



CTPM

CTPM Webinar: The 3 Levels of Reliability for Operations Excellence

Tuesday, 9 September 2014 – 14:00-14:30 EST

The 3 Levels of Reliability for Operations Excellence



Presentation by:
Larry Mazza
CTPM Victoria Director



Welcome & Outline of Presentation

The 3 Levels of Reliability for Operations Excellence:

1. Prevention at Source for Equipment
2. Learning's from DuPont
3. What & how to apply 3 Levels of Reliability



Evolution of Maintenance, Reliability & Equipment Management

Approach	Methodology	Focus	Enablers	Resp
Reactive	Breakdown Maintenance	Fix it when it breaks supported by basic servicing eg lubricating	Quick response Good diagnostics	Maint

Evolution of Maintenance, Reliability & Equipment Management

Approach	Methodology	Focus	Enablers	Resp
Reactive	Breakdown Maintenance	Fix it when it breaks supported by basic servicing eg lubricating	Quick response Good diagnostics	Maint
Planned (1950's)	Preventive Maintenance (PM)	Periodic Replacement plus Inspection / Checks leading to Corrective Replacement	Maintenance Management Systems	Maint
	Predictive Maintenance (PdM)	Condition Monitoring leading to Corrective Replacement	Monitoring Equipment with Technical Expertise	Maint

Evolution of Maintenance, Reliability & Equipment Management

Approach	Methodology	Focus	Enablers	Resp
Reactive	Breakdown Maintenance	Fix it when it breaks supported by basic servicing eg lubricating	Quick response Good diagnostics	Maint
Planned (1950's)	Preventive Maintenance (PM)	Periodic Replacement plus Inspection / Checks leading to Corrective Replacement	Maintenance Management Systems	Maint
	Predictive Maintenance (PdM)	Condition Monitoring leading to Corrective Replacement	Monitoring Equipment with Technical Expertise	Maint
Designed (1960's)	Productive Maintenance	Reliability focus in plant design	Life Cycle Costing	Eng

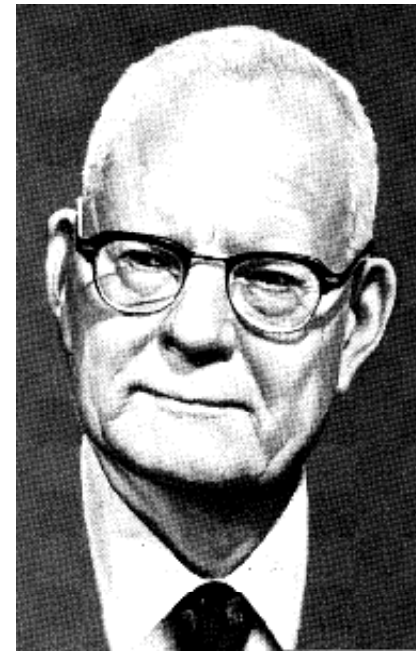
Evolution of Maintenance, Reliability & Equipment Management

Approach	Methodology	Focus	Enablers	Resp
Reactive	Breakdown Maintenance	Fix it when it breaks supported by basic servicing eg lubricating	Quick response Good diagnostics	Maint
Planned (1950's)	Preventive Maintenance (PM)	Periodic Replacement plus Inspection / Checks leading to Corrective Replacement	Maintenance Management Systems	Maint
	Predictive Maintenance (PdM)	Condition Monitoring leading to Corrective Replacement	Monitoring Equipment with Technical Expertise	Maint
Designed (1960's)	Productive Maintenance	Reliability focus in plant design	Life Cycle Costing	Eng
Toyota: Maintenance can't do it by themselves, Operators needs to be involved				
Pro-active (1970's)	Total Productive Maintenance (TPM)	Equipment Defect Identification and Elimination	Clean for Inspection Train for Inspection	Prod

