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Lab Report 2 – Cotter Joint Design & Analysis

1. Introduction

The objective of this lab is to **design and analyze a cotter joint** used to connect two rods subjected to an axial tensile force of **70 kN**. The cotter joint is designed using **Plain Carbon Steel 40C8** as the material for all components, with a **yield tensile strength of 380 N/mm²**.

In this design, a **suitable factor of safety (FOS)** is assumed for each component to ensure structural integrity and reliability under loading conditions. The **compressive yield strength is taken as twice the tensile yield strength**, and the **shear strength is assumed to be half of σyt.**

The following steps are performed in this lab:

1. **Design of Individual Components** – The **socket, cotter, and spigot** are dimensioned based on standard mechanical design equations.
2. **3D Modeling in SolidWorks** – Each component is modeled separately and then assembled into a complete cotter joint.
3. **Structural Analysis** – Stress distribution and factor of safety (FOS) analysis are performed to evaluate the joint's performance under the applied tensile load.

The results from the **SolidWorks simulation** will help identify critical stress regions, validate the design, and ensure the joint meets safety requirements.

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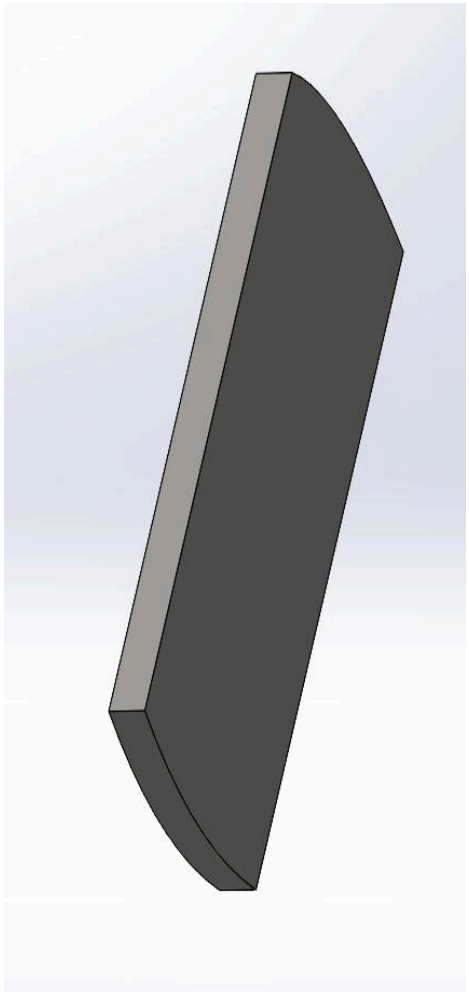
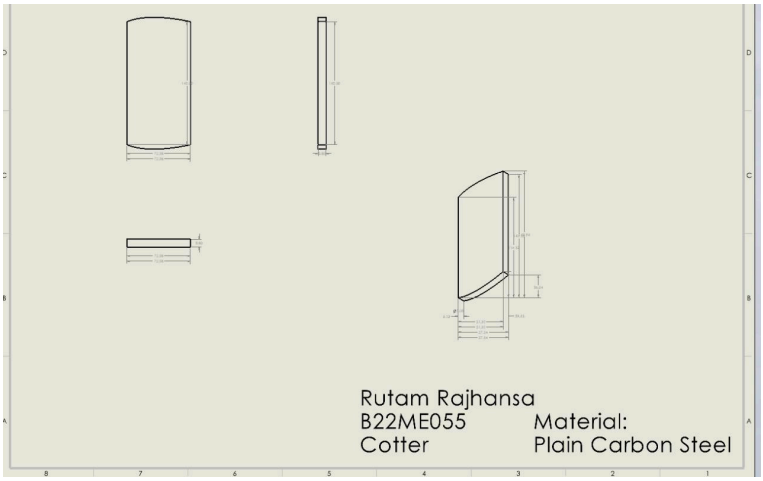
2. Individual Part Design

