

Whitney

METAL FABRICATION NEWS

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RAMPAGE!TM Redefines Plasma Cutting

The NEW *RAMPAGE!* was introduced at Whitney's 2003 Open House



3400 XP with ParthANDLER™-II at Waste Gas Steel Fabrication

RAMPAGE!™

Redefines Plasma Cutting

Looking to save pennies to stay competitive?
How would you like to save dollars instead?

by Al Julian • Marketing Manager

The world is full of trade-offs. Great tasting foods are fattening; powerful cars are gas-guzzlers; fine jewelry is expensive; we all get caught balancing our desires with our limitations. Trade-offs apply to metal fabrication as well. As new processes and technologies are introduced, there are normally trade-offs which limit the opportunities. Speed, quality, and cost are generally three variables that are mutually exclusive—for example, turning up the speed knob in any process generally has consequences in quality.

So, when Whitney introduced the RAMPAGE! process, many expected to see a down side. Not so—RAMPAGE! redefines plasma cutting with faster speeds, lower operating costs, and larger operating window without loss of quality. Furthermore, existing users can easily benefit from this technology. The most economical process in the industry has achieved a major breakthrough, a paradigm shift that pays dollar size dividends when we are looking for pennies to stay competitive.

In 1993, Whitney introduced the TRUECut® process. At that time, this oxygen plasma cutting process offered major benefits over the previously used air plasma process by providing numerous benefits including a wider operating window, dress-free cutting, longer consumable life, and better accuracy and cut quality. The response from our customer base was staggering—the new process broadened the acceptance of the punch/plasma process. Now, 10 years later, RAMPAGE! has done it again. This new process provides major throughput and economic benefits over both the standard TRUECut process, as well as all competitive processes.

What is RAMPAGE!?

In December, 2001, the Whitney and Hypertherm® development teams laid out a plan to reduce the cost of plasma cutting. While Hypertherm's HT 2000 product already had the lowest operating cost in the industry, we felt that a dramatic improvement in speed was needed to solidify its position for the upcoming years. The goals of the project were aggressive:

1. Increase cutting speeds by 40 percent in 1/4" through 1/2" mild steel at 200 amps.
2. No increase in operating costs.

3. Maintain existing cut quality.
 4. Use the existing HT 2000 Plasma Cutting System with a minimum amount of field upgradeable modifications.
- We are thrilled to note, and proud to announce, that all of the project goals were met.

Cutting Speeds

Not only were the project goals met, they were exceeded in many cases. Advantages from this process begin in as thin as 14 gage material! In 1/4" mild steel, cutting speeds increased from 160 inches/minute to 230 inches/minute. That's a 44 percent improve-

ment. In 1/2" mild steel, a full 50 percent improvement was realized—from 80 inches/minute to 120 inches/minute. Across the material thickness range, RAMPAGE! cuts 40 to 50 percent faster than the TRUECut process.

Now here's the good part—the operating window is wide open. For example, dress-free cuts in 1/4" material ranged from 160 ipm to 240 ipm with no discernable difference in edge quality, kerf angle, or part size. In 10 gage, that same cutting window extended from 300 ipm to 500 ipm. And in 14 gage, the cutting window (virtually

dress-free) extends from 400 ipm to a whopping 700 ipm! (We should note that only those machines with new CNC controls and drives may be capable of achieving some of these high cutting speeds). With this new capability in thin material, it is now possible for Whitney users to cut successfully with only one set of consumables throughout the entire thickness range of the machine.

A similar window was seen in the entire range of thicknesses. In other words, the process is wide open. Figure 1 shows the cutting speeds and conditions we tested at Whitney. At our first test site, the cutting speeds were commonly even faster than the new "book" values.

