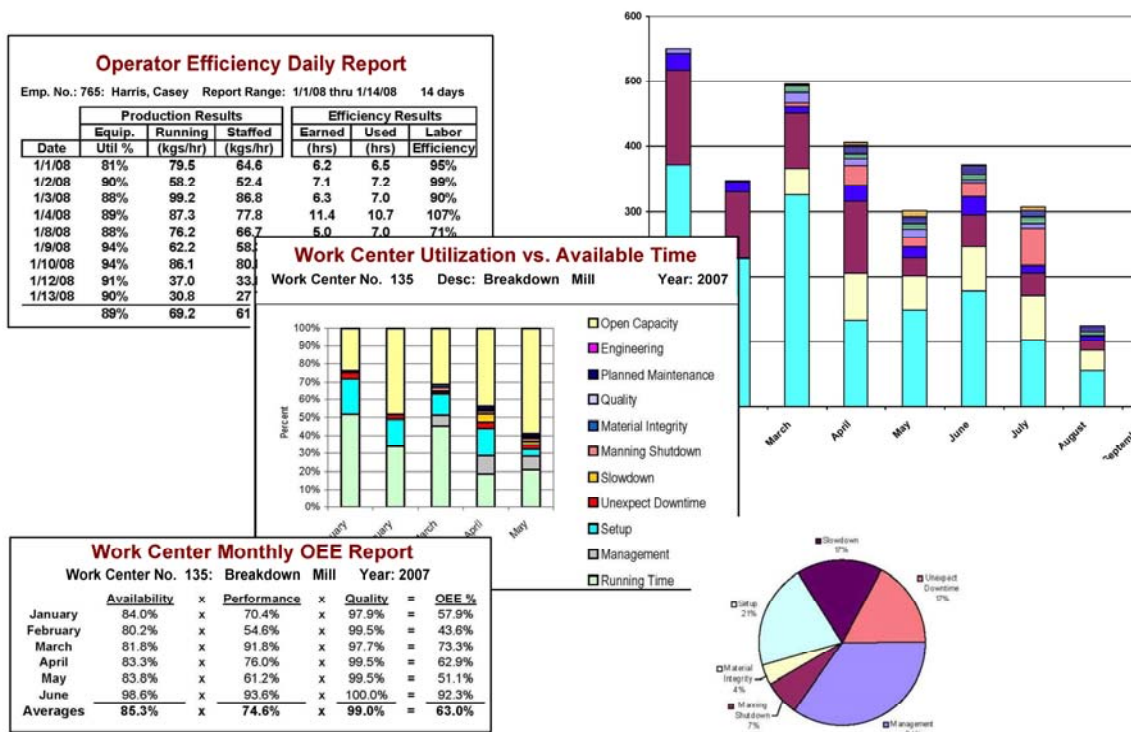


## LeanOps™ – Product Release - White Paper



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### Abstract

This paper outlines some of the special features and benefits of LeanOps, a new performance reporting program designed to provide manufacturing operation managers with productivity information for reducing operating costs, increasing profits, and managing risk. LeanOps transforms raw production data into Overall Equipment Effectiveness (OEE) calculations, equipment utilization reports, throughput reports, work center downtime analysis, part number performance reports, scrap analysis, operator evaluation and other useful reports. These reports are displayed in preformatted and easy-to-read formats for all levels of management.

LeanOps was designed to provide operational information for benchmarking continuous improvement and as tool for justifying specific Kaizen projects. Programmed in Microsoft Access, allows small and medium sized manufacturers the ability to have the decision making productivity information that only multi-billion dollar companies can afford.

## 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 on the various aspects of equipment utilization, downtime, operator efficiency, throughput tracking and scrap reduction. It helps managers, supervisors and engineers maximize their Return-On-Investments by having the data they need easily available to quantify and prioritize operational costs-reduction opportunities.

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 was designed for two reasons. Initially, it was designed as a tool for management and supervisors that do not have the resources to design custom software to benchmark and track the effectiveness of their operations to drive continuous improvements. Secondly, it was created as a process improvement tool for industrial or manufacturing engineers to collect data on a specific processing improvement Kaizen project.

LeanOps provides the ability for the user to group and sub-group various operational variables such as equipment, scrap, downtimes and labor shifts for analyzing the same data multiple ways. This unique feature helps the user identify improvements or trends that otherwise was not possible.

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 how developed a manufacturer's MES system is. 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.

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

Level	Minimum Information Recorded on Log Sheet or Data Entry Screen	Available Reports				
		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

Level	Need to Maintain Information in Database						Application
	DT Codes	Op. Codes	P/Ns	Scrap	Routings	Standards	
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.

### Why use LeanOps?

LeanOps was designed to display productivity data in easy to understand charts and reports to track and make process improvement decisions. A multi-billion dollar corporate manager recently said they were “Data Rich” and “Information Poor”. Even large companies are collecting mass amounts of data that is not being interpreted into decision making information. LeanOps fills this gap between raw data and information by providing standardized reports designed for operations managers. No more downloading data sets into Excel for sorting and filtering or using other individualized software programs. LeanOps is a comprehensive networkable program everyone can utilize.

