

PD17417

Fusion 360 CAM for CNC Programming Production Parts

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Learning Objectives

- Learn how to program parts with prismatic and sculpted/organic-shaped features using 3D machining strategies
- Learn tips and tricks to get the most out of an integrated design-to-manufacturing workflow based in Fusion 360
- Learn how to program for production vs Prototyping.
- Discover how to utilize advanced CAM capabilities offered in the Fusion 360

Description

This class is designed for existing users of the Fusion 360 3D CAD platform who are looking to take advantage of the CAM (computer-aided manufacturing) capabilities. Topics covered will include prototyping and production strategies, better use of 2-D operations, better use of 3-D operations, the workholding of best practices, and 3+2 and indexing strategies. This session features Fusion 360.

Your AU Expert(s)

Jeff Hooper, owner of Backhand Bikes Co., has channeled an extensive manufacturing background toward his passion for engineering components for the bike industry. Jeff has over 17 years working with CAD/CAM in many industries, including aerospace and medical. He has also taught CNC programming and various software platforms within schools and industry. He is excited also about the manufacturing industry, as technology is constantly evolving and progressing.

Curtis Chan is a technical evangelist at Autodesk, Inc. He works with students, startups, and larger companies to help them embrace and get the most out of the new generation of cloud and mobile-based manufacturing software such as Fusion 360 3D CAD design app. Prior to Autodesk, Chan spent several years as a mechanical engineer in the defense industry (associated with the F-35 Joint Strike Fighter Program), and he was an equipments engineer in the medical industry devising new technology for manufacturing coronary stents. Aside from industry experience, as a prior application engineer for 3D-design software companies such as SpaceClaim and SolidWorks, Chan offers expertise in a variety of 3D CAD/CAM (computer-aided manufacturing) tools, complementing his knowledge in finite element analysis (FEA) products and additive/subtractive manufacturing techniques. Chan holds a bachelor's degree in mechanical engineering from San Diego State University. Follow him on Twitter: @Curt_Chan



Program parts with prismatic and sculpted/organic-shaped features

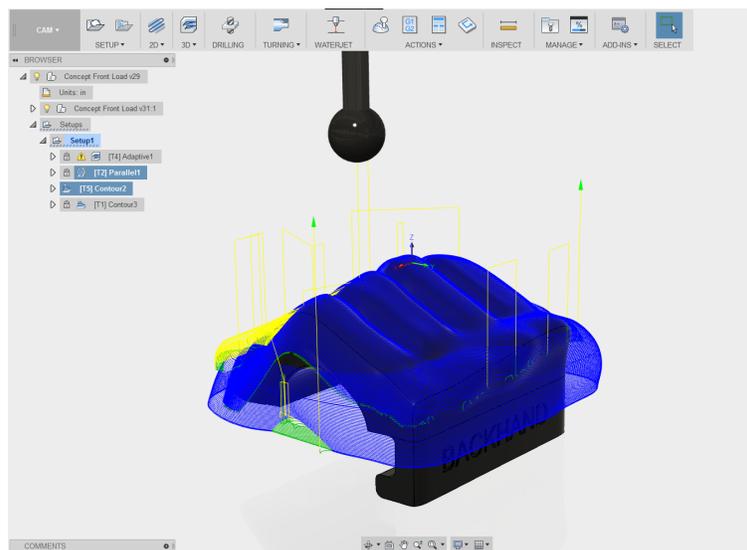
Fusion 360 has created a new type of design environment, fusing sculpting and parametric modeling in one intuitive user interface. Now, we can design very sophisticated products with complex geometry. But, what about manufacturing those products?

Manufacturing

Generally, parts are designed to be manufactured with a specific process in mind. 2.5 Milling, 2 axis turning, plasma, routing, ect. If we have typical parts like these quoted, we find the price is similar from shop to shop. It's when we deviate from those standard processes that we notice a stark difference in prices. Why? Some shops have not invested in technology monetarily, or educationally. This is the niche Fusion 360 fills. It makes machining technology and education readily accessible. Are we using it to the full?

Complex Geometry

More complex parts require more sophisticated work holding and programming; and maybe a change in thinking. We will cover milling sculpted geometry, mutil-axis and 3D undercutting. Practical ways to use these strategies in your shop today.



The image above is a part that we will be considering during the demo. It is not unrealistic to machine parts like these.



