

# Predator MDC™ - White Paper

*Features and benefits for data collection on the manufacturing shopfloor*


**Abstract**

This paper outlines the specific features and benefits of implementing Predator MDC software to collect and analyze real-time shop floor data from CNCs, PLCs, BCRs, and shop personnel for manufacturers worldwide. Predator MDC can be configured to address the unique requirements of each manufacturer with an off the shelf shrink-wrapped software based solution. Every feature, menu, toolbar button and dialog can be configured with a set of permissions per user. Combine this with support for three database platforms; Microsoft Access, SQL Server and Oracle to provide flexibility during the implementation process and an upgrade path as your needs grow.

Predator MDC runs stand alone or fully integrated with Predator Travelers™, Predator Tool Crib, Predator Gage Crib™, Predator DNC™ or Predator Desktop™. Ussually Predator MDC is fully integrated with Predator DNC or Predator Desktop and utilizes the existing DNC network for automated data collection from compatible CNC machine tools, PLC based equipment, PCs or stand alone bar code readers. Predator MDC is a member of a suite of applications all designed to share data and resources. They all share a common design and philosophy based on our unique understanding of manufacturing processes. Collectively they are known as Predator SFC™ or shop floor control.

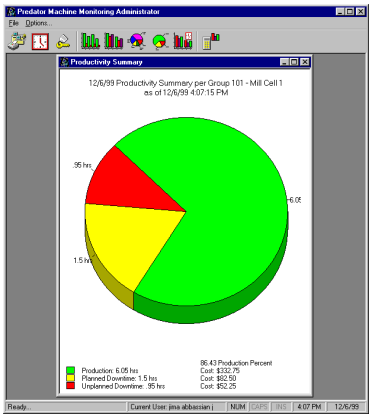
Predator SFC is designed to manage the manufacturing details of every shop floor and can be integrated with a manufacturer's higher level ERP or MES systems to form a seamless management system.


This document is based on features in Predator MDC v1.3.


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# PREDATOR MDC




## What is Predator MDC?

Predator MDC is a software application that collects, reports and graphs shop floor manufacturing details and processes in realtime. With the motto "You can only improve what you measure," Predator MDC helps improve manufacturing processes by empowering decision makers with reports and graphs based on actual shop floor data.

Predator MDC provides realtime answers to many of manufacturer's toughest questions, including:

- What jobs or parts are in production?
- How many have been scrapped?
- Who is currently making parts? Which shift?
- How is production time used?
- Which machines are currently making parts? In setup? Down? Or Idle?
- Why is production going down?
- What does downtime cost?

Answers to all of the above can be displayed from any PC with the ability to drill-down to any level of detail on any of your manufacturing facilities. For example, a manufacturing engineer in the United States can query the status of an individual machine in Mexico and find out if it is currently in setup, making parts, or down for maintenance. Answers are kept indefinitely and current results can be compared with a previous job or part runs. Realtime answers leveraged against actual production history are becoming critical as enterprises go global for engineering and manufacturing resources. Answers based on actual manufacturing details facilitate faster decisions and increase productivity for every manufacturer.

## How does Predator MDC work?

Predator MDC collects data from your two most important resources, your people and your machines/workcenters. Although paper based forms can be used, input is typically automated by scanning bar codes in realtime on the shop floor, running Predator MDC client software on a Windows-based PCs, or by having CNCs, PLCs or other shop floor devices provide automatic input.

### Automatic Machine Monitoring



Input can also be automated by leveraging a Predator DNC network for automatic machine monitoring directly from compatible CNC controls or other devices. Additional methods include database input, file-based input, and customized input using C++, VB or Java.

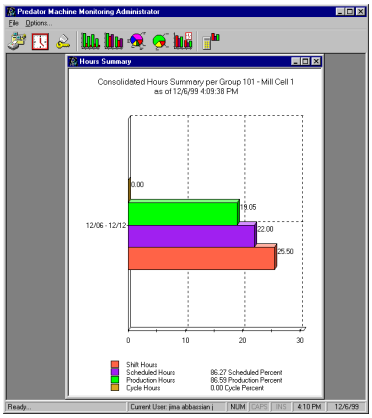
Milliseconds after any form of input is made, it becomes available enterprise-wide via reports or charts. Reports and charts are either realtime or summarized. Both types have their benefits, and they complement each other.

Realtime reports and charts process the collected data and accurately reflect the current state of shop floor activity. For example, the Machine Status report displays the current status of every machine including if it is idle, in setup, production and down. In addition, it displays the current job number and operator per machine. Another realtime example is

the Cycle Analysis chart, which displays the high, low and average cycle times per hour.

Summarized reports speed up the reporting and charting process by processing the numbers according to a daily or shift level detail. For example, the Production Summary chart displays the amount of time and money spent in production, setup, planned downtime and unplanned downtime per day. Summarized reports and graphs are typically used when the required date range is per day, week, month, quarter, or year. Summarization has the added benefit of allowing a Predator MDC administrator to correct any errors found in the collected data prior to generating any reports or graphs.

