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Integrating "Smart Documents" into PLM and the Digital Thread

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PLM Road Map™& PDT North America 2019

PLM for Professionals – Product Lifecycle Innovation

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Agenda

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- What's the problem?
- Is it really a problem?
- What does a smart document look like?
- Smart documents in PLM
- Benefits of smart documents
- What is the potential?

The document quagmire

- Large amounts of information
- Stacks and folders of specifications
- Information extraneous to task at hand
- Large amounts of cross referencing
- Verify the latest version

Lets Go Electronic!

Electronic solution

Applications:

Microsoft Word, Excel, PowerPoint

Adobe FrameMaker, PageMaker

Arbortext

Others

- Convert to PDF format
- Include hyperlinks
- Store in PDM system

Electronic is not enough!

Is it really a problem?

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A Simple Printed Wiring Board Drawing Note

“UNLESS OTHERWISE SPECIFIED PERFORM ELECTRICAL TESTS PER FIND NUMBER 106”

FIND NUMBER 106:
“PRINTED WIRING BOARDS, RIGID, FABRICATION REQUIREMENTS”

Parts list find number 106

"PRINTED WIRING BOARDS, RIGID, FABRICATION REQUIREMENTS"

DOCUMENT PAGE COUNT - 24

4 GOVERNMENT / NATIONALLY RECOGNIZED PUBLICATIONS

- **12** REFERENCED DOCUMENTS

6 INDUSTRY PUBLICATIONS (ANSI, IPC, SAE)

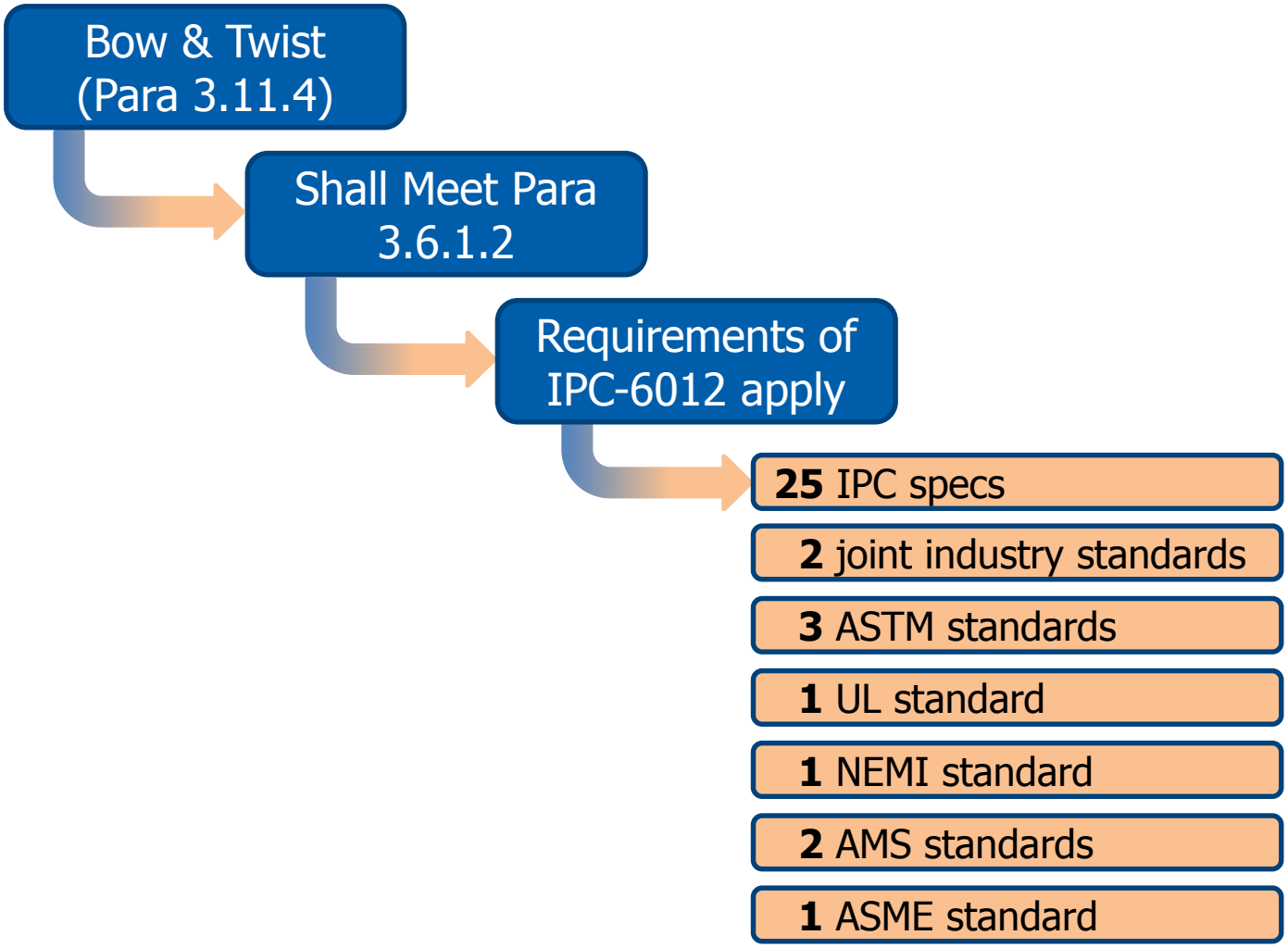
- **2** GOVERNMENT PUBLICATIONS
- **11** INDUSTRY PUBLICATIONS (ASTM, ANSI, IPC)
- **4** OTHER NGSC DOCUMENTS

