Lean Manufacturing: Performance Evaluation Audit

by R. Michael Donovan

Lean Manufacturing, while known by many names, allows manufacturers to be fast and nimble enough to quickly react to changes in customer demand and do it with little inventory. Gone are the days when companies could stockpile large quantities of raw materials, load-up production with work-in-process, and pack warehouses with finished goods. The old ways are very wasteful and customers were not well-served. Times have really changed. Today, Lean Supply Chain performance must become the goal of every manufacturer. Creating the Lean Supply Chain by streamlining business and production processes to significantly reduce cycle time, decrease inventories, lower costs and increase customer service has become the mandate for survival.

"Lean Manufacturing: Performance Evaluation Audit" is a checklist that will help you to assess your current status and then your on-going progress in adopting and adapting to Lean Manufacturing criteria. The checklist can also serve as a 'how do you measure-up' starting point to stimulate thought and discussion among various numbers of your management team. As a result of this assessment and management discussion, your management team should be in a better position to develop and implement an aggressive action plan for a Lean Supply Chain.

Have You Done Enough?

The following checklist will help you to initially assess your Lean Manufacturing efforts. To assess and score your organization's progress with Lean Manufacturing, have your entire management team candidly answer the following 10 questions. A "yes" answer receives 10 points and a "no" answer receives "0" points. The performance criteria contained within the questions are, individually and collectively, very important to performance, making a score of nothing less than 100% really acceptable. More important than the quantitative score is the focus each question and the various responses can bring to management team discussions which should result in initiating the action required to achieve significant cycle time, inventory, quality and delivery performance improvements.

		YES	NO	POINTS
1.	Have our key personnel been thoroughly trained in all aspects of Lean Manufacturing and Lean thinking?	❑	❑	_____
2.	Have we mapped all Supply Chain processes clearly identifying value added and non-value added activities, bottlenecks, queues, cycle times, etc.?	❑	❑	_____

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	YES	NO	POINTS
3. Has the business impact of a Lean Supply Chain and quick response been assessed?	❑	❑	_____
4. Have we organized and trained multi-functional teams, with an accountable leader, to streamline processes and shorten cycle times for all manufacturing, non-manufacturing and administrative processes?	❑	❑	_____
5. Have we specifically defined the barriers to a Lean Supply Chain and have an action plan to remove the barriers?	❑	❑	_____
6. Are we actively working with key vendors to achieve mutually agreed upon improvement objectives?	❑	❑	_____
7. Have we produced substantial improvements in order-to-delivery flow and cycle time by improving information quality and flow, reducing queues in manufacturing and non-manufacturing areas?	❑	❑	_____
8. Are our primary performance measurements and reward system heavily weighted towards fast, on-time customer response with minimum inventories?	❑	❑	_____
9. Can we precisely predict our leadtime for customer orders or to replenish inventories?	❑	❑	_____
10. We have absolute top management commitment and active involvement to create a Lean Supply Chain?	❑	❑	_____
	Total		_____

How is your score? If your performance is less than it should be you need a corrective action plan to achieve the level of performance that is possible and necessary. Total customer satisfaction is a prerequisite to competitive leadership which, at a minimum, requires short cycle time, high quality performance in every internal and external aspect of your business.

PERFORMANCE IMPROVEMENT POTENTIAL

Review the following items of potential performance improvements prior to working with the detailed checklist. This initial review will help establish a mindset that dramatic change in overall business performance is the objective. Once you and others have responded to the checklist, come back to this section for a second time, consider the business impact, and set your performance improvement goals.

PERFORMANCE IMPROVEMENTS	**YOUR COMPANY'S 12 MONTH GOAL**	**24 MONTH GOAL**
• Cost to produce down 20 - 50%	_____	_____
• Manufacturing lead time decreased by 50 - 90%	_____	_____
• Overall cycle time decreased by 60%+	_____	_____
• Inventory down 50%+	_____	_____
• Cost of quality reduced by 60%+	_____	_____
• Factory floor space reduced by 30 - 70%	_____	_____
• Purchasing costs down 5 - 10% every year	_____	_____
• On-time performance **to promise** 99%+	_____	_____
• On-time performance **to request** 95%+	_____	_____