**What specific data does Predator MDC collect?**




Predator MDC is designed to track personnel, machines, and standard manufacturing processes. Standard personnel data collection events track shop floor details on how they spend their time and include the following:

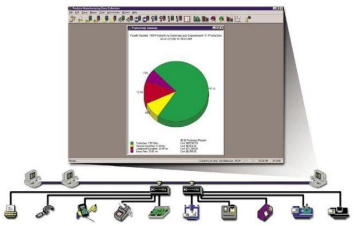
- Log On/Off per machine or work center
- Planned Personnel Downtime Start/End
- Breaks Start/End
- Meetings Start/End
- Other Planned Personnel Downtime Start/End
- Other Unplanned Personnel Downtime Start/End
- Machine Service Summaries

NOTE: Many End events are optional and will automatically be date and time stamped when another event is started.

Standard data collection events include the following:

- Time per Part Number
- Time per Job Number
- Personnel Time per Machine
- Setup Time
- Cycle Time
- Idle Time
- Unlimited number of Custom Time Events
- Good Part Quantities
- Scrapped Parts
- Machine Downtimes
- Personnel Downtimes
- Unlimited number of Custom Downtimes

NOTE: Many End events are optional and will automatically be date and time stamped when another event is started.

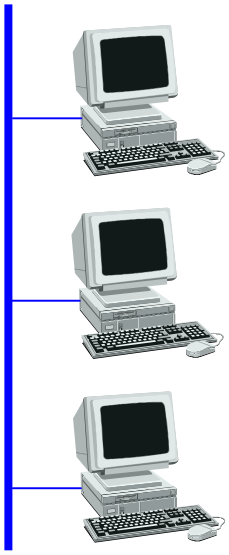


**How flexible are Predator MDC data collection methods?**

One of Predator MDC's major design goals is to provide a flexible data collection environment that supports input from paper-based forms, networked PCs, bar code readers, CNC machines, and a wide range of common equipment found in manufacturing shop floor environments. Input methods can be used individually or combined to form customer specific hybrid data collection processes to support assembly and machining-based manufacturing. The advantage of each method is outlined on the following page:

- Paper-based forms – At the end of every shift, shop floor personnel fill in a simple half page form that summarizes their activities. A data entry person enters the information into a specially designed form that supports high-speed ten key data entry. Finally, additional shop floor forms can be printed for the following shift.

  Advantages of this method include very low implementation costs, minimal maintenance, and a single existing office PC can be used. The downside of this method is that only summarized data collection is possible and realtime data collection is not possible.



- Networked PCs – During each shift, specific events can quickly be entered directly by shop floor personnel as they occur in real time within one or more Predator MDC clients. There is no limit to the number of Predator MDC clients that can be used at the same time. Predator MDC clients are 32-bit applications that support Windows 98, NT and 2000.

  Advantages of this method include support for both summarized and realtime data collection, realtime reports and charts, and shop floor based PCs can be used for other applications including DNC, SPC, and document viewing. Years ago the costs of implementing and maintaining shop floor PCs forced many companies to abandon or delay rollout of paperless based systems. Today the cost of PCs has plummeted to the point where shop floor PCs are often viewed as disposable tools. In production facilities, where maximum uptime is required, we recommend that a fully configured spare PC be on call in the maintenance room should any of your shop floor PCs go down.







- Bar code readers (BCRs) – During each shift, specific events can quickly be scanned directly by shop floor personnel as they occur in real-time. Predator MDC supports two methods of bar coding. The first method fits inline between a networked PC and it's keyboard. The second method requires Predator DNC and allows stand-alone bar code readers to be connected through the DNC and PC network. There is no limit to the number of stand-alone bar code readers that can be used at the same time. Predator Bar Code Readers support many different types of bar codes, although 3 of 9 is typically used. Depending on your requirements, steel wands, laser or CCD guns, and card slots for scanning employee badges can also be used with any Predator BCR. Typically Predator BCRs are bundled with steel wands. Steel wands are preferred for their low cost, low maintenance, and flexibility with long bar codes.

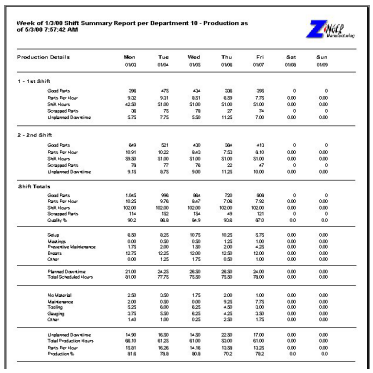
Advantages of this method include support for both summarized and realtime data collection, and realtime reports and charts. Stand-alone Predator BCRs are perfect for assembly areas or very harsh manufacturing areas where it would be cost prohibitive to maintain PCs. Although they are less flexible then PCs, BCRs have no moving parts, are less expensive, and very easy to implement. In most cases, we leverage an existing Predator DNC system and it's cabling and plug them into a CNC machine or other shop floor device.

- CNC controls and PLCs – During the production process, Predator MDC with Predator DNC or Desktop can monitor machine specific events such as cycle start and cycle stop. These signals can be automatically sent by a CNC or PLC as they occur in real-time. This method requires Predator DNC or Desktop and allows CNCs, PLCs or other shop floor devices to be connected through the DNC and PC network. There is no limit to the number of CNCs, PLCs or machines that can be tracked at the same time. Monitoring the manufacturing process is supported via Fadal, Fanuc, Haas, Mazak, Mitsubishi, Okuma, Vickers, and many other modern CNC controls. Older CNC controls can be upgraded with a Predator BTR to support automatic data collection. Automatic data collection at the machine does not eliminate the need for bar coding by shop floor personnel, and the recommended configuration is a hybrid configuration with bar code readers at each machine with automatic data collection whenever possible.

