10 Steps to become a Lean Enterprise

Lean Expert Training Course

Step 5

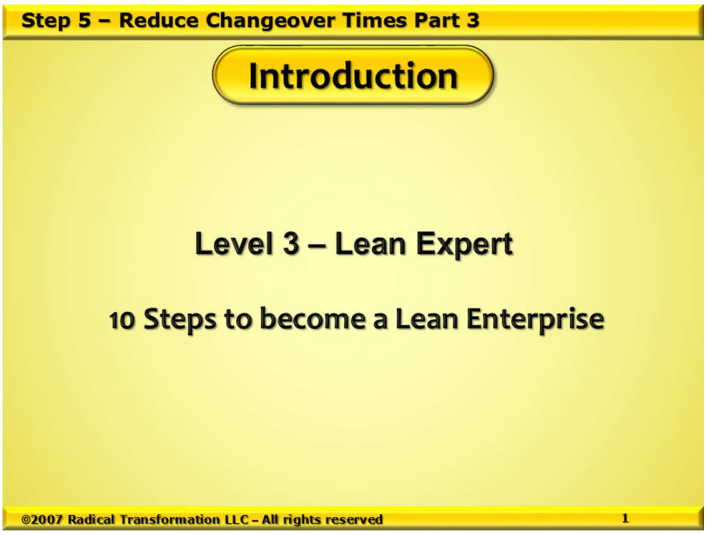
Reduce Changeover Times

Part 3

Lean Expert Course Workbook - Step 5 Reduce Changeover Times Part 3

Table of Contents

Please note that some of the screens in the online course have been omitted from this workbook. This is to protect any proprietary information that may be included in the pictures.



Welcome.

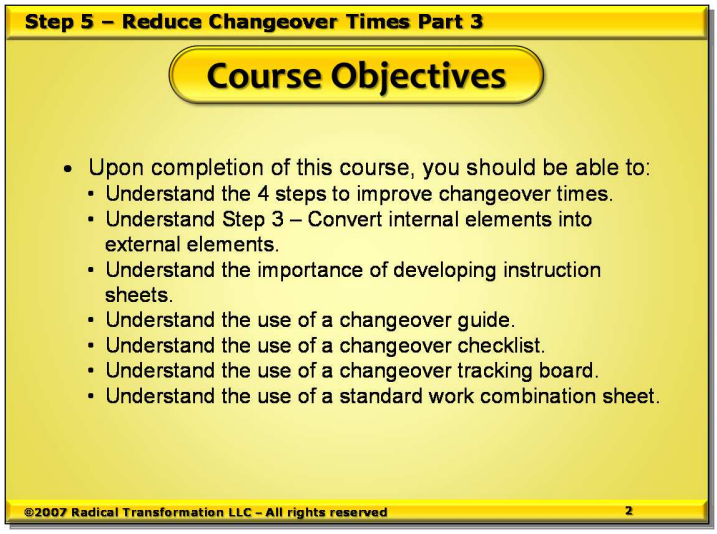
We would like to welcome you back to our next module in this online training course.

This training module is called “Step 5 – Reduce Changeover Times Part 3.”

This module is a continuation of our Lean Expert online course series called “10 steps to become a Lean Enterprise.”

This program has been specifically designed to demonstrate our step by step methodology that will allow any organization to become a Lean Enterprise.

Let’s continue your lean journey!



Course Objectives

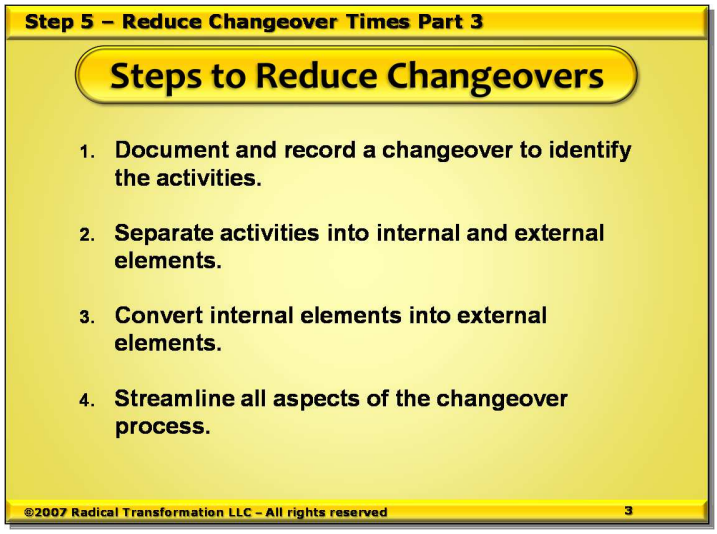
Here are the course objectives for Step 5 – Reduce Changeover Times Part 3.

