

Improving Rotomolded Part Performance Through Effective Quality Programs

For the Association of Rotational Molders, 2017

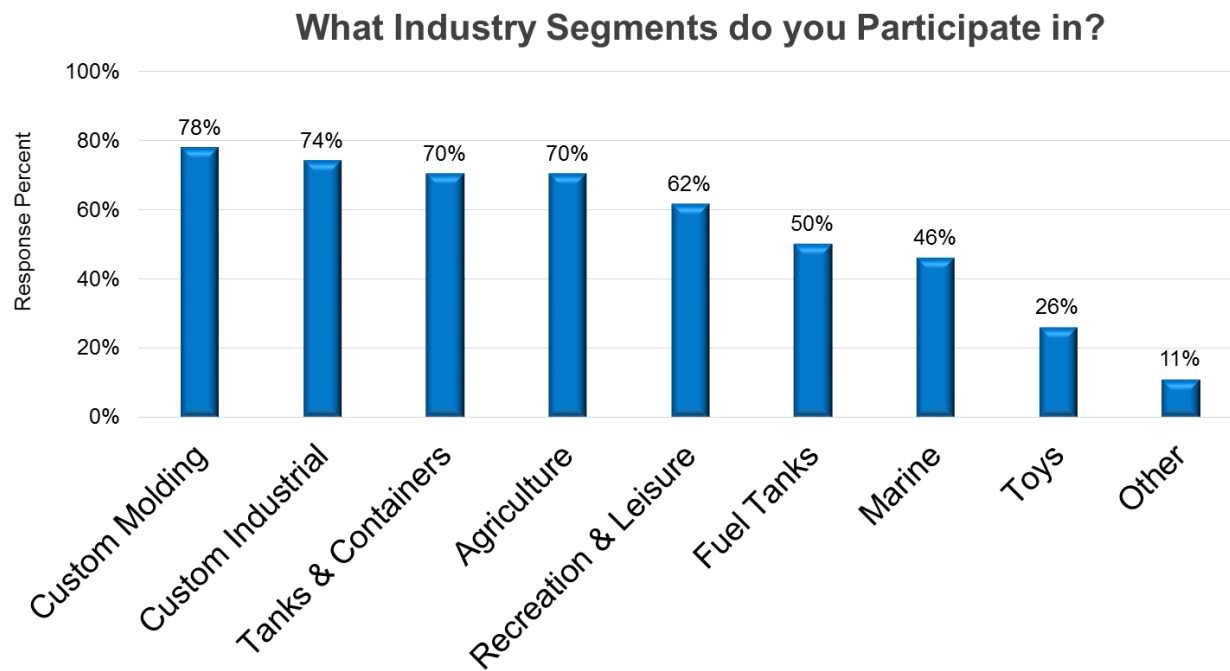
Céline Bellehumeur

September 26-28, 2017

Chicago, IL

First Things First...

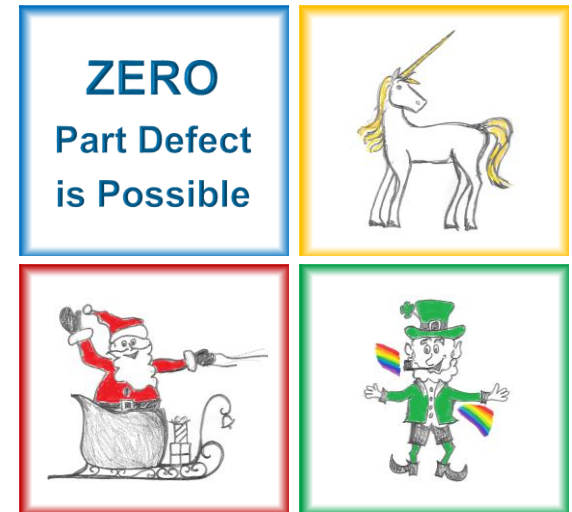
... Thank you to all who participated to the survey (26 respondents)



TOPICS

1. Why Invest in Quality?
2. Principles and Methodologies
3. Using Quality Data in Problem Solving
4. Case Studies

*Quality Story from a Custom Rotational Molder
Most Frequent & Costly Problems*



Only ONE is REAL...

Why Invest in Quality?

Benefits of a Quality Program

Meet customer requirements

Meet necessary **statutory and regulatory requirements**

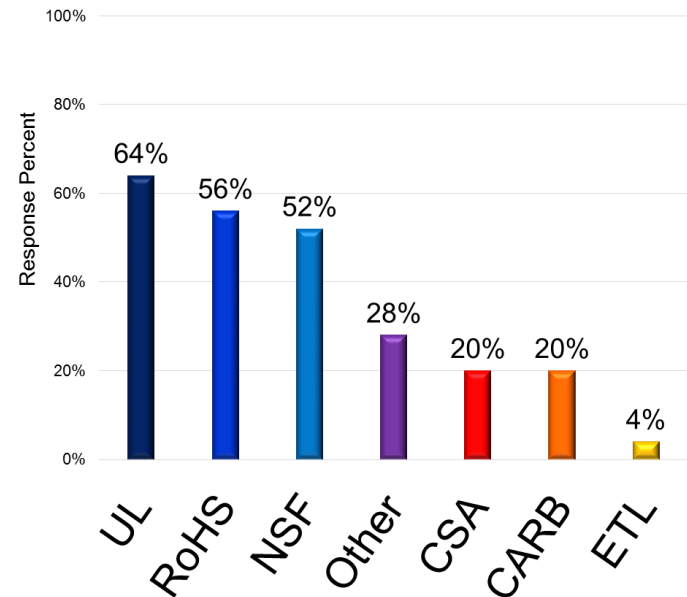
Work in a **more efficient way**

Identify and address risks
associated with your organization

Expand into new markets



What Quality Standards do your Products Need?



