ELPID

E-learning Platform for Innovative Product Development

PROCESS GUIDELINES

Introduction to 3rd Phase

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AGENCY FOR MOBILITY AND EU PROGRAMMES

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Meeting 3.1 – Introduction to Phase 3

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Details

- Deadlines – report for phase 3 and presentation in front of companies
- Checkpoints – 7 major checkpoints
- Other important dates
- Meetings schedule overview

Deadlines

- Report delivery for phase 3 → 29th of May 2020
  - Detail design and components
    - We need to deliver:
      - The CAD files
      - The final report
      - The presentation
- Interactive oral presentation → 4th of June 2020 (7min + 20min)
  - Detail design and components
    - We need to deliver:
      - BOM and
      - Exploded view
- Final workshop presentation → 10th of June 2020 (10min + 10min)
  - We need to deliver:
    - A video how our product works
    - The final product rendering

Checkpoints

Due date	Checkpoint	What must be done?
13th of May	1st checkpoint	Concept finalization, finished functional decomposition and functional requirements list, finished morphological chart, evaluating alternatives based on requirements, establishing the architecture
15th of May	2nd checkpoint	Assign requirements to each module, identify components and subassemblies in each module (what needs to be bought, what needs to be made), creating tasks list, determine schedule of events
16th of May	3rd checkpoint	Assigning team members to theirs tasks (based on survey results)
24th of May	4th checkpoint	Roughly finished subassemblies, components and calculations
28th of May	5th checkpoint	Completely finished subassemblies and calculations
3rd of June	6th checkpoint	BOM + exploded view
9th of June	7th checkpoint	Video how product works and product rendering

Other important dates

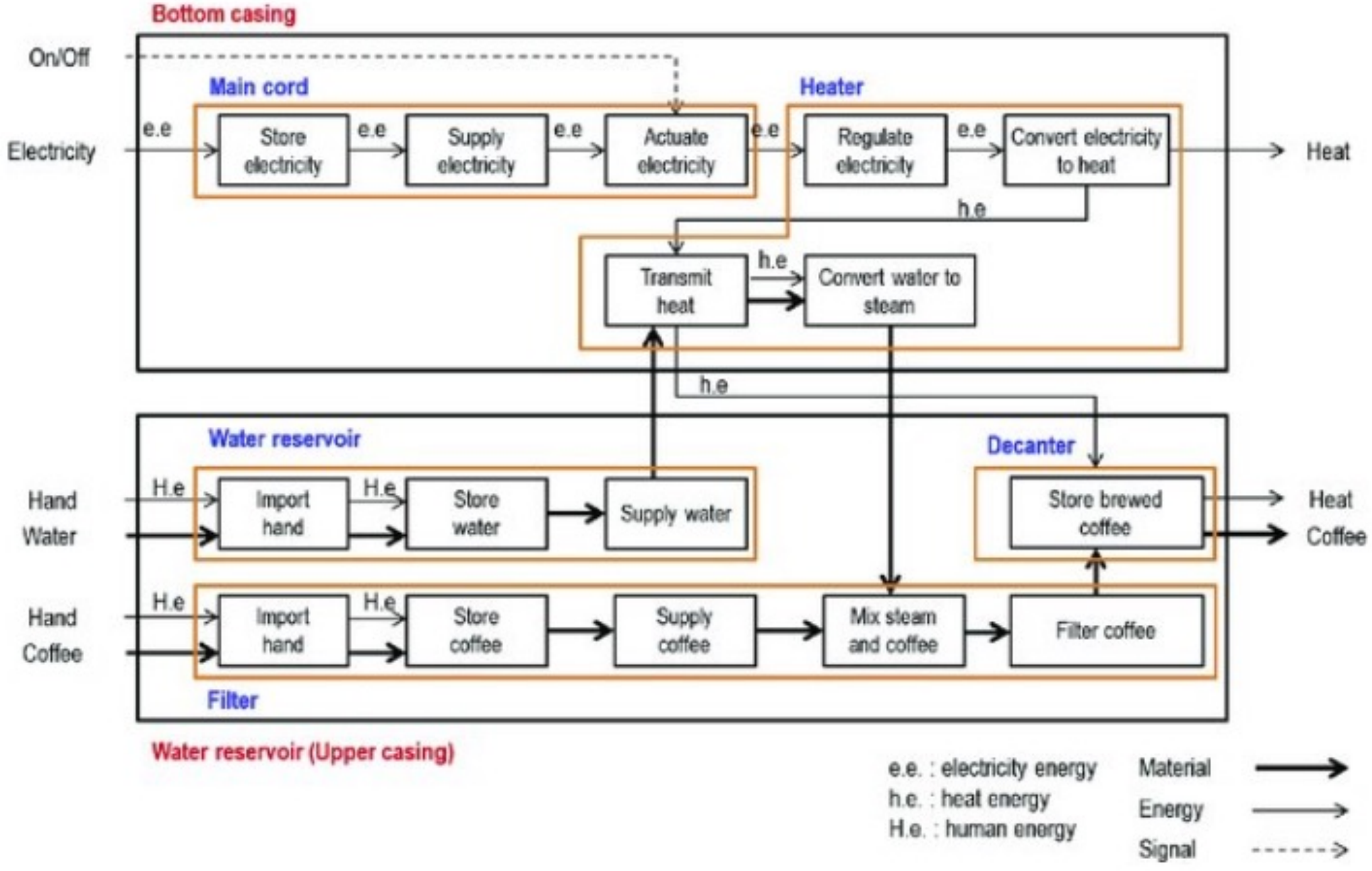
- Start report writing – 25th of May
- Start working on PowerPoint presentation – 26th of May
- Sending first presentation version and first version of report to Nikola – 27th of May
- Finalizing report and presentation based on Nikola’s comments – 28th of May
- Report and presentation delivery – 29th of May
- Creating Bill of Materials and Exploded view – 29th of May
- Creating product’s video and its rendering – 5th of June

