Lean Manufacturing Assessment

Buker, Inc.
Management Education and Consulting

800-654-7990
email: info@bukerinc.com

WWW.BUKER.COM

Lean Manufacturing Assessment

TWELVE ELEMENTS OF LEAN MANUFACTURING

Lean Manufacturing consists of three management areas made up of 12 elements. These areas are Technology Management, People Management and Systems Management. Each area includes four elements of Lean Manufacturing. The **Technology Management** elements are Structured Flow Manufacturing, Small Lot Production, Setup Reduction, and Fitness for Use. The objective of Technology Management is a "Responsive Business Environment. " This means developing flexibility to respond to changes in individual customer demand, changes in marketplace conditions or to produce to customer orders of one or one thousand. In other words, produce the product when and how the customer wants it.

Figure 1: Three Key Management Areas in any Manufacturing Business

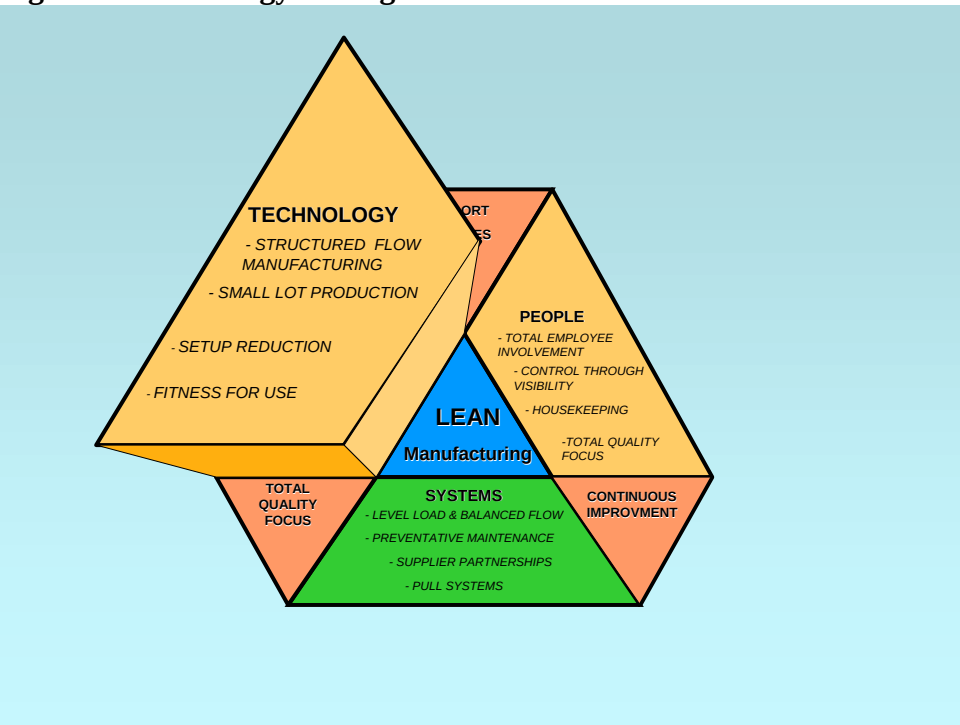
Structured Flow Manufacturing incorporates the concepts of continuous flow manufacturing. The focus is on flow and throughput to reduce the cycle time through manufacturing. It also should be noted that many companies have applied the concepts of Structured Flow Manufacturing to the office environment to shorten cycle time in the total business process. Structured Flow Manufacturing typically involves factory rearrangement or grouping technology into manufacturing cells for organized throughput.

Small lot production means producing the product in ever-decreasing lots or batch sizes until the theoretical lot size of one is reached. The ability to produce one at a time provides the opportunity to make every item every day. This in turn provides the flexibility of responding to customer requirements and meeting those requirements which otherwise could be met only through inventory.

Setup reduction or quick changeover is the process of minimizing equipment downtime between material changeovers. Setup time could be thought of as the elapsed time from the last good part of the previous job until the first good part of the new job is produced. The overall objective of reducing setup or changeover time is to facilitate small lot production.

Fitness for Use was coined by Dr. J.W. Juran in defining the principles of quality. Fitness for Use means understanding and meeting the customer's precise needs. The basic principle is that at each step in the business process there is a customer. Not all customers are external to the business; there also are internal customers. Internal customers are the next work center in the manufacturing process. Another example would be design engineering handing off new products to manufacturing in which case manufacturing is the customer of design engineering.

Figure 2: Technology Management



The elements of **People Management** are Total Employee Involvement, Control Through Visibility, Housekeeping, and Total Quality. The objective is "Capability for Rapid Improvement." This means improvements transpire in the total business process on an ongoing or continuous basis. Continuous improvement is achieved through the involvement of people at all levels in the organization.

