

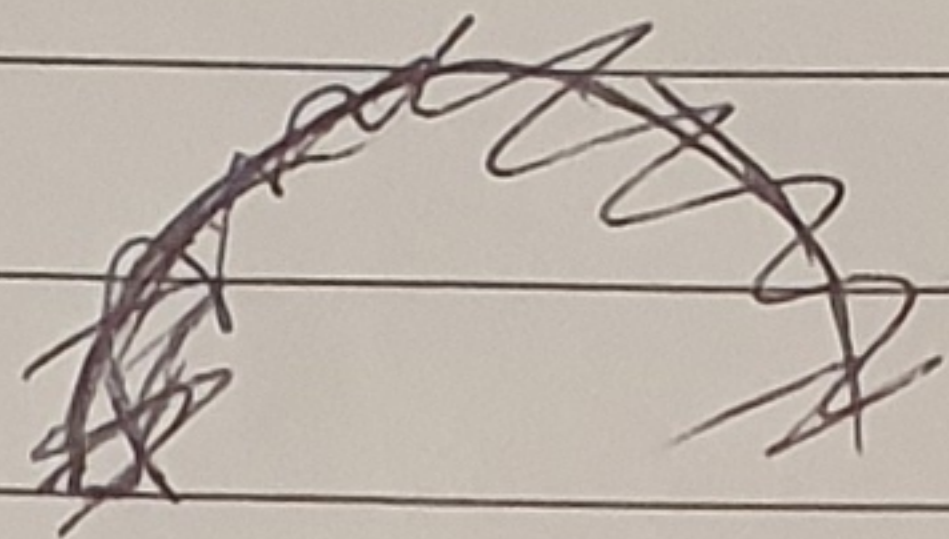
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Full module title and code: CAE and stress analysis

