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

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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."*

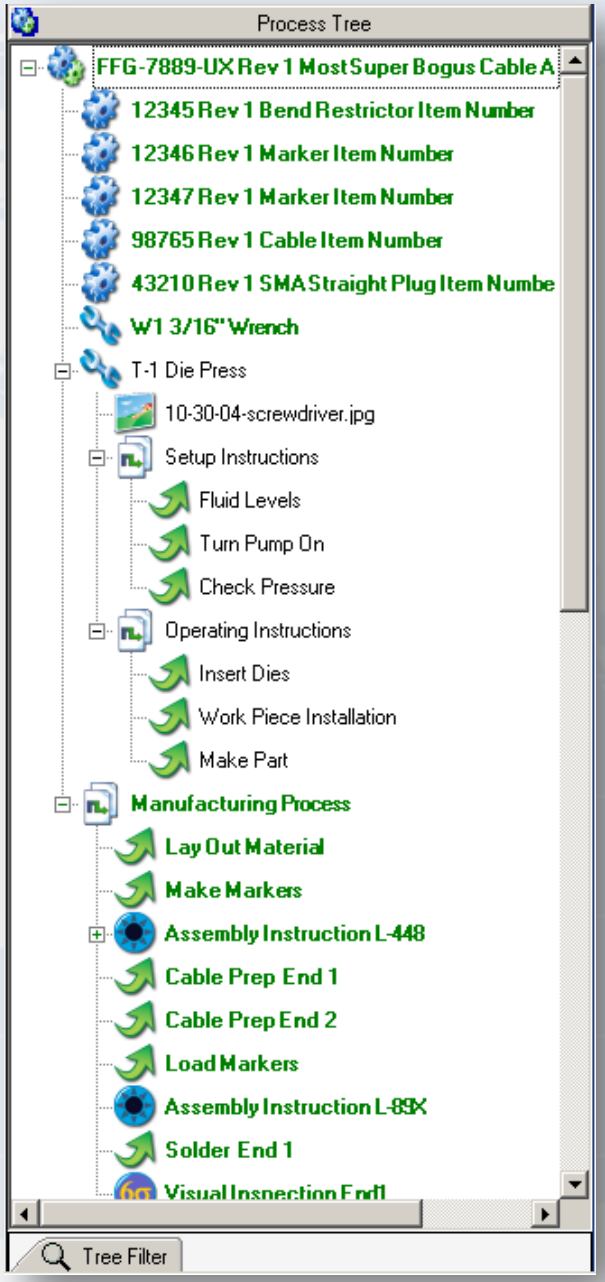
How can we make great work instructions more accessible?

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

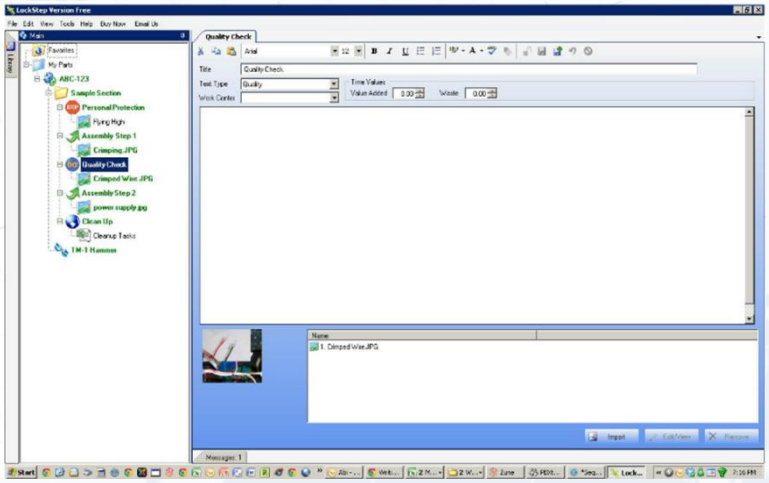
Current trend

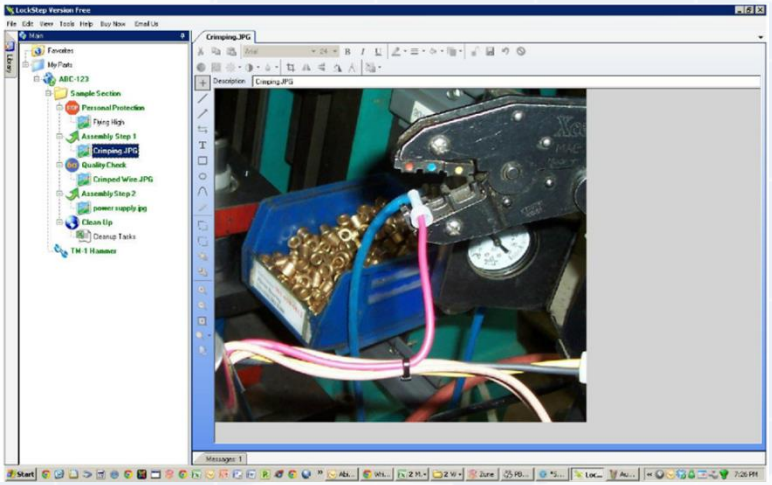
- WI can be managed in a database structure
- Extension ERP/MRP structure
- Information managed as objects instead of documents
  - Easy use of “globals”
  - Only responsible for capture and organization
- Integration
  - Leverage data from other systems (ERP / PDM)
  - Can easily be deployed through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



