The Fullerton Machine Shop

Who are we?

The Fullerton Machine Shop Newsletter's mission is to provide, on a quarterly basis, information of current affairs happening in the machining and manufacturing business world. This newsletter shall consist of a variety of articles from various sources that are beneficial to all individuals and shall not discriminate against anyone. It is our intent to use this newsletter as a form of communication that can benefit students, employers and others that are involved with machining and manufacturing business events and broaden the horizons of those in this industry. As a result, this newsletter shall not be limited to just machining and manufacturing subjects due to the global events that are affecting us all in the business world of today. We at the Fullerton Machine Shop pride ourselves on developing innovative approaches to machining and manufacturing technology.

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Fullerton Machine Shop

Program Description http://machine.fullcoll.edu

Welcome to the Fullerton College Machine Shop. We currently operate Monday through Saturday, with up to 20 students enrolled in our 12 unit program (One semester). This program consists of our beginning machining (MACH 91 and 116), CNC Set Up and Operation (MACH 086), CNC Parts Programming (MACH 087), and our Advanced CNC Set Up and Operation (MACH 088) classes. The Machine Tool - Level II and CNC Certificates are earned when additional units are completed in more advanced courses. Our extended day program runs from 6-10PM M-Th. Each extended day class has an average enrollment of 20 students. Class size varies depending on the topic being taught. We teach courses in conventional machining techniques, CNC machine set up and operation, manual programming for CNC machines (3, 4 and 5 axis), beginning and advanced levels of computer assisted parts programming using SurfCAM, and Mastercam. We also provide instruction in CAD using AutoCAD and Solidworks software, CAD/CAM, blueprint reading, geometric dimensioning and tolerancing (ANSI Y14.5), technical mathematics, metallurgy, and manufacturing processes.

Students are eligible to receive any of our six certificates after successfully completing the specified courses. We also offer an A.S. Degree in Manufacturing Technology with Machining as an area of specialization.

Our central location, our up-to-date laboratory facility and equipment, and our well prepared faculty are just three reasons why Fullerton College has remained a strong force for serious vocational preparation in the machining trades.

Instructional philosophy: We have chosen to stress the learning of functional tasks rather than to promote an environment where students choose their own projects. All of our laboratory exercises are designed to introduce students to a broad scope of tasks typically performed on conventional or CNC machines. Our vocational advisory group annually reviews our curriculum. They guide our decisions to include new topics, delete out-of-date ones, and to continue those that are still viable.

Our conventional machining program stresses the set up and operation of lathes; vertical mills; grinders for a wide variety of processes. The classes provide instruction in blueprint reading, shop math, measurement and inspection, job planning, safety, and general machining theory. Our CNC program also emphasizes the set up, operation, and programming of vertical mills and lathes. In manual programming courses students learn proper formatting of CNC code, calculations related to determining coordinate data, proper use of programming techniques such as the use of sub programming, and experience cutting parts using their own programs on our CNC machines. In computer assisted programming classes student learn how to use software such as SurfCAM or Mastercam to generate machine code for CNC mills and lathes. All classes are structured with time allocated for lecture/demonstrations and hands-on laboratory time.

Fall -2017 Class Schedule At A Glance. Register Now!! www.fullcoll.edu

See us on Facebook at
https://www.facebook.com/Fullerton-College-Machine-Technology-Department-111130205565244/

Check us out at: http://machine.fullcoll.edu/

The Mfg. Business

The following information is taken from the Tooling and Production Magazine http://www.toolingandproduction.com/

Reshoring is Winning! First Time in Decades More Jobs Returning to U.S. Than Leaving

For the first time in decades, more manufacturing jobs are returning to the United States than are going offshore. The combined reshoring and foreign direct investment (FDI) trends grew by over 10 percent in 2016, adding 77,000 jobs (tying the 2014 record) and exceeding the rate of offshoring by about

27,000 jobs. The 2016 results bring the total number of manufacturing jobs brought back from offshore to more than 338,000 since the manufacturing employment low of February 2010.

Manufacturing Jobs/Year 2016: The Tide Has Turned			
	2000 – 2003 Annual average	2016	~% Change
New Offshoring	~240,000*	~50,000*	-80%
New Reshoring & FDI	12,000*	77,000**	+500%
Net Jobs Gained	~-220,000	~+25,000	N/A

* Estimated ** Calculated – Reshoring Library through Dec 31, 2016

There are still huge opportunities and challenges to bringing back all the 3 to 4 million manufacturing jobs cumulatively lost to offshoring. The rate of job return announcements doubled in November 2016 and hit an all-time peak monthly record in January 2017. Clearly, government policy changes and expectations of those changes are key to accelerating the trend.

Overview

The Reshoring Initiative's 2016 Reshoring Report contains data on U.S. reshoring and FDI by companies that have returned U.S. production or sourcing from offshore. The report includes cumulative data from 2010 through 2016, as well as highlights from the first quarter of 2017. In comparison to 2000-2003, when the United States lost, net, about 220,000 manufacturing jobs per year to offshoring, 2016 achieved a net gain of 27,000. The tide has turned. The numbers demonstrate that reshoring and FDI are important contributing factors to the country's rebounding manufacturing sector.

