

# GE TIME-SHARING SERVICE MAKES NEWS IN



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# TOOLING PRODUCTION

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Consider program that makes the NC-type tool manufacturing service.

Manufacturing management is a complex task. It involves the coordination of many different activities, from the design of new products to the production of finished goods. In the past, this has often been done in a piecemeal fashion, with different departments responsible for different parts of the process. However, the advent of time-sharing services has made it possible to integrate these activities more effectively. This article explores the benefits of time-sharing services for manufacturing management, and how they can be used to improve productivity and reduce costs.

Payoff  
for  
time sharing  
at  
Ex-Cell-O





1. Inspecting program changes sent to computer via GE's time-sharing system, Ex-Cell-O engineering NC programmer Terry Moots will get an "instant update" in his program.

## Payoff for time sharing

HERE'S HOW computer time sharing provides jet-age speed for a manufacturer of jet engine parts. It isn't just having the NC machines; you've got to have a plan, too.

The Turbine Products Group of Ex-Cell-O Corp., Lima, Ohio, has been supplying blades, discs, hubs, spacers and other components for jet-engine manufacturers since 1951. Today, 90 percent of the group's business comes from one major aircraft engine manufacturer. To maintain a high level of customer service, the group must keep 23 XLO 453 verticle turning lathes as close to 100 percent productivity as possible, and it's here that a time-sharing system gives the advantages of computer-assisted NC tape programming with quick turnaround time.

According to Ex-Cell-O spokesmen, General Electric's Time-Sharing Mark II Service and available programs like REMAPT have produced results far above expectations. "Depending on the specific job, we actually saved 40 to 60 percent in lathe turning time over conventional machines. Also, time sharing has reduced the time spent in parts programming by over 80 percent compared with manual programming," says George Anderson, engineering manager.

### The operation

How does the service work in practice? First, forgings supplied from

customers along with part blueprints are received and the job begins. Right away, the pressure is on to complete an order in an unusually short time.

The blueprint is enlarged and the expertise of one of the group's four parts programmers is applied to determine the machining requirements — such as tooling and sequence of cuts.

The programmer next describes part geometry and required machining steps to the remote GE computer via telephone lines by using a teletypewriter terminal. In the parts program, symbols and English-like words are used to converse with the powerful computer where REMAPT and post-processor programs are stored.

The computer calculates tool location coordinates, formats data to fit the group's Mark Century control units and then directs the punching of EIA coded tape.

"Our operators locate the tools, set up the part, press the 'start' button — and a disc product is on its way to completion," says Anderson.

### Computerized checkout

Representative parts are periodically checked against specifications. Should there be errors from tool deflections, it is relatively easy to use the computer to come up with program and control-tape corrections. This requires only a fraction of the time needed to correct manual programming. "By

having this instantaneous checkout, we have been able to save many hours of machine downtime which have been sacrificed in the past," emphasized Anderson.

A new program-verification plan significantly improves machine uptime. Using a Calcomp plotter, the parts programmer now plots NC programs from the computer. The plotter's printout reveals the actual path of the tool, and the programmer can spot any error in the path instantly. The computer programs can thus be corrected on the spot via the terminal.

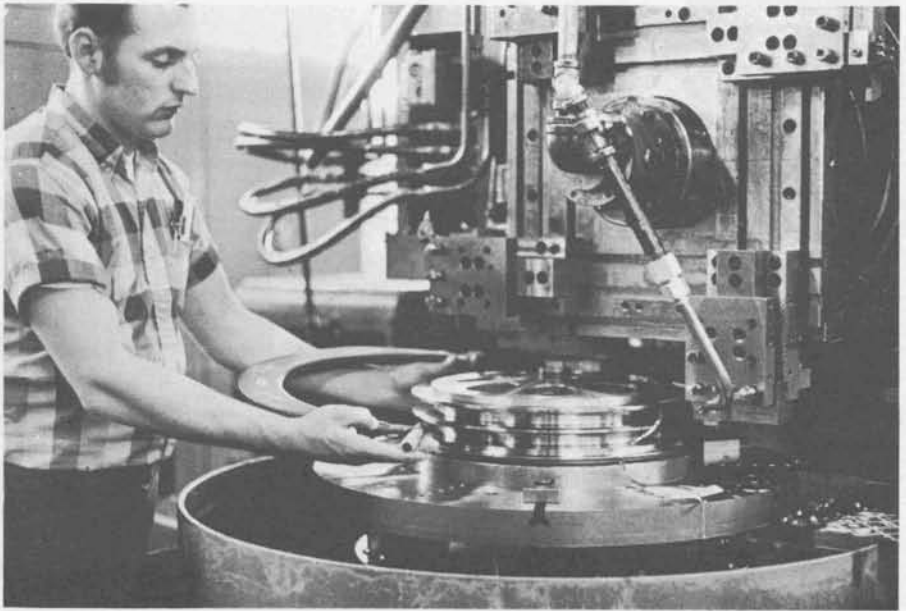
It is not always easy when viewing a computer printout page to detect such errors. George Anderson estimates the plotter has increased each machine's productive load time from 65 to 85 percent. Each new tape verification reduces costs from about \$100 to \$24 in terms of machine tie-up to prove a tape.

### Another saving

The group has more recently saved time by a shift of high-volume production of a jet-aircraft part from a manually operated horizontal lathe to an NC vertical turret lathe. The part, a two-compressor disc of very hard titanium alloy (AMS 4928), requires especially complex grooving, necessitating a highly skilled operator. Now the job runs on two numerically controlled XLO 453 vertical turret lathes



2. Studying printout of Calcomp plotter, George Anderson, manager of engineering, observes tool path for NC lathe. He can thus verify the computer program that creates the NC tape via time-sharing service.



3. At NC XLO-453 vertical turret lathe, the operator checks a titanium alloy disc that the machine has been turning. Time sharing helps keep productivity of 23 NC machines at a very high level.

manned by one operator, and work per man has doubled. Where seven parts had been produced by two men on horizontal lathes, now eight parts are produced by one man on the NC machines.

Anderson says that "as far as programming improvements are concerned, we can do a better job now than ever before. First, we have learned how to combine several functions into a single program statement, thereby improving the program's efficiency. Second, we have developed a simplified form of geometric description by standardizing our program format. This amounts to a reduction of engineering time averaging about 35 percent."

**More management control**

Ex-Cell-O's enthusiasm for time-sharing centers on *management control*: "By further combining NC and time sharing, we will be able to reduce labor costs and keep quality control at an optimum level," says Anderson. "We realize that a great amount of time and money has been wasted in the past due to human error. By incorporating more and more NC time-sharing applications, we are going to be able to noticeably reduce the number of operator errors, thus eliminating ruined parts and the additional time involved in unnecessary breaking down and setting up procedures." ■

