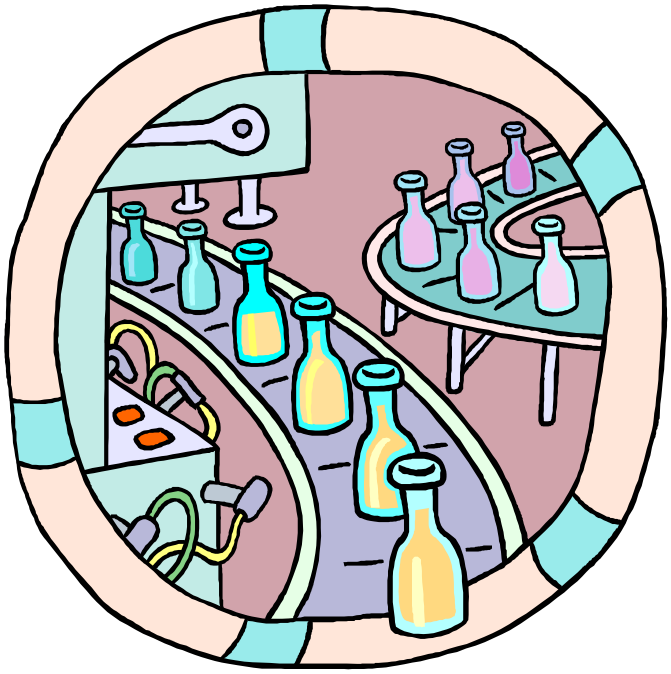
CELLULAR MANUFACTURING:

A Lean Manufacturing Concept



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What is Lean?

Running an operation lean means:

- Removal of waste of all kinds (e.g. time, motion, inventory, poor cost of quality, etc.)
- An organization that stimulates productivity and quality
- An organization using value-added processes

Low Quality = High Waste
High Quality = Low Waste and Higher Value

There are several ways to be Lean—

- TQM
- Six Sigma
- SMED (Single Minute Exchange of Die)
- PM/TPM (Preventive Maintenance/Total Preventive Maintenance)
- JIT (Just In Time)
- Continuous Improvement/Kaizen
- And Many More…

Cellular Manufacturing

One of these lean practices, cellular manufacturing, is based on a group of different processes located in close proximity to manufacture a group of similar products. The primary purpose of cellular manufacturing is to reduce cycle time and inventories to meet market response times. Some of the other benefits include:

- Space Reduction
- Quality Improvement
- Labor Cost Reduction
- Improved Machine Utilization

Where would you begin? First, you would define the cell you plan to create. Criteria required for defining the cell would be based on:

- Processes Required
- Part Numbers & Attributes (size, shape, raw materials required)
- Market segments/customers
- Degree of Automation

Cellular manufacturing is an application of the group technology concepts for factory reconfiguration and shop floor layout design. A part family can be parts similar in size or parts created using similar manufacturing steps. Typically, a cell is dedicated to a single part family.

Cellular manufacturing does have some important human resource issues to consider:

- Operators must be trained properly to perform tasks including inspection and simple maintenance
- Cross functional training is critical since operators perform a variety of tasks and move between workstations and cells as the need arises
- Operators should be trained on Team Building
- Supervisors become Coaches. Cell teams require only guidance. Supervisors facilitate, assist and guide the overall effort.
- Compensation issues: Cell employees usually receive the higher pay because they are better qualified to do multiple tasks. We recommend implementation of an incentive program that provides incentives on the basis of results and incremental improvements.
- Management may be concerned that there will be resistance from employees when the result is actually opposite. Typically, any initial resistance disappears once employees understand the win-win situation at hand.
- Cells need support from several functions including product engineering, material management, manufacturing engineering, QC/QA, maintenance and management. It is vital to implementation success that this support is committed, visible and consistent.

Team Selection

Most crucial to the implementation of cellular manufacturing is team selection. To help determine who is best to include in your team, identify the skills required for each step by creating a Process Map. Clarify the roles and responsibilities of the roles you need filled.

Once the skills are identified, determine the potential team members. Explain to potential members what the nature of the task is and get a feel for their interest. What will you look for in your team members? Understanding the importance of selecting the right team cannot be overemphasized. Both objective and technical criteria should be established, including skills in:

- teamwork
- interpersonal skills
- leadership skills
- change adaptation
- positive thinking

Develop a checklist for selecting these members based on the needs of the cell. This can also be used in setting goals for those who wish to grow in their own skill sets.

From here you will need to do some negotiating. You will need to meet with affected Supervisors to discuss:

- Overall priority
- Current structure and plans
- Current authorities and relative power of team leaders
- Potential team members and the support they will need

Negotiate to acquire members best suited for the team. Renegotiate as necessary with the help of management and a detailed implementation plan.

Skill Matrices

Match skills to tasks. Create a matrix to define who is best qualified to perform specific tasks. This will be the document used for contracting your team to the project: aiding in obtaining commitment as well as communicating responsibilities and expectations. Determine what training is needed and implement a training plan. Make sure communication lines are established, open and well used. The success of the program is contingent on the team dynamic and the goals set. Communication is key—learn to listen and help others to do the same. What are the communication channels and links? Who provides and who expects what? Can the team members accomplish the tasks assigned?

Team Management

Develop trust and provide the team a reason to be motivated. Learn to manage team morale and create a system to encourage teamwork. Make your team an example of how successful teams cause great things to happen. Start with a pilot cell—be sure the product family chosen has the most potential for success. Stockpile if possible to provide an alternate source during implementation. When changes are necessary, communicate the reason for these changes in order to gain acceptance and understanding from your team. Be confident in implementation.

Designing the Cell

Cell design should be based on your project needs. Keep in mind the following when designing the cell:

- product life cycle
- continuous, flowing work through the cell
- proper allocation of resources for gauging and tooling
- aggressive update of equipment and processes
- cell development is evolutionary and always in a state of flux
- challenges in facility changes due to structure and age

Involve your team and their knowledge in the construction of the cell. Understanding throughput is essential to cell development—do not underestimate the contribution and acceptance of the team once the concept is understood. Ultimately, the logistics and cell construction is only a small part of the battle. Creating a culture where a team can flourish is the hard part. This task requires a true leader. *Can you meet the challenge?* -JPP