  Advantages of this method include support for both summarized and realtime data collection, and realtime reports and charts. It is the best of all possible worlds - shop floor personnel stay productive at their machines and every effort is made to automate the collection process at the machines and minimize the amount of input necessary by personnel.

**What kinds of reports are included with Predator MDC?**

63 standard reports are included with Predator MDC. Predator MDC supports two methods of reports; real-time and summarized. Real-time reports process the real-time data events as they occur on the shop floor and can be run at any time. The following real-time reports are included:


Week of 1/3/08 Shift Summary Report per Department 10 - Production as of 5/3/08 7:57:42 AM

| Production Details | Mon | Tue | Wed | Thu | Fri | Sat | Sun |
|---|---|---|---|---|---|---|---|
| | 01/03 | 01/04 | 01/05 | 01/06 | 01/07 | 01/08 | 01/09 |
| 1 - 1st Shift | | | | | | | |
| Good Parts | 396 | 475 | 434 | 336 | 395 | 0 | 0 |
| Parts Per Hour | 8.32 | 9.31 | 8.51 | 6.59 | 7.75 | 0.00 | 0.00 |
| Shift Hours | 40.00 | 51.00 | 51.00 | 51.00 | 51.00 | 0.00 | 0.00 |
| Scrapped Parts | 36 | 75 | 76 | 37 | 79 | 0 | 0 |
| Unplanned Downtime | 5.75 | 7.75 | 5.50 | 11.25 | 7.00 | 0.00 | 0.00 |
| 2 - 2nd Shift | | | | | | | |
| Good Parts | 649 | 521 | 430 | 394 | 413 | 0 | 0 |
| Parts Per Hour | 10.81 | 10.22 | 8.43 | 7.72 | 8.10 | 0.00 | 0.00 |
| Shift Hours | 39.50 | 51.00 | 51.00 | 51.00 | 51.00 | 0.00 | 0.00 |
| Scrapped Parts | 79 | 77 | 76 | 22 | 47 | 0 | 0 |
| Unplanned Downtime | 9.15 | 8.75 | 9.00 | 11.25 | 10.00 | 0.00 | 0.00 |
| Shift Totals | | | | | | | |
| Good Parts | 1,045 | 996 | 864 | 730 | 808 | 0 | 0 |
| Parts Per Hour | 10.25 | 9.76 | 8.47 | 7.06 | 7.92 | 0.00 | 0.00 |
| Shift Hours | 102.00 | 102.00 | 102.00 | 102.00 | 102.00 | 0.00 | 0.00 |
| Scrapped Parts | 114 | 152 | 154 | 49 | 121 | 0 | 0 |
| Quality % | 90.2 | 86.8 | 84.9 | 93.6 | 87.0 | 0.0 | 0.0 |
| Setup | 6.00 | 6.25 | 10.75 | 10.25 | 5.75 | 0.00 | 0.00 |
| Meetings | 0.00 | 0.00 | 0.00 | 1.25 | 1.00 | 0.00 | 0.00 |
| Preventive Maintenance | 1.75 | 2.00 | 1.00 | 2.00 | 4.25 | 0.00 | 0.00 |
| Breaks | 12.75 | 12.25 | 12.00 | 12.50 | 12.00 | 0.00 | 0.00 |
| Other | 0.00 | 1.25 | 1.75 | 0.50 | 1.00 | 0.00 | 0.00 |
| Planned Downtime | 21.00 | 24.25 | 26.50 | 26.50 | 24.00 | 0.00 | 0.00 |
| Total Scheduled Hours | 81.00 | 77.75 | 75.50 | 75.50 | 78.00 | 0.00 | 0.00 |
| No Material | 2.50 | 3.50 | 1.75 | 2.00 | 1.00 | 0.00 | 0.00 |
| Machine | 5.00 | 5.00 | 5.00 | 4.25 | 5.00 | 0.00 | 0.00 |
| Tooling | 0.25 | 0.00 | 0.25 | 4.25 | 1.00 | 0.00 | 0.00 |
| Gauging | 3.75 | 5.50 | 6.25 | 4.25 | 3.50 | 0.00 | 0.00 |
| Other | 1.40 | 1.00 | 0.50 | 2.50 | 1.75 | 0.00 | 0.00 |
| Unplanned Downtime | 14.90 | 16.00 | 14.00 | 22.00 | 17.00 | 0.00 | 0.00 |
| Total Production Hours | 66.10 | 61.25 | 61.00 | 53.00 | 61.00 | 0.00 | 0.00 |
| Parts Per Hour | 15.81 | 16.26 | 14.16 | 13.38 | 13.28 | 0.00 | 0.00 |
| Production % | 81.6 | 78.8 | 80.8 | 70.2 | 78.2 | 0.0 | 0.0 |

- Job Summaries
- Machine Status
- Machine Events
- Machine Time per Resource
- Machine Time per Person
- Machine Service Summary

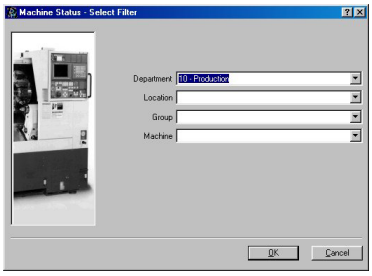
NOTE: Each of the above reports has numerous options and filters to drill down to the appropriate data.

