Letter to a New Machinist

By Miles Free – Director of Industry Research and Technology

Congratulations on your graduation! Congratulations on persevering and completing a major life milestone. Your experience with completing your education through high school bodes well for your continued success in life.

Speaking of success, congratulations again for choosing a career in machining. Machinists are the people who make things, and when you think about it, our lives today would be miserable without the things that machinists make. You know, like the pumps that give us fresh water, appliances to keep our food safe and HVAC to keep our homes comfortable. I'm not sure I know anyone without access to a car, thanks to machinists for fuel injection that makes cars go, brakes that make them stop and airbag components to protect us when there is an operator failure. And guess who makes the bone screws and other medical parts that are used to repair our bodies when they need serious rebuilding?

Machinists are in very high demand right now, and after you get a few years of experience in the shop, you will find that you are one of the most valued people in the company. You will have a positive career trajectory of increasing responsibility as your knowledge and experience grows. As more and more of the baby boomer generation retire, your experience will be what your shop relies on to solve the issues that seem to arise daily in manufacturing operations. I'm talking about job security as you gain experience and knowledge!

I am so pleased that you have chosen a career in machining. Enjoy the rewarding experience of making things that make a difference and the joy of seeing what you have made every day and knowing that the parts you made really matter to someone. In order to help you become even more accomplished in your new craft, I am pleased to provide you with a head start on some lessons learned over the course of my 45 years in the manufacturing business. These will all serve you well, if you consult them. Lesson one: read "Machinery's Handbook."

The answers that you need are very likely in there somewhere. In the steel mill, I used it primarily for the geometric formulas in the front, such as calculating the weight per foot of a hex round or other shape that requires an accurate calculation of the profile's area and volume. You'll find all the formulas that you need in the "Areas and Volumes" section. The distances across corners for squares and hexagons are also in there. Look in the section "Mathematical Tables."

You'll notice that I wrote the weight per cubic inch for steel on the title page of the copy I gave you. If it is a number that you will need many times, why not make it easily accessible? That figure right beside it? That is the weight of steel per cubic foot. Yes, steel is that heavy.

Trig functions are found in the section immediately following "Solution of Triangles." You'll be using them more than you might think.

The sections on mechanics and strength of materials are important as well, but you knew that.

If you get into machining gears, well, "Machinery's Handbook" will be your constant companion.

The sections on screws, threads, allowances and fits are well-worn in my personal copy. I'll bet that yours will be too, if you have interesting work.

The sections covering speeds and feeds and cutting tools are a good first start for reference, but I admit that modern tool substrates, coatings, geometries and CNC programming techniques, like trochoidal milling, make the info in the handbook a charming reminiscence. Still, if you have no more current information, it will give you a place

Continues on page 20

Continued from page 17

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to start. There is a good primer on steels, heat treatment and welding, too. I know you have some experience with welding, and this may expand your capabilities a bit. The sections on nonferrous materials, plating and weights of materials will come in handy for you as well.

The section on surface texture has been important to my work helping people understand what they can and cannot expect from a process despite what the engineer says he needs and the purchasing agent wants to pay for. As a machinist, you should have a very strong knowledge of what surface finishes you are creating in your various processes. Why is it more difficult to get a smoother finish on a drilled hole than on a turned outside diameter surface?

As a machinist, you will start to notice that people will come to you with their problems. Many times they are about weights or measures, such as how to convert millimeters or kilograms to pounds. The back of the book has these factors handy. I made a spreadsheet with a couple hundred of these so I don't have to turn to the book, as long as I'm near my computer. Now you have almost every conversion factor that you might need at hand.

Sometimes, as a machinist, you will encounter a problem that you need to solve for yourself. Here's how I use "Machinery's Handbook" when that happens: I go to the very back of the book to the index. And then I look up the process, tool, material, other things that might be involved like work holding, tool holding and lubricants. Are my speeds and feeds appropriate? The index gives me a structured way to reconsider my process.

I'll review some of those in my next letter.

Continued from page 19

Truckload Shipping 101

Lastly, because of the direct delivery nature of truckload shipments, carriers don't need to have additional overhead like terminals, which limits capital investments and results in generally lower costs.

Quoting

In order to get the best quote, it's imperative to have the following information squared away before setting out to get a bid.

1. **The basics.** Pick up and drop off locations, any date or delivery time requirements, how much weight, how it's packaged and how many individual pieces.
2. **Type of equipment needed.** Can a delivery be shipped via a standard dry van (up to 44,000 pounds or 26 standard sized pallets)? Or will it need a flatbed, refrigerated or other specialty type of trailer?
3. **Commodity.** A basic description of the shipment contents will help get the most accurate quote.
4. **Shipment value.** Typical legal liability coverage tops out at $100,000 per trailer, and there is no longer any federal requirement for carriers to carry insurance. So, a company will want to make sure it is sufficiently covered.

Hopefully, the above information helps create better understanding of truckload shipping, the basics of when to use it and how to get the best quote. PMPA members have free access to PartnerShip's truckload brokerage department, who are committed to matching a shipment to the right carrier at the right price.