The overall trend was up from 2015 due to anticipation of potential policy changes that will make the United States more competitive, continued rising wages overseas, and increased use of total cost of ownership for sourcing decisions.

"We publish this data annually to show companies that their peers are successfully reshoring and that they should reevaluate their sourcing and siting decisions," said Harry Moser, founder and president of the Reshoring Initiative. "With 3 to 4 million manufacturing jobs still offshore, as measured by our $500 billion/year trade deficit, there is potential for much more growth. We call on the administration and Congress to enact policy changes to make the United States competitive again. Our Competitiveness Toolkit is available for them to quantify the impact of policy alternatives, including: stronger skilled workforce; lower corporate taxes and regulations; and lower U.S. dollar."

A Deeper Dive into the Reshoring Data

Proximity to customers was the leading factor in 2016, followed by government incentives, skilled workforce availability and ecosystem synergies.

The Southeast and Texas remain the top regions for reshoring and FDI, with the Midwest in second place due to its strong industrial base. Transportation equipment remained the strongest industry, accounting for nearly 40 percent of total jobs returned. Preliminary 2017 data trends are looking to be at least as good as 2016.

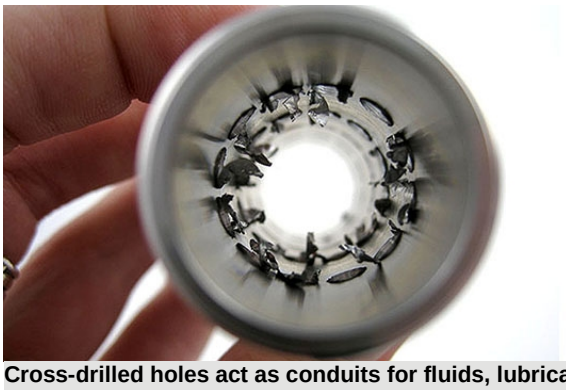
The Tooling Corner

Simple, Effective Crosshole Deburring
American Machinist May 12, 2017

Integrating flexible hones in the machining process means complex parts can be finished in house, at less cost

- The problem of burrs
- Absorbing time, price
- "Independent" suspension

Cross-drilled holes act as conduits for fluids, lubricants and gases. Failing to remove burrs can cause blockage of these critical passages or create turbulence in the flow.
In automated machining, removing burrs and sharp edges in cross-drilled holes can be tedious and time consuming — and the problem also presents in similar difficult-to-access areas, such as undercuts, grooves, slots, or internal holes. "Burrs" are the rough edges left on a cut surface after the tool has done its work, and deburring is the process of smoothing or finishing those edges. One particular challenge is deburring the intersection of cross-drilled holes frequently found in engine and transmission components.



Cross-drilled holes act as conduits for fluids, lubricants and gases. Failing to remove burrs can cause blockage of these critical passages or create turbulence in the flow.

Despite the challenges, removing burrs from the production process is absolutely essential for finishing high-quality, precision parts. In many applications, cross-drilled holes act as conduits for fluids, lubricants and gases. Failing to remove burrs can cause blockage of these critical passages or create turbulence in the flow.

Burrs can also lead to part misalignments, affect dimensional tolerances, and limit the overall efficiency of machined components. "Getting rid of burrs is really important because

if there is any loose material that gets dislodged when the product is in use, it can cause major problems," said Anthony Scott, lead machinist at Orange Vise Company, a manufacturer of machine vises and quick change fixturing components.

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Automating Deburring/Finishing Speeds Throughput
Although there are many techniques for deburring internal passages at cross-holes, the majority of these require sending out parts for finishing, or investing thousands of dollars in equipment to complete the work in-house. These options (which include thermal, abrasive flow, electrochemical, and high-pressure water finishing) effectively remove excess material but they also build time into the manufacturing process, and add to costs.
Cross-drilled holes are produced to function as conduits for fluids, lubricants and gases. Failing to remove burrs can cause blockage of these critical passages or create turbulence in the flow.

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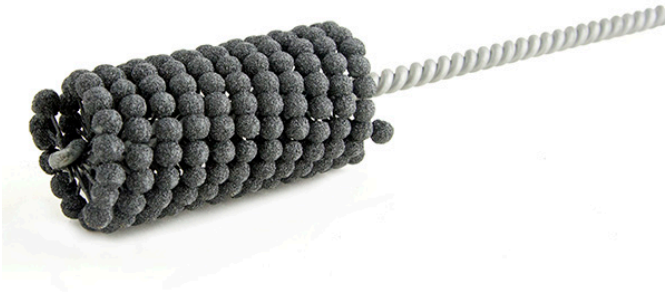
Integrating deburring — A better option for many machining operations is to integrate deburring into the automated process with a simple, effective crosshole deburring tool, such as the Flex-Hone from Brush Research Manufacturing. By doing so, operators can speed up the manufacturing process and ensure uniform quality for precision parts.

Characterized by the small, abrasive globules that are permanently mounted to flexible filaments, the ball-style hone is a flexible, low-cost tool for surfacing, deburring and edge-blending.