Cost of Quality

Defects
Scrap
Rework
Returns
Warranty
Inspection
Quality Assurance

10%
Visible

PREVENTION

Training
Maintenance
Audits
Design Review
Engineering Analysis
Specification Review
Supplier Evaluation

APPRAISAL

Receiving Inspection
Equipment Inspection
Process Control
Quality Control
Testing

90%
Hidden

INTERNAL FAILURE

Engineering Changes
Excess Inventory
Disposal Costs
Re-Inspection
Downtime

EXTERNAL FAILURE

Service after Service
Purchase Changes
Lost Market Share
Product Liability
Delivery Delay

TOPICS

1. Why Invest in Quality?
- 2. Principles and Methodologies**
3. Using Quality Data in Problem Solving
4. Case Studies



ISO Quality management
Principles (2015)
ISBN 978092-67-10650-2

Principles and Methodologies

1. Customer focus

- Identify and understand customer needs
- Communicate needs throughout your organization

Plan, Design, Develop, Produce, and Deliver towards these needs

2. Leadership

- Establish unity of purpose and direction at all levels in the organization

3. Employee Engagement

- Importance of contribution and collaboration
- Empower to take initiatives without fear
- Recognize learning and improvement



Principles and Methodologies

4. Improvement Objectives

- Establish objectives at all levels of the organization
- Implement improvement projects
- Track, review and audit



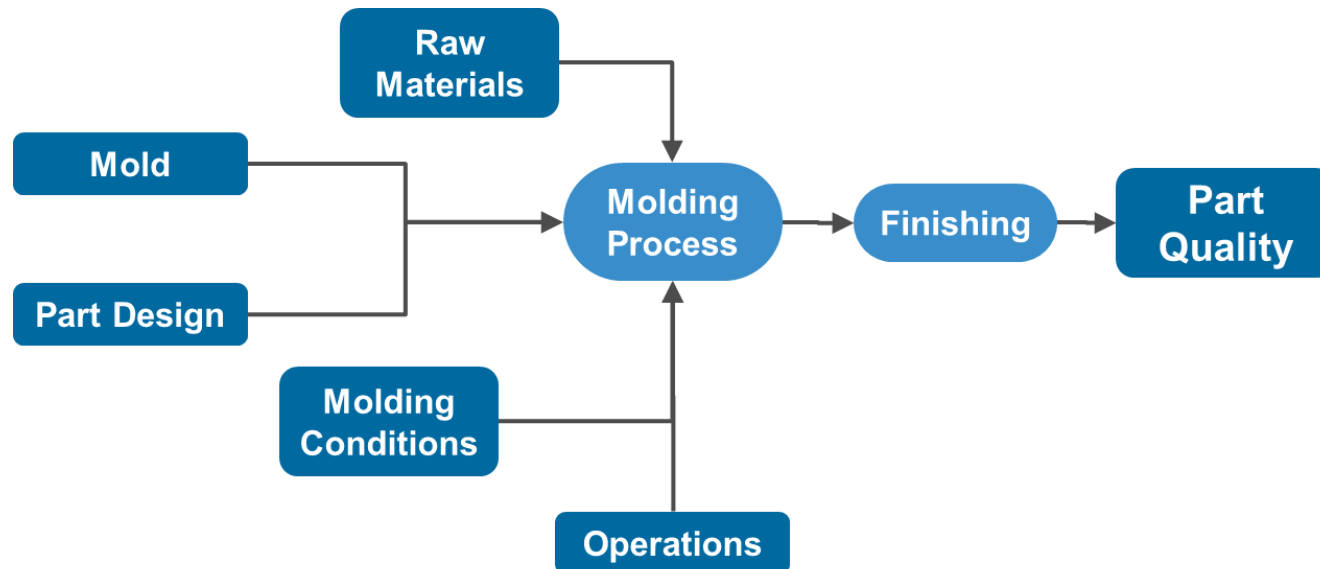
Quality Principles and Methodologies

5. Process Approach

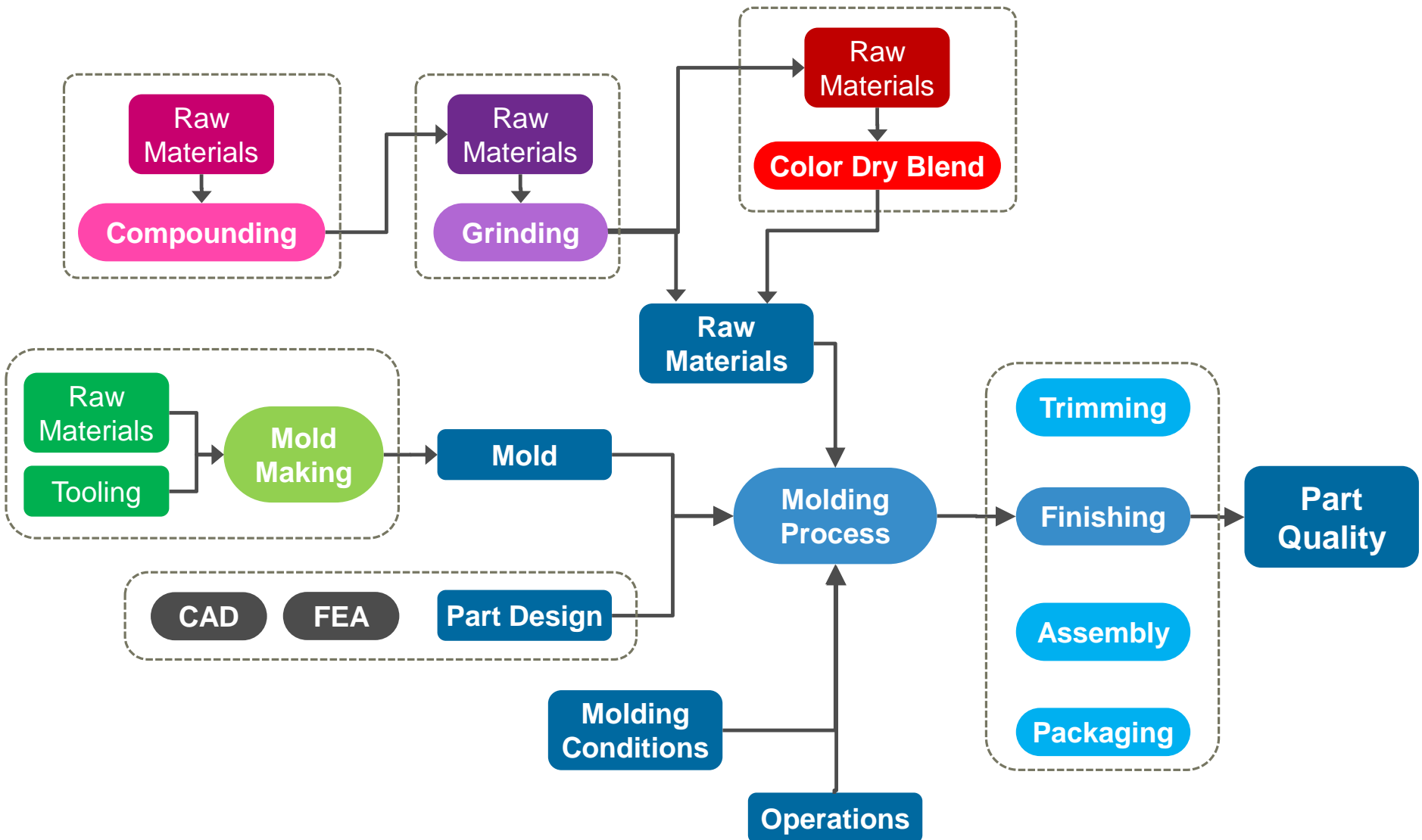
A quality management system consists of inter-related processes

