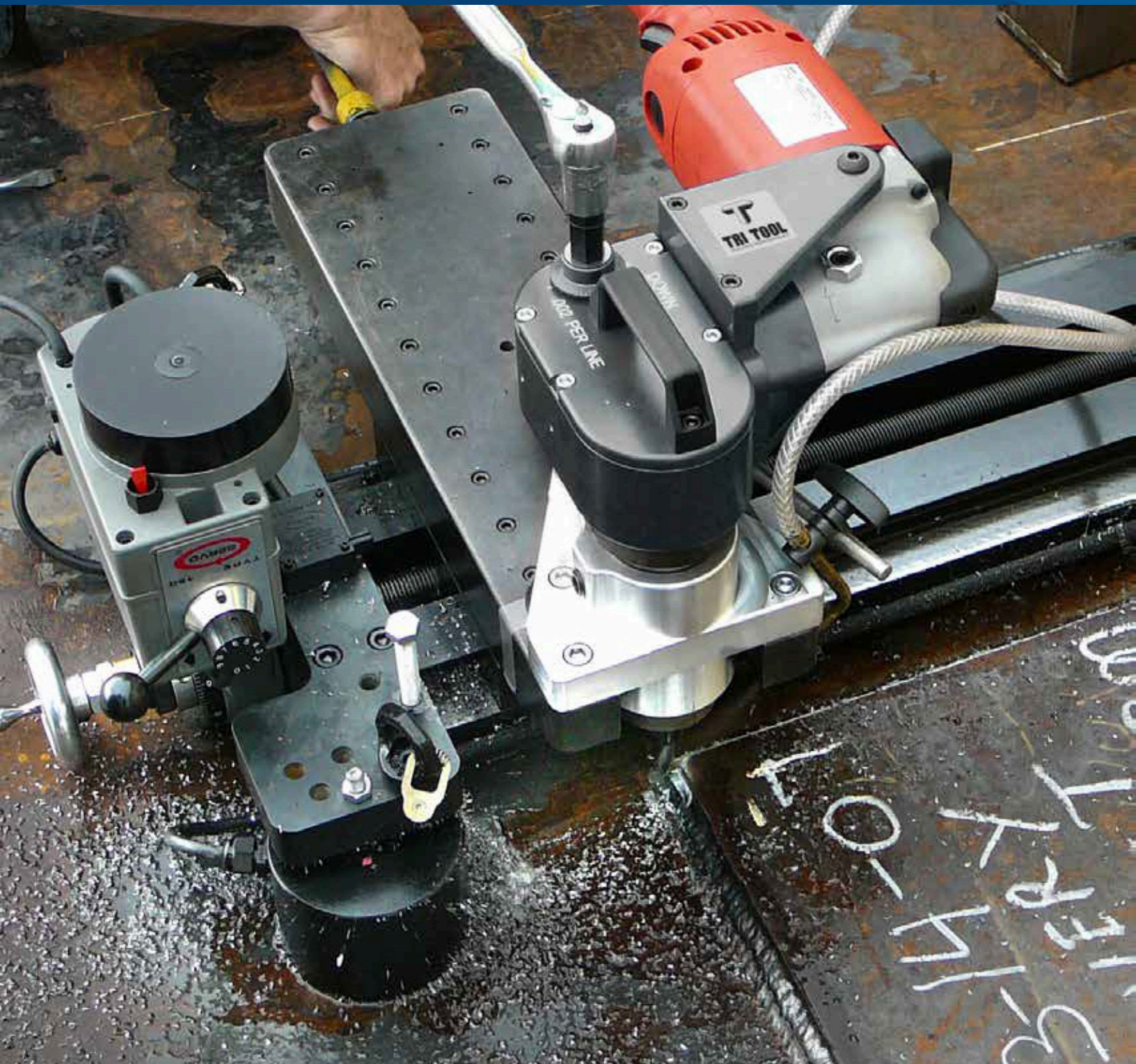


Custom Equipment





Tri Tool Engineering designed and built this custom milling machine for performing replacement of ship deck plates.





