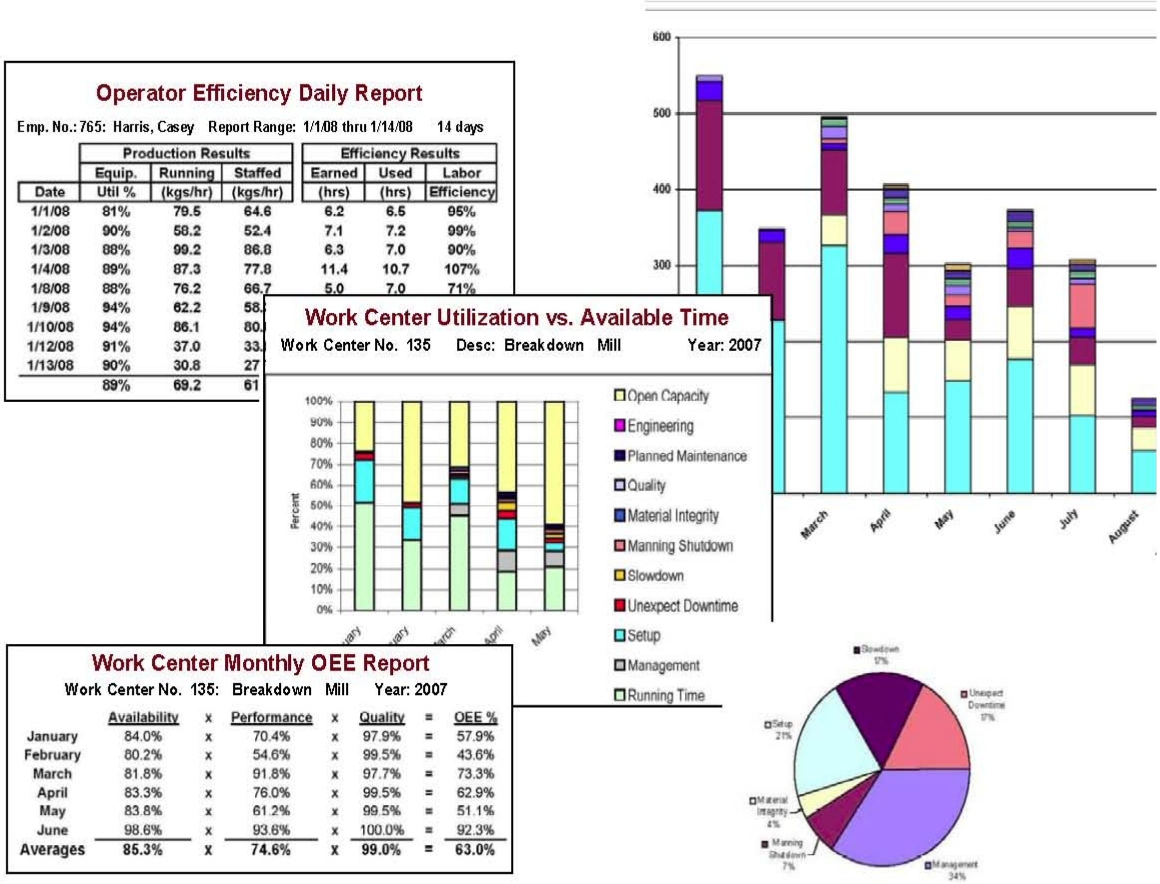
LeanOps™
Performance Reporting Program

LeanOps™ – Product Release - White Paper



	Availability	x	Performance	x	Quality	=	OEE %
January	84.0%	x	70.4%	x	97.9%	=	57.9%
February	80.2%	x	54.6%	x	99.5%	=	43.6%
March	81.8%	x	91.8%	x	97.7%	=	73.3%
April	83.3%	x	76.0%	x	99.5%	=	62.9%
May	83.8%	x	61.2%	x	99.5%	=	51.1%
June	98.6%	x	93.6%	x	100.0%	=	92.3%
Averages	85.3%	x	74.6%	x	99.0%	=	63.0%

Abstract

This paper outlines the special features and benefits of LeanOps™, a new performance reporting program designed to reduce operating costs, increase profits, and manage risk in manufacturing operations. Overall Equipment Effectiveness (OEE) calculations, equipment utilization reports, throughput reports, work center downtime analysis, part number performance reports, scrap analysis and operator evaluation reports—these are just some of the data LeanOps™ can display in easy-to-read reports that will help reduce operating costs. LeanOps™ can be run as a stand-alone application or can be integrated with a manufacturer's higher level Enterprise Resource Planning (ERP) program.

What is LeanOps™?

LeanOps™ is a relational database application that connects you to your process's performance statistics and presents easy-to-read charts, graphs and tables determined from shop floor raw data. LeanOps™ is currently an Access® program that produces over 35 preformatted reports focusing mainly on the various aspects of equipment utilization, downtime, operator efficiency and scrap reduction. It helps managers and engineers maximize their ROI on capital investments by using an activity-based costing approach to quantify and prioritize operational costs-reduction opportunities. LeanOps™ was designed specifically to reduce operational costs in small- to medium-size companies.

