

# Chapter 4

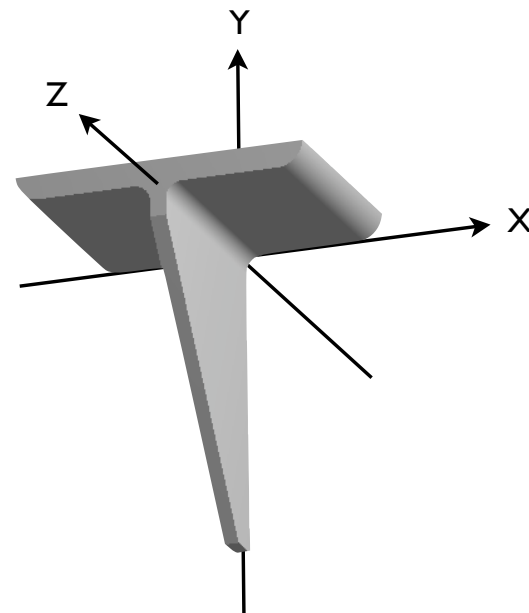
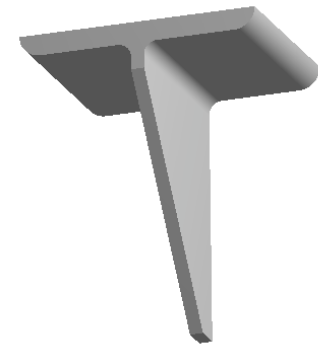
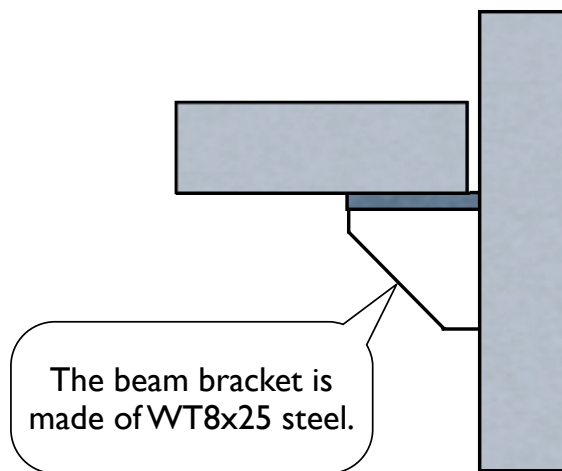
## 3D Solid Modeling

- 4.1 Beam Bracket
- 4.2 Cover of Pressure Cylinder
- 4.3 Lifting Fork
- 4.4 More Details
- 4.5 LCD Display Support
- 4.6 Review

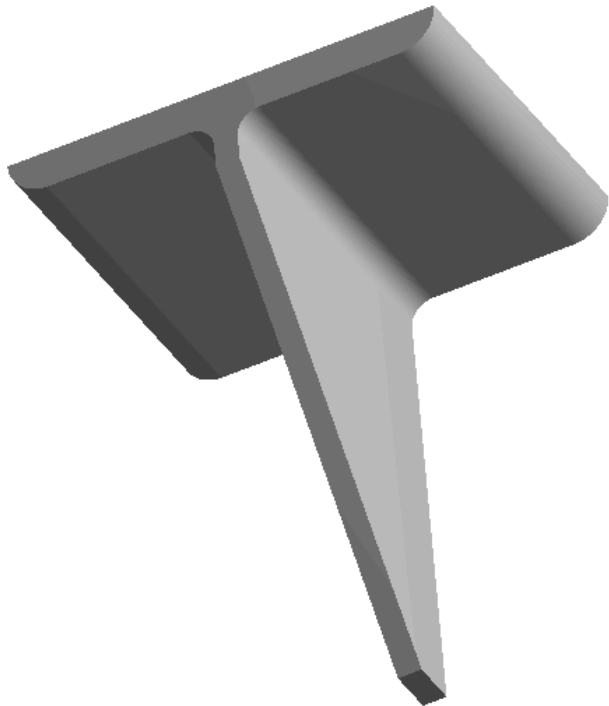
# Section 4.1

## Beam Bracket

### Problem Description



## Techniques/Concepts

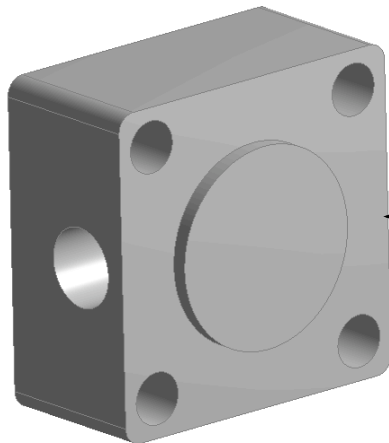
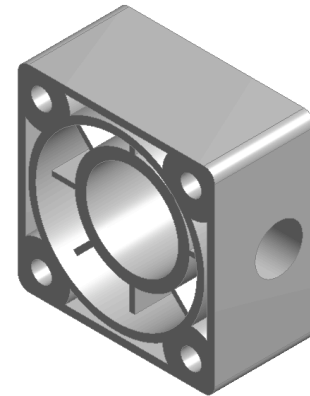