Predator MDC supports a unique summarization process that can be run at any time to "crunch the numbers." Once summarized, additional reports are available:

- Shift Summary
- Machine Time
- Production Details per Resource
- Production Details per Person
- Production Details per Part Number
- Production Details per Job
- Time and Attendance

NOTE: Each of the above reports has numerous options and filters to drill down to the appropriate data.

All reports can be exported to Microsoft Excel or HTML documents for further analysis or processing. Additional Predator MDC Clients can be licensed to run specific reports. Custom reports are available via several third party applications such as Crystal Reports.

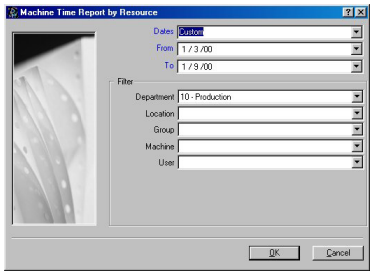



**Why track machine status?**

Monitoring machine status provides shop foremen, manufacturing engineers, or shop owners a quick summary of the state of the shop floor without leaving their desk. Predator MDC can be used to analyze machine status for an entire department or a specific machine. This realtime report displays which machines are currently idle, in setup, in cycle, or down. In addition, it displays the current job and operator logged on to each machine.

Machine Status Report Filtered by Department 10 - Production

| Machine | Status | Current Job | Current User |
|---|---|---|---|
| **Department 10 - Production** | | | |
| **Location 10A - Building A** | | | |
| **Group 10 - Mill Cell** | | | |
| 10 - Fadal VMC 4020 | In Setup | - | jima - Jim Abbassian |
| 11 - Haas VF-650 | Cycling | 8000-0001 - Putter 8000 - Job 1 | joem - Joe Machinist |
| 12 - Mori Seiki GV-503 | Cycling | 9000-0001 - Putter 9000 - Job 1 | joem - Joe Machinist |
| **Group 11 - Lathe Cell** | | | |
| 15 - Okuma Crown-E | Down | - | - |
| 16 - Citizen CINCOM L32 | Down | - | - |
| 17 - Hardinge T42 | Idle | - | richardr - Richard Runnells |




**Why track machine time?**

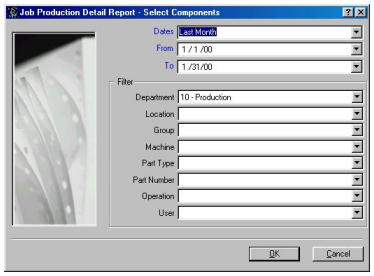
Analyzing machine time and its utilization provides shop foremen, manufacturing engineers, or shop owners a real understanding on how resources are used. Even more importantly it show where production improvements can be made to reduce setup time, down time, and idle time. Predator MDC can be used to analyze machine time for an entire department or a specific machine per day, week, month, quarter, or year. This summary report displays the how machine time is spent per machine. It tracks every operator for each machine and how time was used. For example, for each machine how much time was logged in, cycle, setup, down, and idle.

1/03/2000 - 1/09/2000 Machine Time Report by Resource Filtered by Department 10 - Production

| User | Logon Time (hrs) | Cycle Time (hrs) | Setup Time (hrs) | Down Time (hrs) | Idle Time (hrs) |
|---|---|---|---|---|---|
| **Department 10 - Production** | | | | | |
| **Location 10A - Building A** | | | | | |
| **Group 10 - Mill Cell** | | | | | |
| **Machine 10 - Fadal VMC 4020** | | | | | |
| bobj - Bob Johnson | 42.50 | 23.25 | 2.75 | 13.50 | 3.00 |
| daleo - Dale Olson | 42.50 | 24.00 | 2.50 | 12.50 | 3.50 |
| **Machine 11 - Haas VF-650** | | | | | |
| joem - Joe Machinist | 42.50 | 27.00 | 5.25 | 7.00 | 3.25 |
| markn - Mark Nelson | 42.50 | 28.00 | 2.00 | 9.25 | 3.25 |
| **Machine 12 - Mori Seiki GV-503** | | | | | |
| johnw - John Wilson | 42.50 | 32.25 | 2.50 | 4.00 | 3.75 |
| kipr - Kip Robertson | 42.50 | 27.75 | 2.75 | 8.25 | 3.75 |
| **Group 11 - Lathe Cell** | | | | | |
| **Machine 15 - Okuma Crown-E** | | | | | |
| jacks - Jack Smith | 42.50 | 28.75 | 4.00 | 6.25 | 3.50 |
| janc - Jan Chandler | 42.50 | 24.75 | 5.75 | 8.50 | 3.50 |
| **Machine 16 - Citizen CINCOM L32** | | | | | |
| joels - Joel Smith | 42.50 | 26.75 | 2.00 | 10.25 | 3.50 |
| richardr - Richard Runnells | 42.50 | 27.00 | 4.25 | 7.50 | 3.75 |
| **Machine 17 - Hardinge T42** | | | | | |
| keving - Kevin Gilmore | 42.50 | 27.25 | 4.00 | 7.75 | 3.50 |
| stevej - Steve Jones | 42.50 | 28.35 | 3.75 | 6.65 | 3.75 |
| **Totals** | **510.00** | **325.10** | **41.50** | **101.40** | **42.00** |

In addition, you can also run this same report grouped by user vs. machine. The advantage of this report style is to display all the machines used by a given person and how the machine time was spent.