The majority of shop floor performance criteria or Key Output Variables (KPOVs) are incorporated into standardized reports for ease of analysis. LeanOps™ ability to group products, operating time, downtime, resources, equipment and scrap causes allows the ability to standardize multiple reports and create improvement algorithms for reducing operational costs.

LeanOps™ incorporates plant available time and work center scheduled time to help managers track their budgets. Work centers can be grouped together into two different user-defined categories. The most common grouping is by process function performed, such as mills, slitters or saws. Another approach is to group work centers with high hourly operating cost together, creating reports that focus on those work centers only. Operator production rates can be compared to standards to calculate labor efficiencies. In addition, operators can also be grouped into crews for efficiency evaluations. LeanOps™ also provides an input field to track equipment processing information, such as strokes per minute or the number of passes through a mill for performance or quality analysis.

LeanOps™ is not a traditional ERP system; it does not contain a scheduling program, track inventory or production orders through a shop. It focuses on shop floor performance variables like downtime costs, asset utilization calculations and scrap costs. It is designed as a stand-alone application or can be connected to a manufacturer's current ERP program. Some of LeanOps™ reports may overlap current ERP program reports such as operator efficiencies and part costing.

LeanOps™ can be implemented at five different levels depending on a manufacturer's needs. A user can track equipment downtime only, if that is what they want to focus on exclusively. This level will minimize implementation and program maintenance time at the cost of generating fewer reports. Otherwise, users can track throughput, scrap, product performance, and operator efficiencies to access all of the available reports. When implemented at its highest level, Level 5, it will require the maintenance of part number and routing tables with production standards. Maintaining the LeanOps™ tables that overlap with a manufacturer's ERP system can be accomplished electronically to minimize maintenance labor costs.

Why use LeanOps™?

Manufacturers can use LeanOps™ **t**o reduce operational costs, increase profit and reduce risk. Today's competitive manufacturing environment demands better visibility into operating performance. Historically, manufacturers have relied on traditional ERP systems to provide shop floor performance criteria. The majority of ERP systems focus on material requirement planning (MRP), capacity planning, production management, quality control and cost management applications. The limitation of traditional ERP systems is that they were not designed to focus specifically on shop floor performance criteria like Overall Equipment Effectiveness (OEE), which has been adopted in multiple industries. They have focused their resources on the wide scope of other business applications they provide. In contrast, LeanOps™ focuses on *all* of the shop floor performance criteria, helping manufacturers stay competitive in a global market.

I designed LeanOps™ specifically for small- to medium-size companies to easily identify unnecessary operational costs on the shop floor and cost justify solutions. Eighteen years of process modeling and successful cost reduction projects have led me to believe that contemporary manufacturers require a new and improved method for identifying improvements in process and justifying the costs. . It is easy to implement and provides the preformatted reports that operation managers, plant managers, supervisors and engineers are looking for to manage and reduce their operating costs. Below are a number of reasons why to implement LeanOps™:

- Easy to implement
- Short Return-On-Investment (ROI)
- Ability to implement at five different levels based on operational strategy and availability of funds.
- Easy to access and understand reports
- Reports are designed and built by an industrial engineer specifically for operation managers, plant managers and supervisors to utilize
- Standardized reports to benchmark and track cost reduction projects impact at the plant level, work center level and part number level.
- Ability to seamlessly integrate with manufacturer's current ERP systems
- Can be used as an accountability tool for plant managers, supervisors and operators.

Some manufacturers use dynamic reporting programs like Crystal Reports® to create custom reports from their ERP database tables. With this approach, managers or engineers may not know what kind of reports they want, which database tables they need to access to a create report, or how to format the information once it is gathered. These custom reports are usually unique and get saved on each individual's hard drive and are not shared throughout the organization. Therefore, the same reports may be recreated several times by different people, resulting in increased overhead costs.

Many ERP providers are willing to build customized reports from a manufacturer's request. This usually results in a computer programmer asking the manufacturer what kind of reports they want. LeanOps™ was designed around providing the relevant operational data needed to reduce operating costs. Below are a number of applications from using LeanOps™:

- Benchmarking your operational performances with quantitative values and identify production improvement goals
- Using as a performance accountability tool for employees, supervisors and plant managers
- Identifying potential process improvements by reporting on the categories, sub-categories and codes defined
- Concentrating resources on the top Pareto Analysis downtime opportunities or scrap causes
- Establishing accurate part costing based on actual throughput rates
- Increasing throughput, profit margins and decrease lead times

LeanOps™ Background

I, Tom Perrego, developed LeanOps™ to fill the need for simple, inexpensive and easy-to-read process performance information to help reduce manufacturing costs. I am an industrial engineer with over 18 years of experience, and have performed multiple process or capacity models with Excel® files and ProModel® digital simulation modeling software. The benefit of digital simulation modeling over discrete modeling with Excel® is its ability to use distributions as model inputs making the models more dynamic and accurate. Hence, simulation modeling has the ability to incorporate processing time fluctuations when the data is available.

