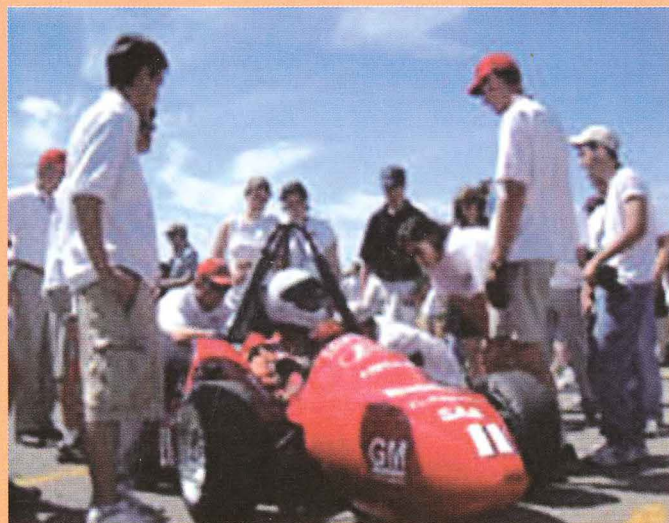


An Update on Formula SAE Championship

With the popularity of all types of automobile racing growing in the United States, an update on the three University teams that Anoplate supports with wear, friction and corrosion reducing coatings, seems to be appropriate. Since our early involvement with Georgia Tech (GT), we have also supported both Cornell and Rochester Institute of Technology (RIT) racing vehicle teams. Various finishes on both the frame, suspension, drive train and fuel systems have been applied. Since our main article on this subject, in the Fall 1999 issue of Anoplate News (back copies available), great success has been obtained. This past year's Competition, in Pontiac, Michigan, 134 collegiate teams from around the world competed, with first place taken by Cornell and third place by Georgia Institute of Technology.

The Formula SAE competition comprises a blend of static and

dynamic events, designed to challenge both the cars design and the students overall knowledge. The



The Cornell Formula SAE Team gathers around their car on their way to achieving top honors in this year's competition.

performance, cost and endurance are major factors in judging. Anoplate feels that it is important to support undergraduate engineering education, particularly "hands on". In a letter recently to the GT Team, Milt Stevenson, Jr. stated "A

Chemical Engineering grad myself (Cornell '77), I'm jealous that you're able to get so deeply involved in a hands-on project, of a practical nature during your undergraduate years". With our involvement, future engineers will have obtained a slight exposure to the broad field of surface finishing.

In another competition, GT journeyed to Birmingham, England, competing with 24 colleges and emerged in first place. The top three teams were separated by only 20 points out of a possible 1000, which showed

the need for close teamwork. The combined GT team members' skill, provided a two-tenths

of a point win. If you are interested in more Formula Student information, go to www.sae.org/students/formula.htm

ACCURATE INFORMATION A BASIC NECESSITY

Twelve years ago, Tom Adydan was asked to prepare some comments involving an important subject, "the things that affect how we arrive at a price". You may wish to ask us for back copies of his talk that was in "SHOPTALK". Yes, we maintain back issues of all of our ANOPLATE NEWS, all 60 issues.

It's funny how certain things never change. The need for basic

information is more of a necessity now for not only pricing and quotations, but also to accurately create a shop order before we can even think about placing work on the floor. These requirements, documented in our ISO procedures and in our forthcoming NADCAP (National Aerospace Defense Contractors Approval) documents, help to eliminate delays in both turn around of quotation requests

and creation of our shop orders. If information is lacking on a RFQ, we are sure that you will receive a call from Mike Ortez. If that same information is missing on your purchase order or incoming paper work, a delay will occur affecting the processing of your order. In this case Mike Muller or Georgette Moncreif will contact

you for filling in the missing data.

Let us just list some of the fundamental information that we need for both an accurate pricing estimate and generation of a shop order. Remember, a little common sense should be exercised. The more unusual the request versus a routine finish, possibly the size of the order or the value of a complex part also plays a role. Here are a few of the factors.