- Determine process inter-dependencies
- Ensure information is available to operate and improve processes

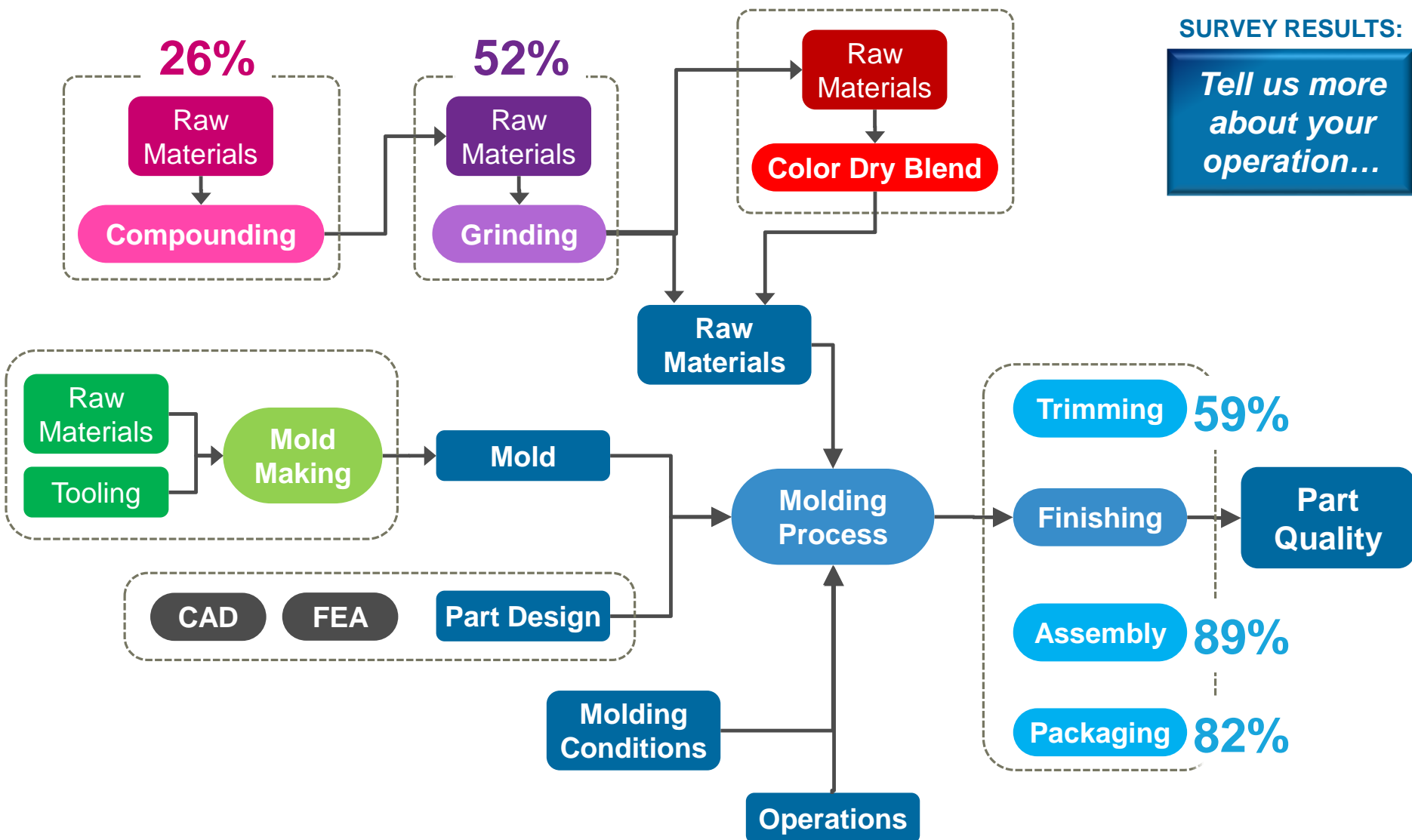
Monitor, Analyze and Evaluate Performance



