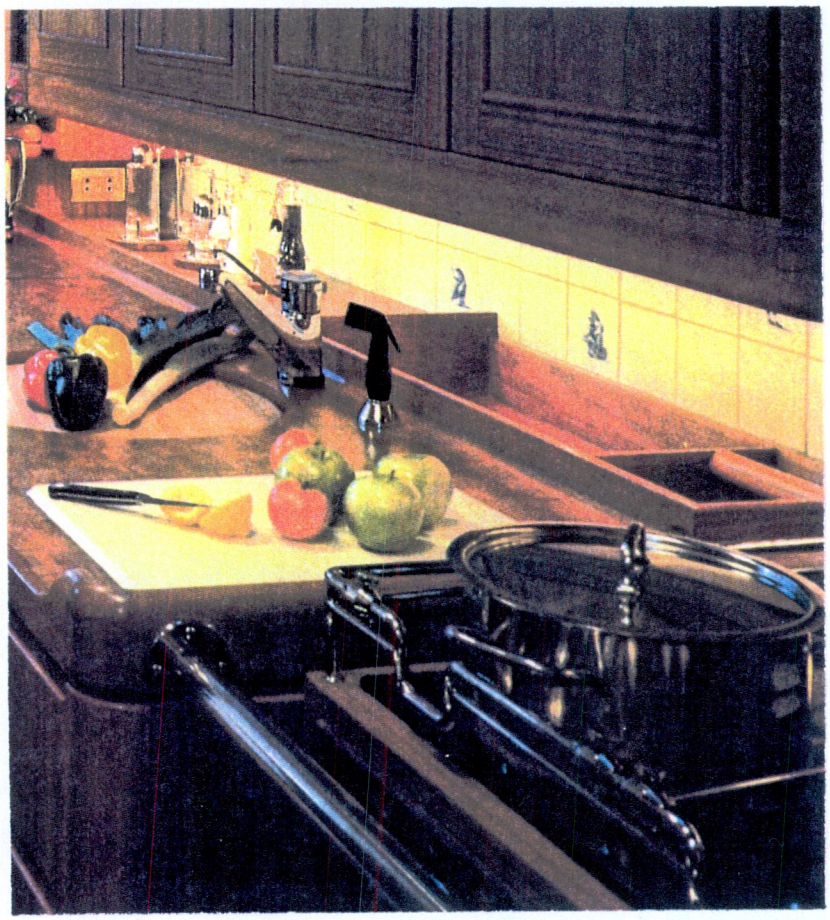

Fig. 27. Fluorescent lights are usedin the galley.

With the building programme completed, interior fitted out, mast ready and all fittings in place it is time for that glorious day, the launch. Like a new baby the yacht is cushioned and protected while she is led out to the waters edge (Fig. 28). Unlike the glamourous launching of war ships and giant tankers there is no sliding down a long slippery track into the water, instead the yacht is craned in to minimise the possibility of damage. She makes the transition from baby to beautiful lady as she gracefully slips into the water.

After the formal client inspection and celebrations comes the equipment inspection. Hydraulic, electrical, and electronic systems are connected and checked (Tomlinson, 1992, p32). The sails are put onto the rig and tested for rope leads. Engines, generators, and every ship system must be started, tested and run-in.

Testing hundreds of systems requires a methodical approach, so a programme is worked out with the engineering staff and the owners representative to ensure that nothing is omitted (Holland, 1988, p102). Propellers and bow thrusters are run at low revs at the dockside. Then its time to cast of the lines and move out to sea. The performance figures are checked against the designers hydrodynamic predictions, data is collected for the speed, range, and fuel consumption tables and the optimum throttle settings are selected. This is followed by the emergency tests one of which involves putting the engines from full ahead to full astern, a brutal manoeuvre which may one day be needed in an emergency.

The operations manual for each yacht is a vital part of the boats equipment. There are 25 thick volumes in the complete manual covering everything from the sink taps to the satellite navigation system. There are usually three copies one on board the yacht, one at the owners home, and one is kept with the builder. Another copy is kept on floppy disk for the yachts computer, this allows quick access to files and easy updating when new additions are made to the yachts equipment (Holland, interview, 1993).

"Whirlwind XII" (Figs. 29&30) was the first 100 foot yacht that Holland designed and as such set the benchmark that many others are measured against. The owner Noel Lister set a brief that specified the ultimate high performance cruising yacht. Lister is a very experienced sailor with a hobby that has spanned twenty years and eleven yachts under the name "Whirlwind". She had to be very fast but also very manageable requiring a crew of no more than four to sail her, this contrasts greatly to the J-class yachts of the same length which required a crew of thirty fit and experienced sailors (Illingworth, 1968, p44). The yacht had to incorporate an enclosed high area with all-round visibility, otherwise known as a pilot house. This was a slightly unusual request as these are normally found on motor vessels only. The pilot house was designed to offer shelter from the cold wind or hot sun while still enjoying the experience of sailing and it has subsequently proved to be the most popular area of the yacht (Horncastle, 1991, p4). Huisman also made an above the water scale model of the yacht to enable Lister to make any changes he wanted with the overall shape and appearance. Dutch designer Peter Sijm was commissioned to create a high quality, modern interior for the yacht that reflected the owners taste.