We specially designed this course to give the information you need to get a full understanding of each step required to become a Lean Enterprise.

Upon completion of this course, you should be able to:

- Understand the 4 steps to improve changeover times.
- Understand Step 3 – Convert internal elements into external elements.
- Understand the importance of developing instruction sheets.
- Understand the use of a changeover guide.
- Understand the use of a changeover checklist.
- Understand the use of a changeover tracking board.
- Understand the use of a standard work combination sheet.

Now we are going to work through each course objective.



Four Steps to Reduce Changeovers

These are the four steps to reducing changeover times.

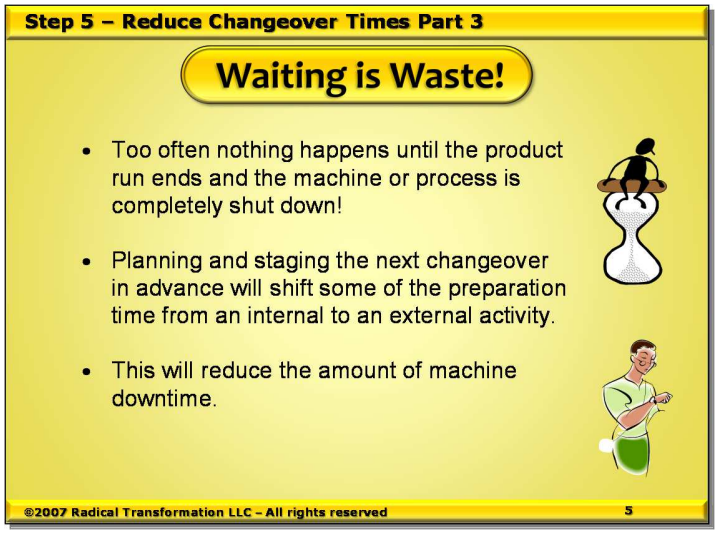
In the following training modules of Step 5 – Reducing Changeover Times, we will discuss these four steps in detail.

The four steps are:

1. Document and record a changeover to identify the activities.
2. Separate the activities into internal and external elements.
3. Convert internal elements into external elements.
4. Streamline all aspects of the changeover process.

Each of these steps is a critical element in reducing changeovers.

Each step must be performed in the prescribed order.



Waiting is Waste

Too often nothing will happen to changeover a machine until the product run has been completed and the machine or process is completely shut down.

The setup team will start to gather their equipment and begin the changeover process.

The machine sits waiting until the team is ready to start the setup.

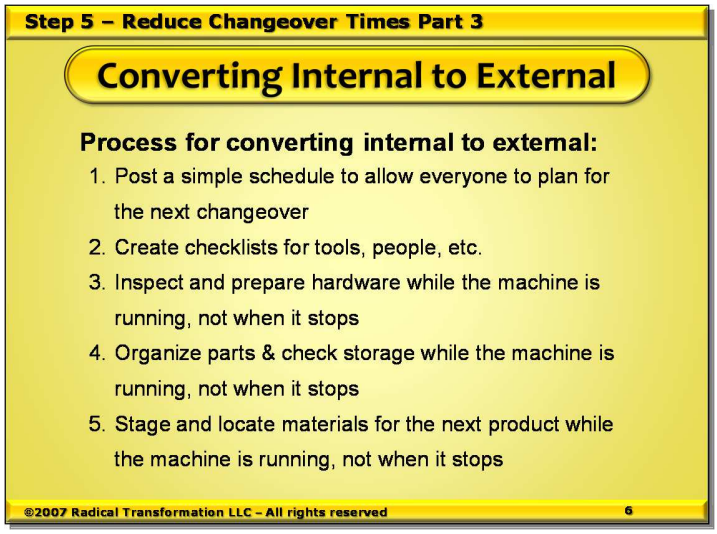
Waiting is one of the eight wastes.

It does not require a complex process to improve the situation.

All that is needed is a little advanced planning, and staging of the equipment for the next changeover.

This will shift some of the preparation time from an internal to an external activity.

This is the primary focus of the improvement process of SMED because it will reduce the amount of machine downtime.

