

MAE 214 – Final Project – Fall 2024

Shock Absorber Assembly

Due: Friday, December 6th by 11:59 PM via Canvas

Problem Statement: You are working as a Design Engineer for Mercedes-Benz USA, Inc. Your design manager has assigned a task to initiate a design of shock absorber used in Mercedes C-class. You are given basic information of parts being used in a shock absorber. **Please refer to the figures attached at the end of the document.** You will need to create all parts and create an assembly using SolidWorks. Be an engineer and amend the areas that are not correct while assembling parts. This may require changing dimensions to avoid or include interferences for intended use, welding parts, identifying the need of missing parts, etc.

Here is the outline for the Project:

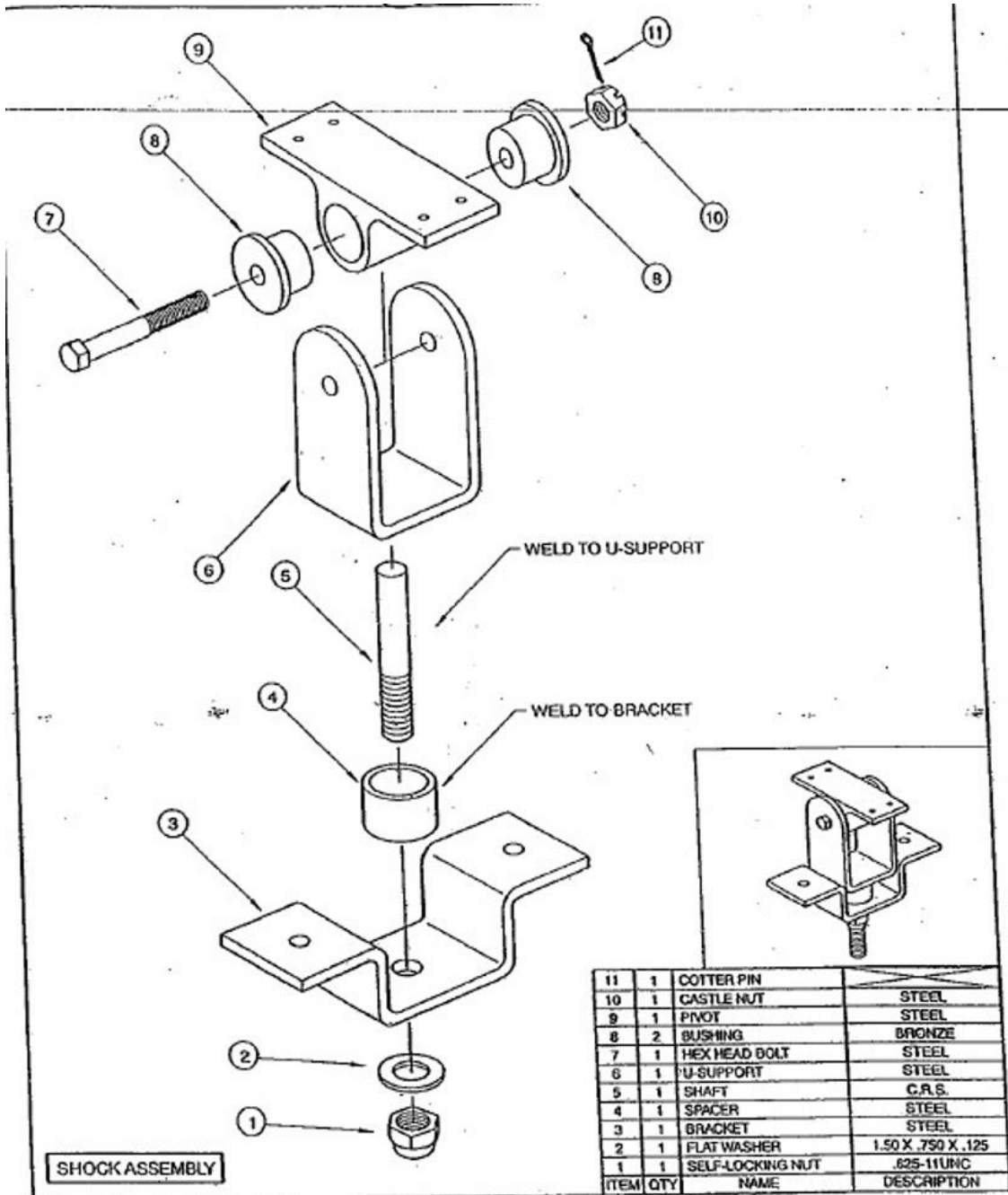
1. Make parts and drawing sheets of all components used in assembly (except for fasteners, parts detailed below). Include all necessary dimensions using 3rd angle projection method. You can make a judgment that a complex part may require more views and simple parts may require less views.
2. Make a drawing with an exploded view of your assembly with a bill of materials sheet.
3. Note that you are the designer, and you are required to amend parts to create a properly functioning shock absorber. **Only threaded components are allowed interferences of up to 0.02 in³. All other components should not have interferences.**
4. Fasteners can be downloaded from www.mcmaster.com (see *Additional Resources – How to download Fasteners from McMaster-Carr; at end of handout*). **Note: All parts requiring an engineering drawing, are to be created by you, except the Shaft which can either be created or downloaded from McMaster-Carr.**
5. The material selection should be done properly; e.g., relevant grades of steels or alloys for some parts and bronze for bushing. You can search this online and make your own choice.
6. Include a Final Project Compilation Document (as described below).
7. Finally, submit all your work in a Zipped folder likewise you have done for Project 1.