Quality Principles and Methodologies



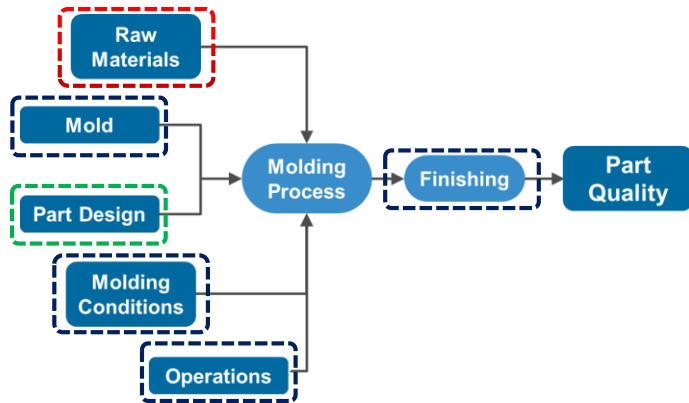
Quality Principles and Methodologies



Quality Principles and Methodologies

SURVEY RESULTS

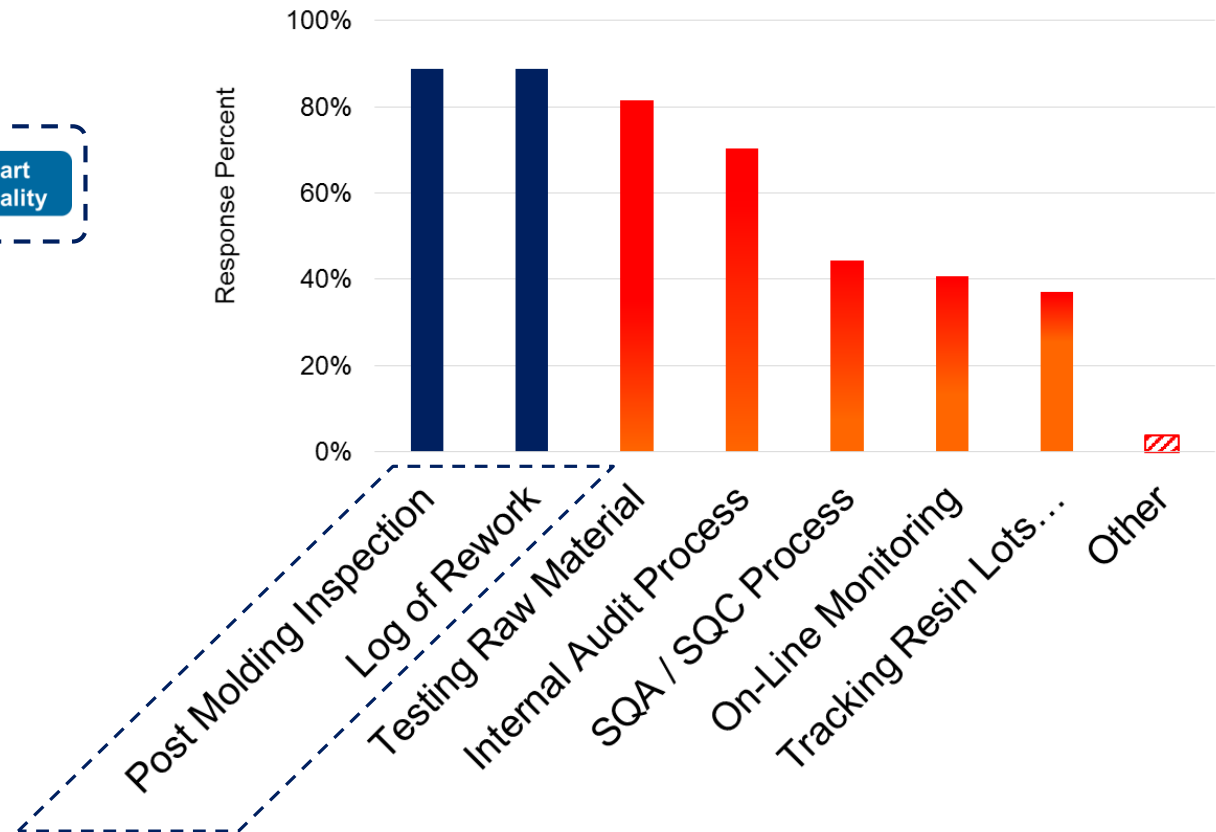
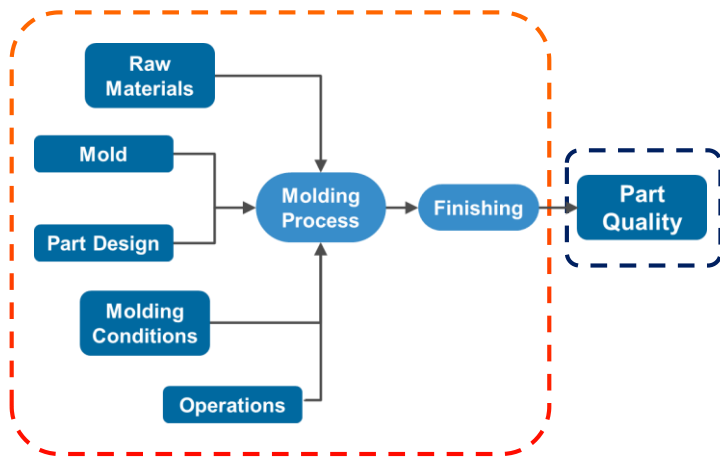
Aspects of the process that are most important for part quality:



Quality Principles and Methodologies

SURVEY RESULTS

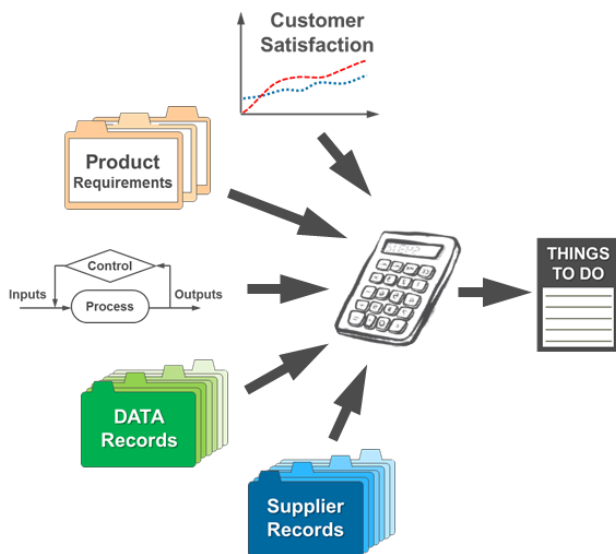
How do you track quality of products and processes?



