

Carbide Processors, Inc.

Newsletter

3847 S. Union Ave. Tacoma, WA. 98409 800 346-8274 nwresrch@nwrain.com

December 1997

Copyright Carbide Processors, Inc. All rights reserved – duplication by written permission only

Testing braze joint strength on saws

There are many ways to test the strength of braze joints. None of them really duplicates what happens when the saw is actually run.

The big problem is that each tooth of a saw is protected by the steel shoulder of the tooth ahead of it. This makes it almost impossible to test the tooth the way it is actually impacted when the saw is used.

Ten years ago we ran tests with Weyerhaeuser to test how good Cadmium-free braze alloy solder was. Weyerhaeuser had special saw segments built that duplicated just one tooth. Then they swung a pendulum down into the tooth and measured how much force it took to knock the tooth out. (cont. p. 2)

Braze treated parts when you want them

Braze treatments or pretreatments can greatly improve the performance of carbide tools as shown in the next column.

We have our ECP line up and running and we can deliver superior quality at low costs.

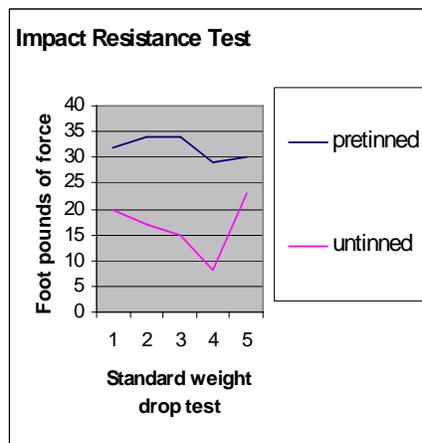
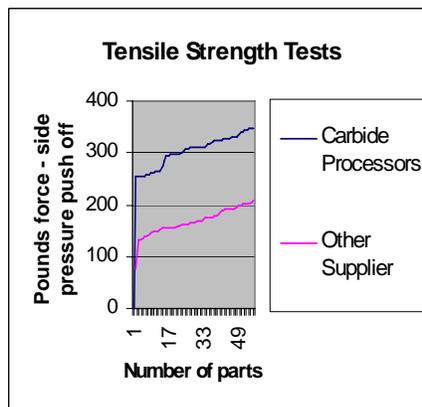
Our process is patented so you can use it to certify for government work or ISO standards.

If you would like us to work for you, do some samples or if you want to read the patent please call.

Our Pretinning is cheaper than doing it yourself

It is very hard for most operations to figure what pretinning really costs them. Weyerhaeuser did the first really good analysis of this in 1981, which is how we got started. (see P. 3)

ECP carbide surface treatment Prevents tip loss and breakage



New web page

We have a web page, which does a good job of explaining what we do and what we can do for you. There is an outline of it on page 3. If you want to see the actual web page the address is:

www.carbideprocessors.com

Brazing Carbide book for sale

We have taken seventeen years of research and put it into a 150-page book. It deals with how to braze carbide, trouble shooting, health issues and many other topics. We are offering it for \$70 US. See our web page or call for a sample.

Low temperature brazing.

We have been working on brazing tools at temperatures below that usually found in tool manufacturing. This is important for diamond coated parts and for brazing to lightweight alloys. We can successfully braze at lower temperatures.

Filter your grinding coolant and make more money

Clean grinding coolant means longer machine life, longer coolant life and longer diamond wheel life. This is true with carbide and Stellite as well as knives, saws and all tools. See our special insert for more information.

High speed machining

We are doing research on brazing carbide and ceramics to lightweight holders such as aluminum. As the speeds increase the weight of the tool becomes more important.

Warning

Any industrial operation can be dangerous. This includes using, repairing and sharpening saws. If you do not know how to handle our products safely contact your safety manager or contact us for more information.

(Testing joint strength from P.1)

This showed that the Cadmium-free solder then in use was not as strong as the Cadmium braze alloy.