Details of your Final Project Compilation Document (Should be in a single PDF)

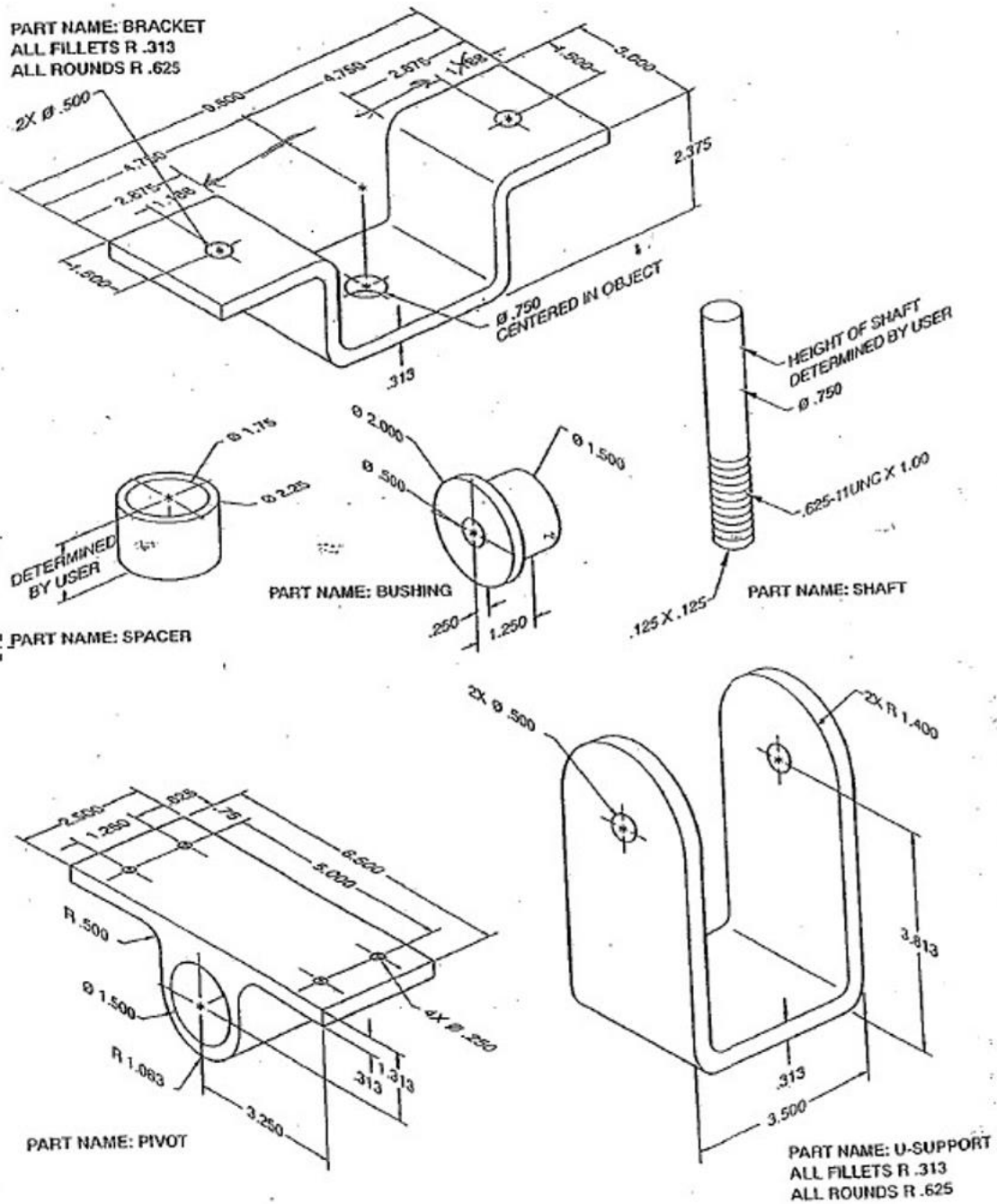
1. Cover Page with Picture/Screenshot of your end-product with your Full Name and Section number.
2. Drawing sheet of Exploded view of your Final Assembly with its Bill of Material
 - i. Bill of Materials should include: Part Name, Material, Quantity
3. Drawing sheet of Bracket
4. Drawing sheet of Spacer
5. Drawing sheet of Shaft
 - i. Note that the Shaft closely resembles a partially threaded stud. If using one, make modifications such that it resembles the provided schematic.
 - ii. Dimensions of the threading will need to be provided. Refer to presentation on threads and fasteners for dimensioning conventions.
6. Drawing sheet of U-Support
7. Drawing sheet of Bushing
8. Drawing sheet of Pivot
9. Drawing sheet of Spring
 - i. Dimensions of coils will need to be provided, can make note of rev/in and/or pitch, as well as their cross-section dimensions.
10. Drawing sheets of any additional parts you decided to include to complete the assembly and that you needed to make by referring to the given video. Note: parts downloaded from McMaster-Carr do not need to have an engineering drawing.
11. An appendix containing a table of all Fasteners used in your assembly. The table should include the following information: Part number, Part description (name & main dimensions), material. Hint: Check Additional Resource (2).

