



SERVICE DELIVERY

LEAN PROCESS QUICK CHANGEOVER

About Us



Synergetics is a privately held New England-based Management Consulting firm established in 1975. With office locations in the US and UK, Synergetics operates internationally and employs over 150 professional analysts, consultants, project managers, and subject matter experts.

As one of the largest "Implementation Consulting" organizations, Synergetics has completed over 1,600 business process engagements across nine distinct verticals to build more than \$8B in bottom line profitability and improve overall operating efficiencies. Synergetics works with a diverse client portfolio of leading industrial and service corporations across Private Equity, Small and Medium Enterprises, and Fortune 500 Companies.

With customized services and solutions, Synergetics performs hands-on detailed management, financial, and operational assessments to develop and deliver specific cost savings and revenue enhancement initiatives.

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"Synergetics was the perfect solution for Bellisio. The difference in their approach as compared to other firms is that they are sensitive to the culture and the current business model rather than forcing a square peg into a round hole. Their ability to FIRST understand where the company is at in their improvement efforts and then apply their model as a tool to reach an optimal solution is unique. The tools and techniques which Synergetics uses are flexible enough to enable the company to optimize results without being disruptive."

Mike Evans
SVP Jackson Operations



Spring 2017 Spotlight

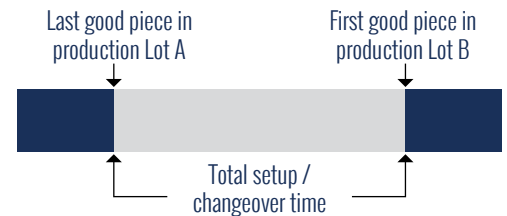


LEAN Manufacturing: How Quick Changeovers Drive Efficiency

INTRODUCTION

This Service Delivery article focuses on the increasing need for manufacturers to reduce equipment / production down-time associated with line set-up and product changeover. Manufacturers, especially within the Food & Beverage sector, **are facing customer demands for faster delivery lead times, reduced order sizes, longer shelf-life, and product customization.** These demands are in addition to the financial challenges they face in reducing customer product cost while maintaining a positive margin.

In a Production Line, **Changeover**, or Downtime, is the amount of time that it takes between changing out a piece of equipment / process in producing the last good piece in production lot A, to receiving the first good piece of the next production lot B. **Failure to control / reduce Changeover and to consistently set-up production lines for optimal performance is a common production variance that can have a snowball effect on any manufacturer.**



Customer demands to reduce production cycle times and produce smaller and variable product lots run counter to the batch and queue production model that calls for larger, high volume production runs. Batch and queue increases operational inefficiencies, space needed for production, and several other cost concerns:

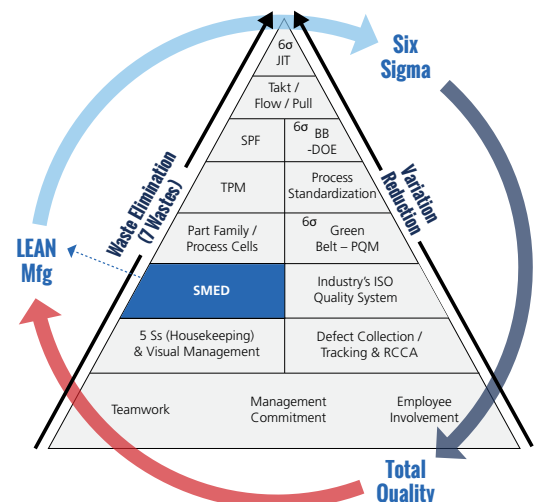
- Overtime Labor Expense
- Expedited Logistics Cost
- On-Time Delivery Penalty Fees
- Quality Standards Compliance
- Material Rework
- Material Waste
- Equipment Capital

Synergetics is well-versed in helping companies curb these costs, and the implementation of LEAN-based improvement actions, with single piece flow being one example, helps to provide manufacturers the opportunity to meet current marketplace demands in a cost-effective manner.