We know, from our customer base, that most Whitney users push the cutting speeds of the current process beyond book values. While the book values for 1/4" mild steel suggests 160 inches/minute, many of our users push it to almost 200 inches/minute. With the standard TRUECut process, this extra speed comes with

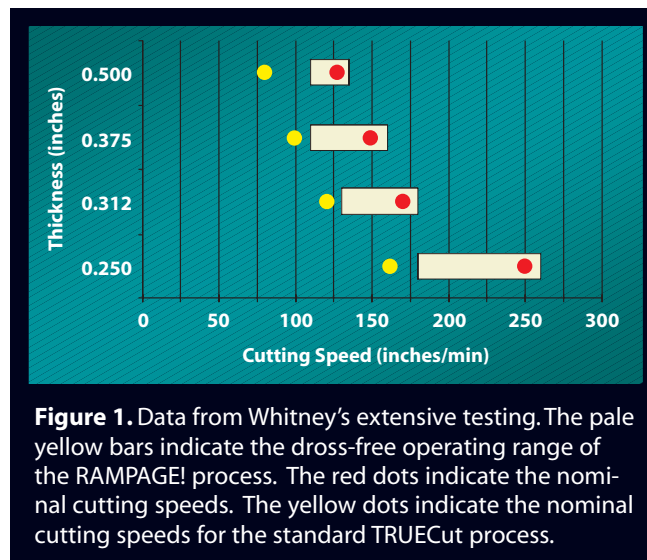


Figure 1. Data from Whitney's extensive testing. The pale yellow bars indicate the dress-free operating range of the RAMPAGE! process. The red dots indicate the nominal cutting speeds. The yellow dots indicate the nominal cutting speeds for the standard TRUECut process.

the sacrifice of part quality and potentially machine wear and tear. Part quality will suffer due to additional dross, kerf angle, and kerf lag (kerf lag is where the top and bottom of the cut are different resulting in irregular contour definition and washed out corners). Machine wear results because the slag spray is not truly vertical, and is therefore directed into the side of the slag collector resulting in accelerated wear and/or failure of the slag collection system.

With RAMPAGE!, the part quality is consistent throughout the operating range, kerf angles and sizes are consistent, and the arc is "stiff", resulting in no kerf lag, and a truly vertical slag spray, greatly reducing wear on the slag collection system. In other words—faster cutting speed, better part quality, and more uptime.

Operating Costs

The overall operating costs of the plasma cutting process are dependent upon power consumption, gas costs, and consumable parts costs.

1. Power Consumption—At first, one would assume that power consumption is identical between the two processes. Both use 200 amps of cutting current. However, since the RAMPAGE! process is running 40 to 50 percent faster, the actual power consumption per inch of cut is greatly reduced. For example, it takes 1.5 minutes to cut 120 linear inches of 1/2" steel at 80 inches/minute with the TRUECut process at 200 amps. With RAMPAGE!, it takes only one minute to cut the same length of cut, still at 200 amps. This results in 1/3 less power consumption for the same length of cut.

2. Gas Consumption—There is a 12 percent increase in oxygen gas consumption per hour. Again, using the same logic as described above, the gas is on for a shorter amount of time per part! By using 12 percent higher flow rate, but increasing the cutting speed 40 to 50 percent, the gas is on for a shorter length of time, and the total gas consumption is reduced by 20 to 25 percent. Taken over a year's time, this results in significant savings in gas expense.

3. Consumable Parts—Consumable parts cost is the single greatest expense in plasma cutting operating costs. These costs are affected by the price of the nozzles, electrodes, and other torch parts, as well as their life. Since consumable cost plays such a big role in overall operating costs, we quickly realized that, for this project, we could not afford to make costly consumable parts—they would need to be similar in manufacturability as the existing TRUECut consumables. Furthermore, the life of the consumables could not suffer.

Maintaining the life of the consumables turned out to be the biggest challenge in the entire project, mostly because it had a tough act to follow. The TRUECut process has long offered incredible consumable life—many of our users experience staggering

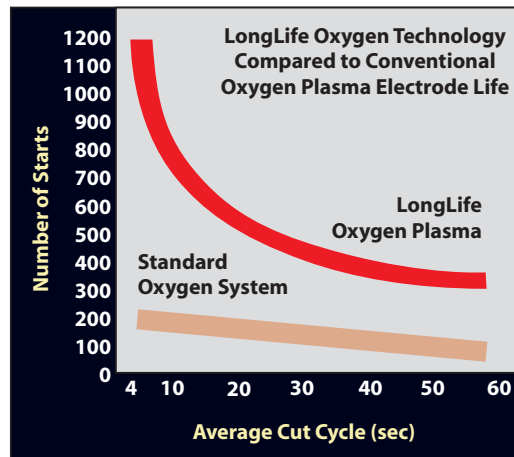


Figure 2. Our test site averaged over 1,000 starts over three machines and two weeks—meeting or exceeding the expectation from Hypertherm's life curve.