There were two problems with this method. 1. It only tested saw segments and could not test saws. 2. It destroyed the parts as part of the test.

When we were developing our “High Impact” braze alloy we needed a test that was simple, easy and cheap. Most importantly, it had to be a test we could do on actual saws without damaging them.

We ended up using a test a customer had developed. They used an oak bat about sixteen or eighteen inches long. It was about an inch and a quarter to an inch and a half on a side.

The customer held the saw in their left hand as though the saw was going to cut down from there. Then they beat on the tips with the oak bat. Because of the way they were holding the saw they were beating on the back – top part of the tips.

The difference in the standard Cadmium-free braze alloy and the High Impact alloy was dramatic. With other alloys the tips seemed to spring or pop off the saw. With the High Impact alloy the tips stayed on the saw no matter how hard it was hit.

The customer developed this test because it was better than no test at all. It is actually a pretty good test. It is a “go” or “no-go” test, which is the simplest to understand. It uses wood and the tips need to be able to survive an impact with wood. It also does a better job of testing joint strength than the tests that impact from the front of the tip. The pockets are designed to give a tremendous amount of strength if the tips are impacted from the front.

Testing from the top-back does a better job of testing joint strength than the braze alloy strength.

\$1,000 free Sell your waste

Todd Foreman of Lemmon & Snoap makes a couple thousand dollars a year extra for his company. He sells the grinding swarf to PM Recovery, Inc. (415) 362-8006. Todd set up a program where they get paid for the swarf instead of having to pay to have it hauled away. The man to talk to at PM Recovery is Ken Miller. He is a nice guy, really knows what he is doing and his company is very reputable. The more waste you have at a time the better but material for recycling is not hazardous waste by definition according to Federal Law 40 CFR so you can accumulate it for a year if you have to.

Reduce diamond wheel cost dramatically

If you filter your grinding coolant you can increase diamond wheel life and reduce costs dramatically. You also get better quality work.

This and additional information is in some free publications from Norton Co. I think that it speaks really well of a company that they would put out a book that tells you how to use less of their product. The Norton Co. does an excellent job of explaining how to use their product so you get the best results at the least cost.

They are [Toolroom Grinding](#) (form 781 EMX 9/96 EP) and [Wheel Dressing Manual](#). (508) 795-2473

Double your machine life

We have been researching the effects that dirty coolant and dirty air have on machine life. We figured that a \$30,000 machine would wear out about 10% a year in a clean shop with good maintenance. In a dirty shop we thought that the wear figure

was about 17%. This 17% wear factor means that the shop is losing about \$5,100 a year or about \$2,100 more than they have to.

We then went out and got opinions from experts in the field. They generally thought that we were too conservative. The estimates were that a well-maintained machine would pretty well run ten years or more with no major problems. In a dirty shop, where the routine maintenance was done poorly or not at all, the same machine might only go five or six years before it had a major problem.

Change your coolant once a year

A common question is how long a sump should go between changes. The Iowa Waste Reduction Center recommends that you change coolant and clean your sumps at least once a year. If you are not getting at least six months between changes you are wasting a lot of money.

Your Christmas card is feeding a child

We used to send out Christmas cards. Now we do a newsletter and wish you well that way. Instead of buying separate cards we make charitable donations. We have an excellent local food bank. They pass out donated food but they have to pay for utilities, salaries and everything else. They typically pass out about \$18 to \$24 worth of food for every dollar donated. The cost of a card helps feed a family for a couple days or a baby for about a week. In a world of flaky charities, there is something pretty right about feeding hungry babies.

Lenny saves money

Lenny of L&L saw shop called. We did a little business then he had few minutes to chat. Lenny’s doctor wanted him to exercise so Lenny thought about an exercise bike but the prices were pretty high. He went looking around and he found a

wonderful selection of used bikes at a secondhand operation. They were cheap and a lot of them looked like they had never been used.