Integrated Design to manufacturing work flow. (Full CAD/CAM)

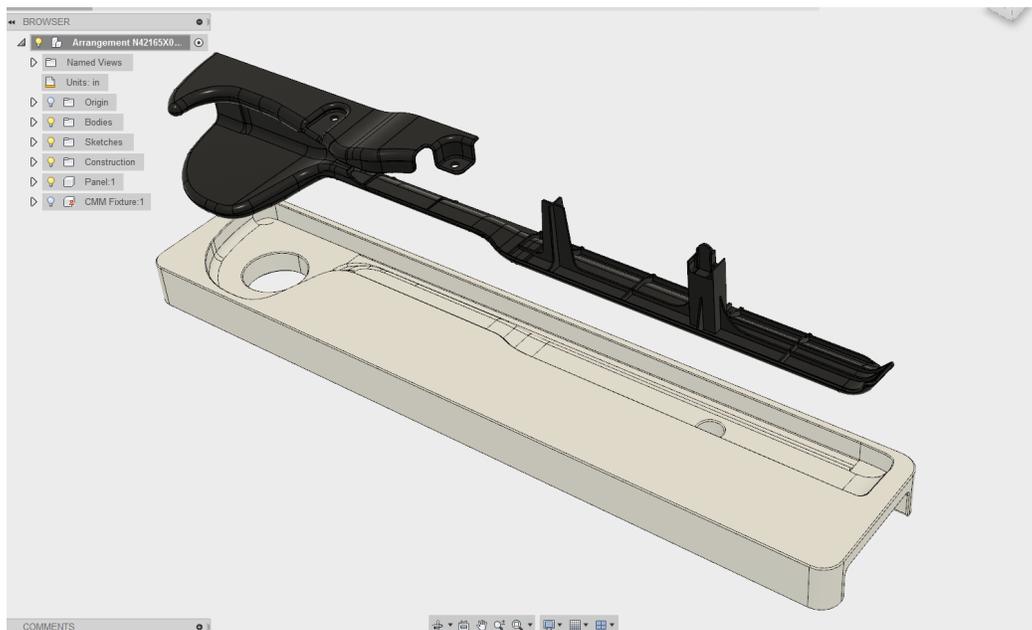
The manufacturing workflows presented in engineering textbooks generally follows the same pattern. Product and Design engineers to manufacturing engineers to CNC programmers to the CNC operators, then to the QC lab and out the door. One walk around a manufacturing trade show and you'll notice, all these software packages have been developed based on this premise. If you're part of a multimillion dollar cooperation, this process is tried and proven. But, for 95% of us users, this workflow is all handled by us, one person. If the process doesn't fit, then neither will the software. Fusion 360 is the only software that brings these together in one seamless interface. For those of us that think of it as CAD/CAM, maybe we should see it as CADAM©. Computer-Aided-Design-And-Manufacturing. Are we taking full advantage?

CADAM

There are plenty of "CAD/CAM" systems available today. However, it's more appropriate to call them CAM systems because the CAD portion of the software is very limited. Having a Full CAD system integrated with the CAM system gives you the ability to design and machine fixtures, reposition offsets, make model changes that make them easier to program while keeping them associated with the toolpath, and it's all one file.

Fixture Design

Having integrated CAD capabilities gives machinists the option for more sophisticated and easily modified fixtures. This opens door for complex edits for adjusting fits, tolerances, and designing fixtures for parts without CAD models.



The image above is an automotive fixture designed in Fusion for Quality control.

Prototyping & Production Programming Strategies

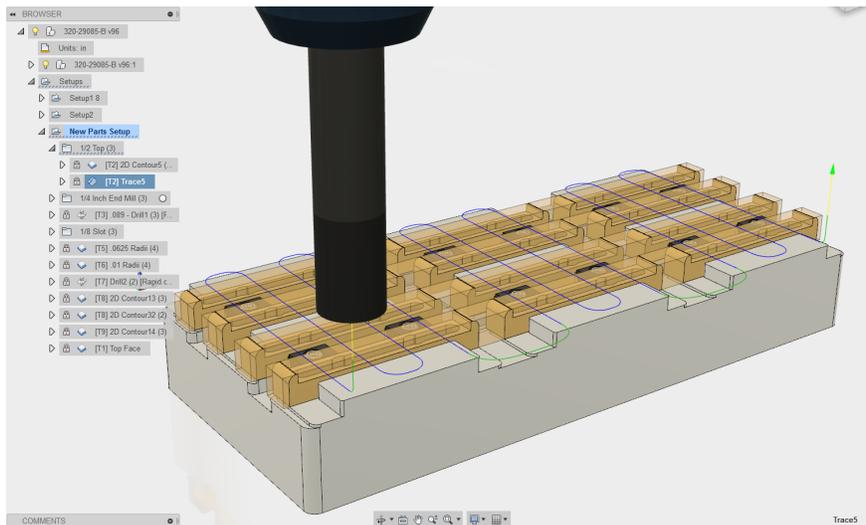
Regardless of what project we're making, we are concerned with time and quality. Prototyping we are 20% concerned with time and 80% concerned with a scrapped part. Production is the opposite. We are 80% concerned with time, and 20% concerned with a scrapped part.

Prototyping Strategies

When programming for prototype parts, we want to lean on as much automated programming tools available to get the part to the machine as quick as possible. So, this section will focus on Fusion 360's Adaptive tool paths and setting up templets that help get you making chips sooner.

Production Strategies

Production programming requires more time with the details because every second counts. If you are running 1000 parts and you save 30 seconds per part. That is an 8 hour day. So, spending an extra 30 minutes tweaking the program could save you 1 or 2 days of running.



This image is a fixture design and tool path generated in Fusion 360 for a 10,000 piece run. Each part required 9 tool changes. The cycle time was 1.5 minutes each.