However, the difficult part of process or capacity modeling is gathering the correct input information, data or logic to create and validate a model. Even harder is collecting multiple data points to create distributions that would more accurately represent reality. Mean-Time-Between-Failures (MTBF), Mean-Time-to-Repair (MTTR), processing times between different operators or equipment are common inputs. Time studies and interviews are typically required to collect this information since the majority of manufacturers do not have it available. Other manufacturers may record downtimes with codes, but the codes are not typically organized or grouped into categories for easy analysis or are too broadly defined to identify a single cause. Either way, manual intervention has typically been required to organize processing times, MTBF and MTTR values into the Set-Up and Downtime categories used by ProModel® . This additional time costs money and usually results in estimated values.

Manufacturers would likely welcome an easier way to collect, organize and analyze this data. It is my belief, based on years of experience that manufacturers need a data collection tool that requires operational codes to be assigned to a piece of equipment 100 percent of the time. This would provide the raw data required to dissect operational costs down to an elemental level. Then, this raw data can be organized into easy-to-understand charts and graphs that would identify cost-reduction opportunities.

Once the data is collected at a single code level it can be categorized and sub-categorized to group operational costs into manageable lots that can be analyzed individually. Using a grouping approach also allows benchmarking to quantify process improvements within a group. This raw data could also be imported into Statistical Fitting programs to create distributions for use in simulation models or Six Sigma projects. A single downtime code would provide MTBF, MTTR and costing information for a specific downtime reason such as, for instance, a broken valve.

The next challenge is to determine what kind of categories and sub-categories will be most useful across all industries. Set-Up, Running and Downtime are the most common categories used by the majority of industries, but not all. For example, a continuous flow operation like glass melting may not use a Set-Up category because glass is flowing 365 for three years straight. They may want to call it "Tank Rebuild" instead of "Set-Up". This difference in terminology creates a challenge that can be resolved by creating a relational database that allows the user to define the number and names of each category, sub-category and code to fit their needs or area of focus. For example, a manufacturer who wants to track how often and how long a work center is idle due to not having any raw material may create a "Supply Chain" downtime category to track this cost. Another manufacturer may not want to track this.

Another challenge is to translate these codes, categories and sub-categories into costs for calculating ROI values. This is easily resolved by LeanOps ™ with a relational database by multiplying the total time of a code over a specified time frame by the corresponding department cost. For example, LeanOps employs a downtime code for when a conveyor's chain breaks and shuts down a work center for 30 minutes. Once downtime data is collected for six months the application can calculate how much that broken chain cost the manufacturer by multiplying the summed code time by the work center's operational cost. With a click of a button you could find out that it cost the plant $10,000 over 6 months and a new conveyor for $5,000 would provide a three-month ROI.

Additional operational reports were built into LeanOps™ once the base program was created. New input information or tables were required to build and maintain as the number and type of new reports were added. For example, OEE calculations require production standards and a scrap reporting module to be added to the program. Operator evaluations reports require routing steps and production standards to be maintained. This is where some of LeanOps™ reports overlap with traditional ERP reports.

The development of LeanOps™ was influenced by the ease to access and interpret the different reports. Many ERP programs provide tables of data that are hard to interpret. I created LeanOps to be user-friendly and provide the majority of reports in both a data and chart form.

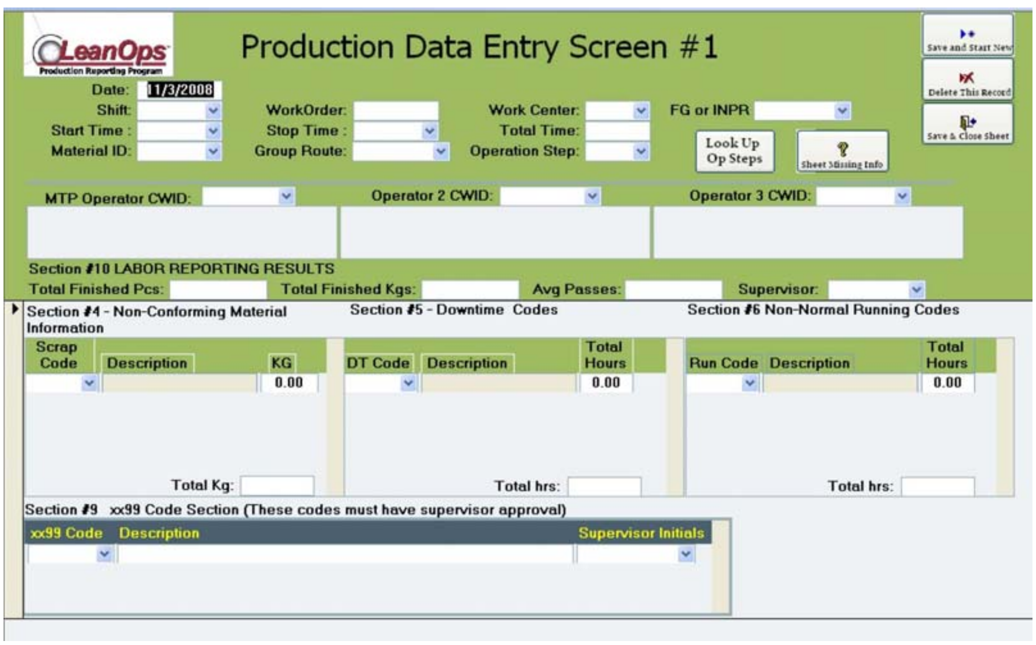
In summary, LeanOps was designed as an industrial engineering tool that organizes time and costs associated with processes to help identify and justify improvements. The preformatted reports have been developed to provide relevant information for operational managers, plant managers, supervisors and engineers to reduce operational costs, increase profits and manage risk.