Frequent dialogue between the owners and skipper is an essential part of the development process. Holland and his team learned that the electrical generating capacity had to be increased in order to cope with peak time demand when for example hot water, cooking and heating were required in cold climates. Lister also decided to fit small wings to the keel which helped improve performance, now a feature on many yachts (Holland, 1988, p116).

"Whirlwind XII", built in 1986, completed her sailing trials two years after the design process started. She has successfully cruised the Atlantic, Caribbean and Pacific.

"Garuda" (Figs. 31&32) also built in 1986, was Hollands first collaboration with designer Jon Bannenberg. Swiss businessman Franz Burda commissioned this yacht after circumnavigating the world in his Swan 76. Like Lister, Burda wanted high performance with no compromise to interior comfort, however he required semi-flush decks which ruled out the possibility of a pilot house.

Burda specified three important requirements for the interior. He wanted the crews quarters to be at the back of the boat allowing easier access to the working deck, engine room, navigation station and galley without having to pass through the owners or guests cabins which were to be positioned forward. He is a keen cook so the kitchen had to lead directly off the main saloon, yet it had to be partitioned off when the professional cook was arranging meals. Finally he decided that the interior was not to be in teak as his previous boat had been.

Originally the length was set at 90 feet but after reviewing the preliminary concepts this was increased to 102 feet (Holland, interview, 1993). This afforded Holland the opportunity to improve on the original performance requirements and allowed Bannenberg full scope for the exciting interior planned.

In 1987 Holland was commissioned by South Pacific Yachts to design a speculative 100 foot yacht called "Gleam". The brief required a top quality cruising yacht that would appeal to as many potential buyers as possible. In order to research the project properly Holland talked to several influential yacht brokers and came up with some interesting points.

The yacht had to be built to the highest possible standards with no compromise to comfort and with only the best equipment. The interior had to include a large owners cabin and two equal size guests cabins with a third one for occasional use. The main saloon had to be well lit and roomy and a pilot house was advised. Finally the cockpit had to be large enough to accommodate outdoor dining (Dunne, interview, 1993).

"Gleam" sailed across the Pacific to America where she passed a thorough survey and was sold to a prominent businessman for use on the east coast and the Caribbean.

"Acharné" (Figs. 33&34) was designed 1987 in collaboration with Bannenberg for his clients Geoffrey and Doreen Simmonds. The Simmonds

wanted a sailing yacht that had an interior arrangement with all the comfort and convenience of a motor cruiser. For this design comfort was of paramount importance and performance came second.

The brief stated that the clients wanted to cruise across the Bahamas Banks which required a depth of no more than seven feet, most yachts over 100 feet long have a draft of up to 25 feet. This posed a big challenge for Holland but he solved it by incorporating a pivoting keel (Holland, 1988, p128) which slots into a gap between the two engines, reducing the draft from 24 to the specified 7 feet. "Acharné" includes such items as full time electricity generation, a large inboard diesel tender, a small sailboat, a rubber crew-boat, a motor scooter and two bicycles.

"Acharné" is unconventional in appearance looking very much like a cross between a motor yacht and a sailing yacht. The most interesting aspect is a full width saloon as the main interior feature. There are large watertight windows at each side, in inch thick armour plated glass which allow panoramic views from the saloon. The windows can be opened to create a "veranda" effect. This is the fist sailing yacht to have such a feature. In order to get the proportions correct the builders Royal Huisman decided to construct a full size mock up of the cockpit area (Fig. 35).

Geoffrey Simmonds has carved out a very successful career in the field of aircraft components where the relationship between quality and cost is vital. He insisted on the same attention to financial efficiency for the "Acharné" project, which proved beneficial for all parties as many lessons were learned (Holland, 1988, p129). The completion of "Acharné" marked a turning point because it was the first sailing yacht to match the comfort of comparable motor yachts.

"Sensation" (Fig. 36), launched in 1989, was Holland's first collaboration with interior designer Andrew Winch. The brief was to design a yacht of sleek, modern appearance which was in keeping with todays motor yacht styling. She was to be a high performance cruising yacht that had two large cabins for the owners and two additional double cabins for family and guests.

"Sensation's" keel is designed to have a very low center of gravity, the same principle that had been applied to the highly successful "Kiwi-Magic". The mainsail is of a fully battened design which is slightly less convenient than the furling system but the extra efficiency and weight saving were deemed appropriate for this project.

She looks very different from a sailors point of view as all the winches are located under the deck resulting in a smooth uncluttered appearance. Seaway products were brought in to help develop the special equipment needed (Holland, 1988, p136). She measures 110 feet long and as a result of the extensive research programme she has exceeded all the normal performance figures for a luxury cruiser of this size.