- Local coordinate systems
- Sketching with plane view versus in 3D view
- Use of Triad
- Add Material
- Rounds/Fillets
- Turn on/off edges display

# Section 4.2

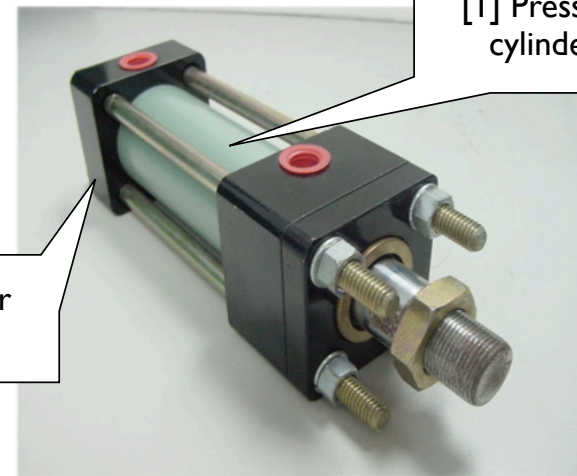
## Cover of Pressure Cylinder

### Problem Description

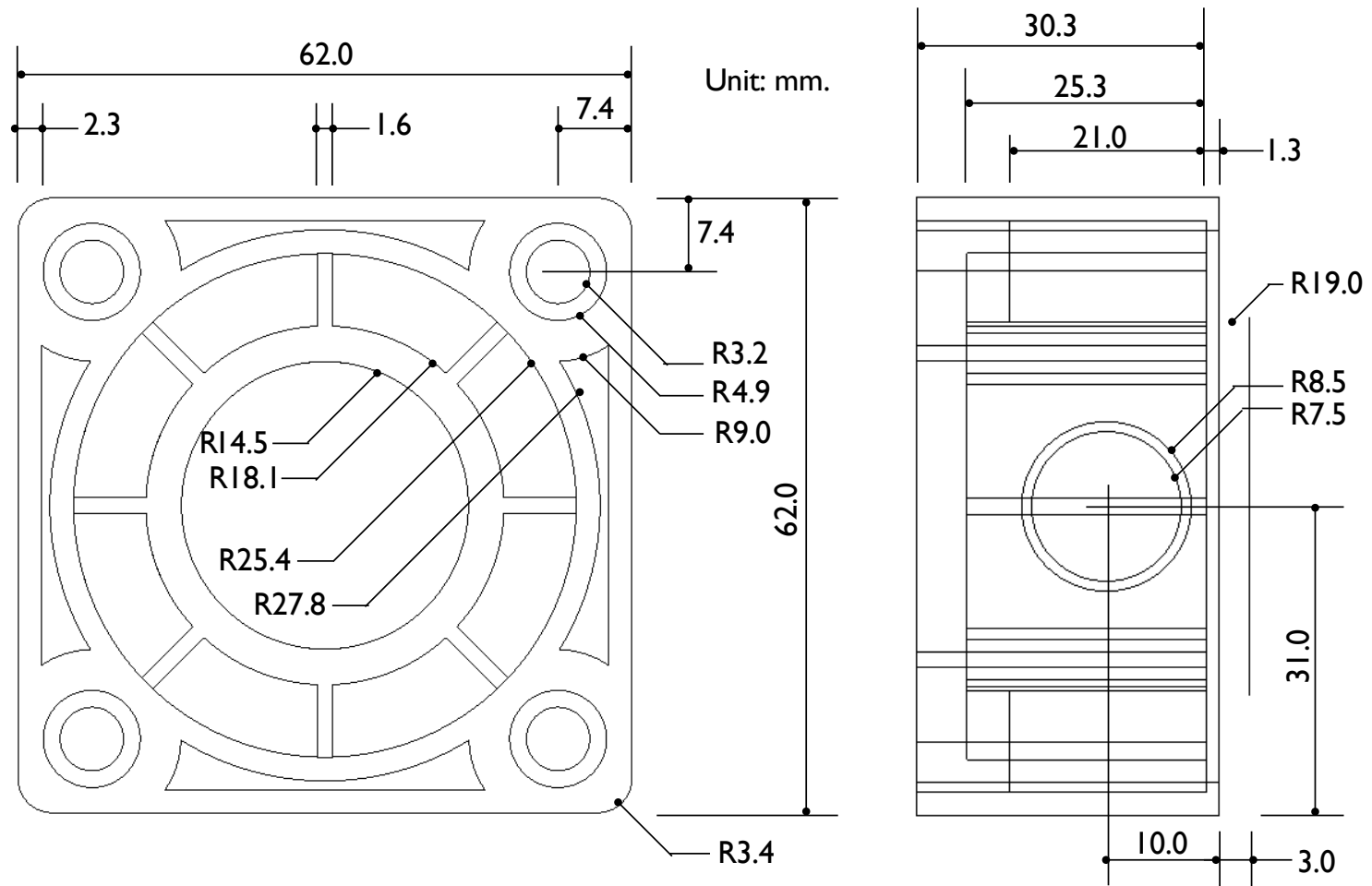


[3] Back view of the cover.