## Table of Contents

<i>Why Utilize Custom Equipment?</i>	4
Legacy of Custom Solutions	5
Aerospace and Defense	6
Power Generation	7
Part Production	8
Oil & Gas Pipeline / Offshore	9
Processing Systems	11
<i>It's Easier Than You Think...</i>	12
Contact Information	12

"I was very impressed with Tri Tool's design group customizing a tool for our unique application and the excellent customer support service they provided when the work was taking place. The project came off exactly as planned and I totally thank the Tri Tool staff with all their knowledge, cooperation and professionalism that was provided. They are truly a wonderful company to work with..."

**Lawrence M. Spiro**

P.E., Senior Mechanical Engineer

**When your work requirements are beyond the scope of standard machinery or you need a special machine for specific application, we can provide solutions ranging from simple modifications to new, custom machinery.**

Tri Tool can extend the cutting range of standard tools, automate operations, enable difficult tolerances to be met or enable machines to perform unusual cuts. Special clamping fixtures can be produced that allow machinery to securely hold specific fittings or tubing assemblies, and specialized form tool bits can be designed to produce complex cutting results.

We are proud of our record of consistently providing the industry's finest custom engineering and manufacturing support. Over the years, we have produced countless variations of our standard equipment. Machinery can be built from special materials, special accessories developed, or entirely new machinery built to customer's specifications.

Our machinery can be modified for increased productivity or specific operations. Examples include remote control panels that provide reliable operation in hazardous or confined environments, alternate drive sources such as pneumatic, hydraulic, or AC or DC electric drive motors, specially engineered collet and saddle systems to grip unique components, and automated feed and clamping systems.

Used in cleanrooms of varying classes, these machines offer the advantage of cold cutting which generates a continuous chip, rather than the particulate matter produced by saws and abrasive cutters. This provides more control over cleanroom contamination.

Machinery can be designed to cut by means of alternative methods such as roller wheels. Roller wheel cutters are important for use where no chips or cutting debris can be produced (as with radioactive materials) or where space is extremely limited.



*This 500 Series SeverMaster® shows the versatility and flexibility of the product range. Designed for hazardous use in a nuclear plant, it offers total remote control operation and unique roller wheel cutting for reduced cutting debris with radioactive metals.*



## A Legacy of Custom Solutions

Comprehensive equipment solutions are a result of proven experience, a thorough understanding of customer requirements, and careful attention to details.

As a longstanding leader as a producer of quality portable machine tools, Tri Tool Engineering has an incredible amount of experience in a wide range of industries.

Most industries have a requirement for critical piping systems at the core of their operations. When new construction, expansion or maintenance is required, project managers know that the dependability and performance of equipment can be a critical factor in meeting tight downtime scheduling and financial budgets.

The unexpected costs of unplanned or emergency outages or budget over-runs can cost many times the price of specialized equipment that could have ensured the work could have been performed withing planning guidelines.

Regardless of the industry or machining operation involved, the creation of dedicated machinery designed for maximum efficiency and performance can make a significant positive impact on your work-flow. This is especially true when conventional equipment available is slow or difficult to use.

By listening carefully to customer feedback and fully understanding the complications or time wasting aspects of conventional machines, custom engineering can produce machine solutions that directly address their specific requirements.

Best of all, many times customers are experiencing problems that we have already solved previously, and have solutions within our engineering archives that can be modified for your specific application.

## Special Fixtures and Mock-Ups

Our manufacturing plant can produce accurate, full size mock-ups of critical maintenance operations to provide customers with definitive proof of concept review (and peace of mind) that complex machining can be performed off-site prior to being completed successfully utilizing our custom designed and manufactured machine tools.



