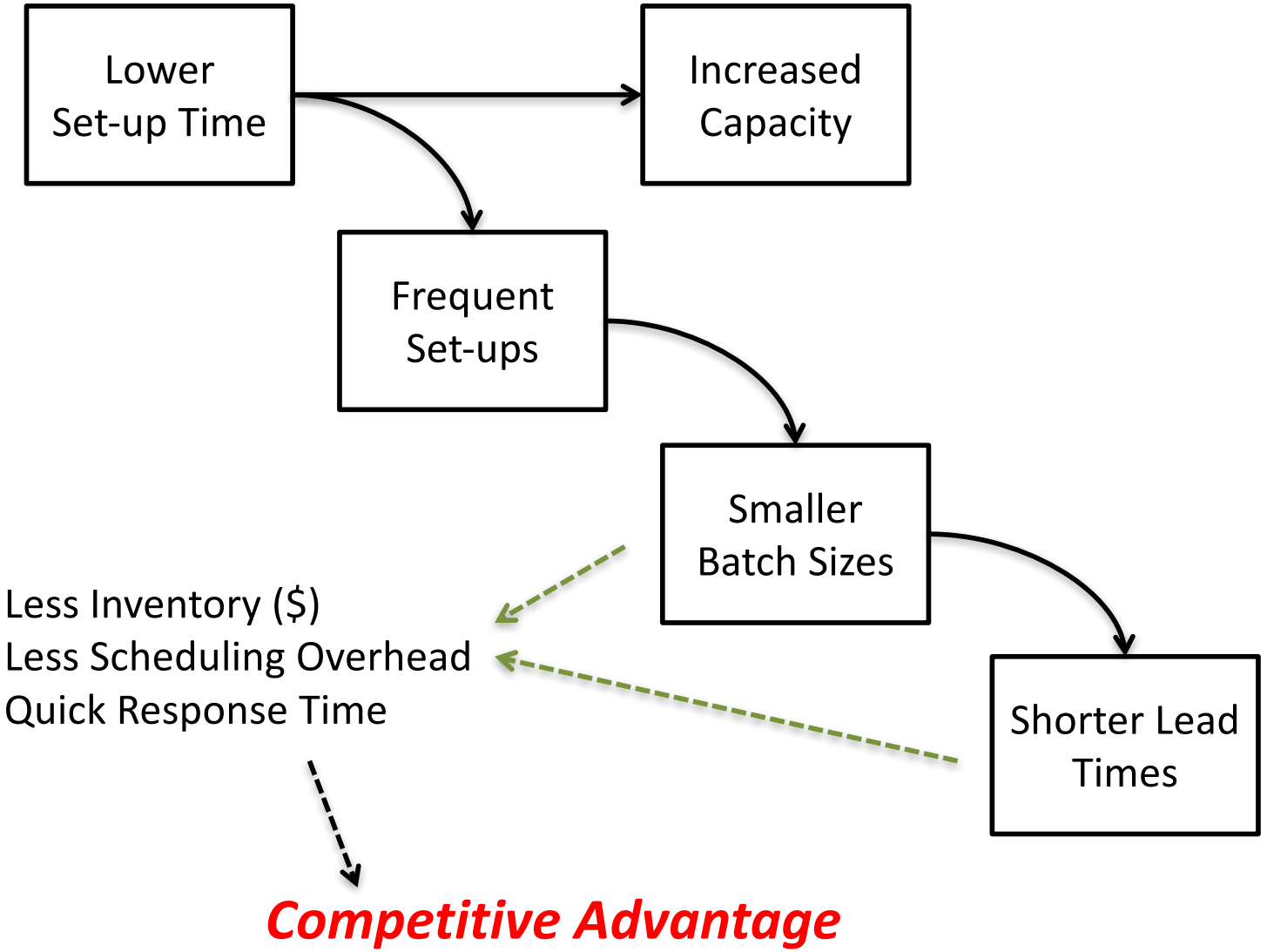
Single Minute Exchange of Molds SMED

Training for Operational Excellence

GAP IMPROVEMENTS

Why Do We Need to Improve Our Set-ups?