HOW THE MANUFACTURING PROCESS HAS CHANGED

The consumer marketplace has greatly changed since the days of Ford Motors producing one model of car in one color — the black Model T. And it was nearly 50 years ago that Shigeo Shingo began to develop LEAN principles and the concept of Quick Changeover at Toyota, as he outlined in *A Revolution in Manufacturing: the SMED System*, in 1985. With Quick Changeover came the benefits of additional cost savings areas, further aided by developing the LEAN production method **SMED — Single Minute Exchange of Dies.**

LEAN Sigma Strategy



The term “lean” is simply a systematic method of minimizing/eliminating waste and creating more value. SMED applied as a means of reducing waste in manufacturing provides an efficient way of converting a manufacturing process from one that is running the current product to one of running the next product.

Over the last few decades we have witnessed the evolution of product variance, in both material content and package offerings.

No longer is a chocolate chip cookie simply a cookie sold in a 24-count package. In addition to the classic version, they now come in low calorie, organic certified, gluten-free, and seasonal varieties. From a packaging standpoint, each variety is offered in the traditional 24-count pack as well as other count packages for different locations. **During all of these transitions, Synergetics has been there to help those companies make the necessary changes to stay competitive in their respective markets.**

UTILIZING LEAN TECHNIQUES TO TURN RESULTS INTO SAVINGS

WHERE ARE THE OPPORTUNITIES WHEN APPLYING LEAN PRINCIPLES?

The process of identifying improvement opportunities includes completing a full observational review of the “As-Is” process, starting with the Changeover process itself. Recording every detail of the process allows improvement opportunities to be identified AND quantified. Key details would include specific actions, distance traveled, time elapsed and noted areas of opportunity. A team review of all data with agreement on what true improvement opportunities are going to be addressed is recorded, then implemented.

Synergetics’ consultants are fully trained to work with and guide client teams to identify areas of opportunity. They have a full toolbox of LEAN-based techniques that yield improvements of 50% or more.

The following areas of opportunity are only a select few of the many that experienced teams using LEAN techniques can turn into savings:

Internal vs External

The most common improvement opportunity associated with Rapid Changeover is the conversion of internal activities (those activities completed when the line is idle) to external activities (activities completed when the line is active). Complete or partial conversion of any internal activity to external will result in reduced downtime. There are three stages involved:

STAGE 1

Separation: Separate internal and external activities and determine why each activity is placed where it is

STAGE 2

Conversion: Assess each internal operational step for its true purpose. Common conversion steps include:

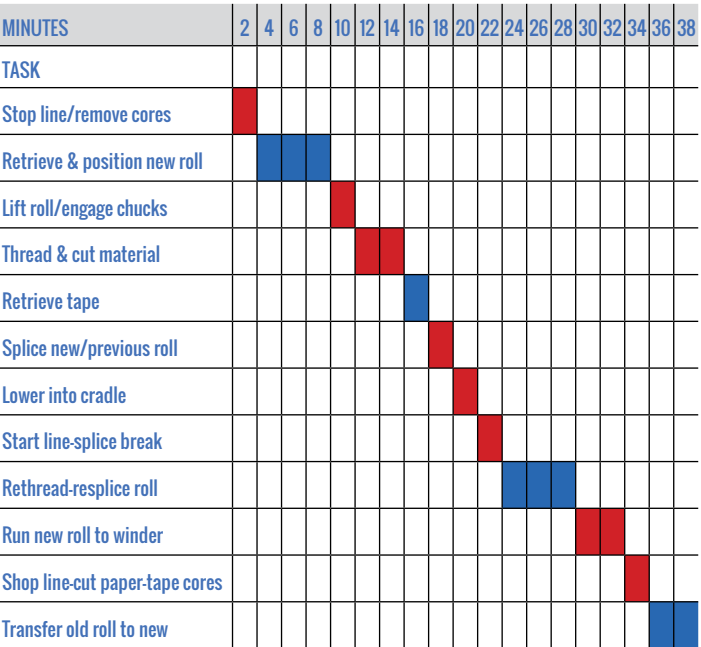
- Prestaging, kitting or eliminating need for required material, parts and equipment
- Secondary sets of machine tools to eliminate internal cleaning
- Use of intermediate jigs to eliminate mounting and adjustment time

STAGE 3

Streamlining: Once conversions have been completed and internal operations minimized, the process of streamlining internal operation steps can begin. By minimizing waste and error occurrence, overall setup time can be reduced.

