



## Why measure Overall Equipment Effectiveness? A case study at Mölnlycke Health Care

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MAINTEC 2011, Learnshop 1: 14.00 - 14:30, Tuesday 29<sup>th</sup> March

# Young Engineers?

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# Mölnlycke Health Care



World leading manufacturer of  
single-use surgical & wound care products

▶ KEEPING INDUSTRY MOVING AND IMPROVING...



# Mölnlycke Health Care



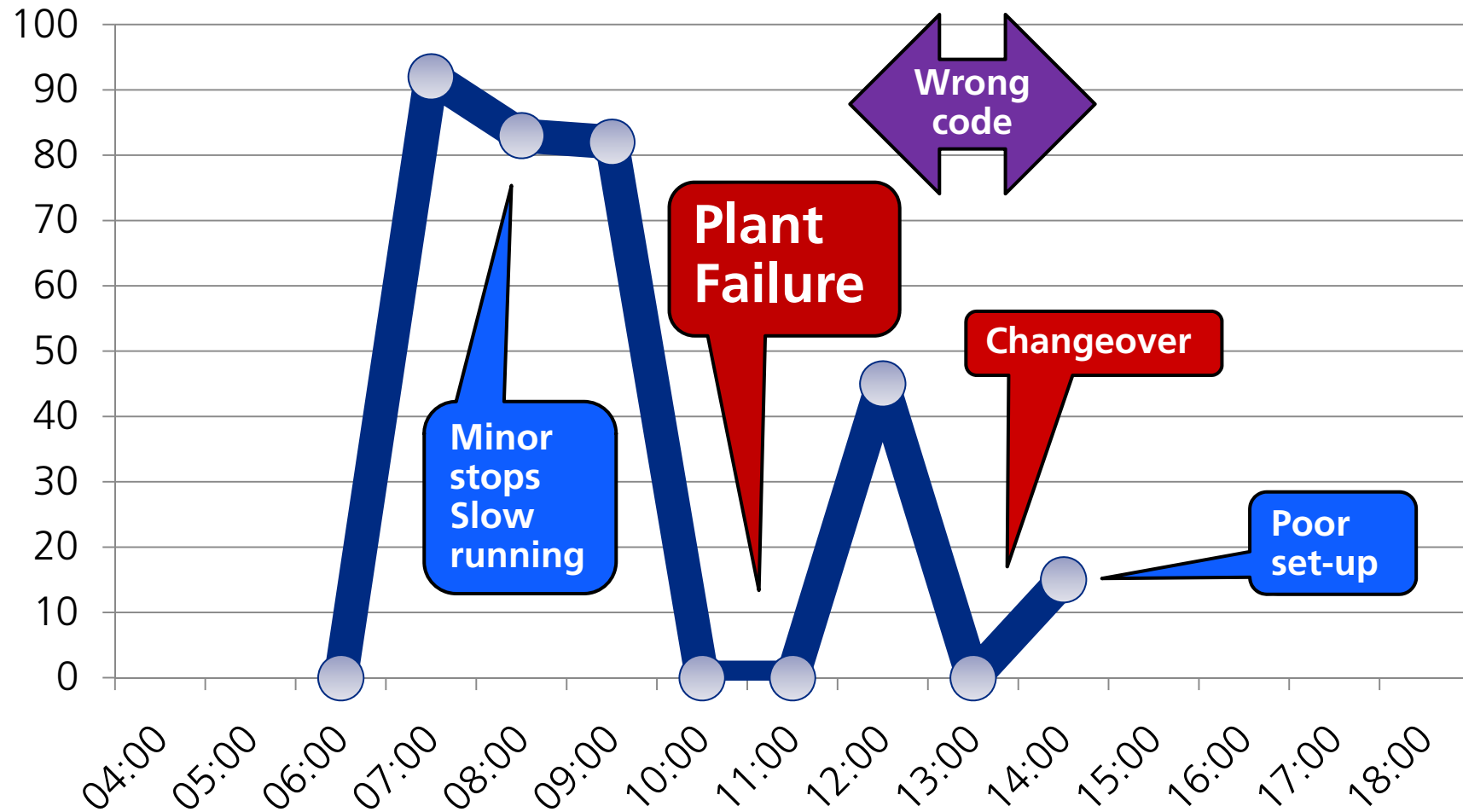
▶ KEEPING INDUSTRY MOVING AND IMPROVING...