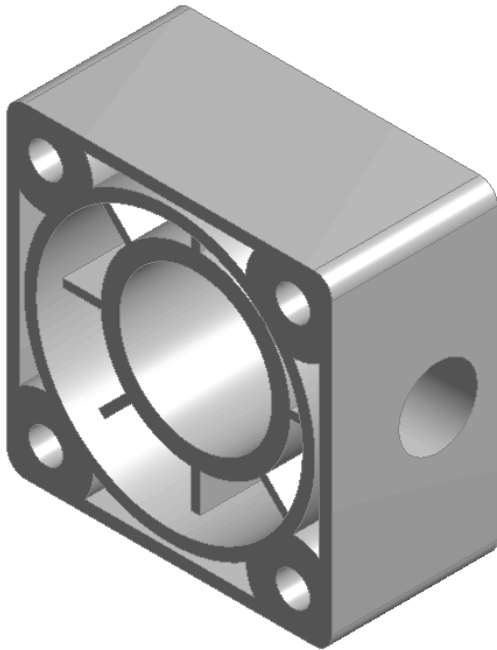
[2] Cylinder Cover.



[1] Pressure cylinder.



## Techniques/Concepts

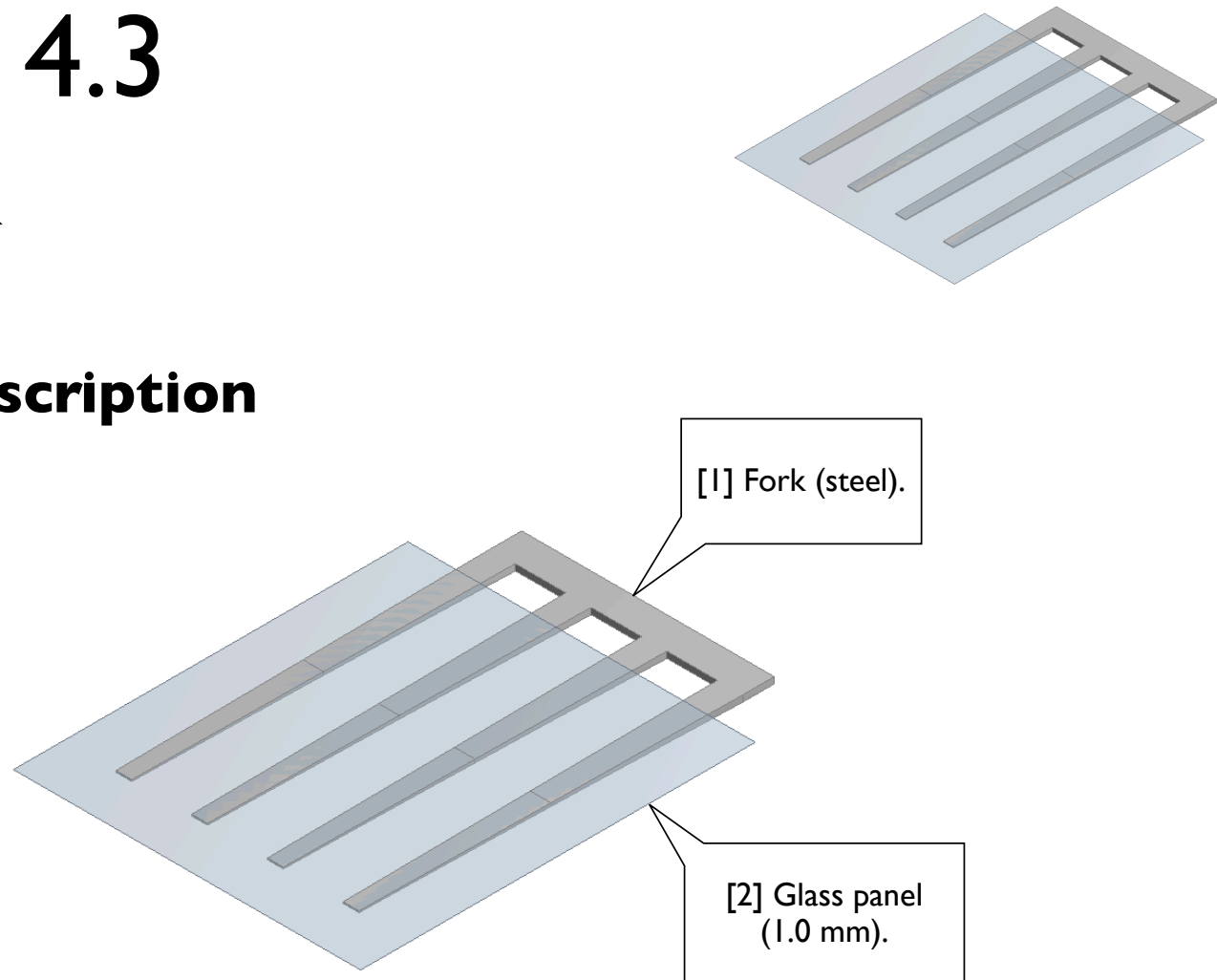


