Ira A. Fulton Schools of Engineering
Arizona State University

MAE 214 – Fall 2024

Project #1 – Fast Acting Clamp Assembly

Due: Saturday, November 2nd, 2024 by 11:59 p.m. via Canvas

Problem Statement: You are working as a Design Engineer in a manufacturing facility where the automation and material handling plays a major role in the line assembly. Your manager/supervisor has assigned you a task of lifting component(s) from a conveyer belt. You have been provided parts (SolidWorks CAD files) only. You are required to understand the mechanism and put the parts together to make an Assembly so the mechanism can later be put together by a team of technicians. Be an engineer and amend the areas that are not correct while assembling the parts using SolidWorks CAD software. Please refer to the figures shown below.

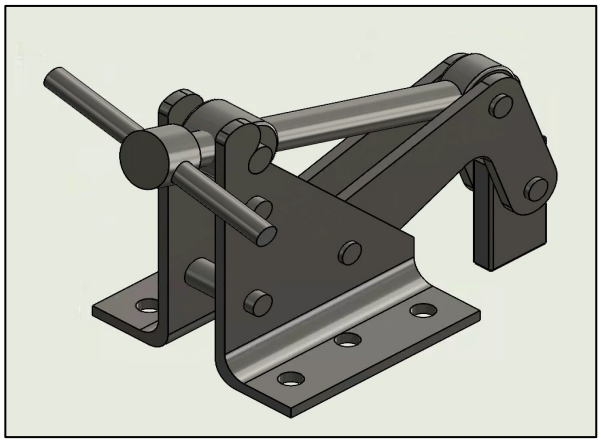

Figure 1- Isometric View

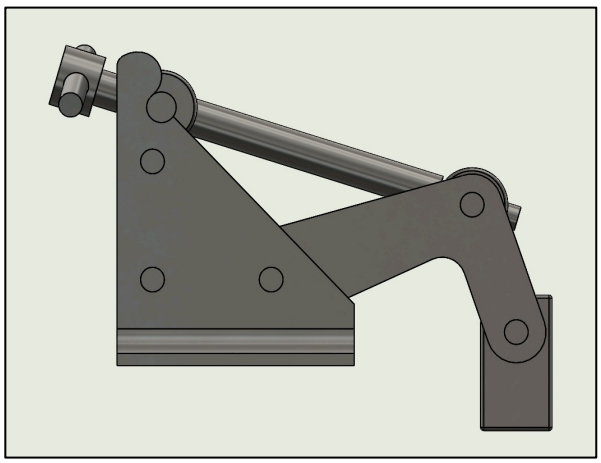

Figure 2 – Right View

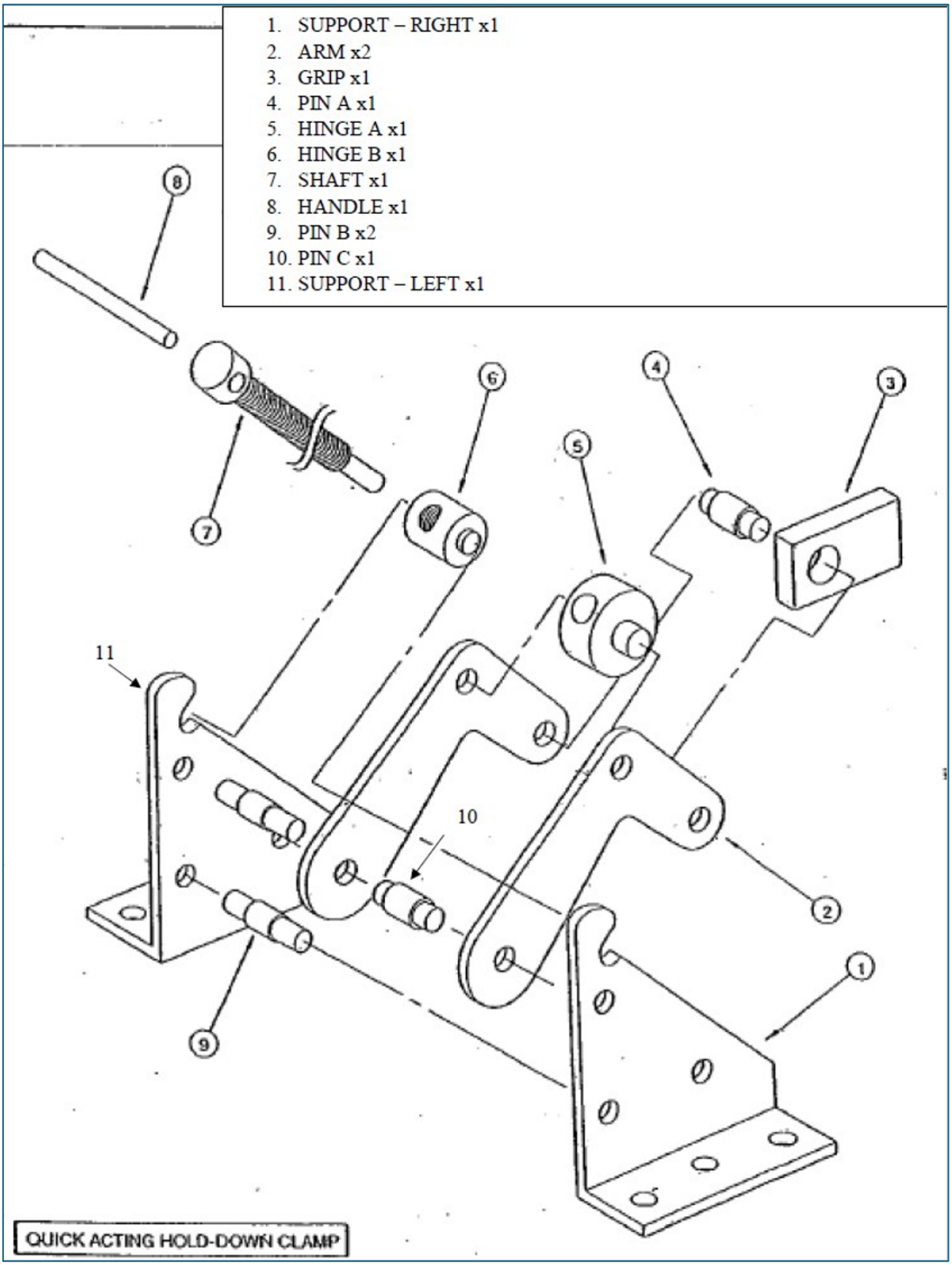

Figure 3 – Exploded View

Amendments:

These amendments will allow you to successfully complete your Project. Each amendment has a video associated to it. Make sure to watch the videos as they will be of great help in achieving each necessary amendment.

- Make sure fasteners are properly dimensioned with other parts in the assembly (no visible gaps between pins and other parts).
  https://www.youtube.com/watch?v=LIdYZ_GWtug

- Make sure that the assembly moves properly (Screw mate between Shaft and Hinge B).
  https://www.youtube.com/watch?v=sQPtU6i4jGQ

  Note: The screw of the assembly has a cosmetic thread but is mated in a similar way to that of a normal screw.

- Make sure parts have reduced interferences.
  https://www.youtube.com/watch?v=ZvDhv7os5D8

  Note: In the case of the screw assembly interferences shouldn't be more than 0.02 in^3, in all other cases interferences should be less than 0.01 in^3.

Further Considerations:

- There are several pin types (make sure to place them in their appropriate location – see Figure 3 – Exploded View).
- The right support must be fixed (not floating), and consequently should be the first part added to the assembly space.