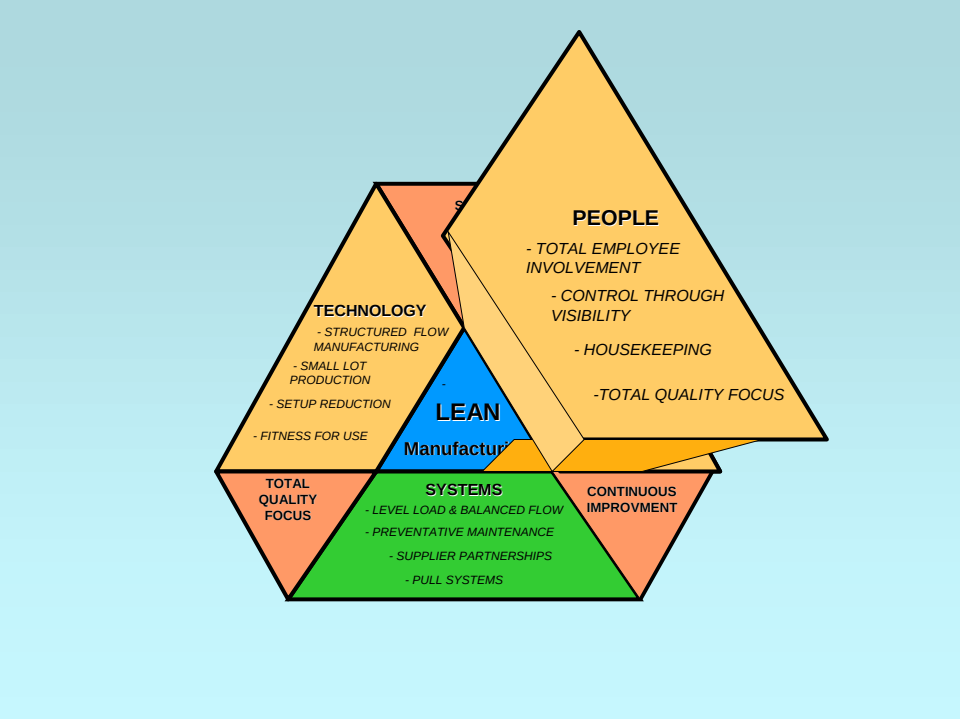
Total Employee Involvement is required to achieve the objective of Capability for Rapid Improvement. Only by everyone being involved in the improvement process can a company achieve continuous improvement in its processes. Employee involvement and continuous improvement will be achieved through Small Group Improvement Activities, typically process improvement teams and/or Kaizen events to implement rapid change.

Control Through Visibility provides visual status of the production environment. The objectives in Control Through Visibility are to communicate goals, highlight problems and attack waste. Often times Control Through Visibility is looked at as an extension of basic housekeeping, the idea being that as unnecessary items are removed from the work area it becomes much easier to see and thus work on process problems.

"5S" Housekeeping or work place organization means a highly organized and efficient work place. In "5S" Sort, Set in Order, Shine, Standardize and Sustain help to create a high performance workplace that eliminates waste of time, motion and effort as everything (materials and tooling) have a place and everything is in its place.

Total Quality is fundamental to Lean Manufacturing and can be defined as striving to continually reduce process variability and create repeatable processes.. Variations in the process increase costs, and must be managed to improve quality. The primary focus is supplier quality, in box quality and out of box quality – customer escapes.

Figure 3: People Management



The **Systems Management** elements are Level Load and Balanced Flow, Preventative Maintenance, Supplier Partnerships and Pull Systems. The objective is "Careful Application of Resources" which means using all company resources wisely. This can be achieved in Lean Manufacturing by extending equipment life, eliminating over-production and developing efficient production processes through the use of Pull Systems.

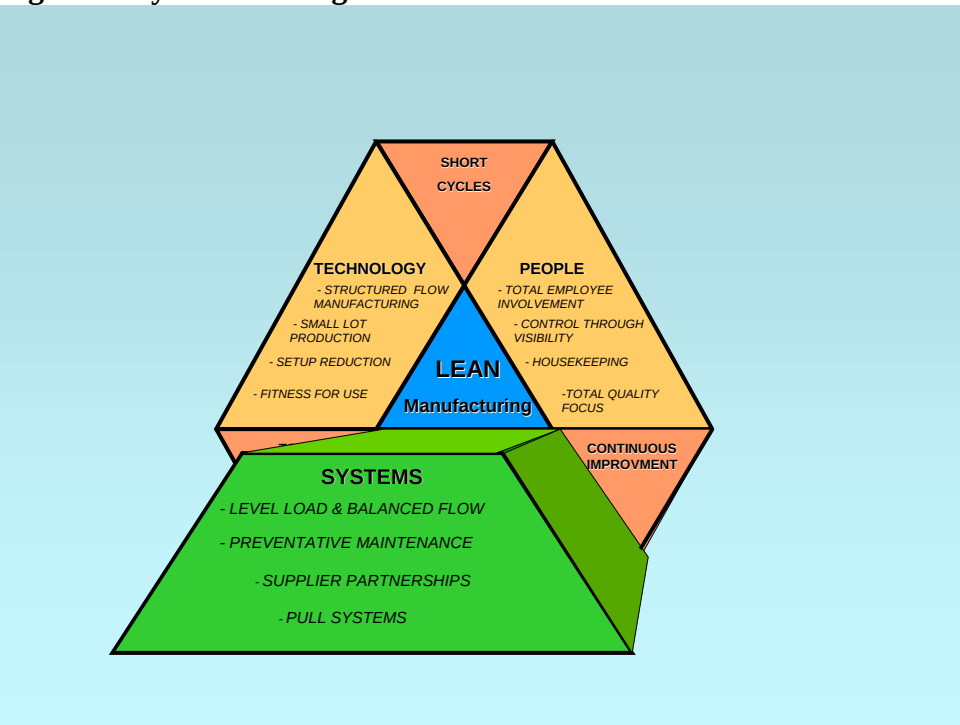
Level Load and Balanced Flow means organizing production processes for scheduled throughput. Leveling and balancing become control mechanisms. The objective is to achieve synchronous production through repeatability and predictability in process cycles.

Preventative Maintenance in Lean Manufacturing means developing reliable tools of production that run flawlessly. Equipment is in a constant state of readiness with the benefits being extended life of equipment, equipment eliminated as a cause of defects, and prevention of major equipment repairs.