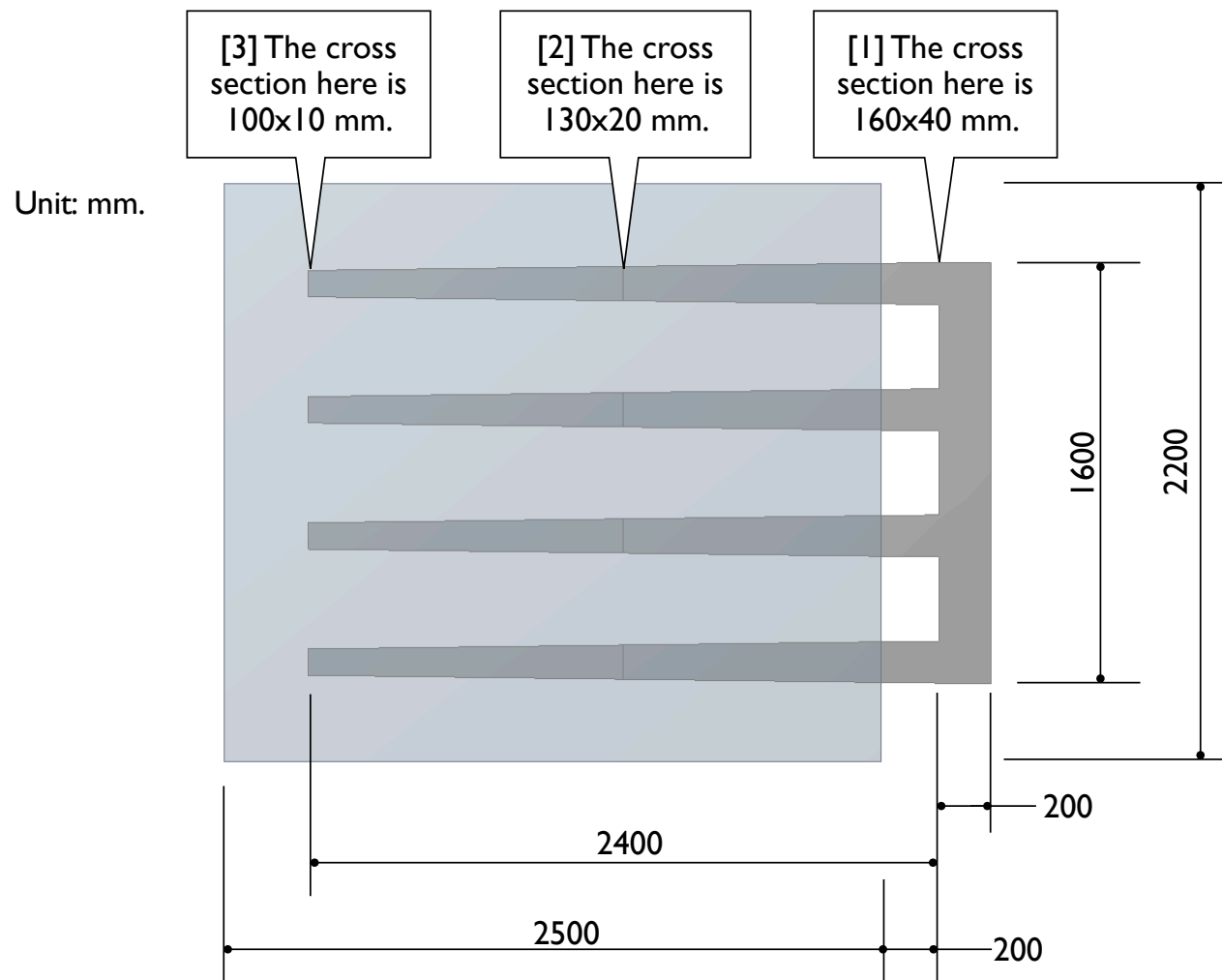
- Create new planes
- Set up local coordinate systems
- Plane with outlines
- Modify>Duplicate
- Cut Material