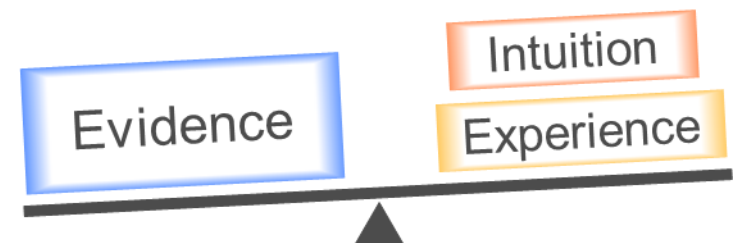
Quality Principles and Methodologies

6. Evidence-Based Decision Making

- **Identify**, **Measure** and **Monitor** key quality indicators
- Ensure that data is sufficiently accurate, reliable and secure
- Analyze and evaluate data using suitable methods



Decisions and Actions:

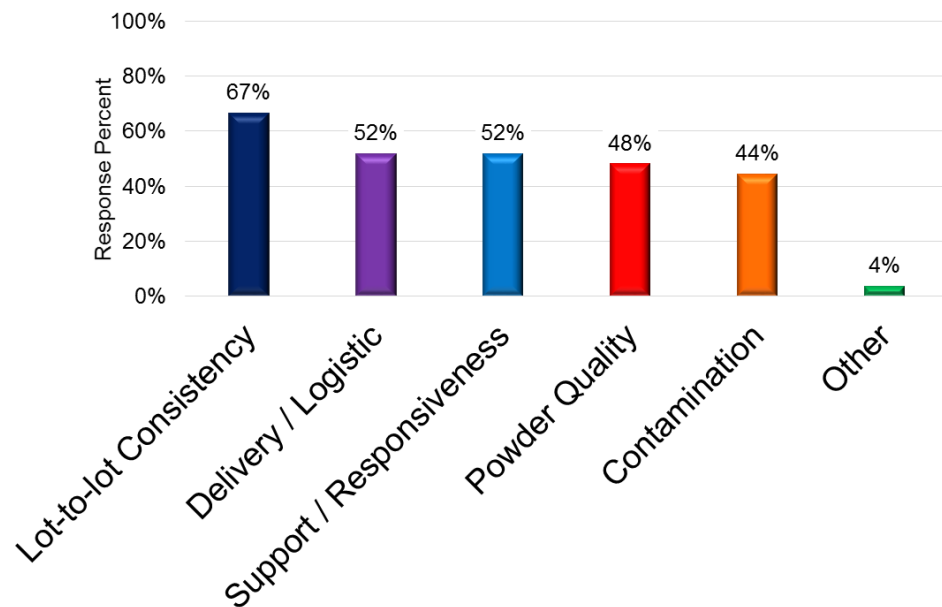


Quality Principles and Methodologies

7. Relationship Management

- Establish collaborative development activities
- Share resources, competence and quality related risks
- Prioritize relationships: short-term versus long term considerations

**Most Important
Issues when
dealing with
Resin Suppliers:**



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Using Quality Data in Problem Solving

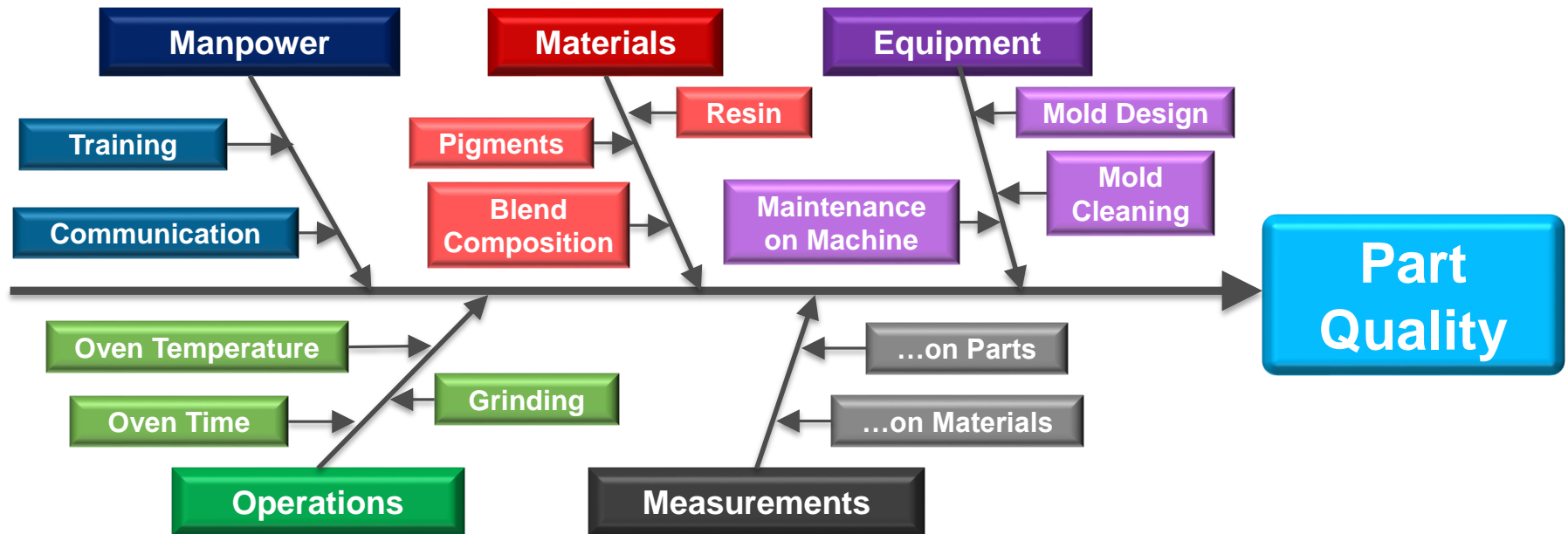
Data Analysis Tools

- Cause and Effect Analysis
- Pareto Diagrams
- Statistical Quality Analysis / Control