Supplier Partnerships will be a total management and company commitment to a cooperative relationship with suppliers. This cooperative relationship will focus on achieving lowest total cost by working on non-price areas of the relationship. The cornerstones of the relationship will be long-term commitments, shared goals and frequent fact-based communications utilizing consignment and Kanban material execution.

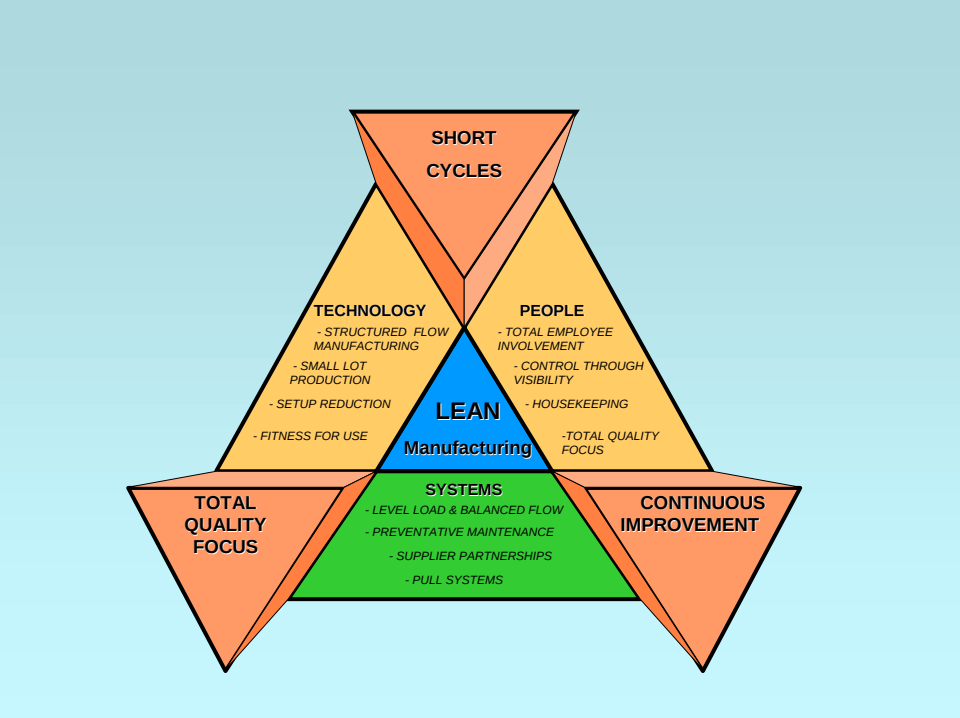
Pull Systems, often referred to as Kanban, are the mechanisms that activate internal production and supplier processes. The objectives of the Pull System are three-fold: (1) keep the time of producing material as close as possible to the time of using material; (2) maintain accurate and rapid feedback on what really is needed in the work area; and (3) provide local control over stocking levels in the area.

Figure 4: Systems Management



Each manufacturing environment that Buker, Inc. has worked with has all 12 of the Lean Manufacturing elements in place. It should be noted that the degree of application of the 12 elements in each company can and may be different. For example, in a traditional job shop manufacturer there could be tremendous application of structured flow manufacturing for improved throughput, thus leading to cycle time reduction, while another company that is a process manufacturer already may understand the importance of structured flow manufacturing, but may need to focus on preventative maintenance and setup reduction.

Figure 5: Short Manufacturing Cycles

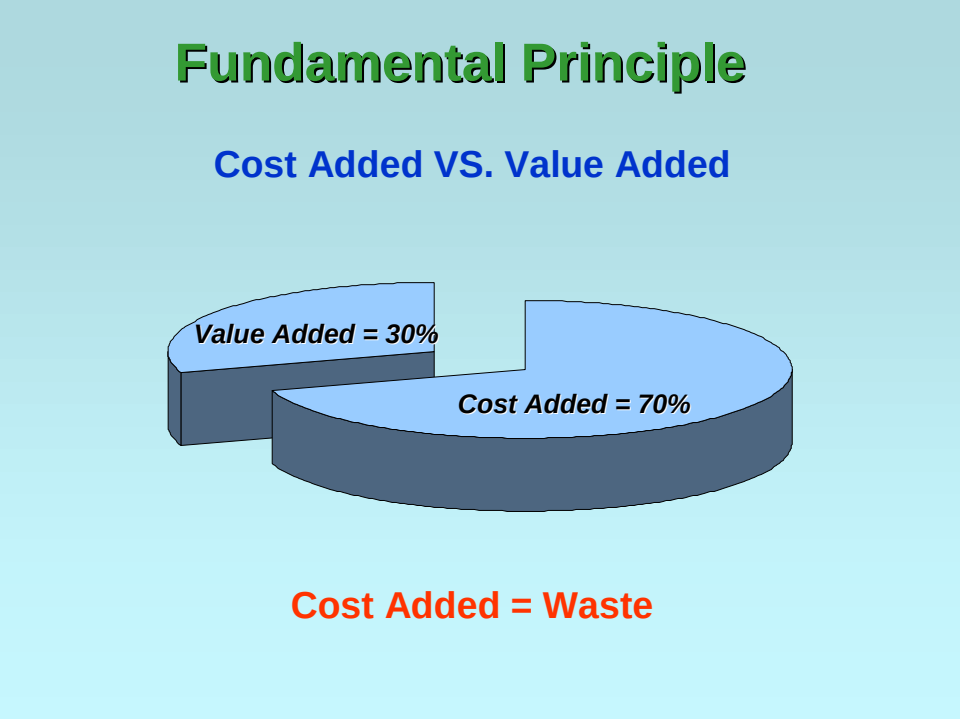


The result of achieving short manufacturing cycles, continuous improvement and a total quality focus is Lean Manufacturing. Lean Manufacturing then is the result rather than the beginning.