# Section 4.3

## Lifting Fork

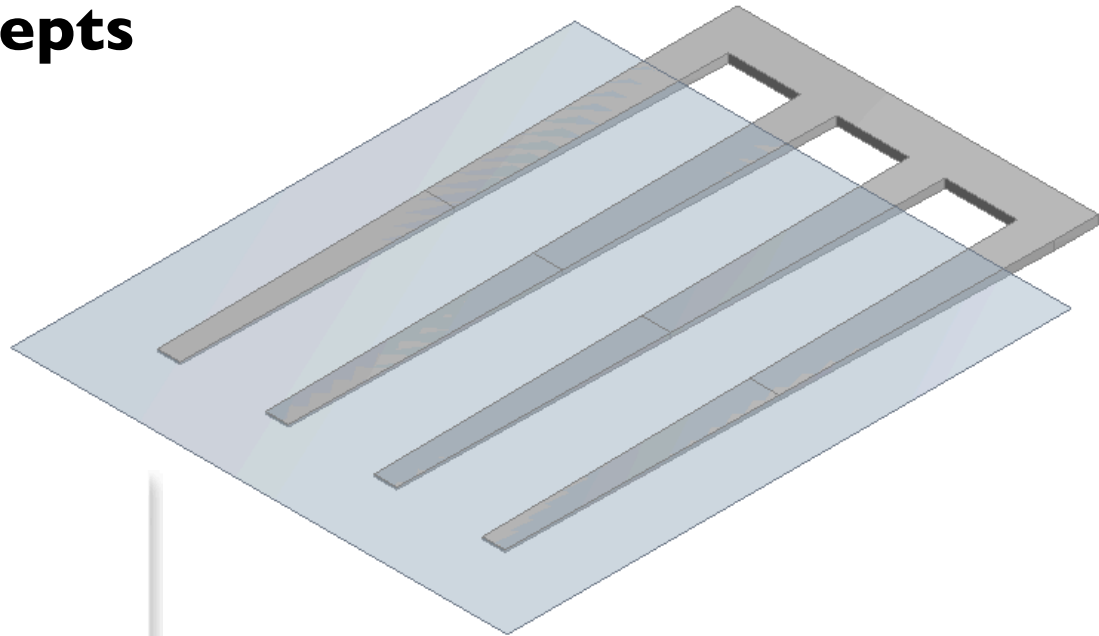
### Problem Description





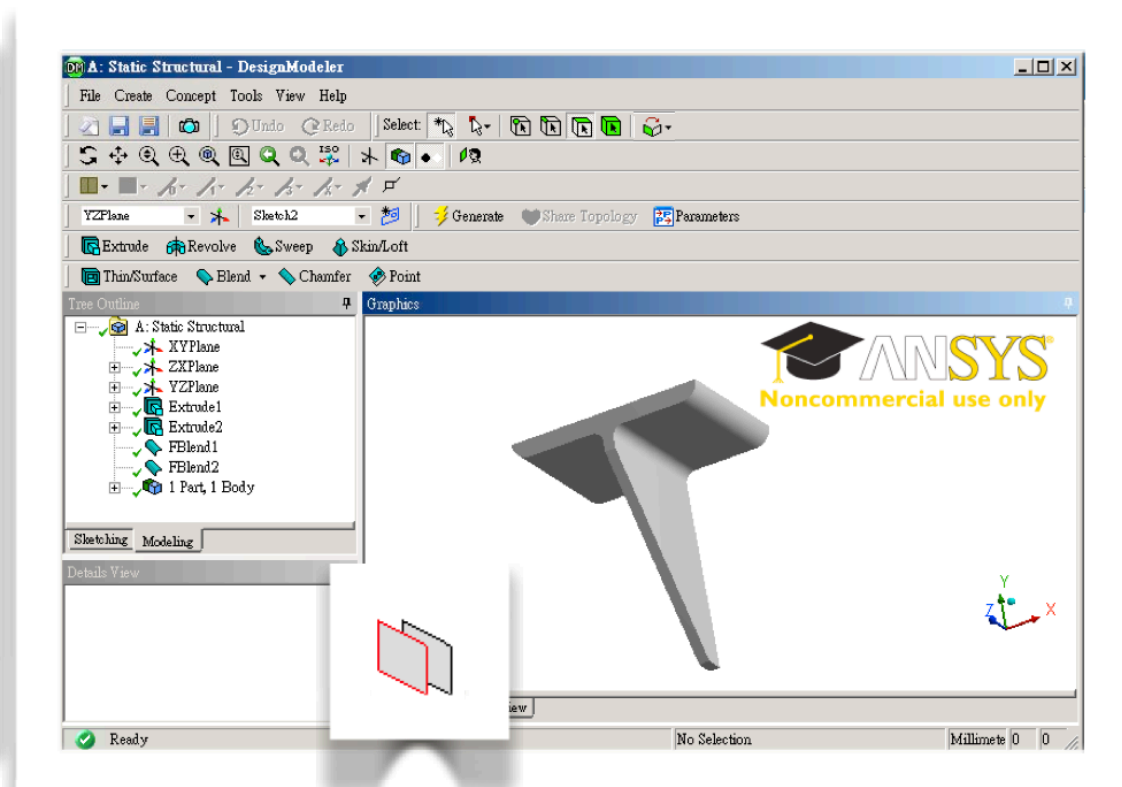
## Techniques/Concepts

- Skin/Loft
- Lofting guide line
- Add Frozen
- Copy bodies (Pattern)
- Boolean
- Create 3D surface bodies