"Thalassi" (Fig. 37) was designed for long time friend and colleague of Holland, Guillermo Cryns. Cryns first association with Holland was back in 1975 when he bought "Silver Apple". He campaigned this well before coming back to Holland for a Mini-Tonner, a Quarter tonner, and an Admirals Cupper (Tomlinson, 1992, p31). Since this he has cruised the world extensively including the hostile south Atlantic.

The brief stated that the owners cabin was to be situated under a large flush after deck. There was to be special storage places for every piece of equipment needed on long cruises this included items as small as cameras. The saloon was to be open plan and the engine room was to have plenty of space for a workbench and spares stowage. This yacht was to be optimised for global cruising and had to be very tough to withstand the pressures of this type of yachting. Performance was important but the primary concern was the safety and comfort of the people on board, in short "Thalassi" had to be completely reliable.

She was built by Belliure in Spain from fibreglass with a Kevlar coating to withstand possible impacts with ice (Dunne, interview, 1993). In her first year she circumnavigated the south American continent.

"Beaupré" was launched in 1989. She is a 120 foot cruising yacht build by Brooke yachts in England. This is Jon Bannenberg's own yacht, therefore the interior was the priority. This resulted in a compromise on performance and boat shape in order to accommodate greater interior space.

"Cyclos III" was launched in 1990. Built by Royal Huisman in Holland her interior was designed by Andrew winch. "Cyclos III" is 140 feet long and the German client specified a high performance yacht. She has achieved speeds of up to 16 knots (Dunne, interview, 1993) making her one of the fastest single hulled yachts in the world. The interior is of a simple design, very functional, and expensive.

"Mariya Uno" was also launched in 1990. She is 120 feet long. This was a speculative project commissioned by the builder and built "on spec". The yacht was sold to a Japanese company and used for charter work off Mauritius, complementing their holiday resort there (Dunne, interview, 1993). She was built by CCYD in Venice, Italy and the interior was designed by Italian Tomaso Spandolini.

The final yacht launched in 1990 was "Gee Dee". She was built by Brooke Yachts in England, is 100 feet long and the interior was designed by Jon Bannenberg. "Gee Dee's" owner wanted a luxury cruising yacht that embodied not only the look and feel of an offshore racing maxi-yacht, but a good measure of the performance as well (Holland, interview, 1993). For this project performance was the primary concern with comfort second.

The "Windship 105" was another speculative project commissioned by the builder in this case Windship yachts in Florida. She measures 105 feet long, was launched in 1991, and the interior was designed by Andrew Winch. This yacht had to appeal to a wide market so there is a good balance between comfort and performance.

"Naos" was launched in 1992. She is 106 feet long and was built by CCYD in Italy. The interior was designed by Andrew Winch. She is a performance cruiser with an innovative interior which makes intelligent use of the space available (Dunne, interview, 1993).

"Aglaia" also launched in 1992 was built by Mediterranea in Italy. She is 88 feet long and her interior was designed by Laura De Gorga Beldoni.

The final launch in 1992 was "Shanakee". She is 107 feet long, and was built by Palmer Johnston in Wisconsin. The interior was designed by Pieter Beeldsnijder.

There are two yachts due to be launched in April of this year, they are "Juliet" (Fig. 38) and "Aga-Jari". "Juliet" is being built at Royal Huisman and the interior was designed by Pieter Beeldsnijder. She is 144 feet long and is of a classic cruiser design. "Aga-Jari" at 72 feet long is the smallest yacht Holland has done for a number of years. She is being built at Southern Wind in Capetown South Africa, and her interior was designed by Antonio Minniti (Holland, interview, 1993).

Later in the year "Twirly Bird II' will be launched. She is 133 feet long and is being built at Lürssen in Germany. Her interior designer is Ken Freivokh.

At present unnamed, design number 306 (Fig. 39) is 160 feet long. It is being built at Gouwerok-Supership in Holland, and it's interior is being designed by Elmer Meurer who has never before styled a yacht. Holland expects this yacht to be launched in June 1994.

Nowadays Holland is working on yachts as large as 200 feet long. The brief for the project on the drawing board at the moment states that the yacht has to be of a very classic style and that she should be designed for life on deck rather than indoors. There are a number of interesting features such as the pilot house which is very spacious with large windows, the crew has been separated with the captain at the rear near to the steering area and the rest of the crew are at the front near the kitchen, laundry and long term storage (Holland, interview, 1993). On the other hand these type of clients really value their privacy and the design of the yacht has to take this into consideration, however the owner specified that he wanted to be able to pop up on deck to check on the goings on, so his suite is

near the gangway for easy access to the steering area while also being close to the main saloon.

Still more of these yachts are in the process of being conceived and Holland sees himself designing yachts over 200 feet long before too long.

Fig. 28. "Acharné" is rolled out of the yard read for launching.

Fig. 29. "Whirlwind XII".