*Tri Tool engineers utilize state-of-the-art software that permits new designs to be fully developed and virtually tested prior to moving on to computer aided manufacturing stages of production.*



*A remote-controlled, self-propelled custom internal pipeline weld profiling system that features laser and video alignment to position and monitor the precise removal of internal weld crowns.*



*The ability to create and perform trial runs with precision mock-ups of complex, critical cutting situations is a distinct advantage of an engineering team with OEM manufacturing support.*

## Aerospace and Defense

We have been a trusted supplier of special application machinery and Federally Approved equipment for the Dept of Defense for many years.

Since our company founding over 45 years ago, our company has provided quality custom tools to the aerospace industry. We have provided engineering and custom manufactured equipment that has been successfully deployed and used by all branches of the armed services.

Our machinery has also been selected for precision in-place machining for many NASA projects, and by leading commercial space and aircraft companies.

With the tight tolerances demanded by space vehicles and missiles, the aerospace industry requires machinery that can deliver exacting precision and reliability. Tri Tool quality equipment and tooling provides the consistently accurate and repeatable performance that has made them the ideal choice for both precision welding and component fabrication.

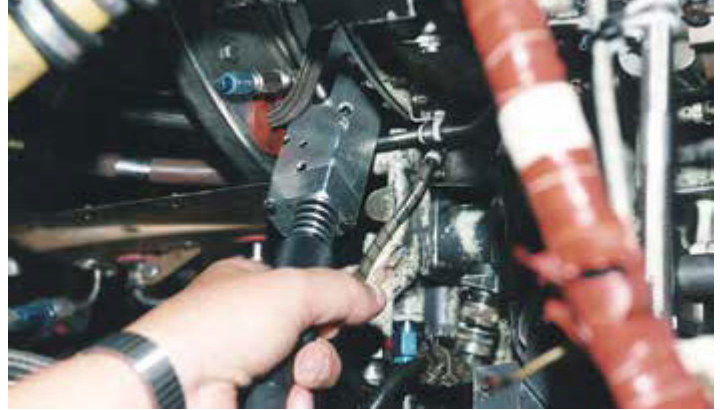
We have also provided machinery for munitions decommissioning that can provides requisite "cold cutting" by remote control, to reduce the hazards inherent in those operations.

Another important aspect of our tools for use in the aerospace and defense industry is their ability to deliver consistent, accurate machining on exotic alloys such as Hastaloy, Inconel, stainless steel and titanium that are often used in critical aerospace applications.

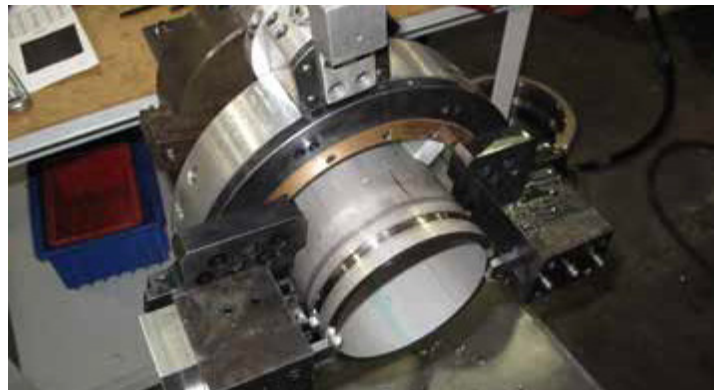
Our proven experience in supplying numerous NSN listed tools, alongside our custom aerospace equipment establishes us as a preferred OEM with quality machine tools made in the USA.