Using Quality Data in Problem Solving

Data Analysis Tools

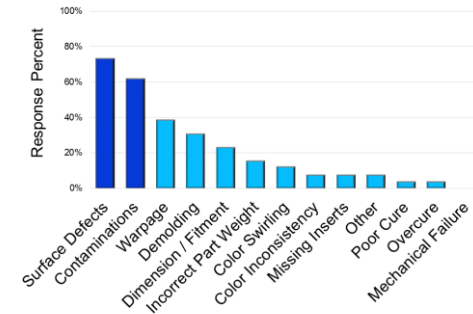
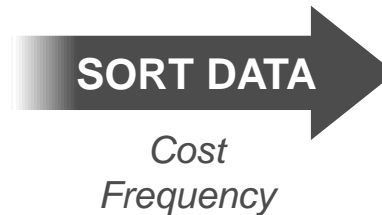
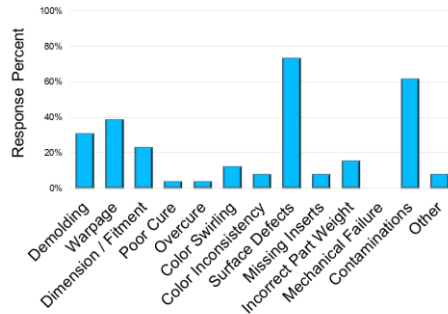
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Using Quality Data in Problem Solving

Data Analysis Tools

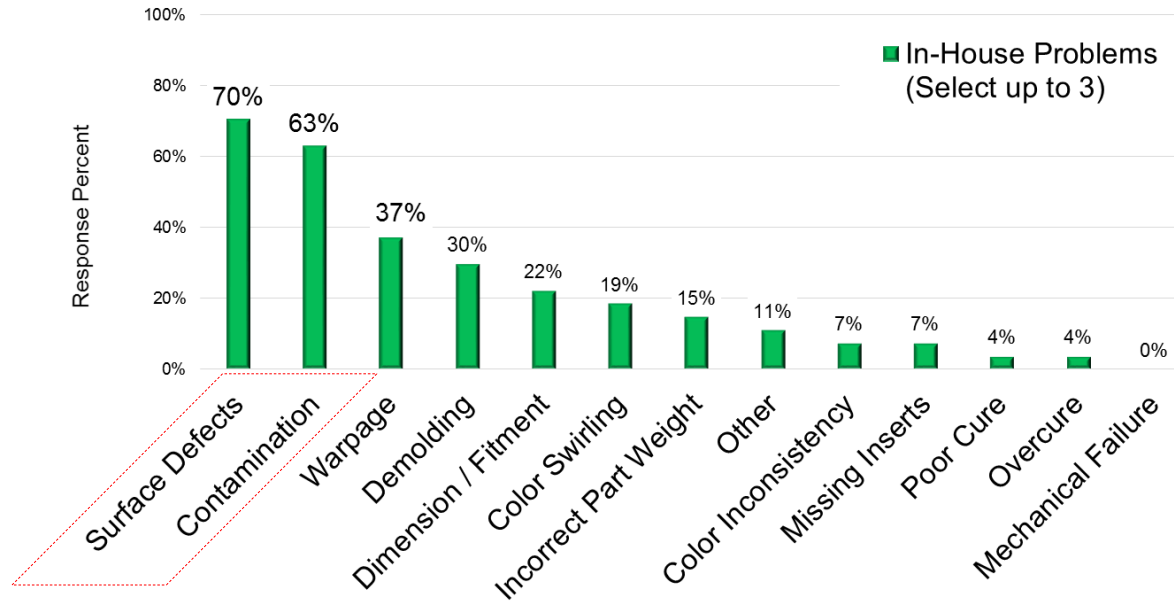
- Cause and Effect Analysis
- **Pareto Diagrams**
- Statistical Quality Analysis / Control



Using Quality Data in Problem Solving

SURVEY RESULTS

Problems Most Commonly Faced with your Products:



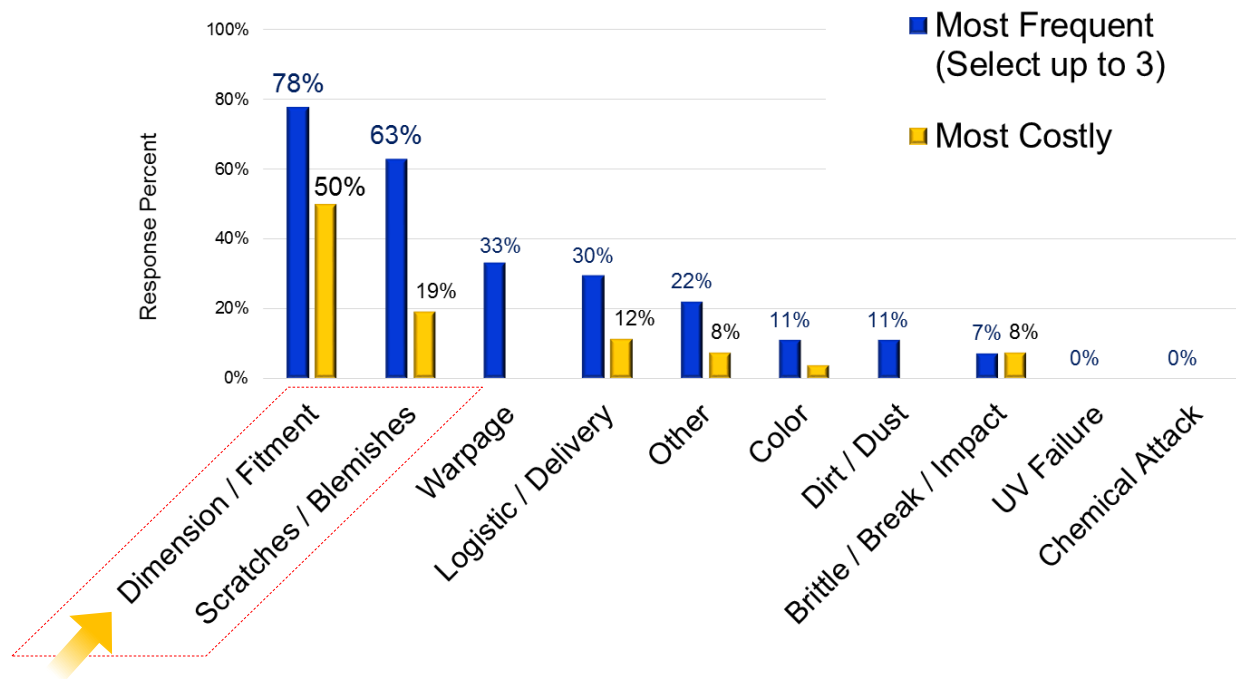
Most Common Problems:

- Surface Defects
- Contamination

Using Quality Data in Problem Solving

SURVEY RESULTS

Complaints you get from your Customers:



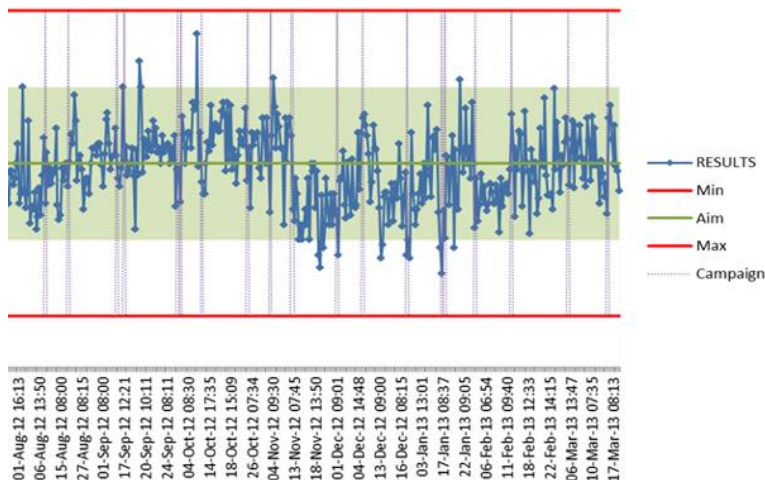
Most Frequent and Costly Complaints:

- Dimension / Fitment
- Scratches / Blemishes

Using Quality Data in Problem Solving

Data Analysis Tools

- Cause and Effect Analysis
- Pareto Diagrams
- **Statistical Quality Analysis / Control**



Systematic cause of error

Scatter data points outside control limits

- Design
- Choice of material
- Operating conditions

Special cause of error

Numerous data points outside control limits

- Lack of training
- Poor lot of incoming material
- Equipment out of order

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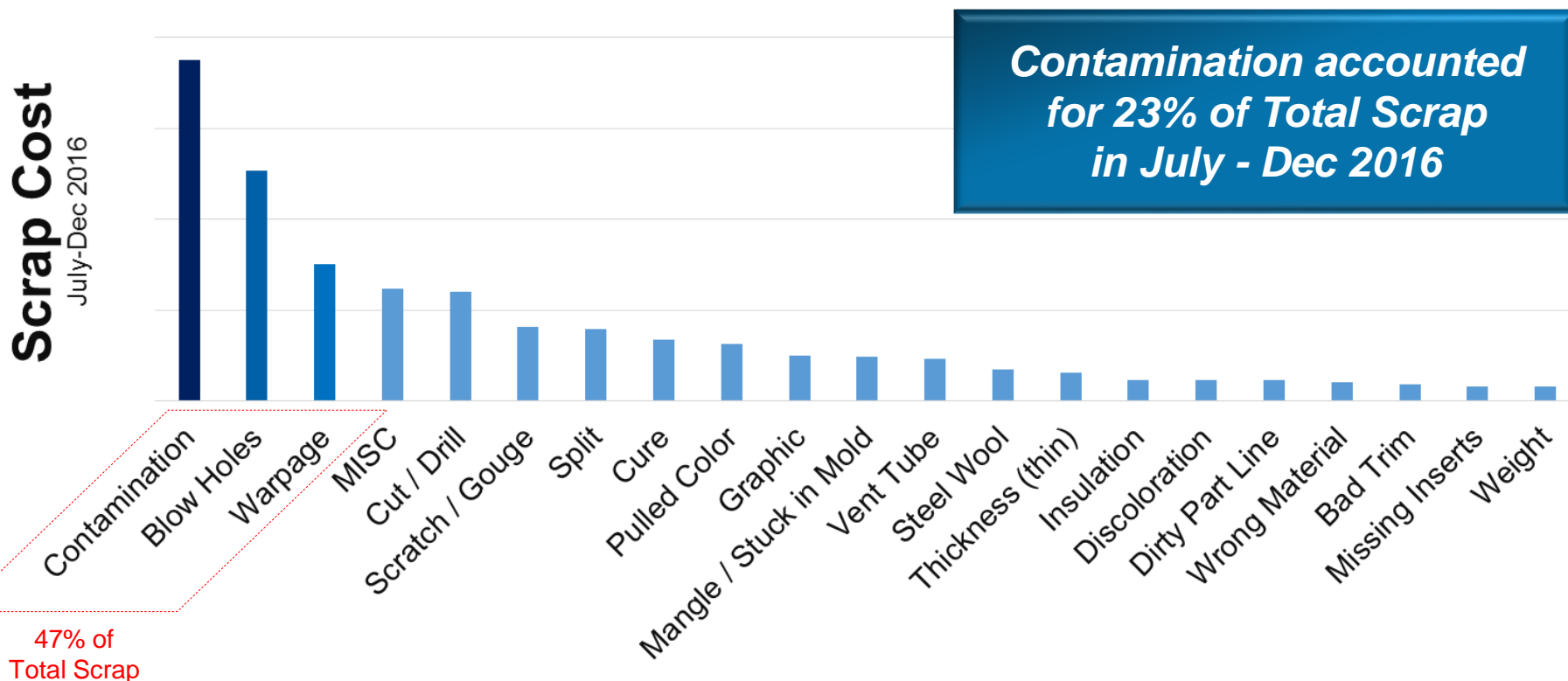
4. Case Studies