Figure 6 : Lean Manufacturing Definition

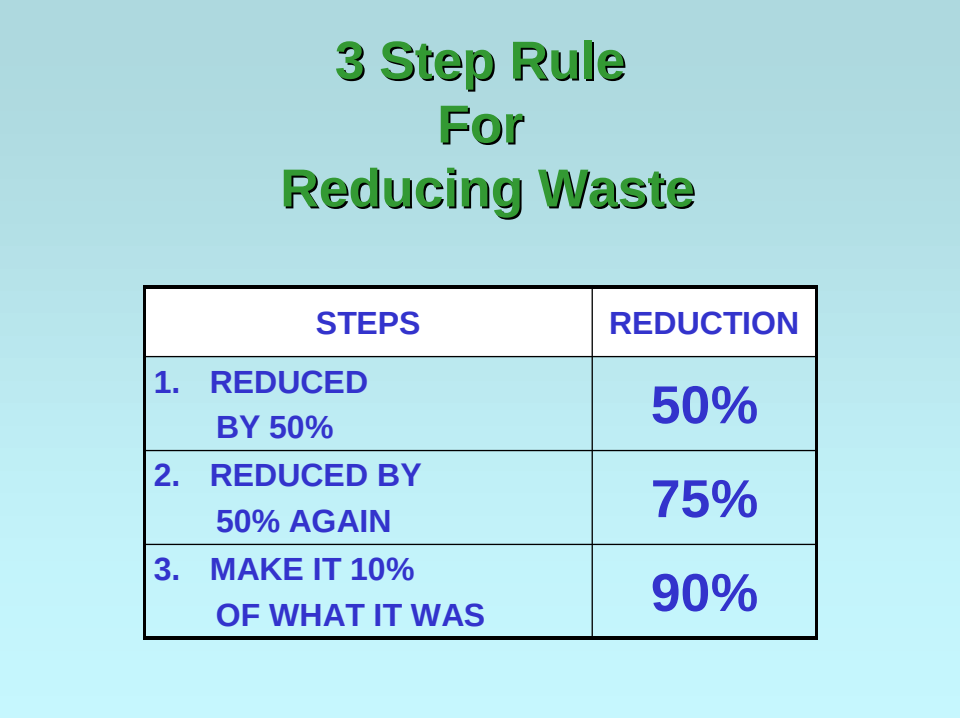
Two significant components of the definition of Lean Manufacturing are elimination of waste and continuous improvement. Elimination of waste means eliminating all activities that do not add value to the process. As an example, moving materials from one manufacturing operation to another is not adding value to the product but rather adding cost.

Figure 7: Cost-added vs. Value-Added



Another way to think of cost-added and value-added is to think of cost-added as motion and value-added as work. Thus, are the activities truly work or value-adding or are they motion, adding cost? Examples of cost-added activities are material movement, inspection, taking material out of one container and putting it into another, engineering change notices, rework and material storage. In a Lean Manufacturing environment, the goal is to reduce the cost-added activities so that the value-added activities become 90 percent of the total cost. This strategy lowers total cost significantly and enhances competitiveness and profitability. Recognizing cost-added activities in a company is not easy. Over the years the cost-added activities have been taken for granted and have become invisible. They are assumed to be the way a company has always done business. This mind set must be changed in Lean Manufacturing.

Figure 8: 3 Step Rule For Reducing Waste

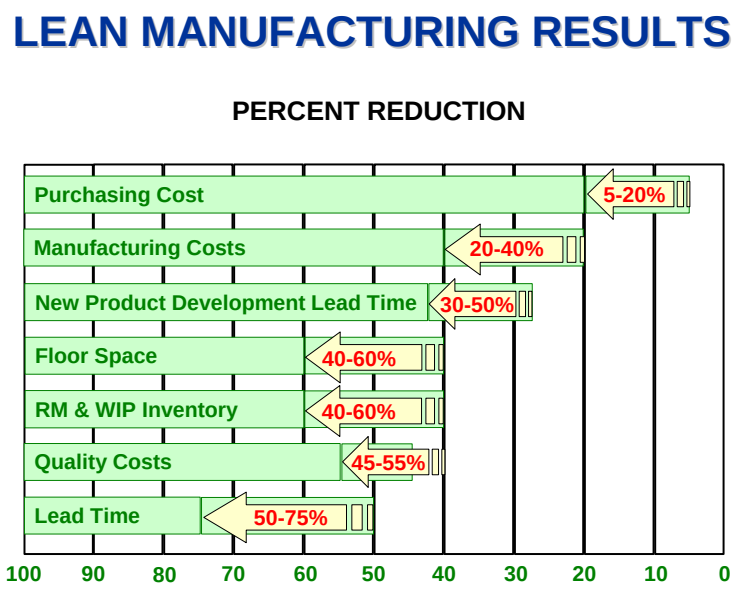


In reducing waste or cost added activities, the first step is to cut or trim the waste by 50 percent. Step two: reduce by 50 percent again which yields a 75 percent cumulative reduction. The final step is making it 10 percent of what it was for a cumulative reduction of 90 percent. A typical application of the three-step rule is the chronic waste existing in most manufacturing facilities - setup time. If a setup or changeover on equipment is presently two hours (120 minutes), step one would be to reduce the setup to one hour (60 minutes) or cut it in half. Step two would cut it in half again or now down to one half hour (30 minutes). Step three would be to make it 10 percent of what it was which means the setup time is down to 12 minutes. A dramatic improvement. Attacking waste in this manner requires a fundamental rethinking of setup activities. Superficial actions rarely result in the reduction of waste called for in the Three Step Rule.