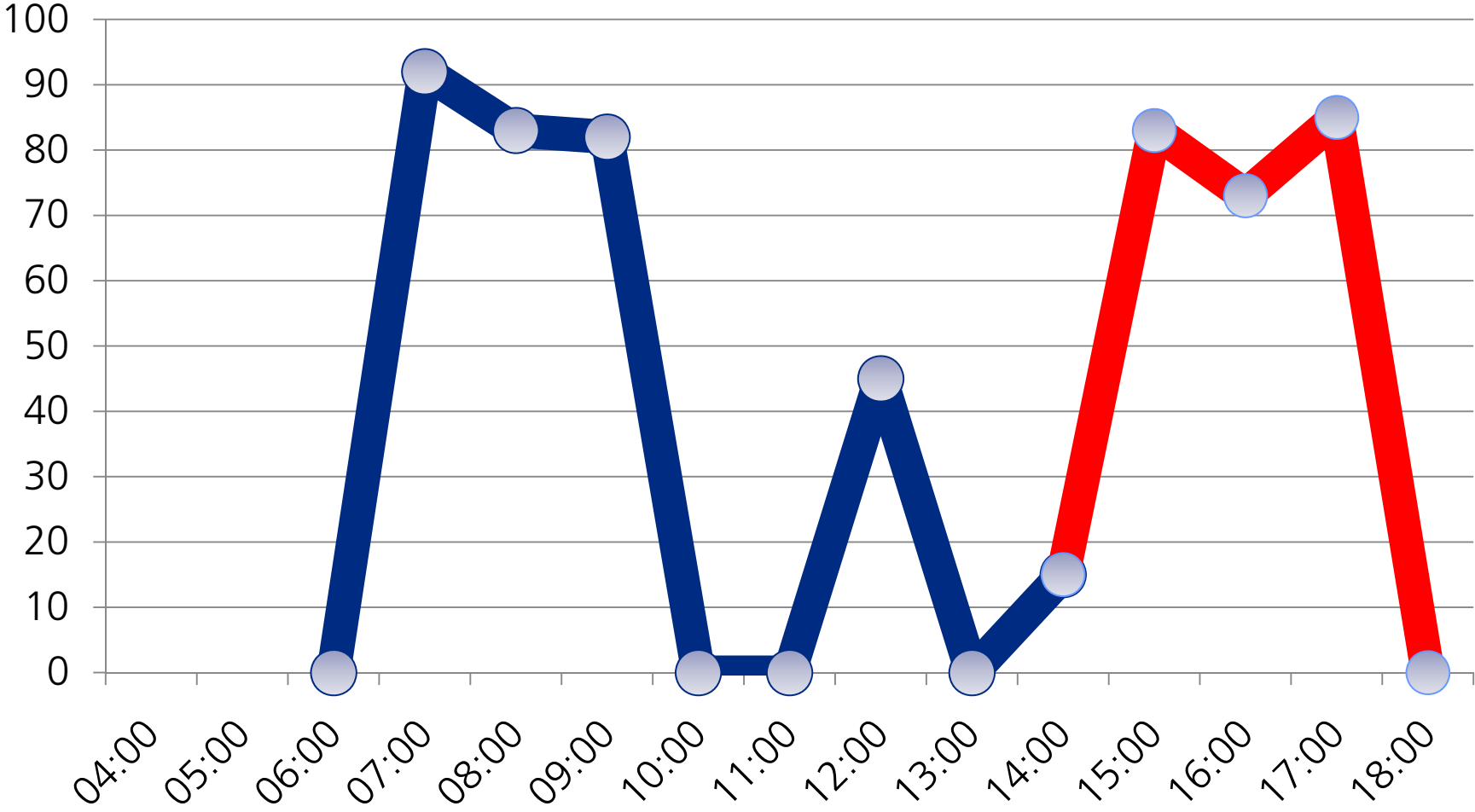
# Mölnlycke Operational Excellence plan

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# Why measure anything?



# Extended Day



▶ KEEPING INDUSTRY MOVING AND IMPROVING...



## Extra Costs per Hour?

Per Hour	Five day Operation	Seven day Operation
£100	104,000	182,000
£200	208,000	364,000
£300	312,000	546,000
£400	416,000	728,000
£500	520,000	910,000