2 OTHER NGSC DOCUMENTS (AS APPLICABLE)

- **2** GOVERNMENT PUBLICATIONS
- **12** INDUSTRY PUBLICATIONS (ASTM, ANSI, IPC)
- **4** OTHER NGSC DOCUMENTS

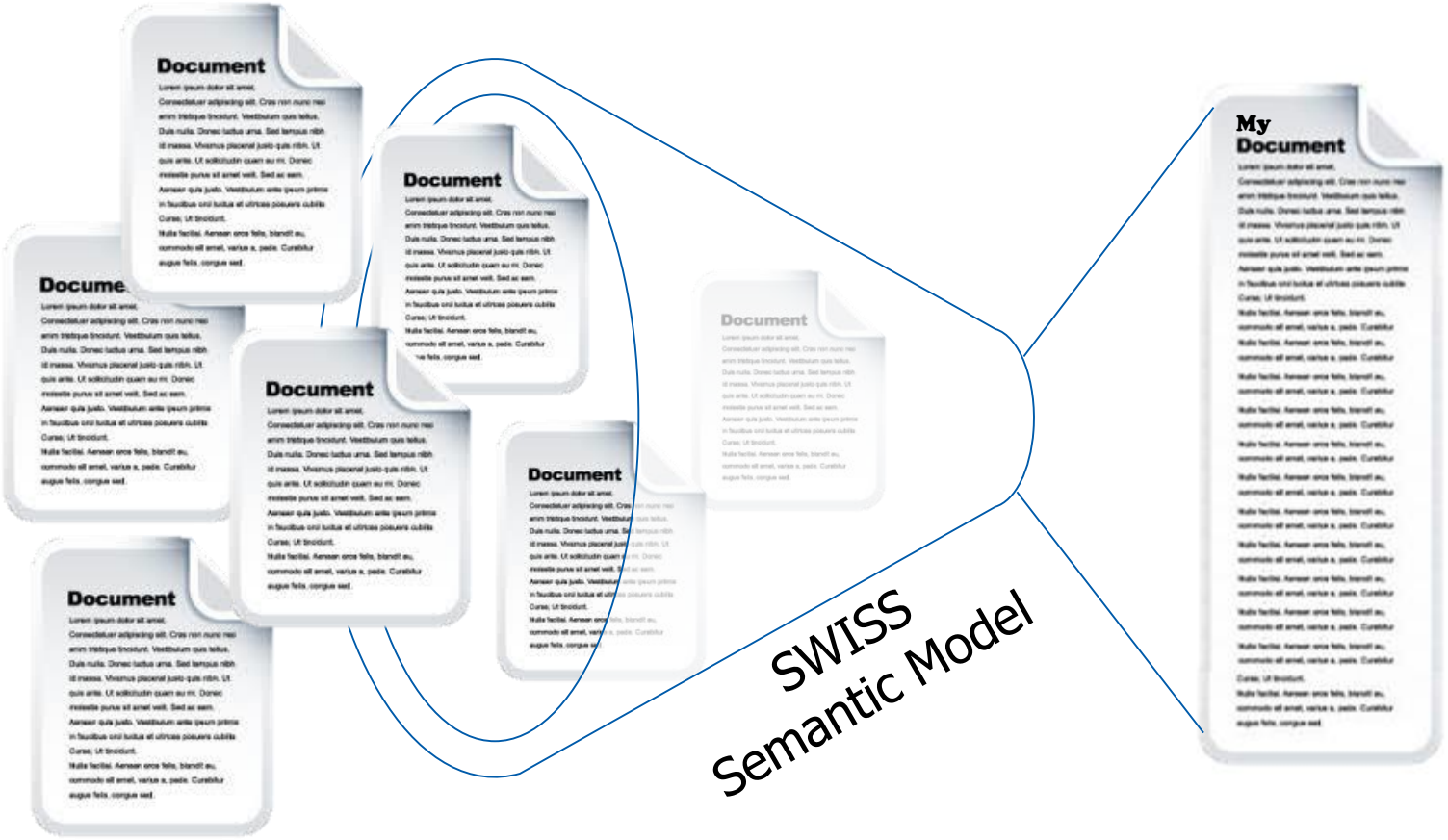
Represents 40+ Unique Documents

Let's narrow further



37 Unique Documents

Leverage transclusion



Looks & Acts Like Standard Cut & Paste

Let's make it smart!

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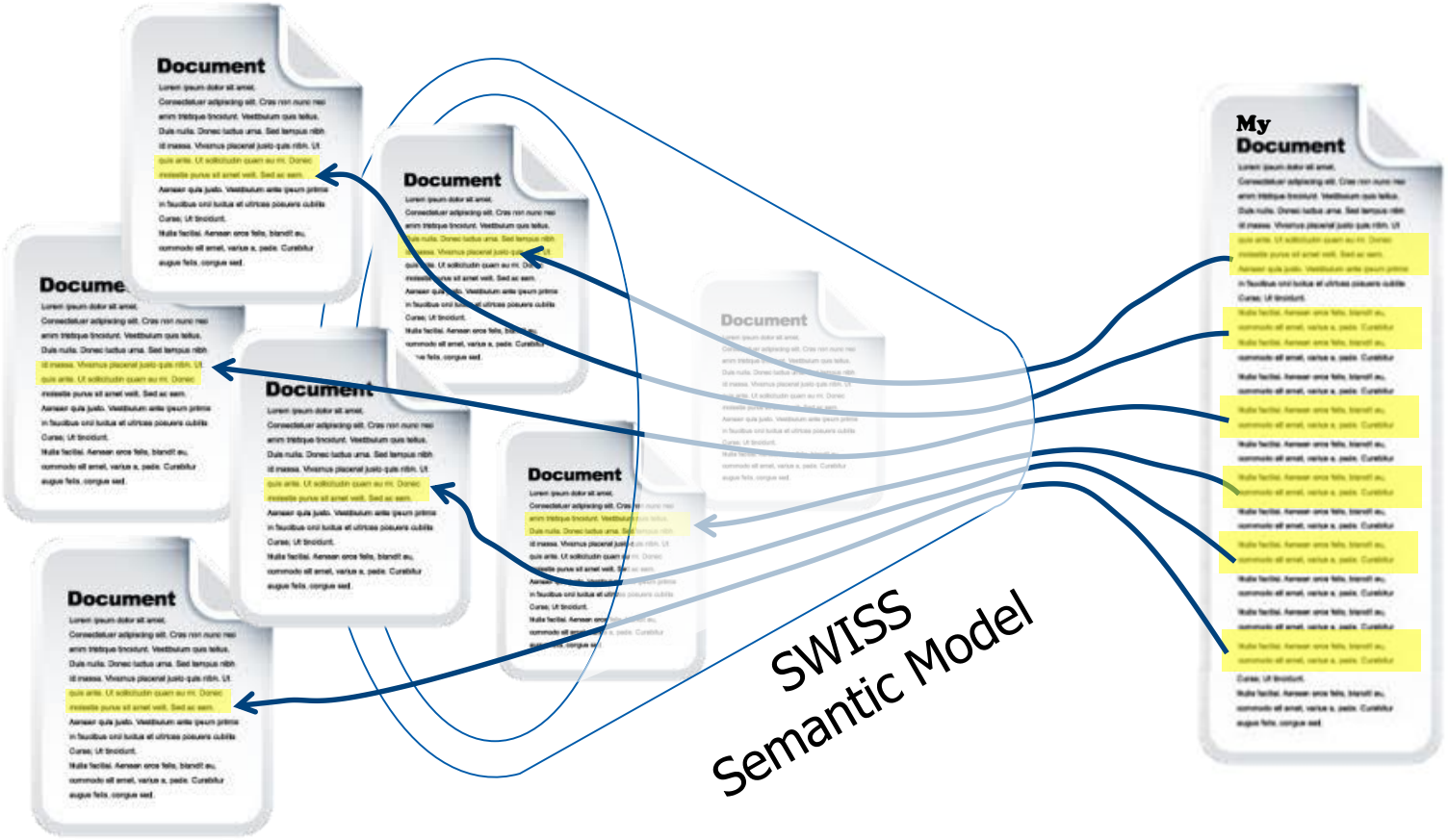
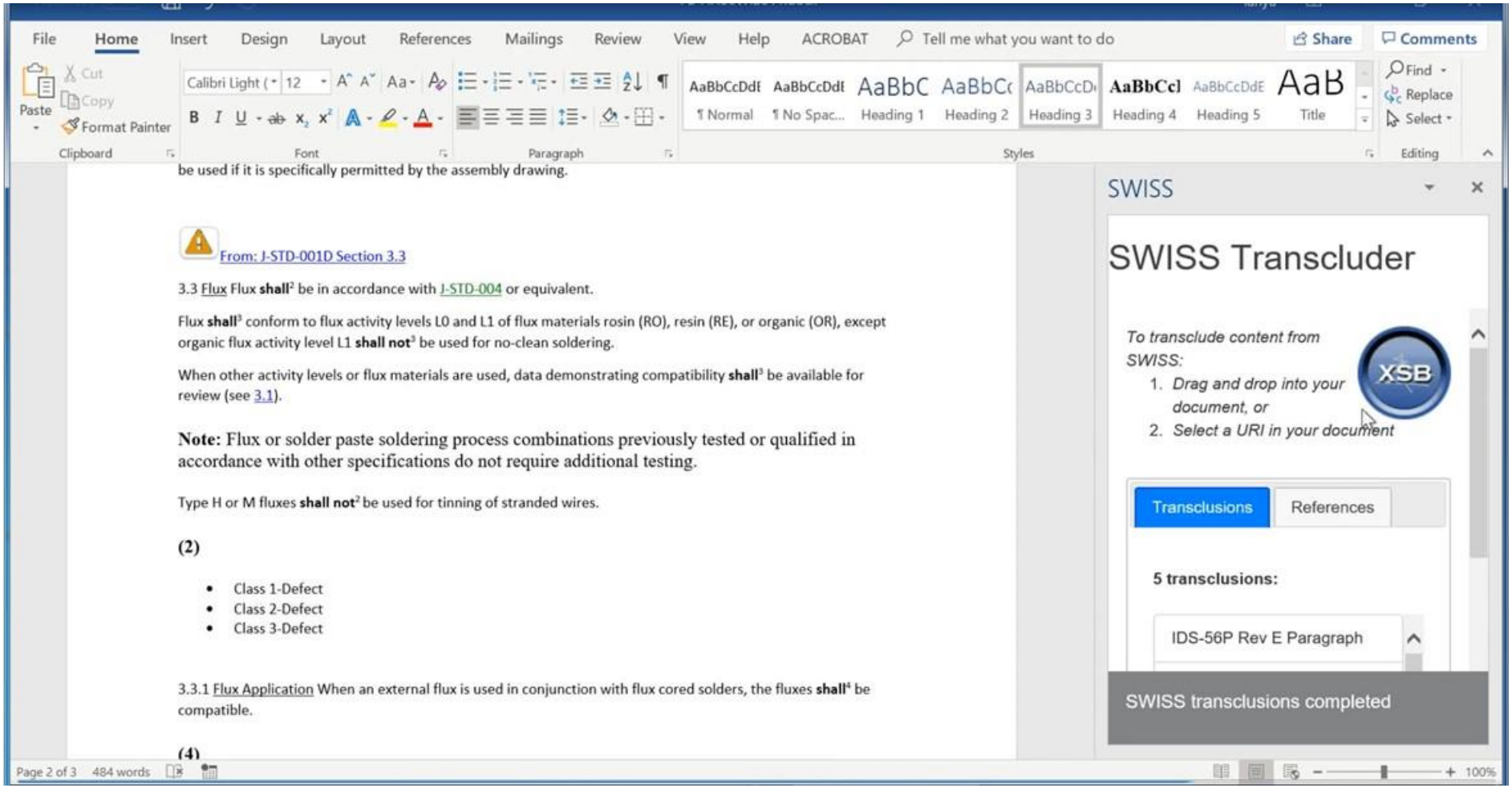