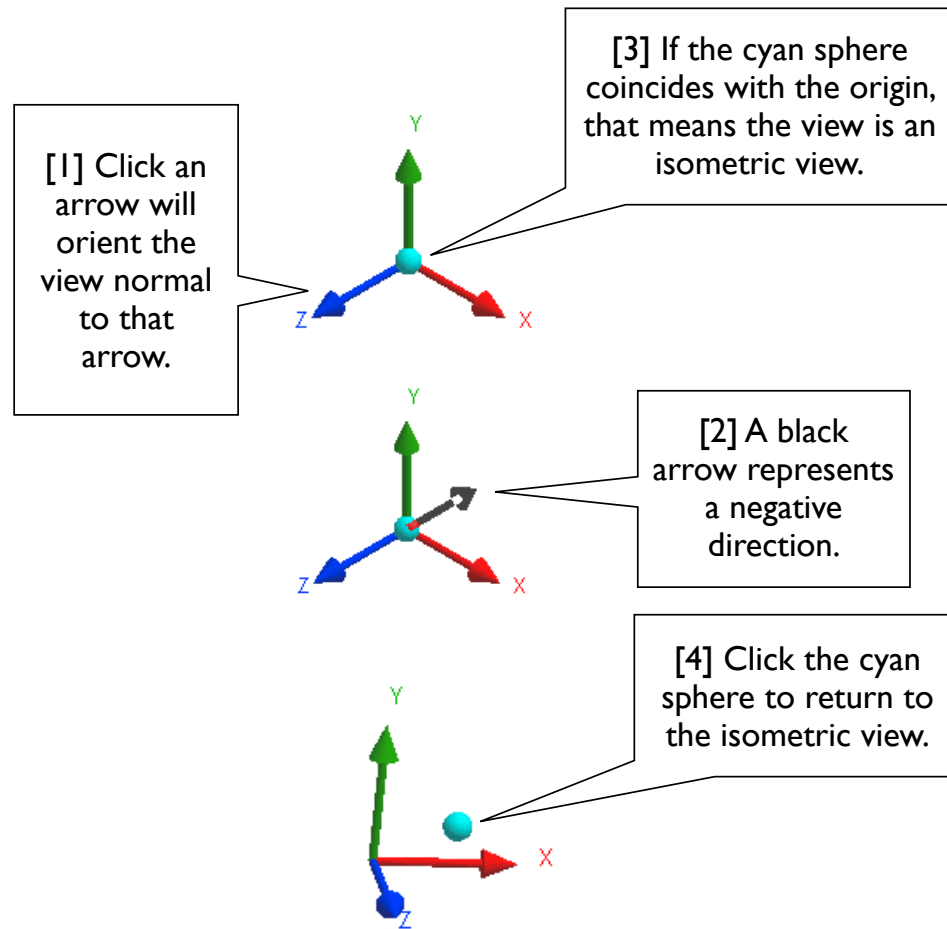


# Section 4.4 More Details

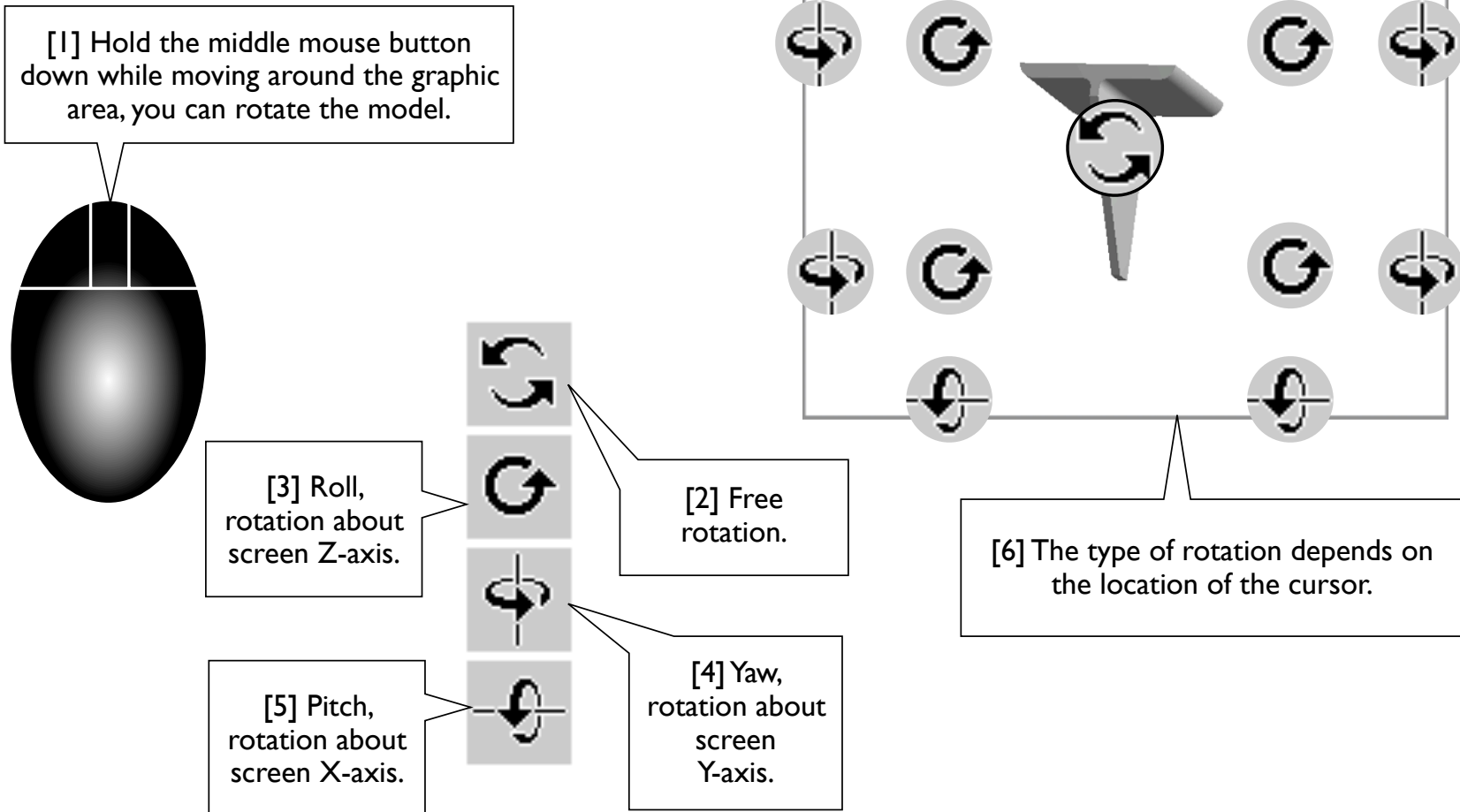
- Triad
- Isometric View
- Rotation
- Selection Filters
- Extend Selection
- Selection Panes
- Edge Display
- Tools for 3D features



