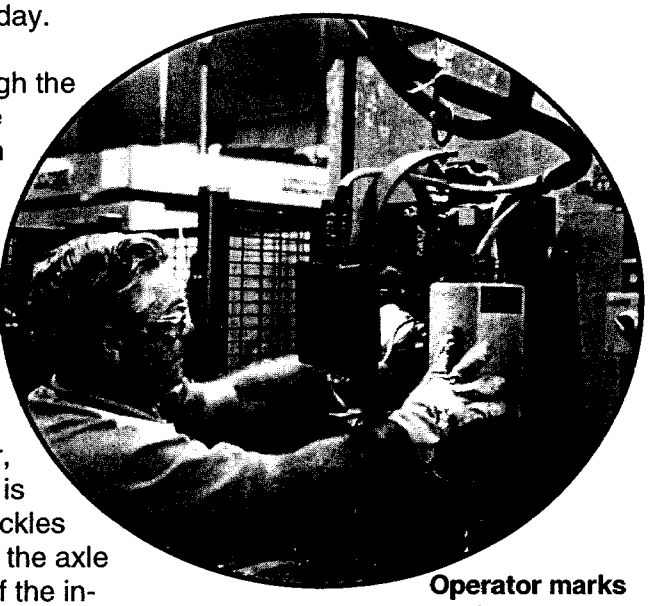
Eaton Axle and Brake Integrates TMM5000 Into Cincinnati Milacron® Flexible Manufacturing Cell

Eaton Corporation Axle and Brake Division in Humboldt, Tennessee manufactures axles for many large truck manufacturers including 18-wheelers like Mack, Peterbilt, and Kenworth and heavy utility vehicles such as dump trucks and garbage trucks. Eaton recently automated the machining line where knuckles are machined for the specific truck models. Knuckles are the left and right ends of the front axles that connect with the tie rod and idler arm for steering. They are forged from AISI Type 4135 steel, turned, and threaded prior to entering the automated machining line. Since Eaton has so many different customers making a large variety of trucks, many knuckles are needed. On a given day there may be well over a hundred different part numbers active. New numbers are continuously added and old ones are discontinued as needed.

A Cincinnati Milacron® (Cincron™) Flexible Manufacturing Cell handles the complex machining duties for the line. It consists of five computer-driven machining centers, a UNIX-based computer system to control the entire operation, a rail guided vehicle (RGV), often referred to as a robot, to move pallets in and out of the machining centers and staging areas. Pallets are loaded and unloaded, and part numbers are marked on the knuckles at the staging areas. At full capacity, the Flexible Manufacturing Cell is capable of machining 160 pairs of knuckles a day.

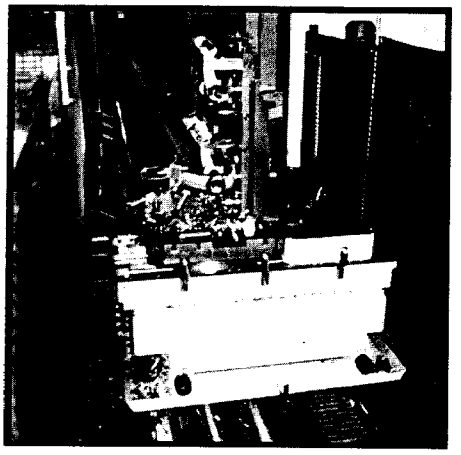
The UNIX computer tracks the knuckles through the line whether they are in staging areas, storage slots, or being transported or machined. When a part is finished, the operator manually gages the hole diameters for quality assurance and marks the part number on the knuckles.

A paint marker was being used to mark the part number on each knuckle. The part number is essential for assembly of the axle and to identify the axle model for the customer, but the mark is obliterated when the axle itself is painted. Eaton needed a way to mark the knuckles so the information would still be readable after the axle was painted. They also wanted to use more of the information available from the Cincron™ computer for internal quality assessments and permanent part traceability.



Operator marks part number, machine number, pallet number and Julian date on an axle knuckle by pressing the "start print" button on the handle of the TMM5000.

Eaton came to TELESIS with their marking problem. They wanted a marker to interface directly with the Cincron™ computer and to be capable of marking at either of two staging areas located fifteen feet apart. Telesis responded with a customized TMM5000 Multi-Pin Marking System suspended on an overhead track and trolley and custom software to interface with the UNIX system.



Cincinnati Milacron® RGV transports a pallet containing axle knuckles to the staging area for marking.

The data marked on each knuckle includes part number, pallet number, machine number, and Julian date. All but the date, which is generated by the Telesis system, are down-loaded from the Cincron™ computer. The marker is held in the proper marking position by the operator and the trigger on the marker handle is pressed to initiate the marking cycle. Fourteen characters, 1/4" high are marked on the knuckle in 10 seconds or less. The part number is always accurate because the Cincron™ computer has kept track of the knuckle throughout the machining process and still has it identified when the data is downloaded to the Telesis system.

The Telesis system may have data for two pallets in active memory at a given time. The proper one is selected for marking by means of a switch on the track that indicates at which of the two staging areas the marker is located.

A gimbal and cable balancer make the marking head easy to position and allow it to retract out of the way when not in use. The PINSTAMP® mark remains legible, even after the knuckle has been painted. The plant runs around the clock, yet there is no opportunity for operator confusion at shift change, because the Cincron™ computer has each part location in memory and sends only the correct part and manufacturing data to the marker.

When Eaton integrated the TMM5000 with their Cincron™ Flexible Manufacturing Cell they gained permanent product traceability, fast, accurate marking, and quality assessment information; and eliminated operator error. The system has worked so well, Eaton is currently in the process of installing a second flexible manufacturing cell. It too will be equipped with a Telesis Marking System.