SAGE

Deliver certainty

Sustainability through technology

Rev 1.00

SAGE Automation

Real-Time Production Monitoring

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Real-Time Production Monitoring

- **Fill & Pack** pressures & problems
- What are "**Best in Class**" doing?
- Using **Theory of Constraints**
- How can **OEE** help?

- **Build a solution…**

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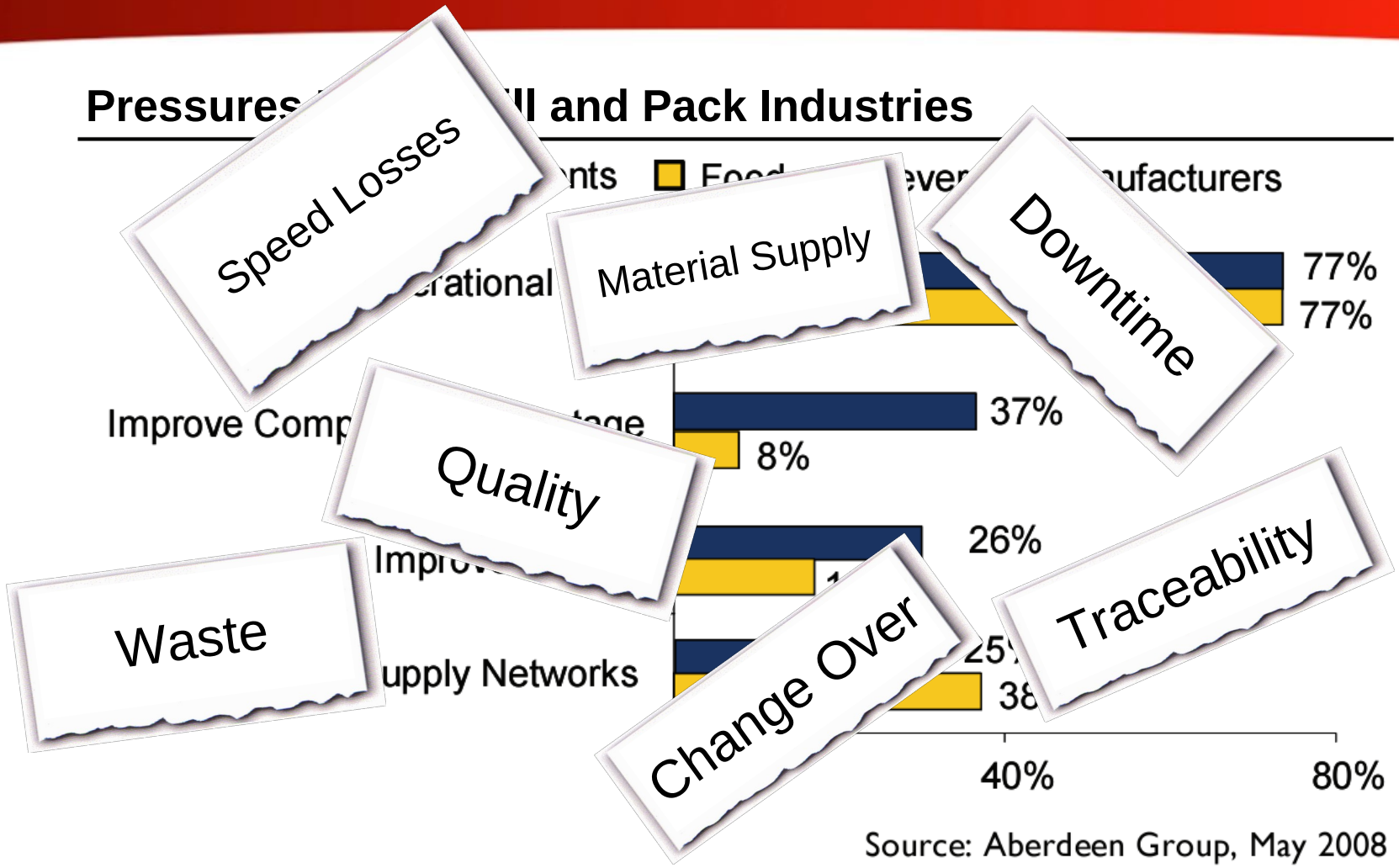
Pressures of Fill & Pack