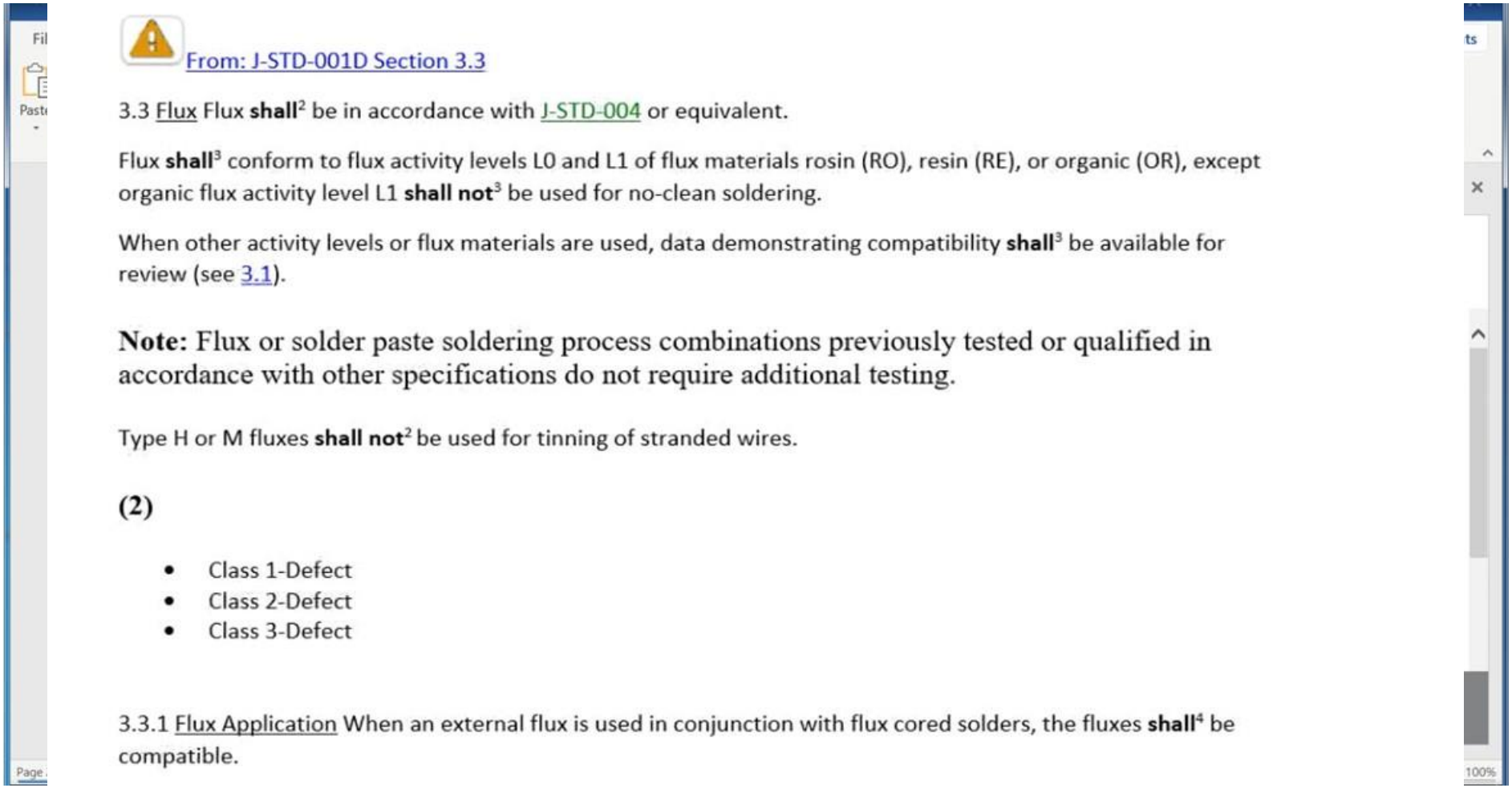
Two Way Communication!