## Custom Safety Modifications

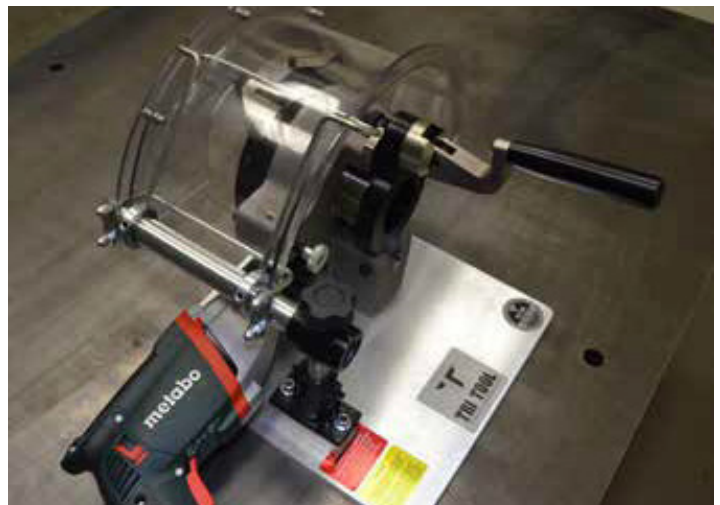
Sometimes, you may need to perform specialized portable machining operations that can introduce increased safety hazards. When you need enhanced safety shielding or guards, our custom engineering can design and build unique safety accessories or modifications to your tools in order to provide any level of safety protection your application requires.



*Our compact (no debris) roller-wheel tubing cutter was designed to perform precision tube severs in tight spaces. This machine is included in most front-line military aircraft maintenance equipment.*



*This custom configured grooving machine was designed to provide precision end grooves to match couplings to construct a military, rapid-deployment, fuel pipeline during Operation Desert Storm.*



*This bench-mounted 500 Series SEVERMASTER® tube severing machine was fitted with a custom designed safety guard that fully protects the operator from debris from the severing process.*



## Power Generation

Nuclear and Fossil fuel power utilities require a tremendous amount of maintenance, and our equipment has been there supporting them all along.

One of our principal customer bases is power generation due to their widespread use of welded piping systems.

High-pressure, heavy-walled pipes used to contain steam pressure need to be assembled with high quality welds. That means that critical weld prep beveling is a requirement throughout the plant.

In fossil fuel power plants, we have designed special tools for water walls and heat exchanger maintenance and construction. In Nuclear plants, custom machinery for completely remote operation is always in high demand.

We've manufactured custom solutions for cutting Nuclear waste cannisters, as well as maintenance equipment for hydro-electric power plants.

Our vast experience working with the power industry makes us the right choice for your custom equipment design and manufacturing.

### Case Study - Turbine Shaft Repair

**Challenge:** Repair a damaged turbine generator shaft, at a major municipal hydro-electric power plant that had critical outage bearing wear damage.

**TRI TOOL Solution:** Design a custom combined OD mounted machining and orbital welding system that could perform repairs to the turbine shaft in-place.

Tri Tool specially modified 600 Series SB Clamshell (split-frame) lathes that performed both the precise machining and welding aspects of this successful repair, preventing the need to remove the shaft.



*This heavy-duty machine above was designed and built to provide consistent depth and diameter cuts to remove socket welds in a very high-pressure heat exchanger header in a fossil power plant.*



*This remote-controlled CNC Machining System with control computer was designed as a fully custom solution for extremely accurate 3-axis cutting in the hazardous environment of a Nuclear Power Plant.*



*The nuclear industry demands that a wide variety of contingency equipment be kept on site to address any eventuality. This is a custom Omega Seal cutter with video cameras designed for remote operation.*



*This precision clamshell lathe can be split and reassembled around in-line objects, usually pipe, but in this case a turbine shaft. Our DUALARC® weld head can be seen performing a weld.*

### Part Fabrication

Our wide range of equipment is used not only for plant maintenance, but as production equipment for precision tube and pipe part fabrication.

Many times, the precision and stability of our portable equipment is an affordable alternative to large, heavier and much more expensive fabrication equipment such as floor mounted mills and lathes. For example, companies that have a requirement for high volumes of tube sections at specific lengths with perfectly square, burr free ends could produce those parts on a large conventional lathe. Alternatively, the same parts could be fabricated from long tube lengths on smaller, bench-mounted SEVERMASTER severing machines fitted with a squaring module.