## Why track production details?



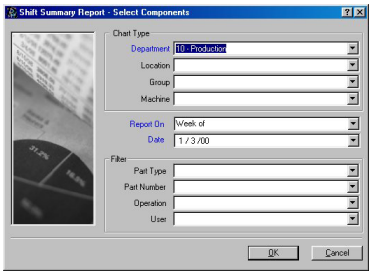

Analyzing production details provides a real understanding on the quality and efficiency of production resources. In addition, it shows where improvements can be made to increase both quality and production percentages. Predator MDC can be used to analyze production and quality details for an entire department or a specific machine per day, week, month, quarter, or year. This summary report displays the number of good parts, scrapped parts, quality percentage, scheduled parts per hour, production parts per hour, and production percentage per machine.

01/03/2000 - 01/09/2000 Production Detail Report by Resource Filtered by Department 10 - Production

| Machine | Good Parts | Scrapped Parts | Quality Percent | Scheduled Parts per Hr | Production Parts per Hr | Production Percent |
|---|---|---|---|---|---|---|
| **10 - Production** | | | | | | |
| **10A - Building A** | | | | | | |
| **10 - Mill Cell** | | | | | | |
| 10 - Fadal VMC 4020 | 1,013 | 149 | 87.2 | 15.01 | 23.70 | 63.3 |
| 11 - Haas VF-650 | 788 | 85 | 90.3 | 12.12 | 15.60 | 77.7 |
| 12 - Mori Seiki GV-503 | 600 | 91 | 86.8 | 9.20 | 10.71 | 85.8 |
| **10 - Mill Cell Totals** | 2,401 | 325 | 88.1 | 12.14 | 16.09 | 75.5 |
| **11 - Lathe Cell** | | | | | | |
| 15 - Okuma Crown-E | 746 | 89 | 89.3 | 12.08 | 14.99 | 80.6 |
| 16 - Citizen CINCOM L3 | 682 | 108 | 86.3 | 10.87 | 13.44 | 80.9 |
| 17 - Hardinge T42 | 604 | 68 | 89.9 | 9.22 | 11.48 | 80.3 |
| **11 - Lathe Cell Totals** | 2,032 | 265 | 88.5 | 10.69 | 13.27 | 80.6 |
| **10A - Building A Totals** | 4,433 | 590 | 88.3 | 11.43 | 14.66 | 78.0 |
| **10 - Production Totals** | 4,433 | 590 | 88.3 | 11.43 | 14.66 | 78.0 |
| **Totals** | 4,433 | 590 | 88.3 | 11.43 | 14.66 | 78.0 |

In addition, you can also run this same report and filter the results by part family, part number, operation, and user. The advantages of these other report styles are to display the results within a more usable context. For example if you experience a lot of part number changeovers or short production runs, the results filtered by part family or part number will provide more insight.

**Why track shift summaries?**




Although detailed, this single report condenses the results of an entire day, week, month, or year down to a single page report. Analyzing shift summary reports can provide unique insight and is the preferred report to export to Microsoft Excel for further analysis and unique charting requirements. Bottom line numbers for production details, setup times, planned and unplanned downtimes provide shop foremen, manufacturing engineers, or shop owners a real understanding on the quality and efficiency of production resources and where improvements can be made. Predator MDC can be used to analyze production and quality details between shifts per day, week, month, quarter, or year. This summary report displays the number of good parts, parts per hour, shift hours, scrapped parts, and unplanned downtime for each individual shift and then totals all of the shifts and adds quality %, planned downtimes, unplanned downtimes, scheduled hours, production hours and production %.

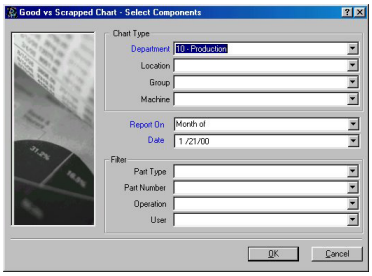
**Week of 1/3/00 Shift Summary Report per Department 10 - Production as of 5/3/00 7:57:42 AM**

