The Relationship between Gage Management and Quality Data

Presenter

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Moderator

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Quality Digest
Who am I and Who are we?
I have a 4 year old...
Define Gage Management

- Inventory Control
- Gage Accuracy
- Auditing / Documentation
- MSA
Effective Gage Management will improve Product Quality, save you money and promote growth!
Define Quality Data

Make it right the first time
Mistakes with Quality Data

• Treating common-cause variation as special-cause

• Treating special-cause variation as common-cause
Kept separate...
If we accomplish nothing else...

5 Tips to get you there!

Gage Management

Quality Data
Tip #1 – Reduce boundaries by involving the same people

“Gage management is his job”

“The quality techs take care of all that”

“Our bosses, who do neither, are the ones looking for the answers”
Is this you?
Tip #2 – Keep organized

• Implement a formal check in/out system
  • Make it part of your company culture

• Make time for gage management
  • It’s a leading indicator of customer satisfaction.

• Strive to have your SPC systems become “gage-aware”
  • Awareness of maintenance/calibration status
  • Awareness of history
  • Awareness of any known uncertainty/bias
Tip #3 – Documentation

• If possible, consolidate into a single system with all the answers!

• Document “Part-Usage” in your gage management system.

• Document “Gage-Usage” in your quality data collection system.

• Be prepared to extract a list of suspect parts following a calibration failure.

• Be prepared to extract a list of involved gages following returned product.
# Parts associated with gages

**PQ Systems**

**11/8/2020**

<table>
<thead>
<tr>
<th>Gage number: DX-34585</th>
<th>Part name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part 2</td>
<td>Brake cylinder - Pontiac</td>
<td></td>
</tr>
<tr>
<td>Part 3</td>
<td>Brake cylinder - Chrysler</td>
<td></td>
</tr>
<tr>
<td>Part 5</td>
<td>Brake hose fitting - Pontiac</td>
<td></td>
</tr>
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<td>---</td>
<td>Parts: 3</td>
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</tbody>
</table>

<table>
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<tr>
<th>Gage number: M-01002</th>
<th>Part name</th>
<th>Description</th>
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<tbody>
<tr>
<td>Part 4</td>
<td>Brake hose fitting - Ford</td>
<td></td>
</tr>
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<th>Description</th>
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<td>Part 2</td>
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<td>Parts: 1</td>
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</tbody>
</table>
# Gages associated with parts

**PQ Systems**

**11/8/2020**

## All Parts

<table>
<thead>
<tr>
<th>Name: Part 1</th>
<th>Gage number</th>
<th>Gage type</th>
<th>Current location</th>
<th>Last calib date</th>
<th>Calib due date</th>
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<tbody>
<tr>
<td>PQS CAL 0001</td>
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### Gages: 13

## Name: Part 2

<table>
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<th>Gage number</th>
<th>Gage type</th>
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<th>Last calib date</th>
<th>Calib due date</th>
</tr>
</thead>
<tbody>
<tr>
<td>DX-34585</td>
<td>Micrometer</td>
<td>Quality Lab</td>
<td>8/26/2019</td>
<td>6/26/2020</td>
</tr>
<tr>
<td>MASTER-06001</td>
<td>Master Blocks</td>
<td>Quality Lab</td>
<td>7/4/2019</td>
<td>7/3/2020</td>
</tr>
<tr>
<td>MASTER-06002</td>
<td>Master Blocks</td>
<td>Gage Room</td>
<td>7/18/2019</td>
<td>7/17/2020</td>
</tr>
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<td>PM-Cal-0001</td>
<td>Caliper</td>
<td>Plant Floor</td>
<td>5/3/2019</td>
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</table>

### Gages: 4

## Name: Part 3

<table>
<thead>
<tr>
<th>Gage number</th>
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<th>Calib due date</th>
</tr>
</thead>
<tbody>
<tr>
<td>DX-34585</td>
<td>Micrometer</td>
<td>Quality Lab</td>
<td>8/26/2019</td>
<td>6/26/2020</td>
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<td>PM-Cal-0002</td>
<td>Caliper</td>
<td>Plant Floor</td>
<td>5/6/2019</td>
<td>11/4/2019</td>
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</tbody>
</table>
Tip #4 – Assess Measurement Accuracy

- Don’t assume your gages are accurate.
- Never use a gage that’s behind on calibration.
  - Implement systems that prevent it from happening, where possible.
- Calibrate routinely per gage manufacturer recommendations.

**BONUS**

- VERIFY gage is holding accurate throughout calibration interval.
Calibration Intervals

But what is the right interval? How often should the technicians calibrate the gage?

Too often – waste of time and money!

Not often enough – possibly using a bad gage to check your parts!
Stability Study

Checking to see if a gage is consistent and predictable between calibration cycles.
Stability Study

Results

PASS
Stability Study

Results
Tip #5 – Measurement Reliability

Now that we know the gage is accurate, can we trust the results?
Measurement System Influencers

• Materials – Pieces/units to be measured
• Machine – Gage or tool used to take measurement
• Method – Procedure followed
• Manpower – Who is taking the measurements
• Mother Earth – Surroundings / climate
Tip #5 – Measurement Reliability

• When possible, study your measurement system to confirm it is adequate for the job.
  – Variable and Attribute R&R Studies
  – Uncertainty studies
  – Linearity Studies
Is your measurement system capable of distinguishing differences among the units produced by a process?
Variable R&R Study Results

• Examine the %RR values to determine the percentage of variation that’s due to the measurement system – rather than differences in parts.

  <10% generally considered acceptable
  10–30% may be acceptable (room for improvement)
  >30% not acceptable – need to improve
Set 1: UCL = 119.79, Mean = 79.23, LCL = 38.66, from: 26 to: 50

Possible Gage error

Over adjustment 2nd shift

Trust your SPC
Long-term Trends

- From users working on focused desktop applications, using local/isolated data - to users collaborating with shared data.
- From using desktop applications to using web based/cloud applications
- From storing data locally to storing data on a server to storing data in the cloud
- From doing all IT work internally – to using the Web and Cloud as main providers of technical resources
In Summary...

1. Reduce Boundaries
2. Get Organized
3. Connect the dots in your documentation
4. Assess measurement accuracy
5. Save time for MSA