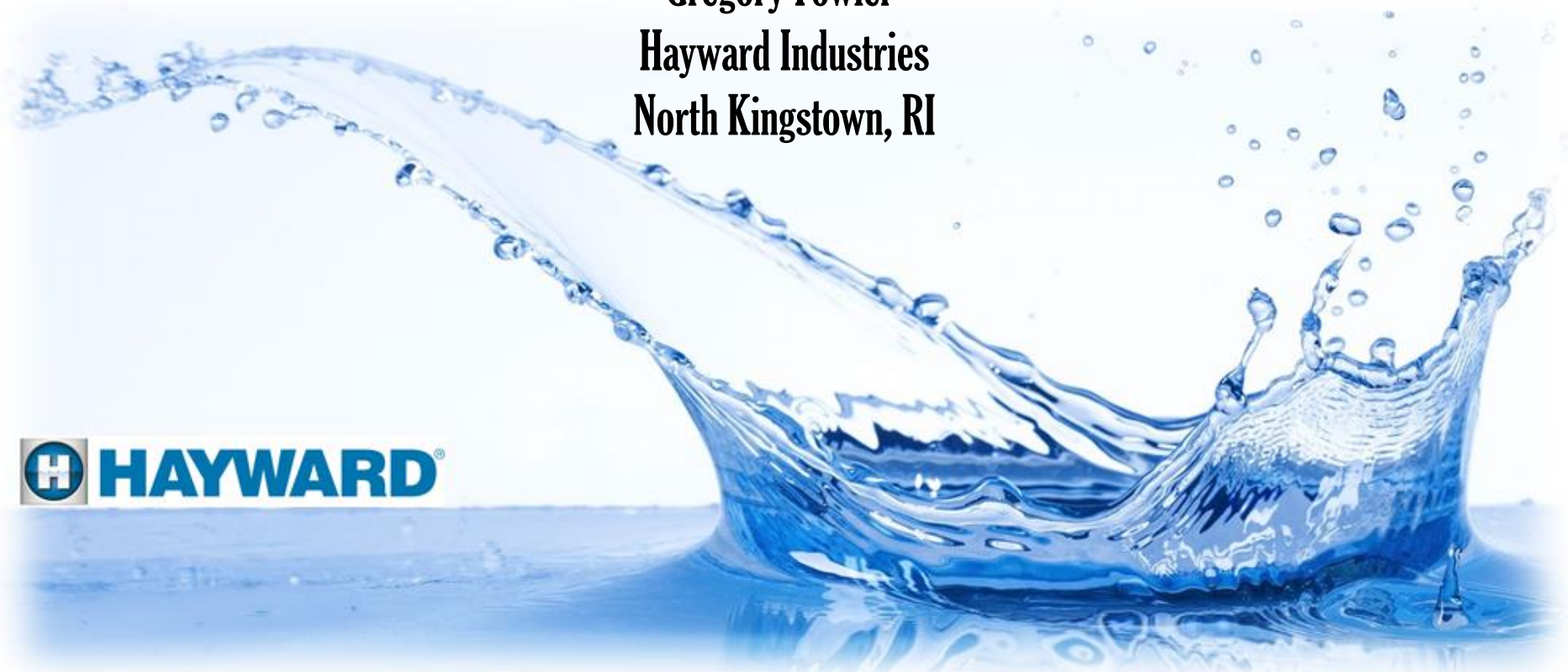


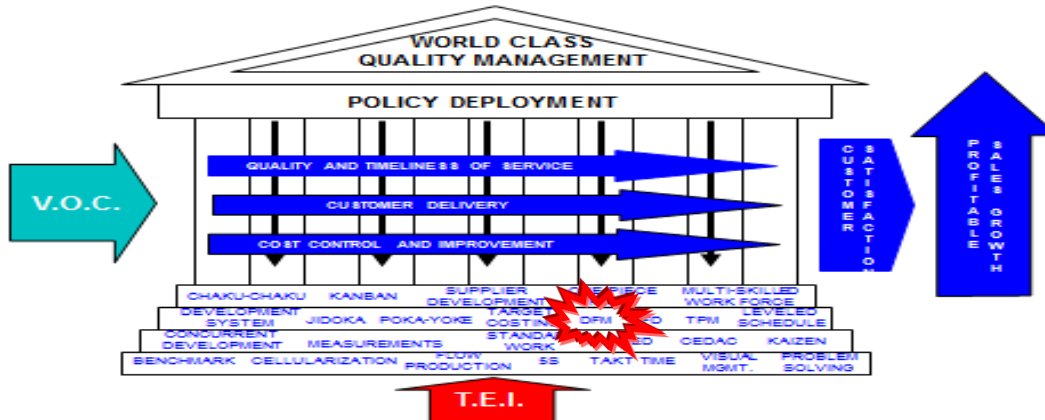
Incorporating DFMA into Product Development Cycles in a Lean Business Environment

Gregory Fowler
Hayward Industries
North Kingstown, RI



- **Lean**
- **Lean & DFMA**
- **FCI (small company)**
- **Hayward Industries (large company)**
- **Assessing your company**
- **Summary**

Danaher Business System



- Waste Elimination
- Continuous Improvement/Kaizen
- Communications
- Organization (5S)
- Teamwork
- Problem Solving
- Developing a Thinking Organization

T.E.I.

The 8 Wastes of Lean:

- Defects
- Over-Production
- Waiting
- Transportation
- Inventory
- Motion
- Excess Processing
- Underutilized Creativity



DFMA Links to Waste Reduction:

Part Count
Part Standardization
Part Orientation
Assembly Time
Material Cost
Labor Cost
Tooling Cost



"You're right, it is difficult to assemble - we'll let the customers do it."

Six Sigma Level:

- Fish Bone
- 7 Steps
- DMAIC
- Shainin

LEAN:

Asking the 5 Why's:

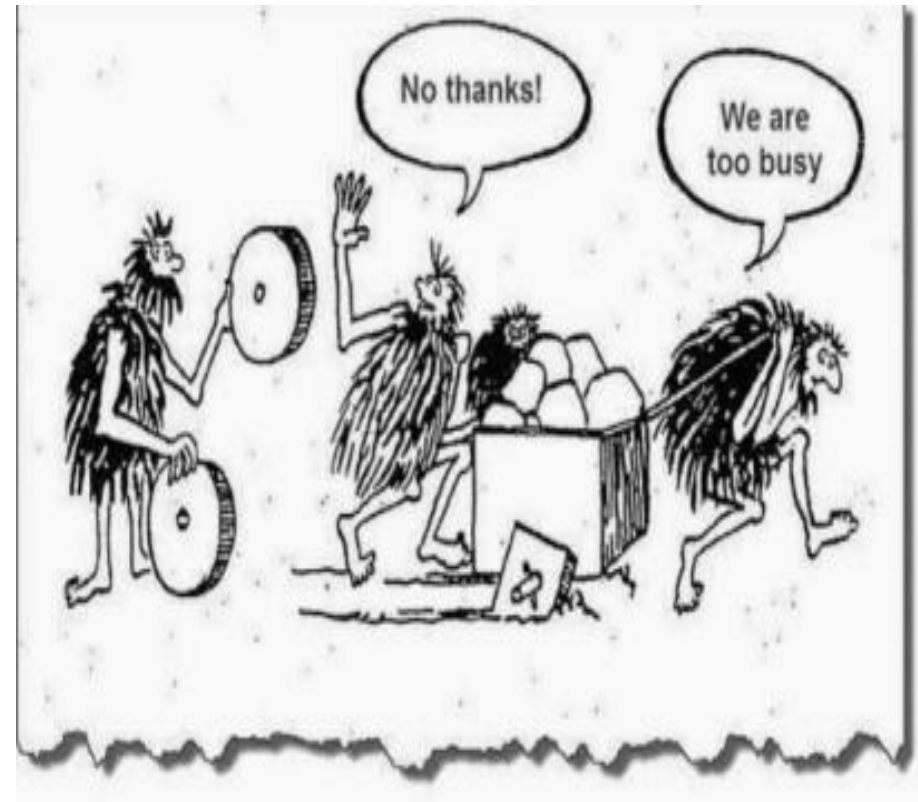
- Get to the Root of the Problem



Q: What is the skill most highly valued by employers?