# Triad

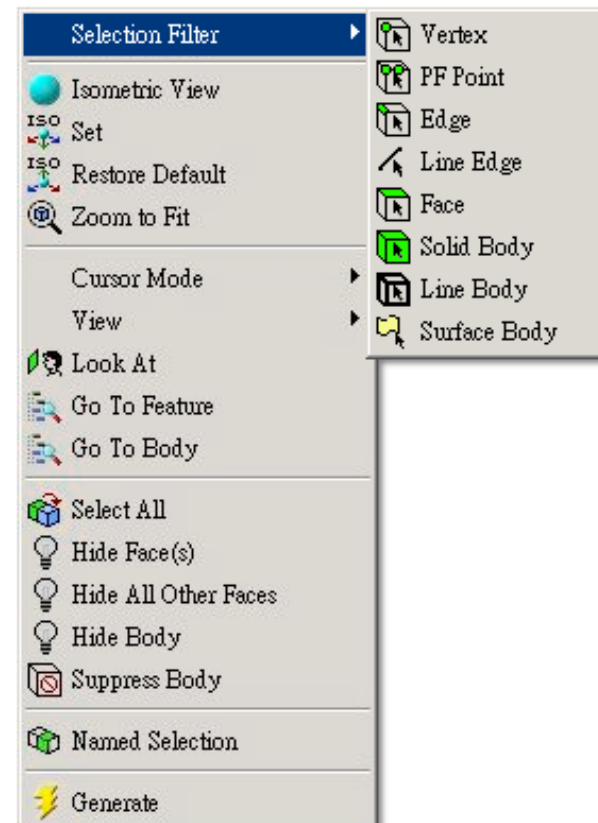


## Rotations



## Selection Aides

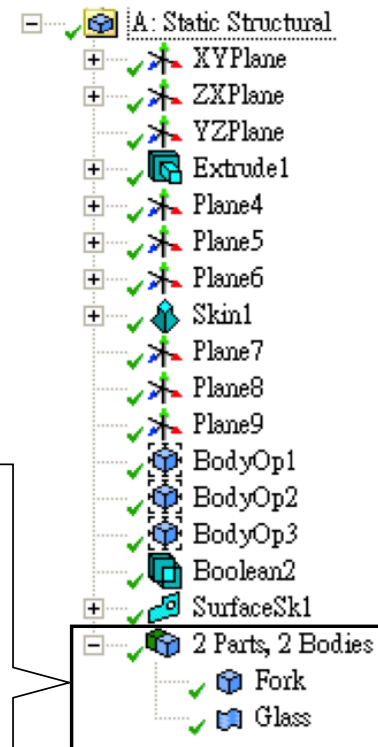
- Selection Filters
- Extend Selection
- Selection Panes



## Bodies and Parts

- A **body** is entirely made of one kind of material and is the basic building blocks of a model.
- A 3D body is either a solid body, a surface body, or a line body.
- A **part** may be a collection of bodies. All bodies in a part are assumed to be bonded together with one another.
- In **Mechanical**, parts are meshed independently
- A model may consist of one or more parts.
- In **Mechanical**, connections (contacts, joints) among parts must be established to complete a model.

This is the only geometric entities that will be attached to **Mechanical** for simulations.