Meeting schedule overview – the first draft	
Meeting 3.1	9th of May
Meeting 3.2	12th of May
Meeting 3.3	13th of May – weekly meeting on Wednesday
Meeting 3.4	18th of May – small meeting for presenting and solving problems
Meeting 3.5	20th of May – weekly meeting on Wednesday
Meeting 3.6	23rd of May – status report meeting, discussing main major problems
Meeting 3.7	27th of May – weekly meeting on Wednesday
Meeting 3.8	3rd of June – meeting before interactive oral presentation (Electrolux and Rold)
Meeting 3.9	6th of June – status report meeting, discussing problems
Meeting 3.10	9th of June – weekly meeting on Wednesday; the last meeting phase 3; meeting before the final workshop presentation

Concept finalization

- Electrolux’s and Rold’s guidelines
- Concepts overview
- Finalization – we need to establish process
- IoT? – smart system

An idea for storage tank

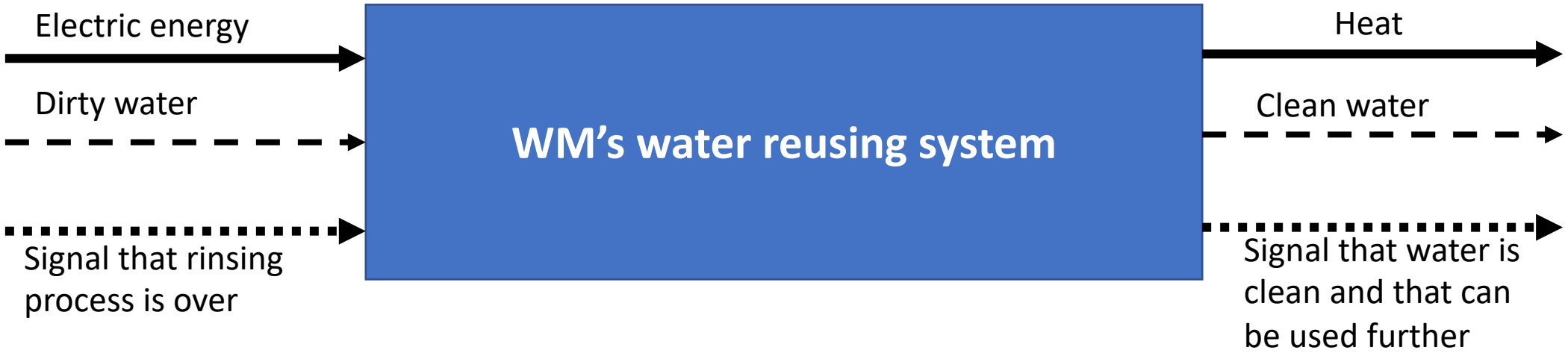

Bottom casing
On/Off
Main cord
Heater
Electricity
e.e
Store electricity
Supply electricity
Actuate electricity
Regulate electricity
Convert electricity to heat
Heat
h.e
Transmit heat
Convert water to steam
Water reservoir
Decanter
Hand Water
H.e
Import hand
Store water
Supply water
Store brewed coffee
Heat
Coffee
Hand Coffee
Store coffee
Supply coffee
Mix steam and coffee
Filter coffee
Filter
Water reservoir (Upper casing)
e.e. : electricity energy
h.e. : heat energy
H.e. : human energy
Material
Energy
Signal

Functional decomposition (1)

- What is main goal?
  - To understand product’s process from the beginning to the end
- Should not contain every detail, but product must be defined with fully understanding its process
- 15 to 20 functions (30 max)
- Define flows of energy, material and signals/information
  - Creating a legend is mandatory
  - Input and output must be initially defined

Functional decomposition (2)

- Two ways how to start
  - Start from one function you are sure you know (e.g. filter water from bigger particles and try to figure out which inputs are needed and which outputs you have and start building network)
  - Try to think on more abstract level (one major black box with inputs and outputs – after defining inputs and outputs try to imagine: „hmm, okay, I have untreated water on the input as material, where I should move that water and with which energy, do I need some signal that water is in the system?...”



Assigning functional decomposition task

- 2-3 members
- First version 11th of May in the evening, final version 12th of May in the morning
