Boatbuilding with aluminum pdf

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Currently Amazon.com Ballast, Society of Boat and Yacht Designers: Brings it all together in an organized and thorough volume that is loaded with custom information and practical advice... I give it a thumbs up for anyone interested in building an aluminum boat! Boatbuilder: This is the reference text of a backyard builder and a small professional builder waiting. WE WROTE A BOOK! Aluminium may be the best material for boat construction: it is economical, lightweight, without maintenance, almost impervious to corrosion, less easily damaged and easier to repair than any other material used for boat construction. It can be cut and worked with conventional woodworking tools, and using the author's special methods, can be welded with easily accessible equipment using a standard household current. Only the lack of information kept aluminum from becoming the material of the court shipbuilder of choice. In Boatbuilding with aluminum, readers will recognize aluminum-making, welding and lofting through the construction of a 14-foot Mackenzie River drift boat. More advanced methods of aluminium formation and construction of large yachts are detailed, using specific examples to allow readers to build aluminum boats of any size. And they will learn from the master of craft. Stephen Pollard has built hundreds of aluminium boats, from large ocean racers to river boats, and has pioneered many of the techniques used in modern production of welded aluminum boats. Content Table: Evolution of Aluminum Hull Benefits Aluminum Boat Building Characteristics Of Marine Aluminum Designing Welded Aluminum Hull Aluminum Building Technology Aluminum Styling for Aluminum Construction Construction Sequence of Propulsion Systems Electric Wood Systems and Aluminum Insulation Hull Picture Systems Applications: Cumber Calculation Curve Formation aluminum changing lines to develop surface line dousing with flexible Batten Installation conventional propeller systems Drive Estimates the cost of building a list of aluminum boatbuilders currently available on the Amazon.com Make Your Dream Boat come true with aluminum aluminum is The ideal boat building material is lightweight, economical, without maintenance, and easy to operate. This second edition offers you everything you need to know about working with this material, from welding to installation and painting. Aluminium may be the best material for boat construction: it is economical, lightweight, without maintenance, almost impervious to corrosion, less easily damaged and easier to repair than any other material used for boat construction. It can be cut and worked with conventional woodworking and, using the author's special methods, can be welded with easily accessible equipment using a standard household current. Only the lack of information has preserved become the material of the court shipbuilder of choice. In Boatbuilding with aluminum, readers will recognize aluminum-making, welding and lofting through the construction of a 20-foot Mackenzie River drift boat. More advanced methods of aluminium formation and construction of large yachts are detailed, using specific examples to allow readers to build aluminum boats of any size. And they will learn from the master of craft. Stephen Pollard has built hundreds of aluminium boats - from large ocean racers to river boats with water jets - and pioneered many of the techniques used in modern production of welded aluminum boats. Aluminum Boat Construction - Sims E.H. (1993, DjVu) Boat Construction in Aluminum Alloy - Ernest H Sims (2000, PDF) Boat Building: Cold Shape and Striped Wood - Nicholson I. (2016, EPUB) Complete Guide to Metal Boats: Construction, Maintenance and Repair - Roberts-Goodson Bruce (Roberts-Goodson Bruce) (200,... Lopping the boat step-by-step guide - Roger Kopanycia (2011, PDF) Repair and Restoration of Wooden Boats - Mike Harper and Dave Johnston (1980, PDF) Boat Building with Steel - Gilbert K. Klingel (1991, PDF) Reeds C Tarnsport - Patrick M Alderton (2011), PDF' Shipbuilding (Chief Course Mate) - Captain S.A. 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Aluminium is becoming increasingly popular among housebuilders: it is economical, light weight, maintenance free, almost impervious to corrosion, less easily damaged, and easier to repair. It can be cut and worked with conventional woodworking tools, and with the help of author's methods can be welded with easily accessible equipment. Only a lack of information kept aluminum from becoming a viable material for a backyard builder. In the With aluminum, readers will learn the manufacture of aluminum, welding and lofting through the construction of the 20 foot Mackenzie River drift boat. More advanced aluminium formation and construction of large yacht yachts detail, using specific examples to allow the reader to build aluminum boats of any size. Stephen Pollard is a ship master who has built hundreds of aluminum boats, from large ocean racers to river boats, and is a pioneer of many techniques used in modern production of welded aluminum boats. The second edition