| Production Details | Mon 01/03 | Tue 01/04 | Wed 01/05 | Thu 01/06 | Fri 01/07 | Sat 01/08 | Sun 01/09 |
|---|---|---|---|---|---|---|---|
| **1 - 1st Shift** | | | | | | | |
| Good Parts | 398 | 475 | 434 | 398 | 395 | 0 | 0 |
| Parts Per Hour | 9.02 | 9.31 | 8.51 | 8.59 | 7.75 | 0.00 | 0.00 |
| Shift Hours | 42.50 | 51.00 | 51.00 | 51.00 | 51.00 | 0.00 | 0.00 |
| Scrapped Parts | 36 | 75 | 78 | 27 | 74 | 0 | 0 |
| Unplanned Downtime | 5.75 | 7.75 | 5.50 | 11.25 | 7.00 | 0.00 | 0.00 |
| **2 - 2nd Shift** | | | | | | | |
| Good Parts | 649 | 521 | 430 | 394 | 413 | 0 | 0 |
| Parts Per Hour | 10.91 | 10.22 | 8.43 | 7.53 | 8.10 | 0.00 | 0.00 |
| Shift Hours | 59.50 | 51.00 | 51.00 | 51.00 | 51.00 | 0.00 | 0.00 |
| Scrapped Parts | 78 | 77 | 76 | 22 | 47 | 0 | 0 |
| Unplanned Downtime | 9.15 | 8.75 | 9.00 | 11.25 | 10.00 | 0.00 | 0.00 |
| **Shift Totals** | | | | | | | |
| Good Parts | 1,045 | 996 | 864 | 720 | 808 | 0 | 0 |
| Parts Per Hour | 10.25 | 9.76 | 8.47 | 7.06 | 7.92 | 0.00 | 0.00 |
| Shift Hours | 102.00 | 102.00 | 102.00 | 102.00 | 102.00 | 0.00 | 0.00 |
| Scrapped Parts | 114 | 152 | 154 | 49 | 121 | 0 | 0 |
| Quality % | 90.2 | 86.8 | 84.9 | 93.6 | 87.0 | 0.0 | 0.0 |
| Setup | 6.50 | 8.25 | 10.75 | 10.25 | 5.75 | 0.00 | 0.00 |
| Meetings | 0.00 | 0.50 | 0.50 | 1.25 | 1.00 | 0.00 | 0.00 |
| Preventive Maintenance | 1.75 | 2.00 | 1.50 | 2.00 | 4.25 | 0.00 | 0.00 |
| Breaks | 12.75 | 12.25 | 12.00 | 12.50 | 12.00 | 0.00 | 0.00 |
| Other | 0.00 | 1.25 | 1.75 | 0.50 | 1.00 | 0.00 | 0.00 |
| Planned Downtime | 21.00 | 24.25 | 26.50 | 26.50 | 24.00 | 0.00 | 0.00 |
| Total Scheduled Hours | 81.00 | 77.75 | 75.50 | 75.50 | 78.00 | 0.00 | 0.00 |
| No Material | 2.50 | 3.50 | 1.75 | 2.00 | 1.00 | 0.00 | 0.00 |
| Maintenance | 2.00 | 0.50 | 0.00 | 9.25 | 7.75 | 0.00 | 0.00 |
| Tooling | 5.25 | 6.00 | 6.25 | 4.50 | 3.00 | 0.00 | 0.00 |
| Gauging | 3.75 | 5.50 | 6.25 | 4.25 | 3.50 | 0.00 | 0.00 |
| Other | 1.40 | 1.00 | 0.25 | 2.50 | 1.75 | 0.00 | 0.00 |
| Unplanned Downtime | 14.90 | 16.50 | 14.50 | 22.50 | 17.00 | 0.00 | 0.00 |
| Total Production Hours | 66.10 | 61.25 | 61.00 | 53.00 | 61.00 | 0.00 | 0.00 |
| Parts Per Hour | 15.81 | 16.26 | 14.16 | 13.58 | 13.25 | 0.00 | 0.00 |
| Production % | 81.6 | 79.8 | 80.8 | 70.2 | 78.2 | 0.0 | 0.0 |

In addition, you can also run this same report and filter the results by part family, part

number, shift, and user. The advantages of these other report styles are to display the results within a more usable context.

**What kinds of charts and graphs are included with Predator MDC?**




Predator MDC supports two methods of graphs; real-time and summarized. Real-time graphs process the real-time data events as they occur on the shop floor and can be run at any time. The following real-time graphs are included:

- Cycle Time Analysis
- Part Change / Idle Time Analysis
- Machine Service Summary

Predator MDC supports a unique summarization process that can be run at any time to "crunch the numbers." Once summarized, additional charts and graphs are available:

- Good vs. Scrap
- Good Parts Summary
- Downtime Summary
- Other Planned and Unplanned Downtime Summary
- Productivity Summary
- Hours Summary
- Production Trend Analysis

NOTE: Each of the above charts and graphs has numerous options and filters to drill down to the appropriate data. For example the Downtime Summary graph can be filtered to a specific department, location, group, and machine. In addition all charts have lots of customization options to reformat the display. For example, all charts can be toggled from 2D to 3D.

Additional Predator MDC Client applications can be licensed to run specific charts and graphs. Custom charts and graphs are available via several third party applications.