# Which Tools?

Value Stream Mapping

Lean Manufacturing

TRIZ

RCM

TPM

SMED

Six Sigma

5S

MSG 3

5 WHY's

FMECA

Kanban

Poke-Yoke

Kaizen

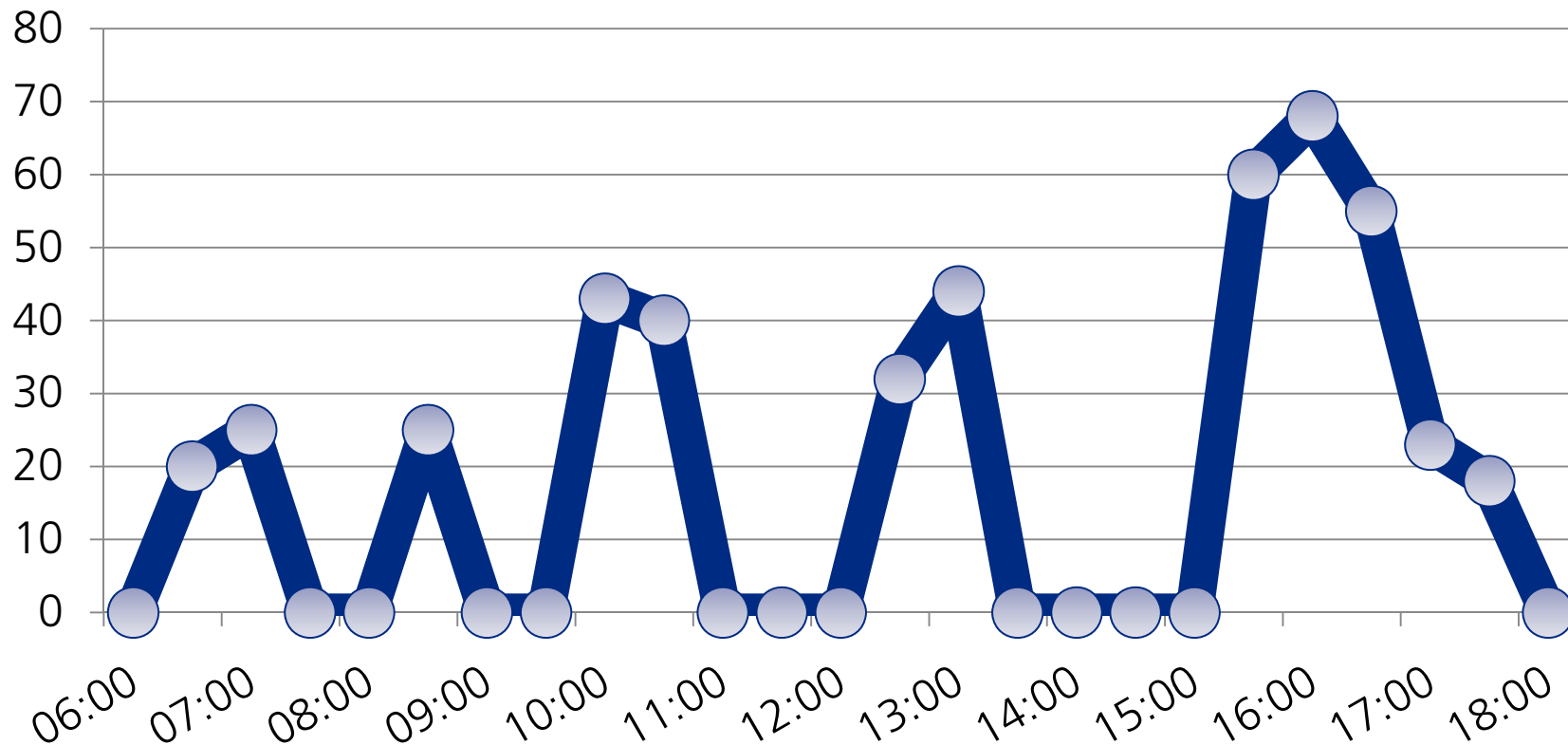
OEE

# OEE Basics



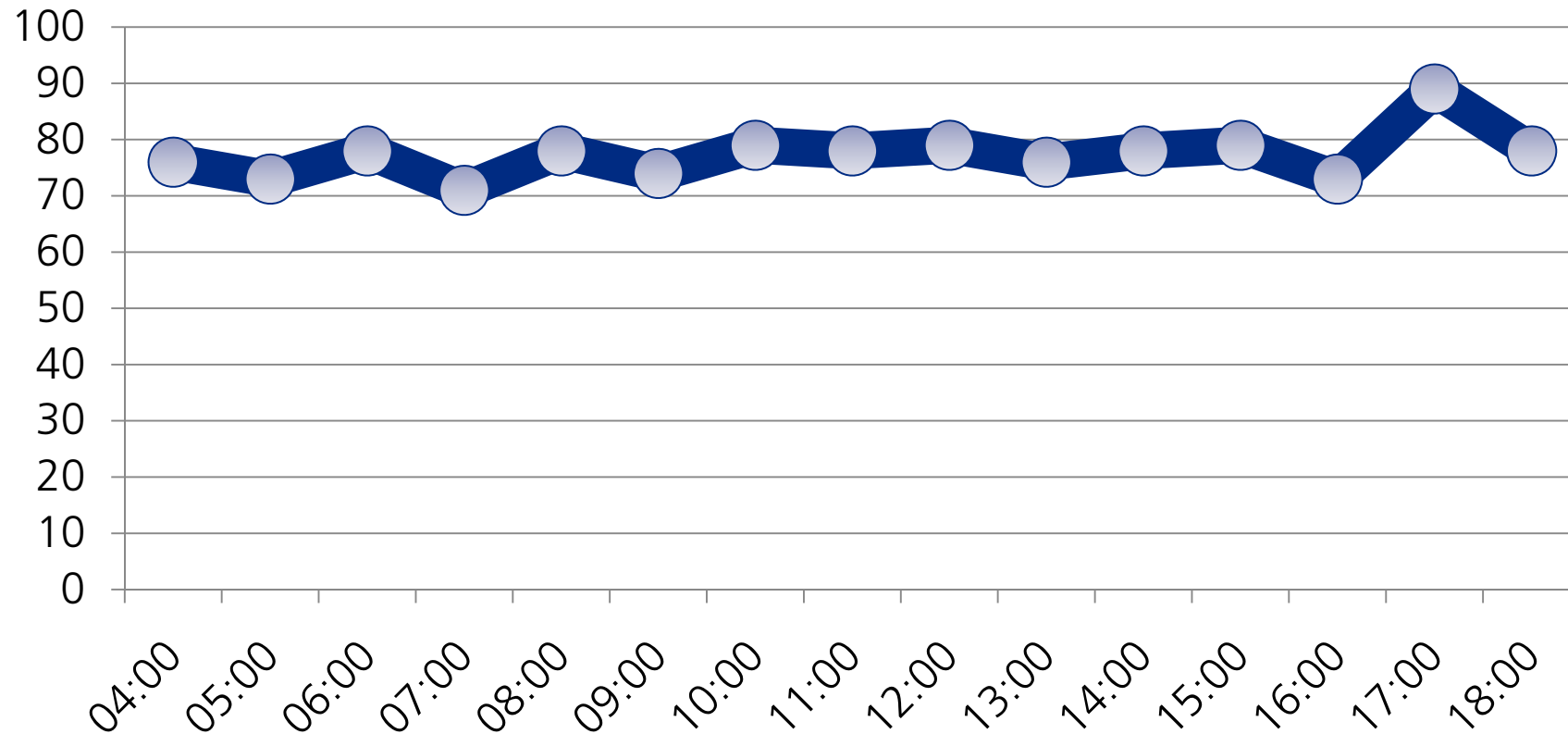
# Manual Data Capture

- ▶ Easy to spot Availability Losses
- ▶ Simple to record accurately



# More accuracy required

- ▶ As OEE Improves
- ▶ Minor Stops and Speed Losses Remain



▶ KEEPING INDUSTRY MOVING AND IMPROVING...

# Targets

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- ▶ **Eliminate duplication**

- ▶ Manual, paper-based recording, then data entry
- ▶ Generate reports closer to the time of operation