includes lighting computer lofts and cutting. The Aluminum Boat Building by Steve Pollards's book on aluminum boat building is the best on the subject. Steve has about 40 years of experience in boat building and design. If you're building out of aluminum, this should be a book - Jim Bauer, WA © COPYRIGHT 2000 The number of people with aluminum welding skills and access to equipment manufacturing has increased significantly over the years. However, many are unaware of the fundamental considerations facing the short arm of amateur building one boat for its own account. I will discuss many of the most common issues, especially since they refer to motorboats in the 15' to 40' size range we most often deal with today. Disposable vs. Manufacturing Building Techniques - Similar results, but the different approaches required would make the aluminum shipbuilder himself already familiar with aluminum often has its roots in non-marine manufacturing manufacturing settings. Thus, there may be a tendency to apply mass-produce methods to the construction of just one boat. But building one boat itself is vastly different from one built on a production line, and thus may require some adjustments and even a revised mind set by the builder. First, there is no such thing as an excellent way to build an aluminum boat. In fact, there can be many appropriate approaches and variations. Secondly, there is no reason why you can't build your own aluminum boat in your own garage or yard that looks identical to the one produced in the factory, and with a similar weight and strength of quality, even if you don't use the same mass production methods, or have access to sophisticated, specialized equipment and your own materials. Let's look at this. Since production builders have always come up with ways to reduce labor and materials costs, as well as the time it takes to build boats, they develop specialized techniques and materials that help for this purpose, even if there is not necessarily any improvement in the boat itself. For example, they can use special own extrusions to speed up some assembly processes, such as side joining and lower coating on the chin (see Pic 1E). But when building your own boat, you can't have access to such a specialized member, and can't afford it shipping in small quantities you need, even if any. In addition, your chins can be backed up by a simple round panel (Figure 1D) or other standard shape, or the coating can just butt together and be welded (Figure 1A). None of these methods above, but just different because of the circumstances. In addition, production builders often make up the complex reuse of production jigs over which pre-cut body panels are assembled and welded first. These jigs can also rotate to facilitate high-speed welding, with internal members added after the case is removed from the jig. But when building your own boat at home, it's just as likely that the inner frame of the boat gets built and configured first, with plates mounted over that, marked with shapes, cut into a suit and then welded in place after. In other words, the frame of the boat becomes a shape-shaped jig and remains in the boat; You do it and pay for it only once. In any case, the final results are largely the same with the comparable quality of the boat. Using a substructure frame to customize the case has several advantages for do-it-yourself, usually working alone. First, the personnel substructure makes it easy to ensure the accuracy of the hull, which is so important for the ultimate performance in a motorboat. Secondly, the framework system allows you to build from finished materials and forms available anywhere to reduce costs and simplify the purchase of materials. Finally, the framework simplifies the formation of the hull members on the spot and during welding, as clamps and other devices can be easily used anywhere as needed, acting as an additional pairing helping hand in the process. Factory-made shipbuilders often use specialized formation equipment not always available to hobbyists, or use formation services that can be provided by metal suppliers when quantitative needs are high. For example, a design for a do-it-yourself builder is likely to indicate internal longitudinal stiffeners (i.e. flat bars, tees, corners, etc.), and be designed this way (as we usually do) so that no special formation or bending of equipment or external services is required. Any method gets the job done, but the latter is easier and cheaper for most to build their own boats. First, rejection. Ideally, when converting a design into one material into another, you should seek advice from a qualified designer or professional naval architect to make changes, or at least consult with the boat designer about the feasibility of such a change. But in fact, few do-it-yourself want to pay the price for the service. So if you can't find the aluminum size design and type you want, you can check out the designs in steel - the closest material to the alternative. Steel is much heavier than aluminum, so boats designed for steel are usually designed for greater displacement. Thus, if the boat is built of aluminum, it will