Easy to author

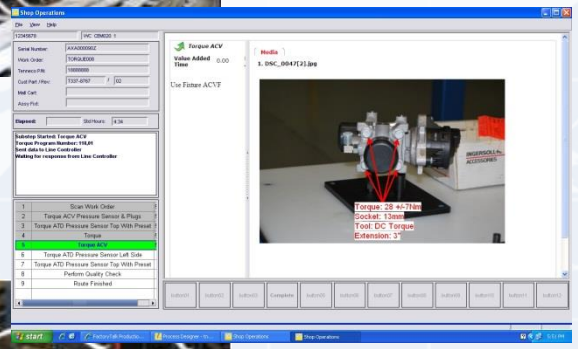
- Designed for rapid, shop-floor knowledge capture
- Intuitive graphical process tree
- “Direct-to-Sequence” image capture with tethered camera
- Integrated editors for text, images
- Rigorous review & approval process





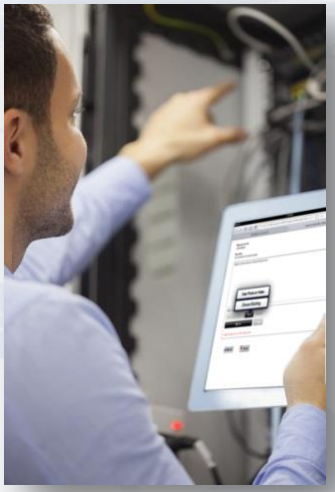
Easy to deploy

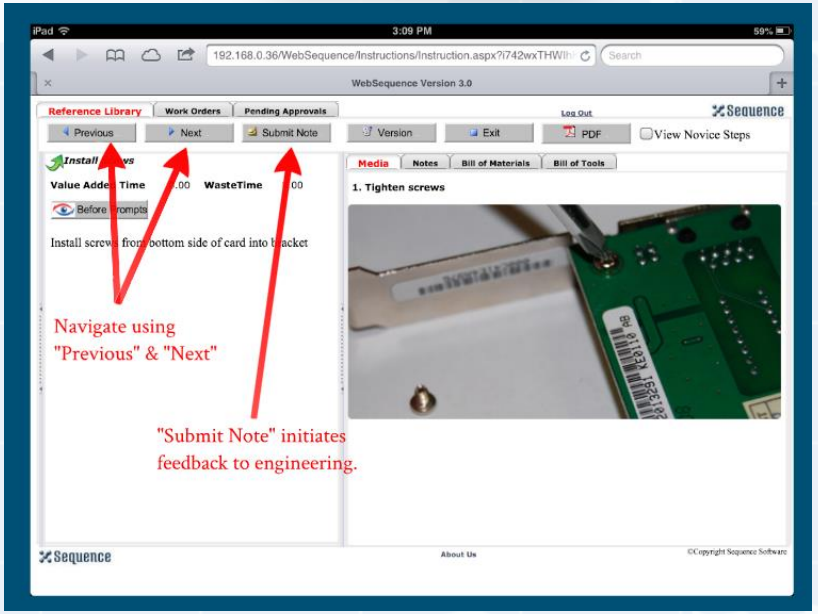
- Separation of “data-capture” from “presentation”
- Pre-formatted PDF creation
- Electronic Work Instruction (EWI) deployment
  - Scrollable Read-Only
  - Step x Step
  - Integrated with MES



Easy to improve

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





Glean gold from your work instructions

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

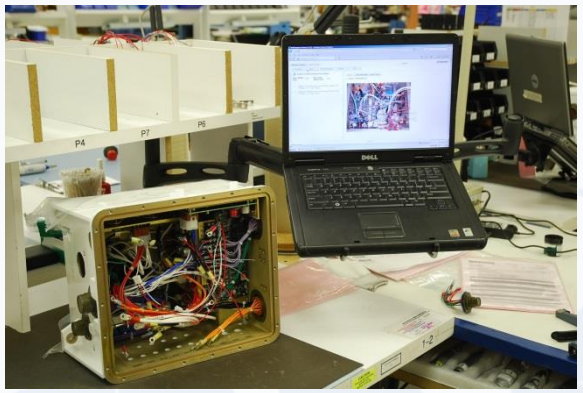
- Short lead times require accelerating the process development cycle and manufacturing handoff with little time for iterative refinement of manufacturing processes