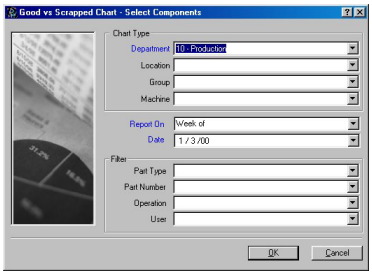
**Why track cycle time?**

Predator MDC can be used to analyze cycle time for an entire department or a specific machine. Since cycle times can be automatically collected via machine monitoring the results are extremely accurate and should be used to improve manufacturing processes. Cycle time analysis shows the fastest, slowest and average cycle time grouped by hour, day, week, month, quarter, and year. Results are displayed in a hi-lo or area style. Charts can be used to compare one machine vs. another, or today's performance vs. yesterday's etc.

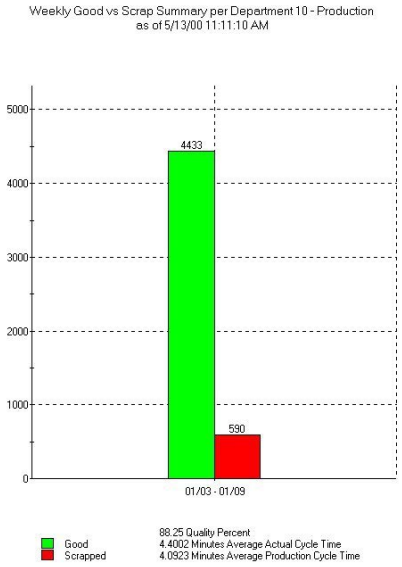
**Why track good parts vs. scrapped parts?**

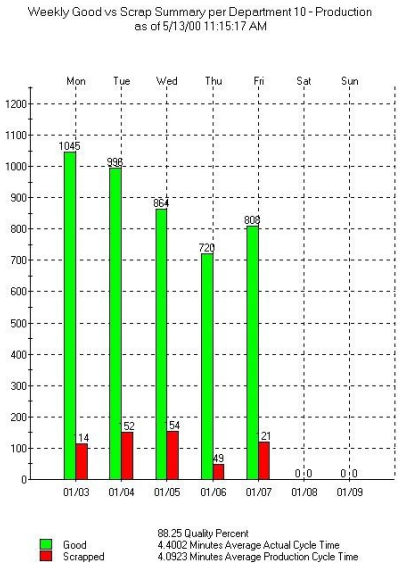
Quickly analyzing production quality is one of the most fundamental benefits of using Predator MDC. Identifying when production counts drop or when scrap rates increase is the first step in determining inefficiencies. For example, the chart on the right identifies that production during the beginning of the week was as much as 30% higher then production during the end of the week. With further use of Predator MDC this trend can

be monitored until corrective action such as changing the shift schedule can be enacted.




The chart on the left shows a consolidated view for the entire week. With a single mouse click you can drill down to the chart on the right to show daily results.



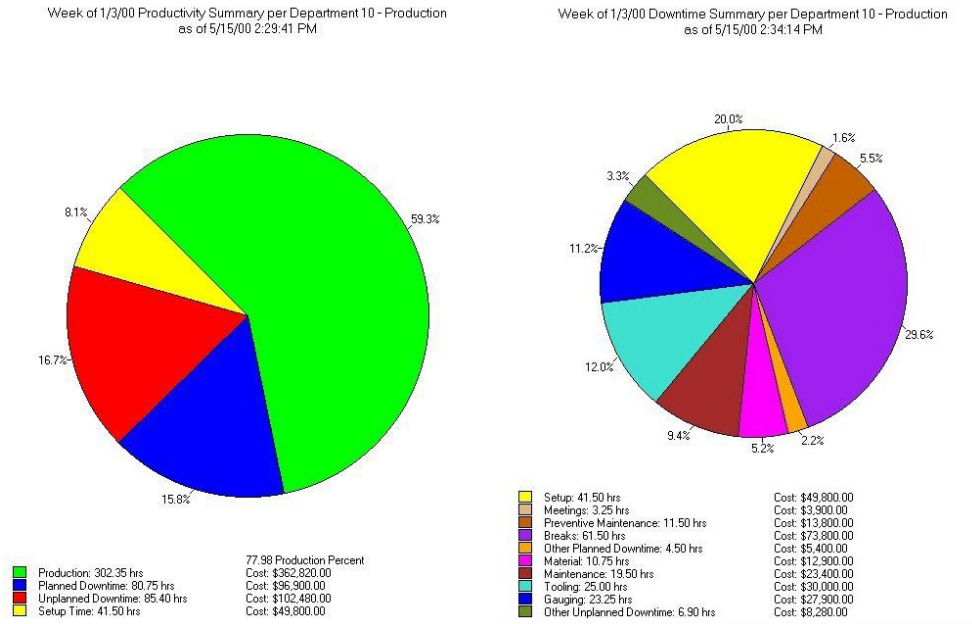




Production and quality details for an entire department or a specific machine per day, week, month, quarter, or year. This summary chart displays the number of good parts, scrapped parts, quality percentage, and average cycle times.

In addition, you can also run this same report and filter the results by part family, part number, shift, and user. Comparing and analyzing good parts vs. scrapped parts provides shop foremen, manufacturing engineers, or shop owners a real understanding on the quality and efficiency of production resources and where improvements can be made.