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Production Reporting

- **Production reports**
  - By shift
  - By work order / batch
- **Downtime reports**
  - By machine / line
  - By shift
- **Quality**

Score Card	
After the event…	✗
Not widely used…	✗
Expensive…	✗

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Response of Fill & Pack

	Best in Class (Top 20%)	Average (Middle 50%)	Laggards (Bottom 30%)
Optimisation production using real-time tools	50%	20%	17%
Monitor plant floor exceptions in real time	66%	38%	25%
The organisation' s strategy incorporates real-time monitoring and response	62%	31%	31%
The real-time data is highly visible in the factory	50%	33%	33%
The real-time system is automated	41%	37%	25%

Real Time!!!

Source: Aberdeen Group – Event Driven Manufacturing Intelligence, May 2008

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Theory Of Constraints

- Dr. Eliyahu M. Goldratt
- 1984 book - **The Goal**

Helping organisations continually achieve their goal

"...A minute lost on a constraint is a minute lost forever and an hour saved on a non constraint is merely a mirage.."

Five Focusing Steps:

1. Identify (The hard bit)
2. Exploit (Fix it)
3. Subordinate (Eg: V – Curve)
4. Elevate (Increase capacity)
5. Sustain (Start again)

What is OEE?

A way to **measure performance** comparing **actual vs. target**

69%	=	**82%**	x	**89%**	x	**95%**
		Productive Time		Speed		Good Units

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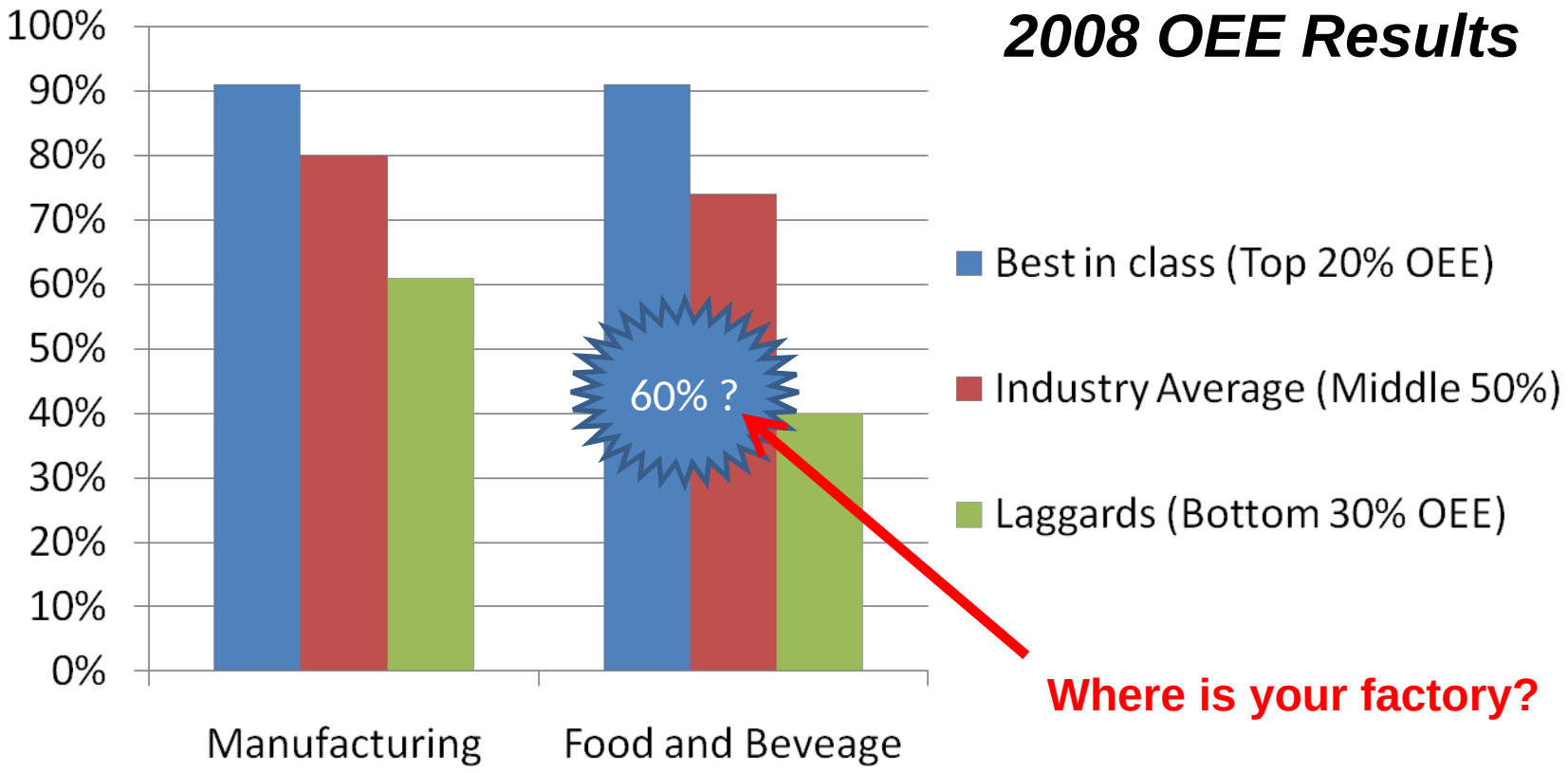
Industry Average OEE