(Pretinning is cheaper from p.1)

There are several problems with doing this kind of cost analysis. One is the “biased sample” problem. People work really well when someone is watching them and testing them. They really go all out and work at a pace that they could not sustain for a whole day. They are not cheating. It is just natural to try to look as good as you can.

Another problem is the ‘fair test’ problem. When people are tested

they want the test to be fair. This means that they generally do not count anything but actual production time. They do not count setup and cleanup time or time spent handling problems. They also take time off for interruptions.

A third problem is that pretinning is often “slack time” work. People know they can do pretinning or go home early. There is a real tendency to stretch the work to fill the time until quitting.

Starting with Weyerhaeuser in 1981 we have had several companies do very professional costing and we have always been cheaper. If you

would like more information on our prices please call.

Grinding coolant disposal

The law is very clear that you have to be able to show what is in your grinding coolant before you dispose of it. If you dump your grinding coolant without analysis you are breaking the law. The legal term is “failure to classify” and it can result in heavy fines. These fines can be levied against the operator, the operator's supervisor or the company. We have developed a program that solves this problem simply and inexpensively.

Our Web Page www.carbideprocessors.com

Carbide Processors, Inc.

Northwest Research Institute, Inc.

In sixteen years we have developed a lot of technology. Some of it is really unusual. Only some of it appears here. In addition we are constantly doing research. If you have a question and we do not address it here we might have an answer. We have some really neat new technology that we would like to use.

We do three things

- We do pretinning and brazing as a service
- We build and sell equipment such as filter systems
- We do consulting on issues such as brazing, health considerations in the workplace, coolant management, waste disposal and EPA compliance

WHO WE ARE

PRETINNING AND BRAZING

- ◆ Pretinning Introduction and History
- ◆ Brazing or Joining Carbides
- ◆ Brazing or Joining Cermets
- ◆ Brazing or Joining Ceramics
- ◆ Welding Carbide
- ◆ Brazing Book
- ◆ Health Hazards in Carbide Brazing
- ◆ High Impact Braze Alloy

COOLANT MANAGEMENT

- ◆ Grinding Coolant Management
- ◆ Coolant Testing
- ◆ Filtering Grinding Coolant
- ◆ EPA compliance

MATERIAL SCIENCE

- ◆ ECP Surface Treatment
- ◆ Diamond Coating
- ◆ Brazing or Joining Cermets
- ◆ Making Ceramics Slicker

SAFETY AND HEALTH

- ◆ EPA Compliance
- ◆ Health Hazards in Carbide Brazing

CONSULTING

- ◆ Failure Analysis Paper
- ◆ Filtering Grinding Coolant

HIGH SPEED MACHINING

Inside: preventing carbide tip loss and breakage, cutting costs, selling waste material for profit, low temperature brazing, high speed machining, Cutting Costs in the Filing Room

Also Recommended sources for more information:

Cutting Tool Engineering is an excellent magazine. The August issue had an article on carbide grades that was probably the best short article I have seen on why grades are different from different manufacturers. The September issue had an article on grinding coolant management that was short, well written and comprehensive. Cutting Tool Engineering is "free to qualified individual concerned with the material cutting function in industry". (847) 498-9100.

World Directory and Handbook of Hardmetals and Hard Materials - sixth edition. Up front you need to know that this costs \$395 U.S. It is well worth the price based on accuracy thoroughness, utility and original research. I admit that it is expensive; however there is information here that I do not believe is available anywhere else. If you are a serious user of carbides, cermets, ceramics and other materials then this is an essential part of your library. If you are unsure you may wish to contact them for more information and you may wish to read the article in Cutting Tool Engineering magazine. The book is available from International Carbide Data, 33 Oakhurst Ave., East Barnet, Hertfordshire EN4 8DN, United Kingdom (telephone: 44-181-368-4997)

Carbide Processors, Inc. Newsletter
Northwest Research Institute, Inc.
3847 S. Union Ave.
Tacoma, WA 98409-4621

Cutting Costs in Carbide Grinding Operations

A well run filing room will do better work for less money than a poorly run filing room. Depending on how big the mill and the filing room are the difference can be up to twenty thousand dollars a year.

