N4 SOLID TEAM

WEEK 3 REPORT

This week’s objectives

1. CAD design of casting tools
2. Design the experiment for determining burn rate exponents (a & n
3. Machining of bulkhead in preparation for hydrostatic pressure test (HsPT)
4. Drafting purchase request and justification
5. Inventory management
6. Justification of mandrel design
7. Sourcing a local supplier of 6061 T6 Aluminium

1. CAD design of casting tools

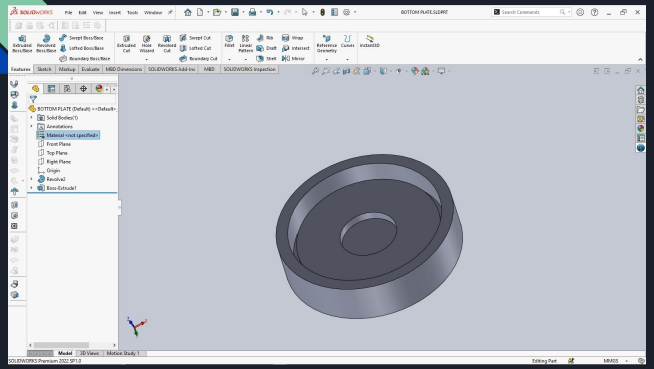


Fig 1: Bottom plate (Do = 106 mm)

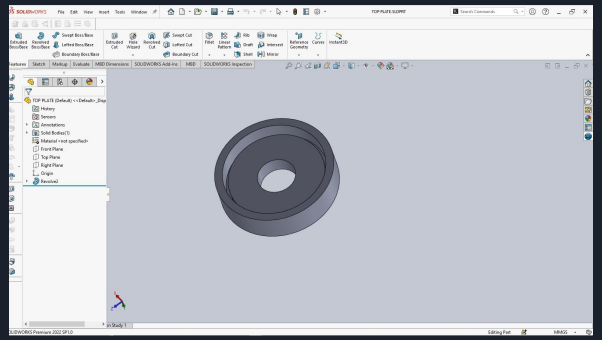


Fig 2: Top plate (Do = 106 mm)

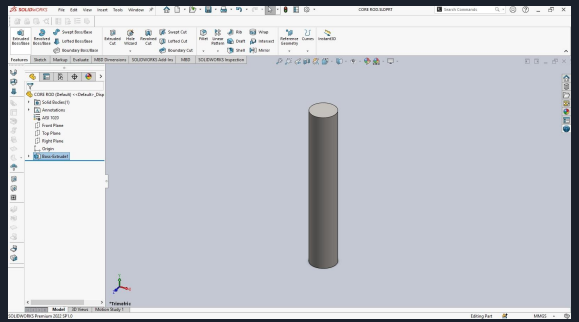


Fig 4: Core rod (Do = 33 mm, L = 200mm)

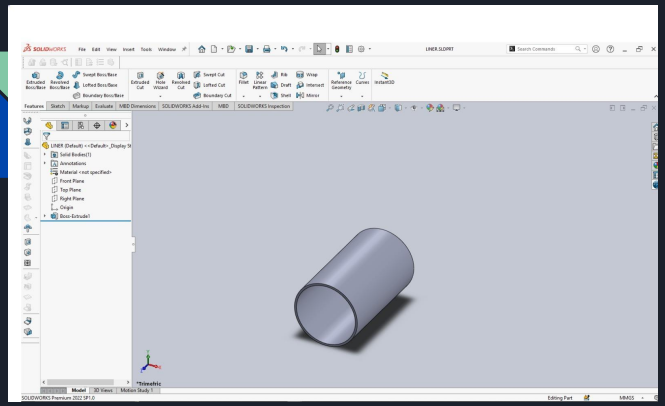


Fig 4: Liner (do = 86 mm, Do = 92 mm, L = 156.66 mm)