Source: Aberdeen Group – Event Driven Manufacturing Intelligence, May 2008

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4 Step Program

Step 1.

Define a target speed for the line.

Step 2:

Capture OEE on every machine.

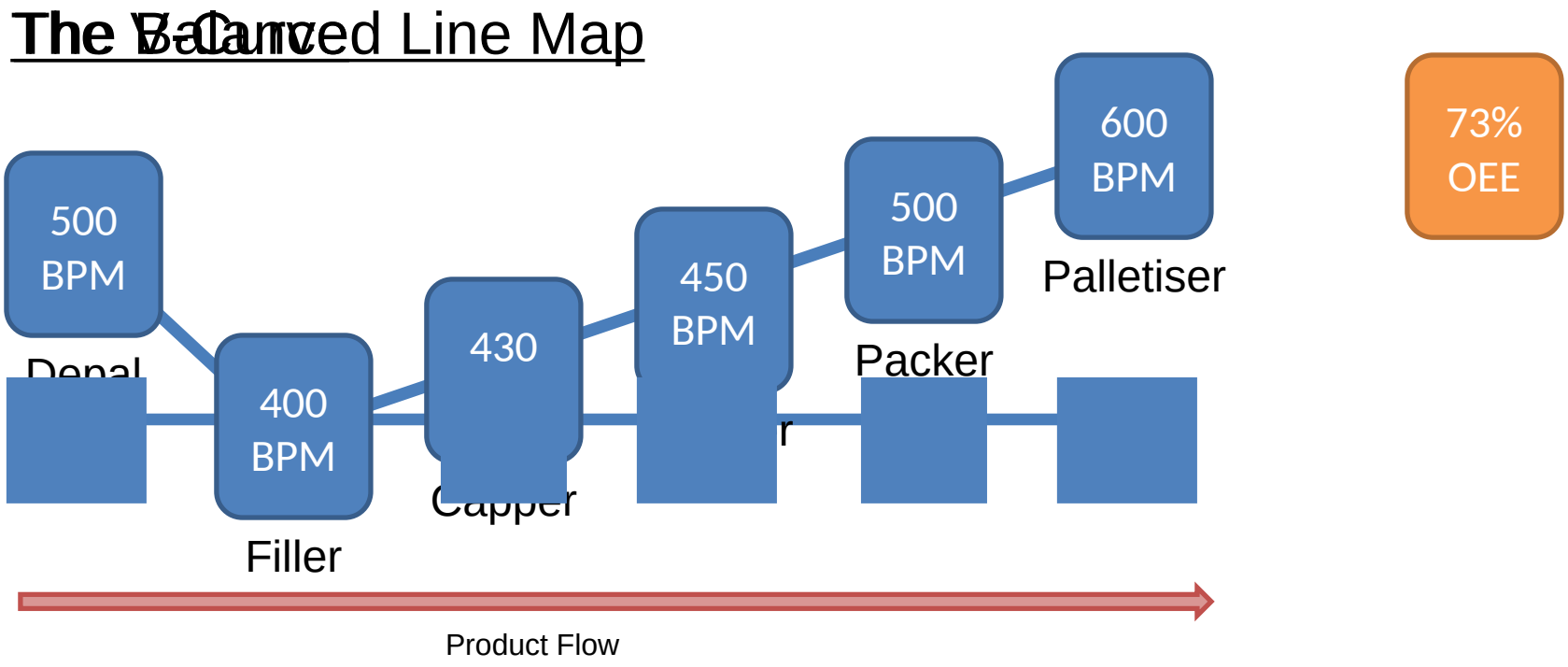
Step 3:

Use lean principles to display in real-time

Step 4:

Use OEE components for a deeper dive

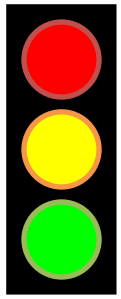
Step 1: Setting the line target



Line Target = 400 BPM

Step 3: Add OEE colour coded display

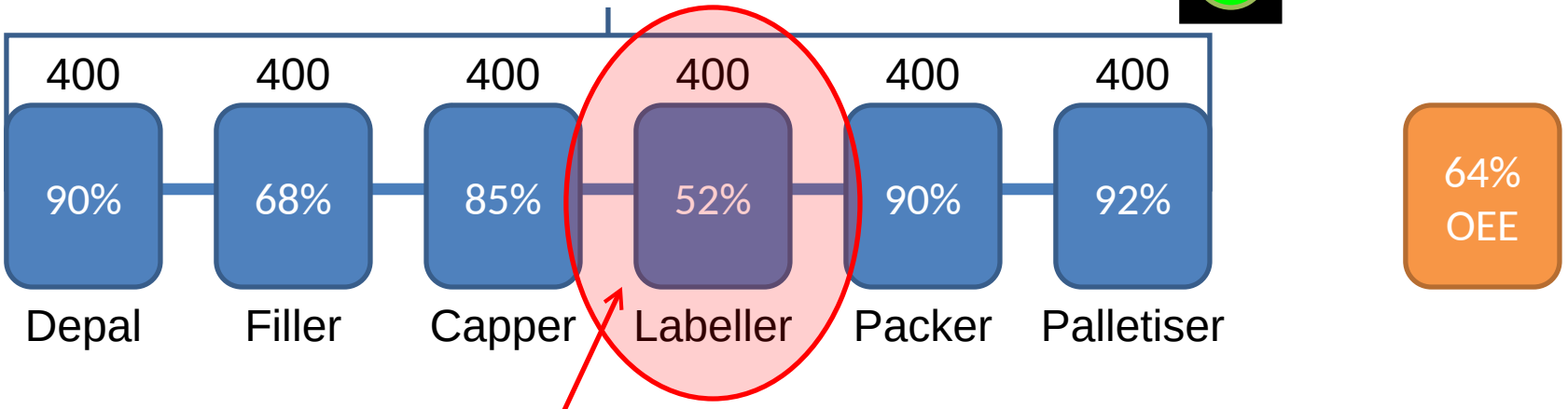
The Balanced Line Map



< 60% OEE

60% - 79% OEE

> 80% OEE



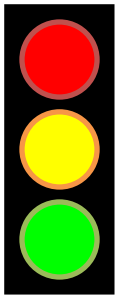
The line constraint is made obvious, such that if it were removed – more good units could be made.

Line Target = 400 BPM

The time dimension

Time?

- Last 15 Minutes
- **Shift To Date**
- Shift / Day / Week / Month etc…



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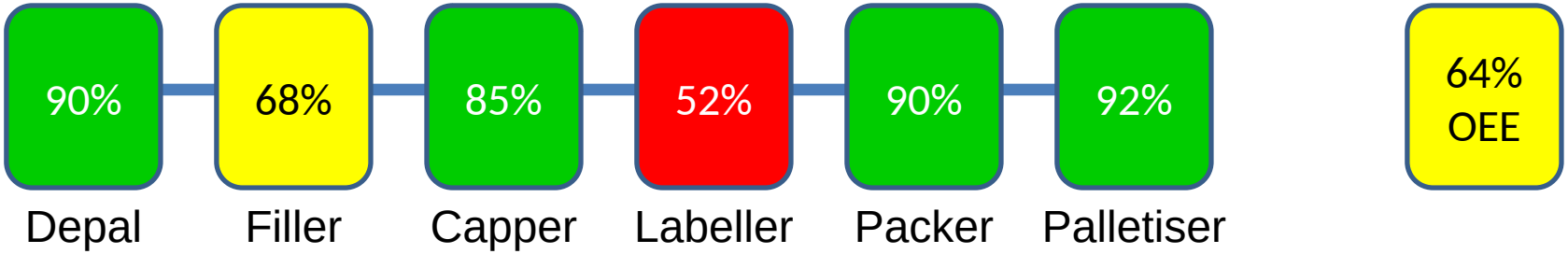