"The main thing we ask for is the most complete and accurate information that you can provide, both when requesting a quote and issuing purchase orders. That's the first and most important step toward accurate pricing"

1. A readable blueprint or sketch helps a great deal. Use caution when sending a blueprint via FAX. It might be unreadable on our end.

2. Dimensions, which may indicate if a part can even be processed to thickness requirements. At times it is difficult to plate to spec finishes and still maintain finished part dimensions.

3. Designate an area where we will both check thickness. Due to part shape, it is most often not possible to obtain uniform plate distribution.

4. Base metal the part is made from.

5. Heat treatment and hardness of part.

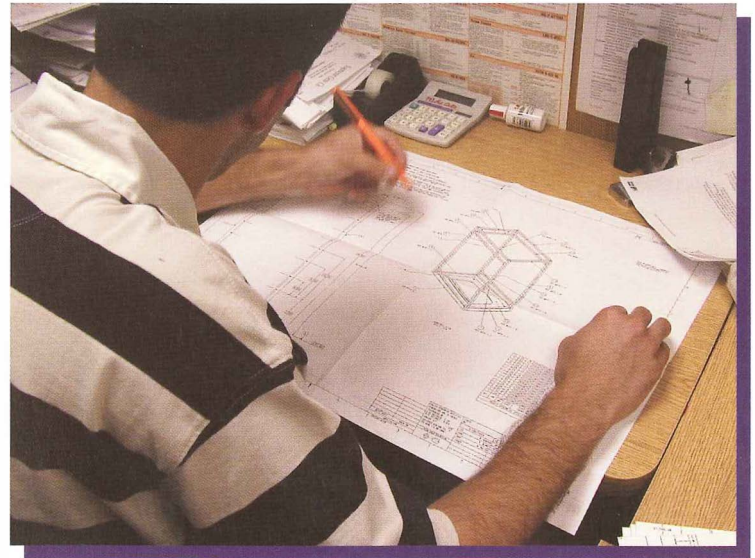
6. If an area of the part is more critical as to corrosion resistance, function or fit, please inform us.

7. If there is any area you WANT US or DO NOT WANT US to rack from.

8. If there is any past problem. The history of the part can prevent us from making the same mistake twice. Hiding those potential pit

prebid, so the above information is vital on your incoming paper work.

If you are bidding work from a customer, that is somewhat unusual to the area, try and obtain any specifications and written requirements as soon as you get your RFQ. Our Ben Arnold maintains a huge number of



Mike Ortiz reviews a blueprint to make sure that we have not only accurate information but also enough of it to provide an accurate quote.

falls might add valuable lost time (due to rework) to your delivery requirements. It will show up the next time thru with a price adjustment on future orders.

9. Any special packing requirements?

If the prints and early requirements are somewhat complex, much of the above information will be in our quote file. It is possible for us to retrieve that data. In most cases, writing up in excess of 150 orders per day it certainly is not possible, nor value added for us to pull that hard copy. Also remember, not every job that comes in has been

specifications in his document files, but there is a limit. Call him if you have any questions on availability.

I think the best way to end is by quoting Tom's last paragraph, from twelve years ago. "The main thing we ask for is the most complete and accurate information that you can provide, both when requesting a quote and issuing purchase orders. That's the first and most important step toward accurate pricing"

ANOPLATE

Where Have all the spec charts gone?


Anoplate has been unable to obtain specification charts from our previous supplier. As a result, we are in the process of production of our own charts with modifications, corrections, and updates. The most significant error in previous charts appears to be in the Federal Governments writing of MIL-A-8625 Type 1, Chromic Acid Anodize. The maximum thickness should read .00007" rather than .0007". Please do correct your current chart and if you would like to be on our list for the new version, just e-mail us at sales@anoplate.com.