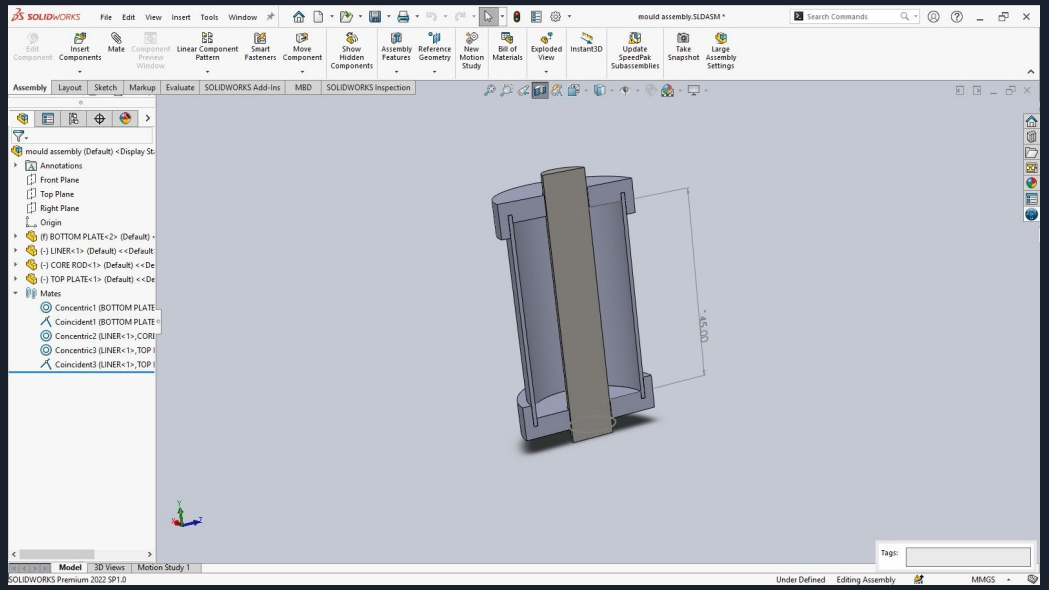


Fig 5: Mold assembly

2. Design the experiment for determining burn rate exponents (a & n)

- We came up with a plan and preliminary for this procedure. It follows Nakka's simplified method

3. Machining of bulkheads in preparation for HsPT

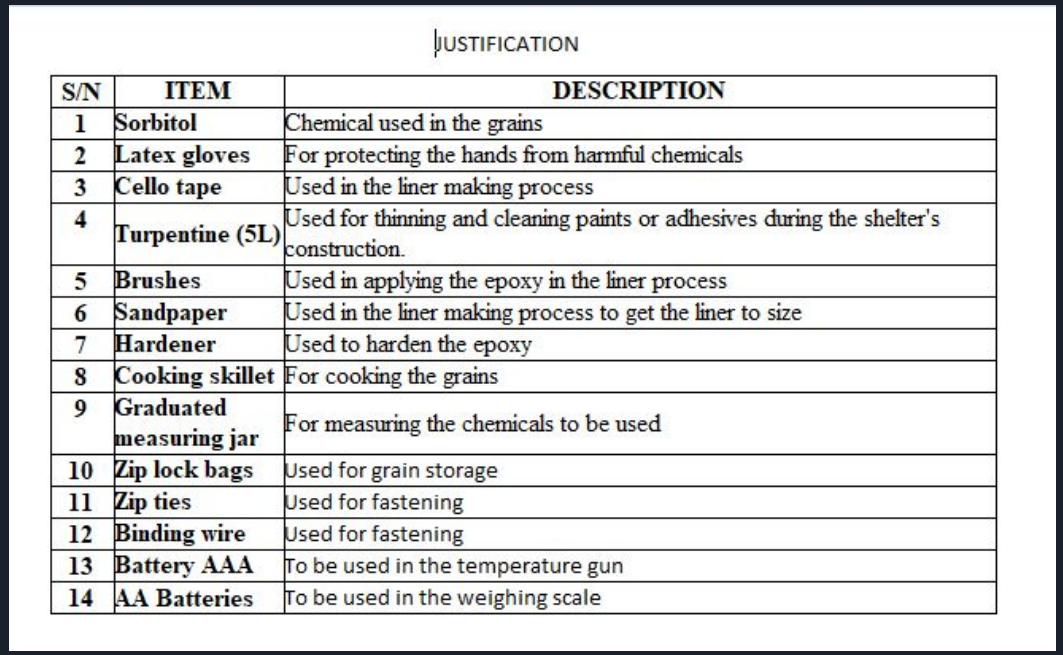
- We will be machining 2 bulkheads: 1 with grooving remaining) and the other boring is ongoing

Fig 1: Bulkhead cut to dimension

Fig 2: Turning of bulkhead

4. Drafting of the purchase request & justification

- This is in preparation for acquisition of important supplies and equipment.



