



## **Machinist Toolkit: NC Files Sequence Generator**

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### **ABSTRACT –**

The NC File Sequence Generator, a flexible software application for creating numerical control (NC) files used in various industrial processes, is part of the Machinist toolset. NC files are essential for operating CNC (Computer Numerical Control) devices, which include lathes, milling machines, and 3D printers. They include a series of instructions needed to create intricate and exact parts. Engineers, machinists, and manufacturers looking to effectively automate the development of NC files will find this software to be beneficial.

Key Words: automation, File export, batch processing, file handling.

## **1. INTRODUCTION**

CNC, or computer numerical control, is a technique for using a computer to operate industrial tools and machinery. It entails automating the operation of numerous devices, including routers, lathes, milling machines, and more, using both hardware and software.

A set of preprogrammed instructions governs how CNC machines function. The machine is instructed on how to move, which tools to use, and other machining characteristics by these instructions sometimes referred to as G-codes and M-codes. They are a series of alphanumeric codes. Expert CNC software is used to generate these codes.

Accuracy and precision are hallmarks of CNC systems. Their ability to do intricate and multifaceted operations regularly makes them perfect for applications requiring constant quality.

### **1.1 Problem associated with NC file.**

An NC or numerical control file is a text-based or binary file containing a series of commands and instructions that direct the CNC (Computer Numerical Control) or VMC (Vertical Machining Center) machine in carrying out specific machining operations. These files are necessary to guarantee repeatability and accuracy in the production of parts and components and to automate the manufacturing process.

or numerical control file is a text-based or binary file containing.

There are multiple NC files for a single job and these NC files generated by Powermill360 software have the same program number for sequential execution of these files' The user needs to change the program number in ascending order manually. Hence this process is more time-consuming.

### **1.2 Purpose of the Machinist toolkit: NC File Sequence Generator**

Specifically, a "Machinist toolkit: NC files sequence generator" is an essential tool for automatically rearranging program numbers(line 2) in ascending order. The goal of this project is to create a software system that can effectively produce a series of numerical control, or NC, files.

By automating the sequence construction process, this project aims to streamline the generation of NC files.

```
%
O1000(M56, A_1001, L00)
M1(M56, DATE, = 17/07/2023)
M2 (TP Ver:Lin = 1529 & Option File : new 0000V3-M56 )
M3(M56, A_1001, L00)
M4 G90 G40 G80 G49
M5 (T000, TYPE: T190AD10SE)
M6 T1 M06 (T001 DIA: 10, TIP RAD: 1.)
M7 G4000 M03
M8 G00 G54 X0 Y0
M9 G41 H01 Z10.
M10(M56, A_1001, L00)
M11 X0 Y0
M12 Z10. M08
M13 X20. Y00 Y17.054
M14 Z5.
M15 G01 Z-.200 F500.
M16 X20. Y13 F1000.
M17 G02 G17 X27.25 Y10.778 I-.001 J4.404
M18 G01 X27.246 Y10.777
M19 G01 X25.601 Y17.055 I-.007 J-.022
M20 G01 X25.590 Y.7.08
M21 X25.397 Y 8.977
```

Fig -1: NC code

## 2. Objective

The "Machinist toolkit: NC files sequence generator" project aims to improve the productivity and efficiency of CNC machining and related applications by utilizing engineering and programming principles to develop an approachable solution.

It will decrease human error, save time, and improve the precision of these procedures, making it a valuable tool for businesses and professionals who depend on CNC machinery for their industrial processes.

## 3. Literature Review

In our survey, NC files are essential to the world of Computer Numerical Control (CNC) and Vertical Machining Centre (VMC) machinery, regardless of their format—text-based or binary. They act as archives for complex directives and instructions that specify the exact motions and functions of these machines when producing

different parts and components. It is impossible to exaggerate the importance of NC files in machining processes. They play a crucial role in guaranteeing accuracy and reproducibility, two essential goals in contemporary production processes. These files enable the complete automation of labor- and error-intensive activities that would be difficult to complete by hand, improving production line consistency and efficiency.

Interestingly, there are several challenges involved in the sequential execution and maintenance of NC files. There may be more than one NC file connected to a certain task. Usually, Powermill360 or other specialized software is used to create these files. These files are distinguished by the fact that they frequently have the same program number, indicating that they are meant to be executed sequentially. Users are unfortunately forced to manually change the program numbers in ascending order, which poses a challenge. This manual intervention takes a lot of time, and if it is not done carefully, it may lead to mistakes.

Numerous studies have discussed the significance of NC files and their use in contemporary manufacturing in the literature that is now available. The difficulties associated with manually managing program numbers during sequential NC file execution have also been studied. It has been acknowledged that novel approaches are required to expedite this procedure and lower the time and mistake risks involved.

More research and development are needed in the area of effective NC file management and seamless execution. The parts that follow will focus on particular research discoveries and advancements in NC file administration as well as possible ways to deal with the laborious process of manual program number updates in these files.



Fig -2: Process of Machinist toolkit: NC files sequence generator

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#### 4. Scope

The application should be accessible, efficient, and able to accurately generate sequences for NC files. It should be user-friendly and available on the Windows operating system.

It removes the need for manually changing of NC file program number.

The system may be useful for operators to easily operate CNC machines.

#### 5. REFERENCES

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