life for a set of consumables. However, using advanced modeling techniques, and long hours of testing, modification, and re-testing, a design was achieved which produced the desired life curve. Our test site indicated that we achieved an average life of over 1,000 starts for a set of consumables. This met or exceeded the expectation as shown on Hypertherm's life curve for the HT 2000 process (see Figure 2).

Not only is the RAMPAGE! process faster, it maintains the economy of the TRUECut process (the standard of the industry).

Quality of Cut

Our customers tell us that dross-free parts are a given. They also state

that the most important aspect of part quality is repeatability. In these respects, the RAMPAGE! process excels.

As already stated, the dross-free operating window of the RAMPAGE! process is wide open. Furthermore, the published cutting speeds for the process still leave some head room for material and process variations. Dross-free parts are a given, and the RAMPAGE! process delivers.

Which brings us to repeatability. Plasma cut accuracy is dependent upon the consistency of kerf angle. It is normally not an issue as to whether the process delivers a one or a three degree kerf angle, but rather whether a one and a three degree kerf angle appear on different edges of the same part. The maintenance of a consistent kerf angle determines process repeatability. Our testing has shown that the RAMPAGE! process delivers not only small kerf angles, but also much more consistent kerf angles than any other conventional plasma cutting system on the market, including TRUECut. RAMPAGE! delivers higher quality parts at faster speeds and lower cost.

Total Cost of Ownership

So let's get back to saving dollars, not pennies; it's time to do the math. RAMPAGE! is standard on all Whitney punch/plasma offerings, including the 3400 XP, 3700 SST, and 4400 MAX products. Using a standard nest (a "benchmark" nest of parts Whitney has used for process comparisons over the last 10 years), we analyzed the total cost of ownership for a 3400 XP with TRUECut, and a 3400 XP with RAMPAGE!. The total cost of machine ownership includes labor costs, operating costs (for the entire machine), and depreciation costs (the amortization of a financial payment per hour). Our Investment Advisor model takes into account all aspects of these costs for each process considered. Figure 3 shows the effect RAMPAGE! gives us on the average of one nest of parts cut in five different material thicknesses between 3/16" and 1/2" in thickness. Amortized over an entire year with a three shift operation, that translates to a savings of \$120,000 per year over the same machine with TRUECut cutting technology.

Even more staggering is the same analysis compared to high end 4.0 kW laser (see Figure 4) showing \$187,000 per

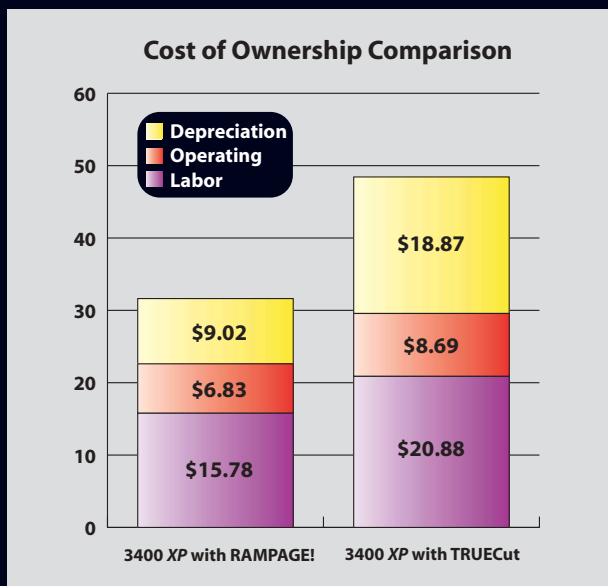


Figure 3. Cost analysis of the 3400 XP with RAMPAGE! versus the 3400 XP with TRUECut shows the substantial economic advantage of the RAMPAGE! system in the thickness range of 3/16" through 1/2" (3.5 – 12.7 mm) steel.