How does it work?

LeanOps™ is a relational database that groups products, work centers, operational codes, scrap codes and operator information into different categories to identify and quantify cost reduction opportunities on the shop floor. LeanOps™ uses a proprietary expandable classification and coding approach to identify the operational status of what assets are doing 100% time and the causes for generating scrap. This "keep it simple" approach is easy to understand and implement.

Part number, work center number, operation step, good pieces or kilograms produced, scrapped pieces or kilograms of waste, employee number(s), operation / downtime codes, scrap codes and processing times for each part number are the maximum number of input values. Many of these are currently recorded in numerous ERP systems. LeanOps™ additional inputs are the tracking of operating and scrap codes. One unique feature of LeanOps™ is its' ability to categorize and sub-categorize these codes to break up large operational costs into smaller groups on which to focus analysis. Below is an example of a data entry screen with multiple pull down lists and error proofing programming.

Example of Data Entry Screen



The nomenclature of the expandable categories, sub-categories and codes are user defined to fit any industry. The next page demonstrates the most commonly used operational main categories and sub-categories assigned to a piece of equipment. This categorization approach allows the user to divide up the overall operational costs into groups to benchmark and focus on individually. Different personnel can be assigned to reduce costs in the different categories.

Operational Categories, Sub-Categories & Code Examples

- Running (0001 to 0099)
- Management (1000 to 1099)
  1. Lunch & Breaks
     - 1001: 30 minute Lunch
     - 1002: 15 minute Break
  2. Training
     - 1003: Safety Training
     - 1004: Equipment Training
- Set-Up (2000 to 2900)
  3. Normal Task
     - 2001: Change Main Rolls
  4. Additional Task
     - 2003: Change Back-Up Rolls
- Slowdown (3000 to 3999)
  5. Equipment Caused
     - Run only 1 furnace: Broken Chain
     - Run only 1 Furnace: Piece Stuck
  6. Manning Caused
     - Training Operator
     - Reduced Operator
- Unexpected Downtime
  7. Mechanical
  8. Electrical
- Planned Downtime
  9. Routing Maintenance
  10. Equipment Rebuild

In this paper, the term "Operational Codes" includes all main categories and codes. The term "Downtime Codes" includes all codes except those under the "Running" main category. Therefore, "Downtime Codes" are a subset of "Operational Codes".

The Use of Codes

The smallest unit of gathering time is the operation code. The name of each code is user defined to fit any industry's terminology. For example, a rolling operation will have set-up code 2001 for "Changing the Main Rolls" and a stamping operation may use 2001 for "Die Change". A list of codes is provided to the operators and maintained with revision levels to maintain data integrity.

LeanOps™ is designed so all codes in the same main category start with the same first two numbers. For example, all Set-Up codes will be between 2000 and 2999. All Management Codes will be between 1000 and 1099. This grouping of code numbers makes it easier for operators to find the correct code and for supervisors to review the accuracy of log sheets. All main categories also have an xx99 code (Ex. 1099, 3999, etc.) that represents downtimes that do not happen often, are not worth tracking and therefore are not on the list to choose from. These xx99 codes require an explanation and supervisor's approval before being entered into the computer. A new code can be generated to replace a non-coded repeated reason to reduce the unknown cause and track its specific cost.

Examples of Code List

Code	Description	Code	Description
Operation / Running Codes		**Slowdown Codes**	
0001	Normal Operation	4000	Reduced Operators
0002	Routing Step Missing and Should be there.	4001	Training (only when slows down production)
0003	Rework: Non Standard Work	4002	Equipment Issue
Management (1,000 to 1,499)		**Manning Shutdown (5,000 to 5,999)**	
1000	15 Minute Break	5000	Not Enough Operators to Run Equipt.
1001	Lunch	5001	Waiting for Inspector / Engineering
1002	Training	5002	Waiting for Maintenance
1003	Clean up (Daily Housekeeping)	5003	Waiting for Material
1004	Meetings	**Quality Dept Codes (6,500 to 6,999)**	
Set-Up (2,000 to 2,499)		6500	Inspection: Dimensional Testing
2000	Die Change	6501	Inspection: Eddy Current
2001	Coil Change	6502	Inspection: Rockwell Hardness
2002	Furnace Temp Change	6503	Inspection: Visual
2499	No Code, Must Explain	**Planned Maintenance (7,000 to 7,499)**	
Unexpected Downtime (3,000 to 3,999)		7000	Replace Brake Pads
3000	Hydraulic Cylinder Repair	7001	Rebuild Furnace
3001	Air Line or Valve Repair	7002	Calibrate Sensors
3002	Automation / Sensor Repair	7003	Clean Bag House