- All parts other than the right support must float, with their respective positions defined using mates.
- Use a Limit mate (Limit Distance or Limit Angle) to control the assembly's range of motion to match the movement demonstrated in the provided video *(Extra-Credit).*
- The grip must remain vertical throughout the range of motion.
- All pins must be centered with respect to the two supports.
- You ***may not use the "Lock" mate***, but you may select the option to lock rotation in a Concentric mate to fully define a cylindrical component (pin) with no other useable features.
- The handle must be centered with respect to the shaft.

Project Submission:

You will submit a Zipped file which should include your *Assembly file* and all your *Assembly Part files* using the following convention:

Project_1_Last_Name by the submission date detailed above.

Instructions on how to Unzip Project Files and Save Assembly

The folder provided with part files should be downloaded and unzipped before starting with your assembly. Follow these steps:

Step 1.- Create a new folder (you can name it – Project_1_Last_Name).
Step 2.- Download part file.
Step 3.- Unzip file and **Extract All Files**.
Step 3a.- **Ignore MacOS folder.**
Step 4.- Save extracted part files into your Project_1_Last_Name folder.
Step 5.- Go to SolidWorks create Assembly and save assembly in your Project_1_Last_Name folder.
Step 6.- Once you've completed your assembly Compress (ZIP) your Project_1_Last_Name folder (which will contain your part files and assembly) and submit on Canvas.

Note: If you only submit your assembly file, your assembly won't work when opened for grading in SolidWorks.

Grading Rubric

Grading Rubric			0%
MAE 214 - Project 1			
Name:			
Item	**Points Available**	**Points Awarded**	**Comments**
Assembly (100 Points)			
Assembly has functioning screw mate	25.0		
Gripper moves properly	20.0		
Handle stays in Shaft while it rotates	20.0		
Pins, Arms, etc. stay within desired positions (e.g., don't translate horizontally)	12.5		
No other major mate issues	12.5		
Assembly has no major interferences (all interferences with exception of Screw mate <0.01 in^3)	10.0		
Extra Credit: Limit mates implemented to realistically constrain motion	5.0		
Total	105.0	0.0	