Evolution of Maintenance, Reliability & Equipment Management

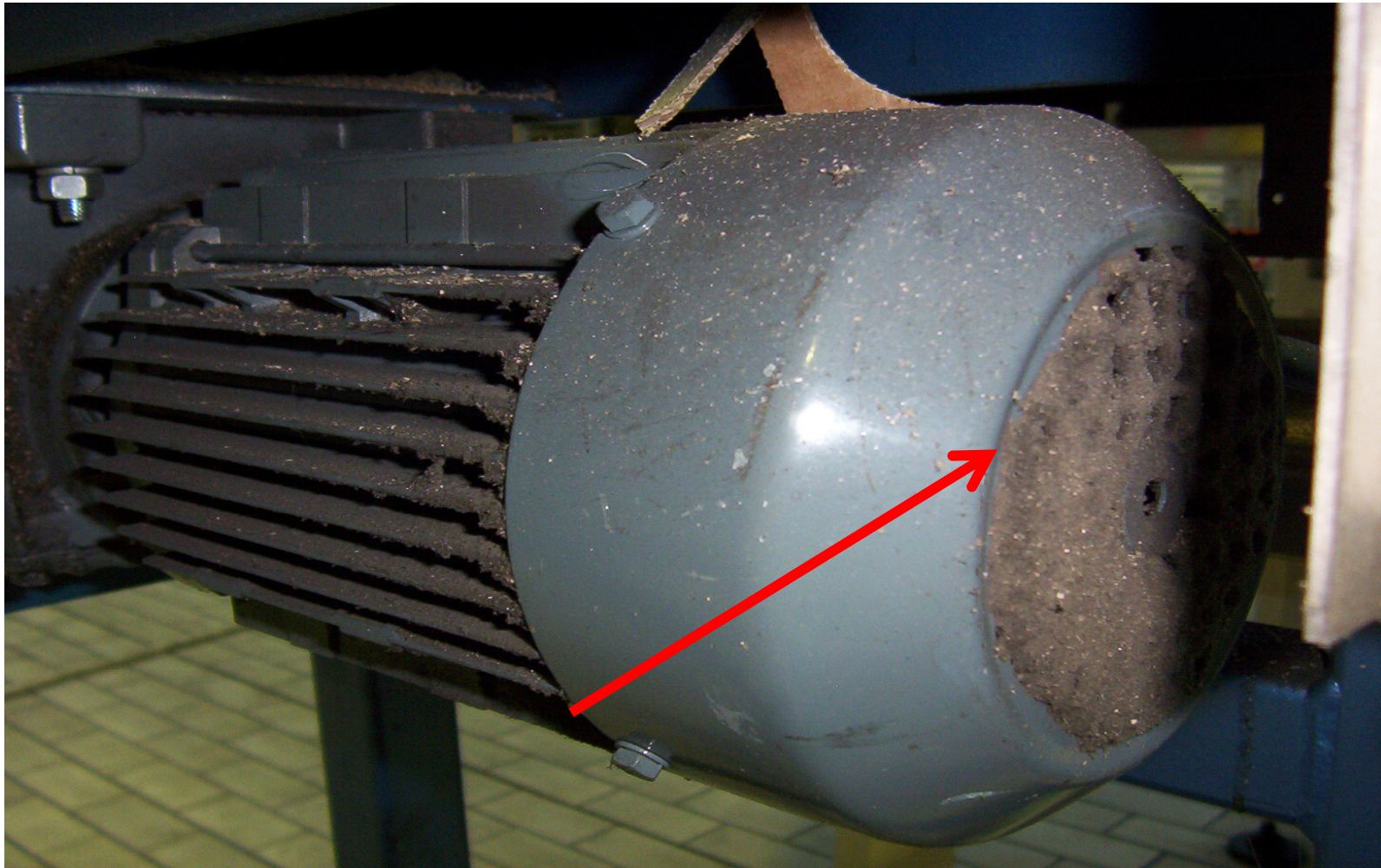
Approach	Methodology	Focus	Enablers	Resp
Reactive	Breakdown Maintenance	Fix it when it breaks supported by basic servicing eg lubricating	Quick response Good diagnostics	Maint
Planned (1950's)	Preventive Maintenance (PM)	Periodic Replacement plus Inspection / Checks leading to Corrective Replacement	Maintenance Management Systems	Maint
	Predictive Maintenance (PdM)	Condition Monitoring leading to Corrective Replacement	Monitoring Equipment with Technical Expertise	Maint
Designed (1960's)	Productive Maintenance	Reliability focus in plant design	Life Cycle Costing	Eng
Toyota: Maintenance can't do it by themselves, Operators needs to be involved				
Pro-active (1970's)	Total Productive Maintenance (TPM)	Equipment Defect Identification and Elimination	Clean for Inspection Train for Inspection	Prod
DuPont: Maintenance can't do it by themselves, Everyone needs to be involved				
Learning (1990's)	TPM & Lean (TPM ³)	Equipment Defect Avoidance and Equipment Management	Goal Alignment Ownership Engagement of all	Prod

Prevention at Source for Quality



Dr W Edwards Deming

What's the Equipment Defect here?