What does a smart document look like?



Defines the Authoritative Source!

What does a smart document look like?



From: J-STD-001D Section 3.3

3.3 Flux Flux **shall**[2] be in accordance with J-STD-004 or equivalent.

Flux **shall**[3] conform to flux activity levels L0 and L1 of flux materials rosin (RO), resin (RE), or organic (OR), except organic flux activity level L1 **shall not**[3] be used for no-clean soldering.

When other activity levels or flux materials are used, data demonstrating compatibility **shall**[3] be available for review (see 3.1).

Note: Flux or solder paste soldering process combinations previously tested or qualified in accordance with other specifications do not require additional testing.

Type H or M fluxes **shall not**[2] be used for tinning of stranded wires.

(2)

- Class 1-Defect
- Class 2-Defect
- Class 3-Defect

3.3.1 Flux Application When an external flux is used in conjunction with flux cored solders, the fluxes **shall**[4] be compatible.

Defines the Authoritative Source!

What changed at the source?

Type H or M fluxes **shall not**[2] [D1D2D3] be used for tinning of stranded wires.

(2)

- ~~Class 1 Defect~~
- ~~Class 2 Defect~~
- ~~Class 3 Defect~~

3.3.1 Flux Application When an external flux is used in conjunction with flux cored solders, the fluxes shall [D1D2D3] be compatible both from a cleaning process standpoint and a chemical standpoint. Objective evidence of compatibility, e.g., surface insulation resistance testing, ion chromatography testing, shall [N1D2D3] be available for review, see 1.8.7 and Appendix C. IPC-9202 and IPC-9203 are examples for qualification testing.~~When an external flux is used in conjunction with flux cored solders, the fluxes **shall**[4] be compatible.~~

(4)

- ~~Class 1 Defect~~
- ~~Class 2 Defect~~
- ~~Class 3 Defect~~

That is a Smart Document!