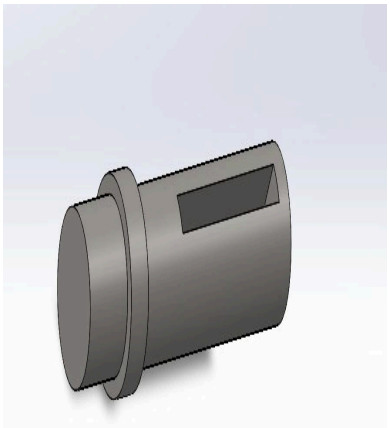
2.1 Cotter

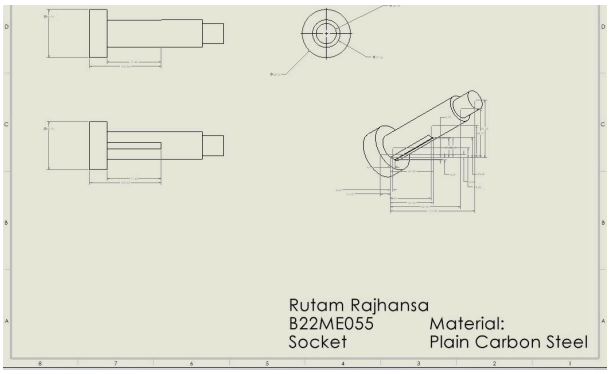




- Dimensions and features.
- Design considerations.