A: “Problem Solving” according to a 2015 survey in Forbes

- Educate
- Encourage Ideas
- Give Them a Voice
- Empower Employees
- Positive Environment
- Culture



Assess Lean In Your Company



Is the term “Lean” used in your company?

What does it mean to you?

How long has your company been on its “Lean journey”?

What changes have you seen?

How is the communication?

Are expectations clear?

Are people held accountable?

Is there continuous education?

Is the work environment calm or chaotic?

Are there metrics used to focus resources and drive continuous improvement?

Are employees engaged?



- **Small – Approximately \$25M with 120 employees**
- **Life Safety Products**
- **Complex Control Systems**
- **Long Time to Market (NPD)**
- **Silos**
- **Poor Communications**
- **Lacked Accountability**
- **No Documented Process**
- **No Strategy**



- ISO Implemented – All Processes Documented
- Lean Implemented in Operations
- Sales, Marketing, and Finance embrace Continuous Improvement
- Still Long NPD Lead-time
- 100% fill rate, Six Sigma Level Quality and Safety
- Information Sharing – Improved Communications
- Need New Products to Compete
- A Couple of Silos
- Metrics and Increased Accountability



- **Management Intro to DFMA**
- **Strategy to Implement – Overcome Fear**
 - **Structure and Teamwork**
 - **Process Documented and Standardized – fosters teamwork**
- **Education in DFMA Methodology and Software**
 - **5 Products; 6 Teams – very selective**
 - **Cross Functional Disciplines**
 - **All Level of Personnel**
 - **Innovation, Creativity, Communications, Tinkerers, Thinkers, Product Knowledge, ...**
- **Observe Interaction**
- **Implement into Business**
 - **Standardize Process to Include DFMA analysis**
 - **Measure Performance**

- **Large Multi-Facility**
- **7 Manufacturing Facilities Globally**
- **Over 2500 Employees**
- **HRI 200+ Employees**
- **Pool Products**
- **Complex Control Systems**
- **Long Time to Market (NPD)**
- **Agendas/Silos**
- **Mixed Communications**
- **Lack of Accountability**
- **Good Documented Process for NPD**
- **False Sense of Strategy**

