Chapter 1 : Weld Fusion vs. Weld Penetration

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YouTube I have heard some people say that with all welding, you must have deep or maximum penetration into the base plate in order for a weld to be strong. If you have shallow penetration, the weld is weaker. The deepest possible weld penetration is always best. Are these statements accurate? To keep the article fairly short, the discussion will be limited to arc welding, two common types of weld joints T and butt and two common types of welds fillet and groove. See examples in Figure 1. Commmon Joint and Weld Types Arc welding is taking two or more separate pieces of metal and joining them into one continuous or homogeneous section. You achieve coalescence, which means to blend or come together. In other words, the purpose of arc welding is to achieve fusion between the initially separate pieces of metal. Fusion occurs when you have atomic bonding of the metals. The molecules of each separate piece of metal and the filler metal bond together when you have 1 atomic cleanliness and 2 atomic closeness see Figure 2. This occurs with arc welding such that the atoms of each piece of metal bond together with shared electrons to become one solid or homogeneous piece of metal. A cross section of a weld particularly when etched will show you the penetration profile of the weld, including the depth and width of penetration see examples in Figures 3 and 4, which also name and highlight the various parts of a fillet and groove weld. To achieve the proper weld strength, all welding requires complete fusion to occur between the pieces of metal and filler metal, but not all joints require a large depth of fusion or deep penetration. As long as you have achieved complete fusion between the filler metal and the base plates and when appropriate, the steel backing bar , you have successfully joined the metal together into one homogenous piece. It does not matter if you have deep penetration or shallow penetration. Theoretically but not realistically , you could even have complete fusion to just the depth of a few molecules and still have welded the pieces together. As an example, refer to the T joint and fillet weld in Figure 3. The required weld strength is achieved by having complete fusion and by producing the proper fillet weld size measured by either the leg length or theoretical throat length for a given weldment. The appropriate weld size needed to achieve adequate weld strength is determined by the design engineer during the design stage. How this is determined is beyond the scope of this article. However, as the fabricator, as long as you make the proper sized weld per the design specification and achieve complete fusion between the filler metal and base plates, including the root, you have produced a weld of sufficient strength. Weld strength is not determined by the level of penetration into the base plates. Proper weld strength for a CJP groove weld is achieved by having complete weld fusion and by using the correct strength filler metal i. Again, weld strength is not determined by the level of penetration into the base plates. Note also that with a CJP groove weld, the size of the weld does not determine weld strength either, as it does with a fillet weld. Rather, weld size is simply the resulting volume of weld metal necessary to fill in the joint of the proper dimensions i. Proper joint dimensions are those which allow enough access of the electrode into the joint so that good welding techniques can be used to achieve complete fusion with the base plates and steel backing bar. In addition, proper joint dimensions are necessary to ensure that the root pass has the correct depth to width ratio discussed later in this article. Parts of a Groove Weld The need to achieve complete fusion has been emphasized in this article. That is because a problem can arise if you have a lack of fusion in any part of the joint. This can be a discontinuity with the sidewall fusion, properly termed joint penetration, or fusion at the root, properly termed root penetration. Incomplete fusion can become a weld defect area, which can affect the weld strength and ultimately lead to weld failure. Figure 5 shows examples of acceptable and unacceptable weld profiles. Fillet Weld Profiles While not necessarily related to weld strength, there are situations in which deeper weld penetration can be beneficial. Here are three examples: As stated earlier, you must achieve complete fusion at the root of a weld joint. When you have a welding procedure that produces a deeper weld penetration and a resulting wider penetration profile , you increase the chances of still achieving complete fusion at the root, even with welders

