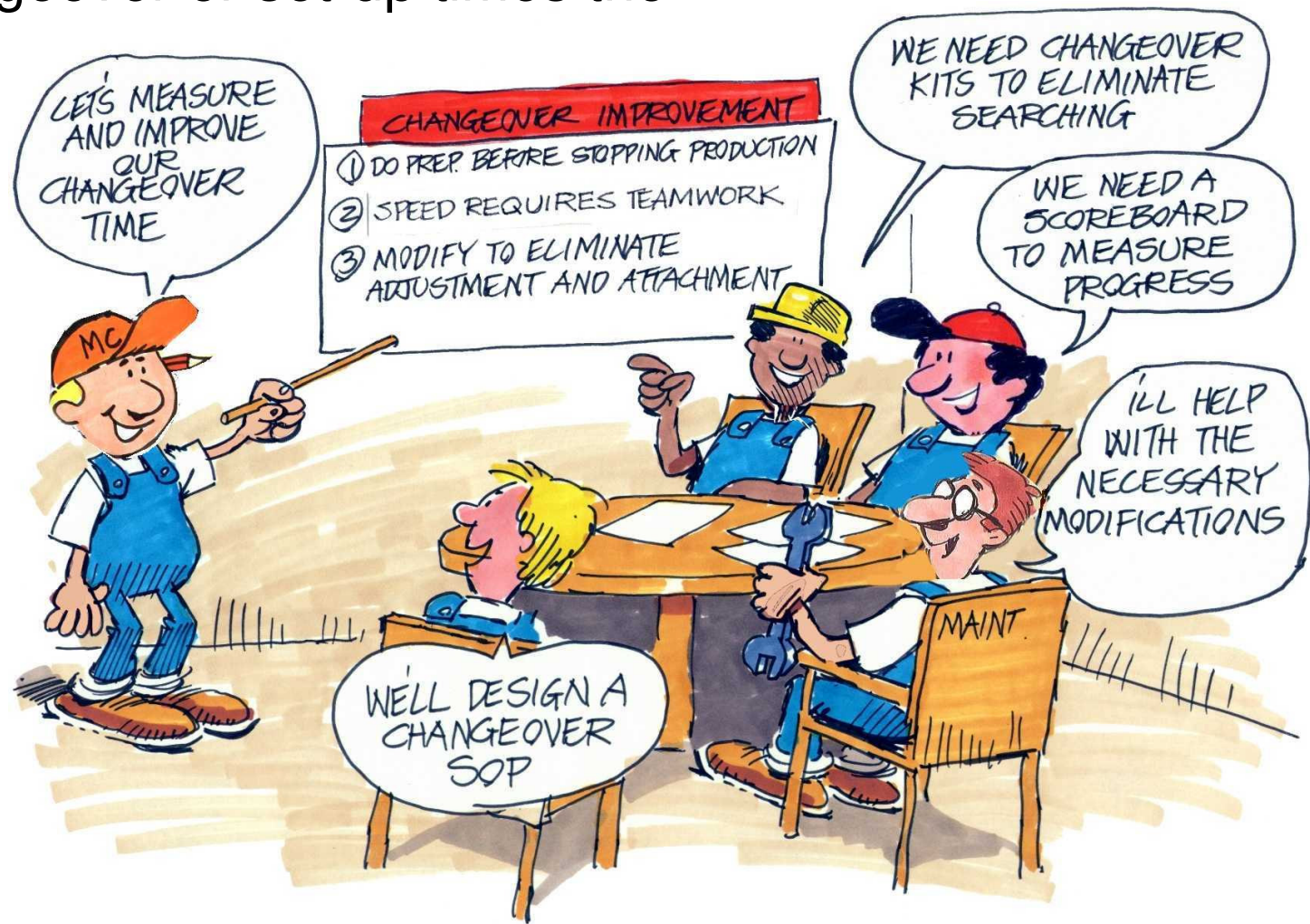


**Quick Changeover. Context, then theory.....**  
*in preparation for practical exercise tomorrow.*

## Quick Changeover Techniques

# Quick Changeover Techniques

With long changeover or set-up times the challenge is to reduce these times so that we can produce **what** is required, **when** it is required.



# Long Set-up Times

## Traditional Company

*Accept Set-up time*



The traditional approach is to live with long set-up times, the tradeoff is often excess inventory caused by long runs.

## World Class Company

*Challenge to improve Set-up time*



The world class approach is to challenge and reduce long set-up times, so we can produce what is required when it is required.

# Definition of Changeover Time

The time taken between the last product produced from a previous run to the running of another quality product at full speed.