Another advantage is that options such as autoclamping, auto-feed and automatic reset can be added to the standard machines to facilitate and streamline repetitive, time consuming operations. The same machines that perform accurate cutting for maintenance on facility tube and pipe can be configured for a production role with enhancements for mounting, work fixturing and bench-top mounting.

Think about work flow applications where you require repetitive, precise cutting. Our custom equipment engineering can automate production operations with quality portable machine tools that are much more flexible and versatile in your plant layout. Machinery can be set-up for short, medium and long runs as needed and then be stored and shop space reallocated until the need for their deployment arises again.

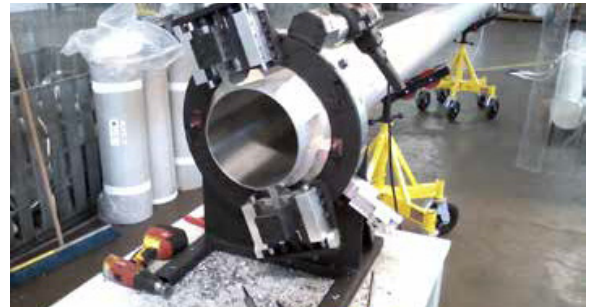
Our specialized production tools can be a costeffective and efficient option for your production requirements, while saving you time and money.

### OEM Equipment Modifications

Many special machining capabilities can be added to standard portable machine tools to satisfy customers requirements. This simpler approach is advantageous because the time and costs are greatly reduced compared to designing and building completely custom equipment.



*This custom 200 Series BEVELMASTER® ID mounted beveler features a hydraulic drive that is serving dual duty, providing drive power for the cutting head as well as operating an auto-feed system.*



*This RBL clamshell has been custom configured with a bench stand, electric drive, and features a full support clamping system and spring actuated cutting heads - both to correct out-of-round issues.*



*This Model 302 was configured with pneumatic saddle clamping actuation and a quick-detach air fitting for increased cycle times in a high volume tube production role.*



*A great comparison shot of the standard (saddle clamping) Model 304, next to a custom 304 with Quick-Lock collet clamping and a special adjustable, offset bed for performing oblique cuts.*



## Oil & Gas Pipeline / Offshore

Despite our wide range of pipeline equipment, custom designed pipeline equipment is often needed to provide special machining, profiling and coating removal.

Tri Tool produces high-performance oceanic and midstream, land-based pipeline equipment with our PIPEMASTER® and TERRAMAX® product lines that include PFMs, HPUs and ILUCs.

The varied and complex process of exploration, production and transportation of petroleum resources to the world of anxious consumers requires many specific and specialized machines.

Our custom engineering projects have produced numerous innovative portable machine tools that compliment or standard range of pipeline products to ensure customers attain maximum production.

We not only make the tools that face the pipes that carry the oil and gas, we engineer equipment to perform 7-Axis CNC deep counterboring, laser dimensioning and specialized ID and OD weld profiling. This equipment contributes to superior welds that leads to environmentally safer production and produces stronger fabricated structures used to produce in the deeper and deeper depths of today's projects.

When your pipeline or offshore project presents equipment challenges and it seems like there are no solutions out there for what you need to do, our experienced engineering team can ensure you have the special tools you need to get the job done right, the first time.

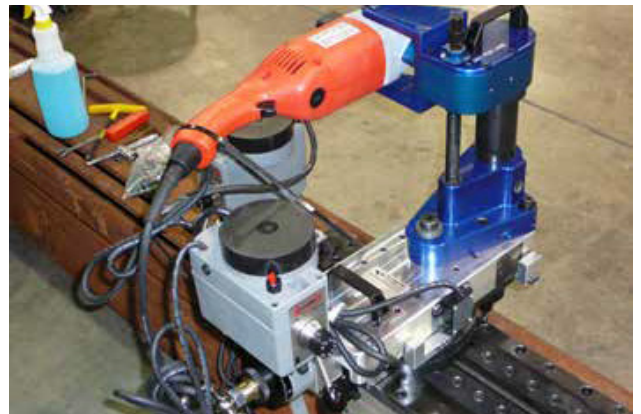
Our standard range of pipeline equipment has set new standards for performance and precision, and that's the kind of advantage you can expect from our custom engineered and manufactured equipment for any of your project requirements.