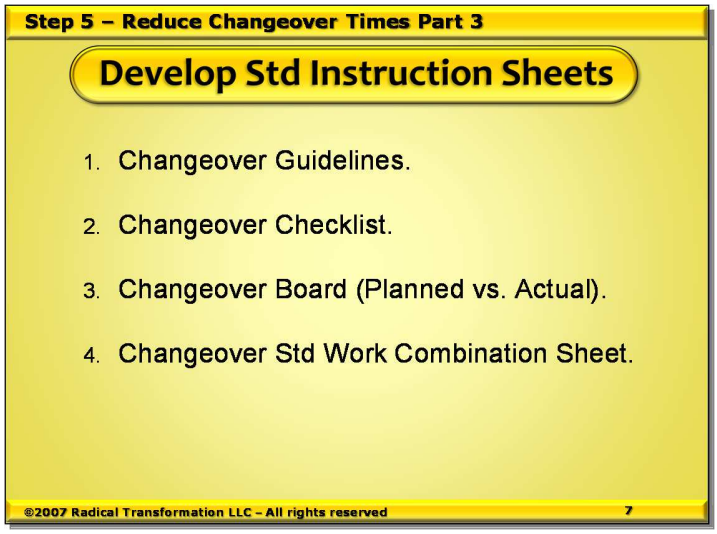


Step 3 - Converting Internal to External

Here are some actions for converting internal to external activities:

1. Post a simple schedule to allow everyone to plan for the next changeover.
2. Create checklists for tools, people, etc. used with specific products.
3. Inspect and prepare equipment for the next parts setup while the machine is running. Do not wait until the machine stops because this extends the downtime.
4. Organize parts and check storage while the machine is running, not when it stops.
5. Stage and locate materials for the next product while the machine is running, not when it stops.

Following these actions will make it easier to achieve the goal of reducing changeover times.



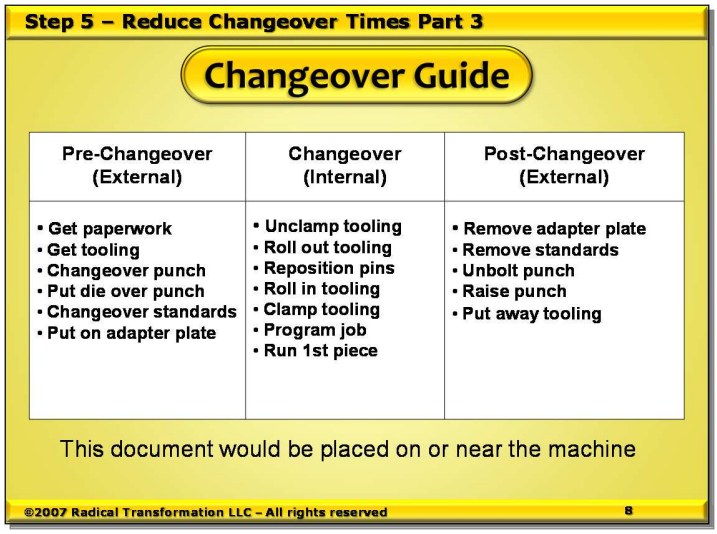
Develop Standard Instruction Sheets

Instruction sheets are necessary to ensure the correct actions are being followed during the changeover event.

Here is a list of four methods for documenting changeover procedures:

1. Changeover Guidelines.
2. Changeover Checklist.
3. Changeover Board (Planned vs. Actual).
4. Changeover Standard Work Combination Sheet.

We will discuss each of these items in detail in the following screens.



Changeover Guide

In this screen, you can see an example of a document called a changeover guide.

The purpose of this document is to be a reference guide for the person or persons setting up a machine.

It would be placed on or near the machine for easy viewing.

It defines exactly what must occur before, during, and after the changeover event.

It defines the best practices to minimize equipment downtime.

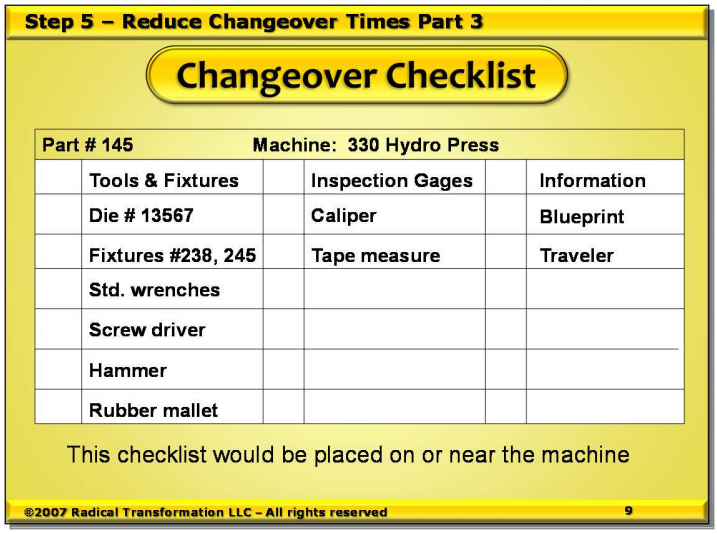
Pre-Changeover: This section of the document defines all the activities that must be performed before the changeover is started, while the machine is still working.