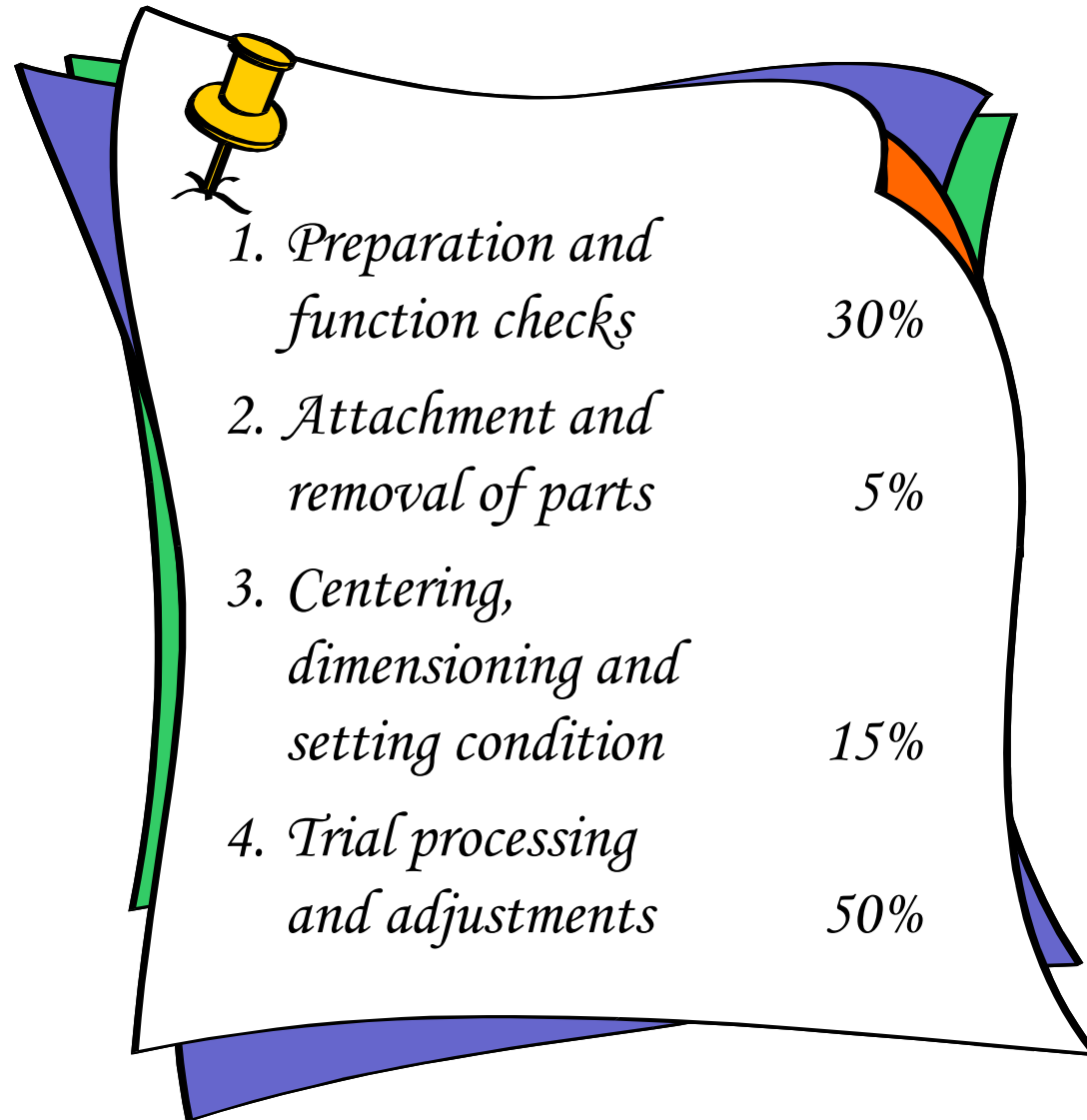
# Standard Set-up Activities

Think of a change over.  
What are the things that happen ?

1. Preparation, Cleaning, Paperwork.
2. Attachment and Removal of Parts.
3. Centering, Dimensioning and Setting Conditions.
4. Trial Processing and Adjustment.

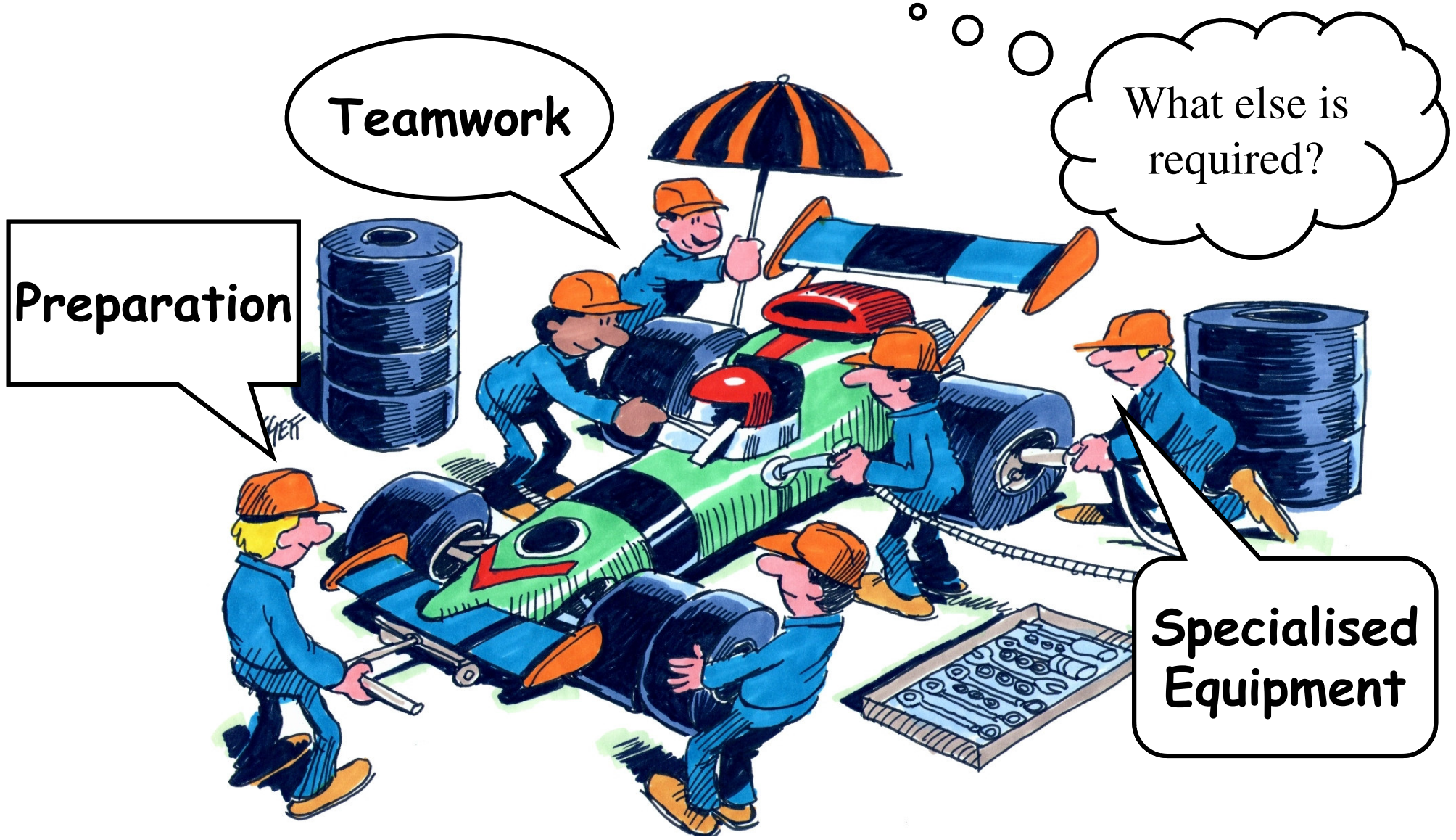
# Time Spent on Standard Setup Activities

