Purpose and Performance DEN126 Design Studio Project 3.1
March 2021

Brief: Water Timer

Necessary item: 1 ping-pong ball

Design Studio Project 3 is a group project. This product should be a "fun" design object. You all need to take the role of a mechanical engineer and a mechanism designer for this project. You will be placed in a team of 3-4 students to design a "water timer" – see DEN126 QMPlus week 6 block for your team. Your designed product must ensure that the water either directly, or indirectly via other use mechanisms, **moves** a ping-pong ball to indicate a 15-second time lapse.

The design process will be organised and managed by each team. Each team must agree on one final design after exploring suggestions from all team members. This design will then be built and presented independently by each student, so these will differ according to e.g. available material, attention to detail etc.

This is a formative project, i.e. no marks will be directly allocated after the presentation. However, students are expected to include this project – or a revised version based on feedback (whether within the group or from the examiners) – in their end-of-year portfolio (worth 40%).

A student who is judged to not have contributed to the group design process will not be allowed to include their group's piece in their portfolio – attendance and contribution will be recorded. They will instead have to design a different water timer, and include this in their end-of-year portfolio. Failure to engage sufficiently in the group project, or failure to include a water timer in the portfolio will impact the portfolio mark.

Requirements

- The time indicator ball should move from the starting point to the time indicating point/event in an interesting and exciting manner, showing a clear time lapse of 15 seconds.
- The mechanical system should be designed and constructed according to the following maximum dimensions 400mm x 400mm x 200mm (note: not the maximum volume).
    - As part of the video, see below, you will need to show, e.g. with a rule or tape measure, the measurements of each dimension
- Each team design can have a maximum of 1/2 litre of water and a ping-pong ball. This ball cannot be modified
- You are allowed to use potential energy of the water only. You are not allowed to e.g. freeze or heat the water and no pump or motor or any use of electricity is allowed.
- All the materials you use to construct this product should be reused or recycled materials. Do not buy any material (other than a ping-pong ball if necessary) for this project.

- The system should be designed in such a way so that timings can be repeated, reusing any water.
- The product should be visually intriguing and all the components should be made to a high standard.
- Pouring the water is the only interaction that you can have with the water timer. An independent timer cannot be used to aid this.
    - All the water must be poured in one go, with the timer starting from when all water is in the system. Pouring the water cannot be used to control the flow.

All of the studio contact time is essential, attendance is mandatory.

Dates:

March	Tues 2	Start project 3
March	week 7: SEMS Reading Week. While there are no SEMS taught sessions in week 7, students are expected to use some of this time to catch up on material, continue work etc. Teams should arrange meetings to share ideas during this week	
March	Tues 16	Each team outlines concepts made by each member
March	Weds 24	Video uploaded to QMPlus by 10am
March	Thurs 25/Fri 26	Individual presentations (30 seconds)

Video Submission:

- max 1 minute, max 50MB, .mov or .mp4
- you must show the measurement of the 3 dimensions (max)
- this should show close-ups so a viewer can see any mechanism etc.
- **you <u>must</u> demonstrate the water timer working, showing the exact time taken**

Presentation:

- you need to show the water timer, explain decisions, the process
- state the time achieved
- outline any problems and how you would solve these
- (if time) outline any improvements before including in the portfolio
- you will not have time to demonstrate the water timer working