Lean Manufacturing Results:

The average improvements we at Buker, Inc. have seen are represented in figure 9.

Figure 9: Lean Manufacturing Results



To achieve these results means revolutionary change in the way a company does business. It means developing a disciplined, watchful company culture, one that distinguishes cost-added from value-added activities in all areas of the business, and attacks waste of time and resources whenever and wherever found. That disciplined culture requires adopting revolutionary new attitudes, new attitudes that having problems is good news, because acknowledging them means they can be solved. Lean Manufacturing is the beginning of a new world for manufacturers that brings continuous change and continuous improvement. Once a company accepts the challenge of Lean Manufacturing it becomes a forever commitment.

Lean Manufacturing Assessment

The Lean Manufacturing Assessment offers companies beginning their Lean journey a methodology to identify where a company can have the most impact and fastest payback both in the beginning and throughout their Lean initiative.

The Lean Assessment can also be used by companies actively engaged in their Lean journey. The assessment offers these companies the opportunity to benchmark themselves against the "best in class" Lean standard. Based upon the benchmarking exercise of comparing the company's Lean practices to the Lean Manufacturing Assessment "best in class" standard a company can define remaining areas of improvement in their Lean initiative.

Conducting the Lean Manufacturing Assessment

The Lean Manufacturing Assessment is divided into fourteen (14) areas:

1. Cultural Awareness
2. Structured Flow Manufacturing
3. Small Lot Production
4. Setup Reduction
5. Fitness For Use
6. Employee Involvement
7. Control Through Visibility
8. Housekeeping/Workplace Organization
9. Total Quality Focus
10. Level Load and Balanced Flow
11. Preventive Maintenance
12. Supplier Partnerships
13. Pull Systems
14. Education and Training

The assessment should be reviewed and conducted by the company's management team. Conducting the assessment review as a team avoids the assessment results being just one person's opinion and provides the management team the opportunity to candidly discuss the company's current condition and where to start their efforts.

The Lean Manufacturing Assessment asks a series of questions regarding the "current state of operations" as compared to the standard in a Lean Manufacturing company. The response to each question is either:

A – Best practice standard is in place.
RI – Requires Improvement – The practice was found during the assessment but the process is sub-standard or not fully implemented throughout the enterprise.
F – The practice is not found.

For each area where RI or F is recorded during the assessment the area should be identified and discussed by company management as a potential starting point or area for opportunity in their Lean effort. It should be noted specific areas such as housekeeping/workplace organization, and education and training are fundamental elements for starting any company's Lean Manufacturing journey.

Lean Manufacturing Assessment

Company: _____
Location: _____
Audit Date: _____

Lean Manufacturing

Cultural Awareness

Expectation	Evidence	Evaluation		
		A	RI	F
Plant management communicates with shop floor workers regarding employee satisfaction and organizational objectives at least twice per year.	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
		A	RI	F
Employees are able to accurately describe the organizations goals and how their job contributes to the achievement of those goals.	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
		A	RI	F
There is a formal process for production workers to regularly receive feedback on problems detected in downstream processes and at the customer.	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
		A	RI	F
There is a formal process in place that provides shop floor workers the opportunity to work in groups to address performance, quality, or safety issues.	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
		A	RI	F
Shop floor employees understand and can use common performance metrics to monitor and improve production processes.	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

A = Acceptable/Best practice in place
RI = Requires Improvements / the practice is found but process is substandard or not integrated throughout the enterprise
F = Failed / the practice is not found

Lean Manufacturing Assessment

Company: _____
Location: _____
Audit Date: _____

Expectation	Evidence	Evaluation		
When problems in the production process occur they are detected and investigated within 10 minutes of the first occurrence.	•	A	RI	F

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
Production engineers and support staff routinely go to the spot of a problem in production to assess the actual situation and talk to production workers.	•	A	RI	F

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Structured Flow Manufacturing

Expectation	Evidence	Evaluation		
Operators are given a formal training period before doing a job on their own. Few defects or production slowdowns are attributable to new/inexperienced operators.	•	A	RI	F

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
Part travel distances have been analyzed and reduced by moving equipment and workstations closer together. (E.g. Wasteful material conveyance has been eliminated by reducing the distance between processes, work cells, process groups, or material staging areas.)	•	A	RI	F

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
Subassembly or production areas that supply a main production line or cell(s) do not change-over early to build inventory buffers, etc. *(E.g. Changeovers are synchronized across related production processes.*)	•	A	RI	F

	Observation	Action	Responsibility	Date
Site	•	•	•	•

A = Acceptable/Best practice in place
RI = Requires Improvements / the practice is found but process is substandard or not integrated throughout the enterprise
F = Failed / the practice is not found

Lean Manufacturing Assessment

Company: _____
Location: _____
Audit Date: _____

Expectation	Evidence	Evaluation		
		A	RI	F
Defective items are immediately detected when they occur in the production process. (E.g. Very seldom does a bad part make it to a down stream process or to the customer with a lot of suspect parts in between requiring additional inspection.)	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
		A	RI	F
Processes and equipment are arranged to facilitate a continuous flow of work through production and not arranged in machinery or process groups. *(E.g. WIP inventory does not accumulate after processes. Machines or equipment groups do not bottle-neck the material flow, etc.*)	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
		A	RI	F
The Ratio of actual to theoretical cycle time shows continuous improvement month to month.	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
		A	RI	F
Production operators are multi-process capable, fully trained and able to do the work at each station in a production cell or each job in a production line team.	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
		A	RI	F
U-turn layouts and U-shaped cells have been implemented on the shop floor to enable one-piece (continuous) flow of material through production.	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

A = Acceptable/Best practice in place
RI = Requires Improvements / the practice is found but process is substandard or not integrated throughout the enterprise
F = Failed / the practice is not found

Lean Manufacturing Assessment

Company:_____
Location:_____
Audit Date:_____

Expectation	Evidence	Evaluation		
		A	RI	F
Labor reporting by individual and by operation has been replaced with team reporting.	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Small Lot Production

Expectation	Evidence	Evaluation		
		A	RI	F
Lot or batch sizes are reduced as process improvements are made.				