Basic Equipment Conditions

No Looseness



No Contamination



Perfect Lubrication



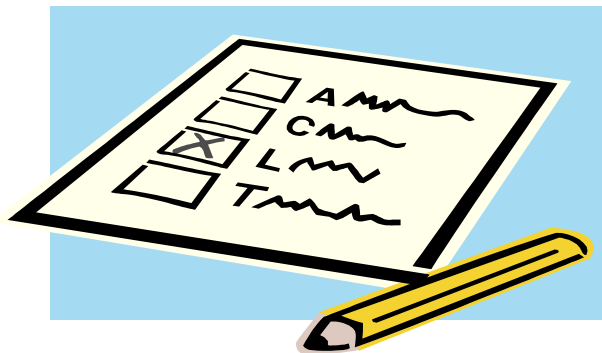
TPM is about 'Prevention at Source' for Equipment

Eg: fix damaged grease lines rather than failed bearings

However Toyota was faced with 3 Challenges - How do we:

- Train the operators to know what to look for
- Change the equipment so it easy for operators to find the problems
- Create a maintenance support capability that can respond to small problems and issues identified by the operators

Time for the 1st Poll



Question 1.

Does your company apply ***Prevention at Source*** for Equipment as part of their Reliability Strategy?

- a) Yes
- b) No
- c) Not sure

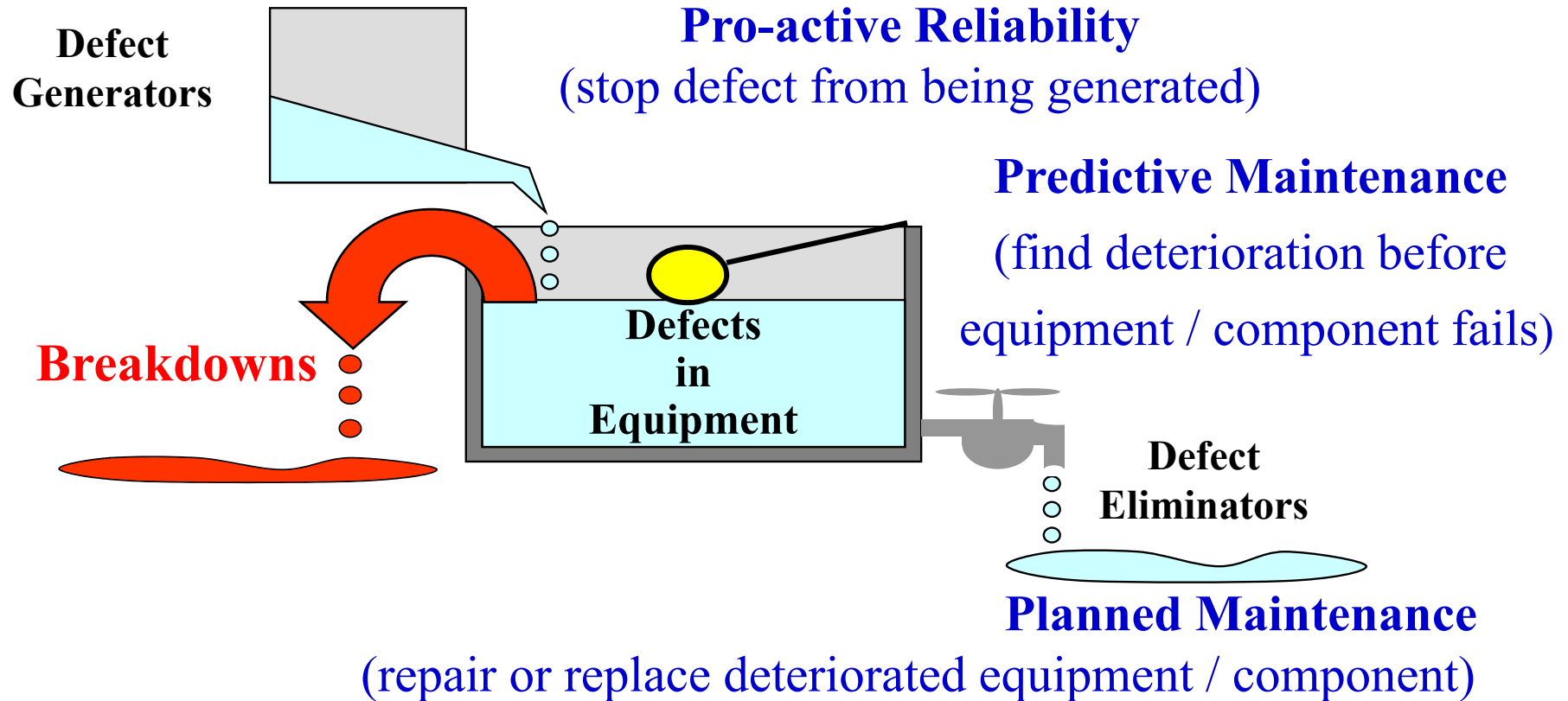
The DuPont Story



Learning's from DuPont

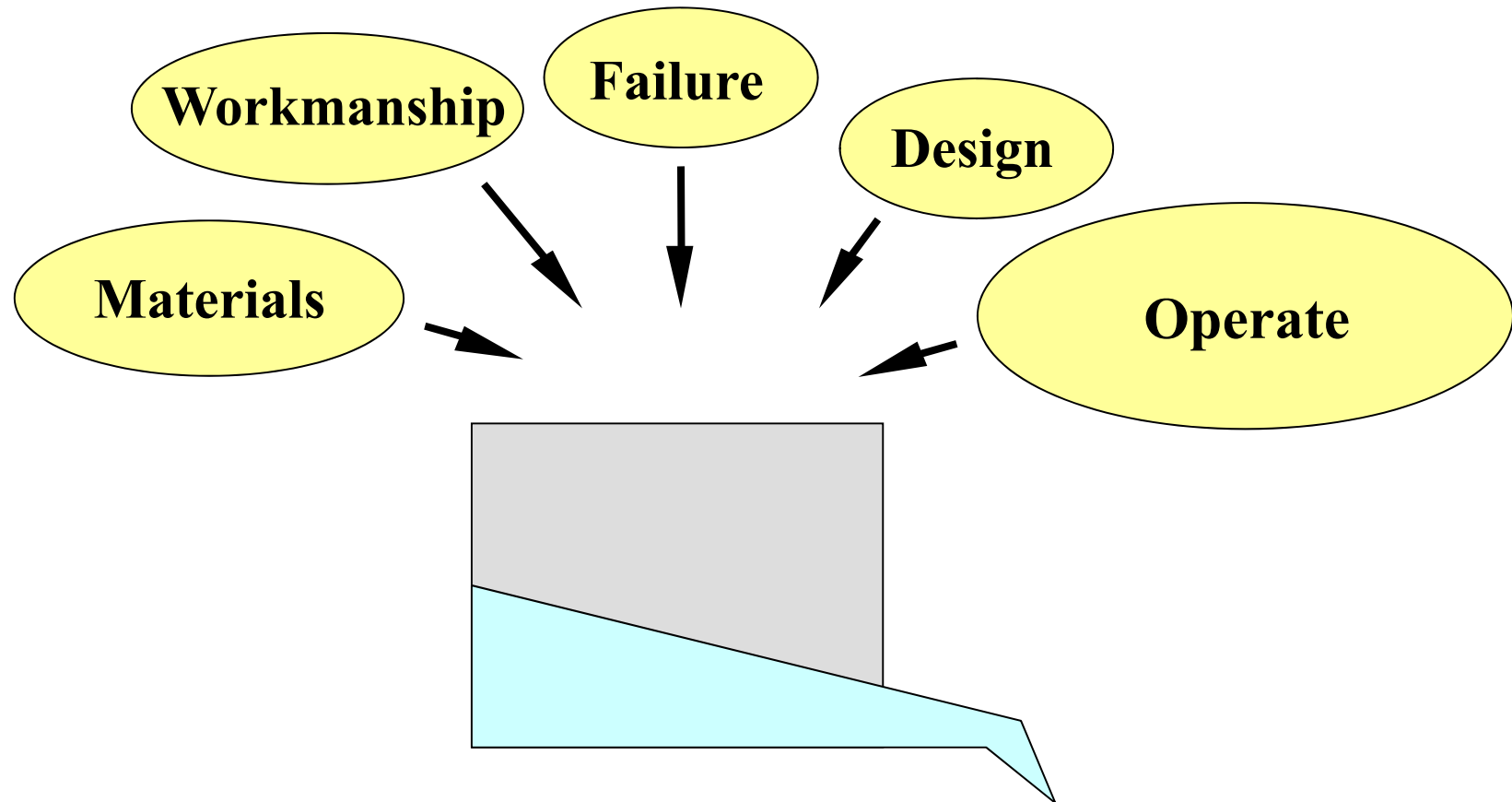
The Impact of Equipment Defect Management (The DuPont Story)

In our plants we generate defects, store defects in our equipment and eliminate defects through our maintenance activities.