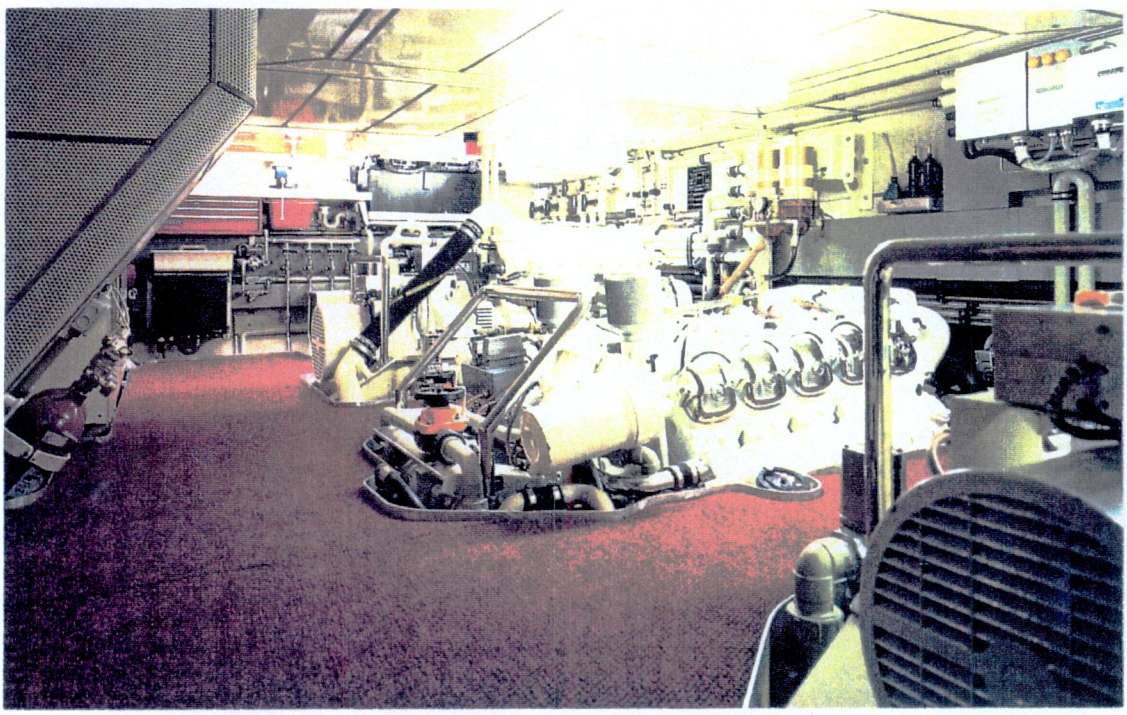

Fig. 30. "Whirlwind XII's" engine room.

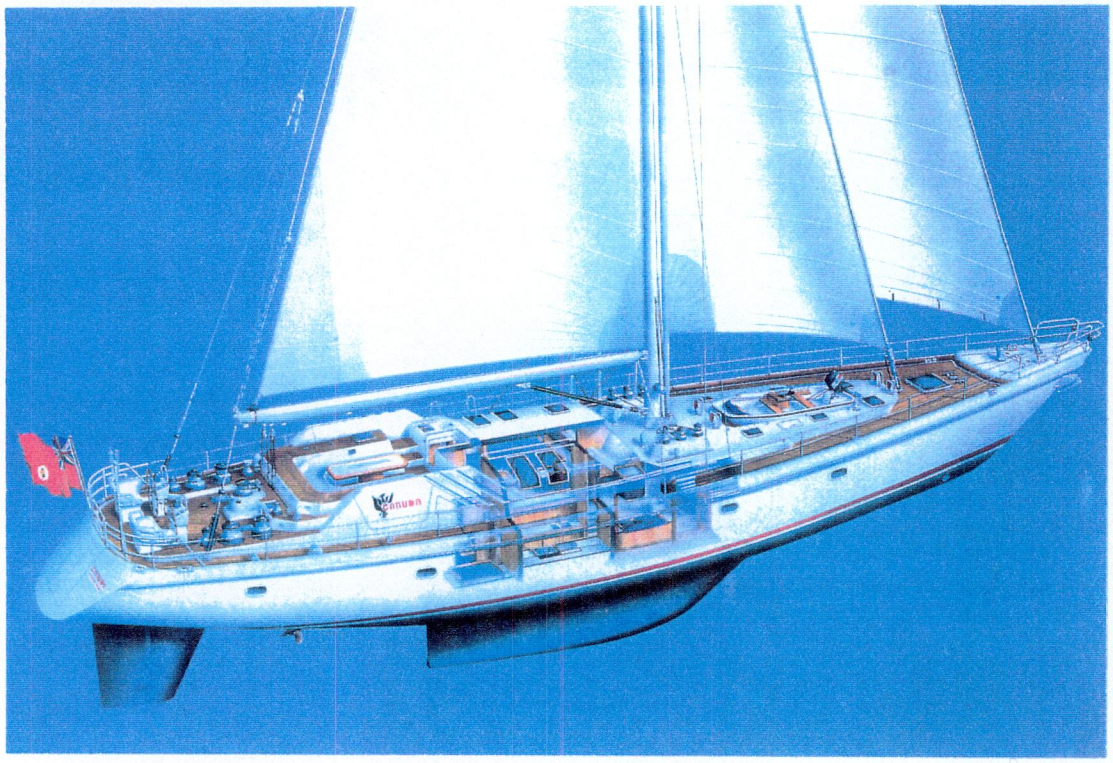

Fig. 31. "Garuda".