The savings can be as high as 20% of the annual expenses in areas such as machine life, machine maintenance, diamond wheel use, coolant use, down-time, saw life, and equipment replacement. In addition, a well run filing room in a sawmill will produce more board feet of better lumber and get more life out of the saws.

The extra expense comes from three areas of cost. These three areas are: 1. Consumables such as diamond wheels, coolant, saw tips and saws. 2. Poor quality work, which shortens saw life, cuts yields and increases maintenance expense. 3. Machine life can be dramatically shortened in a poorly run filing room. This can be the biggest expense and the one most often overlooked.

The most useful rule of thumb to use when judging a filing room is overall cleanliness. In the filing room, cleanliness directly tells you how much life you are getting out of your machines. It indirectly tells you how much waste there is and how good the work is.

The relationship is simple. Dirty filing rooms mean that the machines are being damaged and damaged machines produce bad work.

Signs of an expensive filing room

The first sign of an expensive filing room is the color of the air. The dirtier the air is the more expensive the filing room is. Filing room haze is a combination of everything that is eating up the equipment in the filing room. The thicker the haze, the

faster the equipment is being destroyed. This haze is made of consumables such as coolant, sawtip and wheel particles and fumes. If there are enough of these to get in the air so you can see them then there are definitely more than enough of these to get into the equipment and cause excessive wear. Consumables cost money. The less you use and the less you waste then the less money you spend.

Another sign of an expensive filing room is dust and sprayed coolant. Once again this is waste and the less waste the better. If the dust and coolant are getting loose then they are also getting into sensitive areas such as bearings and eating up machines. It is pretty easy to see how rapidly the machines are wearing out inside by the build-up on the outside.

Smell and noise are both signs of waste. Well-run grinders make a soft, stroking sound. It is possible to stand next to them and have a normal conversation. If the grinding operation is too loud then probably too much material is being removed too fast. This is hard on diamond wheel life and the saw tip and it is expensive.

Sometimes people who work in a filing room get used to the smell and do not notice it. Smells always mean wasted dollars the same way dirty air and loud noise always mean wasted dollars. However something can do damage and still be hard to smell. Not many people can smell lead in small concentrations. Lead is gummy and it fumes well below the point it boils. The fumes can be hard or impossible to see. They still come out and they gradually build up on metal surfaces as much as twentyfeet away. If you have a bearing or a cylinder rod that needs to be slick

and smooth then a little lead can start to gum it up and cause drag.

The fumes from brazing fluxes generally have fluoride compounds in them. These are able to etch glass and they also etch metals nicely. Fumes from welding saw tips also come off and deposit onto other surfaces.

Air and coolant quality are as important in a filing room as in an automobile engine and for the same reasons. Cars have air intake filters and oil filters to keep dirt and metal particles from damaging the engine. Good filing rooms have air cleaners and coolant filter systems for the same reasons.

At one time it was expensive to keep a filing room clean. Now it has come to the point where it is more expensive to run a dirty filing room. This is partly because of the increased cost of everything in the filing room and partly because air handling and coolant filtration equipment have gotten so good and so inexpensive. The most profitable filing rooms now collect and filter the air, filter the grinding coolant and keep the filing room clean overall.

Five main problems

The problems are grinding dust, dirty coolant, coolant overspray, fumes from specific sources and general “filing room haze”.

Machine life

The difference can easily be 7% a year, which is \$7,000 on \$100,000 worth of equipment. Anyone who has bought new equipment lately knows that \$100,000 is not much money anymore.

The key factor is how well the machines are maintained. In the past ten years there have been a lot of advances so that grinders are both more accurate and more durable.