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
		A	RI	F
Setup or changeover time has been eliminated as a driver for production quantities produced.	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
		A	RI	F
Production quantities are equal to customer order quantities. (The line, cell or work center has the ability to produce only to the customer requirement).	• Operating Procedures and Process Maps			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Setup Reduction

Expectation	Evidence	Evaluation		
		A	RI	F
Changeovers are scheduled in advance and communicated so all workers on the team know the day's changeover schedule.	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

A = Acceptable/Best practice in place
RI = Requires Improvements / the practice is found but process is substandard or not integrated throughout the enterprise
F = Failed / the practice is not found

Lean Manufacturing Assessment

Company:_____
Location:_____
Audit Date:_____

Expectation	Evidence	Evaluation		
		A	RI	F
Quick changeover teams have received training on changeover time reduction procedures and are actively improving changeover methods.	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
		A	RI	F
Set-up activities have been subject to detailed process analysis techniques such as motion and time study, videotaping to identify waste, etc.	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
		A	RI	F
Changeover time, both internal and external, is visibly tracked at each workstation where changeovers are performed.	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
		A	RI	F
As new changeover procedures are developed, they are standardized and replicated in other areas of the plant.	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
		A	RI	F
Special tools or equipment have been developed and implemented to reduce the time and labor involved in the changeover process.	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

A = Acceptable/Best practice in place
RI = Requires Improvements / the practice is found but process is substandard or not integrated throughout the enterprise
F = Failed / the practice is not found

Lean Manufacturing Assessment

Company: _____
Location: _____
Audit Date: _____

Expectation	Evidence	Evaluation		
		A	RI	F
All of the dies, fixtures, tools, fasteners, materials, parts, raw stock, etc, needed for the next production run are prepared in advance to reduce changeover times.	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
		A	RI	F
All dies, fixtures, and changeover tools are stored in a neat, orderly fashion when not in use and are maintained in good working condition.	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Fitness For Use

Expectation	Evidence	Evaluation		
		A	RI	F
Analysis has been conducted on parts and components to identify design opportunities to eliminate waste and improve productivity.	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
		A	RI	F
Quality of release from engineering for new products is measured and shows continuous improvement.	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
		A	RI	F
Workers actively and routinely meet with internal customers, external customers and suppliers on the elimination of fitness for use issues (elimination of time, motion and effort in a non-value add sense).	• Operating Procedures and Process Maps			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

A = Acceptable/Best practice in place
RI = Requires Improvements / the practice is found but process is substandard or not integrated throughout the enterprise
F = Failed / the practice is not found

Lean Manufacturing Assessment

Company: _____
Location: _____
Audit Date: _____

Expectation	Evidence	Evaluation		
Standardized containers are used throughout the supply chain to eliminate duplicate handling, counting and weighing of materials.	•	A	RI	F

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Employee Involvement.

Expectation	Evidence	Evaluation		
There is a clearly communicated strategy and designated champion for continuous improvement in the plant with the necessary resources, organization, and infrastructure in place to support the process.	•	A	RI	F

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
There is a formal process in place to solicit ideas and suggestions for improvements from all employees and to recognize their participation. *(E.g. Suggestion systems, quality circles, incentive programs, etc.*)	•	A	RI	F

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
Employees have been trained in the continuous improvement methods and have been affected by or participated in a continuous improvement project.	•	A	RI	F

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
Employees know the nine wastes, are actively involved in identifying waste in their processes, and are empowered to work to reduce or eliminate the waste.	•	A	RI	F

	Observation	Action	Responsibility	Date
Site	•	•	•	•

A = Acceptable/Best practice in place
RI = Requires Improvements / the practice is found but process is substandard or not integrated throughout the enterprise
F = Failed / the practice is not found

Lean Manufacturing Assessment

Company:_____
Location:_____
Audit Date:_____

Expectation	Evidence	Evaluation		
		A	RI	F
Continuous improvement projects are structured, planned, and time boxed; successes are recognized and expanded throughout the plant. (E.g. Project have champions responsible for implementation, action items have responsibility assigned, and implementation timing milestones are established.)	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
		A	RI	F
Many of the improvements made throughout the plant involve minor or no capital investment. (E.g., The improvement process is dominated more by small, incremental improvements than by large scale, capital intensive projects.)	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
		A	RI	F
SOP's are subject to a continuous improvement process that seeks to improve the sequence of steps in the operations, reduce WIP inventories, increase labor and machine utilization, etc.	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Control Through Visibility

Expectation	Evidence	Evaluation		
		A	RI	F
Updated display boards containing job training, safety, operating measureables, production data, quality problem and counter-measure information are readily visible throughout the plant.	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

A = Acceptable/Best practice in place
RI = Requires Improvements / the practice is found but process is substandard or not integrated throughout the enterprise
F = Failed / the practice is not found

