The Impact of Product Variability on Profitability

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Product Variability

- The term “product variability” refers to both the amount of variability in product that meets specification along with out-of-spec product.

- This characteristic is also important in hidden, or non-delineated specifications.
A Fundamental Problem

- Most roll goods manufacturers use the concept of product “in-spec” as compared with product “in control.”

- There are several problems with this philosophy:
Internal Problems

1. The entire spec (and more) is used to ship product to customers.
2. Assignable causes are not usually recognized until bad product is made.
3. Current inspection acceptance procedures assure that some level of out-of-spec product will be shipped.
4. Current inspection techniques are nearly always statistically invalid.
External Problems

1. Shipment-to-shipment variability
2. Doff-to-doff variability
3. Within doff variability
4. Out-of-specification product
Key Drivers of Profitability

1. Customer satisfaction and loyalty
2. Internal costs
Hidden Customer Factors

- Product/Service dissatisfaction not communicated
- Hidden specifications
- Changing markets/processes
- 2nd sourcing
Customer Communication

Dangerous perceptions

1. If I deliver product that meets specification, my customers will be happy.

2. If I provide poor product or poor service, my customers will tell me.
Customer Complaints

- 50% of all customers experiencing a problem **never** complain to anyone.

- Of those who complain, 45% complain only to frontline personnel who either fail to escalate the problem up to management and/or mishandle solving the problem.

- Only **5%** voice the problem to management

  - TARP & Goodman and Ward
Hidden Specifications

- Virtually every customer has product expectations that are not covered in the specification; however, “they know it when they see it.”

- Nearly every manufacturer is capable of producing a “new and exciting” defects with potential “Shut Down” capabilities.
Changing Markets/Processes

- New or modified production processes at the customer/supplier facility may impact product quality perceptions.

- Changing markets and/or consumer needs may impact product specifications.
2nd Sourcing

- SOP for many customers
  - Raw material costs
  - Quality
  - Unions
  - Good business practice
  - Shutdown Hedge
Hidden Manufacturing Factors

- Operator variability
- Machine variability
- Critical Raw materials
- Changeovers
- Operating procedures
- Bottlenecks
- Lean Waste
- Environment
Operator Variability

- Training
- Habit
- Attitude
- Union
- Operating procedures
- Maintenance
- Communication
Machine Variability

- Design
- Maintenance
- Wear
- Set-up
- Start-up
- Steady state variability
- Effect of environment
- Comparisons
Critical Raw Materials

- Within lot
- Lot-to-lot
- Environment
- 2nd source comparisons
Changeovers

- Time
- Frequency
- Product effect
- Standardized procedures
Cost of Quality

- Reports
- Calculations
Non-Traditional Reports

- Effect of variability on product quality
  - Process average location & range
  - MD/CD patterns of variability
- Intangibles
  - Covert customer dissatisfaction
  - Poor company image
  - Unknown/underestimated competitor advantage
- Impact of quality & service on revenue
- Taguchi Quality Loss Function
Roll Goods vs. Piece Parts Overview

1. Product variability is *integrated* in both the cross and machine directions.
2. Test values may be correlated in the cross and/or machine directions.
3. Multiple populations may well be manufactured over time.
Where Does Roll Variability Analysis Add Bottom Line Value?

- The Entire Supply Chain
  - Raw Materials
  - Mat
  - Coating
  - Converting
  - Customer
Conclusions

- Profitability is more important than ever.

- There are many **hidden** factors influencing profitability.

- Controlling overall product variability and patterns of variability is critical to minimizing cost.

- There are a number of specialized tools to help us.
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