Changeover: This section of the document defines all the activities that must be performed during the changeover, while the machine has completely stopped.

Post-Changeover: This section of the document defines all the activities that must be performed after the changeover has been completed and the machine is working again.

A changeover guide is usually product specific.

This means that each product group will have its own changeover guide included as part of the changeover documentation.



Changeover Checklist

In this screen, you see an example of a changeover checklist.

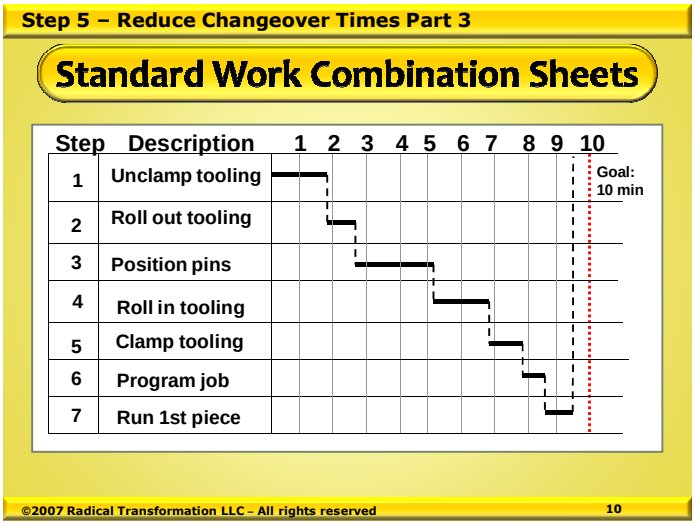
The purpose of this checklist is to identify all the critical items that are needed to perform a changeover.

Every item included in the checklist must be available to complete the changeover process.

If any of the items are missing during a changeover event, it will require someone to go and obtain them.

This is another example of waste.

A changeover checklist would be included in the standard setup documentation package.



Standard Work Combination Sheet

In this screen, you see an example of a standard work combination sheet.

It is used to define the activities during a changeover event.

It graphically represents the time required for each changeover activity.

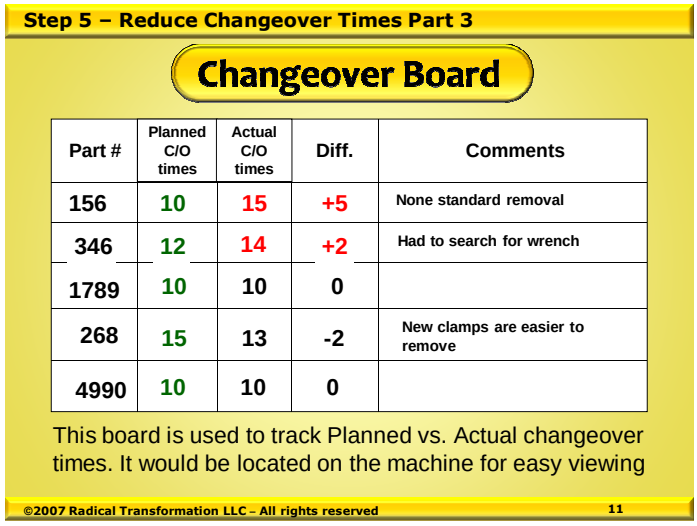
On the left side of the document, there is a red line, which indicates a goal time of ten minutes for this changeover.

The purpose for using this document is to give the setup team an idea of what it should take to complete the changeover.

This goal time would have been decided upon after observing and monitoring several changeover events on the same piece of equipment.

The changeover time on the standard work combination sheet defines the best practice or standard work process.

The standard work combination document will be explained in more detail during Step 8 – Standardized Work.



Changeover Board

In this screen, you see an example of a changeover board.

The purpose of this board is to track the actual vs. planned changeover times.

If the actual time is the same or less than the planned time, the setup team achieved the desired goal.

If the actual time is longer than the planned time, the team would use problem solving to identify the root cause.