Fig. 32. The owners cabin on "Garuda".

Fig. 33. "Acharné".

Fig. 34. An intimate corner inside "Acharné".

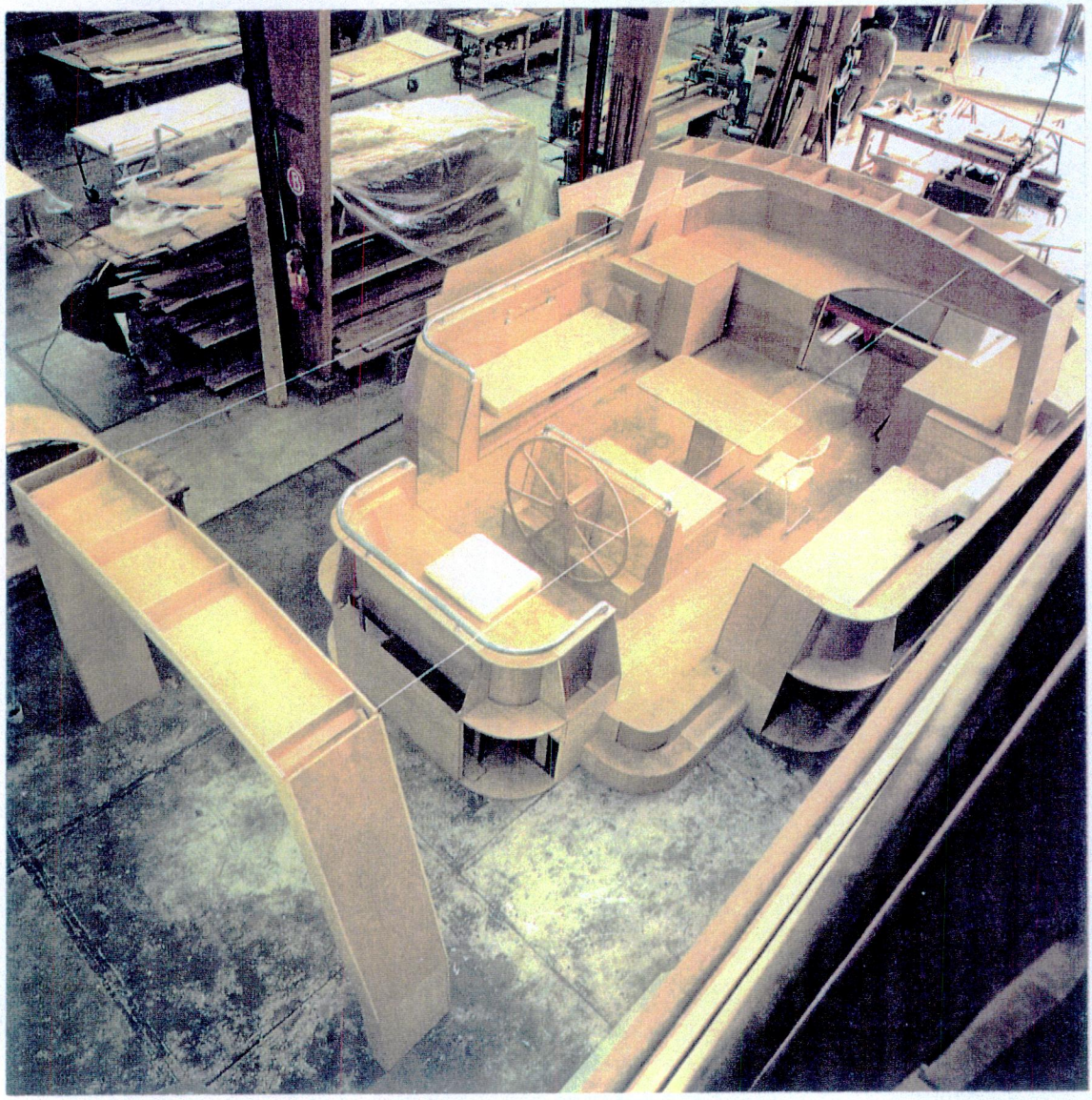

Fig. 35. The mock up of the cockpit area of "Acharné".