that have limited skills. A deeper and broader penetration profile covers a bigger area. Thus you are more likely to still hit the root i. Figure 6 shows examples of CJP groove welds in a butt joint with a root face dimension i. These joints will be welded from the first side with one or more passes, depending on plate thickness. Then typically the weldment is flipped over and welded from the second side again, with one or more passes. To achieve complete joint penetration, the plates must be beveled, as in the double V joint shown in the top picture. Or if it is a square edge joint shown in bottom picture , then after the first side is welded, the second side of joint must first be back gouged to sound weld metal. Then the second side is welded. If welding procedures that produced a deeper weld penetration were used, then the depth of the joint bevels would not need to be as deep, making the root face longer. Or in the case of square edges, not as much base plate on the second side would need to be removed by back gouging before sound weld metal was reached. In either case, the volume of weld metal required to fill the joint would be reduced. This reduces both the amount of filler metal required to fill the joint and the welding time. Less welding would also reduce potential plate warpage issues. Joints Requiring Penetration Benefit: For fillet welds with a flat face and even leg sizes, the distance from the weld face to the root is called the theoretical throat. If you achieve fusion beyond the root, then the actual or effective throat length increases see Figure 3 for identification of the theoretical and actual throats. Generally no design credit of extra weld strength is given for normal root penetration. However, if significant and consistent root penetration can be achieved, which significantly increases the effective throat depth, then the fillet leg size can be reduced without sacrificing weld strength see example in Figure 7. Deeper weld penetration does not produce a fillet weld with more weld strength. Rather, it allows a smaller fillet weld to be made with the same strength level as a larger fillet weld made with less weld penetration. Smaller fillet welds decrease the amount of weld metal needed, and may even allow for increased travel speeds. This benefit could be potentially realized by using the Submerged Arc Welding SAW process, known for its deep penetration capabilities. Other arc welding processes can be capable of achieving deep penetration as well. However, the fabrication shop must be capable of producing the deeper penetration level on a consistent basis, so this concept may not always be applicable. Greater Effective Throat Produced with Significantly Deeper Weld Penetration There are also situations in which deeper weld penetration can be detrimental. Deep penetration can be troublesome when burn through is a concern. When welding on thin material, such as gauge thickness sheet metal, too much penetration can cause the weld to burn all the way through the joint and fall out the bottom. In other cases, a thin root pass is made in an open root joint e. If the second pass has too much penetration, burning through the root pass can be an issue. If penetration is too deep, centerline cracking a form of hot cracking may become an issue. See Figure 8 for an example of a centerline crack in a fillet weld. A balance must be maintained between the depth of penetration and the width of the root pass. This keeps the shape of the weld fairly uniform. As the weld metal solidifies, the shrinkage stresses are thus fairly uniform in all directions. However, if the weld is significantly deeper than wide, then the shrinkage stresses are unequal and the weld will crack in the center of the bead as a result. Too much admixture with the base plate may also be a problem with deep penetration welds. As penetration increases, so does the volume of base plate that is melted and combined with the filler metal in the resulting weld puddle. This can possibly add additional elements into the weld puddle that makes the weld more crack sensitive. These softer elements have lower melting and solidification temperatures than steel. So in the liquid weld puddle, they tend to migrate to the center of the weld where they are the last elements to solidify. This high concentration of softer elements in the center of the weld bead often leads to centerline cracking from the solidification shrinkage stresses of the weld. Additionally, in the case of hardfacing or overlay applications, deeper penetration may dilute the weld deposit chemistry and potentially decrease its resulting wear resistance properties. Overlay welds are simply "bead on plate" welds. Figure 9 shows a weld overlay with minimum penetration and thus minimum admixture between the weld metal and base plate. Figure 10 shows a bead on plate weld with deeper penetration and thus much more admixture between the weld metal and base plate. Weld with Shallow Penetration Figure Weld with Deep Penetration Products.

Chapter 2 : Windows 10 - How to make the text larger? - Microsoft Community

To the author's knowledge, no such study of filler dispersion kinetics has ever been made with other polymer-filler systems, and would particles wetting by the polymer be difficult or would strong inter-particles interactions exist, more complex mathematical models than the equations above are likely to be needed.