The Use of Categories

Defining the number and names of each category is one of the first steps of setting up the database. LeanOps™ allows the user to define as many operational and scrap categories as they wish, dependent upon their industry processes or need of analysis. Running, Set-Up and Downtime are the three main operational categories that manufacturers typically use.

Increasing the number of main categories breaks down overall operating costs into smaller groups. The creation or addition of any main category should be tied to a reason or area that can be segregated to identify cost reduction opportunities or minimize time fluctuations. A typical example of creating a new category is by breaking "Overall Downtime" into "Unexpected Downtime" and "Planned Maintenance" main categories. Then a person can benchmark and focus on decreasing Unexpected Downtimes. A manager may also want to focus on "Unexpected Downtime" to manage risk.

The Use of Sub-Categories

Sub-grouping allows the user to group codes within a main category and custom-design LeanOps™ to highlight potential costs reduction areas. For example, assigning "Normal Task" and "Additional Task" sub-categories under the main "Set-Up" category on a rolling mill is useful to separate repetitive tasks from sporadic tasks. On a rolling mill, "Normal Tasks" represent the minimal repetitive tasks required to complete a roll change. Since these tasks are repeatable on every set-up, a "Standard" time can be created to evaluate set-up efficiencies on different crews or operators.

"Additional Tasks" are tasks that pop up during a set-up when a machine is disassembled. These tasks may include replacing a hydraulic hose or other worn parts during a set-up. Separating "Normal Tasks" from "Additional Tasks" allows the user to separate fluctuating times from repetitive times to help determine how to reduce process fluctuations and increase process controls. Six Sigma projects usually focus on reducing processing time fluctuations to reduce costs and manage risks.

Costing

LeanOps™ provides the operational costs for each category, sub-category or individual code recorded over a user defined time frame. This is accomplished by adding up their recorded times and multiplying the sum by the department operational cost. The reports show the amount of time, percent of time and cost of each downtime grouping. For example, you can find out that set-up recorded 80 hours in the month of January 2008 on work center #100. An operational cost of $500/hour would show you that $40,000 was spent on Set-Up for that month. The 80 hours consisted of 50 hours or $25,000 of "Normal Set-Up Tasks" and 30 hours or $15,000 of "Additional Set-Up" tasks. A user can then whittle it down to see that 20 of the 50 Normal Set-Up task hours ($10,000 worth of time) were for code "2012: Main Roll Change".

Scrap Reporting

The category, sub-category and code approach is also used to identify and reduce scrap causes. For example, a main scrap category called "Out of Dimension" with "Machine Caused" and "Operator Caused" as two sub-categories is useful to identify whether an operator needs more training or that a piece of equipment needs to be calibrated to minimize scrap in the future. Traditional ERP reporting systems may track how many parts are out of dimension, but not why or how to eliminate it.

Scrap Categories, Sub-Categories and Code Example

- Dimensional
  - Operator Caused
    - SC101 Piece Too Long – Op Caused
    - SC102 Piece Too Short – Op Caused
  - Equipment Caused
    - SC103 Piece Too Long – Equipt Caused
    - SC104 Piece Too Short – Equipt Caused
- Material Integrity
  - Bad Grain Structure
  - Edges Tearing

Utilization Analysis

The approach of assigning time to operational codes allows the ability to calculate asset utilizations based on inputted plant Gross Time (24/7, 365), Available Time (Gross – Holidays) or Scheduled Time (shifts / week staffed). Visually reviewing these utilizations with preformatted bar charts highlights the downtime categories that are excessive. The user can then run a more in-depth report of a specific main category to reveal the sub-categories and specific codes that created the excessive downtime.

What specific data does LeanOps™ organize?

The minimal amount of information required to set-up LeanOps™ is listed below.

<u>Minimal Database Set-Up Tables</u>

1. Company Specific Information
    a. Name, address, phone, logo
2. Plant Operations Information
    a. Plant Location
    b. Available time / month
    c. Scheduled time / month by Work Center
3. Work Center Information
    a. Main Category
    b. Process Group
    c. Work Center Specific Information
4. Operation/Downtime Codes
    a. Main Categories
    b. Sub-Categories
    c. Codes

The type and amount of data organized by LeanOps™ is dependent upon which implementation level a user desires. Below is a breakdown of the different implementation levels and applications they best fit.