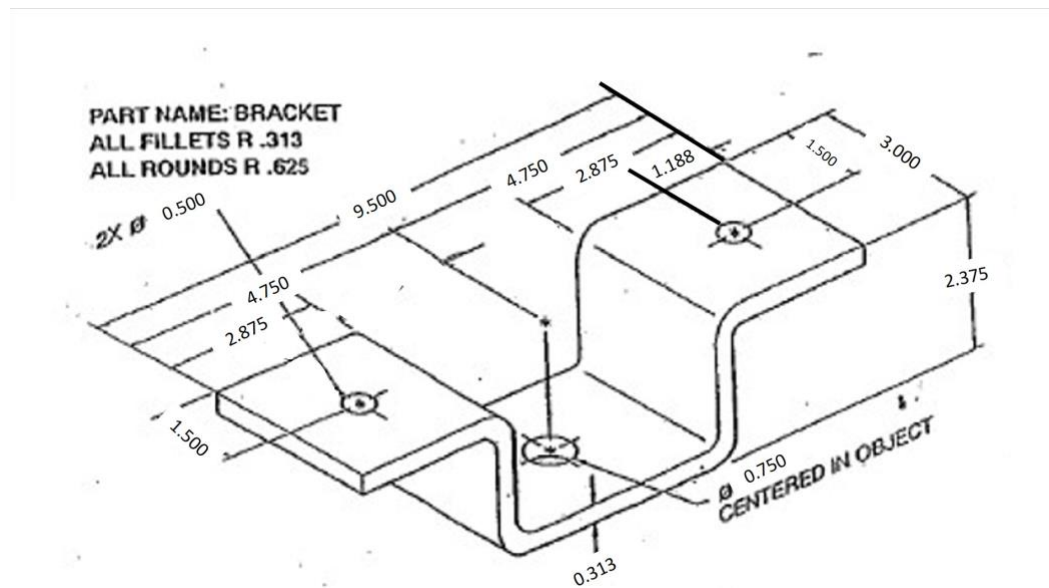
Note: You can save each drawing sheet as a PDF and merge multiple PDFs into a single document.

SHOCK Assembly Figures. Below is general information on the Shock Assembly device. **Do not assume you have all the needed information. Be an engineer, fill in the needed areas and amend the areas that are not correct.** View the provided mp4 video file to create the proper motion of the assembly in SolidWorks.



Note: The provided part dimensions are to be used as an initial reference. Remember you may modify your parts dimensions as needed in order to achieve a properly functional shock absorber.





Additional Resources:

1) Adding a Weld to an Assembly

<https://www.youtube.com/watch?v=OHsrTqjcLTs>

2) How to download Fasteners from McMaster-Carr

<https://www.youtube.com/watch?v=RpCytQM7LL0>

Grading Rubric

Grading Rubric			0%
MAE 214 - Final Project - Shock Absorber			
Name:			
Item	Points Available	Points Awarded	Comments
Engineering Drawings			
Engineering drawings for all required assembly parts	15		
Engineering drawings have appropriate orthogonal views and views are correctly dimensioned	10		
Exploded View and Bill of Materials			
Assembly parts are visible and properly identified in exploded view	10		
Bill of Materials has assembly parts properly identified with appropriate Part Name and Material Description	10		
Shock Absorber Assembly			
Components are properly mated (allowing proper assembly movement)	30		
Components have appropriate material specified	5		
Final Project Document			
Cover page, Exploded view, Engineering drawings, Fasteners List	10		
Extra Credit: Formal write up for report, including introduction, explanation of steps/process where relevant, and conclusion	5		
Design Conflicts			
Design related issues (i.e missing modifications)	10		
Total	100	0	