Many activities done after production has stopped could have been done as preparation before stopping the previous production run.





# Think of Quick Changeover - Formula 1 Racing



# Fundamental Concept

To achieve QCT it is important to differentiate between what can be done before stopping production what has to be done once production has stopped, that is differentiate between **Internal** and **External** Changeover.



## **Internal Changeover:**

Activities that must be done while the machine is shut down

## **External Changeover:**

Activities that can take place while the machine is operating



# Examples of Activities

## Internal

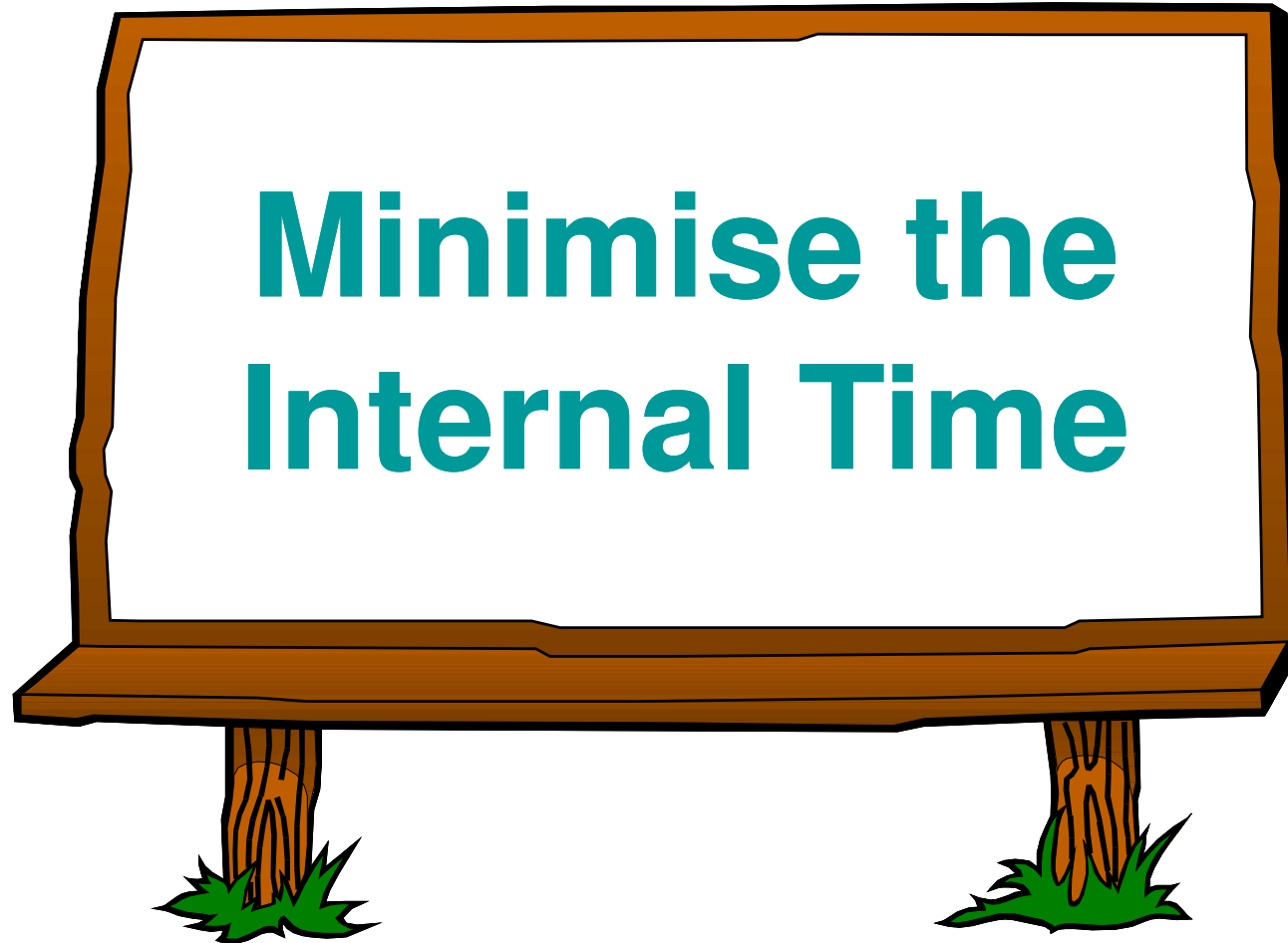
- Exchange machine parts
- Exchange products
- Cleaning
- Adjust settings
- Running in
- .
- .

