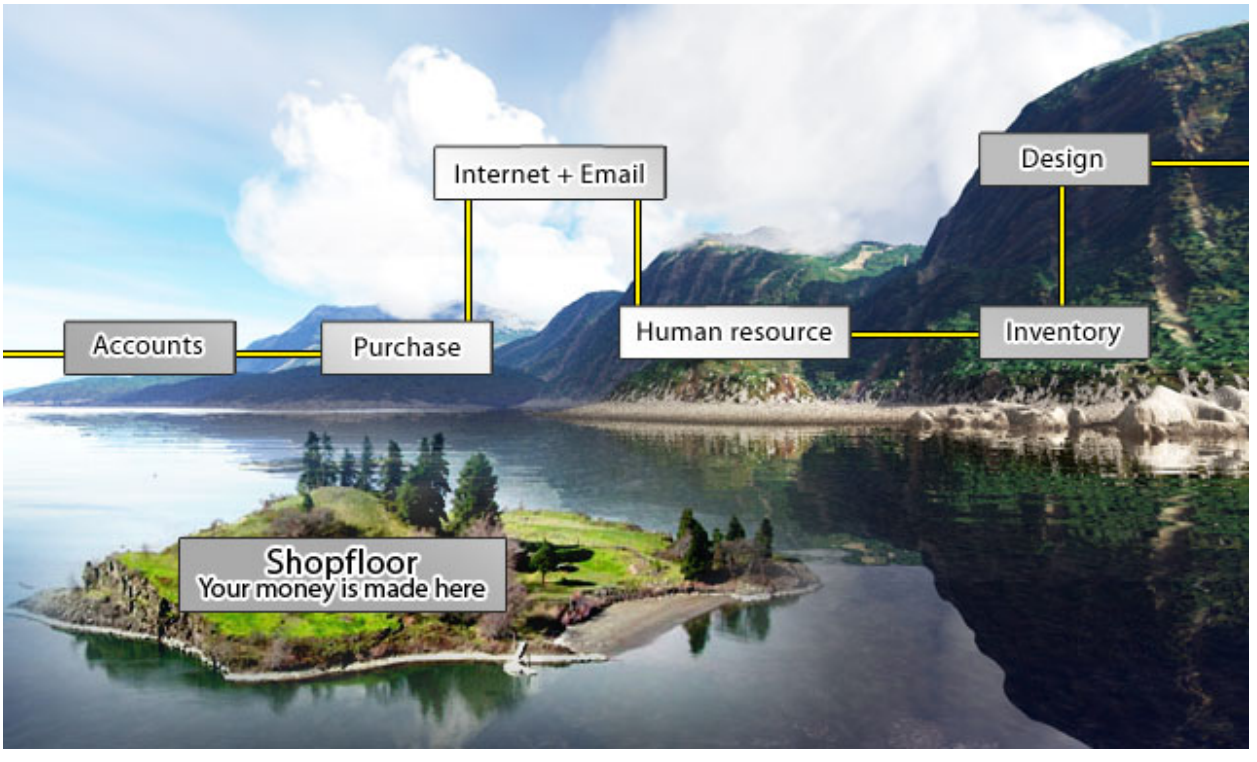
The shop floor is the heart and the prime mover of a manufacturing company. Money is made here.

“If you can’t measure it, you can’t manage it” *- Peter Drucker*

CNC machines account for a large percentage of the investment and production in most shop floors. Under-producing CNC machines can be the biggest bottleneck on the shop floor, disrupting all downstream processes and cutting into profits. A lot of decision making is involved in keeping productivity high, and this requires accurate and current data on the production status. Solving problems in real-time requires real-time data.

For the past couple of decades IT has been used extensively in functions like sales, inventory, purchase, accounts and payrolls. Decision makers have access to accurate and current data on any of these areas. Unfortunately, IT stops at the door to the shop floor. The shop floor is the heart and the prime mover of a manufacturing company. Money is made here. However, machines on the shop floor are isolated islands of cost with no information on how much they have produced or what they are doing at a particular instant.



Traditionally, production data has been collected manually from machines and fed into computers. The production data is usually available only the next day, and scheduling decisions are made on the basis of this old data. No accurate data is available for help in enhancing productivity, like actual cycle times, load / unload times, and the durations and causes of machine downtime.