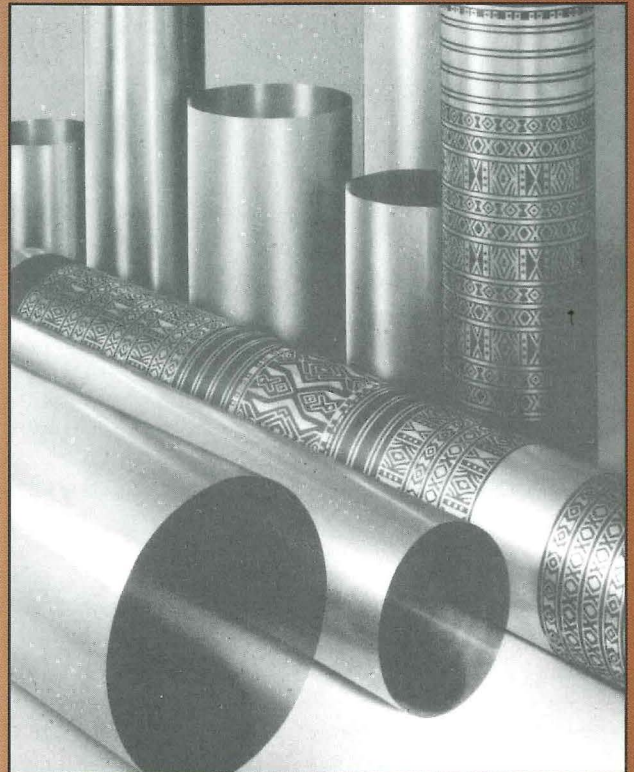
Electroforming

Electroforming is the electrodeposition process by which complex shaped objects can be exactly duplicated by plating on a mandrel. If the mandrel is a permanent one, it is made from a hard material that is tapered for easy removal of the electroform and from a material that is resistant to adherent bonding, such as stainless steel. This is one time a plater does not want good adhesion! Permanent mandrels can be used repeatedly until damage to the surface makes them obsolete. Expendable mandrels are made of materials such as cast fusible metals (alloys of tin, bismuth and lead), plaster, waxes or aluminum. These materials can be destroyed by heat, chemicals or impact leaving the complex electroform intact.

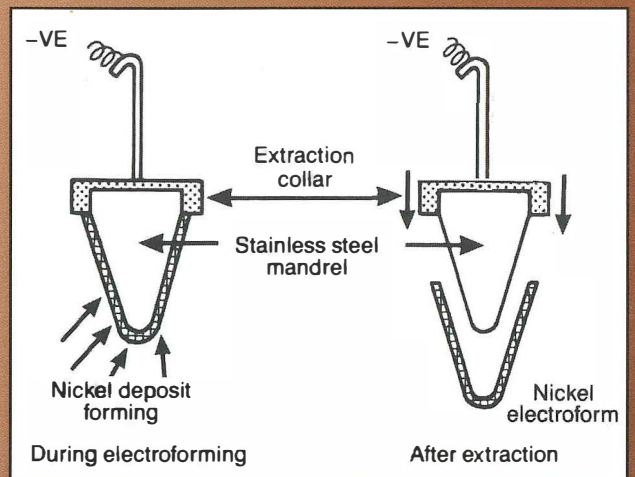
The art of electroforming is over 160 years old. Professors Jacobi (Russia) and Boettger (Germany) produced art objects by using nickel, iron or copper. In the later 1800's the large intricate street lights in downtown Paris were produced creating iron electroforms. Another early application was in the production of duplication printing plates for currency where high accuracy is necessary and this is still current technology. Today many high tech uses such as complex metal bellows, prosthetic devices, holographic masters and scores of other objects are produced by electroforming. Unusual applications are duplication of the surfaces of leathers and various wood grains. The highly intricate pattern of a holograph, that new symbol on your credit card, makes the precise electroformed printing plate more difficult to copy. The most common everyday object that we touch, that uses electroforming techniques, are CD discs that were hot pressed using electroformed nickel disc molds.

Currently Anoplate does not perform electroforming, but ten years ago there was a whole room dedicated to the production of electroformed paint masks. Four tanks were dedicated to sulfamate nickel electroforming with mask thickness of 0.025 inch and higher produced. The solutions used are similar to current baths but the operating controls are much more stringent. Since nickel baths have moderate stress under normal plating conditions and when extra heavy deposits are applied to the mandrels, stress must be reduced, or controlled to around zero. This is accomplished by use of organic additives such as saccharin, maintaining the chloride content as low as possible and extra care on bath parameters (pH and temperature).

