Creating Design Packages
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MEEG 304 - Machine Design Elements

Design Process & Graphic Communication

Sketches
Solid Models (CAE)
Design Package (2-D Drawings & Schematics)

1) Assembly and Installation Instructions
2) "As-Built" Drawings
3) Schematics

Visualization Communication Documentation

Drawing Packages

- Contains all the descriptive documentation needed to ensure a part or system can be manufactured and assembled.
- Drawing Package = a group of drawings that communicate the details of a system or sub-system.
- Needs to be finished before any parts can be made.
- The final drawing package will be given to your customer.

Drawing Package Elements

- Package Content
  - Drawings for each component linked to parent assembly
  - One or more assembly drawings
    - 2D or 3D
    - Assembled or Exploded
    - Label all components
    - Include a Bill of Materials
    - Link to component drawings
  - May also include wiring, pneumatic and other diagrams to communicate and illustrate connectivity and installation.
Drawing Package Organization

- Full Assembly & Bill of Materials
  - Sub Assembly #1
  - Sub Assembly #2
  - Sub Assembly #3
    - Parts in Sub Assembly #1
    - Parts in Sub Assembly #2
    - Parts in Sub Assembly #3
  - Etc...

Exploded Assembly
Example
2D Sectioned Assembly

Typical Content
- Geometry of an object
- Material type and characteristics
- Manufacturing requirements
- Surface finishes and features
- Tolerances (primarily geometric)
- Other (e.g., assembly information)

Drawing Title Block
- Typical Title Block Contents:
  - Material
  - Scale
  - Tolerance
  - Description
  - Team name
  - Part number
  - Sheet “number” of “total number of sheets”
  - Part drawn by and date drawn
  - Checked by and date checked
  - File Name
  - Quantity
Dimensioning

- Dimension with intent to manufacture
  - All dimensions from one setup coming from the same datum
  - Parts with many dimensions may need two or more different drawings or enlarged views.

Engineering Drawings

The Legal Context

- Engineering Drawing:
  - Binding document or set of documents that disclosed graphically and in text the form and function of an object.
  - Legally binding if created by or approved (i.e. stamped) by a professional engineer.

Bill of Materials

- Bill of Materials Contents:
  - Part No.
  - Quantity
  - Material/Stock Size
  - Sheet #
  - Source
- Bill of Materials are needed for each full and sub assembly
- If the same part appears in multiple subassemblies it only needs to appear once in the drawing package.
- Common format: Table with Columns
- Typically included on the assembly drawing.
Purchased Parts

- Most manufacturers provide electronic drawings.
- Do not need to be fully dimensioned in drawing unless modified after they are purchased.
  - Add a note for the material giving the part number and contact info of the company the part was purchased from.

Don’t Forget about Sketching

- Technical sketches (i.e. to scale) are a great way to convey ideas.
- Attempting to sketch in SolidWorks often presents more obstacles than just using pencil and paper.
- Jumping into SolidWorks before your design intentions are clear causes problems. i.e. origins, planes, etc…
Installation Drawings

Installation Drawing Requirements

- Necessary to insure proper installation of a new design.
- Adapting into or onto an existing system.
  - Demolition
  - Modifications (holes, cutouts, etc.)
- Can integrate/illustrate several sub-systems (mechanical, electrical, controls, etc.).

Valve Installation
Thank you!

Questions?