- ▶ **Real-Time data**

- ▶ Accurate stoppage times
- ▶ Obtain more frequent product/reject counts

- ▶ **Improve accuracy**

- ▶ Need FACTS as a basis for decision making

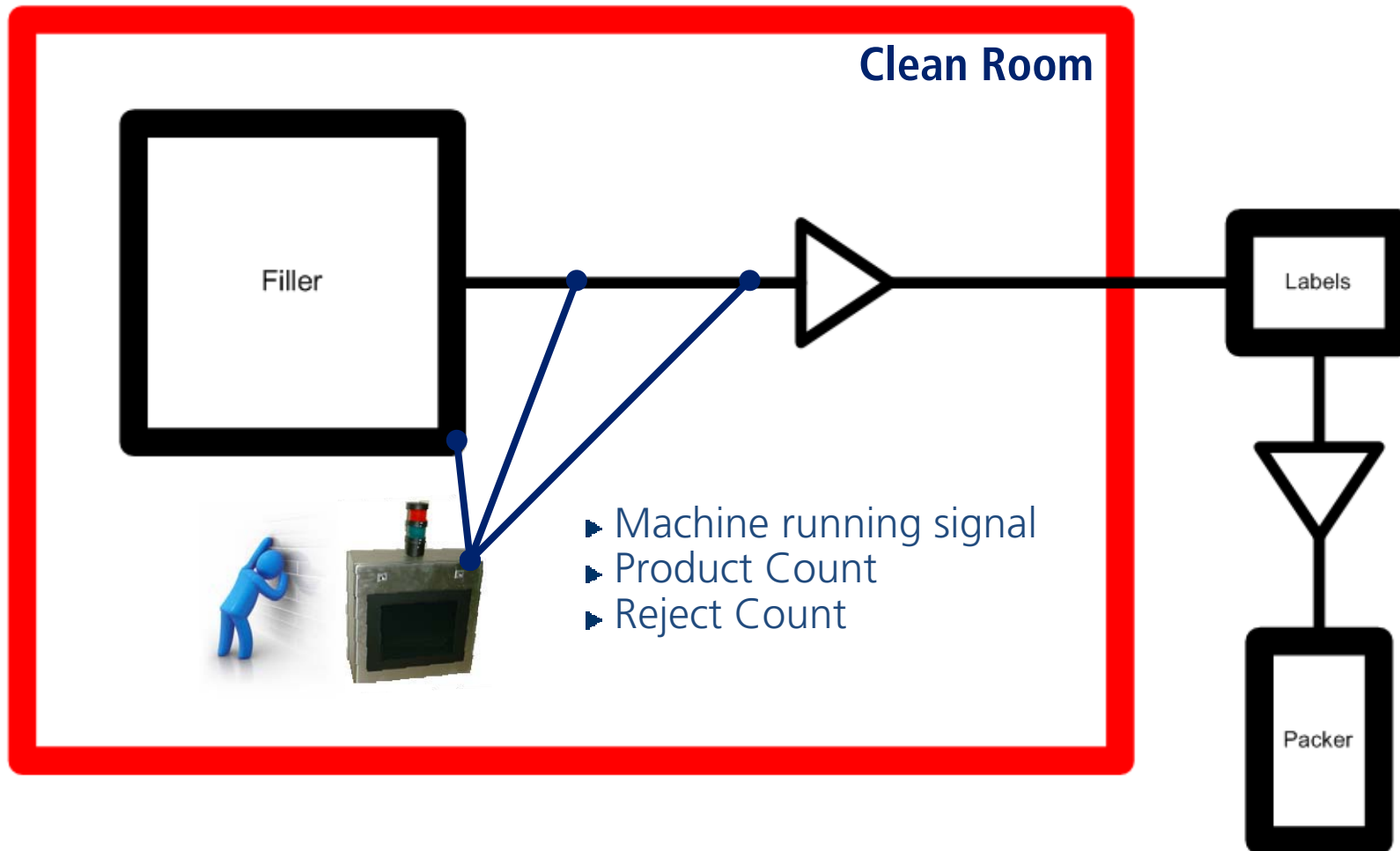
- ▶ **Remove distractions**

- ▶ Focus on improvements

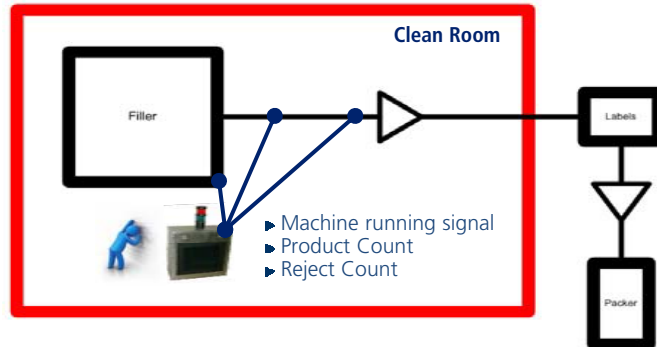
# Support the Operator

Element	Operator Input	Automatic
Product Count		✓
Reject Count		✓
Additional Waste	✓	
Stoppage Time		✓
Stoppage Reason	✓	

# Simplified Layout



# Typical Layout









- ▶ When a machine stop is sensed
  - ▶ Record the lost time automatically
  - ▶ Capture fault reason & comments
  - ▶ Capture good products by second
  - ▶ Capture rejects









- ▶ Show performance against plan
  - ▶ Time to finish at this performance
  - ▶ Losses this and last shift
  - ▶ Next product to be made
  - ▶ Real-time dashboards

# No Operator Time Entry

Machine Stopped	
	Started: 08:15:39 (24/12/2010)
	Elapsed: 
	Equipment
	Material
	People
	Process

10:12:01



# No Operator Time Entry

Machine Stopped	
	Started: 08:15:39 (24/12/2010)
	Elapsed: 
	Equipment
	Material
	People
	Process

10:12:02

# No Operator Time Entry

Machine Stopped



 Started: 08:15:39 (24/12/2010)  
Elapsed: 

- Equipment
- Material
- People
- Process

10:12:03

# No Operator Time Entry

Machine Stopped



 Started: 08:15:39 (24/12/2010)  
Elapsed: 

- Equipment
- Material
- People
- Process

10:12:04

# No Operator Time Entry







Machine Stopped

 Started: 08:15:39 (24/12/2010)  
Elapsed: 

- Equipment
- Material
- People
- Process

10:12:05

# No Operator Time Entry



Machine Stopped	
	Started: 08:15:39 (24/12/2010)
	Elapsed: 
	Equipment
	Material
	People
	Process



10:12:06

# No Operator Time Entry







Machine Stopped

 Started: 08:15:39 (24/12/2010)  
Elapsed: 

- Equipment
- Material
- People
- Process

10:12:07



# No Operator Time Entry

Machine Stopped	
	Started: 08:15:39 (24/12/2010)
	Elapsed: 
	Equipment
	Material
	People
	Process

10:12:08

# No Operator Time Entry

Machine Stopped



 Started: 08:15:39 (24/12/2010)  
Elapsed: 

- Equipment
- Material
- People
- Process

10:12:09

# No Operator Time Entry

Machine Stopped


 Started: 08:15:39 (24/12/2010)  
Elapsed: 




- Equipment
- Material
- People
- Process

10:12:10

# No Operator Time Entry

Machine Stopped



 Started: 15:39 (24/12/2010)  
Elapsed: 



-  Clutch Fault
-  Drive Fault
-  Electrical Fault
-  Guard issues
-  Hydraulics

10:12:11

# No Operator Time Entry

Machine Stopped



 Started: 15:39 (24/12/2010)  
Elapsed: 





-  Clutch Fault
-  Drive Fault
-  Electrical Fault
-  Guard issues
-  Hydraulics

10:12:12

# No Operator Time Entry

Machine Stopped

 Started: 15:39 (24/12/2010)  
Elapsed: 


-  Clutch Fault
-  Drive Fault
-  Electrical Fault
-  Guard issues
-  Hydraulics

10:12:13

# No Operator Time Entry

Machine Stopped



 Started: 15:39 (24/12/2010)  
Elapsed: 