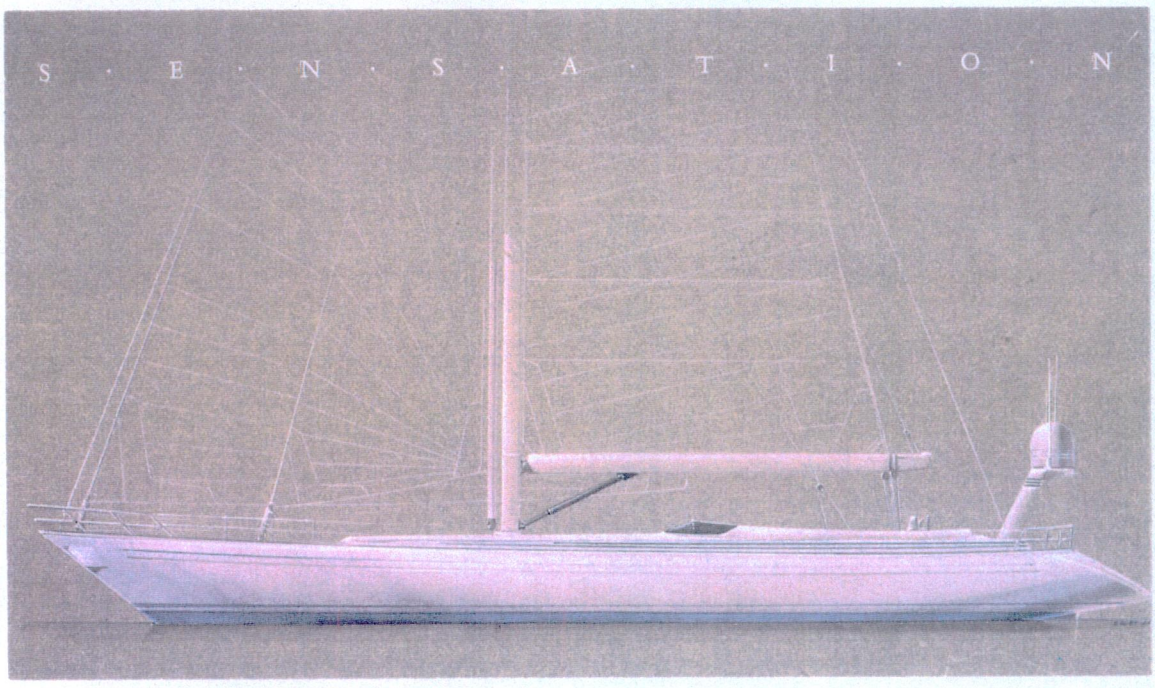

Fig. 36. "Sensation".

Fig. 37. "Thalassi".

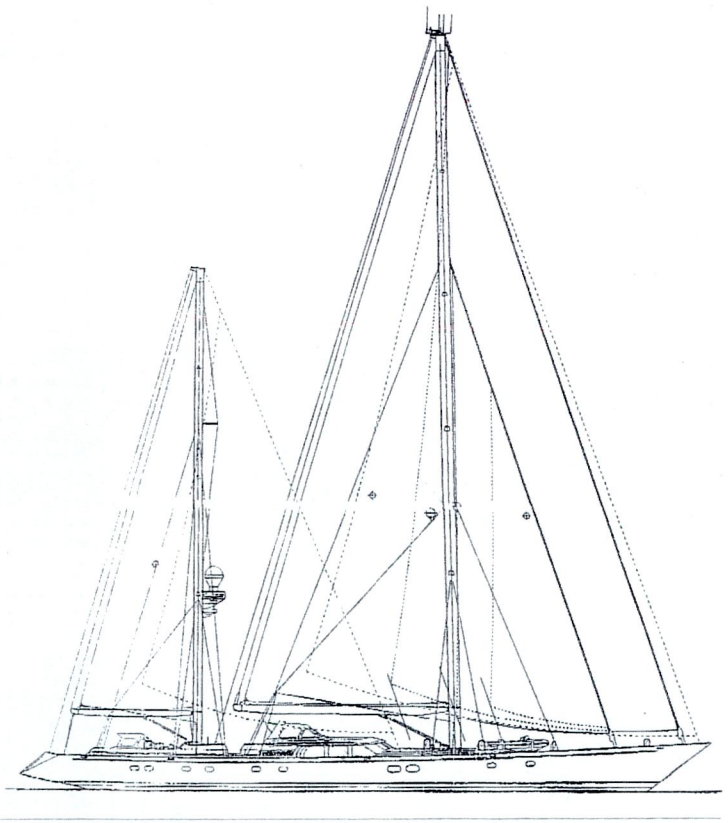

Fig. 38. "Juliet".

