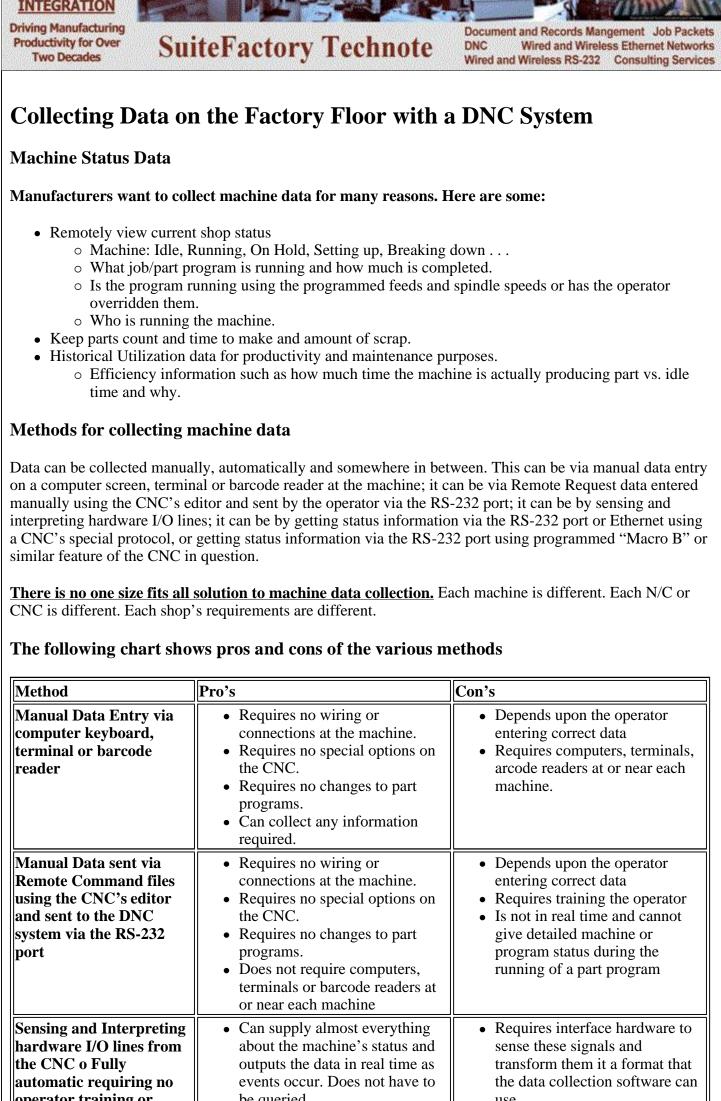
CADCAM



operator training or intervention.

- be queried.
- Does not require computers, terminals or barcode readers at or near each machine.
- Requires I/O signals being • available – these signals can be "mined" by an engineer using the machine builders wiring diagrams and/or finding them empirically at the machine or specifying the requirements on a new machine or having them added by the machine tool builder. In either case there is the expense of finding the signals or paying the machine tool builder to add them.
- use.
- Requires interpretation of these signals. For example, on one CNC being 'In Cycle' turns an I/O line to 5 volts. On another CNC the signal might go to 24 volts or 0 volts. On one CNC the mode might be determined by a single signal for each mode. On another CNC the mode might be encoded into 3 lines.
- Need to use some manual data input method or software RS-232 or Ethernet method to get data as to what program is running and who is running it for what job as well as information such as Machine

Software method using a CNC's special protocol	<ul> <li>Fully automatic requiring no operator intervention</li> <li>Might Collect data in real time</li> <li>Requires no wiring or connections at the machine</li> <li>Requires no changes to part</li> </ul>	<ul> <li>Setup, Breakdown, Idle, Waiting for Material, Under Maintenance etc.</li> <li>Special protocols are usually options that have to be purchased</li> <li>These special protocols are different for each CNC hence require the DNC software to</li> </ul>
	<ul> <li>programs</li> <li>Does not require computers, terminals or barcode readers at or near each machine</li> </ul>	<ul> <li>support all these different unlike protocol increasing the costs of the software</li> <li>The special protocols might not provide all the data required such as job numbers and operator.</li> <li>The special protocols do not usually output data as the events happen but have to be queried by the DNC software</li> </ul>
Software method using "Macro B"	<ul> <li>Fully automatic requiring no operator training or intervention</li> <li>Requires no wiring or connections at the machine</li> <li>Data is output automatically – does not require any query.</li> <li>Does not require computers, terminals or barcode readers at or near each machine</li> <li>Macro B is usually an option that has to be purchased</li> </ul>	<ul> <li>Requires changes to part programs to output the data.</li> <li>What can be collected is limited to parts count and time and program status. Does not provide all the data often required such as times when the machine is in Hold or Single Block Mode.</li> <li>Not real time – data is output as the part program is executed. If the program stops or there is a machine alarm no more data is sent.</li> </ul>

## Summary

DNC software shop floor data collection features can range from having fixed manual data input forms; fixed remote command data output methods; fixed requirements for getting data via RS-232 ports or Ethernet communication; and/or fixed numbers of I/O lines interpreted in a fixed way; or provide a full blown customizable system where the end user can specify or and configure the I/O and reports to the specific needs of the organization. All these methods or combinations of them are possible. It's a matter of cost effectiveness as to which method, if any, a customer determines has the best ROI.

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