Different Implementation Levels

Available Reports for Different Levels

		Available Reports				
Level	Minimum Information Recorded on Log Sheet or Data Entry Screen	Util. & DT Analysis	Part Costing	OEE & Scrap	Standards & Op. Eff. Eval.	Overhead & TimeSheets
1	Log W/C No. & Downtime Codes. DO NOT Record P/N No Info.	X				
2	Log W/C,DT, Part No. & Op Step. Do not need to match DB	X	X			
3	Log W/C, DT, Part No., Op. Step & Scrap	X	X	X		
4	Log W/C, DT, P/N, Op Step, Scrap & Must Match DB to Enter	X	X	X	X	
5	Log Level 4 and All Operator's Time & Secondary Equipment	X	X	X	X	X

Application for Implementing Different Levels

	Need to Maintian Information in Database						
Level	DT Codes	Op. Codes	P/Ns	Scrap	Routings	Standards	Application
1	X						Incorrect routings or when multiple parts are run on a single shift
2	X	X	X				Incorrect routings and when you want to track time for costing
3	X	X	X	X			When you want to track Scrap and calculate OEE values.
4	X	X	X	X	X	X	Accurate routings for operator evaluations based on standards.
5	X	X	X	X	X	X	Non-equipment tracking of total hours charged to a department.

<u>Level 1: Log Work Center No. and Downtime Codes Only</u>

Only downtime code times and a work center's number are collected and analyzed for a Level 1 implementation. This would be desired by manufacturers who have incorrect routings or incorrect part numbers, or who are not concerned about part specific costing information. Only the operational/downtime codes and work center information need to be entered into LeanOps™ to generate utilization and downtime reports.

Level 2: Log Work Center No., Part No., Operational Codes & Operation Steps that **DO NOT NEED** to match the set-up tables in LeanOps™ database.
Part numbers and operation steps are recorded in a Level 2 implementation but they do not need to match any tables in the database. This eliminates the need to maintain routing or part number tables or connecting LeanOps™ to an existing ERP system. This level would not prevent typing errors from being entered into the computer. The additional part number and operation step inputs allows LeanOps to generate a historical part costing.

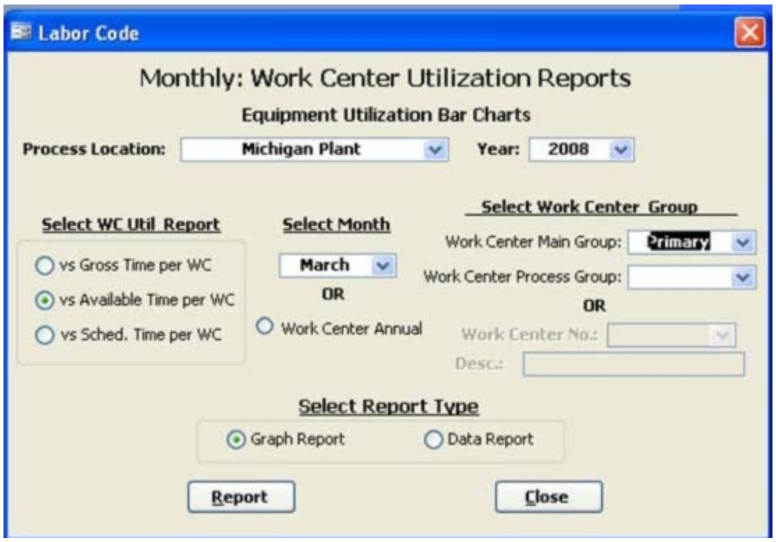
Level 3: Log W/C No., Part No, Downtime Codes, Operation Steps & Scrap Codes
Level 3 is the same as Level 2 with the addition of tracking scrap causes and costs with codes. Therefore, a scrap category, sub-category and specific code descriptions and tables must be maintained. This additional information allows LeanOps™ to generate Overall Equipment Effectiveness (OEE) and scrap reports.

Level 4: Log Work Center No., Part No., Operational Codes & Operation Steps that **DOES NEED** to match tables in LeanOps™ database tables.
Level 4 is the same as Level 3 except the part numbers, operation steps and work center combination must match a routing table in LeanOps™ to be entered into the computer. This requires maintaining accurate part numbers, routings and production standards to generate accurate operator efficiency evaluations.

Level 5:

What kind of reports or charts does LeanOps™ provide?

Multiple charts and reports are available with LeanOps due to the various groupings of equipment, products, operational codes, scrap codes and operators. LeanOps™ provides easy to navigate menus for generating reports. Below is an example of a report selection menu.



