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Fast Method for Obtaining Scale Dimensions on Tape-Controlled Milling Machine

The problem:

To devise a fast, mechanical means of obtaining the Rail and Z-scale dimensions on the tape-controlled Sundstrand milling machine. The two dimensions are used to establish the clearance plane the computer requires to process the automatic tool program. Prior methods involved mathematical calculations subject to human error.

The solution:

A fast, accurate calculator designed to provide the computer with depth information required to process numerical control programs which, in turn, provide the tapes for operation of N/C milling machines.

How it's done:

The computer is basically concerned with two things. First, it sets up all calculations with the use of a clearance plane. The calculations involve the use of the clearance plane in relation to the gage length of the first and each of the following tools used in the program. The second concern is the depth to which each tool is required to travel to accomplish its work. A simple example follows (all dimensions in inches):

12.750	Length of 1st tool (standard length of indicator tool)
−12.000	Rail height (assuming height of carriage to clear fixture, workpiece, and clamps has been determined)
0.750	Difference between rail height and indicator tool
+ 1.750	Add-on height of fixture and part
2.500	The Z-scale setting would be at this reading.

From this Z-scale setting (2.500) on up to the tool change position (19.250), there is a distance of 16.750. This distance is known as the clearance plane and is what the computer must have for its calculations.

Notes:

1. All information for the most complicated job can be calculated in about ten minutes to assure correctness of programmed depths and avoidance of collision due to program error.
2. Inquiries concerning this innovation may be directed to:

   Technology Utilization Officer
   Manned Spacecraft Center
   Houston, Texas 77058
   Reference: B68-10047

Patent status:

No patent action is contemplated by NASA.

Source: Lindon J. Thompson
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Category 05

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