Lean Manufacturing Assessment

Company: _____
Location: _____
Audit Date: _____

Expectation	Evidence	Evaluation		
		A	RI	F
Check-sheets describing and tracking the top defects are posted and up to date at each workstation. (*E.g., Each operator is aware of the key quality points and defect history of the process they are doing*.)	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
		A	RI	F
There is good, effective communication between production shifts in the plant. (E.g. Equipment, quality problems, production schedules, etc. are communicated daily, and production areas are left "ready to go" by the previous shift.)	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
		A	RI	F
Processes are equipped with call lights or signals that workers or machines can call for assistance when a problem is encountered.	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
		A	RI	F
Manual processes or tasks have been equipped with mechanized checks to aid human judgment wherever possible.	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
		A	RI	F
Marked squares on the floor or other signaling devices are used to aid and activate production.	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

A = Acceptable/Best practice in place
RI = Requires Improvements / the practice is found but process is substandard or not integrated throughout the enterprise
F = Failed / the practice is not found

Lean Manufacturing Assessment

Company: _____
Location: _____
Audit Date: _____

Housekeeping/Workplace Organization

Organization and Visual Management

Expectation

The plant is generally clear of all unnecessary materials or scrap and isles are clear of obstructions.

Evidence

-

Evaluation

A	RI	F

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation

Lines on the floor clearly distinguish work areas, paths, and material handling isles. Signs clearly identify production, inventory staging, and material drop areas.

Evidence

-

Evaluation

A	RI	F

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation

A daily checklist exists in each work center that identifies housekeeping activities to be performed.

Evidence

-

Evaluation

A	RI	F

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation

There is “a place for everything and everything in its place:” every container; tool and part rack is clearly labeled and easily accessible to the user. People using tools, parts, fixtures, quality gages, etc. know where to find them.

Evidence

-

Evaluation

A	RI	F

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation

A radar chart/spider diagram chart displays each area’s workplace organization performance.

Evidence

-

Evaluation

A	RI	F

	Observation	Action	Responsibility	Date
Site	•	•	•	•

A = Acceptable/Best practice in place
RI = Requires Improvements / the practice is found but process is substandard or not integrated throughout the enterprise
F = Failed / the practice is not found

Lean Manufacturing Assessment

Company: _____
Location: _____
Audit Date: _____

Total Quality Focus

Expectation	Evidence	Evaluation		
		A	RI	F
Operators can stop the line when a defective unit/part is found or when they cannot complete their process according to the SOP.	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
		A	RI	F
Error proofing devices and methods have been implemented to eliminate the top production defects for each work area.	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
		A	RI	F
Workers have been trained in the basics of error proofing and analyzing production defects and identifying error proofing opportunities.	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
		A	RI	F
A standardized operating procedure (SOP) has been developed and used to train operators for each production process.	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
		A	RI	F
Every production process has the SOP posted within view of the worker performing the process.	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

A = Acceptable/Best practice in place
RI = Requires Improvements / the practice is found but process is substandard or not integrated throughout the enterprise
F = Failed / the practice is not found

Lean Manufacturing Assessment

Company: _____
Location: _____
Audit Date: _____

Expectation	Evidence	Evaluation		
		A	RI	F
Internal quality is actively measured through first pass yield.	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
		A	RI	F
Failure analysis is performed with results displayed.	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
		A	RI	F
External quality to customers is measured through on-time performance, warranty costs and returns.	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Level Load and Balanced Flow

Expectation	Evidence	Evaluation		
		A	RI	F
There is an effort to level production schedules by spreading the monthly purchase volume evenly over the period. (E.g. The daily production volume for a part does not vary substantially from one day to the next based on daily release quantities,)	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
		A	RI	F
Changeovers in production are made to support the mix of customer demand and not to support long productions runs, WIP inventory buffers, or daily short ship emergencies, etc.	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

A = Acceptable/Best practice in place
RI = Requires Improvements / the practice is found but process is substandard or not integrated throughout the enterprise
F = Failed / the practice is not found

Lean Manufacturing Assessment

Company: _____
Location: _____
Audit Date: _____

Expectation	Evidence	Evaluation		
Takt time determines the pace of production in the plant. (*E.g., Takt time = Production time available / Customer volume*)	•	A	RI	F

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
The Takt time is used as the basis to determine process cycle times and allocate work throughout the production process. (*E.g., Production processes are designed with cycle times that does not exceed the Takt time.*)	•	A	RI	F

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
Processes on production lines or in cells are balanced or leveled so the difference between cycle times of linked processes is negligible.	•	A	RI	F

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
When demand volumes increase, production processes are rebalanced or redesigned to reduce the process cycle times to correspond to the new Takt time.	•	A	RI	F

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
Performance to the plan is measured in daily or hourly rates.	•	A	RI	F

	Observation	Action	Responsibility	Date
Site	•	•	•	•

A = Acceptable/Best practice in place
RI = Requires Improvements / the practice is found but process is substandard or not integrated throughout the enterprise
F = Failed / the practice is not found

Lean Manufacturing Assessment

Company: _____
Location: _____
Audit Date: _____

Expectation	Evidence	Evaluation		
Output to plan by day or hour is ±5% to plan.	•	A	RI	F

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Preventative Maintenance

Expectation	Evidence	Evaluation		
Maintenance team managers and workers have been trained in the basics of TPM.	•	A	RI	F

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
Machines have all safety guard devices operative, and are locked out immediately when broken down. (E.g., Safety guards are not disabled or removed. Malfunctioning equipment is not allowed to continue operating in production.)	•	A	RI	F

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
Preventive maintenance activity lists are posted in work areas and item completions are tracked over time.	•	A	RI	F

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
Accurate and visible maintenance records are kept up to date and posted nearby for all production machinery.	•	A	RI	F

	Observation	Action	Responsibility	Date
Site	•	•	•	•

A = Acceptable/Best practice in place
RI = Requires Improvements / the practice is found but process is substandard or not integrated throughout the enterprise
F = Failed / the practice is not found