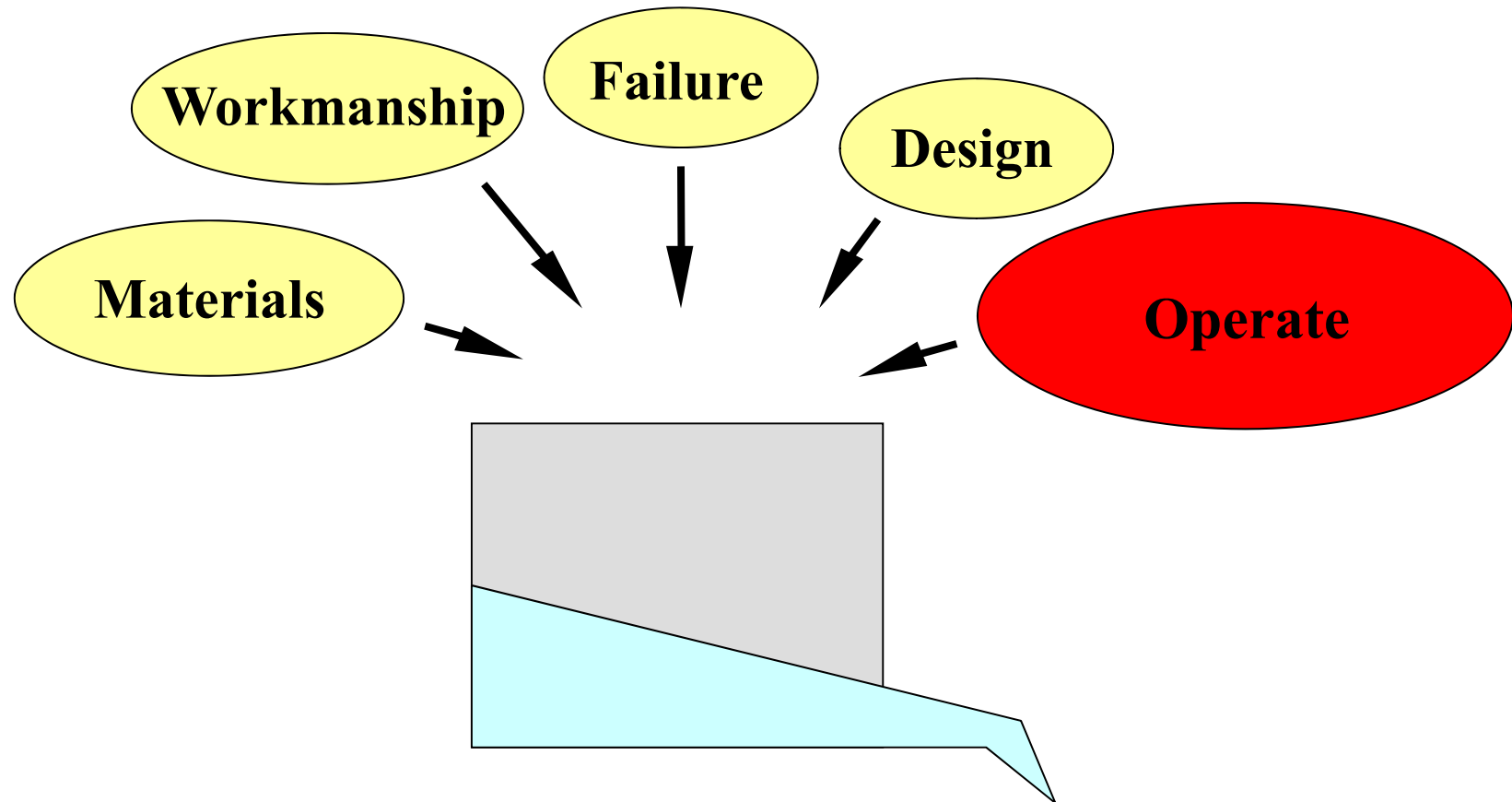
Source: Winston Ledet, The Manufacturing Game ©