-  Clutch Fault
-  Drive Fault
-  Electrical Fault
-  Guard issues
-  Hydraulics

10:12:14

# No Operator Time Entry

Machine Stopped

 Started: 15:39 (24/12/2010)  
Elapsed: 




-  Clutch Fault
-  Drive Fault
-  Electrical Fault
-  Guard issues
-  Hydraulics

10:12:15

# No Operator Time Entry

Machine Stopped

 Started: 15:39 (24/12/2010)  
Elapsed: 




-  Clutch Fault
-  Drive Fault
-  Electrical Fault
-  Guard issues
-  Hydraulics

10:12:16

# No Operator Time Entry

Machine Stopped



 Started: 15:39 (24/12/2010)  
Elapsed: 





-  Clutch Fault
-  Drive Fault
-  Electrical Fault
-  Guard issues
-  Hydraulics

10:12:17

# No Operator Time Entry

Machine Stopped

 Started: 15:39 (24/12/2010)  
Elapsed: 




-  Clutch Fault
-  Drive Fault
-  Electrical Fault
-  Guard issues
-  Hydraulics

10:12:18

# No Operator Time Entry

Machine Stopped


 Started: 15:39 (24/12/2010)  
Elapsed: 





-  Clutch Fault
-  Drive Fault
-  Electrical Fault
-  Guard issues
-  Hydraulics

10:12:19

# No Operator Time Entry

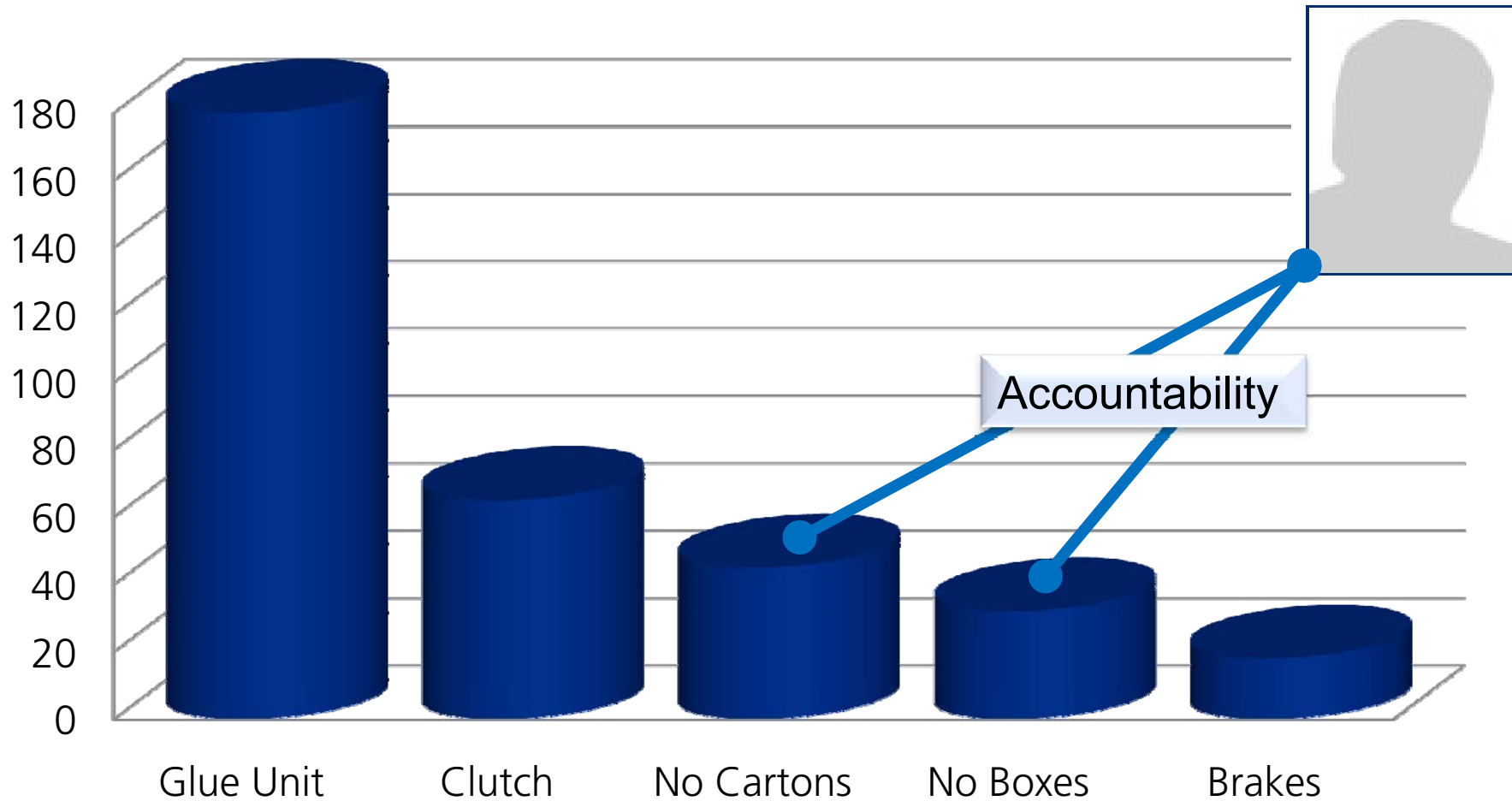
Machine Stopped

 Started: 15:39 (24/12/2010)  
Elapsed: 