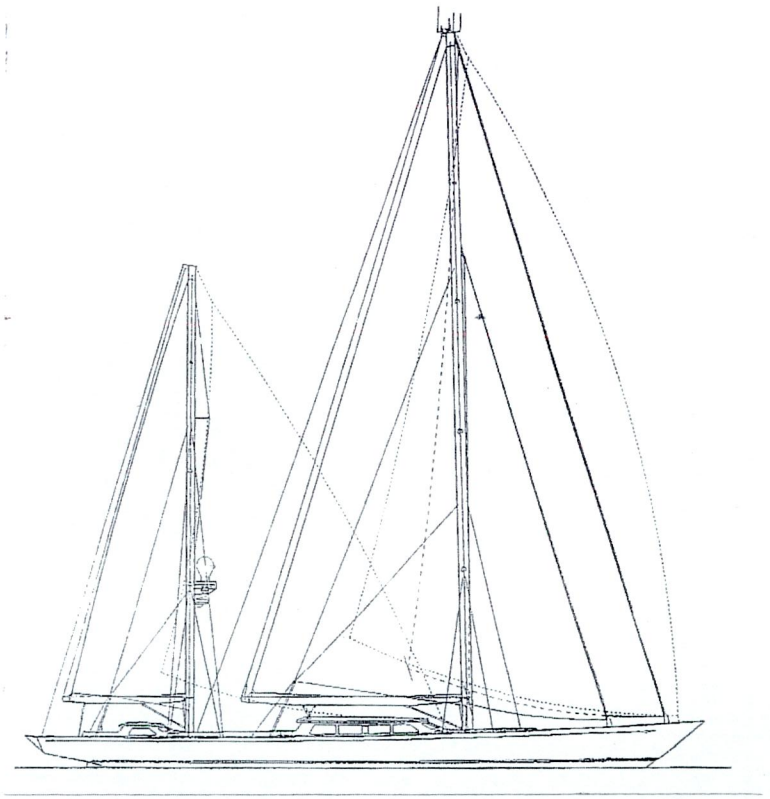

Fig. 39. Design number 306.

CONCLUSION

Holland's practise has been badly hit by the recent world recession. Not long ago he had thirteen employees, now that figure has dropped to seven. His organisation used to have three to four projects running concurrently, now he only has this number in the space of a year. People do not have the same confidence in their financial security, and as a result are wary of spending large sums of money on relative luxuries. He is not discouraged however pointing out that the company can be profitable while operating at this scale (Holland, interview, 1993).

Ever the optimist Holland has numerous plans and ideas he wishes to explore (Fig. 40). He is starting to experiment with motor-yacht design, feeling that his company has something unique to offer in terms of sea kindliness. He has done some preliminary designing (Fig. 41) in this field but as yet nothing has been built. He sees motor yachts as a growing market and one which he is keen to examine.

He also sees development in the area of presentation, and in particular the field of computers. Concepts such as virtual reality could be used in the future to enable the client to "walk" around the proposed interior of the yacht, and at the push of a button change the colour of the carpet, move the cooker to a different location, or perhaps insert more windows and see if there is an increase in cabin brightness.

As the size of the yachts increases a number of components remain unchanged. It is hard to know where the limit lies. It could be the sailcloth, it might be the masts, rigging, or the winches, or there may be no limit in which case we can expect to see sailing ships before too long.

The thesis discussed the significance of Holland's racing designs and outlined how he adapted his talents in this area to benifit his cruising designs. There was an assessment of the importance of the designer client relationship and an evaluation of the influence of

the brief on the final design. The thesis analysed the uses of AutoCAD and the impact of new technology on Holland's design process. Finally there was an investigation of the need for co-operation and an examination of the yachts and how they accomplished their briefs.

Ron Holland's story outlines considerable opportunities for the design industry in Ireland. With its high graduate population and increased telecommunications possibilities Ireland has the potential to become a place where talented designers can operate successful businesses, designing the very best products, from any location.

Ron Holland has enjoyed considerable success to date. This degree of accomplishment could not have been possible if it were not for the significance of the following factors.

Holland established an excellent reputation as both a talented helm and a first class designer. He capitalised on this success by branching into the world of luxury cruising yacht design where his reputation attracted people in ever greater numbers to commission yachts from his organisation, confident that they would be the very best of their class.

As it became obvious that his excursion into the world of cruiser design was permanent Holland realised that his ability to be designer, engineer, interior stylist, and sailmaker was not sufficient to produce designs of the quality required. His willingness to consult specialists, take advantage of every technological innovation, and his talented eye for the subtleties of curve that are so essential for successful yacht design enabled Ron Holland to become one of the worlds very best specialist yacht designers regardless of his location.

Reflecting on these factors and considering the continuing developments in all fields I conclude that the best, most exhilarating designs are yet to come.