Defect Generators found in Existing DuPont Plants



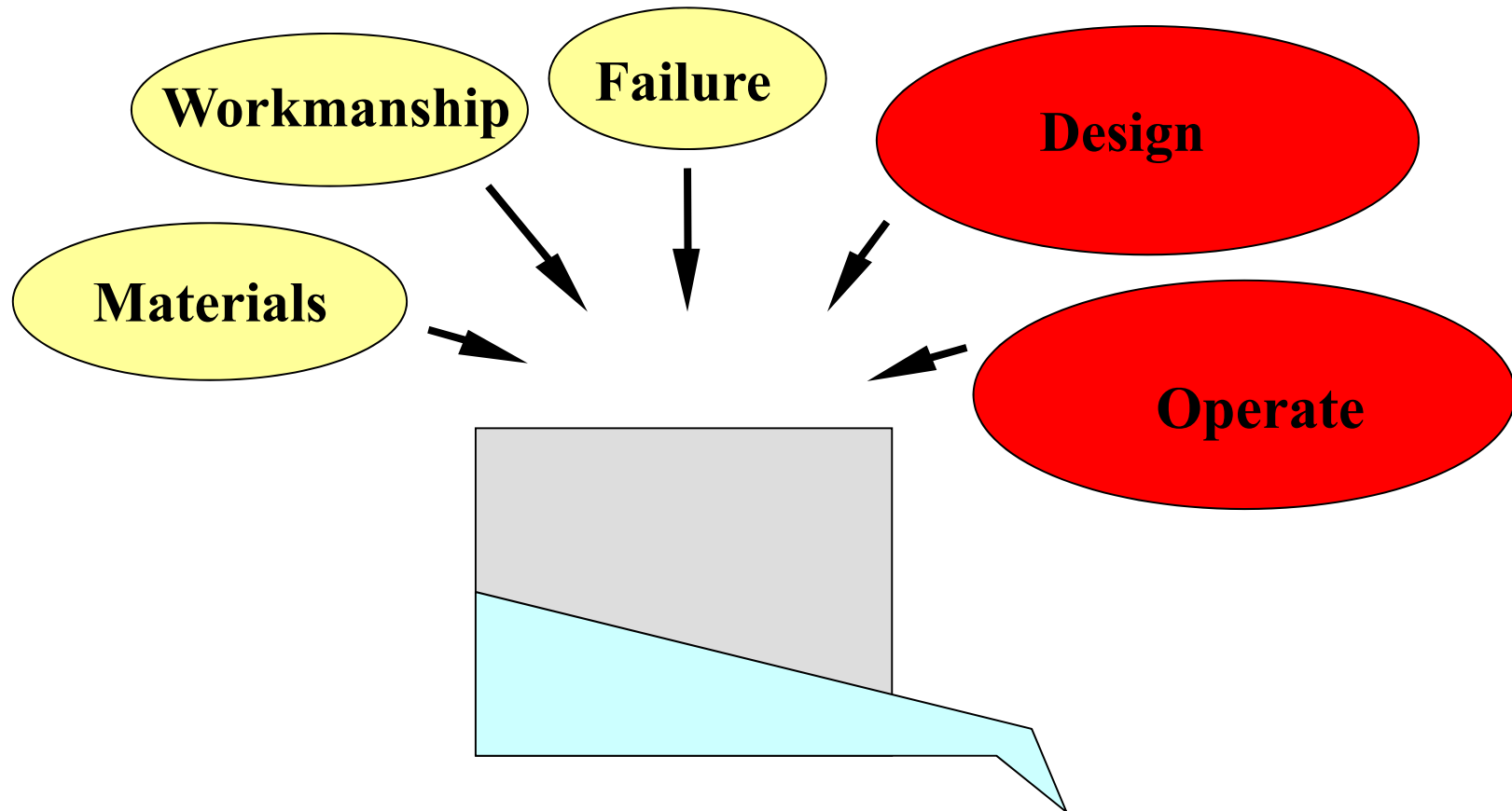
Source: Winston Ledet, The Manufacturing Game ©

Defect Generators found in Existing DuPont Plants



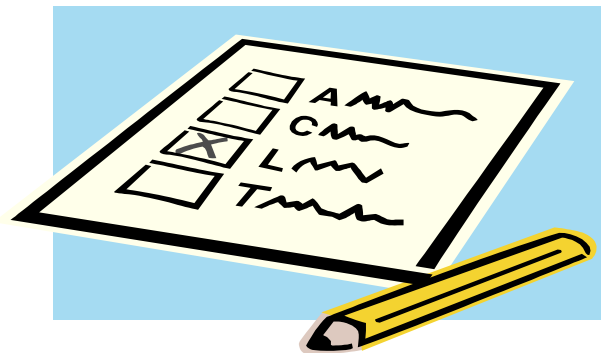
Source: Winston Ledet, The Manufacturing Game ©

Defect Generators that can be found in New Plants



Source: Winston Ledet, The Manufacturing Game ©

Time for the 2nd Poll



Question 2.

Does your site involve everyone to eliminate
Equipment **Defects Generators**?

- a) Yes
- b) No

Is your Plant & Equipment like a company Vehicle?



Is your Plant & Equipment like a company Vehicle?

Key Learning:

Who takes ownership of the plant & equipment?

Production Department, or keep it as a common asset looked after by ***Maintenance***.

**I Operate – You Fix
Vs
Equipment Ownership – Reliability by All**

“the cost and reliability implications are enormous”

3 Levels of Reliability

3 Levels of Reliability	Who	Key Role
Frontline Care of Equipment	Operators in Area Based Teams	<ul style="list-style-type: none">• Operate Plant at high standard• Ensure Basic Equipment Conditions• Minor Servicing

3 Levels of Reliability

3 Levels of Reliability	Who	Key Role
Frontline Care of Equipment	Operators in Area Based Teams	<ul style="list-style-type: none">• Operate Plant• Ensure Basic Equipment Conditions• Minor Servicing
Tactical Maintenance	Area Maintenance	<ul style="list-style-type: none">• Breakdowns• Planned / Predictive Maintenance• Support Frontline Care of Equipment