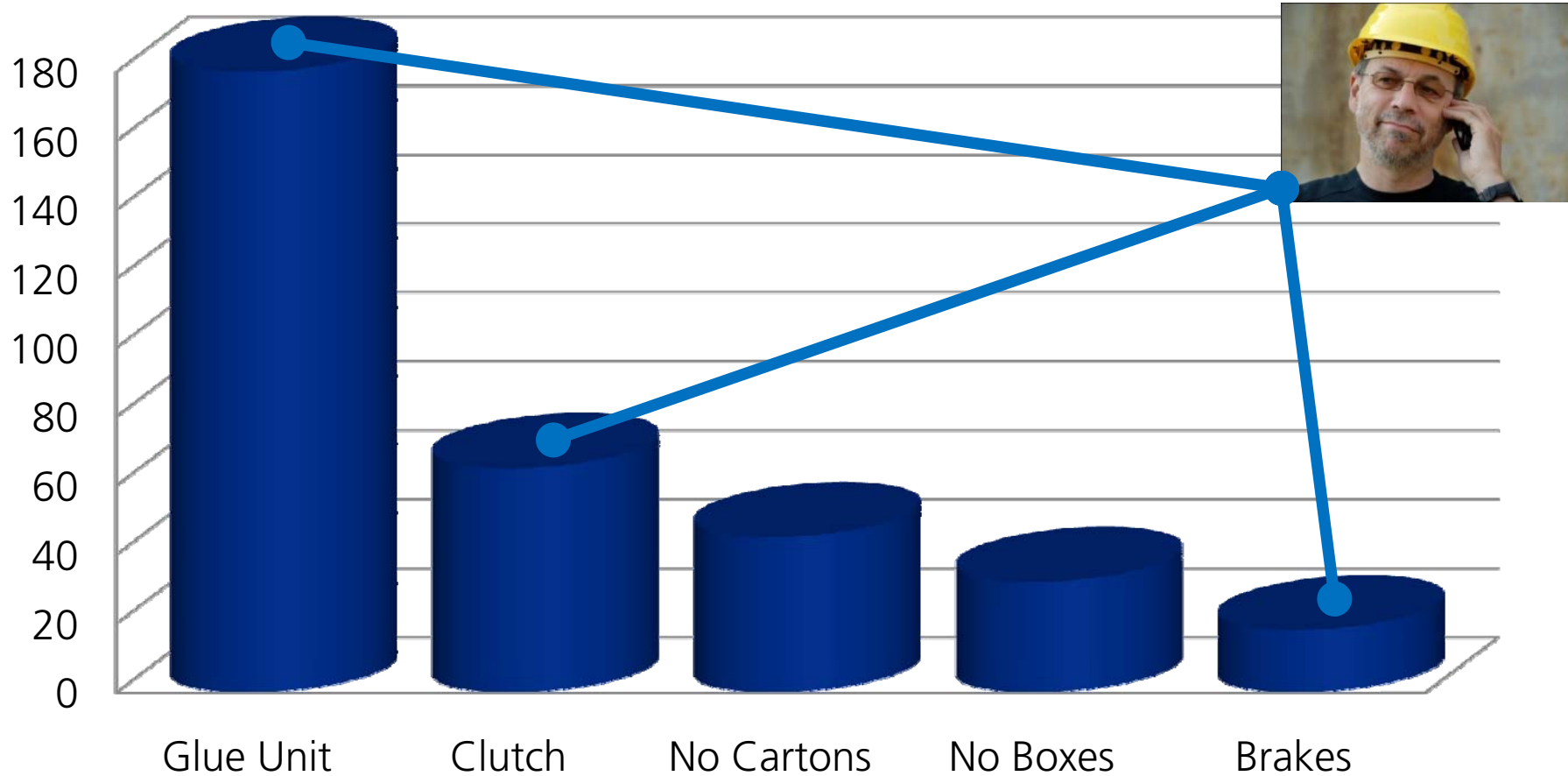
-  Clutch Fault
-  Drive Fault
-  Electrical Fault
-  Guard issues
-  Hydraulics