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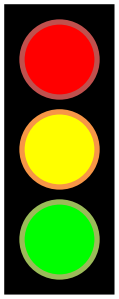

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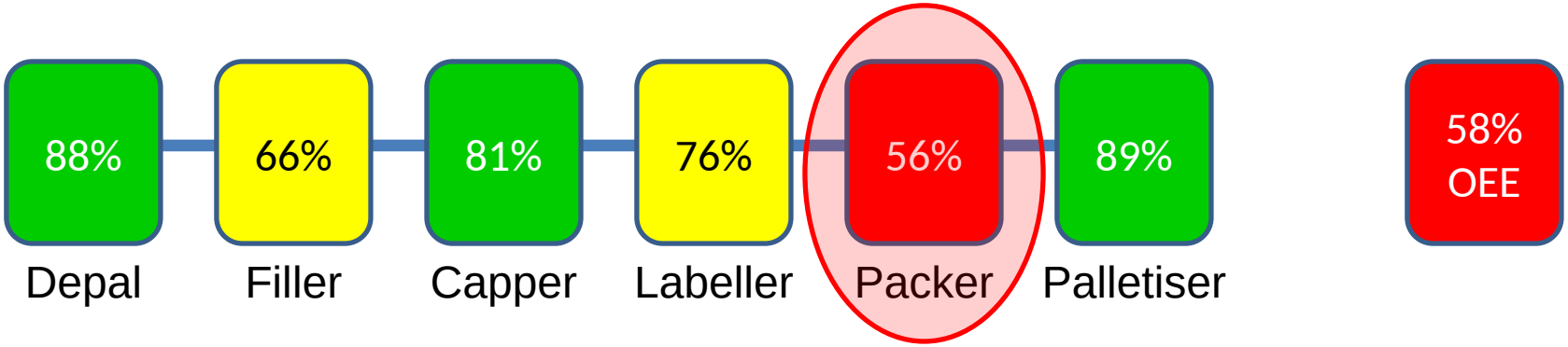


Step 4: The Deeper Diver

Packer OEE Loss Categories

Target Units:	Good Units:	Variance Units:	Variance %:
96000	63123	-32877	-34.2%

Availability

Downtime Losses:	54%
Lost Time:	44 min
Lost Units:	17753
Occurrences:	26
MTBF:	1.2 min
MTTR:	0.5 min