## Special Equipment Modifications

While designed with superior stability and ample power to cut many types of metal, portable tools such as our 600 Series Split-Frame Lathe are an ideal solution to precisely remove pipe coatings so that they can be welded for pipeline construction or maintenance. Successful coating removal can be performed by either milling or form tool type machining methods as required by the coatings.



*This custom engineered and built automatic-mounting High Speed Severing System was designed to rapidly cut-out defective welds for re-welding in an offshore J-Lay pipeline barge production role.*



*The track milling system above was designed utilizing our Model 424 Keyway Cutter. The machine is guided by a custom track that is temporarily welded in place to provide stability and precision results.*



*Our fast and versatile RBL split frame lathe was the ideal platform when a customer needed a light and reliable Coating Removal System that featured our custom designed form tooling bits.*

The midstream segment of the oil and gas industry is expanding at a tremendous pace as the U.S. has become a principal exporter of oil and gas energy resources to the world.

The increasing need for effective and dependable infrastructure for the gathering and transmission of oil and gas has become a critical challenge to energy producers. With the ever-growing demands to move these commodities from production areas to refining and shipping locations, vast numbers of midstream pipelines will be needed.

All of this demand comes at a time when much of the existing pipeline networks that were installed in the last century are reaching their end-of-life phase. Countless miles of gas and petroleum transfer pipes that had been made from mild steel have effectively rusted away, requiring massive maintenance and replacement projects.

With the example of how corrosion has compromised countless miles of aging pipe, energy producers and project supervisors are turning to more exotic pipe materials and anti-corrosion coatings to achieve pipeline reliability and to eliminate safety hazards. Regardless of the requirements for special maintenance and construction of new pipelines, we can ensure that you have any custom machines that your project requires. We have experience with exotic alloys, coating removal and custom pipeline welding to help you produce the next generation of oil and gas transmission systems.

### Case Study - Pipe End Preparation

**Challenge:** Produce a high-volume containerized fab-yard dual-workstation and pipe rack system that could perform rapid, precision CNC deep counterboring and laser pipe end dimensioning.

**TRI TOOL Solution:** We custom engineered, constructed, and deployed a self-contained, modular 7-Axis CNC Deep Counterboring System with innovative, hands-free "Safety" pipe rack, with laser dimensioning pipe end matching capabilities that achieved record levels of performance.



*A custom deep counterboring system was needed for a major onshore pipe fabrication project. Our custom system was deployed with a completely custom built pipe rack featuring maximum safety.*



*This clamshell lathe has been custom built to mill the outer casing in a tight tolerance pipe-in-pipe based maintenance operation.*



*Designed to eliminate weld prep bevel inconsistencies that occur from out-of-round conditions, this pipe facing machine is fitted with custom-built OD tracking tool holders for uniform bevel profiles.*



*Pipe fabrication can sometimes mean working in remote areas, exposed to the elements. Our 7-Axis CNC Deep Counterbore System operates successfully in remote, harsh environments.*



## Processing Systems

From our company's beginning, our precision cutting and squaring machines have been your best choice for ensuring excellent end preps for welding quality tubing systems.

Thousands of companies rely on high-purity tubing systems for processing of food and beverages, pharmaceuticals, chemicals, and semiconductors, as a critical part of their production equipment.

The amazing versatility of our portable tube severing and squaring equipment is demonstrated in the seemingly countless variations and configurations we provide for an unbelievable variety of end uses.