Hayward Industries – Centers of Excellence



OmniLogic



Salt & Swim 3C



ProLogic and Accessories



Universal ColorLogic
Pool & Spa Lights



EcoStar Pump



Universal H-Series



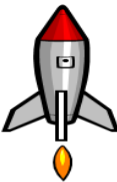
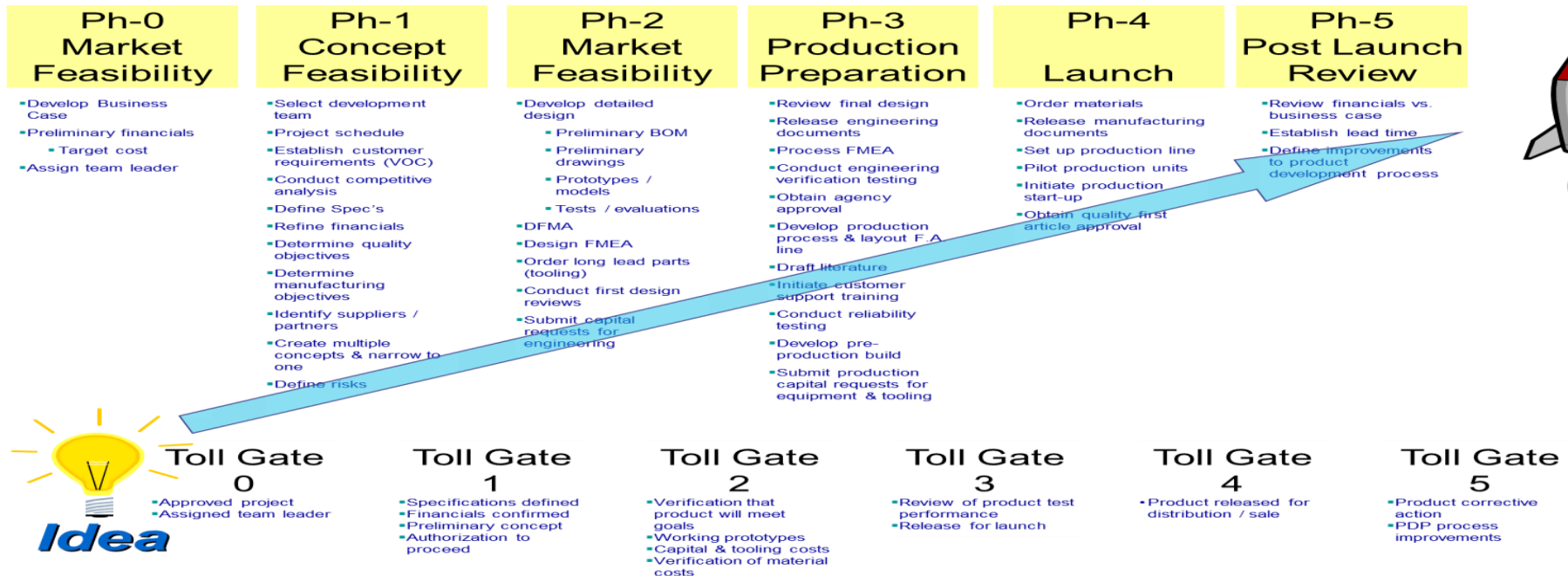
ColorLogic 320 & 160
LED Lights



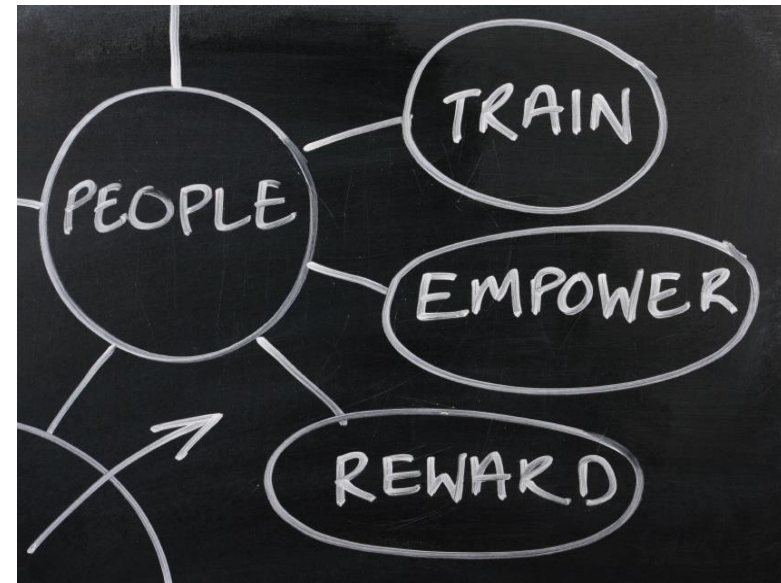
SwimClear Filter

- Lean Driven Strategy
- Finance Beginning to Recognize Continuous Improvement Value
- Very Profitable – Comfortable
- Commitment to HDLS Process (NPD)
- Recognition of Oppty. in Manufacturing & Assembly of Recently Released Products