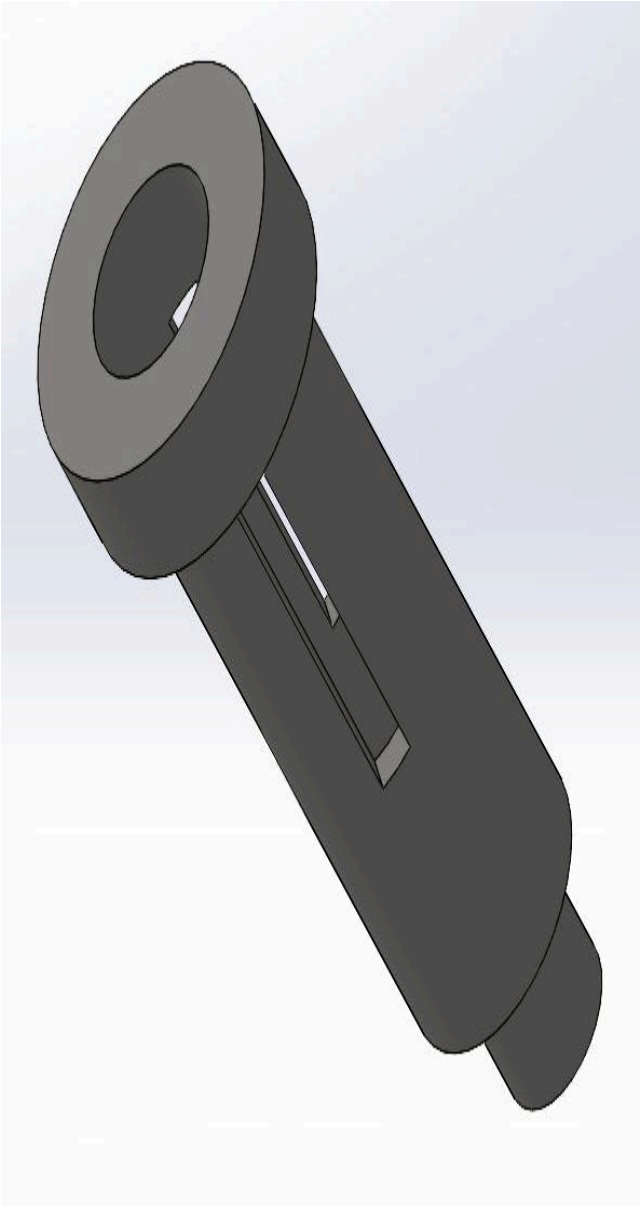
2.2 Socket



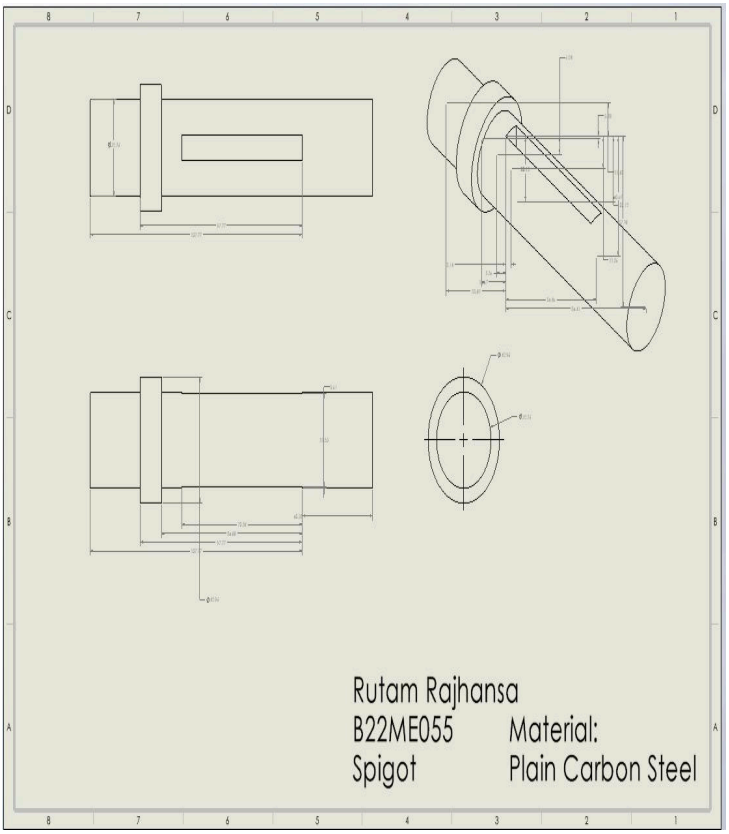


- Dimensions and features.
- Design considerations.

2.3 Spigot

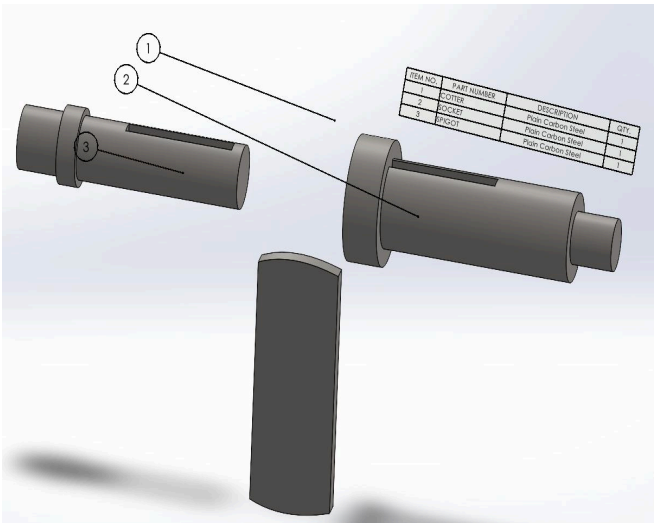


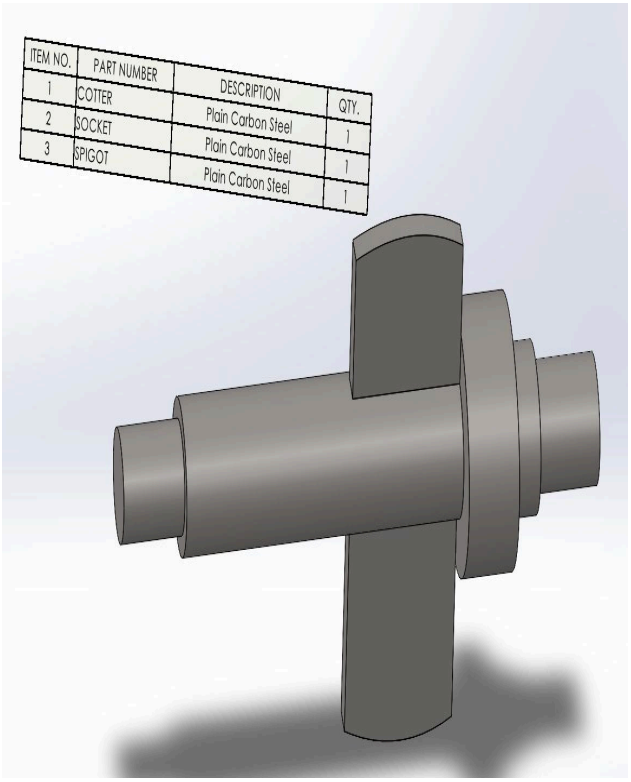
- Dimensions and features.
- Design considerations.

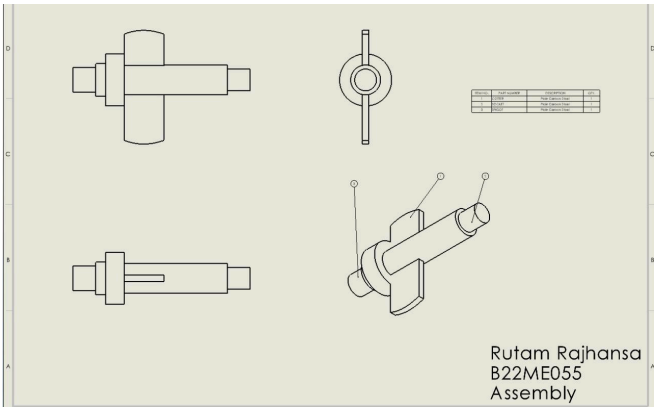


3. Final Assembly of Cotter Joint

- Assembly process.
- Proper alignment and fitting of components.







4. Structural Analysis