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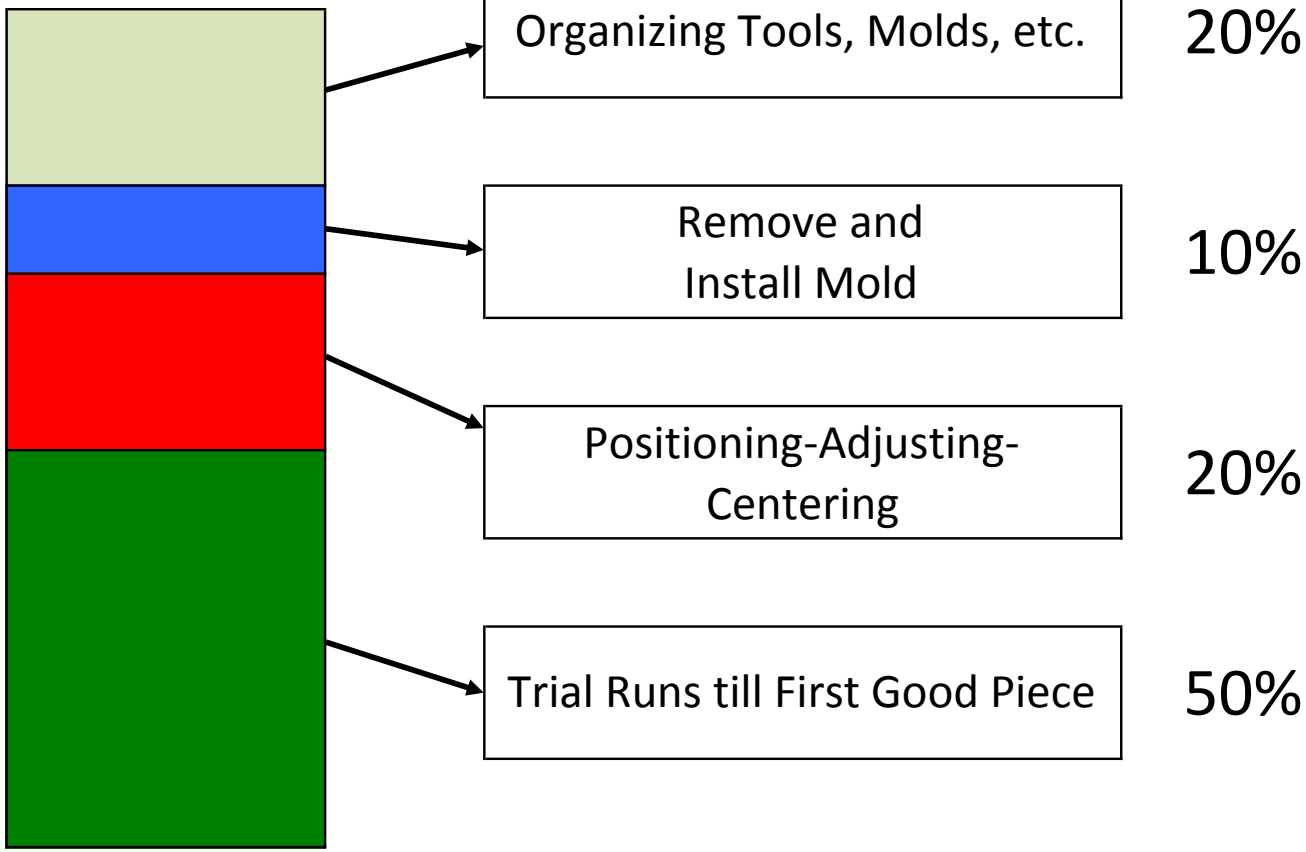
Typical Set-up Findings