Waste Elimination

When mapping a process to identify waste, or Non-Value Added activities, teams have several tools to utilize. In addressing Changeover, motion diagrams are completed to identify opportunities for improvement. These would include walking to and from work stations, or the staging of tools / material



The use of Gantt charts is one of several tools used to assist teams in determining “Value-Added” vs. “Non-Value Added” activities, such as when mapping out the “As Is” vs. the “To Be” process.

utilized in Changeover processes. For example, **a past client of Synergetics recognized a 60% reduction in mold Changeover by utilizing automatic features of the production line and ergonomic positioning of material.**

8 Changeover Wastes to Target and Remove

1 Transport	Moving people, products, information	5 Defects	Rework, scrap, incorrect documentation
2 Inventory	Storing parts, pieces, documentation ahead of required use	6 Skills	Under-utilizing capabilities, delegating tasks with inadequate training
3 Motion	Bending, turning, reaching, lifting, walking	7 Over Production	Making more than is IMMEDIATELY required
4 Waiting	Waiting for parts, information, instructions, equipment within the process	8 Over Processing	Using tighter tolerances or higher grade materials than are called for

Centerlining

Time lost for adjustment or accurate positioning of machine components can represent as much as 25% of a Changeover time duration. Centerlining of production lines provides an operator an obvious, or at a glance, point of reference to assure proper setup of production equipment. Additionally, it allows equipment operators the ability to complete a setup without calling maintenance and provides a simpler process for training inexperienced employees.

Poka Yoke

The official stop time to any Changeover process is the consistent production of "Good" parts. A key to producing "Good" parts is to ensure all equipment is set up correctly and within specifications. Although Centerlining is effective in assuring compliance, an additional LEAN concept known as Poka Yoke, or "Mistake Proofing," can also be used. Poka Yoke assures there is only one way to complete something, thus eliminating the potential to make errors. Examples of Poka Yoke might be:

- One way plugs or jigs—these pieces being non-uniform in shape that make installation only possible in the correct position for operation
- Contact Method—installation of sensors that will detect when material is not aligned correctly and will stop operation of equipment
- Templates—creation of templates that can be placed on a completed item to highlight errors or compliance
- Jigs—creation of jigs that can be used to verify length or size of component materials prior to installation

Standardized Procedures

Once defined and implemented, the Quick Changeover process requires thorough documentation, often with an MOS (management operating system) and playbooks for all staff to follow. Not only will this serve as the basis for future improvements, but it will also provide critical back-up to alleviate effects of "Tribal Knowledge" and simplifies the training process. Standardized procedures should include detailed work instructions, displayed one point lessons and process checklists. Without having standardized procedures and a dashboard, the improvements gained through a successful SMED implementation will fade over time and fail to be sustained.

Basic Examples of How to Centerline a Process

ELIMINATED ADJUSTMENTS — For any equipment component that does not require adjustment between setups



Before



After

FIXED POSITION ADJUSTMENTS — For any equipment component that has alternate set range based on setup



Before



After

GRADIENT SCALES — For any type of gauge or scale setting that has an ideal operational range



5S is a workplace organization technique composed for five primary phases:



SORT

Keep only necessary items in the workplace



SET IN ORDER

Arrange items to promote efficient workflow



SHINE

Clean the work area so it is neat and tidy



STANDARDIZE

Set standards for a consistently organized workplace



SYSTEMATIZE

Maintain and review standards

Lean6sigma4all.eu

Two Recent Client Engagements Representing Rapid Changeover Implementations

1) Large International Bakery-Snack Food Provider

The food industry's leading contract manufacturer and private bakery engaged Synergetics to help implement its internal management operating system (MOS) throughout their production facilities. MOS is a best practices continuous improvement program that relies on extensive training for staff to utilize its operations / processes in meeting company-wide strategic objectives.