Overall Equipment Effectiveness (OEE) Reports

- Availability x Performance x Quality = OEE%
- Monthly: OEE Utilization Reports by Gross, Available or Scheduled Time

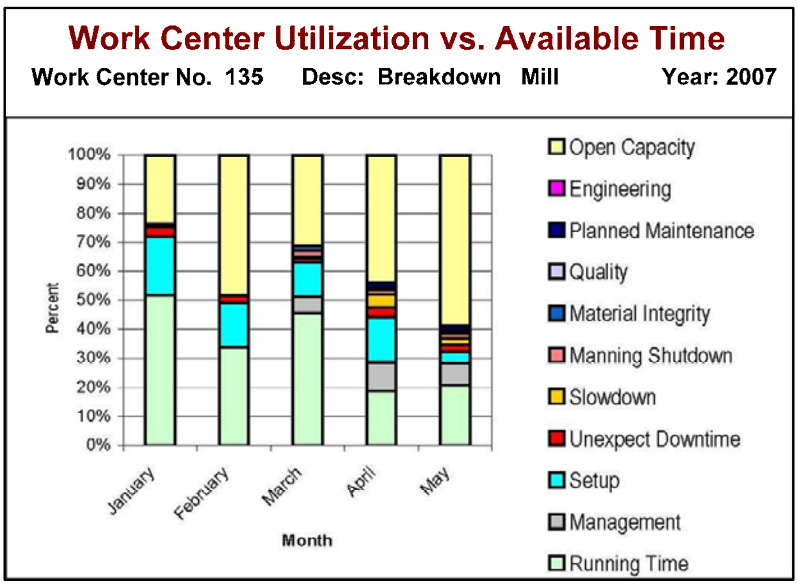
Work Center Monthly OEE Report

Work Center No. 135: Breakdown Mill Year: 2007

	Availability		Performance		Quality		OEE %
January	84.0%	x	70.4%	x	97.9%	=	57.9%
February	80.2%	x	54.6%	x	99.5%	=	43.6%
March	81.8%	x	91.8%	x	97.7%	=	73.3%
April	83.3%	x	76.0%	x	99.5%	=	62.9%
May	83.8%	x	61.2%	x	99.5%	=	51.1%
June	98.6%	x	93.6%	x	100.0%	=	92.3%
Averages	**85.3%**	**x**	**74.6%**	**x**	**99.0%**	**=**	**63.0%**

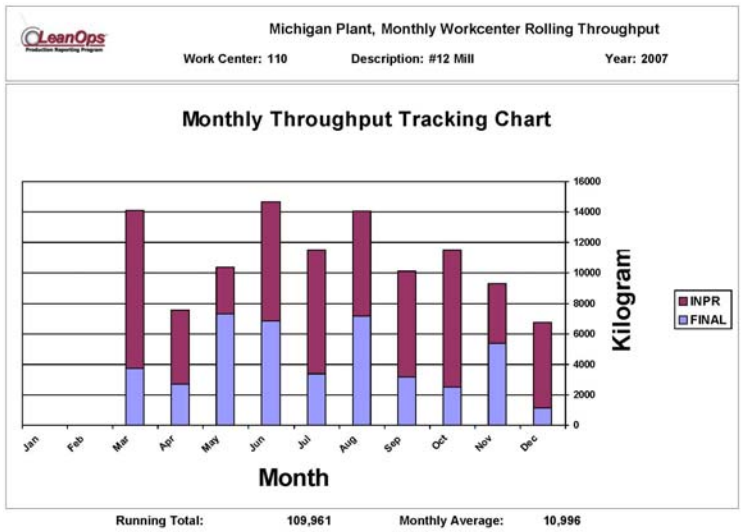
Utilization Reports

- Monthly W/C Utilization Reports by Gross, Available or Scheduled Time
- Daily: Work Center Summary Report
- Daily: Work Center Detail Report



Throughput Reports

- Monthly: Plant Throughput Report
- Monthly: Work Center Throughput Report
- Kgs/Staffed Hour vs. Kgs/Running Hour
- Pcs/Staffed Hour vs. Pcs/Running Hour
- Work Center: Part Number Pareto Analysis by Kgs or Run Hours
- Daily: Work Center Summary Report
- Daily: Work Center Detail Report



Work Center Downtime Reports

- W/C Downtime by Category and Sub-Category
- W/C Downtime by Sub-Category and Specific Code
- W/C Downtime Sub-Category Detail Report
- Single Code Downtime Report
- W/C Downtime Hourly Bar Charts by Month

PERREGO & Associates L.L.C. Your Process Improvement Specialists

WC Downtime by Sub-Category & Codes

Process Location: Michigan Pllant

Work Center 110 #12 Mill Main Down Time Category: Setup

Report Start Date: 5/1/2008 End Date: 5/30/2008 Report Range: 30 Days

Work Center Operating Costs: $150.00

		Total Hrs	Total %	Costs $
Sub Category: Additional RC Tasks				
2036	#5 Mill: Additional Time for Roll Dia Change	2.00	20.00%	$300.00
2014	Roll Change: Backup Rolls	8.00	80.00%	$1,200.00
	Sub Total:	10.00	100%	$1,500.00
Sub Category: Inprocess Mill Set-Up Tasks				
2013	Oil Mill Temp. Change	3.50	100.00%	$525.00
	Sub Total:	3.50	100%	$525.00
Sub Category: Normal Roll Change				
2015	Roll Change: Main Rolls	2.00	40.00%	$300.00
2009	Heating Rolls from Roll Change	1.00	20.00%	$150.00
2008	Roll Change: Furnace Temp Change	2.00	40.00%	$300.00
	Sub Total:	5.00	100%	$750.00
	TOTAL:	18.50		$2,775.00