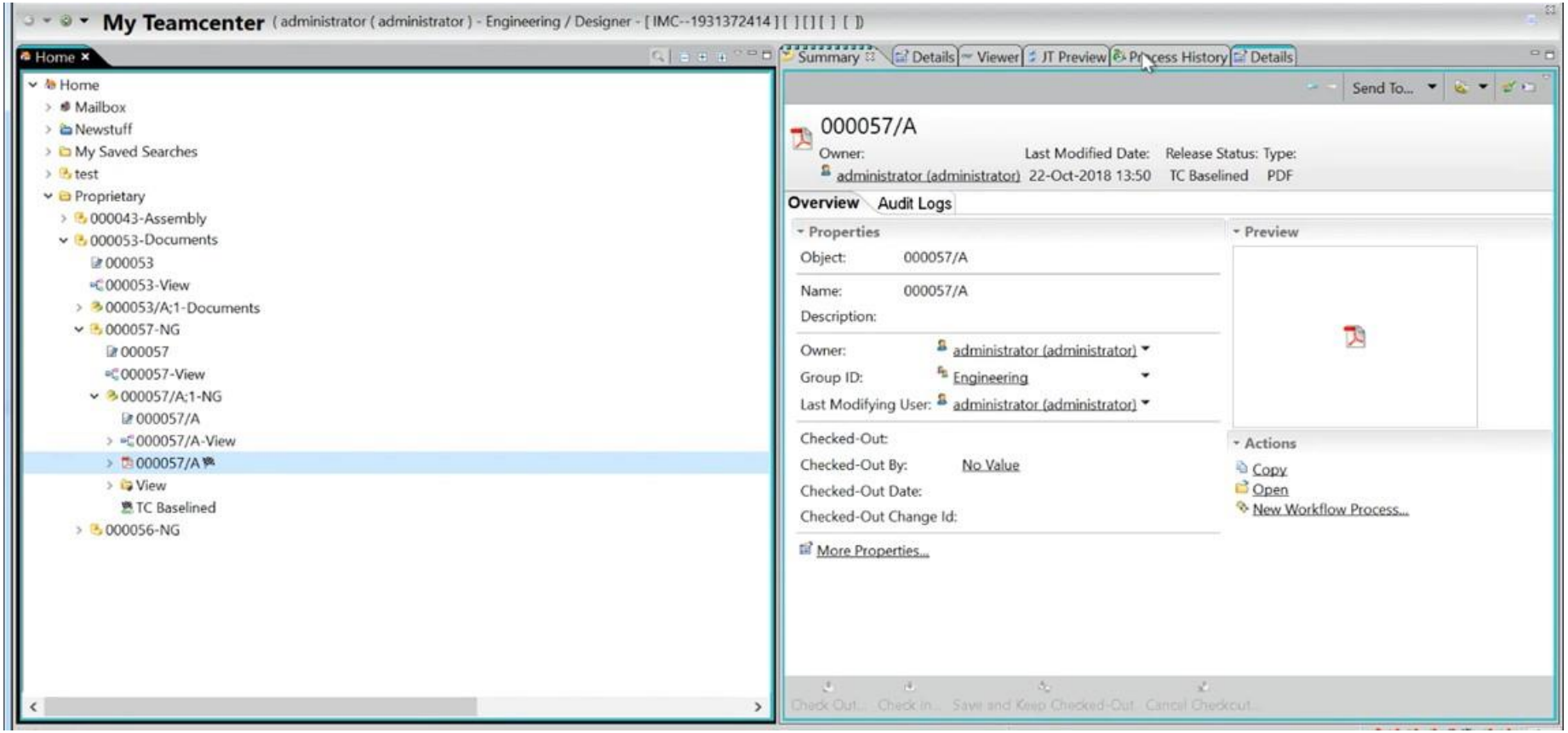
PLM representation

Engineering BOM

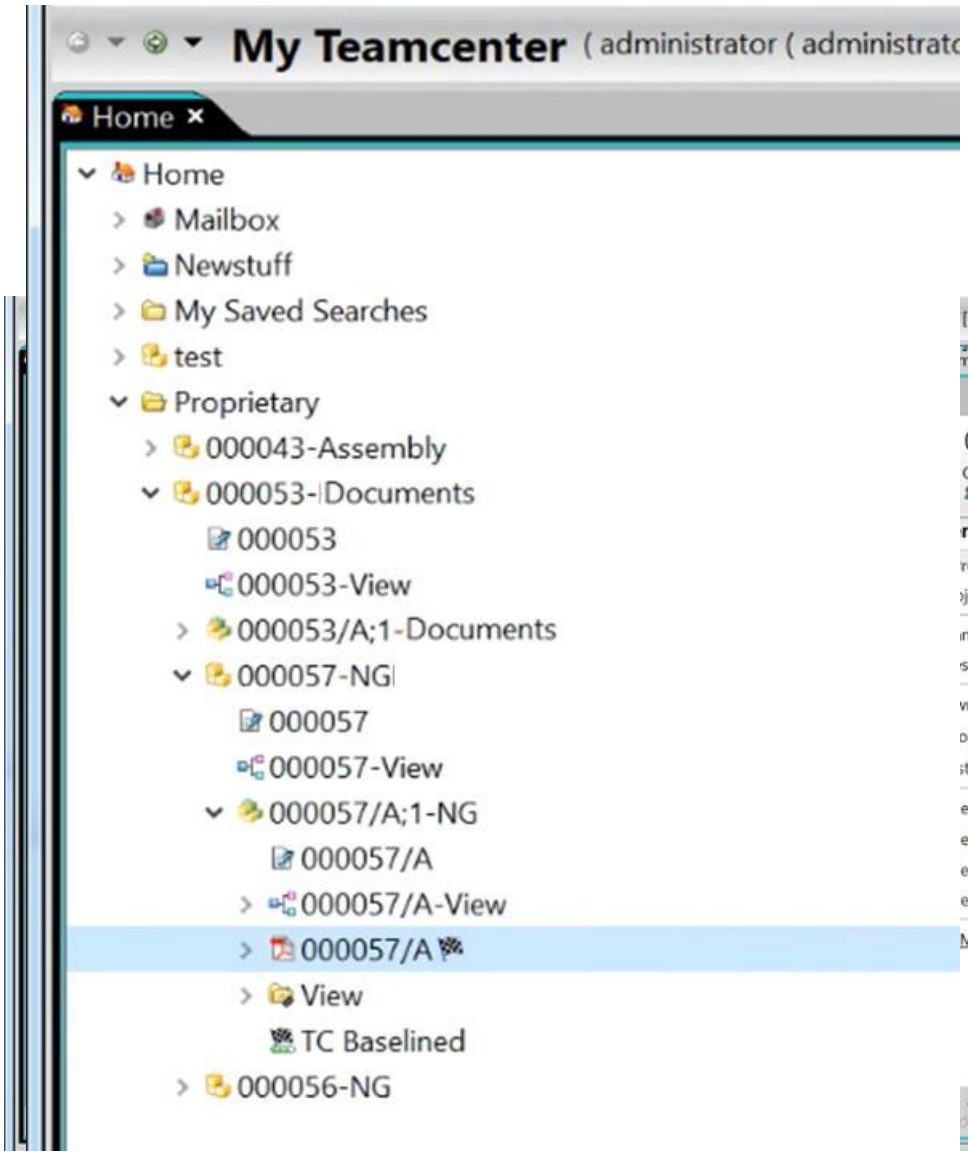
Manufacturing BOM

Bill Of Process

Product Structure



PLM representation

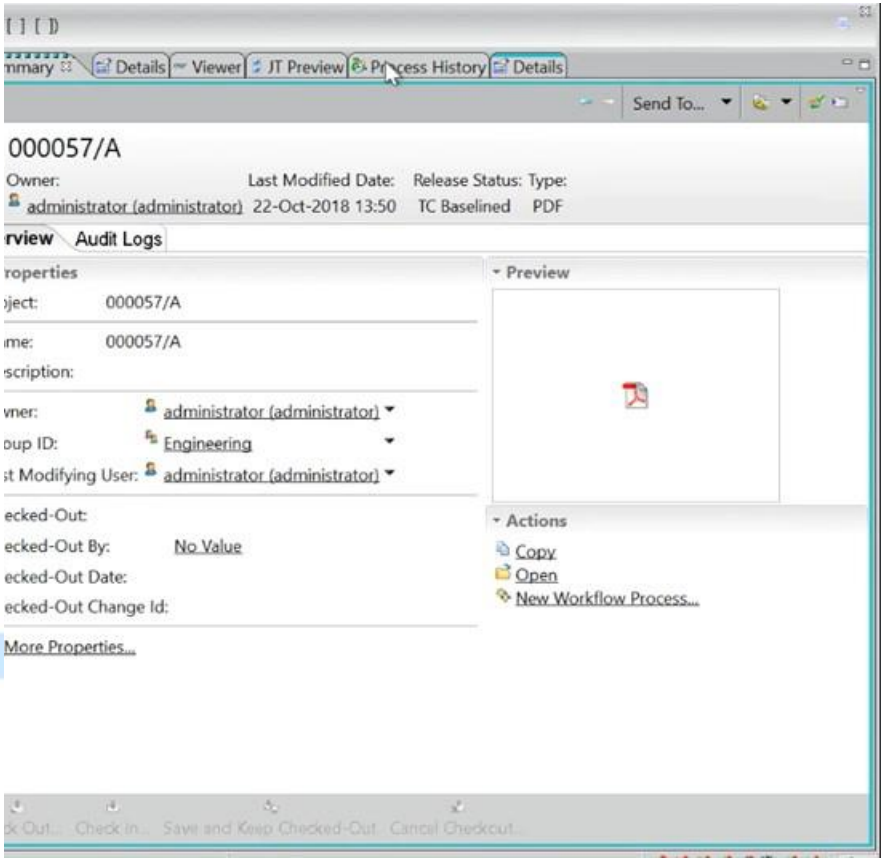


Engineering BOM

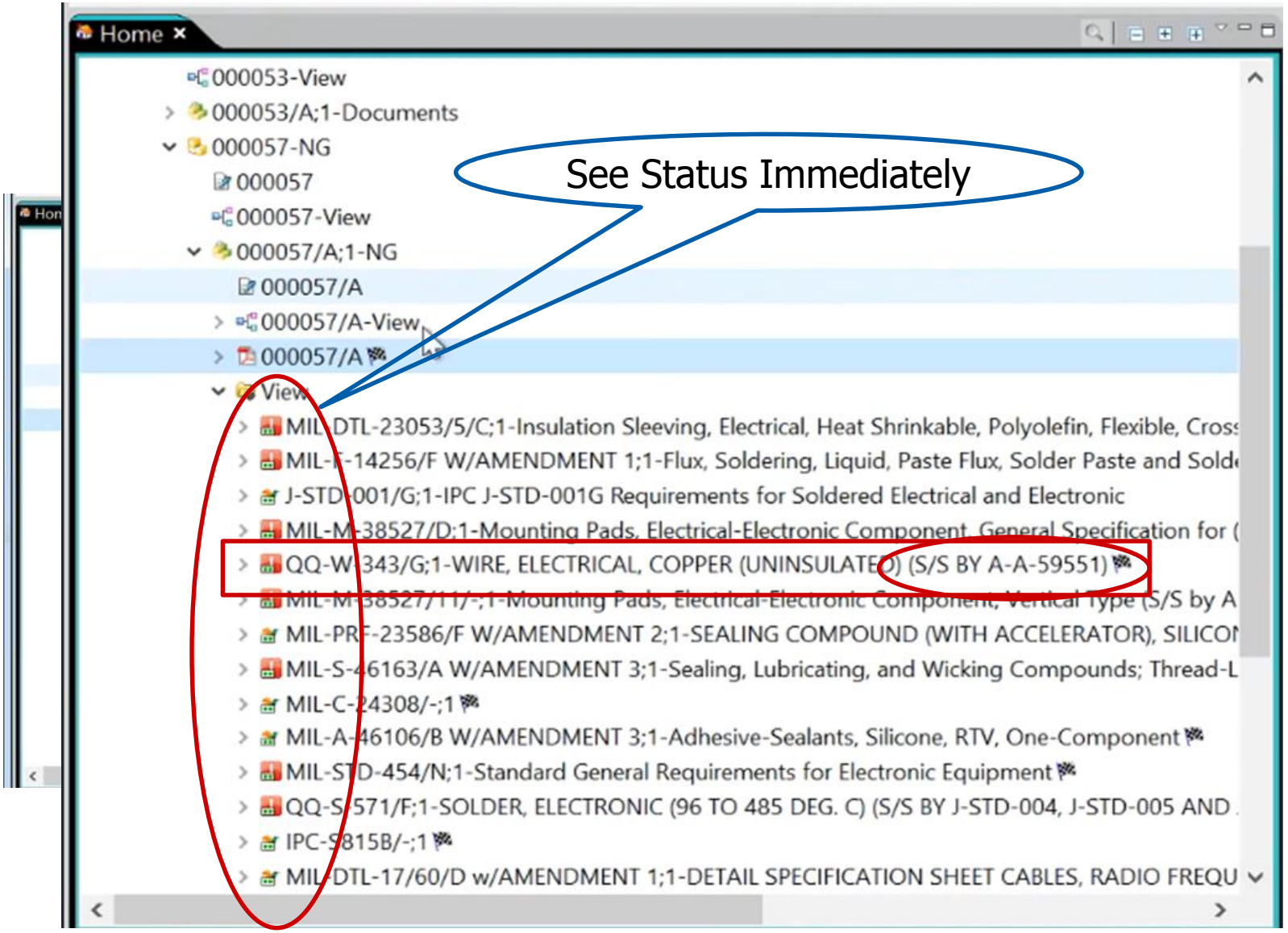
Manufacturing BOM

Bill Of Process

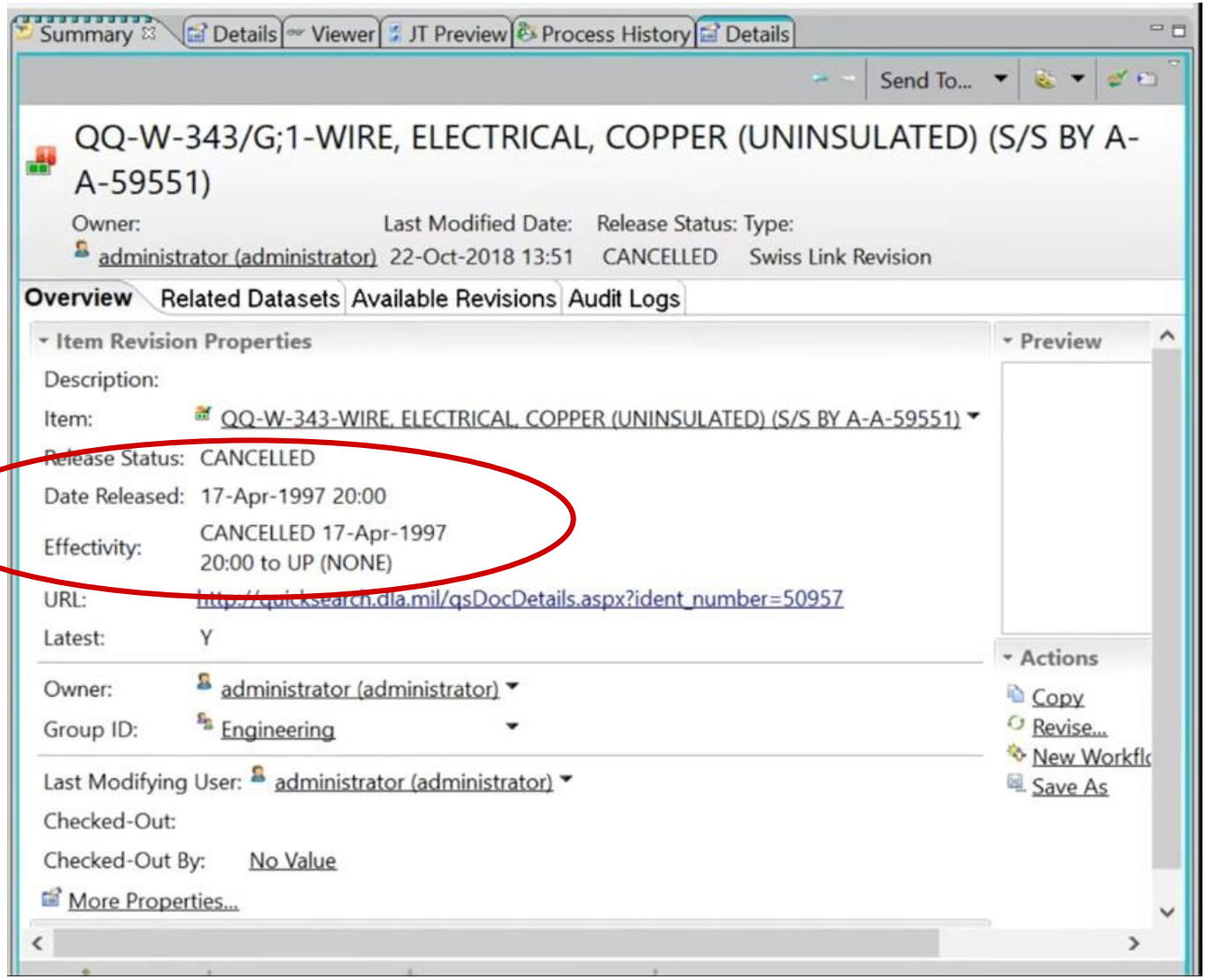