This will no longer do in today's highly competitive and cost-conscious manufacturing industry. This is where SHOPtrack comes in. SHOPtrack monitors CNC machines electronically and provides the latest production information about the shop floor. It makes production and productivity data available at the fingertips of decision makers. They need not go to the shop floor to get first-hand production data - the data comes to them, wherever they are, by email.

SHOPtrack meshes with TPM's philosophy of 'continuous improvement'. It measures factors that affect productivity and provides accurate data for management of CNC machines, a key component of the company's income generating physical assets. OEE, the measure of productivity in TPM, can be directly and automatically determined by SHOPtrack for any specified time period and machine

SHOPtrack focuses on the holy trinity Man, Machine and the Material

What SHOPtrack does

- Keep track of parts count
- Identify abnormal cycle times
- Get production data on email
- View productivity status from anywhere on LAN
- Keep an eye on operators in unsupervised shifts
- Get TPM enabled, improve OEE dramatically
- Identify and remove causes of idle times
- Unmanned, wireless 24x7 machine monitoring

Productivity improvement

- Helps detect abnormal cycle and load / unload times.
- Helps keep a close eye on machines and operators, particularly in the night shift.
- Helps in making productivity comparisons between operators.
- Enables identification and removal of causes of idle times.
- Prevents misuse of feed rate override on the machine.
- Makes operators more conscious of productivity.
- Generates OEE metrics.

SHOPtrack reports

SHOPtrack generates easy to understand reports displaying all the key performance data of the shop floor. Reports can be generated and printed in seconds on current or past performance of machines. People at various levels in the organization can view the reports on their PCs on a LAN. These are some of the key reports that can be viewed:

- Hourly parts count on each machine
- Details of each individual cycle
- Tabular summary of each machine's activities
- Graphical summary of part cycles
- Machine-wise quality report
- Idle time analysis - reason-wise break up
- TPM parameters-OEE, availability, productivity, quality
- Machine availability analysis
- Historical TPM data

Idle time report

Plant / Cell / Machine : Takisawa TC-20

Report period : 14 Apr 2005 08:00 to 21 Apr 2005 08:00

Total Available time 50:28:33

Total Idle time 20:26:44

Idle reason	Duration	No. occurences	Percentage
Part setup	00:35:00	1	2.900
Waiting for raw material	01:57:26	3	9.600
Load/Unload time	17:54:18	1434	87.600

SHOPtrack in a typical company

In Production

Current and historical production data can be viewed by all levels of shop management right from Shop supervisor to the General Manager on their desktops, at their convenience. Time-consuming production meetings to share this data are eliminated. Production managers can instantly access the current production status to ensure that production schedules are on track.

In data collection

SHOPtrack dynamically collects accurate data and can replace the manual element involved in the traditional method. It replaces inefficient and inaccurate traditional system where dedicated personnel visit each machine periodically to collect production status data.

In Industrial Engineering

Small deviations in the cycle time and load/unload time creep into the machining processes over a period of time. These can accumulate and gradually add up to a considerable amount and pull down profits. Historical reports can be used to investigate and control deviations from standard cycle time and load /unload time. Since data is available for every part that is cut, micro analysis is possible and this helps in setting more accurate production norms.

In Maintenance

SHOPtrack detects machine idle times caused by power shutdowns and breakdowns. Maintenance engineers can view the status of all machines on their PC in the maintenance department, and take corrective action immediately. They can study historical data to associate links of breakdowns with factors like running durations, specific operators and specific machines.

In vendor management

Companies sourcing parts from sub-contractors are always anxious to know if their vendors can keep up delivery commitments. By deploying SHOPtrack at vendors' shop floors, they can receive hourly production data over email and monitor their deliveries.

In JIT deliveries

Improves the predictability of production and helps in sticking to delivery commitments to a greater extent.
Parts count of each machine on the shop floor can be got on a cell phone.
Production data can be obtained by email at any specified time interval.
Any production delays can be detected and corrected immediately, before they get out of hand.

In profitability

As a sub-contractor he faces constant pressure from customers to reduce prices, resulting in wafer thin operating profits. SHOPtrack can help in increasing the profit margin directly. Product quality and tool life are improved because of strict vigilance on Feed rate override. Production rate is improved because of greater adherence to cycle times and load / unload times.