MANAGEMENT	**YES**	**NO**	**NOT SURE**
• Top management is developing a learning organization.	❒	❒	❒
• A clear, compelling vision exists for a Lean Manufacturing and a Lean Supply Chain.	❒	❒	❒
• All managers understand the need to treat the Supply Chain as a seamless, defect-free process with the shortest possible cycle time and minimal inventory.	❒	❒	❒
• The attitude of "we're different" or "it can't be done in our type of environment" has been eliminated.	❒	❒	❒
• The organization is focused on Lean thinking to significantly improve the order-to-delivery process and the entire Supply Chain.	❒	❒	❒
• A senior executive is aggressively championing the Lean Manufacturing effort.	❒	❒	❒
• Management has carefully developed performance objectives to guide business process improvement through Lean thinking.	❒	❒	❒
• Management's reward system is based on performance toward Lean performance standards rather than just improvement over last years' results.	❒	❒	❒

MANAGEMENT (cont'd)	YES	NO	NOT SURE
• Cross-functional teams assisted by an expert facilitator to develop, plan and implement Lean operating improvements are active and achieving measurable results.	❒	❒	❒
• Lean Manufacturing is being adopted as a business strategy.	❒	❒	❒
• Top management's commitment to and support of Lean Manufacturing is evidenced by initiation of the actions required, active participation and the requirement for measurable results.	❒	❒	❒
ASSESSMENT			
• Management has conducted a thorough opportunity assessment to develop awareness, goals, plans, understanding and acceptance.	❒	❒	❒
• The assessment has defined the short-term fixes of process disconnects that will be the basis for self-funding the entire improvement effort.	❒	❒	❒
• Major business processes (as is) are well defined and have non-value added activities and improvement opportunities identified.	❒	❒	❒
• The assessment has provided a thorough definition for top management of the impact Lean Manufacturing will have on cost, quality, cycle time, customer satisfaction and competitive advantage.	❒	❒	❒
• A time-phased action plan has been developed, resources assigned, measurements established and reengineering activities initiated.	❒	❒	❒
INVENTORY			
• The entire organization understands that excess inventory masks operational and quality problems, hampering identification of problem causes and corrections.	❒	❒	❒
• The entire organization understands that excess inventory results from:			
▪ Excessive queues	❒	❒	❒
▪ Inappropriate performance measures	❒	❒	❒
▪ Poor quality	❒	❒	❒
▪ Long change-over times	❒	❒	❒

INVENTORY (cont'd)	YES	NO	NOT SURE
▪ Unbalanced schedules	❒	❒	❒
▪ Poor material flow	❒	❒	❒
▪ Overplanning	❒	❒	❒
▪ Unreliable processes	❒	❒	❒
▪ Product proliferation	❒	❒	❒
▪ Poor sales and operations planning	❒	❒	❒
▪ Inadequate product and process documentation	❒	❒	❒
▪ Poor vendor performance	❒	❒	❒
▪ Inaccurate bill of material and inventory records	❒	❒	❒
▪ Information queues	❒	❒	❒
▪ Poor information quality	❒	❒	❒

CUSTOMER FOCUS

• "Customer" is defined as the next person in the process.	❒	❒	❒
• Throughout the organization a clear understanding exists of who the customer is.	❒	❒	❒
• We constantly work with customers to understand their requirements.	❒	❒	❒
• Customers (internal and external) have been invited to participate in Lean Manufacturing efforts.	❒	❒	❒
• Feedback is continually sought from customers as a basis for improvement.	❒	❒	❒
• Enterprise-wide customer satisfaction monitoring and feedback systems provide input into product and service requirements.	❒	❒	❒
• The entire Supply Chain from product design, suppliers and manufacturing through field service is a process designed for focusing on customer satisfaction.	❒	❒	❒
• Every activity throughout the organization is focused on customer satisfaction.	❒	❒	❒
• Everyone in the business understands that delighting the customer is their overriding responsibility.	❒	❒	❒