Simple Tools and Techniques Can Have a Dramatic Effect on Set-up Time

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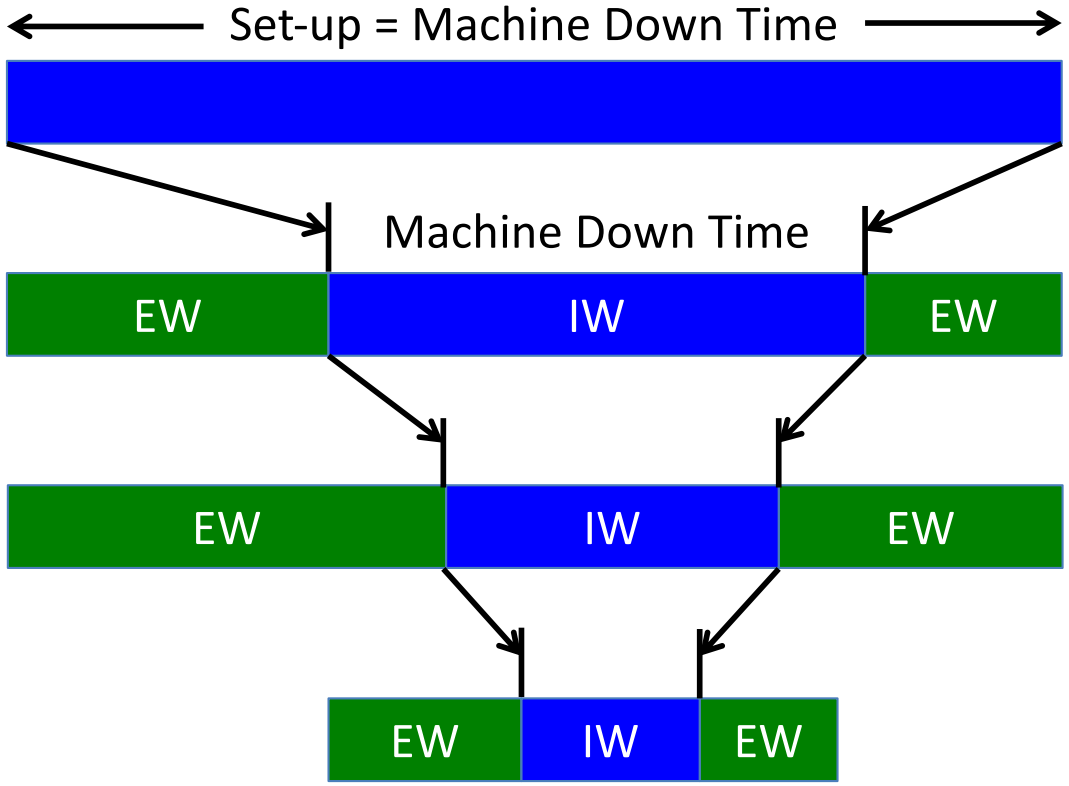
Four Steps to Setup Reduction

1. Separate Internal Work (IW) from External Work (EW)
2. Convert Internal Work to External Work
3. Reduce the Remaining Internal/External Work
4. Develop Functional Standardization



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Four “W’s” and One “H”

What is the purpose?	Eliminate Unnecessary Actions
Where is it being done?	Combine or Change Place
When is it being done?	Combine or Change Sequence
Who is doing it?	Combine or Change Person
How is it being done?	Simplify or Improve Method

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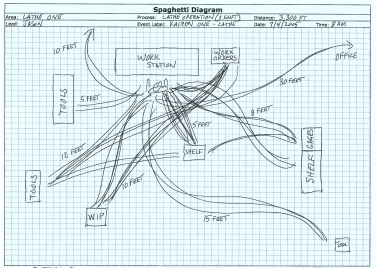
1 - Separate IW and EW Detail Analysis Techniques