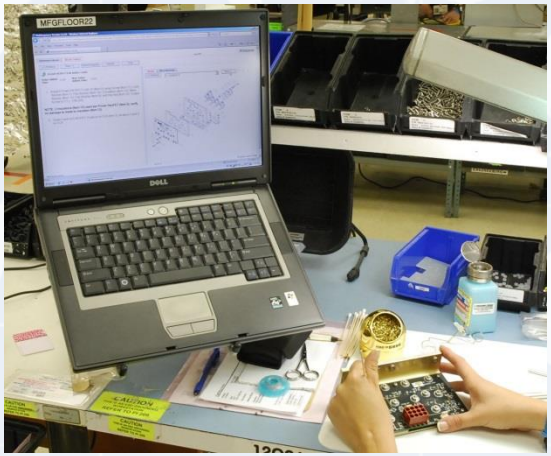
Success Story II: Sechan Electronics

- 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 than17,000 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

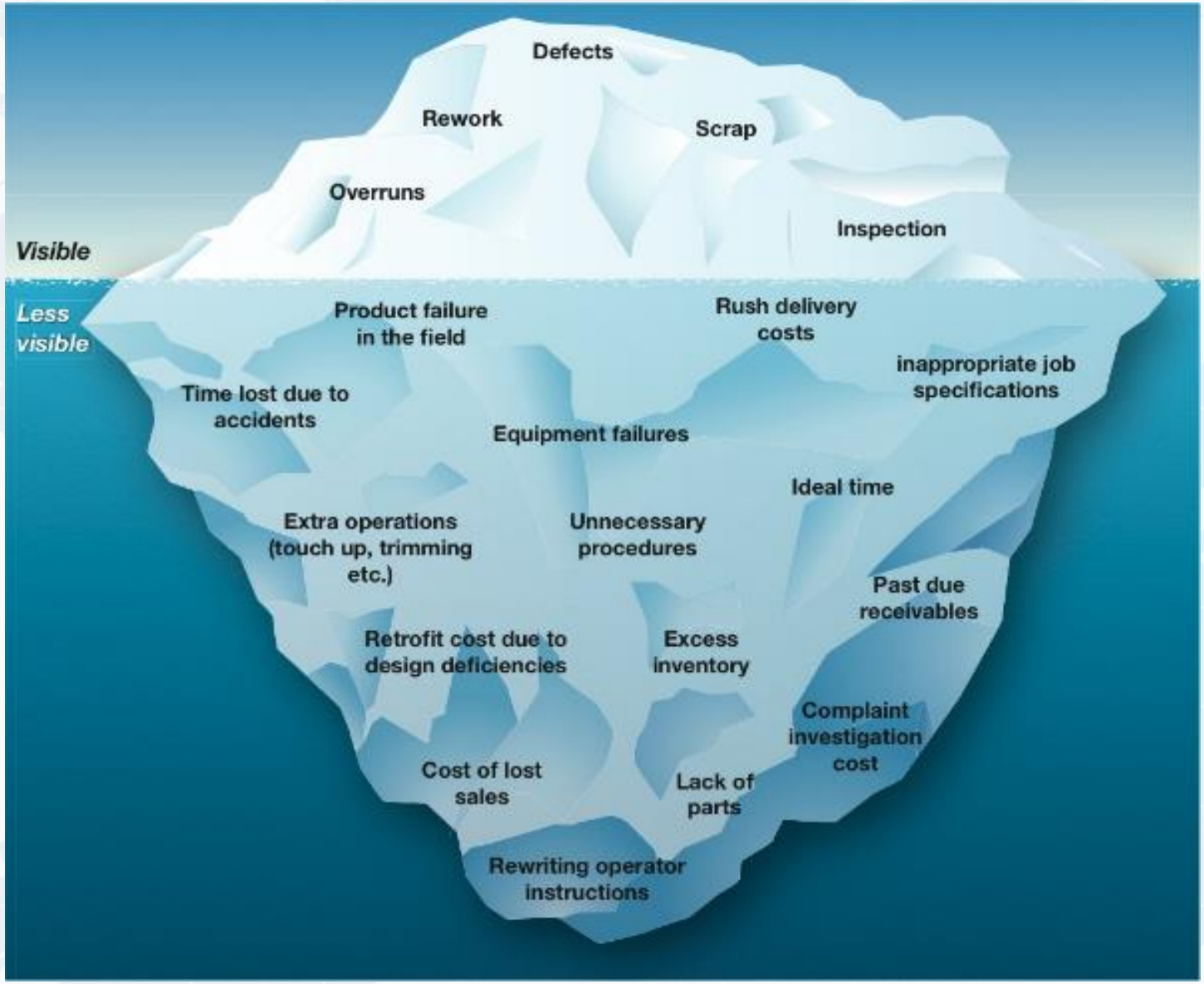
- Knowledge that can be “captured” is essential so that:
  - It is understood and approved by the company
  - It can be systematically reused by others
  - It can be systematically improved upon

- 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



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Prevent issues at the source