Date and time: Thursday 7th May 20, 1:00pm

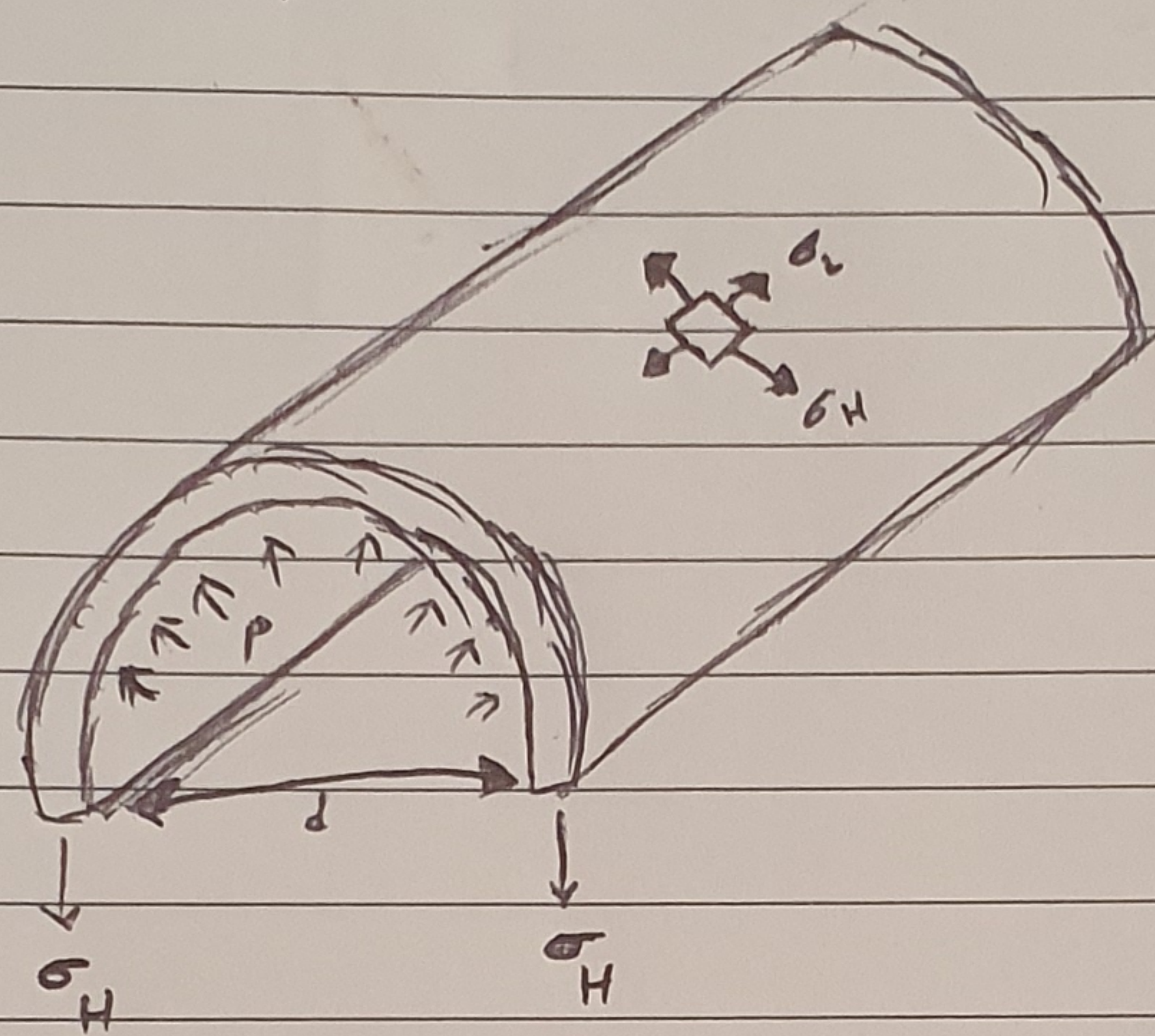
Number of pages: 3 pages

~~Q1, A1~~



$$\sigma_h = \frac{Pd}{2t}$$

Q1, A,



Force in the cylinder : $= P \times \text{Projected area}$
 $= P \times dL$

Total abusive force $= 2\sigma_H \times Lt$

$$\therefore F_{\uparrow} = F_{\downarrow}$$

$$PdL = 2\sigma_H Lt$$

$$\therefore \sigma_H = \frac{Pd}{2t}$$

The thin cylinder is going to have a very narrow diameter, so in terms of the factor that the structure of the micro structure is there is much less materials to bond the materials together. so there will be more chances of weakness.

c) The density of the sea water is:

~~1028~~ $1.0280 \text{ m}^3/\text{kg}$

or

1028 g/cm^3

d) $P = \rho gh$, P = Pressure, ρ = density, h = height

$d = 1.3 \text{ m}$

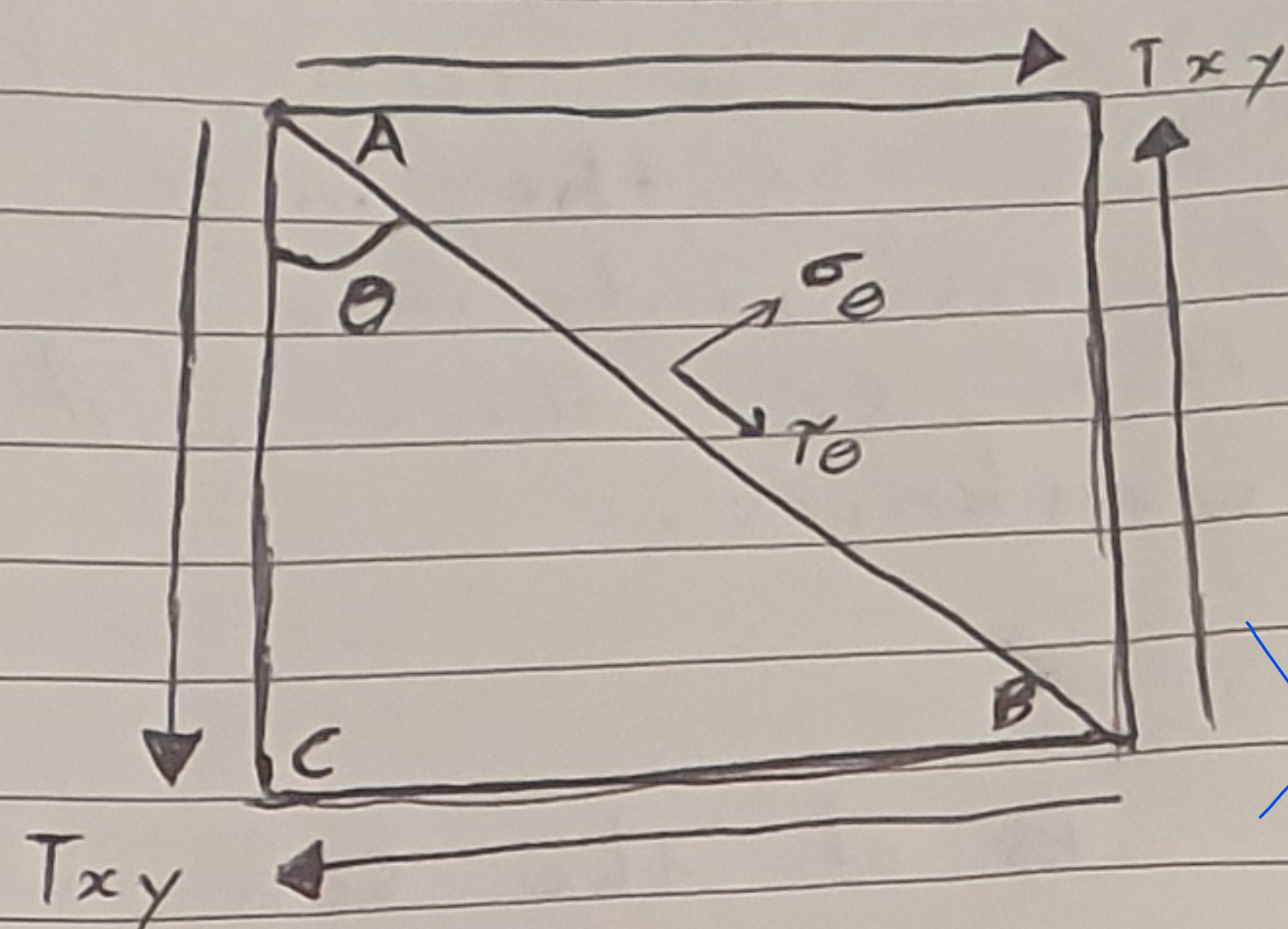
wall thickness = 1.3 mm

↓ convert to

$1.3 \times 10^{-3} \text{ metres}$

height (depth) =

Q4 a,



$$\begin{aligned}\sigma_{\theta} &= T_{xy} \sin 2\theta \\ &= 47 \times 10^6 \sin(0.03) 68 \\ &= \underline{111.54 \times 10^6 \text{ MPa}}\end{aligned}$$

Q2, a,

- A. **Split**, The first step that needs to be undertaken is to split the geometry down into finite elements. So that mathematical assumptions can be made from one element to the next.
- B. **Interpret**, In order to be able to receive a reasonable result in a reasonable amount of time the geometry needs to be approximated.
- C. **Material**, Once the part has been broken down and meshed up, the material information needs to be added. This will determine if the linear or non-linear solver may be used.

D. ~~Set~~ Physical property, If 1D or 2D elements are used, then physical property information needs to be added to the model.

E. Loading, Once the above information has been added to the FE model the solver will be able to calculate the stiffness from the matrix for the structure. From this, a set of ~~simultaneous~~ simultaneous equations can be obtained.