not be nearly as heavy and therefore can float higher in the water. The consequences for a semi- or full-veg all the better, as a lighter aluminum boat will require less energy and fuel. But in converting a slower displacement type of motor boats from steel to aluminum, you may need to add ballast to such a boat made of aluminum to return it to its original lines. This can place the center of gravity too far lower than that of its steel brethren and lead to quick, jerky movements. So instead, you can place some of the added weight above. But then again, the best advice is to consult with the boat designer. Aluminium is not as strong as steel, so some compensation should be made when using it instead of steel. Without getting too technical, with the aluminum used for shell coating (e.g. 5086-H116) compared to soft steel, the strength yield for aluminum as welded is about 25% to 35% less than that of steel. In addition, it has about 75% strenuous strength at 1/3 weight. In other words, to get the same strength as steel in an aluminum casing, it must be about twice as much steel. More important is how the two perform under repeated cycles of load stress fatigue alternating between tension and compression. Tests show that for a similar number of cycles, steel remains above the yield strength threshold. But aluminum falls below it, suffering loss so that the force is equivalent to only 75% of its stress output. In other words, it is likely to fail due to fatigue over time, which is an important consideration for boats subject to such conditions (i.e. high-speed motor boats). The fact is that if you decide to adapt the steel design to aluminum, you will need to increase the meagre (i.e. the size of the members' enclosure). But for how much? The conversion from steel to aluminum is pretty straight forward mainly because the members used are pretty much the same in configuration and design and construction methods are similar. And while there are standards-making organizations (such as A.B.S.) with rules and formulas that can be used to determine the skimps of a boat, a more pragmatic approach for the less technically oriented is to use the following rule of thumb. After all, we're talking relatively small boats here, and as we'll see, the sizes, types and thickness of the members are readily available and the appropriate ones put some practical restrictions on what can be used for the frame and plate of the metal boat in the first place. Consider the thickness of the coating. On a steel boat, it is most often based on the practical minimum required to repel corrosion over time, provide a decent weld, and thickness is enough to minimize unsightly deformation. Thus, 10GA (.1345) coverage determined at least in small steel boats, even if something something thinner can be enough if strength is only a requirement. (NOTE: Many of our SHRINK-WRAP steel structures can effectively use steel much less than 10GA, such as 11GA and 12GA.) Thus, in light of the above-mentioned materials, and based on Over time, aluminum members who are 30% to 50% larger than steel members will be enough for most small boats up to about 40'. And in most cases, this increase refers mainly to thickness alone, as is listed in rice. 2 showing sections for a typical power utility utility chin shape. The operational premise is that steel boats in the range of sizes under discussion are almost always stronger than necessary; this is because of the nature of the material, for reasons previously noted, and the fact that the shape of most boats adds strength in itself, and often where it does the best, for example in the nasal part. So there's some latitude in the transformation process - we're not talking rocket science here. Thus, using the example, the 10GA (.1345) lower coating in the steel boat, and applying our thumb rule, results in a par 3/16 (.190) coating thick in aluminum, or just over 40% thicker. In other words, multiply the thickness of the steel penis by many times from 1.3 to 1.5 to come to the thickness required in aluminum. (Tip: Start at 1.4 and round up or down to satisfy the availability of material or have a boat that is lighter and a little less strong or heavier/stronger accordingly). That's basically all there is to do. Fig. 2 (Left) - Half of the sections show originally specified scantlings for 26' planning utility boats in steel and modified scantlings based on the rule of thumb explained in the text, and what could be used if the boat was built of aluminum. Listing a (I) for the aluminum version indicates additional material that can be replaced in lieu of the extrusion if the form and/or size are unavailable or too expensive. The fact is that many alternatives can be used to create an aluminum boat with pretty much the same results in terms of strength, durability, etc. F.B. - Flat bar KEY MEMBER STEEL ALUMINUM Bottom coating 3/16 1/4 B Side cover 10 GA. 3/16 C Keel 3/8 1/2 D Нижняя рамка 3-1/2 x 1/4 F.B. 2-1/2 x 1-1/2 x 1/4 Угол (я) 3-1/2 x 3/8 F.B. E Боковая рама 3 x 3/16 F.B. 2-1/2 x 1-1/2 x 3/16 Угол (я) 3 x 1/4 F.B. F Боковой пучок палубы 2-1/2 x 3/16 F.B. 2 x 1-1/2 x 3/16 Угол (я) 2-1/2 x 1/4 F.B. G