## Features

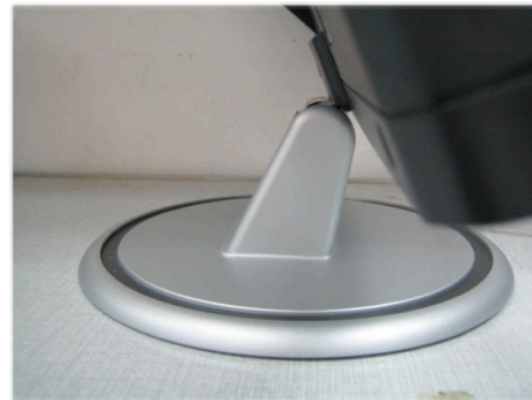
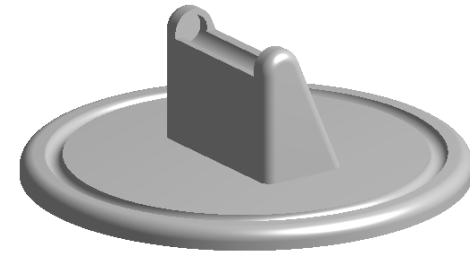
### Features

- Based Features
  - Extrude
  - Revolve
  - Sweep
  - Skin/Loft
  - Surface
  - Lines
  - Point
  - etc.
- Placed Features
  - Thin/Surface
  - Blend
  - Chamfer
  - etc.
- Planes
- Operations
- etc.

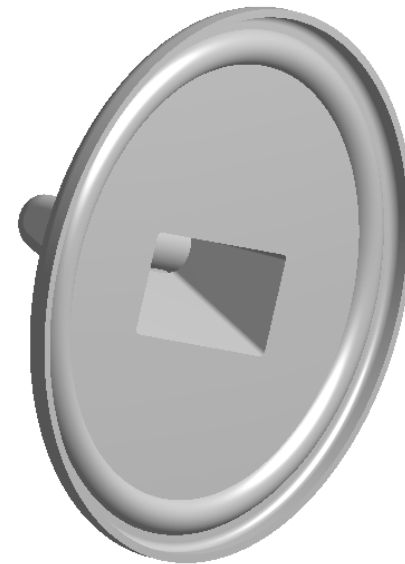
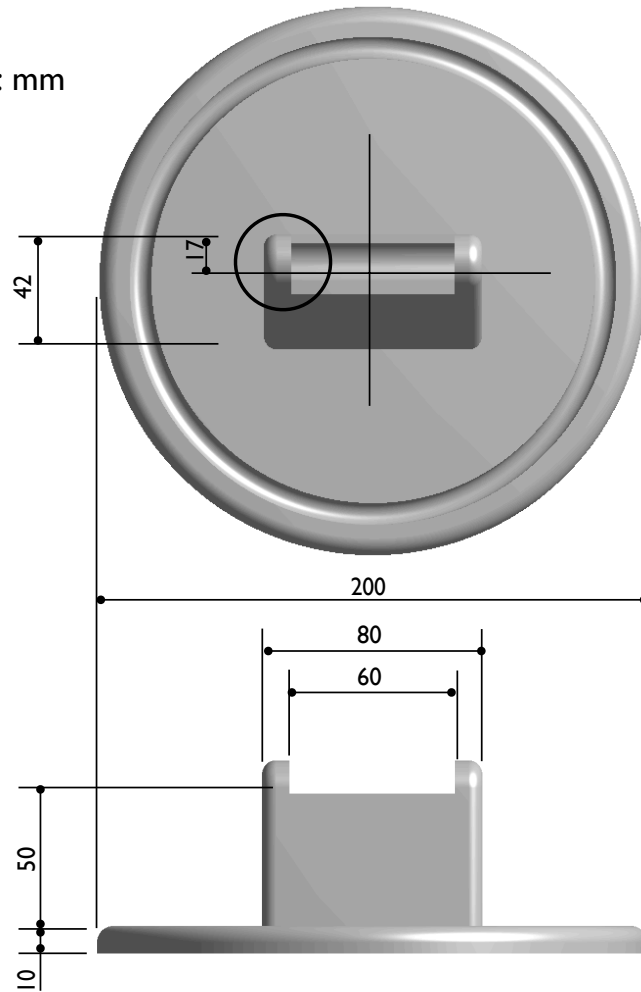
# Section 4.5

## LCD Display Support

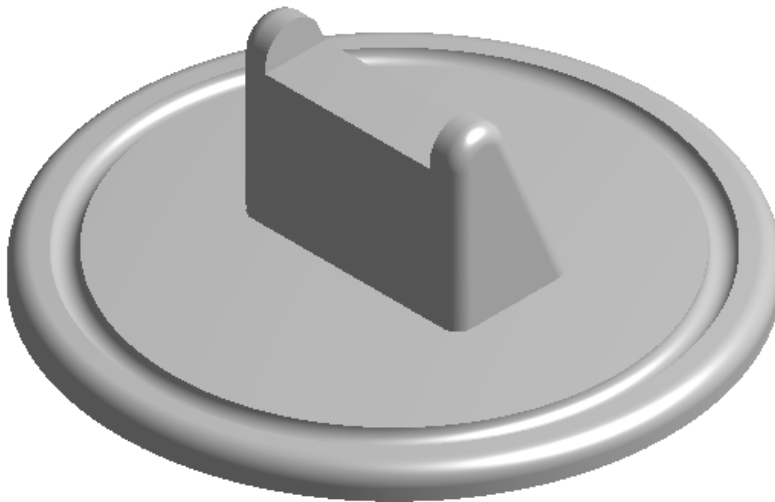
### Problem Description



Unit: mm



## Techniques/Concepts



- Revolve
- Skin/loft
- Thin/Surface