According to Scott, flexible hones are ideal because they provide a cost-effective solution to smooth edges and produce a blended radius for crosshole deburring. "It is really about accessibility, because there aren't really any other tools that can do what a Flex-Hone can," he said. "Whether it is internal grooves or multiple cross-holes, there really is no way to reach those areas with any sort of other tool."



Characterized by the small, abrasive globules that are permanently mounted to flexible filaments, the ball-style hone is a flexible, low-cost tool for surfacing, deburring and edge-blending.

For engineers in the automotive, aerospace, manufacturing and machining industries, the ball-style hone is a highly specialized abrasive tool that is instantly recognizable by its unique appearance.

Characterized by the small, abrasive globules that are permanently mounted to flexible filaments, the product is a flexible, low cost tool utilized for sophisticated surfacing, deburring and edge-blending.

Available in a range of sizes from very small diameter (4 mm) up to 36 inches or more in diameter (a size appropriate for large engine cylinder bores), deburring tools can be custom-designed to the size, shape, and abrasive grit to fit any application's needs.

"I used the Flex-Hone quite a bit when I was working in aerospace," explained Ken Spaulding of Zodiac Engineering, a California contract manufacturer. "We did a lot of parts that involved tubes with multiple crossholes and slots. Getting inside there to reach the burrs, particularly if the walls were thick, is extremely difficult."

According to one machining expert, flexible hones are a cost-effective solution to smooth edges and produce a blended radius for crosshole deburring.

According to one machining expert, flexible hones are a cost-effective solution to smooth edges and produce a blended radius for crosshole deburring. With experience machining aerospace parts as well as in mold making, Spaulding currently is focused on creating products of his own design, such as high-end pocket knives and cycling components for BMX, road, and mountain bikes. He also takes on contract manufacturing projects.

Self-centering, self-aligning — Spaulding particularly appreciates how each of the flexible hone's abrasive globules have independent suspension that is self-centering, self-aligning to the bore, and self-compensating for wear, all of which facilitate close-tolerance finishing work.

"The hone conforms to whatever you are working with, even if it's irregular," said Spaulding. "For example if the back side of the part is not flat or not on consistent level plane in z, the tool still is flexible enough to remove any burrs."

For best results, the deburring tool typically is rotated into the main bore into which the crossholes break. After a few clockwise strokes, the tool is removed and the spindle reversed to rotate and stroke the flexible hone in a counterclockwise direction for a few more strokes.

The forward and reverse rotation creates a symmetrical deburring pattern. Coolant should be used to keep metal cuttings and deburred metal in suspension.

According to Orange Vise's Scott, although the Flex-Hone is often used with automated production equipment it also can be used for secondary deburring options offline, as needed.

"The tool can be used in CNC machines and also with a cordless drill," said Scott. "So, if you manage to deburr 90% of the holes in a machine, but have a few left you can't access easily, you can use it with a handheld drill and maintain the uniformity in surface finish and process."

Additional customization from BRM in a variety of shapes is also possible to meet the requirements of non-traditional applications. This includes spherical-end configurations, stepped or multi-diameter configurations for double diameters and counter-bores, tapered or cone shapes, segmented shapes, or combining Flex-Hone globules with other filament materials.

The Career Corner

George Bonnand, CMfgE

The information below was taken from:
https://collegegrad.com/careers/machinists-and-tool-and-die-makers

Job Outlook for Machinists and Tool and Die Makers

Overall employment of machinists and tool and die makers is projected to grow 6 percent from 2014 to 2024, about as fast as the average for all occupations. Employment growth will vary by specialty.

Employment of machinists is projected to grow 10 percent from 2014 to 2024, faster than the average for all occupations. Despite improvements in technologies, such as computer numerically controlled (CNC) machine tools, autoloaders, high-speed machining, and lights-out manufacturing, machinists will still be required to set up, monitor, and maintain these automated systems.

In addition, employers will continue to need machinists, who have a wide range of skills and are capable of using modern production techniques in a machine shop. As manufacturers invest in new equipment, modify production techniques, and implement product design changes more rapidly, they will continue to rely heavily on experienced machinists.

Employment of tool and die makers is projected to decline 13 percent from 2014 to 2024. Foreign competition in manufacturing and advances in automation, including CNC machine tools and computer-aided design (CAD), should reduce employment of tool and die makers.

Machinists and Tool and Die Makers Job Prospects
Job opportunities for machinists and tool and die makers should be very good, as employers continue to value the wide-ranging skills of these workers. Also, many young people with the education and skills needed to become machinists and tool and die makers prefer to attend college or may not wish to enter production occupations. Therefore, the number of workers learning to be machinists and tool and die makers is expected to be smaller than the number of job openings arising each year from the need to replace experienced machinists who retire or leave the occupation for other reasons.

Employment projections data for Machinists and Tool and Die Makers, 2014-24

Occupational Title	Employment, 2014	Projected Employment, 2024	Change, 2014-24	
			Percent	Numeric
Machinists and tool and die makers	477,500	506,600	6	29,100
Machinists	399,700	438,900	10	39,200