Нижние продольные 1-1/2 x 3/16 F.B. 1-1/2 x 1-1/4 x 3/16 Ти (1-16 Ти () 1-1/2 x 1/4 F.B. H Side продольные продольные 1-1/2 x 1/8 F.B. 1-1/2 x 1-1/4 x 1/8 Tee (я) 1-1/2 x 3/16 F.B. I Sole продольные 1-1/4 x 1/8 F.B. 1 x 1 x 1/4 Угол (я) 1-1/4 x 1/4 F.B. J Coamings 3 x 1/8 F.B. 3 x 3/16 F.B. K Motor girder 10 GA. 1/4 мин. L Motorflange 2 x 3/16 F.B. 2 x 1/4 до 3/8 F.B. M Floors 10 Ga. W/1-1/2 Flange 1/4 with 1- 1/2 Flank N Sole beams 2-1/2 x 3/16 F.B. 2 X 1-1/2 x 1/4 Corner (j.) 2-1/2 x 1/4 F.B. O Sole 10 GA. 3/16 P Stanchion 1 Pipe 1-1/2 Tube 1-1/2 40 Pipe 1-1/2 Sche. 80 Tube R Side Deck 10 GA. 3/16 In the above and referring to rice. 2 for the steel vessel, the ship, The internal framing shows simple members such as flat bar stiffeners etc. These members are common in steel boats, not by using formed or extruded members such as corners, canals, tees, etc., for several reasons. First, the extra strength that the shape of the penis would provide in a steel boat is simply redundant in the size of the boat discussed; It's just adding weight, cost and complexity. Second, the formed members add to the difficulties of inspection, maintenance and corrosion protection in the steel boat; for example, the ability to see and cover the lower flanks is difficult, especially when such members are small. However, in an aluminum boat in rice. 2, Forms, Forms, or Extruded Members are shown to many members along with options for flat bar and/or plate members for comparison purposes, which can also be used as a lower cost alternative. But there are several reasons to use member molds, especially for longitudinal stiffeners. First, such members are stronger. Or, in other ways, you might have the same power in a lower form than with a flat bar. And the extra strength in the aluminum boat is a plus. Another advantage may be to use more the volume of the interior. And since marine aluminium does not require corrosive coating and does not rust, the shapes do not add to maintenance and inspection difficulties, as in a steel boat. Finally, formed members, especially symmetrical sections such as tees and channels, are easier to work with. They tend to not be so floppy, and bend more evenly than a flat bar. The downside is that extrusions cost more than a flat bar or stock sheet you can use to make flat bars, and may not be readily available (at least in the amount you want). When dealing with stock plans for an aluminum boat, the designer will probably have defined certain sizes, types and alloys of members to design, etc. however, it is possible that not every item will be available from your supplier or at a reasonable price. But deviations may be possible. Most designs have some latitude in alternatives that can be replaced. It's just not practical for a designer to specify every option. For example, corners can be replaced with a tee and vice versa. The channels can be made from separated square or rectangular pipes, or even split pipes if somewhat larger than the specified channel. You can even make your own sectional shapes from a built-up flat bar. Then too, if members are not available in one size, perhaps one next size will suffice. However, you should always consider the effects of the extra weight that such a change can do. Conversely, it is probably best to avoid reducing to a smaller member as Alternatives. But you can compensate for the use of smaller members by placing them closer together, for example in the case of longitudinal rigidity, and/or you could space space more closely together all in an attempt to reduce the area of unsupported coverage. For a beginner, there is a bewildering array of aluminum alloys available. But for a welded aluminum boat, the choice is to narrow down to so-called marine alloys in the 5,000 and 6,000 series, the latter usually extrusion. However, even within these series there are still many alternatives. But the most common, readily available, and suitable for welded boat hulls include: 5052-H32 5052-H34 5083-H321 5086-H32 5086-H112 5086-H116 6061 6063 With this choice, you should be able to find everything you need to build your own boat. The material 5052 is less expensive than 5086, but has a smaller strength (about 20-25% less) temperament for temperament. However, the designer may have already taken this into account if 5052 is listed. The corrosive resistance to the 5,000 alloys listed above is excellent in all cases. Material 6061 also has good corrosion resistance and is commonly used for forms extrudation. Previous does not mean that other alloys and/or temperaments in the series may not be suitable; Check with your supplier for recommendations on alternatives in such cases. Many of these replacement manuals can be used according to what are provided. Early aluminum boats were often made with tight-space transverse frames with several, if any, longitudinal, transfers from traditional wooden boating, no doubt. However, the amount of welding required and the final heat build-up caused significant distortion and weakening of the skin. The more enlightened approach used today emphasizes longitudinal clasps, quite closely placed by these intersecting more widely marked