3 Levels of Reliability

3 Levels of Reliability	Who	Key Role
Frontline Care of Equipment	Operators in Area Based Teams	<ul style="list-style-type: none"> • Operate Plant • Ensure Basic Equipment Conditions • Minor Servicing
Tactical Maintenance	Area Maintenance	<ul style="list-style-type: none"> • Breakdowns • Planned / Predictive Maintenance • Support Frontline Care of Equipment
Strategic Maintenance	Central Maintenance	<ul style="list-style-type: none"> • Standardise components / practices / lubrication • Major Overhauls across site • Technical expertise across site • Improve design weaknesses

Key Maintenance Management Strategies that supports the 3 Levels of Reliability

Involvement of all Maintenance personal in
Production focused Improvement Teams.

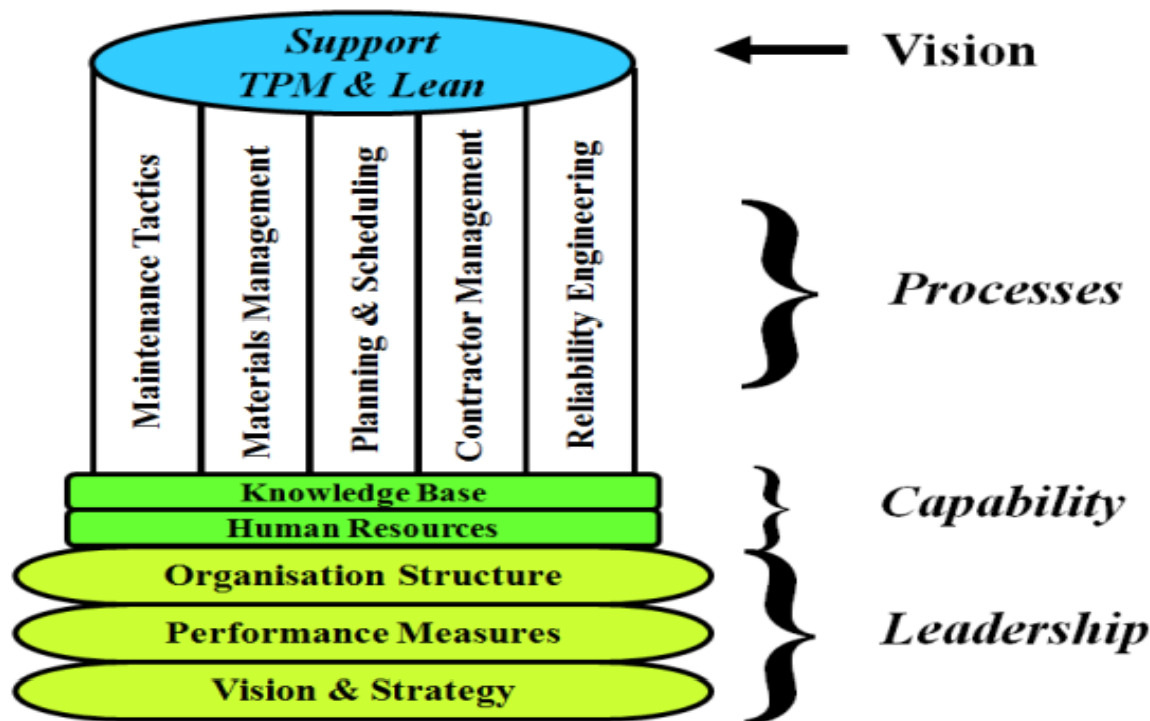


Key Maintenance Management Strategies that supports the 3 Levels of Reliability

Formal On-going Improvement Activities for Maintenance

(Maintenance Excellence Management – MEM)

The 10 Elements of Maintenance Excellence



Key Maintenance Management Strategies that supports the 3 Levels of Reliability

1. Assist Operators in their learning to better understand operate and care for their plant & equipment.
2. Develop maintenance capability in Preventive / Predictive Maintenance, Planned & Corrective Maintenance, Process Capability and ability to respond rapidly as required to any unforeseen situation affecting the safe operation of the plant & equipment; and
3. Provide reliability expertise.

