The Rewards of Having Great Work Instructions (And How to Get Them)

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- 11 year history of helping companies that have operational problems as a result of inadequate, non-existent or onerous work instruction processes

**Our Goal** - To make it possible for every manufacturing organization - regardless of size, industry or stage of growth – to have work instructions that positively impact their bottom line
Tonight’s topics

• Definition of a work instruction
• Why are work instructions important?
• Methods of creating work instructions
• Glean gold from your work instructions
What do we mean by “work instructions”

- Once
  - The work has been scheduled,
  - The parts delivered to the work station and,
  - An operator assigned to the job,
  - The *work instruction* tells the operator “what to do” with the parts
Work instructions take many forms

- Tribal knowledge
  - Knowledge “known” but undocumented
  - Passed down from worker to worker
- ‘Ask Steve’
  - Steve is not a “corporate” asset
- Hands-on training
  - Requires taking experts off line
- Handwritten notes
  - Knowledge is not a available to all
- Engineering drawings or exploded views
  - Interacting with a solid model cannot define a standard process
- Step-by-step instructions
Are work instructions necessary?

- We would argue that accurate, up-to-date, and visually rich (i.e., GREAT) work instructions contribute to increased quality, productivity, and capacity therefore ultimately to the bottom line!
Quality

• Standardizing on best processes, you bring all employees up to the level of the ‘A’ player

• Workers aren’t required to process as much information on the line resulting in less errors, less missed steps

• Work instructions ensure the correct process is used, no longer is one person doing something his way while another does it his way
Productivity

- Optimal process is always available
  - No wasted time figuring out what is next or fixing mistakes
  - Time is not lost in refreshing memory or working out the process
  - Time is not spent waiting for expert or engineering assistance

- By eliminating errors, non-value-added activities and waste, resources become available

- Successful organizations use freed-up employees to address priority outcomes that add to bottom line
Capacity

- Work instructions can reduce the overall production cycle time
- Work instructions can increase the availability of manpower and equipment due to less rework
- This results in an increase in capacity with no capital outlay.
If work instructions really matter . . .

• Why do so many companies have work instructions that they describe as less than “great?”
What we propose . . .

• Currently methods of authoring limit the capacity of most organizations to have great work instructions . . .

  • “In Excel I can easily spend 80-100 hours on one [10 page] document. And, we have 1000 products”

  • “Our current work instructions are incomplete and constantly out of date.”

  • “Global changes often required us to manually change hundreds of documents.”

  • “Our products change so rapidly we simply can’t keep up.”
How can we make great work instructions more accessible?
Work instruction specific software

- Designed with a “structure” to handle manufacturing information
- Integrate tightly with other business systems
  - Upstream with ERP/PLM
  - Downstream with MES / SCADA
- Separation of “data” from “presentation”
  - Significantly reduce time to author and revise work instructions
- Encourage extensive use of visuals which has been shown to increase effectiveness
Current trend

- WI can be managed in a database structure
- Extension ERP/MRP structure
- Information managed as objects instead of documents
  - Easy use of “globals”
  - Only responsible for capture and organization
- Integration
  - Leverage data from other systems (ERP / PDM)
  - Can easily be deployed through other systems (MES)
Easy to author

- Designed for rapid, shop-floor knowledge capture
- Intuitive graphical process tree
- “Direct-to-Sequence” image capture with tethered camera
- Integrated editors for text, images
- Rigorous review & approval process
Easy to deploy

- Separation of “data-capture” from “presentation”
- Pre-formatted PDF creation
- Electronic Work Instruction (EWI) deployment
  - Scrollable Read-Only
  - Step x Step
  - Integrated with MES
Easy to improve

- Paperless
- Auditing
- Request for change
- Kaizen
- Redlines
- Non-conformance

Navigate using “Previous” & “Next”

“Submit Note” initiates feedback to engineering.
Glean gold from your work instructions

- Innovate
- Ramp Up
- Optimize
- Divest
Success Story I: AS&E

- Global provider of threat and contraband detection solutions for premier events, ports, borders, military, critical infrastructure, etc.

- Tremendous focus on Revenue per Employee - $590k when last reported

- Systems are designed in a variety of configurations for cargo and vehicle inspection, parcel inspection, and personnel screening
Success Story I: AS&E

- Work instructions form the core of the “production record book” which is required for every build

- Up until 2008, AS&E was managing an entirely paper process requiring 1.5 person headcount per 8 hour shift

- Inability to more effectively manage work instructions was a limiting factor in ability to efficiently navigate the product lifecycle
Success Story I: AS&E

- Fully paperless deployment of Sequence Enterprise
  - Integration to Oracle ERP for work order specific traceability
- Average production cycle times reduced by 2 weeks
- Freed-up resources now contributing to high-value activities
- “Great” work instructions have allowed AS&E to outsource “low-value” activities to continue to grow company value / revenue per employee
Success Story II: Sechan Electronics

• Leading military electronic contract manufacturing services company

• Must act quickly to change the configuration of any given product to accommodate a mission or the physical environment at the time of order receipt

• Short lead times require accelerating the process development cycle and manufacturing handoff with little time for iterative refinement of manufacturing processes
Success Story II: Sechan Electronics

- High mix, low volume environment could drive hundreds of changes per day resulting in redlines to numerous paper work instructions on the floor
- Redlines manually managed via paper on the shop floor
- “It was a never-ending, constant struggle to make sure it was getting done properly.”
- Paper processes were limiting productivity and capacity
Success Story II: Sechan Electronics

- Fully electronic Sequence Enterprise deployment
  - Integration to Finesse ERP for Work Order specific instructions and tracking
- 95% reduction in total cycle time for redline changes
- Reduced rework due to forced operator acknowledgement of changes
- Manufacturing engineering capacity gains > 20%
Case Study III: Hubbardton Forge

- Oldest and largest commercial forge in the country
- Team of over 200 people creating hand-forged lighting
- Product line includes more than 1,000 base items with an average of 80 new products added on a yearly basis.

*Will be featured in December ‘13 Quality Magazine.
Case Study III: Hubbardton Forge

- In 2009, the number of printed work instructions increased to more than 17,000 documents filling 12 large filing cabinets.

- Employees spent up to 30 hours per day chasing paper.
  - “It was a tremendous cost to our company”
  - “Manufacturing errors (rework and returns) occurred because the paper documents were not always the correct document or revision.”
  - Cycle time for revisions was weeks.
Case Study III: Hubbardton Forge

- Today, Hubbardton Forge utilizes 10 authoring licenses to source electronic work instructions to 58 touch screens on the shop floor.
- “Units per day” went up after first week of rollout in most departments.
- Through March 2013, rework was 4.3% and return rate < 2% compared to industry average of 10%.
- Training times down 25%.
In closing

- Work instructions CAN have a significant impact on the bottom line

- Knowledge that can be “captured” is essential so that:
  - It is understood and approved by the company
  - It can be systematically reused by others
  - It can be systematically improved upon

- Re-examine the value proposition for work instructions as part of the Total Cost of Quality and Corporate Strategy
Thank you!
4-6% of Sales

20-40% of Sales

Prevent issues at the source