The vast majority of electroforming is done with nickel. Copper is the next most widely used metal. Copper's use is principally in the printed circuit board industry. Like iron plating, the solutions are highly corrosive and the deposits more stressed. Even though copper is less expensive, its mechanical properties are not as good. Unless electrical conductivity is of prime importance, nickel with it's resistance to corrosion, excellent ductility and "bang about" rigidity comes out as King. 



This picture illustrates how complex an electroformed object can be. The fine detail shown on these printing rolls is why government currency printing plates and holographs use this technique. The ultra fine detail that is created makes it very difficult for illegal duplication.



Simplified diagram showing the sequence of creating an electroformed object. This is a case where the electroplater must obtain enough adhesion to the permanent form for exact duplication, but marginal enough to allow the release of the formed object. Easy release is critical so as to not damage the very expensive permanent form.

For fast response and to save customers time and money, we have many contacts available via the following aliases:

sales@anoplate.com

cust_service@anoplate.com

quality@anoplate.com

1 Megan Pellenz has become a Certified Quality Engineer having passed the requirements and examination of the American Society for Quality Control.

2 Milt Stevenson, Jr received a Certificate of Appreciation from the Philadelphia Branch of the American Electroplaters and Surface Finishers Society for his presentation on Hydrogen Embrittlement Management. He presented this talk again at the Society's AESF Week to an audience that included representatives from Rolls Royce, GE, and Boeing among others. Hydrogen Embrittlement will always raise a lively discussion among finishers.

3 Five managers attended the annual American Electroplaters and Surface Finishers Conference held in Chicago this June. A combination of technical sessions, networking with our job shop peers and a large exhibit of

metal finishing equipment and processes makes this a very valuable endeavor.

4 In June, Anoplate passed their Third Surveillance Audit of our ISO 9002 Quality Management System and our ISO 14001 Environmental Management System. Several opportunities for improvement were suggested and also we were commended for the work of our Internal Audit Team. Of particular importance there were no findings with floor level operations, employee performance or regulatory compliance.

5 Milton Stevenson Jr. and Eric Stevenson attended a corrosion conference specific to the needs of the military this July. A new display, based on our current military sales effort was exhibited and manned throughout the show. This makes the fifth marketing effort during the Spring/Summer time period.

Q & A

1) Question: Why do you prefer to do the masking of my plated jobs? It seems as though it would save me money if I did it. **Syracuse, NY**

Answer: There is more to the technique of masking than it appears. Thin first coats then second and possibly third top coats, after the proper cure time between coats. Careful masking to an edge without trimming. Plugging blind holes so that paint does not fill them, making it difficult to remove. If the paint lifts causing rework, which one of us is responsible for the rework. These are just a few of the reasons.

2) Question: Why do you caution us to not wrap my parts with tape when sending them to you? It makes it easier to keep track of count when in 25 piece bundles. **Fulton, NY**

Answer: We like the bundles also, it's the sticky tape residue that gets left behind. It will not come off with our normal cleaning cycle. The parts have to be hand wiped with MEK or some other solvent, causing more time in pre-cleaning than was estimated on the whole job.

3) Question: On rare occasion, we get request from our customer to wrap parts in VPI paper. What is that and why does it cost so much? **Kingston, Ontario, Canada**

Answer: VPI stands for "vapor phase inhibitor", a paper impregnated with an organic substance, that releases vapors around the wrapped part with a corrosion inhibiting compound. It is very expensive to purchase. That is just one of those added cost items we had both better catch right in the quote stage. Don't let your customer sneak this in on you as a free add on!

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Anoplate Corporation
459 Pulaski Street
Syracuse, New York 13204-1134
Phone: (315) 471.6143
Office Fax: (315) 471.7132
Quote Fax: (315) 471.4206
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