## External

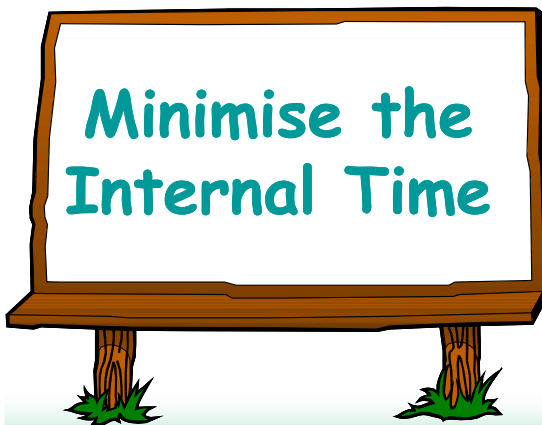
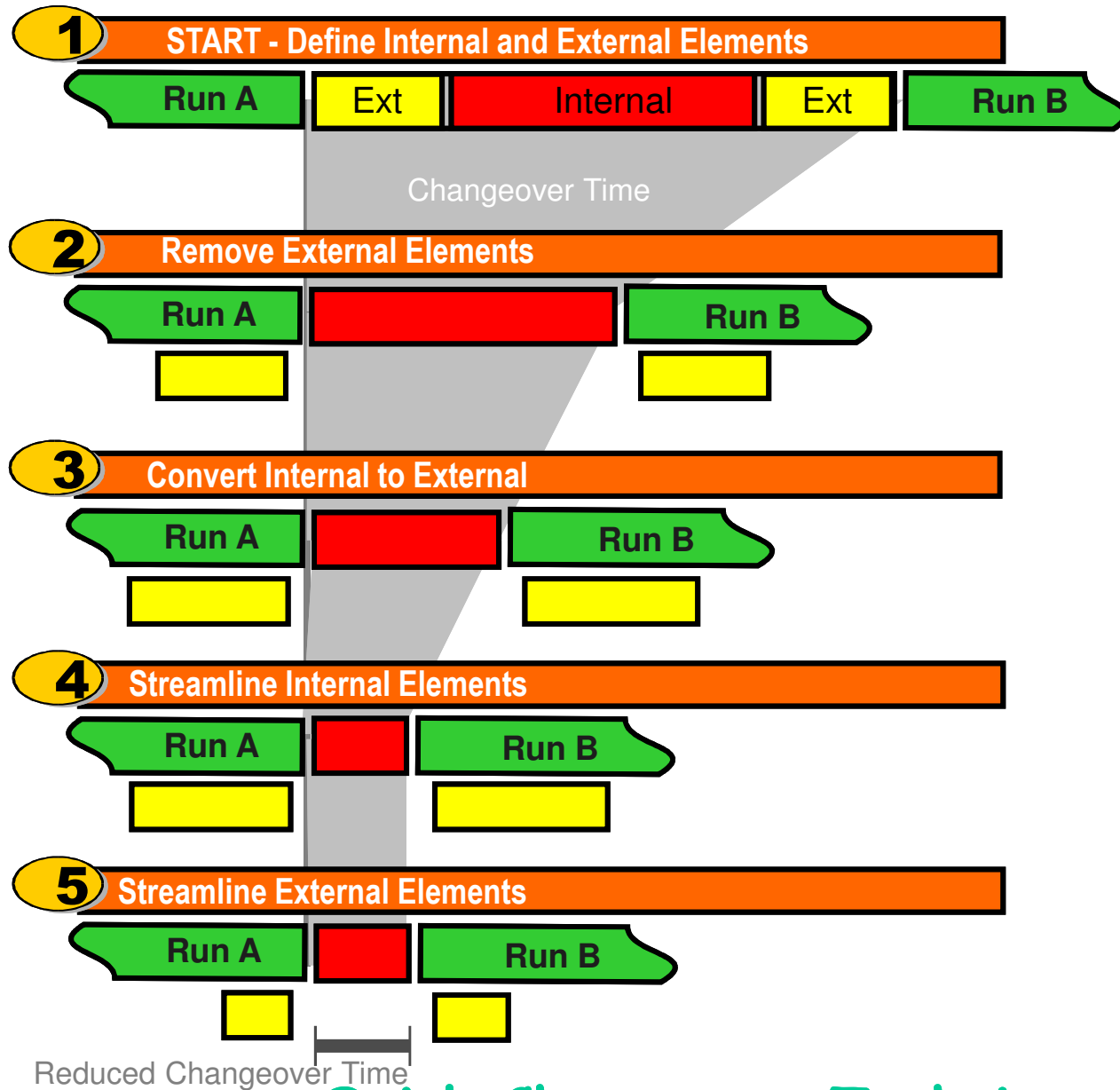
- Paperwork
- Cleaning
- Collection of parts, tools, materials, people
- .
- .
- .

*5 Minutes. Buzz groups. Identify other examples.*

# Important Principle of QCT



# The 5 Steps of QCT



## Step 1: Define Internal Elements

- Observe an actual changeover.
- Record the actual steps in the changeover process.
- Analyse the changeover.

## Step 2: Remove external elements from the changeover time

- Eliminate the external elements identified in step 1.

## Step 3: Convert as many internal elements to external elements

- Review the remaining internal elements and determine if they can be externalised.



## Step 4: Streamline the remaining internal elements

- Eliminate adjustments.
- Use single turn attachments.
- Use single motion devices.
- Changeover team should not move their feet while performing a changeover.
- Use parallel operations where possible.