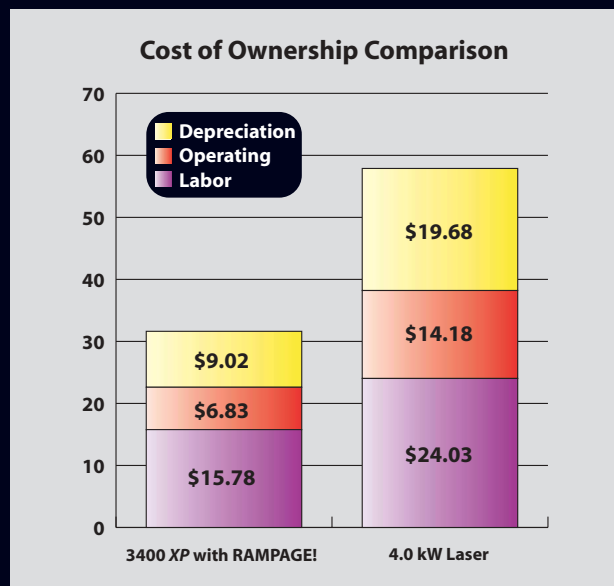


Figure 4. Cost analysis of the 3400 XP with RAMPAGE! versus a 4 kW laser cutting machine shows the substantial economic advantage of the 3400 XP in the thickness range of 3/16" through 1/2" (3.5 – 12.7 mm) steel.

year cost difference—dollars toward the bottom line. Will your customers pay you \$187,000 per year to have their parts cut on a laser? Or are your customers pushing you for additional cost reductions that you cannot afford today?

Is It Real?

Just ask Dale Harper, Vice President and General Manager, and Wayne Mount, Production Manager at Mancor Industries in Oakville, Ontario. Mancor tested the RAMPAGE! process on their three Whitney machines—two 3700 ATC's and one 3400 RTC. The result? Mancor ran their three punch/plasma machines non-stop for two weeks and received more parts at the end of each shift than ever before. Aside from the feed rate changes, no other programming changes were made—even for common cut parts. In some material thicknesses, Mancor even exceeded the book values.

"In our next corporate meeting, I will be introducing this process to the other facilities as part of our 'best practices' program" says Dale Harper. Mancor's sister plant in South Carolina has three Whitney machines as well.

Existing Users—You're in Luck!

RAMPAGE! is available as a retrofit to all existing TRUECut users, and the best news is that it is very affordable. Call your local Whitney distributor, or contact Whitney service directly. We will be glad to help you save money.

Some final thoughts on the big picture for the 3400 XP

We have made major design enhancements on this product over the last two years, and it is important that all of our cus-

tomers understand the continuous improvement process we have undertaken here at Whitney. We are an industry leader, leading the way in process economy for fabricated parts. Our Investment Advisor model has shown us the direction we need to go in order to maintain our leadership position.

Here are some of the changes and enhanced offerings we have made in the last two years on the 3400 product line alone:

- Faster rapid speeds—from 1,000 inches/minute to 1,500 inches/minute.
- 10 percent faster tool change times.
- 67 percent reduction in drop door cycle times.
- 50 percent reduction in torch ignition times.
- Skeleton Drop Table—automated skeleton removal within the existing machine envelope.
- PartHANDLER-II automation package—for loading of raw material, and unloading/sorting of large parts.
- Tool Caddy—tool expansion system for reduction of set-up.
- Open Architecture CNC Control with improved communication features, remote diagnostics, messages, and contour definition.
- TuffSkin™ Premium Tooling
- RAMPAGE! Plasma Cutting Technology.

Each of the above has provided a benefit to the bottom line—for reducing the cost of fabricating sheet metal and plate. So if you are an existing 3400 RTC user, change your reference point. Today's 3400 XP has made a good thing better, faster, and at a lower cost. You do not need to trade off cost for quality. Today's fabricator can have his cake and eat it too. ♦

Whitney

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