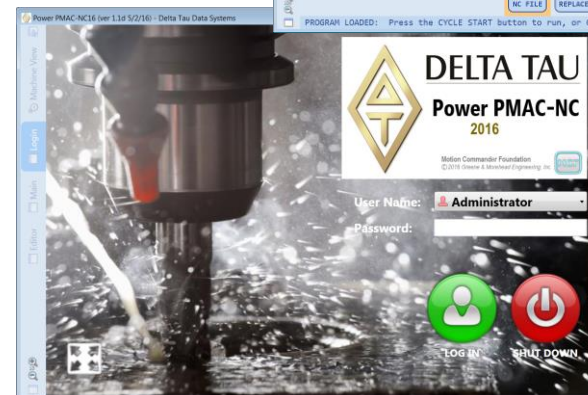
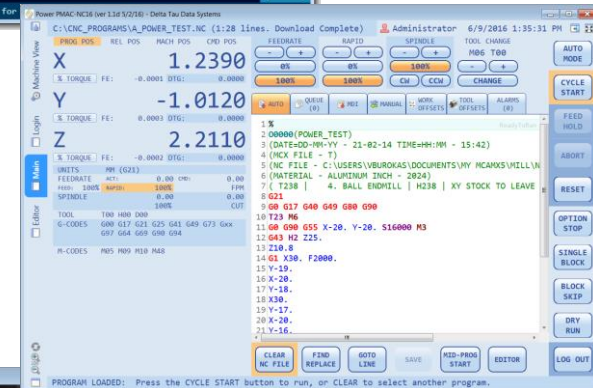
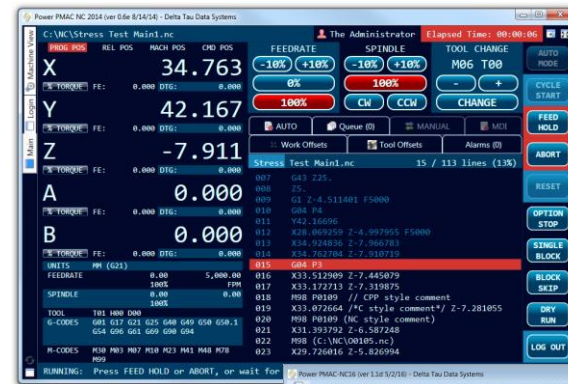


ODT – CNC Introduction

March 2018
Vincent Burokas



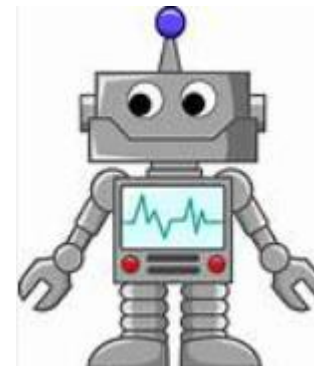
Presented by:

**Vincent Burokas
CNC Product Manager
vburokas@deltatau.com**

**CNC is short for
“Computer Numerical Control”**

**CNC machining is the method by which
computers control the movements of
manufacturing machines via software
programs.**

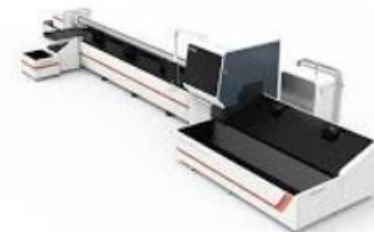
The CNC process represents the evolution of manufacturing and moving from manual control of equipment, to purely digital automation of mechanized systems.



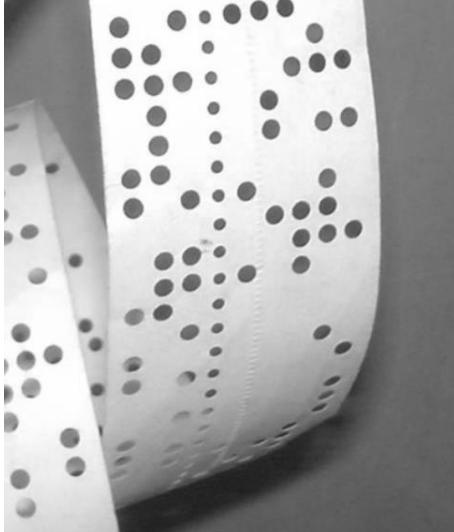
Types of CNC Processes...