## Step 5: Streamline the external elements



## Quick Changeover Techniques Bar Chart

| Step No. | Step Description | Step Time (min)   | Bar Chart (Time -min) |    |    |    |    |    |    |    |
|----------|------------------|-------------------|-----------------------|----|----|----|----|----|----|----|
|          |                  |                   | 5                     | 10 | 15 | 20 | 25 | 30 | 35 | 40 |
| 1        |                  |                   |                       |    |    |    |    |    |    |    |
| 2        |                  |                   |                       |    |    |    |    |    |    |    |
| 3        |                  |                   |                       |    |    |    |    |    |    |    |
| 4        |                  |                   |                       |    |    |    |    |    |    |    |
| 5        |                  |                   |                       |    |    |    |    |    |    |    |
| 6        |                  |                   |                       |    |    |    |    |    |    |    |
| 7        |                  |                   |                       |    |    |    |    |    |    |    |
| 8        |                  |                   |                       |    |    |    |    |    |    |    |
| 9        |                  |                   |                       |    |    |    |    |    |    |    |
| 10       |                  |                   |                       |    |    |    |    |    |    |    |
| 11       |                  |                   |                       |    |    |    |    |    |    |    |
| 12       |                  |                   |                       |    |    |    |    |    |    |    |
|          |                  | <b>Total Time</b> |                       |    |    |    |    |    |    |    |

## Quick Changeover Techniques Analysis Sheet

| Step No.          | Step Description | Time | External/Internal | Problem | Solution |
|-------------------|------------------|------|-------------------|---------|----------|
| 1                 |                  |      |                   |         |          |
| 2                 |                  |      |                   |         |          |
| 3                 |                  |      |                   |         |          |
| 4                 |                  |      |                   |         |          |
| 5                 |                  |      |                   |         |          |
| 6                 |                  |      |                   |         |          |
| 7                 |                  |      |                   |         |          |
| 8                 |                  |      |                   |         |          |
| 9                 |                  |      |                   |         |          |
| 10                |                  |      |                   |         |          |
| 11                |                  |      |                   |         |          |
| 12                |                  |      |                   |         |          |
| <b>Total Time</b> |                  |      |                   |         |          |

## Case Study – Backsliding. Implementation of New Changeover Procedure:

Last year, a well known consumer goods company spent four months and \$68,000 on C.I. and Quick Changeover re-engineering of their filling lines to enable operators to perform faster changeovers.

One year later, during review, the changeovers were taking more than double the predicted time, and very little of the predicted savings had been realized. So, what went wrong?

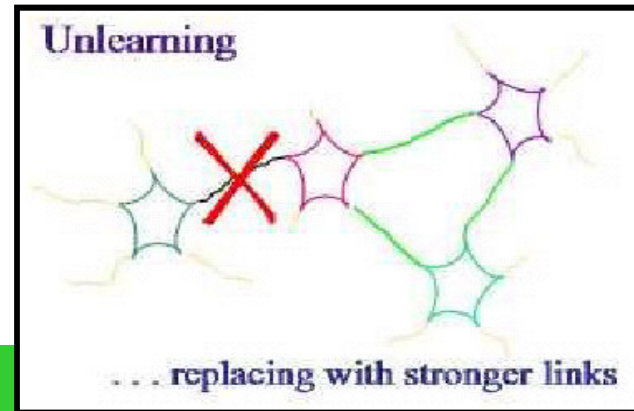
A statement by the best operator was recorded:-

*" We wanted to do well,  
but we just reverted back to our old way of doing things".*

- The production manager was fascinated and researched this.....

## Case Study – Backsliding. Implementation of New Changeover Procedure:

He found that most people could be good at learning, but they often need more help with **unlearning**. Breaking habits.



He found one thing causing it.

**Repetition** - each time that a person carries out a task, they are strengthening the knowledge and motor skill links associated with that task, further strengthening those learning links.... *Learning is a process of making links (neural pathways) between brain cells (neurons) in the brain.*

And when he studied further he found:-

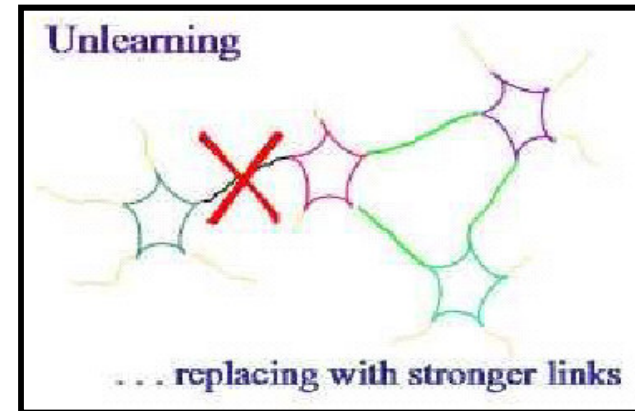
**Emotion.** The things we do, we become attached to in our thinking and valuing, even if those things don't serve us very well.

And another thing. It just happens in humans automatically.  
It all happens outside of conscious awareness.

2

## Case Study – Backsliding. Implementation of New Changeover Procedure:

**Support during the process of unlearning and new learning is vital.**



Looking forward, he wanted his operator saying  
*'That's the way we do things around here'*  
And he realised that there must be focus and support provided by leaders during the unlearning/learning process.