Results Overview: Over the course of 10 weeks, Blitz Team results exceeded expectations, as they achieved their objectives of cost reductions and improved efficiencies utilizing LEAN manufacturing methodologies that included the following areas:

- Changeover Reduction Practices
- Change in Line Layouts and Process/Material Flows
- Increased Throughput (to continue operations through breaks/lunch)
- Labor Reductions (via reasonable work capacity)
- Improved Shop Floor Management
- Organizational Redesign

Over \$2M in annualized savings were realized through changeover and efficiency improvements, line balancing, and increased equipment uptime, while utilizing fewer employees.

Management teams in facility locations received training on all aspects of MOS where everyone, every day, has input into raising plant performance. Each plant management team, now held accountable to attain certain plant/shift performance measures, utilizes tools to help their facilities' equipment capability reach performance levels exceeding 85% of T-Max (theoretical maximum being 100%). A culture of Continuous Improvement is present and growing with the business.

2) North American Frozen Entrées/Snack Manufacturer

A leading North American manufacturer and marketer of branded and private label frozen entrées and snacks engaged Synergetics to work with their management team to help identify Changeover opportunities within their plants. As the third-largest producer of frozen entrées in the US, with a daily production capacity of over 2M meals and marketing more than 400 products across several categories, it became apparent that production / processes needed to be streamlined.

Results Overview: Over a 4-week period, Blitz Team members were trained on Rapid Changeover "LEAN Principles" to identify and understand:

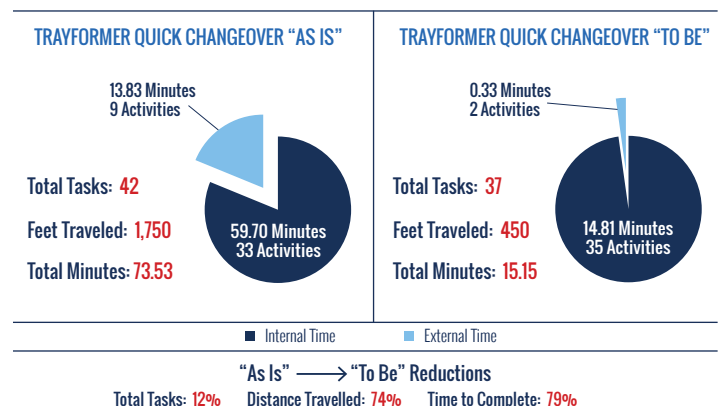
- Internal vs. External Work Activities (Externalize activities)
- Decreasing Wasted Time – Playbook – Expectations
- Increasing Changeover Efficiency – Employee "Task List"
- Optimizing Work Flow – 1 Pt. Lessons / Best Practices
- Preserving Value with Less Work – New "Work Standards"
- 7 Manufacturing Wastes – Defects, Inventory, Processing, Waiting, Motion, Transportation, and Over Production.
- 5S – Sorting, Straighten, Sweeping, Standardizing, and Sustaining the Work Place and Processes.

Measurable benefits of a Rapid Changeover included higher quality, production runs closer to customer orders, reduced lead time through facilities, reduced inventories, and a flexible operation. The following example of measurable differences from an "As Is" to a "To Be" Quick Changeover for forming particular food trays illustrates how effective this practice can be spread over an entire facility. Increased line efficiencies and throughput in various processes are quite evident.

A hallmark of excellence that Synergetics has earned over the years is their specialists' ability to work collaboratively with client managers and front-line teams on the shop floor. Their hands-on approach and use of industry best practices, with client staff knowledge of the company business, allow employee teams to take ownership of the process. Synergetics' use of LEAN methodologies and change management principles to optimize production is instrumental during this implementation period.

Client senior management commitment, employee involvement, and Synergetics' team support are critical for project success. With these key elements in place, as outlined above, along with well-defined benchmarks and project scope, **Synergetics can deliver significant, sustainable improvements in profitability and operational efficiency with a guaranteed ROI.**

Trayformer Quick Changeover



FOR MORE INFORMATION

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