There are various types of machines which utilize a CNC command set:

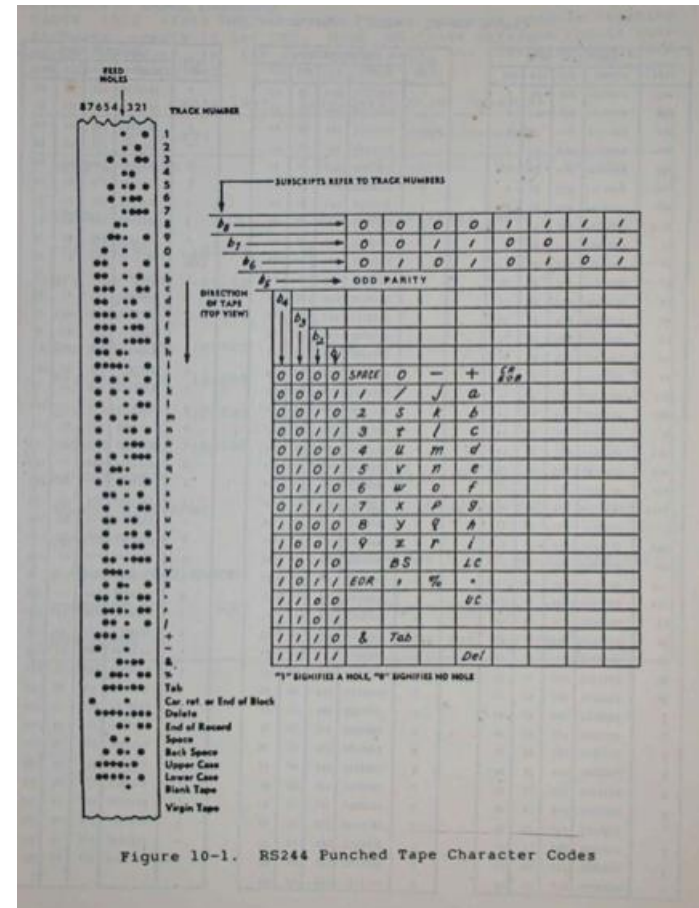
- Milling
- Turning
- Waterjet
- Laser
- EDM (Electrical Discharge Machine)
- 3D Printing/Additive
- Router
- Punch Press
- Plasma Cutter
- ...and more!



Early CNC Machines...



Early NC (not CNC) controls used punched tapes to upload the program into the machine.



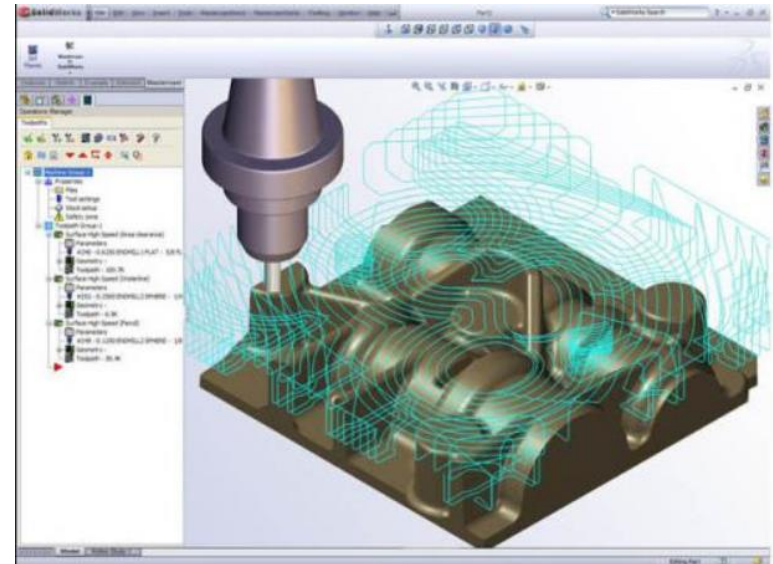
The Modern Digital Process...