**Why track productivity and downtime?**

Since the value of time cannot be overstated, analyzing overall productivity and how one's time is spent is critical. Identifying when and why setup time, downtime, and idle time increases and production times decrease start with Predator MDC's Productivity Summary chart. For example, the chart on the left identifies that downtime accounts for about 40% of the time with production occurring at about 60%. With two mouse clicks you can drill down to the downtime chart on the right to identify additional specifics and details. With further use of Predator MDC, unplanned downtime can be lowered with better shop policies for access to tooling, increased preventive maintenance, or whatever solutions are found to fix root causes.




Production and downtime summaries for an entire department or a specific machine per day, week, month, quarter, or year. These charts display percentages of time, hours, and estimated costs.

In addition, you can also run this same chart and filter the results by part family, part number, shift, and user. For example, this flexibility can help identify which part families or part numbers accrue the most downtime.

**Does it work with other Predator applications?**

Predator MDC is a stand-alone database driven application built on Predator's common database platform. This common platform is a shared foundation to an entire suite of Predator applications. Shared common data improves overall productivity and minimizes implementation time when adding additional applications. For example, Predator MDC, Predator DNC, Predator Desktop, Predator Travelers, Predator Tool Crib and Predator Gage Crib all share common data. For example, edit a machine's properties and every Predator application is immediately updated.

Predator's common database platform is an open architecture structure independent of the actual database server. It can range from Microsoft Access to Oracle depending on the customer's requirements. Predator's common database platform is fully relational and supports powerful object-based design to support an unlimited number of events, parts, personnel, machines, departments, etc.

**Why integrate Predator MDC with Predator DNC or Desktop?**

The primary benefit of an integrated solution is the ability to leverage the existing DNC network to monitor machines and collect data automatically from compatible CNCs,

PLCs, stand alone bar code readers, terminals, and other shopfloor devices. The following features are realized when both products are used together:

- Multiple simultaneous users from any Windows based networked PC.
- Powerful database design to support an unlimited number of data collection events, part numbers, machines, downtimes, etc.
- Multiple manufacturing plants can be supported within a single Predator MDC database with reports and charts that span the enterprise or drill down to each plant.
- Open architecture design with native database and SQL query support for Microsoft Access, SQL Server and Oracle.
- Comprehensive ISO 900x compatible history of edits/changes.
- Designed to track Job Time, Part Time, Machine Time, Setup Time, Cycle Time, Downtime, Good Parts, Scrapped Parts, Operators, Machines, Cells, Departments, Shifts, Part Families, and many more shopfloor manufacturing workflow processes.
- Works with existing DNC cabling.
- Supports Predator BTRs for older style CNC machines.
- Support automatic monitoring and manual monitoring.
- Easy to use wizards for all MDC processes.
- Edit common components with automatic updates. For example, change machine properties and every related event collected against that same machine is updated.
- Query and print reports based on current statuses. For example, display all released jobs.
- Powerful multi-threading and multi-tasking with support for up to 256 CNCs or PLCs with simultaneously per PC.
- Open architecture hardware design supports any I/O hardware with Windows 98, NT, 2000 and XP device drivers.
- Flexible bi-directional interfaces objects including serial, parallel, network printer, Ethernet, Winsock, ftp, and usb.
- Multiple ports per CNC or PLC are supported, for example both serial and FTP-based Ethernet communications to the same CNC control. Multiple ports per CNC or PLC are also required for optional hand-held terminals, shopfloor terminals, bar code readers, badge slot scanners, and PCs.
- Interface independent protocol objects, for example, a custom data collection object can be used with the serial port object or the parallel port object.
- Unique object-based design with administrative flexibility to combine objects to create powerful new data collection commands and features.
- Optional job management and data collection features with create jobs, release jobs, finish jobs, WIP reports, WIP viewing and job filters for all reports and charts.
- Optional database and spreadsheet objects date and time stamp shopfloor activities, for example, Predator DNC/MDC can update Microsoft Access, Excel, SQL Server, Oracle, and HTML files at the same time.
- Optional SDKs or software development kits to create custom objects with C++, VB or Java.
- Optional Internet-based objects include FTP, E-Mail and HTML.
- Easy to use explorer style user interface.
- Remote Request allows any DNC, data collection or machine monitoring commands to be initiated automatically by the CNC control.

- 100% Network compatible with Server Safe™ operation.
- Linked multimedia can include any file on the network with additional viewers for Microsoft Excel, Word, PowerPoint, RTF, AutoCAD, DXF, HTML, PDF, text and bitmaps included with Predator MDC.
- Predator MDC includes a *secure* browser for access to corporate Intranets.
- Automatic database integration with:
  - Predator DNC
  - Predator Desktop
  - Predator PPM – Parametric Part Manufacturing
  - Predator Travelers
  - Predator Tool Crib
  - Predator Gage Crib
- Includes 63 standard MDC management reports.
- Includes 20 standard MDC management charts.
- Custom reports and graphs are available via several third party applications.
- User and group permissions for features, menus, toolbars and dialogs.
- Comprehensive HTML based on-line help that leads the industry.
- Automatic database migration as each software version is released.
- Real-time transaction based processing to minimize database corruption with automatic rollback when power is restored.
- Flexible licensing including SIMs, network cards and floating network licenses.

***For more information***

For the latest information on Predator MDC, check out our World Wide Web site at http://www.predator-software.com