10:12:20

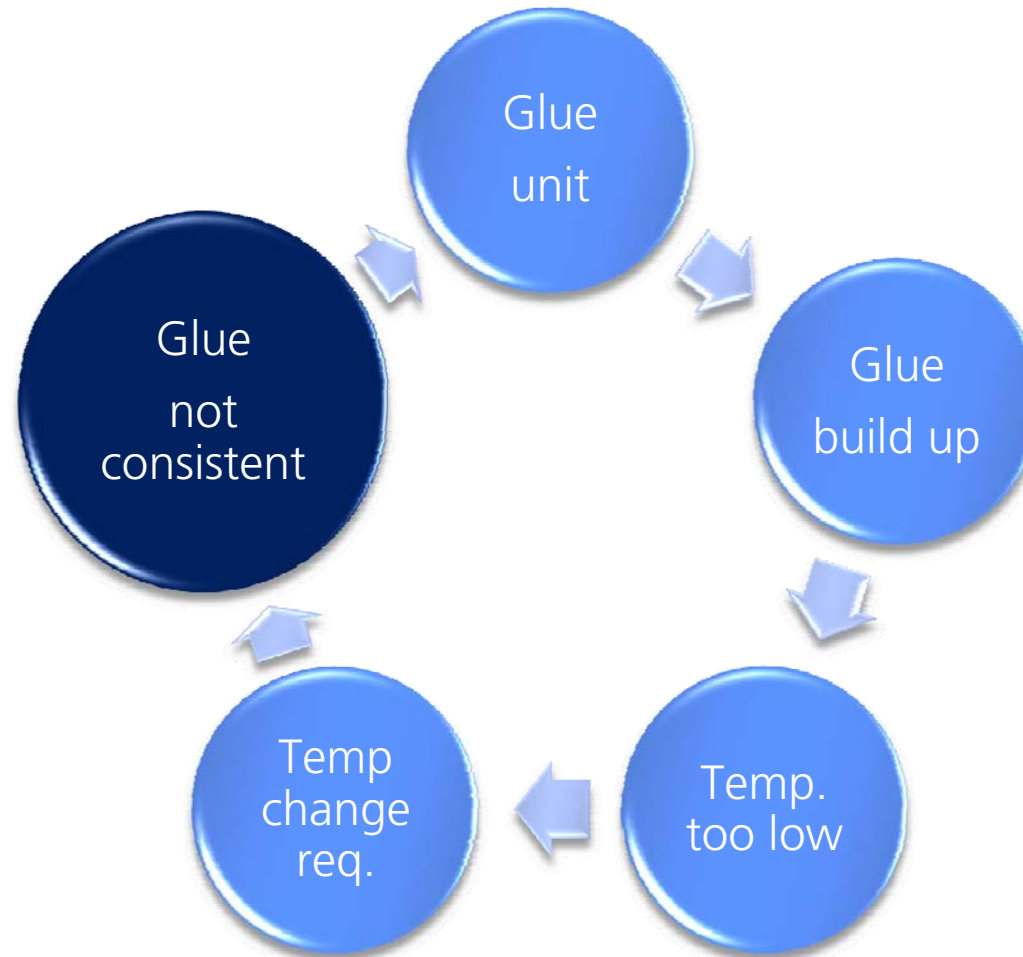
# Top 5 Lost Time Reasons



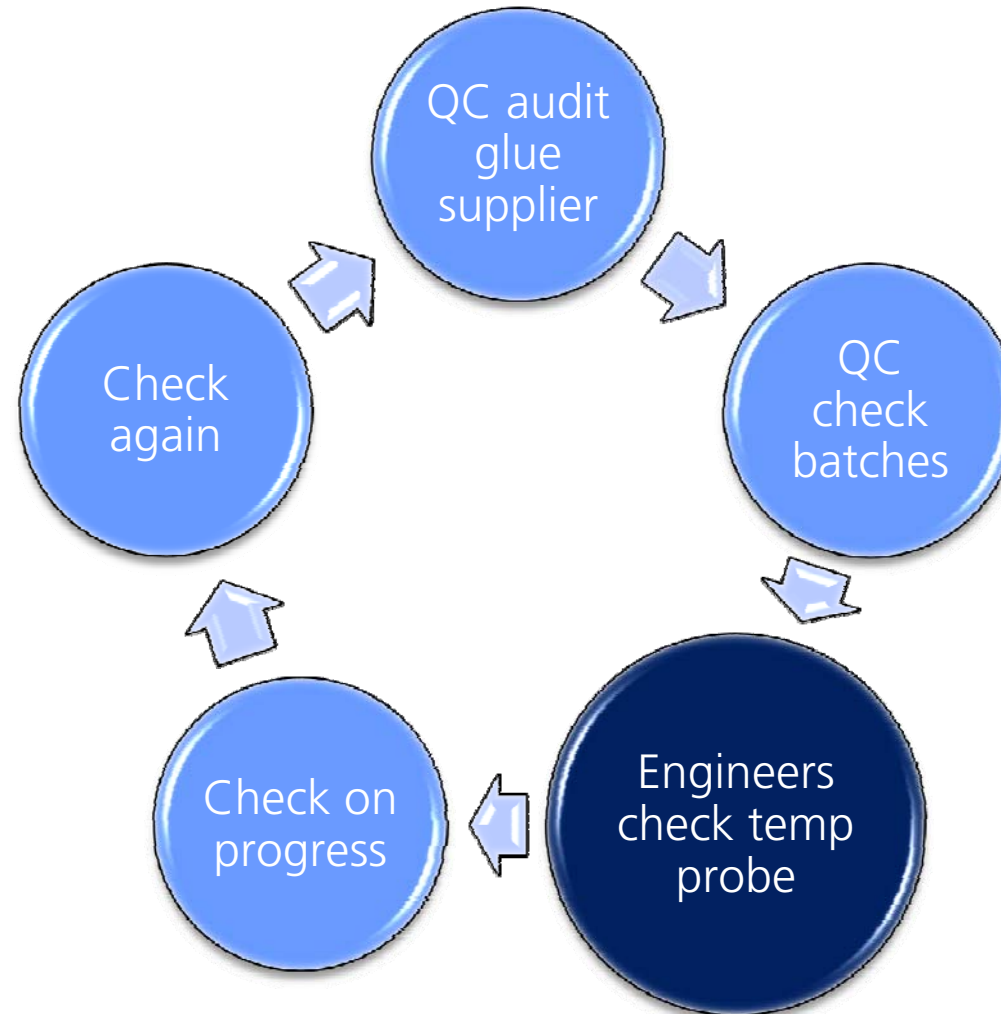
# Top 5 Lost Time Reasons



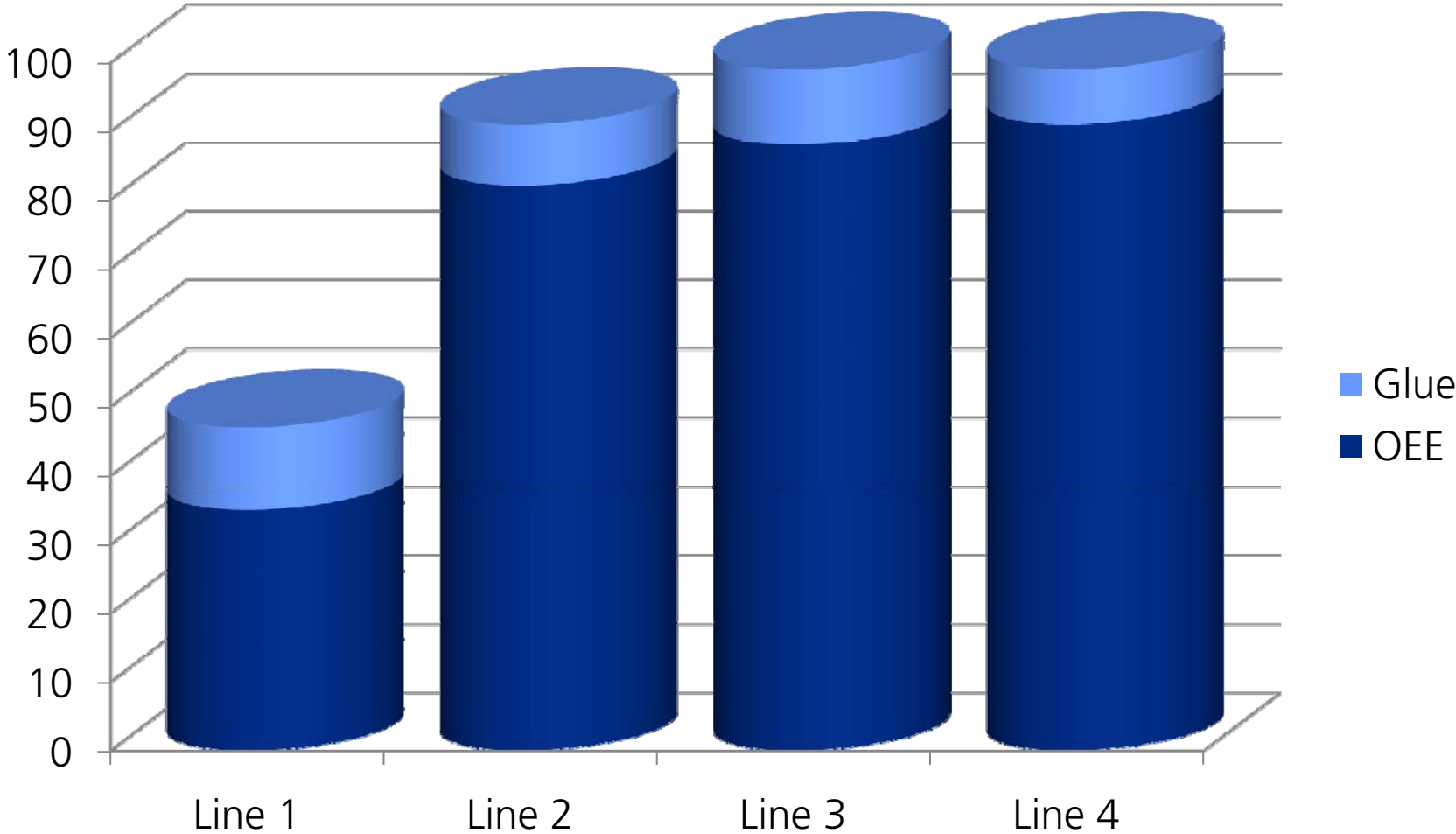
# 5 Whys



# MMS Counter-Measures



# Discover the impact



# Potential Improvement



Asset Name	Availability %	Theoretical Availability %	Performance %	Quality %	OEE %	Theoretical OEE %
Line 1	61.42	86.07	53.05	97.03	31.61	44.30
Line 2	92.86	97.62	<b>101.03</b>	98.05	91.98	96.69
Line 3	92.39	96.74	96.31	98.41	87.56	91.68
Line 4	94.85	<b>25%</b>	92.32	98.14	85.93	<b>13%</b>

# What's the cash benefit?



OEE %	Units	Increased %	Increased Units	Extra Revenue
39.00	51,281	8.00	10,356	£ 7,637
40.00	52,575	9.00	11,650	£ 8,592
41.00	53,870	10.00	12,945	£ 9,547
42.00	55,164	11.00	14,239	£ 10,501
43.00	56,459	12.00	15,534	£ 11,456
44.00	57,753	13.00	16,828	£ 12,411
45.00	59,048	14.00	18,123	£ 13,365
46.00	60,342	15.00	19,417	£ 14,320

**13%**

**16,828**

**£12,411**

# Best of Best Targets

Time Range	Availability	Performance	Quality	OEE
Week 01	74.74	<b>72.1</b>	97.73	52.67
Week 02	80.95	58.00	99.84	45.26
Week 03	94.67	46.31	<b>99.85</b>	43.77
Week 04	96.53	43.53	99.84	41.95
Week 05	97.04	57.49	99.18	<b>55.33</b>
Week 06	97.33	57.72	98.46	55.31
Week 07	98.00	38.19	97.70	36.56
Week 08	<b>98.50</b>	42.50	97.73	40.92
Week 09	95.89	47.32	97.53	44.26

<b>Best OEE</b>	<b>Best of Best OEE</b>
<b>55.33</b>	<b>70.92</b>

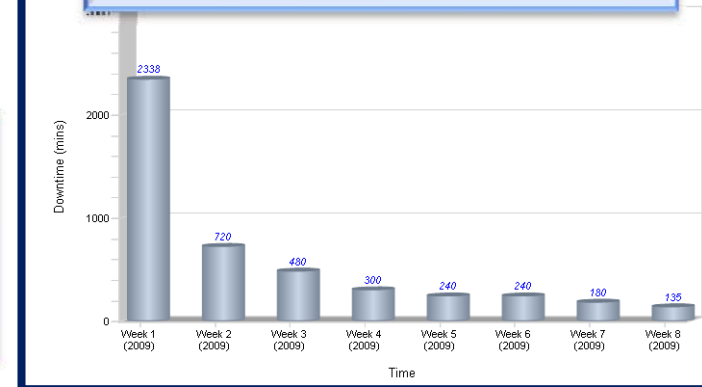
# Focussed Improvements

## 1. Generate the Top 5 Losses Report



## 2. For each loss: identify an accountable individual

## 3. For each loss: generate an event by time report



## 4. Create an improvement plan, review & record progress weekly

	Improvement	Asset	Status	Priority	Created By	Date Created	Target Finish Date