transverse frames only as needed to maintain the shape of the hull. In fact, some small welded aluminum boats may need a few if any frames at all, especially where bulkheads can serve double duty. The preferred approach is for transverse frames so as not to come into contact with the shell coating (except perhaps on limited areas along the chin or keel). In fact, such frames float inside the hull and are used to support and reduce longitudinal longitudinal, which are the main members, tightening the coating of the hull. About the only case where a cross bulkhead should make continuous contact of the coating if it is designed for waterproofness. Even then, this practice tends to distort the coating and is often easily visible on the outside of the boat. In short, the general practice is not to weld the coating of cross frames or bulkheads, even if such members touch or approach the coating. The chin is a connection between the bottom and side on the V-bottom or flat bottom boat. On this angle should be as clear as possible, especially in the left half of the hull. The reason is that the water should break out of the hull to reduce friction resistance at speed rather than climbing up As shown earlier, fig. 1 includes several possible chin configurations, with and without the support of members, as discussed earlier. Support members (such as 'C' and 'D') help tie the frame members together when setting up and help identify the chin line to ensure a smooth, fair curve. Otherwise, a member backup is largely optional. If special extrusion, as discussed earlier, is available, they are acceptable. The example in E involves a built-in deflector spray, and can be bent along its entire length as required to fit the ever-changing angle between the side and bottom of what usually happens. The side and bottom coating fit into the slots, which are then welded continuously. Whether such welding is done on both sides depends on the thickness of the coating and the desires of the builder. In terms of appearance, continuous inside welding looks best. However, such extrusions are often proprietary or otherwise prohibitively expensive, as well as a problem to buy and send in small quantities. Completing the ends of such extrusions where they join the transistor and stem areas is also not always easy for the builder to make one boat. An alternative that provides almost the same effect is the tee bar in 'C'; It is easy to bend and is usually easily accessible. However, if the protruding flank is too pronounced, there may be a tendency to hang on rocks in some boats, such as white-water boats, or snag debris and catch piles in other types of boats depending on their use. A lower alternative to the cost is a simple round bar in the 'D'; this adds the protection of the abrasion to the often vulnerable angle. But if too large a diameter, won't provide the clear edges needed for a higher speed planning boat (you can add a flat bar deflector edge wise against the bar a little above the angle, which might help, however). Otherwise, the round bar bends easily around the frames and gives a well-defined boundary to work when installing side and lower plates. A simple corner joint with side and bottom butting together, as in A, is technically feasible, but it is harder to fit and make fair. A temporary chine support member can help in this regard. If the coating is thin, say 1/8 or less, take care when welding to prevent a kick through, and use equipment suitable for the task. The modification with the whole deflector spray/lift strain, ideal for high-speed work, is shown 'B'. In this case, the bottom is set first and cut with care along the chin line (a temporary support member can help in the installation). The upper sides are then set, allowing the edge to hang over the connection at a distance needed to form Spray flat. While this design is good, this configuration also takes care to ensure a fair line. As mentioned, on a modern aluminum case most of the coating is reinforced with longitudinal. Fig. 3 shows several member configurations that can be used. While a good set of plans will indicate what to use for these these this does not necessarily exclude another alternative if what is stated is not available. The cheapest and easiest to get is the simple flat bar ('A'). They are available in many sizes, often in the form of extrusions with radius edges that facilitate welding, or you can cut your own off the plate. The thickness of 1/4 or more tends to bend more easily without distortion, or you can cut down to curvature from the plate. For a strength comparable to other shapes such as a tee, the flat bar should be wider and thus tend to encroach more on the interior of the case. Other stiffeners are often extruded by forms that can get expensive and may not be so readily available in the sizes required. Angles, as in B, are usually easy to get and have good strength for weight, but the asymmetrical shape can make bending in two planes difficult. Tee's ('C') represent two symmetrical shapes that form easily. Inverted channels ('D') are also effective tightening, but rectangular tubes ('F'), and I's ('E') are largely