Start



- **DFMA Implementation Strategy Development**
Middle Management Driven
- **Educate executives in DFMA value**
- **Include all Hayward facilities developing New Products**
- **Identify appropriate personnel for education**
- **Establish a feedback loop**
- **Leverage HDLS Process (Standardize)**
- **Education — same as FCI model**
5 Products, 6 Teams, ...
- **Observe Interaction**
- **Implement Into Business**



Before DFMA Education

19 components



After DFMA Education

9 components



Assess Your Company

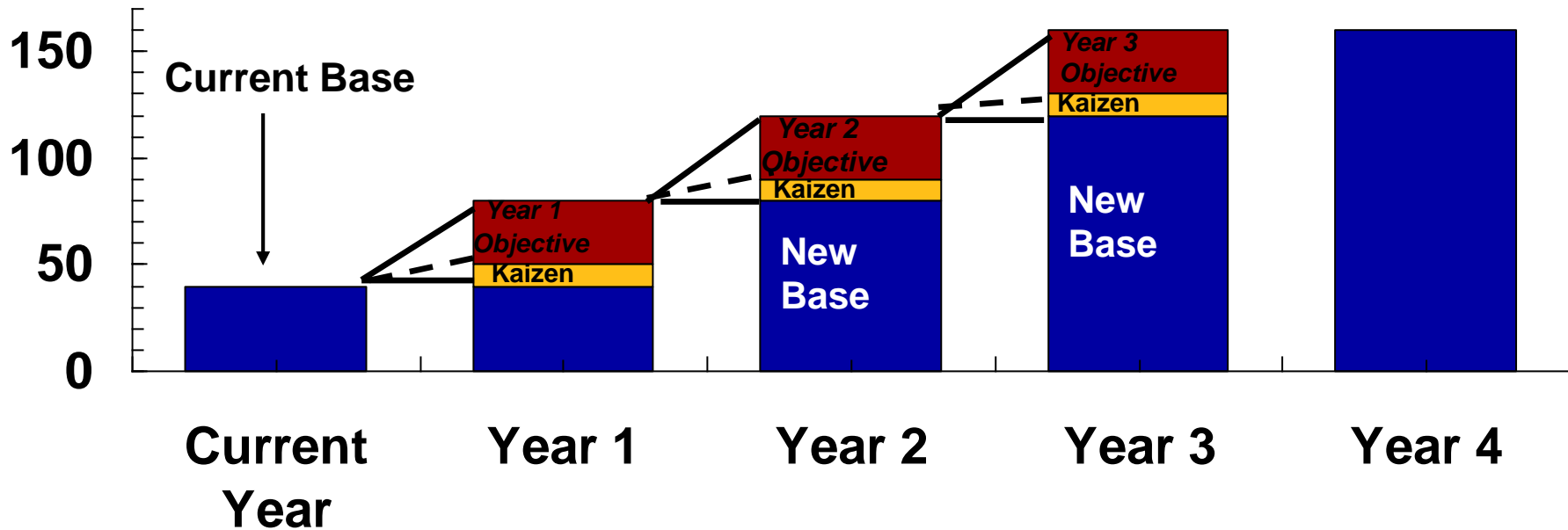


- Are you “doing” Lean?
- Are you doing DFMA?
- Is there company wide standard work?
- Is leadership involved and how are they involved?
- Does your company use Strategy or Policy Deployment?
- How much education of employees takes place?
- Is the philosophy of Continuous Improvement prevalent?
- Are Kaizens run continuously with all employees involved?
- How open is the company and it’s leaders to new ideas?
- How driven is the company to improve Delivery, Quality & Costs?



Competitive Advantage Through Breakthrough

3-5 Year Breakthrough Target



■ Daily Management ■ Kaizen ■ Breakthrough

- ✓ **Assess the Need**
- ✓ **Assess the Willingness**
- ✓ **Assess the Environment**
- ✓ **Develop a Plan**
- ✓ **Implement**

Be Patient, Be Persistent, Never Quit when you know it's the right thing to do!

Thank You!!!