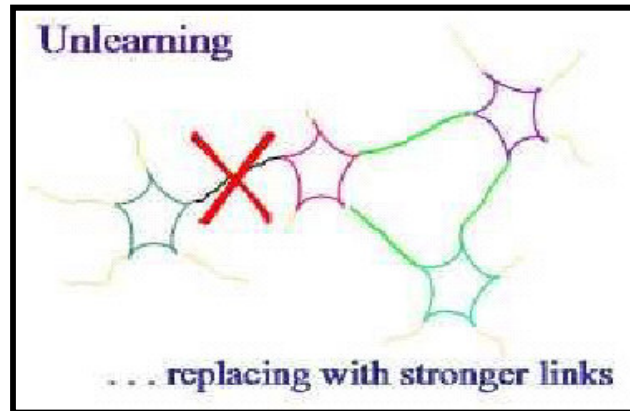


## Case Study – Backsliding. Implementation of New Changeover Procedure:

What are the ways to provide support during the learning transition period?

‘Support during the process of unlearning and new learning is vital.’

How do you do this?



5 Minutes.

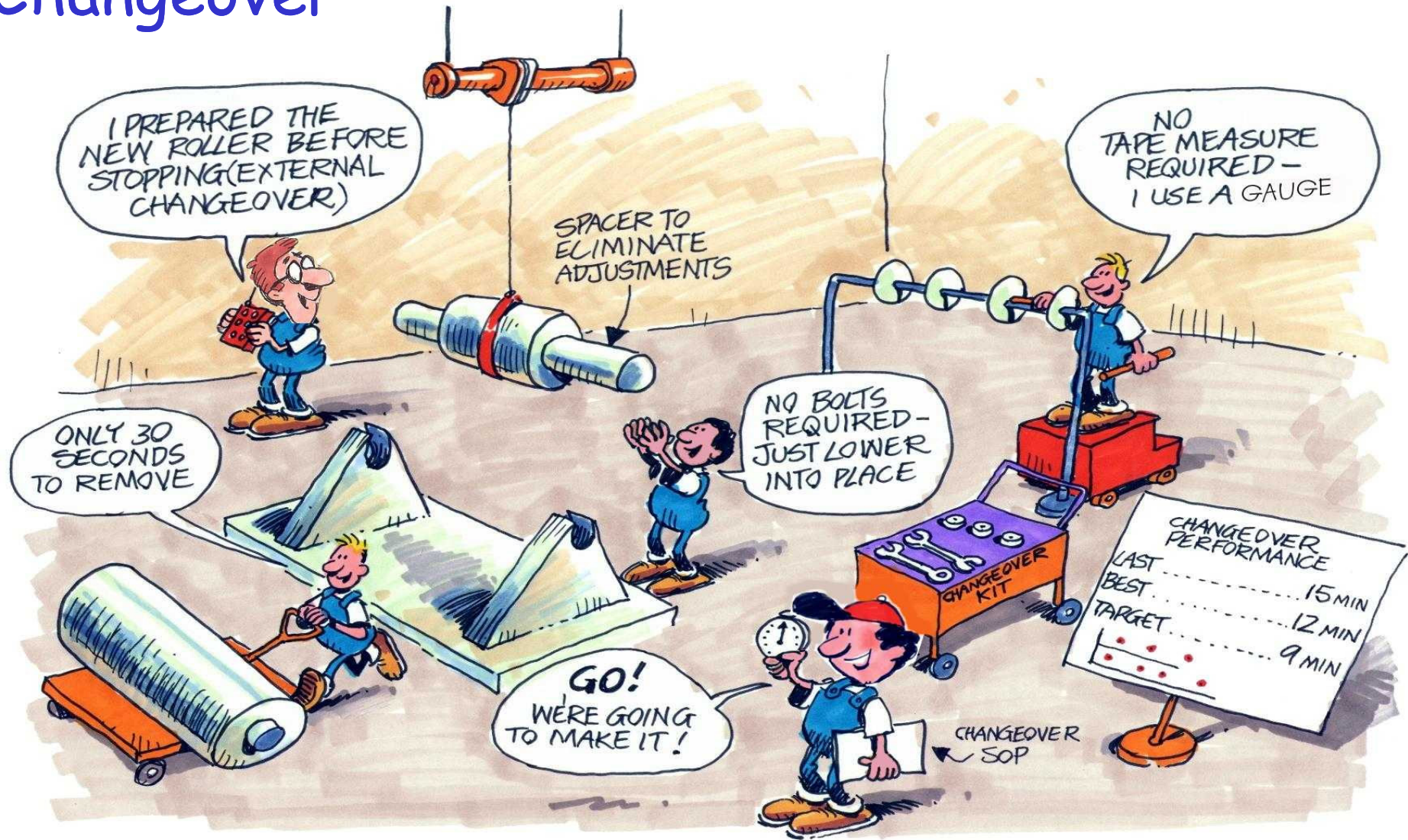
Buzz groups.

Identify possibilities.

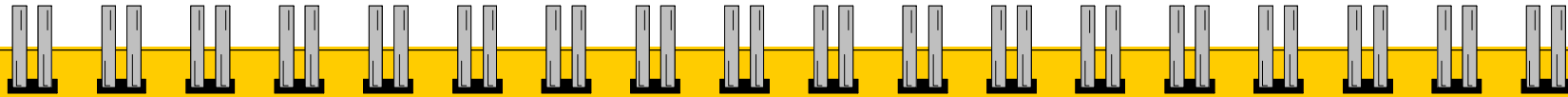


3

# Implementing the 5 Steps for Quick Changeover



# Sustaining the Gains



- Team members are trained and skilled.
- Change over objectives and actual results are displayed and tracked.
- SOP's and check sheets are displayed and used.
- Support and resources are available to the team for improvement.
- Celebrate success.