Because balsa is so porous and has such a loose grain, you have to give the wood some kind of treatment if you want smooth fins. You have to fill or cover the wood grain with something. Anything you put onto a model rocket while you are building adds some amount of weight. I decided to investigate how much weight common balsa grain filling techniques might add to a model rocket build and share it here. I hope any weight-conscious builders might find it useful, or at least, interesting. First, a while back here on the blog, I investigated how much weight I was adding to my rockets simply by painting them. The added mass from the paint would certainly have depressed the altitude this rocket could achieve! I papered the fins, by gluing on skins of simple copy paper. Out of curiosity, I weighed one set of the large, main fins before and after papering. By papering the fins, I added 3. This rocket had four main fins, four booster fins, and 8 tiny "dorsal" fins. The added weight of the paper skins, plus the optional payload section, plus a Jolly Logic Altimeter Two, plus however much the paint job weighed, plus not one but two motors - one in the booster, one in the main body of the rocket - ended up being too much for the motors I had selected, and resulted in one rather disappointing flight. I decided to compare five of the most popular. The balsa stock was three inches wide, so I cut five square sections three inches long. The result was a 9 square inch or just over 58 square centimeters test piece for each method. What I would be attempting to determine is how much weight each filling method adds per square inch or square centimeter. Results may vary slightly, but should give you a ballpark idea of the kind of weight penalty your rocket may have to pay depending on how you fill in your balsa grain. After a light sanding with grit paper and a sanding block, each piece was carefully weighed on a metric scale accurate to 0. I checked the calibration of the scale with a gram weight before each use to ensure accuracy. It was important to weigh each piece before and after treatment, because the density of balsa varies greatly. As always try things out and do what works best for you while building. The SIG balsa was really nice and uniform. Nearly every piece weighed in at exactly 2. CWF must be thinned with water, then brushed onto the wood with a paint brush. You allow it to dry thoroughly, then sand it smooth with a sanding block and grit fine sand paper. It thins enough so that the filler is brushable, but not so much it takes forever to dry. When using wood filler on fins, once they are dry, they will look something like this: Because it is water based, CWF can cause fins to warp, as the cells in the wood absorb moisture. Doing both sides of the fin at the same time should help prevent this. I like to let my fins dry on a cooling rack, seen in the picture at the top of this post. After drying overnight, I sanded the piece as smooth as I could. The finished piece looks like this. It may be hard to see with the lighting in the photograph, but the wood grain is faintly visible, yet there is a thin skin of filler left on. If you sand all the filler off in a few places, you will have to retouch the fin and re-sand. The CWF added 1. This is a technique where you may find some variability in results. Sometimes I accidentally sand CWF too far, until some of it is completely sanded away. If the wood filler is sanded off in spots, your balsa grain will show through and you will need a second coat. In fact, when I first sanded this test piece, it came in at 4. I decided to see if I could sand further and still have a smooth surface. So I did, and ended up with the lighter result. Could I have sanded even more off? In the old days, this was the standard grain filling material. While there are basic lacquer sanding sealers used in woodworking to get a smooth finish on projects, what rocketeers often use is a type of sealer called butyrate dope or aircraft dope. In the early days of aviation, aircraft dope was applied to the canvas skins of airplanes. It would cause the canvas to shrink and tighten against the wooden spars of the aircraft, giving the plane its structure and rigidity. Today, RC aircraft builders still use it to shrink tissue paper skins onto their models. Rocket builders can use it to get a smooth finish on balsa, and because it shrinks, it can tighten the balsa and make it slightly harder. Because of this, though, you need to brush sanding sealer evenly on both sides of the fin, or the shrinking will cause the fin to curl and warp. Sanding sealer actually seals the pores in the wood, so when you sand it smooth, you are able to

sand the whole piece to a near glass-smooth texture. Any little imperfections can later be filled in with a good primer before painting the rocket. You brush the sanding sealer on, allow it to dry, then sand it smooth. It usually requires a few coats - between two and five. Rocketeers traditionally apply sanding sealer after fins are glued on, though I usually do it before. You do need to be careful doing that, though, because it will seal the wood, making a glue bond harder to achieve, if you get any on the root edge of the fin. The sanding sealer piece in my test again started out at 2. I used a total of four coats, finally determining I was happy with how smooth the piece was. I did two coats before sanding, then applied a third, then sanded, then a fourth, and sanded again. The final weight of the piece: Total weight added, 0. This is a gain of 0. Pros Creates less dust than CWF Hardens balsa Easy to use Dries quickly - I was able to apply and sand all four coats in under two hours Cons Puts out noxious fumes - you really need to have adequate ventilation when using it Hard to find - I ordered mine from Brodak. Papering Fins with Glue and Copy Paper Papering fins is a technique for both concealing balsa grain and adding strength to the fins, by essentially gluing paper directly onto the fin surfaces. This creates a smooth surface the paper for painting, and the paper and glue add stiffness and strength to the fin itself. There are four main techniques for fin papering - 1 using glue and paper, 2 using a glue stick and paper, 3 using spray adhesive and paper, and 4 using self-stick Avery labels. Probably the oldest technique for papering involves cutting two pieces of paper, slightly larger than the fin itself, from ordinary office printer or copy paper. Glue - either white glue or "yellow" wood glue - is spread on the surface of the fin. Then most of the glue is wiped off with a finger. This leaves only a very thin layer of glue on the fin. The paper is pressed down to one side of the fin and burnished down with any object which can act as a kind of squeegee to squeeze out any excess glue from between the paper and the fin I use the body of a Sharpie marker. The fin is then flipped over, the process is repeated on the other side of the fin, and the whole thing is left pressed under flat, heavy books until the glue is dry. After that, usually a bead of thin CA - cyanoacrylate or hobby grade super glue - is run along the edge of the paper and fin, sealing the edge down and making any overhanging bit of paper nice and stiff. My test piece was, again, 2. When it was dry, I ran a bead of CA around the entire edge. The end result looked like this. I expected this to be the heaviest application, but the result surprised even me. This test piece gained 2. So papering as I did with 20 pound copy paper and Titebond II wood glue resulted in an increase in weight of 0. While that might not sound like much, you must bear in mind that most rockets have fins, and some of them have fins with a lot of area - certainly something to consider when building. Pros Many people find it easier than sealers or fillers Much quicker.