MANUFACTURING PLANNING	YES	NO	NOT SURE
• The organization has well-established sales forecasting processes to support sales and operations planning.	❒	❒	❒
• The sales and operations plan ties to the business plan and manufacturing's inventory deployment plan.	❒	❒	❒
• Bills of material have been flattened to reduce movement, material handling and inventory transactions.	❒	❒	❒
• Managers understand that some of the "standard," commonly accepted techniques used in ERP software systems are obsolete.	❒	❒	❒
• The ERP and Supply Chain management system has been evaluated to ensure its functions are consistent with a time-compressed manufacturing environment.	❒	❒	❒
• Safety stocks for variation in demand are dynamically adjusted.	❒	❒	❒
• The system backflushes labor and material when work is completed in a work cell.	❒	❒	❒
• Managers recognize "standard" ERP software does not provide for synchronized scheduling and balanced flow considering bottlenecks.	❒	❒	❒
• System provides for high-speed, realistic production simulation scheduling techniques for precise schedule preparation and execution.	❒	❒	❒
PRODUCTION SCHEDULING			
• Our philosophy and practice have changed from "push" to "pull" scheduling of product through the manufacturing process.	❒	❒	❒
• Bills of material have been restructured to facilitate balanced flow scheduling in the manufacturing cells.	❒	❒	❒
• Production scheduling balances product mix and volume to optimize performance of all manufacturing cells.	❒	❒	❒
• Operation dependencies have been recognized and are physically linked to ensure balanced flow of material through manufacturing.	❒	❒	❒

PRODUCTION SCHEDULING (cont'd)	YES	NO	NOT SURE
• Production rates for final assembly dictate production rates in upstream manufacturing cells via "demand pull scheduling".	❒	❒	❒
• Material queues between operations have been significantly reduced as a result of smaller lot sizes and balanced, structured flow.	❒	❒	❒
• The scheduling system performs flow synchronization of dependent parts and dependent operations for maximum output.	❒	❒	❒
• The production schedule is level and balanced to the rate of demand and production capacity capabilities.	❒	❒	❒
CHANGEOVER TIME REDUCTION			
• A changeover time reduction program has been established that examines each changeover element for time reduction or elimination.	❒	❒	❒
• Management understands that changeover time reduction of 90%+ is possible and necessary for maximum production flexibility.	❒	❒	❒
• The productive capacity increase and inventory decrease from a 75+% reduction in current changeover times has been calculated.	❒	❒	❒
• Operators have been trained to perform quick changeovers.	❒	❒	❒
• Tooling and equipment have been designed, modified or standardized to reduce changeover and set-up time.	❒	❒	❒
• Changeovers have a specific documented methodology that includes task sequence, resource requirements, tools and utilities.	❒	❒	❒
• Bottleneck work-center changeover time elements are identified first for changeover time reduction.	❒	❒	❒
INFORMATION TECHNOLOGY			
• Business process redesign is not confused with the evolutionary updating of systems.	❒	❒	❒
• Automation is not being used to "pave over existing cow paths".	❒	❒	❒
• Processes are reviewed for redesign before they are automated.	❒	❒	❒

INFORMATION TECHNOLOGY (cont'd)	YES	NO	NOT SURE
• Information technology is viewed as an enabler to process redesign rather than the objective.	❒	❒	❒
SUPPLIERS			
• Suppliers clearly understand how their product or service will be used.	❒	❒	❒
• The organization has significantly reduced multiple sources of supply and made suppliers working partners.	❒	❒	❒
• Key suppliers actively and routinely assist with product design and improvement.	❒	❒	❒
• Suppliers are advised of specific quality requirements with their performance measured and reported back to them.	❒	❒	❒
• The organization routinely works with suppliers to obtain defect-free material and subsequently eliminate incoming inspection.	❒	❒	❒
• Vendors deliver product packaged to minimize additional handling to the point of use.	❒	❒	❒
• Suppliers are evaluated based on a rigorous certification process.	❒	❒	❒
• Long-term contracts are negotiated with most suppliers.	❒	❒	❒
• The organization has a program in place to work with suppliers to reduce cost by at least 5% per year.	❒	❒	❒
5 "S'" HOUSEKEEPING			
• Housekeeping is highly disciplined for on-going work area organization that follows the 5S approach.			
1. Sort out and throw-out	❒	❒	❒
2. Systematic organization with everything arranged in a predetermined place.	❒	❒	❒
3. Scrub everything clean	❒	❒	❒