Quality Story on Contamination (Forté Products)
Discussion on Most Frequent & Costly Problems



Case Study on Contamination

1. Problem Statement
2. Key Factor Identification
3. Counter-Measure Activities



Case Study on Contamination

KEY FACTOR IDENTIFICATION

Forté
Products

Manpower

Dirty Brushes
Dirty Buckets
Glove Dots
Steel Wool
Insulation
Scales / Dipper / Scoop
Staging of Tubs
Graphic Glue
Mold Release
Cross Contamination
Airborne Contamination
(air wands)

Dirty Tubs
Hopper Tilt
Vent Tubes
Operator Misc
Part Pull Order
R&R Bag Staging
Cleaning Blenders
Pigment Handling
Mixing Room Brooms
Staging of Buckets

Material

Contaminated Mat'l from Supplier
Gaylord Cardboard
Age of Tub
Additives

**No Current
Issues**

Contaminations

Plastic Build-up
Dirty Part Line
Dirty Mold
Teflon
Fill Ports

Mold

Dirty Equipment
Crane Debris
Inner Air
Fans

**No Current
Issues**

Big Gate Valve
Mixer Chute
Lid Hinges
Forklift

Silos
Hopper / RE
Hopper Tilt

Machine

Measurements

...on Parts

... on Contaminants

... on Materials

Case Study on Contamination

COUNTER-MEASURE ACTIVITIES



Housekeeping

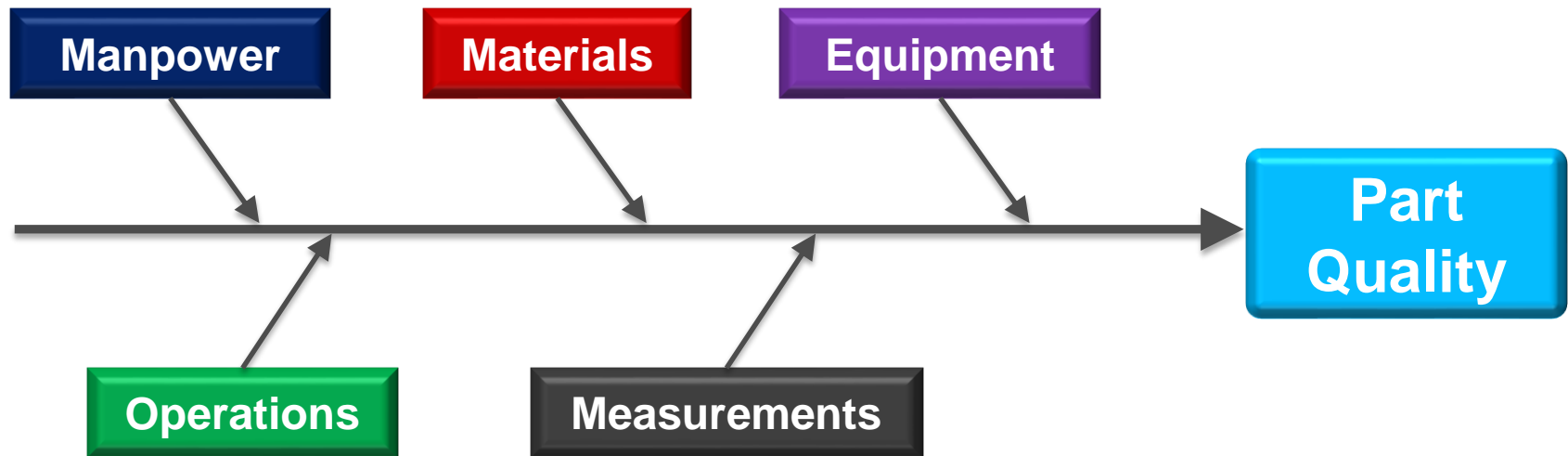
- Review 5S Checklists
Deck, Assembly, Materials
- Review Deck Audits
- Review Maintenance PM Schedule
- Review Blow Down Schedule
- 5S of Equipment
Impacts, Tools, Air Lines, Saws, Fixtures

Processes

- Material Staging
- Bucket Staging
- Part Pull Order
- Graphic Application
- Steel Wool / Insulation Vent Tube Packing
- Mold Release Application
- Review Roto 101 Training (Process Related Items)
- Review New Hire Orientation (Housekeeping)

Case Studies – DISCUSSION

1. Possible Causes
2. What to Monitor, How and How Frequently
3. Counter-Measure Activities



Concluding Remarks

Why Focus on Quality?

Meet customer requirements

Reduce costs

Drive growth (price advantage, market share)

Inspection, while necessary, is not the answer to quality improvement.

Quality programs require organization-wide effort, long-term commitment, and investment in training.

Involvement and leadership of top management are essential to establish a culture of quality.

Quality comes first... Schedules are secondary.



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