Operator Evaluation Reports

- Monthly Efficiency and Accuracy Reports
- Daily & Detailed Efficiency Reports
- Crew Throughput & Hour Breakdown Report

Operator Efficiency Daily Report

Emp. No.: 765: Harris, Casey Report Range: 1/1/08 thru 1/14/08 14 days

	Production Results			Efficiency Results		
	Equip.	Running	Staffed	Earned	Used	Labor
Date	Util %	(kgs/hr)	(kgs/hr)	(hrs)	(hrs)	Efficiency
1/1/08	81%	79.5	64.6	6.2	6.5	95%
1/2/08	90%	58.2	52.4	7.1	7.2	99%
1/3/08	88%	99.2	86.8	6.3	7.0	90%
1/4/08	89%	87.3	77.8	11.4	10.7	107%
1/8/08	88%	76.2	66.7	5.0	7.0	71%
1/9/08	94%	62.2	58.3	5.7	7.5	76%
1/10/08	94%	86.1	80.8	7.6	7.3	104%
1/12/08	91%	37.0	33.8	7.4	7.2	103%
1/13/08	90%	30.8	27.7	7.4	6.7	110%
	89%	69.2	61.9	64.1	67.1	96%

Part Number Performance Reports

- Work Center and Operation Step Historical Reports
- Work Center & Operational Step Efficiency Reports by Date or Crew
- Part Number Costing Report

Part No., Work Center, Operation Step Performance Report

	Shift		Piece Information				Throughput Information				
			Finished Good		Scrap	Yield	Run	Actual		Target	Efficiency
Date	No.	Crew	(pcs)	(kgs)	(kgs)	(%)	(hrs)	(kgs/hr)	(hrs/pc)	(hrs/pc)	(%)
2/11/08	1	3	2	216.0	50.0	81%	2.0	108.0	1.000	0.700	70%
2/18/08	2	2	3	327.1	0.0	100%	3.0	109.0	1.000	0.700	70%
2/19/08	3	1	7	700.0	0.0	100%	7.0	100.0	1.000	0.700	70%
2/24/08	1	1	2	200.0	108.0	65%	1.0	200.0	0.500	0.700	140%
3/1/08	1	2	1	108.0	0.0	100%	0.5	216.0	0.500	0.700	140%
3/10/08	2	3	1	108.0	0.0	100%	1.0	108.0	1.000	0.700	70%
3/26/08	2	12	2	218.0	60.0	78%	1.0	218.0	0.500	0.700	140%
3/26/08	3	1	10	1090.0	6.0	99%	5.0	218.0	0.500	0.700	140%
			28.0	2967.1	224.0	93%	20.5	144.7	0.732	0.700	96%

Scrap Reports

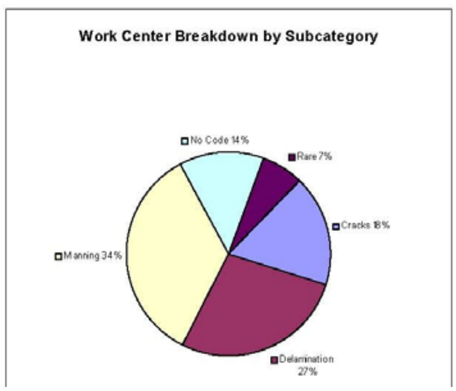
- Plant Scrap Summary
- Work Center: Scrap by Category and Sub-Category
- Work Center: Scrap by Sub-Category and Specific Code
- Scrap Sub-Category Detail Report
- Part Number Yield (%) Information

Work Center Scrap Subcategory Summary

Process Location: Michigan Plant   Work Center 110 #12 Mill

Report Start Date: 1/1/2008   End Date: 10/1/2008   Report Range: 275 Days

Scrap Subcategory	Total Kgs	Total %
Cracks	26.00	18%
Delamination	40.00	27%
Manning	52.00	35%
No Code	20.00	14%
Rare	10.00	7%
Work Center Total:	148.00	100%



What are the main features of LeanOps™ ?

One of its major design goals is to provide a customizable and easy to use tool to identify, quantify manufacturing cost reduction opportunities. The following features achieve this goal:

- Multiple simultaneous users from any Windows based networked PC
- Relational database design to support an unlimited number of operational and scrap categories, subcategories and codes for ease of analysis
- User security levels to protect confidential information
- Error proof data entry screens to protect data integrity
- Ability to implement at 5 different levels to fit users needs and require minimum resources to maintain
- Works across multiple industries
- Easy to generate and interpret preformatted reports
- Designed by an industrial engineer to provide relevant reports
- Low implementation costs provides short ROI

For more information, contact Perrego & Associates LLC at www.perregoassoc.com or call 216-521-7828.