Case studies - large company

Hero Motors Limited in Ghaziabad, part of the Hero group, has a wireless SHOPtrack installation on 18 CNC machining and turning centers. These machines produce engine and transmission parts for two/four wheelers for overseas customers.

"Earlier, production data was collected manually by a person visiting each machine every hour. It was a person-specific job and therefore slow and limited. Now with SHOPtrack the quality of reporting has improved." says Mr. Ankur Gupta **,** AGM - Production of Hero Motors. "The hourly production reports are now delivered automatically to my desk by email." Mr. Gupta also observes that their production in the night shift has increased dramatically. "Within a short period of installing SHOPtrack, we could see that the machines were over producing at times and this was affecting our tool life figures. We could take instant corrective steps to stop this practice of over producing. The machine tracking system has been installed recently and it is already proving to be a wise investment."

Siddheshwar Industries, Pune is one of India's fastest growing companies in the field of precision components for the automotive and engineering industries. It is known for its quality forgings and critical machined components. They are OE suppliers to some of India's largest engineering companies; giants like Bajaj Auto Ltd. and regularly export to the European engineering giant SAB WABCO, France. Wireless SHOPtrack in Siddheshwar is used to track their large bank of 35 CNC machines from ACE Designers and AMS.

Mr.Shingte, GM of Siddheshwar Industries, says, says "SHOPtrack gives us a true picture of cycle and idle times on the machines and enables us to evaluate operating efficiency. We study each day's idle time and production reports every evening and take corrective action immediately, and there has been a remarkable 10% improvement in our productivity since we installed the system." I find that the SHOPtrack is helping us in measuring the idle times accurately to eliminate bottlenecks and therefore the machine availability index has gone up and as a result our OEE has also moved up. More than anything else, a fresh new culture of productivity consciousness has evolved since the installation of machine tracking system.

Case study - small company

Small CNC shops are typically owned by an entrepreneur who runs the shop floor and simultaneously handles other business functions like meeting customers, banks and government departments. He cannot be physically present on the shop floor all the time or employ a supervisor to do this. SHOPtrack gives him the freedom to move about and run his business from anywhere, without being anxious about what is happening on his shop floor.

Antrak Automotive Components is a Gurgaon based SME that is involved in manufacturing high precision parts for the automobile industry and uses SHOPtrack to monitor 5 CNC lathes. It consistently wins repeat orders from Tier -1 auto part suppliers due its performance in the areas of quality and deliveries. Mr. Ashish Andley, the driving force behind Antrak, says “Before getting SHOPtrack I was tied down to my shop counting parts and this used to prevent me from focusing on other critical aspects of my business like marketing. I am now able to spend more time on these activities because I get hourly production data on my email.

“When production is not on schedule I know immediately, and can take corrective action. The night shift has traditionally been a low-productivity shift for me, but SHOPtrack has helped me pinpoint the causes of the low productivity and increase the production by 18% to 20%.” My operators too have responded favorably and have now become productivity-aware and cost-conscious.

SHOPtrack and TPM

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The mPOD – wireless shop floor data capturing device

The actual tracking of machines in SHOPtrack is done by a device called the mPOD, short for Machine Productivity on Demand. The mPOD automates data collection from the shop floor and solves the complex last-mile-problem of **linking the shop floor with the top floor**. Each machine has an mPOD. The mPODs record events as they occur on the machine and send them through a wireless network to SHOPtrack running on a central PC.

- Logs productivity data for TPM
- Interfaces with any machine - CNC or non-CNC
- Wireless communication
- Ruggedised for shop floor use
- Logs inspection data
- Logs data for traceability of parts
- Menu driven operator interface
- Displays operator alerts for inspection
- Displays tool life monitoring alerts

Scalable hardware and software

SHOPtrack's hardware and software is modular and scalable. This enables machines to be added to SHOPtrack as the shop floor grows. The network can be wired or wireless. A wireless network provides great flexibility in locating machines. The machine layout can be changed or new machines added at any time without bothering about the cabling, or a process layout can be changed to product cells.

The system works seamlessly with Cadem's other CNC productivity products - NCnet DNC for program management and transfer, and CAPSmill / CAPSturn for accurate machining cycle times.