Chapter 3 : The Rocket N00b: Balsa Grain Fillers and Added Weight

The basic problem was the tank vents exited on the side of the tank near the top, the new tanks have a larger diameter vent out the top. With our new tank and filler necks, we can now fill at any high flow rate truck pump on the highest setting and almost completely fill the tank in about five minutes or less.

Getting that last 20 gallons in the tank can take a long time; I discovered of the last 20 gallons, the first 10 gallons or so must have a flow rate of not more than about 0. The last 10 gallons can take an eternity and must be trickled in. If I had a gallon tank, no big deal - I would consider it a or gallon tank. Since the tank is only gallons, every gallon counts. Every fuel stop was an adventure in patience, for us as well as those behind us. It was one of those minor but completely aggravating and annoying issues we get to deal with in life from time to time. It was also a reminder that our coach, while a really good well thought-out and built product, was not without its warts. It was with great glee I noticed a thread several months ago on a popular RV forum about Freightliner and Winnebago addressing this problem. The problem was apparently inadequate venting - about fuel tanks were going to be replaced, and on other chassis numbers, improved filler necks were the solution this latter category includes us. If your unit was in warranty, no charge for parts and labor. Out of warranty, the owner pays for parts, Freightliner covers the labor. This was apparently one of those "soft" recalls - it is available only if a customer complains and is not proactively offered by either Freightliner Custom Chassis or Winnebago Industries. I have no idea what the problem is with the or so tanks that are being replaced. My guess is this was a cost-driven decision and not an engineering decision. Freightliner of Tolleson, Arizona Phoenix is about the only Freightliner dealer I will let touch my chassis besides the factory , so I made an appointment with Kirk, the Oasis manager, to have our new filler necks installed. Kirk and the tech said they have replaced two fuel tanks in the campaign, but no filler necks - lucky me. The installation of the left side went fairly well with no complications other than the tech bolting some parts together that needed to move when the slide was extended - guess how we discovered that! There must be about ten man-hours of labor in this job - I sincerely hope the results are worth the cost. After the tech was finished, he wanted us to try a fill-up, so we drive the mile or so to a nearby Pilot. It was extremely busy at the station and for the first time ever in 40, miles of using mostly truck pumps, we had to pre-pay for a specific amount with our Visa card. May update As much as we wanted it to work, the new filler necks unfortunately did not solve the slow fill problem. We lived with basically the same problem for a few months, then I got the idea to call Freightliner since I know Freightliner has replaced fuel tanks in the past for owners with similar issues. We made an appointment to have our new tank installed at the Freightliner factory service center in Gaffney, SC summer of It is about an all day job. When our coach was brought out after the job was completed, I managed to talk to the tech. He said they replace at least one tank a month for the same problem. The basic problem was the tank vents exited on the side of the tank near the top, the new tanks have a larger diameter vent out the top. With our new tank and filler necks, we can now fill at any high flow rate truck pump on the highest setting and almost completely fill the tank in about five minutes or less. I think we are two to five gallons shy of being completely full!! Even though my filler neck replacement article has little value today, here are the pictures anyway. Maybe you will find it a little interesting. The large pipe with the hose barb in one of the new fuel necks fill tubes, tank end. Of course you can see the differences between the two vents The new filler necks as unpacked Tank end of the new necks Tank end of the new necks The cut-out old filler neck mounting plate. This is where the fill neck sticks out where you place the pump nozzle. The tech drilled out the spot welds on the second one which was much quicker than hacking this one out New filler neck mounting plate another bad cell phone picture This is what happened when we tried to extend our slide when Freightliner was all finished! So we got two more nights of free camping at Freightliner this happened on Friday afternoon at quitting time. Julio the tech had us reasonably well repaired Monday morning and we were finally on our way - yea! Later, I did a much better repair job -End-.

Chapter 4 : Explanation of Filler in a COBOL Program | calendrierdelascience.com

Filler is the main component of asphalt mastic and its properties are closely associated with the performances of asphalt mastic. To investigate the relationship between properties of fillers and performances of asphalt mastic, four fillers including limestone, hydrated lime, fly-ash and diatomite were selected to prepare corresponding asphalt mastics.