Programming LeanOps in Microsoft Access instead of a web based .NET, C++ provides another reason for small and medium sized manufacturers to utilize LeanOps. The use of Access minimizes the operational cost of maintaining and modifying the program. First, there is no need for staffing a large IT department to support a SQL server and web based programming. Secondly, if desired the programing costs for modifying Access is almost half then .NET or C++. Thirdly, Access was designed for non-programmers to be able to create reports on their own.

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, 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.

LeanOps 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 and use.
- Short Return-On-Investment (ROI) from the information and value it provides.
- Ability to implement at five different levels based on MES capability and availability of funds.
- Easy to access and understand reports on a company intranet.
- 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.
- 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

## How does it work?

LeanOps is a relational database that groups products, work centers, operational codes, scrap codes and operator information into different categories and sub-categories to track, 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.

One unique feature of LeanOps is its’ ability to categorize and sub-categorize these codes to break up data into smaller groups on which to focus on. For example, an operations manager may want to know what percent of a work center’s Downtime was “Planned” vs. “Unexpected”. This is easily done by creating two main categories called “Planned Downtime” and “Unexpected Downtime”. They may also want to know what caused the unexpected downtimes. Did the equipment break or did the operator operate it incorrectly causing a crash. Assigning these causes as sub-categories allows the opportunity to identify preventative maintenance or training opportunities.

Have you ever asked an operator how much time it takes to set-up a machine? If so, the most likely answer is “It varies” and depends on this or that. How would you like to take out the word “varies” ? This can be accomplished with the use of sub-categories. For example, A “Set-Up” can be broken down into the sub-categories “Routine Tasks”, which occur every set-up and “Additional Tasks” that occur sporadically and causes variation in the overall set-up time. Assigning all of the variable “Noise” tasks into its’ own “Additional Task” sub-category allows the ability to create set-up standard times for the “Routine Tasks”.

This separation allows the manager to focus on the two different categories separately. The “Routine Tasks” repeatable time can be reduced by utilizing SMED or reducing the 7 wastes, This “repeatable” time can also be used to identify training opportunities by calculating and tracking employee set-up efficiency. Six-Sigma can be utilized to minimize the variation tasks in the “Additional Task” sub-category.

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 under the different categories.

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## **Operational Categories, Sub-Categories & Code Examples**

1. Running (0001 to 0999)
2. Set-Up (1000 to 1999)
  - a) **Normal Task**
    - 2001: Change Main Rolls
  - b) **Additional Task**
    - 2003: Change Back-Up Rolls
3. Unexpected Downtime (2000 to 2999)
  - a) **Equipment Breaking**
  - b) **Operator Caused**
4. Planned Downtime (3000 to 3999)
  - a) **Routing Maintenance**
  - b) **Equipment Rebuild**
5. Management (4000 to 4999)
  - a) **Lunch & Breaks**
    - 1001: 30 minute Lunch
    - 1002: 15 minute Break
  - b) **Training**
    - 1003: Safety Training
    - 1004: Equipment Training
6. Slowdown (5000 to 5999)
  - a) **Equipment Caused**
    - Run only 1 furnace: Broken Chain
    - Run only 1 Furnace: Piece Stuck
  - b) **Manning Caused**
    - Training Operator
    - Reduced Operator
7. Engineering
  - a) New Product Development
  - b) New Equipment Design
  - c) Process Analysis

### **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. The next page displays an example of scrap categories, sub-categories and code examples.



## **Scrap Categories, Sub-Categories and Code Example**

1. Out of Dimension
  - a) **Operator Caused**
    - SC101 Piece Too Long – Op Caused
    - SC102 Piece Too Short – Op Caused
  - b) **Equipment Caused**
    - SC103 Piece Too Long – Equipt Caused
    - SC104 Piece Too Short – Equipt Caused
2. Material Integrity
  - Bad Grain Structure
  - Edges Tearing

LeanOps is security enabled with log in passwords required for each user. Each user is assigned security levels to limit what they can access. For example an operator is allowed to enter data and review some reports. They cannot change routings or other information which the engineers are allowed to.

LeanOps is designed as two separate Access databases. One is all of the programming of forms, queries and reports and the second stores all of the data. This allows easy program updating. Programming changes can be performed offline and then used to replace the current program when ready. The data file can also be stored as a Sequel Server Express (SQL) database if desired.

### **What type of data can LeanOps organize?**

Below is list of data which is production data is tag with for analysis.

1. Company Specific Information
  - a. Name, address, phone, logo
    - You can program multiple plants on the same database.
2. Plant Operations Information
  - a. Plant Location
  - b. Available time / month for OEE Calculations
3. Work Center Information
  - a. Main Category
  - b. Process Group
  - c. Scheduled time / month for OEE calculations
  - d. Operating Cost \$/hr

4. Operation/Downtime Codes
  - a. Main Categories
  - b. Sub-Categories
  - c. Codes
5. Scrap Causes
  - a. Main Categories
  - b. Sub-Categories
  - c. Codes
6. Part Specific Information
  - a. Routings
  - b. Standard production rates at each routing step.
7. Work/Shop Order Information
  - a. Shop order number
8. Personnel Information
  - a. Employee ID
  - b. Equipment Department
  - c. Shift

### **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

### **In Summary**

LeanOps is a tool for all levels of management and engineering to reduce operating costs by collecting raw production data and transforming it into valuable information with minimum effort.

For examples of the preformatted reports or additional information, contact Productivity Solutions LLC at [www.productivity-solutions.net](http://www.productivity-solutions.net) or call 216-650-0938.