Advanced CAD Week 2: McMaster, CAD, and Constrain a Mount

Rohawks 3419 -- Celina, Nathan, Lili -- 2019-2020

Lesson Goals

- Show students how & why to download + import parts from McMaster-Carr.
- Link that mount to assembly → give students practical experience.

Lesson Plan

- Pre-Lesson Setup
    - Review the material from last week's lesson; especially be comfortable with the constraint types.
- Why Use McMaster-Carr?
    - CADding every bolt, nut, washer, gear, etc. on our robot is impractical…
    - ...so we download the parts from the supplier's website and then place them into our assemblies.
    - Other suppliers, like AndyMark, also post CAD's on their websites - for parts like motors, squishy wheels.
    - Even when CAD files are not posted, there are often dimensioned drawings - can be used to make an approximation.
    - The technical documentation is EXTREMELY IMPORTANT - for motors, used to calculate acceptable loads.
- Using McMaster-Carr
    - Here's their website! https://www.mcmaster.com/
    - The part file is not always in the format that Autodesk uses (.ipt), but it can be imported into Inventor anyway.
        - Alternate file types: STEP, STL.
- Mount CADing Exercise
    - Navigate through McMaster-Carr and find a levered limit switch (like this one)
    - Download as a file that can be imported into Inventor (likely STEP)
    - Import into Inventor and use the measurements to CAD a mount that will secure the limit switch to a metal extrusion
    - Add your new mount part to an assembly and constrain it onto a metal extrusion
    - **Bonus challenge**: do the exercise with nothing but a dimensioned drawing.

Supplementary Materials

- AndyMark (FRC-specific parts): https://www.andymark.com/

- Description of common 3-D file formats: https://all3dp.com/3d-file-format-3d-files-3d-printer-3d-cad-vrml-stl-obj/
- Autodesk resources:
    - https://knowledge.autodesk.com/support/inventor-products/learn-explore/caas/CloudHelp/cloudhelp/2016/ENU/Inventor-Help/files/GUID-7FACB50F-ED00-419D-8C23-F98283CCD8F8-htm.html
    - https://knowledge.autodesk.com/support/autocad/learn-explore/caas/sfdcarticles/sfdcarticles/What-file-formats-can-AutoCAD-import.html