redundant because this part of the penis vs. hull adds weight with little or no gain in effect, but at a higher price. In other words, don't use it if nothing better is available. On the other hand, a special configuration of the hull hardening channel is sometimes available, as the 'G' makes an effective tightening. A less effective member of strength wise is a split tube or tube, as in H, which is sometimes also stocked as ready-made stiffness. When installing longitudinal, bending can present problems depending on the curvature and the type of penis. One approach some builders take to reduce bending efforts is to gore members along their flanks, both in rice. 4 below. This idea is sound, but the performance takes care to provide fair curves. Light practice also requires a radius of angles on the gorce a little to minimize hard spots against the coating. Avoid over welding, and completely around the end of each incision. For motor boat transistors - especially those using suspension or i/O that transmit traction to the transistor - the lower coating should extend past the trance coating at least twice the thickness of the coating (see Figure 5B below). This allows strong fillet welding on either side of the compound (inside welding can be intermittent). A simple corner intersection here, as in rice. 5A below is harder to fit and the angle of welding is ultimately weaker. In fact, some builders extend the plating bottom significantly beyond the transom on faster planning enclosures to form integrated non-regulated finish tabs. Later they can be slightly bent if required for the best performance and then bracketed to the transistor as soon as the optimal position has been found. Transom thickness should be no bigger than that of the side or bottom coating. But in the case of suspension or /O, the coverage should be at least 1/4 . Extra thickness may be required - at least in the cutout area - - with the help of understudies or thick inserts. A thicker insert is preferable to a cutout to avoid having to seal the joints between the understudies when welding. Where the thin coating occurs with a thicker coating, the thicker edge on the slope is equal to at least three times the thickness of a thinner plate (see rice. The insertion should have rounded corners and not be rigid square or rectangular. There is a discussion about whether welded aluminum boats should be made as lightly as possible through light coating and framing (but with more of it), or with a heavier coating, using minimal but also multiple lyker framing members. To put this issue in perspective, we will assume the power is sufficient in both cases in order to explore the merits otherwise. The boat, built with light coating and framing lighter in weight for more economical operation, has a higher speed for a given power, is more easily a trailer, has a larger payload, and because it has less material, will cost less. Proponents of heavier coating and framing counter that thicker coating is tougher, which better resists bending, twist, and fatigue, will not dent as easily, and will deter no more effects of corrosion. They also argue that light scarcity will take longer and more labor to build (more members cut, fit, and weld), and that any weight gain and/or cost is offset (at least to some extent) by a reduction in design. Then, too, they claim the thicker coating is less prone to distortion by welding heat, and it is easier to make stronger joints because it is more likely that both sides of the joints can be welded without problems or defects. In addition, thicker members are often easier to handle and work because they resist distortion and are not so floppy. Who's right? As a designer I feel that there is a reality in both camps, but with some qualifiers. First, there is a natural tendency among builders in any material to over-build and second guess the designer, even if the boat uses a heavier coating approach initially. The typical idea is that if so much good, then a little more should be better. As a result, such boats weigh more than the designer predicted. And who gets the blame when the boat doesn't perform up to the forecasts? You guessed it wasn't a builder. Consider. The seemingly innocent coating increase of 1/16 for the boat originally specified for the sheet 1/8 (.125), results in a 50% increase in the weight of the coating. Or for a boat listed with 3/16, another 1/16 (up to 1/4 of the total) adds 1/3 more cover weight (perhaps 400 pounds or so for a boat in the 25' range). Conversely, creating frames of 1/4 of the material on With 3/16 will not add, but a few pounds and can also make construction easier. In other words, I would prefer the latest change, but may call into question the increase in coverage. Much depends on the boat and its expected service. For pleasure boats, I tended to favor a light skimpy, but for for strict duty, heavier construction can be justified. However, instead of just increasing the thickness of the coating, you can get similar results by adding a few more internal members clasping instead. An attractive feature on metal boats are tanks integrated with the hull, which is acceptable