Are you Prepared for Quality 4.0?

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Industry 1.0 to 4.0

- **Industry 1.0**: Mechanization, steam and water power
- **Industry 2.0**: Mass production and electricity
- **Industry 3.0**: Electronic and IT systems, automation
- **Industry 4.0**: Cyber physical systems
Industry 4.0
Manufactured parts are getting smaller, more complex with higher precision requirements.

Shrinking product lifecycles dictate shorter delivery times and faster response to engineering changes.

The rise of just-in-time manufacturing (JIT) has created pressure on supply chain with frequent short-cycle manufacturing (SCM), continuous-flow manufacturing (CFM) and demand-flow manufacturing (DFM).

Robotics automation further increases the productivity and improved cost structure of competitors.

OEM’s demand compliance with more stringent quality standards and require supply chain greater transparency.

OEMs see their suppliers as a critical component of their supply chain. As such, they expect the suppliers to adopt technology and automation so they can improve productivity, quality control, meet timeline and reduce cost.
Quality 4.0 with challenges

- **Quality 4.0** is a term that encapsulates the current trend of **automation** and secure data exchange in manufacturing and quality control technologies.
- It acknowledges that **Quality Control contributes to the “Smart Factory”** evolution by leveraging **modern technologies and practices**.
Quality 4.0 – The Gap
Quality 4.0 – Closing the Gap

- Streamlining of processes
- Improving the “Cost of Quality”
- Improving Overall Product Quality
- Meeting Product Delivery Time
- Support organization to better compete in a fast-changing landscape
Quality 4.0

Readiness

• **Lower cost of technology** infrastructure (Storage, Connectivity, CPU)
• Better reliability, Systems maturity

Opportunities

• Leverage Technology to **augment human effort** (not replace)
• **Free your resources to focus on analyzing data and creative problem solving** compare to conducting manual data entry and doing copy and paste compiling data by hand.
“Company Inc.” is a value leader in the machining, manufacturing, and assembly of components and complex assemblies.

Company relies on over 40 years of manufacturing and assembly experience. Combining state of the art C.N.C. machining equipment, manufacturing systems, strong supply chain relationships and a commitment to quality and continuous improvement.

The Company facilities are distributed over seven locations (across three states in the Midwest) and is employs 700 employees.

As an early adopter of Information Technology, the Company management committed to investing in information systems infrastructure and is continuously looking for additional ways to leverage smart technology and software solutions.

Quality 4.0 – Case Study (Tyler) (2017-2018)
We wanted to improve our Quality Management process and flow, ranging from ballooning, GD&T recognition (without manual interpretation), through inspection planning, CMM and inspected data collection through final documentation and reporting all in one cohesive centralized database.

Company contacted HighQA, the software company behind the Inspection Manager Software.

We were using a different technology and realized still a huge pain:

- Staff Spend too much time on manual tasks
- Software doesn’t really enforces best practices
- Usability?
- Not making enough progress

We wanted Quality planning to lead the quality control process.
• An example to what wasn’t working well:
  • we do a lot of “big things”, we can have thousand and more dimensions and G&D characteristics. *Ballooning took so much time that the CMM team already completed their inspection prior to having the ballooned plan shared with them.*
Case Study

Current process:
1. Project Kicked off in "Job Boss"
2. Quality Eng. - Manually creates in process inspection reports for production floor
3. Manufacturing measures parts are manually fills out inspection report
4. Quality Inspector create bubble drawing
5. Quality Inspector measure part on CMM and manual tools + inspection report--Manually Created
6. Optional Steps depending on Customer requirements
7. Quality Mgr. Quality Inspector create FAI
8. Quality Mgr. Quality Inspector create FPAP

Inspection Manager:
1. Project Kicked off in "Inspection Manager"
2. Drawing (PDF) executed with immediate parallel results
   - Ballooned drawing
   - In process inspection
   - Inspection tools assignment (optional)
   - Shop floor data "clicked" to "Inspection Plan"

All Data: Job/PO/reports etc. can be transferred bi-directional (see information in next slide)
What did we look for?

• Call it an **Expert System**, or Artificial Intelligence
• **Database driven** and strong IT infrastructure
• **Performance** should be Optimized
• **Streamline** our Quality Management **process**
• **Usability** and level of **Service**
• **Trusted Vendor**
Where are we now? Six months later

- IM enabled us to create the right logical and optimized workflow process
- Automatically propagating inspection plan from one location to all facilities
- Automatically inspection results “pushed” to automated reporting

Strategically we are now:
- Meeting higher demand with the same staff (scalability)
- Significantly less “busy time” with lots of manual tasks
- We now allocate staff to other needed activities (opportunity)
- We are able to better respond to changes
- We are in control
Driven by Four Disruptions

Quality 4.0 Improvements:

• Ability to handle much larger volume of data
• Strong computation power - do it significantly faster
• Secure Connectivity - share it with your internal and external colleagues
• Analytics and business-intelligence – Keep an Eye on Quality
Wants to Move Forward?

- Look for a Database Driven Applications

- **Search for unique innovation** - Identify automation differentiators that will cut time to achieve the results you need at a reasonable cost.

- **Interoperability** - interact, integrate, and exchange data with other applications such as ERP systems, SPC, Tool Management, supply chain management.

- **Prepare your IT infrastructure** - enough storage to contain large amounts of collected data, strong CPU to run *statistical computations and reporting*, and fast bandwidth to bring it all to your screen (dashboard) or a remote facility, with good performance.

- **Top Security Standards** - Data Encryption, review Locally Installed compared to a Cloud model, Secure Communication, User’s authentication, traceability and audit trail registering who did what.

- **Support** for key Industry Compliance Standards.

- Learn what it will take to **implement and train on the software** and plan accordingly.
Summary

• Automation is expected! Manufacturers will not be able to compete and survive without catching up wisely on its latest trends.

• Commit to change and evolution – win more business!

• Slow-moving competitors will fall further behind.
Thank You

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