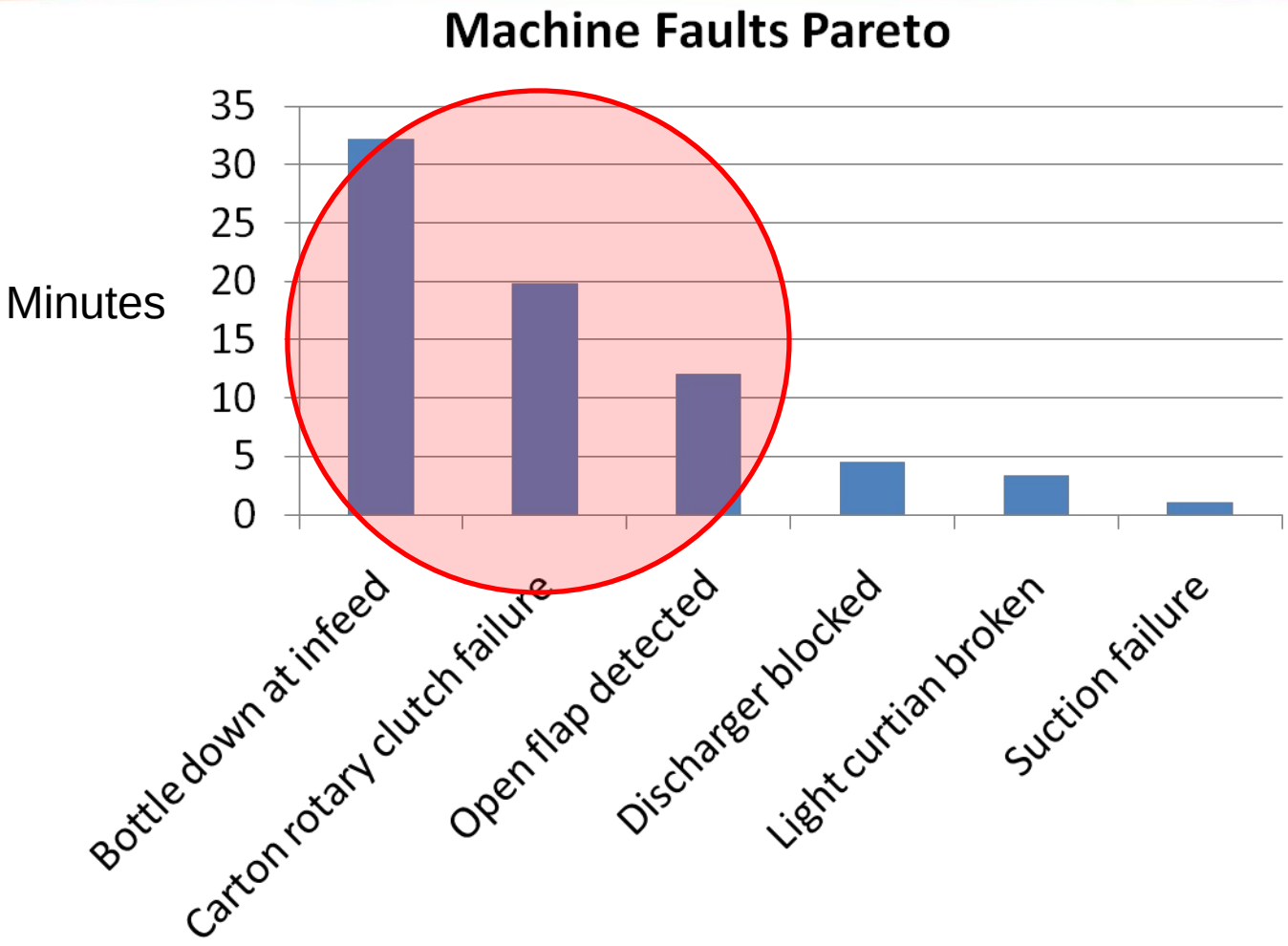
Performance

Speed Losses:	42%
Lost Time:	34 min
Lost Units:	13808
Occurrences:	12

Quality

Quality Losses:	4%
Lost Time:	3.3 min
Lost Units:	1315

The poorest component of OEE is **highlighted in red**.



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OEE Even Deeper Dive

Availability	x	Performance	x	Quality

Availability	Performance	Quality
• Machine Alarms • Operator Feed-back (Root Cause Assignment) • Production Metrics • Process states	• Speed Trends • Production Metrics • Machine Alarms • Operator Feed-back	• In-Line Quality Checks • Machine Alarms • Operator Feed-back (Root Cause Assignment)

Go and see..

Automation Requirements

- **Network connectivity** to machine or line controller PLCs
- **Minimal** machine **signals**:

• Out-feed count	(Integer)
• Blocked	(Bit)
• Starved	(Bit)
• Faulted	(Bit)
• Producing	(Bit)
• No Demand	(Bit)
• SKU ID	(Integer)
• (Alarms)	(Bits)
• (Quality)	(Bits)

A quick re-cap

	Best in Class (Top 20%)	Pass/Fail	Comments
Optimisation production using real-time tools	**50%**	✓	*Great metrics and KPI's displayed.*
Monitor plant floor exceptions in real time	**66%**	✓	*Downtime, speed quality captured.*
The organisation' s strategy incorporates real-time monitoring and response	**62%**	✓	*Even managers can see this is easy!*
The real-time data is highly visible in the factory	**50%**	✓	*Large screens & on every PC*
The real-time system is automated	**41%**	✓	*Ask SAGE…*

Source: Aberdeen Group – Event Driven Manufacturing Intelligence, May 2008

What customers are saying

Easy to use

3-5 % OEE increase easily achievable and **sustainable**

Speed losses identified

Shift production **records set**

Common **strategy**

Different - better

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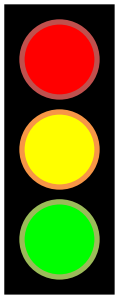
Best In Class!



Thank you for your time…

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