for diesel, but not gasoline. Because the shell hull covering provides one or more sides of the tank, and the inner members of the tank can double as the hull of the members freezes, such tanks can retain the material and add capacity without taking more space. However, I prefer individual tanks for boats less than about 40' for the following reasons. First, tanks can be of such size or position that welding dense seams around the perimeter is difficult, if not impractical. Secondly, since full welds are required, there is a high probability of heat accumulation and final distortion of the coating of the case. Finally, special attention should be paid to the intersection of the tank ends, the hull of the hardening members, and the inner partitions of the tank when needed. Trying to match and weld the tank ends tightly around stiffeners who pass through the tank tediously, if not impossible. Instead, the hull stiffeners should stop at the ends of the tank, with similar members cut and installed inside, or with internal partitions installed under such stiffeners as substitutes and to maintain continuity. Conversely, individual tanks built outside the hull are physically easier to manipulate during assembly and welding, easier to verify and ensure integrity, easier to repair or replace, and not so likely to be affected by a collision. The thickness of the aluminum tank is sometimes shown as a tank capacity function as the following: Up to 50 Gals: .090 50 to 80 Gals: .100 80 to 150 Gals: .125 However, For practical purposes, most tanks should be at least .125 thick, and for larger tanks, 3/16 material can be justified in terms of strength and because it is easier to weld both sides of the joints. Thicker tanks also require less hardening, and since covering the material is usually suitable, no special thin stocks should be ordered, as may be implied from the above list. Water and waste held by the tank should be covered from the inside to prevent contaminants and exposure to aluminium hydroxide precipitation, which can turn water into dairy. Also provide striker plates or understudies at the bottom under the probing tubes (if used) to prevent damage to the inside of the tank. All tank tops must be sloping, sloping, or cambered so condensation or moisture will drain from the tops. Tanks can be made from the same used to cover the case (5052, 5086, etc.). Special computer design programs, combined with numerically controlled cutting techniques, have made it possible to literally pre-cut all the components of the metal boat to the exact size and shape in the form of a kit, ready for the final finale Assembly. However, for successful results, a qualified boat designer is familiar with the material and manufacturing techniques, along with the ability to operate the software within the demanding tolerances is a prerequisite. Otherwise, as they say, a blunder can be as good as a mile. If one major component is not spot-on, you could spend a lot of expensive metal quickly and possibly assemble a boat that can be so inaccurate as to suffer seriously performance-wise. But done correctly, the system has an inherent appeal, as such boats should be easier and faster to assemble. Is this technology suitable for building only one boat? That depends. The ability to provide such a technologically advanced product is not cheap. The design process usually requires a completely different building and assembly system than it would be in the case of a one-off that can use a simple, traditional framing, is more expensive, and often takes longer than traditional design methods, even if the computer is used and needed. For a production builder, higher design and development costs will be depreciated over a large number of boats. And the labor economy will no doubt make up the investment in many times over time. But it's not like straight forward for the average do-it-yourself looking for a stock plan or kit. First, such projects tend to be property; that is, the rights belong to the boat construction firm that commissioned the project and is unlikely to be interested in sharing its design or making it available as a design stock to anyone else. Secondly, objects for pre-cutting metal boats are now far and small in between, and not all of them have equal opportunities and experience when it comes to boats. Third, if the do-it-yourselfer is not near such an object (provided there is a design), the shipping cost can be prohibitive on just one block. Finally, although there are some designs available (often because the builder waives his design rights for one reason or another), the design choices are minimal. A design where you build from scratch and cut out your own parts can take a little longer to build, but will be an inexpensive alternative. In addition, pre-cut kits usually allow little, if any, leeway to make changes - something that is easy to do when building from scratch. And there are countless stock plans to choose from, many at a low price. Glen-L Marine Designs/www.glen-l.com/Boat Plans for Home Builder Builder boat building with aluminum. boat building with aluminum pdf. building a boat with aluminum foil