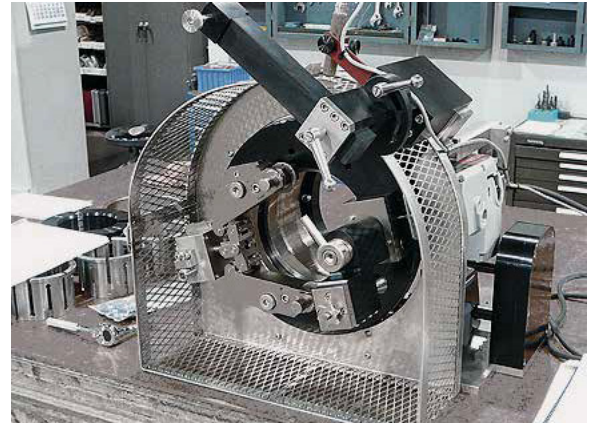
Designed primarily for producing incredibly accurate end preparation for autogenous welding systems, our 300 Series and 500 Series SEVERMASTER machines are the choice of professionals throughout the world.

Our precision tubing equipment is also the ideal for production roles when precision components are fabricated from tubing. Tube equipment can be modified to automate and streamline repetitive functions such as clamping or tool bit feed. This means that our engineering can design practical modifications so that you can get the precision and high-volume you require, from machinery much less expensive than large floor mounted lathes, etc.

If you work with tubing for welded high-purity tubing systems, for special cutting processes, or for the production of tubing component parts, discover how easy it can be for our Custom engineering to optimize a machine to achieve maximum results for your specific application.

## Specialty OEM Tooling

Ensure you are getting maximum performance and precision with your tube and pipe cutting machinery by consulting with our Engineering Dept. regarding your specific requirements. Depending on the material and weld prep you're performing, bits can be custom produced to achieve reliable, superior cutting results resulting in quality welds.



*A custom Model 576AC SEVERMASTER® features roller cutters to perform remote chipless cutting. Other unique features include a pivoting base stand, laser cut indicator, burnisher, and full safety cage.*



*This ID mounted BEVELMASTER® has been custom engineered as a production, bench-mounted end-finishing machine for thin wall tubing with a special base plate and full support mandrel pads.*



*We have a library of over 10,000 unique bit designs that were developed for use in our machinery. Despite that fact, we are constantly designing new bits for customers' specific requirements.*

## It's Easier Than You Think...

See how quick and easy it is to take advantage of our custom engineering and manufacturing. We can provide innovative, precision equipment for your most challenging requirements.

Customers are often surprised to find how effective custom equipment can be, and how much time and money can be saved when you have rapid and efficient equipment solutions working for you.

Many times, the custom equipment you may need is similar to special products we have designed and built to perform similar operations for previous customers. This can significantly reduce the time it takes to deliver the machines you require.

Regardless of whether your need is a special tool bit, a simple modification to one of our standard tools, or a completely new piece of equipment from the ground up, we have the knowledge and experience to tackle your most demanding applications.

It all starts with a simple call to our helpful and experienced Engineering and custom equipment representatives. They'll make sure you get reliable equipment - perfectly suited to your job.



*Sometimes it's not just the machine but the mounting system that must be custom manufactured. This special milling machine was designed to be able to conform to the curved side of a ship's hull.*

## It's as easy as 1,2,3...

### 1. Consider what custom tool you want:

- What kind of cut you need to perform?
- What sizes and materials do you need to cut?
- What automation features do you need?
- What production rate/cycle time are needed?

### 2. Contact us and let us know if you need:

- Custom modifications to our existing tools?
- Special fixturing, tooling or configurations?
- Custom mock-ups and pre-project demos?
- Special coatings or remote operation?

### 3. Our Engineering Department will:

- Thoroughly develop a proposal and detailed plan to produce a custom solution just for you.



*The introduction of electronics to our custom engineered equipment solutions has become much more prevalent such as this integral video system being used to monitor a critical welding operation.*

**Call us when it seems like there's no machine for what you want to do!**

- Portable Precision Machine Tools
- MissionBuilt Custom Engineered Solutions

- On-site Field Services
- Equipment Rentals