5"S" HOUSEKEEPING (cont'd)	YES	NO	NOT SURE
4. Standardized approach to checking and maintaining work place organization and cleanliness.	❒	❒	❒
5. Sustained self-discipline to maintain the first four as a way of life.	❒	❒	❒
• Everyone understands that 5S is a cornerstone to eliminating waste, controlling processes, establishing safe working conditions, improving quality, maximizing value-added work, and achieving overall control.	❒	❒	❒
PROCESS CONTROL			
• Business processes that serve internal and external customers are designed to "do the right thing right the first time".	❒	❒	❒
• All production and administrative processes produce the desired quality level on a consistent basis.	❒	❒	❒
• Everyone focuses on controlling the process as the only way to ensure consistent product quality at the source.	❒	❒	❒
• All managers recognize that scrap and rework problems are the result of process-control problems.	❒	❒	❒
• No more than one reject is allowed before the process is shut–down.	❒	❒	❒
• The organization has empowered personnel to stop production the instant it is known that quality is not acceptable.	❒	❒	❒
• The organization has multi-functional problem-resolution teams immediately available to resolve a production problem while it's occurring.	❒	❒	❒
• Production workers are fully utilized as part of the problem-resolution teams.	❒	❒	❒
• Zero defects is the goal of every process that causes information and material to flow.	❒	❒	❒
• Each process is well-defined, documented and flawlessly repeatable to TAKT time.	❒	❒	❒

MATERIAL CONTROL	YES	NO	NOT SURE
• All materials are clearly identified.	❒	❒	❒
• Material handling, from receiving to shipment, is continually being reviewed to eliminate non-value added activities.	❒	❒	❒
• Material issues are not made with known shortages.	❒	❒	❒
• Use of kits has been reduced or eliminated and replaced by point-of-use storage and standard containers.	❒	❒	❒
QUALITY PLANNING AND STRATEGY			
• Quality planning is carefully integrated into overall business strategy.	❒	❒	❒
• "Customer" is defined as the next person in the process.	❒	❒	❒
• The company has precisely defined product and service requirements necessary to delight the customer.	❒	❒	❒
• Business processes that serve internal and external customers are designed to "do the right thing right the first time"	❒	❒	❒
• The organization has compared customer requirements to what is actually provided.	❒	❒	❒
• Quality-planning teams participate in all phases of preparing for improvement and implementation.	❒	❒	❒
• Business strategy defines specific and measurable quality goals that are directly related to a business process.	❒	❒	❒
• Organization is not structured for top-down-only information flow but is flexible and responsive to immediately improve customer satisfaction.	❒	❒	❒
• A good deal of time has been spent "unlearning" established ineffective methods.	❒	❒	❒
• The entire Supply Chain from product design, suppliers, and manufacturing through field service is a process designed for focusing on customer satisfaction.	❒	❒	❒

TOTAL QUALITY	YES	NO	NOT SURE
• The company works with customers to understand their requirements.	❒	❒	❒
• Management has conducted a quality assessment to develop awareness, goals, plans, understanding, and acceptance and to initiate implementation.	❒	❒	❒
• The true cost of quality is understood and documented.	❒	❒	❒
• Quality improvement meetings involving all employees are conducted on a regular basis.	❒	❒	❒
• Quality documentation is up-to-date and is available to all employees at the point of use.	❒	❒	❒
• Processes are designed to eliminate the creation of defects and non-value added work.	❒	❒	❒
• Separate inspection steps have been eliminated from the process and quality responsibility lies at the source of production.	❒	❒	❒
• Quality Assurance understands each vendor's manufacturing process capabilities.	❒	❒	❒
• The organization consistently practices "management by fact" to uncover opportunities for improvement.	❒	❒	❒
• Root-cause problem analysis helps ensure continuous improvement.	❒	❒	❒
• Statistical Process Control techniques are used to monitor and identify the source of a problem for corrective action.	❒	❒	❒
• Employees have been trained to inspect and are empowered to stop the process if a quality problem exists.	❒	❒	❒
• Quality-control systems provide feedback on specific corrective actions.	❒	❒	❒
• Problem prevention and resolution are the highest priorities.	❒	❒	❒
• The organization adheres to a policy of not allowing known defective material to move to the next operation.	❒	❒	❒