Practical

Set-up Simplification Techniques

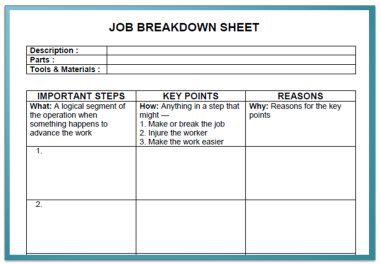
Graphical

Before & After Improvement Drawings



Analytical

Detailed Time & Type Breakdown of Activity



JOB BREAKDOWN SHEET

Description :	
Parts :	
Tools & Materials :	

IMPORTANT STEPS	KEY POINTS	REASONS
What: A logical segment of the operation when something happens to advance the work	**How:** Anything in a step that might — 1. Make or break the job 2. Injure the worker 3. Make the work easier	**Why:** Reasons for the key points
1.		
2.		

2 – Converting Internal Work to External Work

Organization

- ✓ Organize Tools, Parts, and Tooling Prior to Set-up
- ✓ Locate at Point of Use and Sequence

Checklist – Prevent Oversights or Mistakes

- ✓ List tools, specifications, and # workers required for given operation
- ✓ Indicate proper operating conditions (pressure, speed, etc)

Improved Transportation

- ✓ From Storage to machine while machine is in operation

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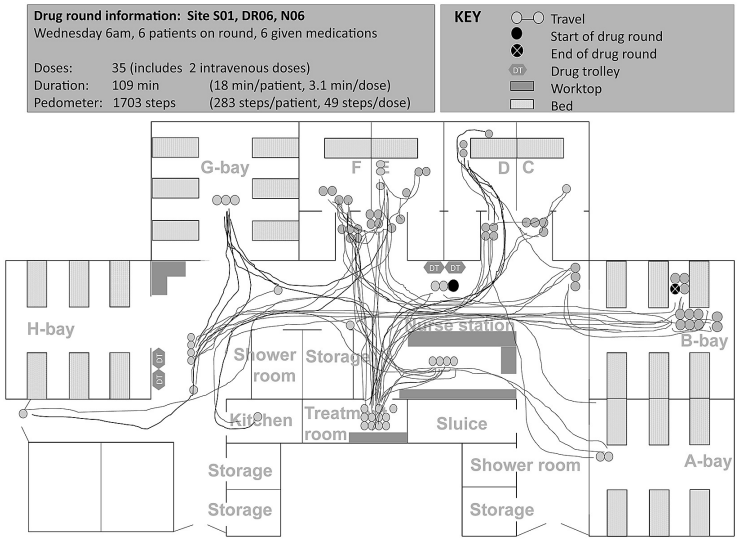