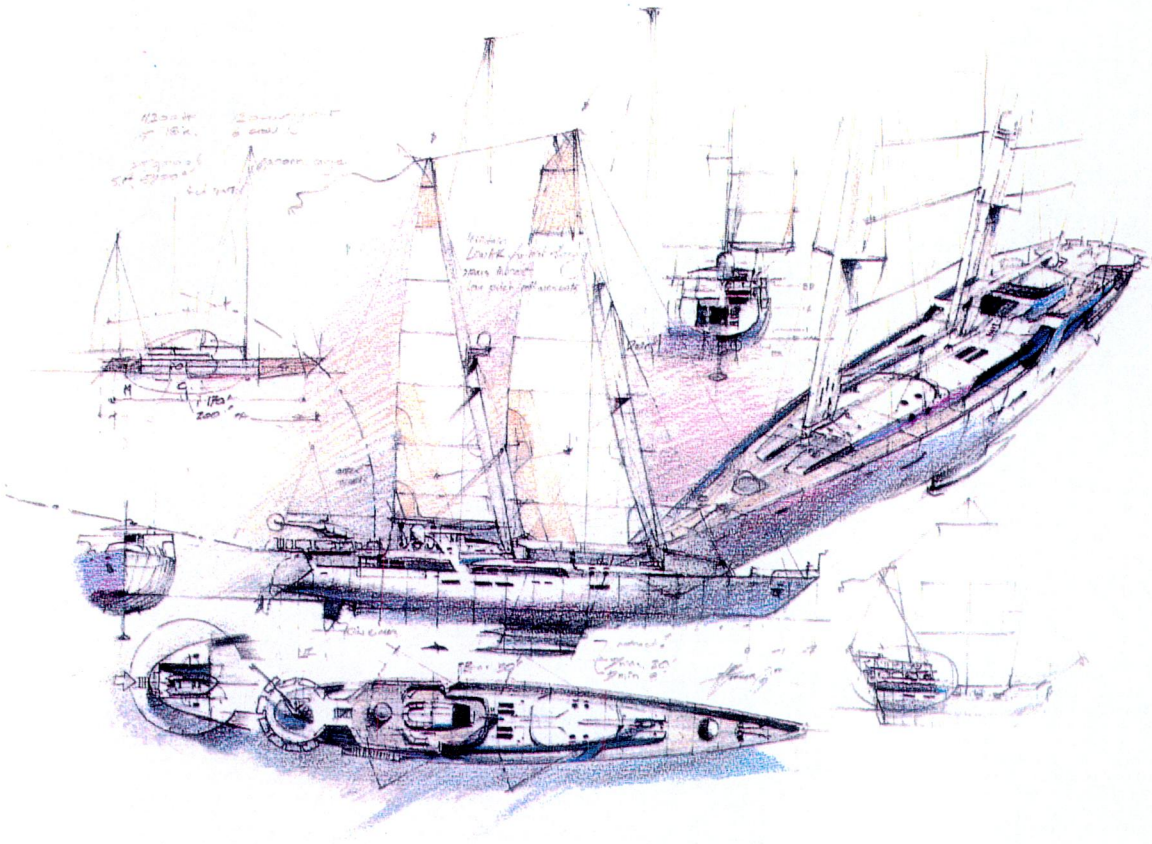

Fig. 40. Some of Holland's ideas for the future.

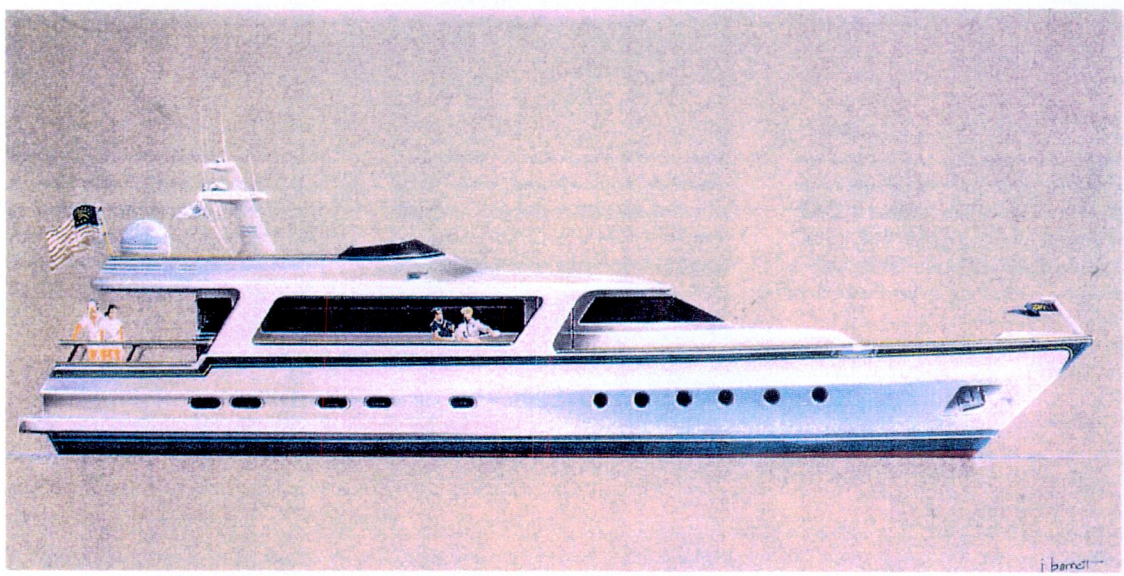

Fig. 41. One of Holland's proposed motor yacht designs.

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