TOTAL QUALITY (cont'd)	YES	NO	NOT SURE
• Material flow from suppliers through production and shipment is under continuous scrutiny for improvement.	❒	❒	❒
CYCLE TIME			
• Cycle times have been thoroughly analyzed in all function including order entry, engineering, planning and production.	❒	❒	❒
• Management has calculated the potential reduction in work-in-process and finished-goods inventories from shorter cycle times.	❒	❒	❒
• Plant layout and material handling supports high-speed, balanced production flow.	❒	❒	❒
• The organization has attained production changeover time reduction of at least 75+% for all operations.	❒	❒	❒
• Managers are focused on the velocity of the information and material flow as the basis to uncover non-value adding, wasteful activities.	❒	❒	❒
• The organization has educated and organized multi-functional cycle-time reduction teams for information flow areas such as order entry, sales, engineering and production control.	❒	❒	❒
• The company measures current cycle times by area and has aggressive improvement goals to reduce non-value adding time.	❒	❒	❒
• A program exists for the identification and elimination of all non-value adding (queue) time from all processes, including order entry, engineering, planning, and production, to create a quick-response capability.	❒	❒	❒
STRUCTURED-FLOW			
• Work cells have been developed and implemented to support specific product families.	❒	❒	❒
• Clear, concise manufacturing and assembly documentation is present in all manufacturing cells.	❒	❒	❒
• Manufacturing cells are designed for quick changeover.	❒	❒	❒

STRUCTURED-FLOW (cont'd)	YES	NO	NOT SURE
• Test equipment and procedures are integrated into the manufacturing cell.	❒	❒	❒
• Plant layout and manufacturing cell structures support point-of-use storage of materials based on projected usage quantities.	❒	❒	❒
• Visual control of inputs, outputs and the process are employed as the basis for control wherever possible.	❒	❒	❒
• Kanban quantities are determined by appropriate formula.	❒	❒	❒
• Equipment and material flow are so closely linked and monitored that disruptions such as equipment breakdowns, quality problems, or material shortages are quickly identified and resolved.	❒	❒	❒
• Production processes are designed to achieve balance for one piece flow make one, move one with minimum work-in-process inventory.	❒	❒	❒
PRODUCIBILITY			
• The organization has a program in place to identify products that are too complicated and difficult to manufacture because of "overdesign".	❒	❒	❒
• Manufacturing and Design Engineering regularly review product designs for producibility, cost reduction and quality improvement.	❒	❒	❒
• Design engineers review and improve designs of existing products that have manufacturability problems.	❒	❒	❒
EMPLOYEE INVOLVEMENT & TEAMWORK			
• All managers in the organization support the concept of the "thinking worker".	❒	❒	❒
• All managers understand that opportunities will be lost if the <u>entire</u> work force is not actively involved in improving the business.	❒	❒	❒
• Active involvement by workers in product and process problem solving is part of the operating practice.	❒	❒	❒
• Philosophy and practice is that the best appreciable investment is educating and training employees to improve the business.	❒	❒	❒

EMPLOYEE INVOLVEMENT & TEAMWORK (cont'd)	YES	NO	NOT SURE
• Education and training programs are established and ongoing to make continuous improvement the prevailing attitude and actual operating practice.	❒	❒	❒
• The organization has an active cross-training program for maximum s staffing flexibility.	❒	❒	❒
• Bargaining Unit contractual matters have been jointly examined by Union and management personnel to focus on customer satisfaction needs and long-term business success.	❒	❒	❒
• Production meetings take place with employees on the shop floor to determine production needs and delivery dates.	❒	❒	❒
• Employees are empowered so that the first person who knows about a problem is the one who can and does take action.	❒	❒	❒
• Employees understand how to meet the needs of the customer and are really empowered to <u>make</u> <u>it</u> <u>happen</u>.	❒	❒	❒
TOTAL PRODUCTIVE MAINTENANCE			
• Total Productive Maintenance (TPM) is employed to ensure production processes are always able to perform as intended and without interruption.	❒	❒	❒
• Management recognizes the need for Total Productive Maintenance for product quality, schedule reliability, safety and minimum cost.	❒	❒	❒
• The organization has "institutionalized" the concept of Total Productive Maintenance involving every department and employee.	❒	❒	❒
• Scheduled maintenance activities have been established for all equipment in the facility.	❒	❒	❒
• Operating practice is for equipment care by operators as part of their day-to-day activities.	❒	❒	❒
• Root causes of unexpected downtime are identified and corrected to increase equipment availability and reliability.	❒	❒	❒
• The maintenance department maintains a stock of critical repair parts and tools.	❒	❒	❒