Product Structure



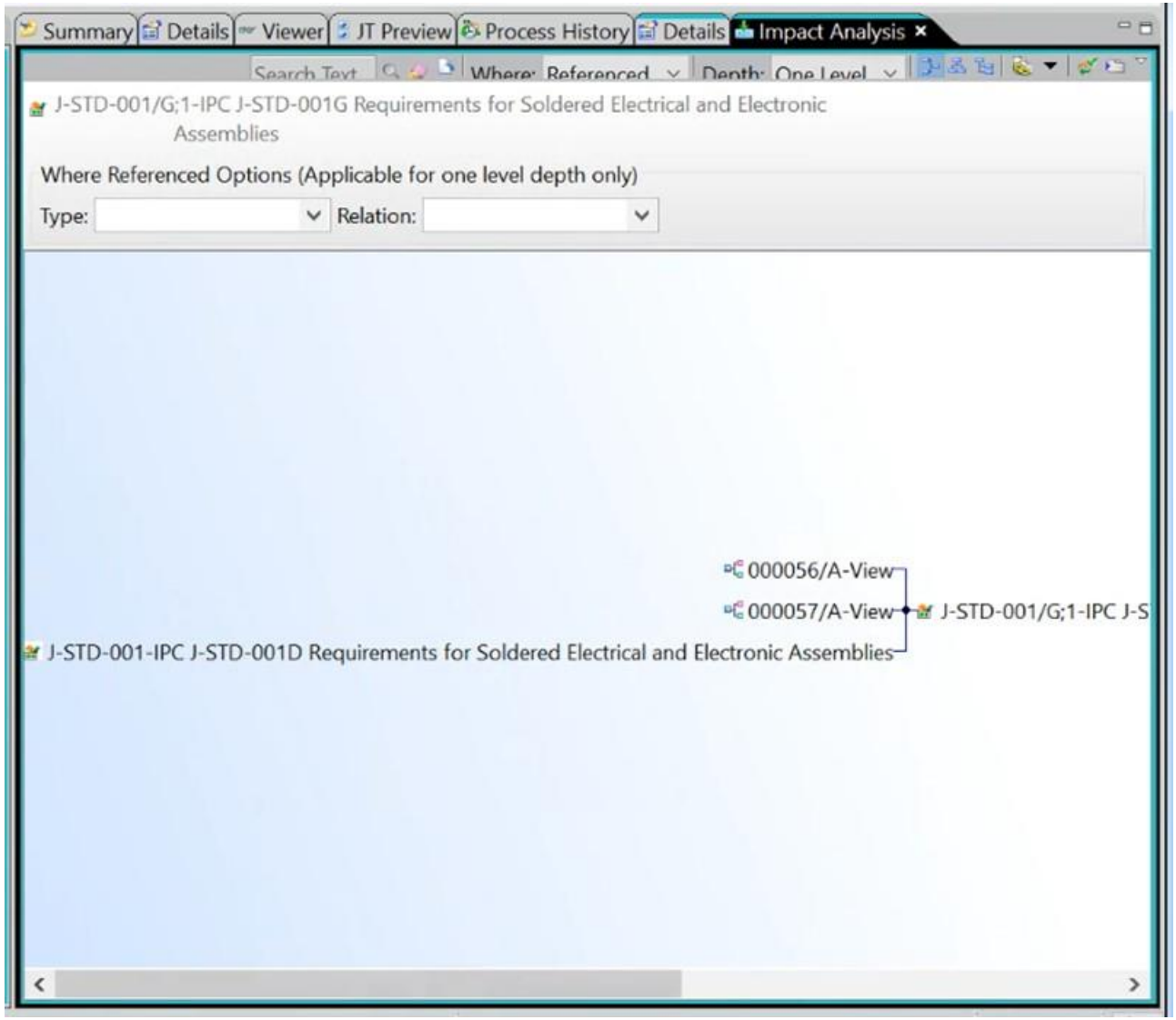
PLM expanded view



See the details

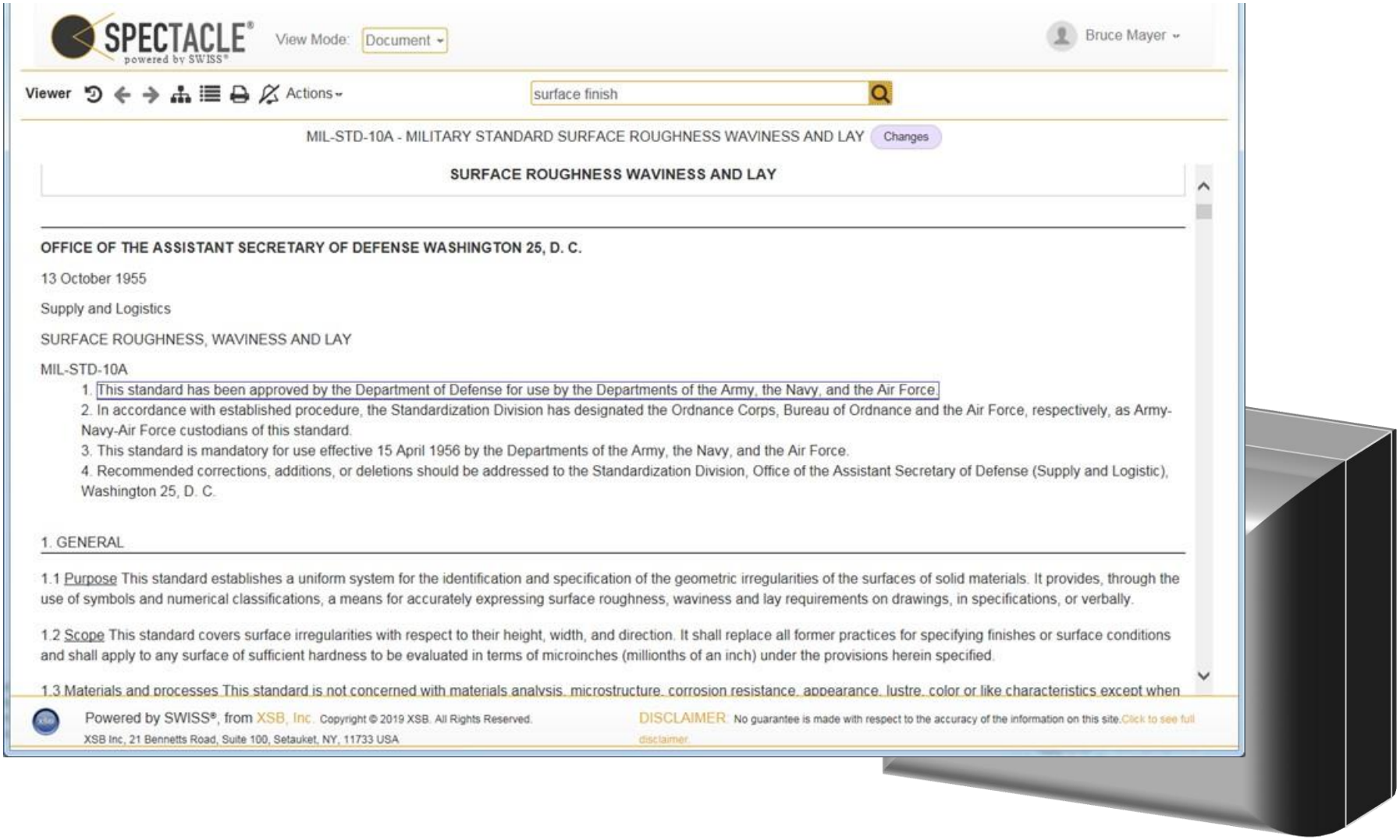


PLM where used

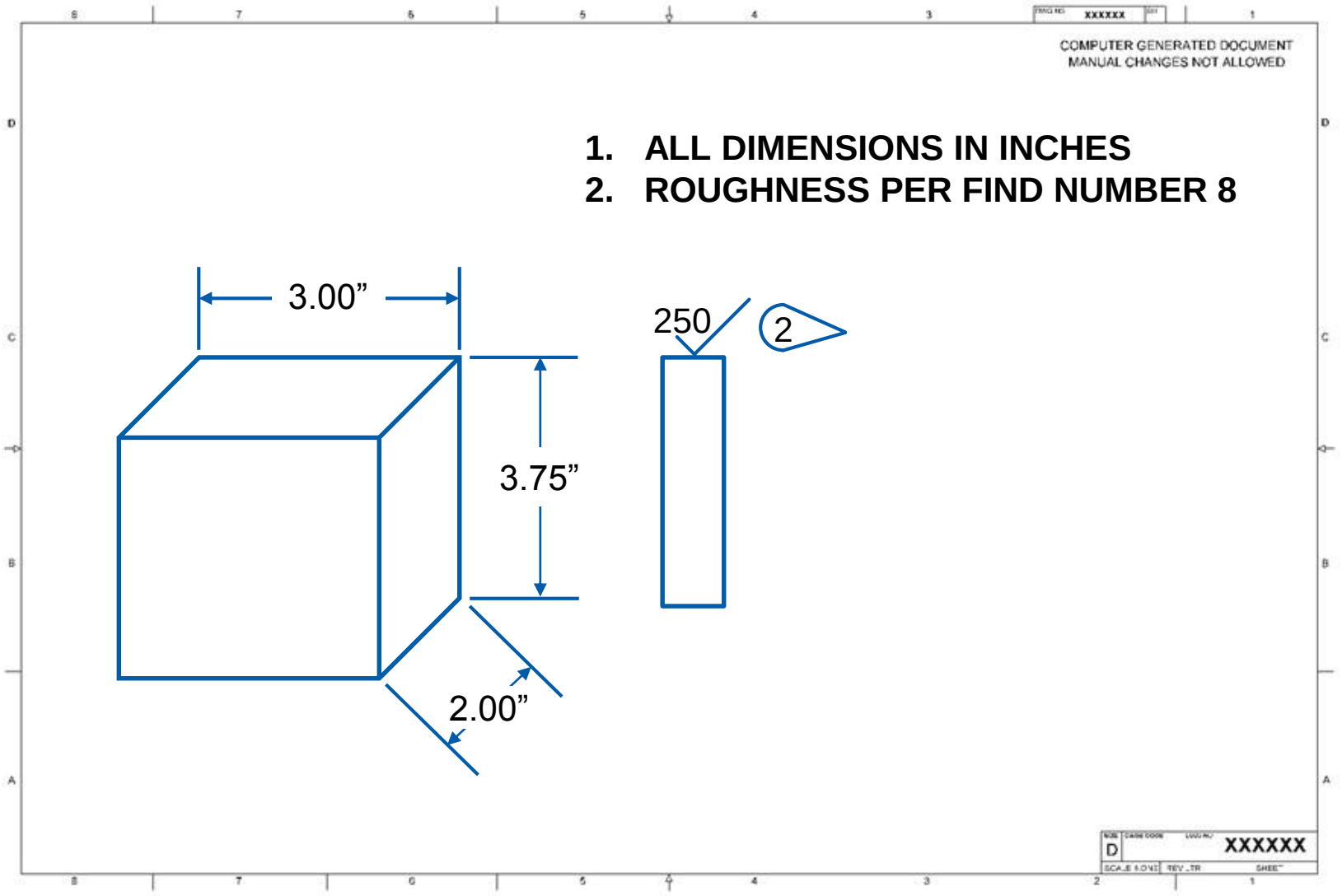


Augmented reality

Augmented reality



What about drawings?



What about drawings?

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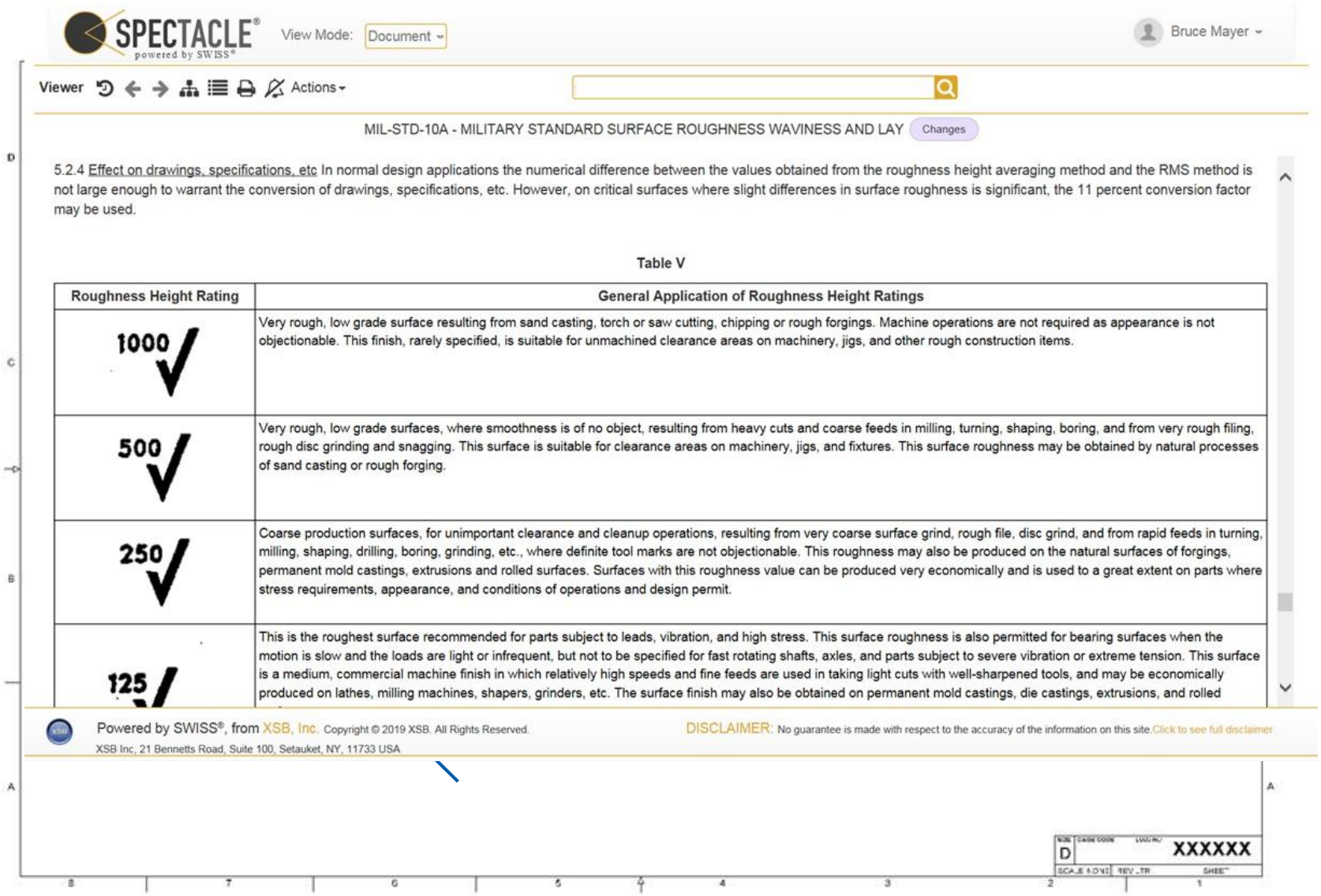

Benefits of a smart document

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- Identify authoritative source change
  - What if a critical value changed in a table?
- Recognize change impact
- Proactive not reactive
- Demonstrable digital thread of documents
- Ensure compliance
- Maximize continuous improvement
  - Is there a best practice update?
  - Is there a change due to lessons learned?

Work Smarter NOT Harder!

Maximize the digital thread

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- Purposeful specifications
- Version cognizance
- Managed in PLM/PDM/ERP
- Linked to CAD data
- Get the most out of your documents
- What about AI - ask questions "How do I ….."
- Think outside the box

SMART CONNECTED DOCUMENTS!