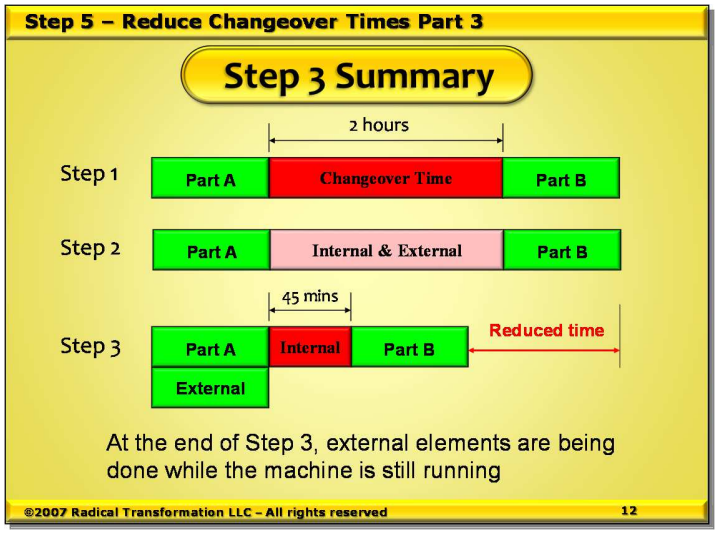
In the previous screen, we discussed the standard work combination sheet which had a red goal line of ten minutes.

This time would represent a planned changeover time.

Every time a changeover event took place on the same piece of equipment, the time would be recorded on the board.

You can see in the example where the planned and actual changeover times have been entered and compared.

The data from the changeover board is a vital part towards maintaining and improving the set up procedures on any machine.



Step 3 Summary

At the end of Step 3, some of the internal activities will have been converted into external activities.

This means the overall changeover time will have been reduced even further.

It is very important to continue to convert internal activities into external activities.

Why is this so critical?

When one minute of internal time is converted into external time, the machine downtime is reduced by one minute.

Read this sentence again!

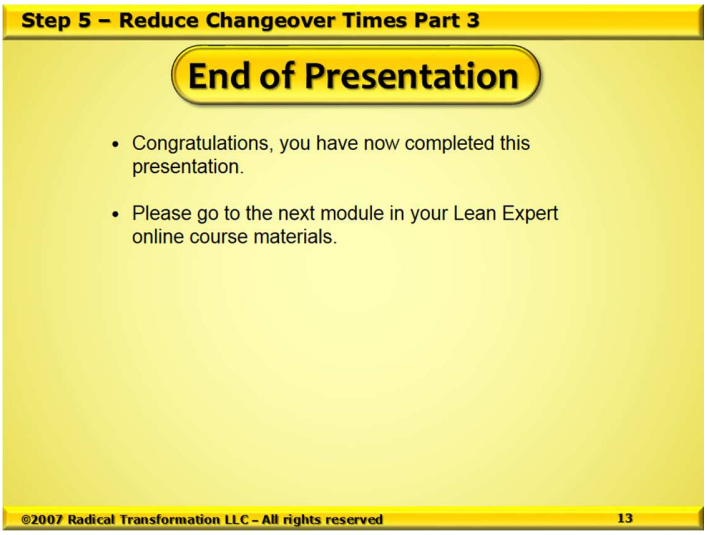
It is crucial for any business to understand this statement.

Without implementing this, a business cannot become a Lean Enterprise.

It must create the necessary level of flexibility in its processes to meet fluctuations in customer demand.

The lower the changeover time, the more flexibility there is. The more flexibility a business has, the more agile they are to meet the demands of the market place.

Now we are ready to move onto Step 4 – Streamline all aspects of the changeover process.



End of Presentation

Congratulations, you have now completed this presentation.

Please go to the next training module in your Lean Expert online course materials.

Lean Expert Course Workbook - Step 5 Reduce Changeover Times Part 3

Reference Materials

1. **Quick Changeovers for Operators: The SMEDSystem.**
   By: Productivity Press Development Team. Published by Productivity Press 1996.
2. **Quick Changeover Simplified -The Manager's Guide to Improving Profits with SMED.**
   By Fletcher Birmingham and Jim Jelinek. Published by Productivity Press 2007.
3. **Kaizen for Quick Changeover: Going Beyond SMED.**
   By Keisuke Arai and Kenichi Sekine. Published by Productivity Press 2006.

Lean Expert Course Workbook - Step 5 Reduce Changeover Times Part 3

Documents List

1. **Quick Changeover Analysis Sheet**

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Name: _____ Dept: _____ Date: _____

Machine/Equipment #: _____ Product #: _____ Prod Desc: _____

All Work Elements	Time	External Elements	Time	Internal Elements	Time	Reduce/Eliminate	Time
Total Minutes Total Hours		Total Minutes Total Hours		Total Minutes Total Hours		Total Minutes Total Hours	