TOTAL PRODUCTIVE MAINTENANCE (cont'd)	YES	NO	NOT SURE
• Frequently used spare parts and tools required for repair are kept at point of use.	❒	❒	❒
MEASUREMENT			
• Management understands that maximum pressure for improvement comes from the areas that top management considers critical	❒	❒	❒
• Performance measures put pressure in the right directions for improvement.	❒	❒	❒
• Performance measures emphasize good business results, not just functional activities.	❒	❒	❒
• All the business processes are measured on cycle time, customer service, cost and quality with process accountability clearly defined.	❒	❒	❒
• Measurements focus on the effectiveness of business processes to serve internal and external customers.	❒	❒	❒
• Performance measures drive the effective integration of all processes for the company's total benefit.	❒	❒	❒
GOAL PLANNING			
• Assessment has been conducted to identify operational improvements that provide the best overall business impact.	❒	❒	❒
• Management's philosophy is to have improvement goals over last year's performance replaced with goals comparable to 'Best-in-Class' performance.	❒	❒	❒
• Assessment results and strategy specify short- and longer-term measurable goals to competitively excel in quality, response time and cost to produce.	❒	❒	❒

LEAN MANUFACTURING PERFORMANCE

Quick response, lower inventories, higher profits, better quality and total customer satisfaction are the cornerstones of world class business performance and competitive leadership. Achieving this result requires time-compressed, high-quality performance in every internal and external aspect of your business. Breakthrough performance advances can only result from management's commitment to action. We can help you achieve significant performance improvement.

BREAKTHROUGH PERFORMANCE IMPROVEMENTS

Executives are all too familiar with systems, techniques and programs that promise big results but don't deliver. However, the potential for breakthrough performance gains **is** possible, and surprisingly fast, using Lean Manufacturing techniques. The consultants at R. Michael Donovan & Co., Inc. have spearheaded numerous projects and the following typify some of the results achieved.

Engineered Machinery Manufacturer
- Decreased engineering and manufacturing cycle time by 60%
- Lowered assembly labor costs by 30%
- Decreased inventory by over 50%

Mechanical Equipment Manufacturer
- Increased poor line fill to 97%
- Throughput increased by over 12%
- Profits up 70% and climbing
- Decreased inventory by over 30%

Metal Products Manufacturer
- Decreased cycle time from 6 weeks to 4 days
- Sales projected to more than double
- Gross margin increased by 12 points

Electronic Equipment Manufacturer
- Reduced electronic assembly cycle time by 80%
- On-time to promise doubled to 98%
- Reject rate reduced by 90%

Impressive? Without a doubt. But just how do companies achieve such breakthrough performance gains? While consulting expertise can help, the number-one success element is management's compelling determination to achieve new, higher levels of success. Then management initiates the actions required, actively participates in the process, and requires results. We can help you do it too.

ABOUT R. MICHAEL DONOVAN, INC.

We offer a full complement of Lean Manufacturing and Supply Chain Management services to companies that want to achieve breakthrough advances in performance. Our goal is to help our clients outperform their competition through the intelligent application of modern tools, techniques and management processes that get RESULTS. If your goal is a significant increase in performance, we provide consulting, education, systems integration, implementation expertise, and the experience that is necessary to get RESULTS. Inquiries about our services are always welcome. Please contact Mike Donovan for further information at 800-745-4101.

COMPLIMENTARY MATERIAL

A wide variety of complimentary educational information is available upon request. To receive our latest literature list, email rmd@rmdonovan.com, fax 508-655-3000 with your request, or telephone 800-745-4101.

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