Applying this learning to the DuPont Defect Generators

Defect Generator	3 Levels of Reliability	TPM ³ Activities
Materials	Tactical	<ul style="list-style-type: none">Maintenance Excellence Management Elements – Knowledge Base (E5), Materials Management (E7), and Reliability Engineering (E10)

Applying this learning to the DuPont Defect Generators

Defect Generator	3 Levels of Reliability	TPM ³ Activities
Materials	Tactical	<ul style="list-style-type: none">Maintenance Excellence Management Elements – Knowledge Base (E5), Materials Management (E7), and Reliability Engineering (E10)
Workmanship	Tactical	<ul style="list-style-type: none">Maintenance Excellence Management Elements – Human Resources (E4), Knowledge Base (E5), Maintenance Tactics (E6), Planning & Scheduling (E8), and Contractor Management (E9)

Applying this learning to the DuPont Defect Generators

Defect Generator	3 Levels of Reliability	TPM ³ Activities
Materials	Tactical	<ul style="list-style-type: none"> Maintenance Excellence Management Elements – Knowledge Base (E5), Materials Management (E7), and Reliability Engineering (E10)
Workmanship	Tactical	<ul style="list-style-type: none"> Maintenance Excellence Management Elements – Human Resources (E4), Knowledge Base (E5), Maintenance Tactics (E6), Planning & Scheduling (E8), and Contractor Management (E9)
Failure	Tactical & Strategic	<ul style="list-style-type: none"> Maintenance Excellence Management Elements – Reliability Engineering (E10) New Equipment Management

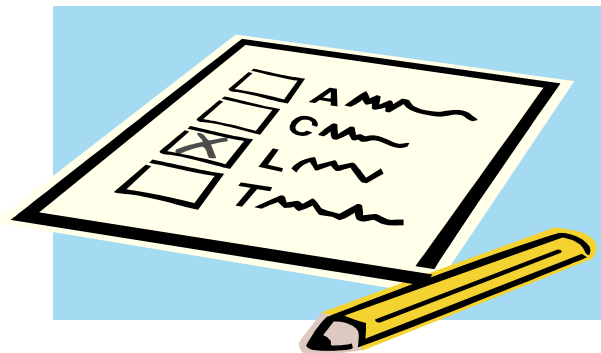
Applying this learning to the DuPont Defect Generators

Defect Generator	3 Levels of Reliability	TPM ³ Activities
Materials	Tactical	<ul style="list-style-type: none"> Maintenance Excellence Management Elements – Knowledge Base (E5), Materials Management (E7), and Reliability Engineering (E10)
Workmanship	Tactical	<ul style="list-style-type: none"> Maintenance Excellence Management Elements – Human Resources (E4), Knowledge Base (E5), Maintenance Tactics (E6), Planning & Scheduling (E8), and Contractor Management (E9)
Failure	Tactical & Strategic	<ul style="list-style-type: none"> Maintenance Excellence Management Elements – Reliability Engineering (E10) New Equipment Management
Design	Tactical & Strategic	<ul style="list-style-type: none"> Maintenance Excellence Management Elements – Reliability Engineering (E10) New Equipment Management

Applying this learning to the DuPont Defect Generators

Defect Generator	3 Levels of Reliability	TPM ³ Activities
Materials	Tactical	<ul style="list-style-type: none"> Maintenance Excellence Management Elements – Knowledge Base (E5), Materials Management (E7), and Reliability Engineering (E10)
Workmanship	Tactical	<ul style="list-style-type: none"> Maintenance Excellence Management Elements – Human Resources (E4), Knowledge Base (E5), Maintenance Tactics (E6), Planning & Scheduling (E8), and Contractor Management (E9)
Failure	Tactical & Strategic	<ul style="list-style-type: none"> Maintenance Excellence Management Elements – Reliability Engineering (E10) New Equipment Management
Design	Tactical & Strategic	<ul style="list-style-type: none"> Maintenance Excellence Management Elements – Reliability Engineering (E10) New Equipment Management
Operate	Frontline	<ul style="list-style-type: none"> Maintenance Excellence Management Elements – Vision & Strategy (E1), Performance Measures (E2), Organisation Structure (E3), and Human Resources (E4) Focused Equipment & Process Improvement Education & Training (Base Skills) Education & Training (Mastery Skills) Education & Training (Team Skills) Work Area Management Operator Equipment Management

Time for the last Poll



Question 3.

Does your company apply all 3 Levels of Reliability in the pursuit of Operations Excellence?

- a) Tactical Maintenance Only
- b) Tactical & Strategic Maintenance
- c) All 3 Levels
 - Frontline Care of Equipment
 - Tactical Maintenance
 - Strategic Maintenance

Key Learning's

3 Key Learning's;

1. *Prevention at Source for Equipment:*

- ✓ Identify and fix Equipment Defects before they become failures
- ✓ Involve Operators to identify Equipment Defects & assist in their rectification

2. *Defect Generators*

- ✓ Stop the problems from happening by identifying and addressing equipment Defect Generators.

3. *Maintenance Can't do it on their own*

- ✓ Production to takes ownership of the plant equipment
- ✓ Everyone needs to be involved in reliability to achieve Operations Excellence

Any Questions Please?