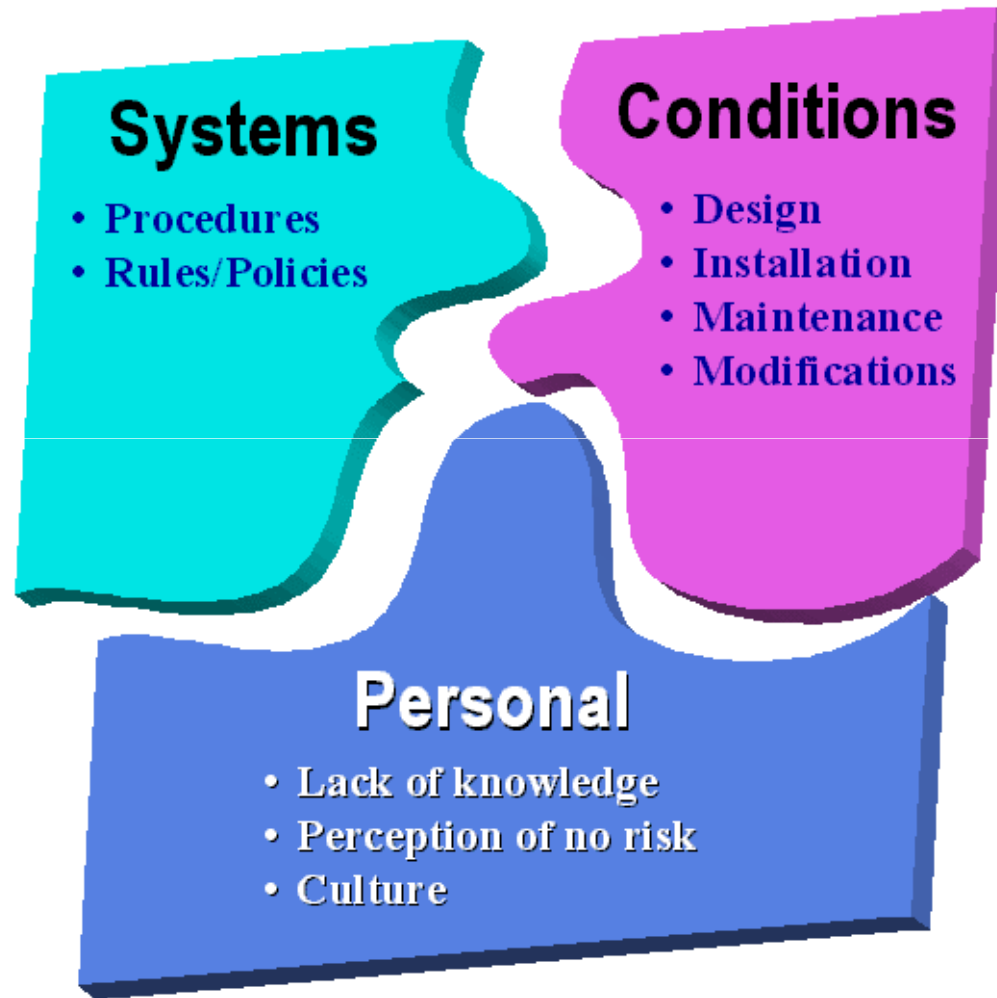


## Manage complexity & flexibility through rapid change-overs



Quick Changeover Techniques 22

# What Influences At-risk Behavior?





# Focus on Behavior

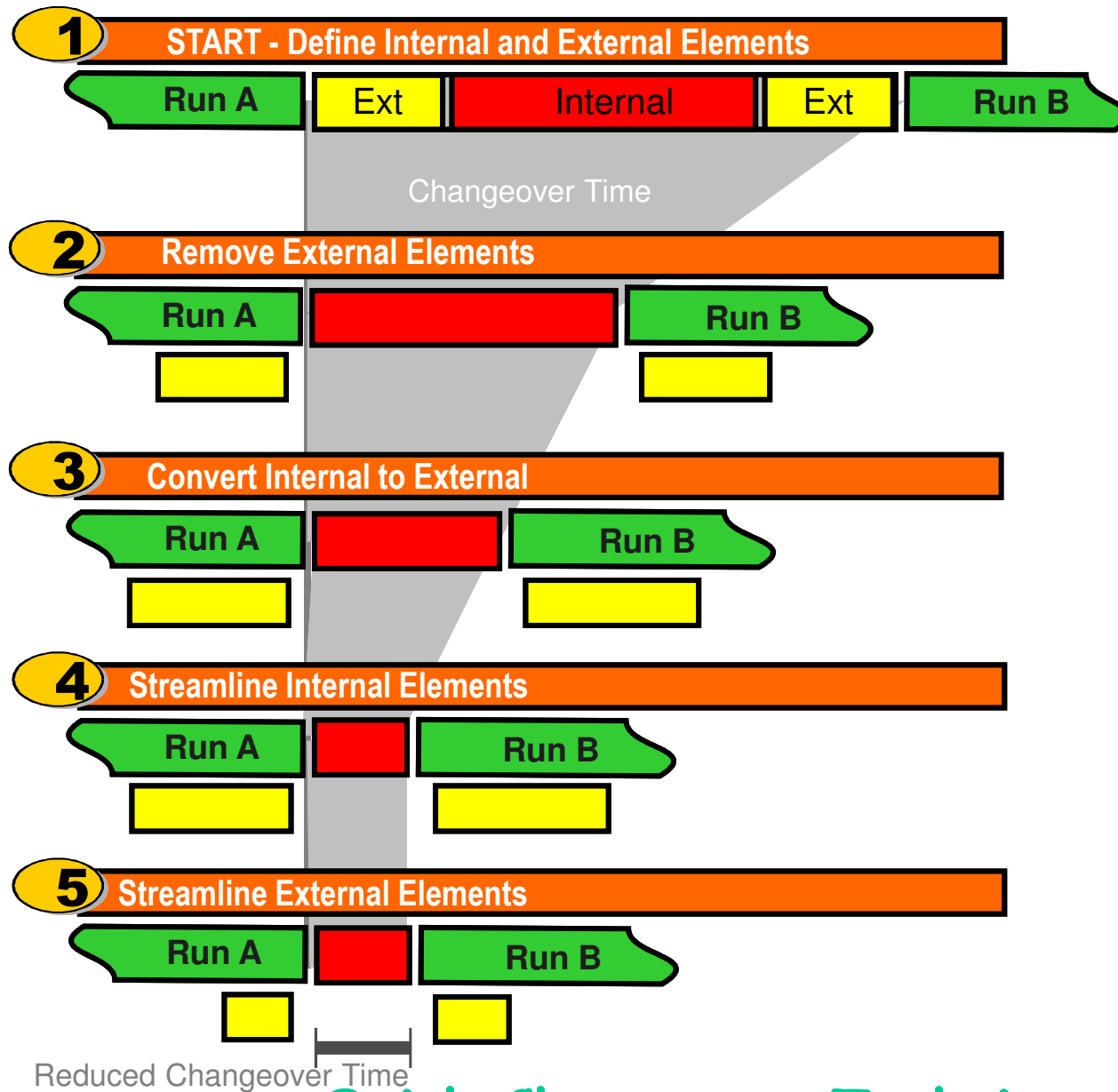
## Measure and Manage

An  
Observable  
Act



# Summary

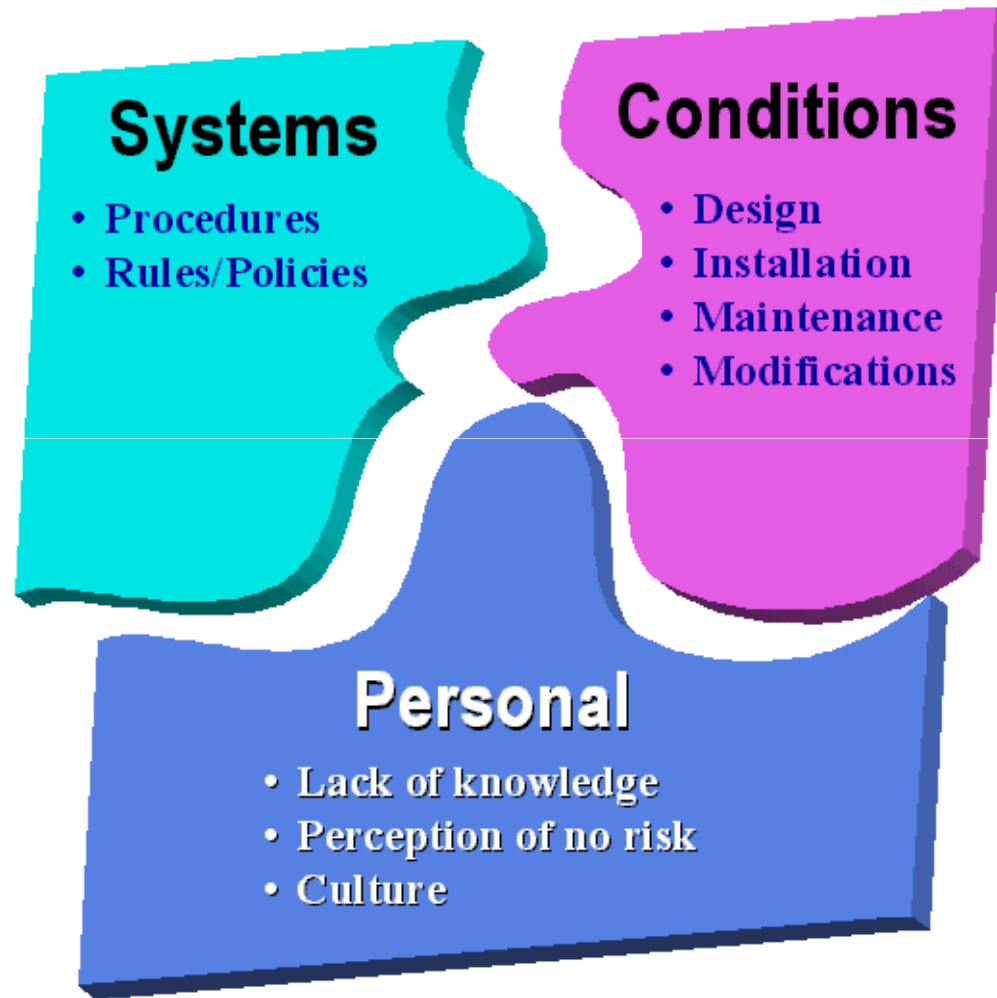
# The 5 Steps of QCT



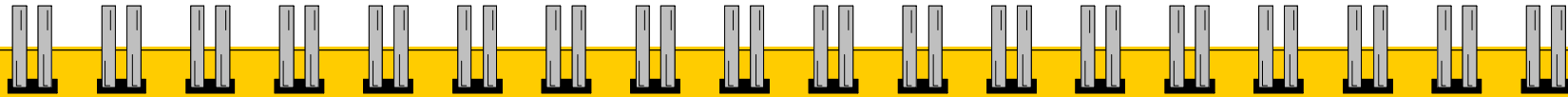
## Quick Changeover Techniques Bar Chart

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|          |                  | <b>Total Time</b> |                       |    |    |    |    |    |    |    |

# What Influences At-risk Behavior?



# Sustaining the Gains



- Team members are trained and skilled.
- Change over objectives and actual results are displayed and tracked.
- SOP's and check sheets are displayed and used.
- Support and resources are available to the team for improvement.
- Celebrate success.



...And QCT will be necessary not only for your  
success

...But also your sanity.