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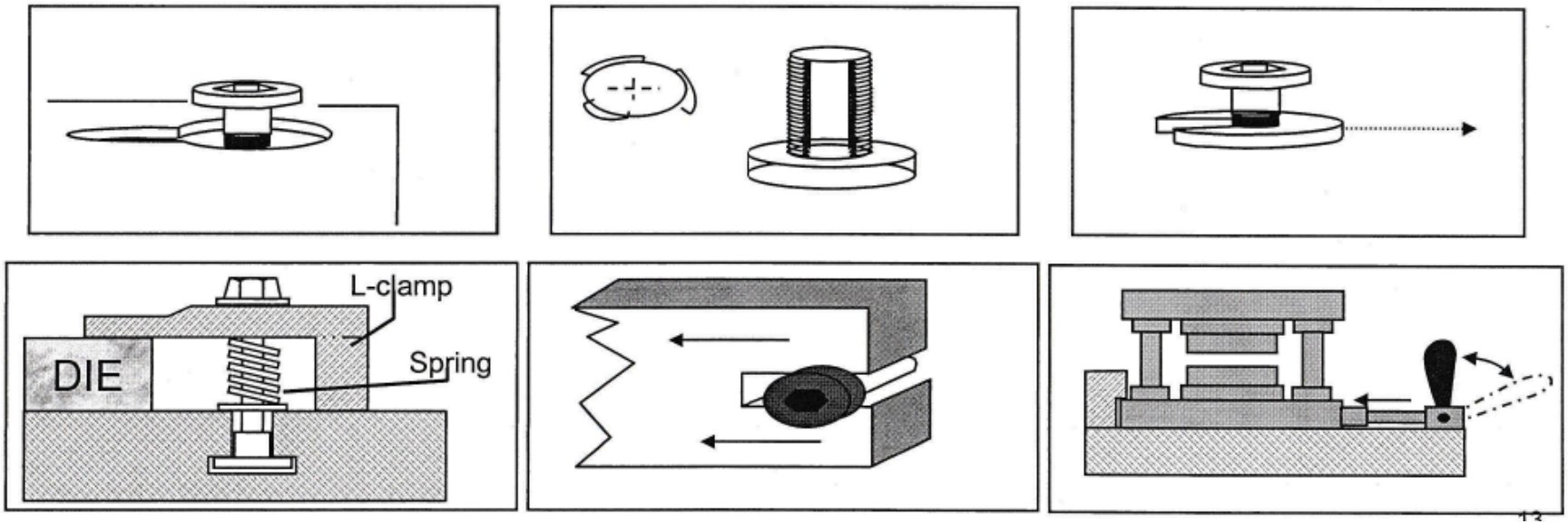
3 – Reducing Internal & External Work

Reduce Attachments/Detachments

- Standardize fixtures
- Reduced # of Bolts
- Standardize Bolt Heads
- Cut off Unnecessary Threads
- Use a quick fastener such as a pear-shaped hole, U-shaped washer, chipped nut and bolt



4 – Setup Standardization

Understand Current Setup Operation

- Videotape, analyze, and improve the setup with operators

Standardize Setup Activities

- Develop standard work for the internal & external setup
- Implement the standard work package to ensure an efficient & consistent approach to the setup
- Revisit the standard work package on a regular basis to evaluate for any improvement areas

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Setup Reduction Targets

What are World Class Performance Levels?

0%	Preparation and Organization of the Work Area or Product	0%
0%	Centering, dimensioning, and aligning	0%
0%	Trial Runs and Adjustments	0%
0%	Mounting and Removing Tools, Dies, and Work Pieces	100%

Single Minute Exchange of Die (SMED)* Setup time in less than 10 min's

One Touch Exchange of Die (OTED)* Setup Time is Less Than One Minute

The goal in set-up reduction is to reduce the skill level required to perform the change over operations.

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Classification of Set-up Elements

Type	Term	Description
EW	**External Work**	The work performed by the operator when the machine is running
IW/EW	**Internal Work/External Work**	A way to describe each process step, IW = Internal Work & EX = External Work
IW	**Internal Work**	The work performed by the operator when the machine is down
C	**Center & Aligning**	The tasks associated with centering, aligning, and adjusting tools and parts prior to manufacturing
M	**Mounting & Removing**	The tasks associated with the preparing machines, tools, parts, and equipment to transition a workstation from one model to the next model
P	**Preparation Work**	The tasks associated with the preparing machines, tools, parts, and equipment to transition a workstation from one model to the next model
T	**Trial Runs**	The time associated with producing the first good part after the workstation changeover

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Key Concepts

Set-up Time: The elapsed time from the last good piece of the last product on the machine to the production of the first good part.

Internal Work: Internal work is set-up work that must be performed while the machine or equipment is not running. For example, a new die can only be added to a punch press while the machine is disabled.

External Work: External work is set-up work that can be performed while the machine is still running. For example, material preparation for the next part. Product can be performed while the machine is running the current part.

SMED: An acronym for the term: single Minute Exchange of Dies. SMED performance levels for the changing of tooling (9 minutes and 59 seconds or less).

OTED: An acronym for the term: One Touch Exchange of Dies. A set-up perform by one touch

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