This also includes the automatic tipping machinery using high chrome/cobalt alloys. However a great many operations are buying new equipment and then ruining it by improper use. The fumes, grit and coolant in filing rooms attack and destroy bearings, rods, arms, electronics, belts and diamond wheels. They severely decrease machine life, which means more down time, more maintenance, more rebuilds and more replacements. It also means sloppier grinds.

Grinding dust from either carbide or Cobalt/chrome alloys is different but equally bad. Grinding saws creates millions and millions of tiny, sharp, hard particles. These particles are measured in microns, which is one millionth of a meter or one twenty five thousandth of an inch (1/25,000). Particles this small can get in anywhere. They are sharp and hard and small. These particles readily get past seals to get to bearings, guides, rods, cylinder arms and electronics. A simple test of this is general dust in the shop. If there is dust in the shop then there is dust getting into the bearings and eating up the machines. The difference can be 5% to 7% a year and it gets worse over the years. A machine may have a ten-year life between rebuilds if treated well. If the shop is dirty it may lose the scheduled 10% the first year plus another 7%. This can rapidly cut the life in half.

Increased consumable expense

A dirty filing room will use up to six times as much coolant or more than a clean shop. A poorly run shop will let the grinding swarf collect in the sump. When the level of swarf gets too high the sump is then emptied and changed. You should filter coolant for the same reason you filter oil in a car. If you do not filter constantly or regularly it is like adding a handful of sand to a crankcase every day and changing oil when the crankcase is so full of sand that you cannot add anymore. Sand in a crankcase and grinding waste in coolant both do the same things to machines. They cause excessive wear, rob the owner of performance and drastically shorten equipment life.

A good filing room will get six months to a year out of its coolant. This is a big saving on coolant for most shops and an even bigger saving on labor. Dirty coolant shortens diamond wheel life by as much as ten percent depending on the operation. Dirty coolant also means poor quality grinds. Typically this means that more is ground off the saw than is necessary which shortens saw life. It also means uneven grinds.

Poor quality work

In a dirty shop the machine will go bad faster. Then what will happen is that the machine will get sloppier. It will grind to looser tolerances. Looser tolerances mean uneven tooth grinds so the saw will dull faster because only some of the teeth are doing the work. Saws with duller teeth use more power to make poorer cuts. Looser tolerances on the grinds mean more retipping which eventually means more saws.

Cutting filing room costs

There are four simple steps to cutting filing room costs. These are proper settings, maintenance of equipment, proper air handling and proper coolant management.

1. Make sure the settings are proper. It is common to find coolant nozzles that are pointed in the wrong place. To compensate for this the stream of coolant is increased. A smaller stream of coolant that is aimed properly is more effective than a bigger stream pointed in the wrong direction.

Make sure air and dust collection vents are as close to the work as possible. Moving a vent four inches away from the work cuts the efficiency of the vent in half.

2. Do your maintenance. When routine maintenance is done in a good shop the oil and grease that is taken off looks new or almost new. The outside of the machine just needs a wipe or a gentle scrub at most. There is no caked material. Remember we are talking precision machines and very fine abrasive particles. If you can see any wear then it is too late.

3. Make sure the air collection equipment you already have is working properly. Equipment that is not turned on or plugged up does not do you any good. Some machines are so dirty that you cannot see the air intakes any longer. Older, dirty machines may have air intakes that are buried under years of crud.

There are several new air handling machines that are portable, inexpensive and easy to use.

4. Coolant needs to be maintained at the proper level, it needs to be kept at the proper concentration and it needs to be kept clean. Dirty coolant can have as many as 75,000,000 microscopic abrasive particles per cubic centimeter. These particles turn coolant into the same kind of liquid that water jets use to cut through solid steel.

Buying Equipment

We manufacture coolant filtering systems that make for a cleaner, more efficient workplace and that pay for themselves.

For more information contact:

Northwest Research Institute, Inc.
Carbide Processors, Inc.
3847 S. Union Ave.
Tacoma, WA 98409 – 4612
800 346-8274