JUSTIFICATION

S/N	ITEM	DESCRIPTION
1	**Sorbitol**	Chemical used in the grains
2	**Latex gloves**	For protecting the hands from harmful chemicals
3	**Cello tape**	Used in the liner making process
4	**Turpentine (5L)**	Used for thinning and cleaning paints or adhesives during the shelter's construction.
5	**Brushes**	Used in applying the epoxy in the liner process
6	**Sandpaper**	Used in the liner making process to get the liner to size
7	**Hardener**	Used to harden the epoxy
8	**Cooking skillet**	For cooking the grains
9	**Graduated measuring jar**	For measuring the chemicals to be used
10	**Zip lock bags**	Used for grain storage
11	**Zip ties**	Used for fastening
12	**Binding wire**	Used for fastening
13	**Battery AAA**	To be used in the temperature gun
14	**AA Batteries**	To be used in the weighing scale

Fig 1: Screenshot of Justification

5. Inventory management and Housekeeping

- We all know that a project's success will be determined by the quality of the housekeeping.
- We developed an inventory spreadsheet that will track our equipment and storage items.

Fig 1: Members discussing housekeeping

Fig 2: Wooden cabinet organized

6. Justification of mandrel design

- This is in line with the grain dimensions (Do = 86 mm and L = 145 mm)
- We can make 5 grains easily with this design

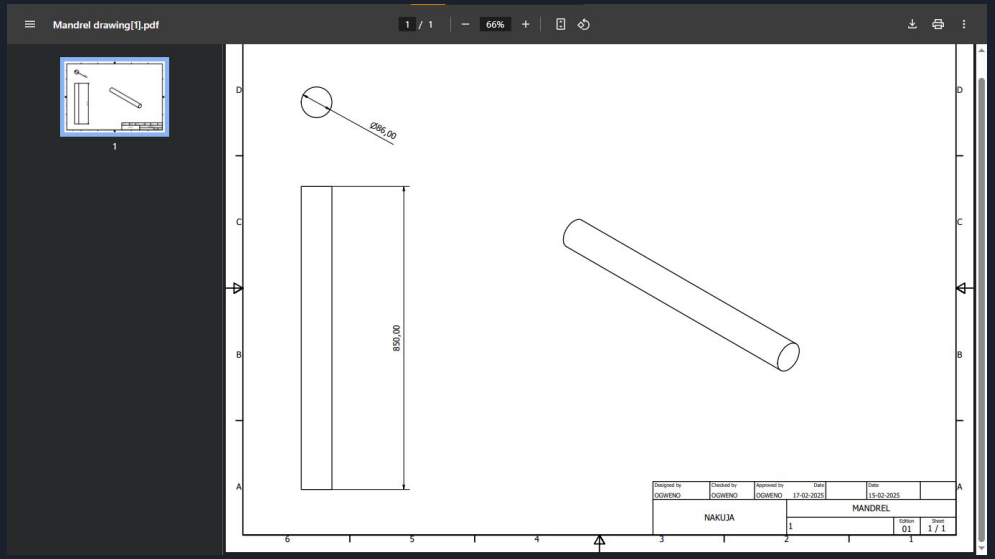


Fig 1: Mandrel design

7. Still sourcing a supplier of Aluminium T6.

Next week’s objectives

1. Start implementing the burn rate exponent (a & n) test
    - CAD design of casing (1 grain)
    - Cutting of 2 casings (1 grain)
    - Finalize CAD design of casting tools and 3D printing of grain molds.
2. Finalize machining of bulkhead in preparation of HsPT
3. Fabrication of mandrel
4. ProPEP simulations of grains
5. Sourcing a local supplier of 6061 T6 Aluminium


THANK
YOU