Lean Manufacturing Assessment

Company:_____
Location:_____
Audit Date:_____

Expectation	Evidence	Evaluation		
		A	RI	F
Preventive maintenance activities are focused on increasing utilization and minimizing cycle time variation. (E.g., Capacity utilization is tracked and cycle time performance is monitored for each machine and issued in maintenance activity planning. The maintenance team is evolving from preventive to predictive abilities.)	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
		A	RI	F
Preventive maintenance responsibilities are defined for both maintenance and production workers. (*E.g., Operators are doing routing tasks like checking oil, cleaning machines, & changing tools*.)	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
		A	RI	F
Maintenance is scheduled as part of the overall production plan.	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Supplier Partnerships

Expectation	Evidence	Evaluation		
		A	RI	F
Suppliers have early involvement in the design process for new products.	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
		A	RI	F
Suppliers are at least quarterly provided feedback on delivery, quality and service.	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

A = Acceptable/Best practice in place
RI = Requires Improvements / the practice is found but process is substandard or not integrated throughout the enterprise
F = Failed / the practice is not found

Lean Manufacturing Assessment

Company: _____
Location: _____
Audit Date: _____

Expectation
The supplier and customer are actively engaged in initiatives regarding the non-price areas of cost.

Evidence
•

Evaluation

A	RI	F

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation
Suppliers deliver materials to point of use.

Evidence
•

Evaluation

A	RI	F

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation
There are specific goals/objectives for the supply base for total dollars spent to be at point of use, supplier managed inventory and consignment.

Evidence
•

Evaluation

A	RI	F

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation
On-time performance from the supply base is at least 95% on time to the due date.

Evidence
•

Evaluation

A	RI	F

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation
The company consistently provides technical expertise to supply partners to activate their lean manufacturing efforts.

Evidence
•

Evaluation

A	RI	F

	Observation	Action	Responsibility	Date
Site	•	•	•	•

A = Acceptable/Best practice in place
RI = Requires Improvements / the practice is found but process is substandard or not integrated throughout the enterprise
F = Failed / the practice is not found

Lean Manufacturing Assessment

Company: _____
Location: _____
Audit Date: _____

Expectation	Evidence	Evaluation		
		A	RI	F
Long term agreements exist for at least 80% of total purchase dollars.	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Pull Systems

Expectation	Evidence	Evaluation		
		A	RI	F
The target and actual hourly output is displayed for each manufacturing cell or line or process group as well as the day's production requirements and timing.	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
		A	RI	F
All production managers and supervisors have been trained in the principles and implementation of shop floor material pull systems. (*E.g., Kanban or other shop floor JIT replenishment systems*.)	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
		A	RI	F
Material flow or movement in the plant is dependent on individual pull signals (via Kanban, etc.) from downstream workstations as parts or materials are consumed.	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
		A	RI	F
Downstream processes are pulling material from upstream processes; upstream production schedules are dependent on downstream use. (*E.g. Production departments or process groups do not operate on autonomous production plans determined by inventory targets, batch size capability, etc*.)	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

A = Acceptable/Best practice in place
RI = Requires Improvements / the practice is found but process is substandard or not integrated throughout the enterprise
F = Failed / the practice is not found

Lean Manufacturing Assessment

Company: _____
Location: _____
Audit Date: _____

Expectation	Evidence	Evaluation		
		A	RI	F
Adapting to changes in customer demand requires changing only the production schedule for the "final" line or process. (E.g. Customer order changes do not require the rework of numerous "process" production schedules throughout the plant since the "final" line pulls from all preceding processes.)	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
		A	RI	F
Production supervisors are not motivated to produce more parts than the subsequent processes require. (E.g. Supervisors are not motivated to "build to make the numbers" regardless of downstream process requirement.)	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Employee Education and Training

Expectation	Evidence	Evaluation		
		A	RI	F
An ongoing education/training program has been developed for all employees, including new hires, transfers, and promotions.	• Policy or defining document			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
		A	RI	F
Participation in relevant professional organizations is supported. Professional certification processes are supported.	• Policy or defining document			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
		A	RI	F
The education and training needs of all employees are evaluated annually, and progress is reviewed quarterly.	• Observe planning and review process			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

A = Acceptable/Best practice in place
RI = Requires Improvements / the practice is found but process is substandard or not integrated throughout the enterprise
F = Failed / the practice is not found

Lean Manufacturing Assessment

Company: _____
Location: _____
Audit Date: _____

Expectation	Evidence	Evaluation		
		A	RI	F
Promotions, new hires, and transfers receive an initial education and training needs assessment and plan.	• Observe assessment process			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
		A	RI	F
Education and training requirements are evaluated for all newly formed improvement teams.	•			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
		A	RI	F
All employees have received Lean Manufacturing education tailored to their job.	• Observe training records			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
		A	RI	F
Every employee receives at least 40 hours of classroom education/training annually.	• Observe training records			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

Expectation	Evidence	Evaluation		
		A	RI	F
Key employees are pursuing, or have achieved certification through relevant professional organizations.	• Observe certification records			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

A = Acceptable/Best practice in place
RI = Requires Improvements / the practice is found but process is substandard or not integrated throughout the enterprise
F = Failed / the practice is not found

Lean Manufacturing Assessment

Company: _____
Location: _____
Audit Date: _____

Expectation	Evidence	Evaluation		
		A	RI	F
All employees are trained in basic problem solving skills.	• Observe certification records			

	Observation	Action	Responsibility	Date
Site	•	•	•	•

A = Acceptable/Best practice in place
RI = Requires Improvements / the practice is found but process is substandard or not integrated throughout the enterprise
F = Failed / the practice is not found