Its unparalleled sanding qualities are a result of the patent pending EcoResin. Its non-sag formula has excellent filling properties, while eliminating the need for finishing putty. Stir the body filler before using. Knead the cream hardener. Apply in thin layers and spread smoothly. Do not blob on or apply all at once. Sand body filler with 80 grit sandpaper. If necessary, reapply Rage. Finish sand body filler with grit. Shipping and handling The seller has not specified a shipping method to Germany. Contact the seller- opens in a new window or tab and request shipping to your location. Shipping cost cannot be calculated. Please enter a valid ZIP Code. Warren, Michigan, United States Shipping to: United States No additional import charges at delivery! This item will be shipped through the Global Shipping Program and includes international tracking. Learn more- opens in a new window or tab Quantity: There are items available. Please enter a number less than or equal to Select a valid country. Please enter 5 or 9 numbers for the ZIP Code. Handling time Will usually ship within 1 business day of receiving cleared payment - opens in a new window or tab. Taxes Sales tax may apply when shipping to: You are covered by the eBay Money Back Guarantee if you receive an item that is not as described in the listing.

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Chapter 5 : How to take a screenshot of a window larger than the screen - Super User

Marble Filler S, T, G, S-Soft. Technical Instruction Sheet page 1 of 2. Characteristics: AKEMI Marble Fillers S, T, G, S-Soft are paste-like 2-component products.

The mechanical properties of hybrid nylon-steel-fiber-reinforced concrete were investigated in comparison to that of the steel-fiber-reinforced concrete, at the same volume fraction 0. The combining of fibers, often called hybridization is investigated in this paper for a very high strength concrete of an average compressive strength of MPa. Test results showed that fibers when used in a hybrid nylon-steel fibers reinforced concrete form could result in superior composite performance compared to steel-fiber-reinforced concrete. The basic property of the hybridized material that was evaluated and analyzed extensively was the modulus of rupture MOR and splitting tensile while the compressive strength was only slightly decreased compared to single steel fiber reinforced concrete. There is a synergy effect in the hybrid fibers system. Hong Wei Wang Abstract: A designed experimental study has been conducted to investigate the effect of polypropylene fiber on the compressive strength and flexural properties of concrete containing silica fume, a large number of experiments have been carried out in this study. The flexural properties include flexural strength and flexural modulus of elasticity. On the basis of the experimental results of the specimens of six sets of mix proportions, the mechanism of action of polypropylene fiber on compressive strength, flexural strength and flexural modulus of elasticity has been analyzed in details. The results indicate that there is a tendency of increase in the compressive strength and flexural strength, and the flexural modulus of elasticity of concrete containing silica fume decrease gradually with the increase of fiber volume fraction. Based on the experiment, the splitting tensile strength and axial tensile strength of specified density steel fiber concrete are studied. The influence of type of steel fiber, volume content of the fiber and substitution ratio of lightweight aggregate is analyzed. The relationship between splitting tensile strength and axial tensile strength of specified density steel fiber concrete is suggested. Magnesium phosphate cement MPC was modified by fly ash, silica fume and re-dispersible latex powder and the properties of modified MPC, such as fluidity, setting time and compressive strength, were tested. The experimental results showed that the addition of fly ash prolonged the setting time and significantly increased the compressive strength of MPC. The addition of silica fume improved only the water resistance of MPC. The addition of the re-dispersible latex powder prolonged the setting time and improved the water resistance of MPC. Mechanical properties of the resulting ECC mixtures were assessed using the compression, flexural and uniaxial tensile tests. The ECC mix with 1. Moreover, the results portray that the use of POFA should be helpful for achieving strain-hardening behaviour.

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GREAT STUFF Big Gap Filler Insulating Foam Sealant with Quick Stop Straw Technology offers the same benefits as GREAT STUFF Gaps and Cracks but fills gaps larger than 1 in. So it's great for creating larger weather-tight seals to stop drafts and keep critters out.

Chapter 7 : EVERCOAT RAGE ULTRA WORLD'S BEST SANDING BODY FILLER (GALLON) | eBay

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Chapter 8 : Acrylic Crystal Gem Stone Ice Rocks Table Scatter Confetti Vase Filler pcs F | eBay

The large quantities of expensive materials such as steel fiber, silica fume, filler and superplasticizer required in the composition of Ultra-High Performance Concrete (UHPC) make its fabrication cost significantly higher than ordinary

concrete.

Chapter 9 : Motormouth: More on fuel-filler position - calendrierdelascience.com

How cosmetic fillers can destroy your looks: They can turn skin blue and lumpy, leave you blind, and experts warn they could be a bigger scandal than faulty breast implants.