⏸	Audit Glue Supplier	Line 01	Waiting	Normal	C.Bischeim	02/12/2009 ...	31/12/2009 ...
✅	Engs check glue sensor	Line 01	Completed	Normal	Lars.Anderson	02/12/2009 ...	04/12/2009 ...
▶	QC check glue batches	Line 01	In Progress	Normal	Lars.Anderson	11/11/2009 ...	31/12/2009 ...
▶	Reduce glue stoppages	Line 01	In Progress	Normal	Alan	02/11/2009 ...	31/12/2009 ...

# Improvement Agenda



Status	Who	Cat	Asset	Event	Cause	Action
	AJM	A	J6	Tray Jam	Poor PM	Modify the Maintenance Plan
	PBF	A	J8	No Packing	Training	Single Point Lesson
	MAS	P	J2	Speed Loss	Ops	Monitor speed each hour
	WAS	Q	J3	Material Loss	Poor Set-up	Training
	AJM	Q	J3	Material Loss	Check Weigh	Modify the Maintenance Plan

# Any Questions?



*"One asset was running seven days a week and struggling to meet customer demands. Now it typically does the same volume in four-and-a-half days."*

MARK ROGERS, MANUFACTURING SUPPORT MANAGER, SMITH & NEPHEW

*"In addition to savings in labour and wastage, we have experienced significant savings in energy. Optimised OEE also has a hugely beneficial impact on our energy-efficiencies."*

BOB KING, HEAD OF OPERATIONAL EXCELLENCE, PREMIER FOODS



*"... We have achieved a speed increase from 250bpm to 280 + bpm"*

DAVE MCVITTIE, ENGINEERING MANAGER

*"It's genuinely surprising, the losses identified would have been unquantifiable without Idhammar OEE. ..."*

JOHN DONNELLY, GENERAL MANAGER LARGO FOODS, IRELAND



*"Our minimum OEE improvement last year was 14% and our best was 47%, so the system paid for itself in a couple of months."*

STUART DRYSDALE MANUFACTURING DIRECTOR, AUNT BESSIE'S