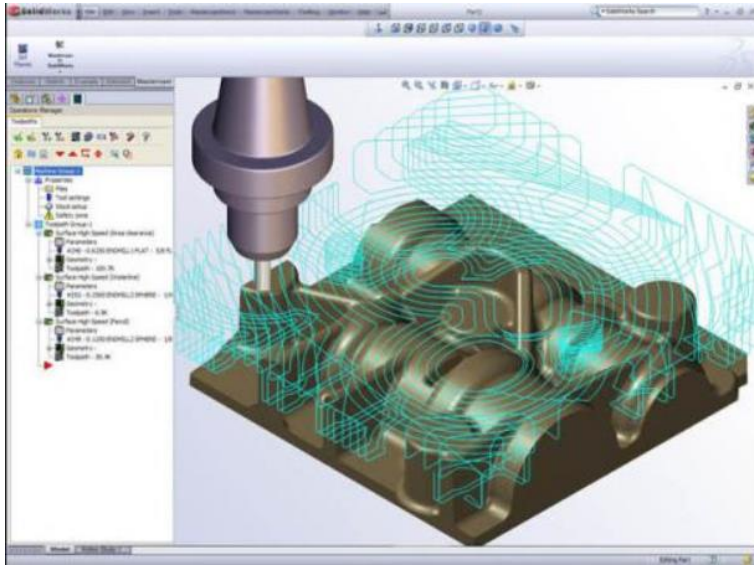
CAD – Computer Aided Design
Designers leverage powerful
CAD tools to design products.



CAM – Computer Aided Manufacturing
Engineers and Machinists use CAM to
define the cutting or manufacturing
process using machine specific tools.



The Modern Digital Process (cont.)...



The CAM software uses a 'Post' to convert the shapes, in combination with the selected tool geometries, into the code which controls the machine motion.



This code is commonly referred to as G-Code. G-Code is the de facto standard for virtually all modern machine tools.

```
WAVE_SURFACE_FINISH.NC  x
1  %
2  O0000(WAVE_SURFACE_FINISH)
3  (DATE=DD-MM-YY - 22-12-11 TIME=HH:MM - 14:12)
4  (NC FILE - C:\USERS\PUBLIC\DOCUMENTS\PMAC_COUNTOURING\WAVE_SURFACE_FINISH.NC)
5  (MATERIAL - ALUMINUM INCH - 2024)
6  ( T249 | 1/8 BALL ENDMILL | H249 )
7  N100 G20
8  N102 G0 G17 G40 G49 G80 G90
9  N104 T1
10 N106 G0 G90 G55 X0. Y0 S2852 M3
11 N108 G43 H4 Z2
12 N110 Z2.01855184
13 N112 G1 Z1.91855184 F500
14 N114 X.15822651
15 N116 X.16310516 Z1.91816986
16 N118 Z1.91836114
17 N120 X.1728327 Z1.9175995
18 N122 X.1754129 Z1.91720619
19 N124 X.17768159 Z1.91702856
20 N126 X.17955457 Z1.91657486
21 N128 X.1818616 Z1.9162232
22 N130 X.19254341 Z1.91364137
23 N132 X.19492479 Z1.91285171
24 N134 X.19743243 Z1.91224428
25 N136 X.19980617 Z1.91123305
26 N138 X.20232477 Z1.91039789
27 N140 X.21193799 Z1.9063026
28 N142 X.21456041 Z1.90511332
```


The Modern Digital Process (cont.)...

```
WAVE_SURFACE_FINISH.NC
1 %
2 O0000(WAVE_SURFACE_FINISH)
3 (DATE=DD-MM-YY - 22-12-11 TIME=HH:MM - 14:12)
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27 N140 X.21193799 Z1.9063026
28 N142 X.21456041 Z1.90511332
```

The G-Code program is then uploaded to the control for material processing.



An operator controls the processing of the part at the machine control, or increasingly the machine is controlled remotely by a supervisory system and automation.



Why is this important?

Practically all modern products are developed using this digital method starting with CAD, then CAM, then off to the machine for processing.

Virtually everything you come in contact with today is manufactured using this method, and more importantly, using G-Code as a shared language for machinery.

ODT wants to be part of this process and has developed a modern, flexible, G-Code enabled manufacturing interface which bridges between CAD/CAM and the machine tool.

That product is Power PMAC-NC...