- We need to find as much functions as possible, considering that we still don’t have feedback

Brainstorming session (10 min)

- Which functions our product has?
  - Store water
  - Prevent biofilm
  - Detect water quality (detergent, dirt, suspended solids)
  - Detach dirt from water
  - Controlling the system
  - Feedback system
  - Filter water (maybe we could divide this function)
  - Measure the water level
  - Kill bacteria
  - Move the water
  - Actuate pump
  - Actuate valve
  - …

Functional requirements list

Helpful questions:

- What might happen to the product?
- What kind of state might it find itself in?
- How might be treated and used?
- How should the product react?
- How should dangerous situations be avoided?

Google sheet

Functional requirements list

- Every team member must participate
- Be specific as much as possible
- Due date 11th of May (8pm)

Morphological chart

- After we get first version of functional decomposition, we start immediately with creating and finding solutions (name + figure)
- Each team member will be assigned to one or more functions (spend half an hour per one function max.)
- Due date 12th of May
- 1 person to create a morphological chart

Next meeting (3.2) – 12th of May

- When? It’s Tuesday
- We will go through requirements list and see which alternatives are best – basically we will do evaluation according to our requirements list
- Concept finalization based on Electrolux’s and Rold’s feedback
- Cluster the functions into modules (I’ll provide presentation with explanations at the beginning of the meeting)
- Identify the fundamental and incidental interactions

Don’t forget on Onshape

https://learn.onshape.com/

I recommend to take „Onshape Fundamentals: Data management” course

1 course with 6 topics – each topic lasts 30 minutes

I’ll put a link from this course on Trello (due app. 16th of May) just as a friendly reminder – it’s not mandatory

Overview

- Trello cards with due dates
- Tasks will be assigned
- Presentation will be uploaded to each card
- Your outcome should be under the Trello card
- Google Sheet links should be there
- Commenting on functional decomposition is mandatory
- Short survey about identifying team skills

Don’t forget to fill in the questionnaires!
2nd phase for Nikola and team members

Questions, comments, suggestions?

References

- Kim, S., & Moon, S. K. (2017). Sustainable platform identification for product family design. *Journal of Cleaner Production*, *143*, 567–581. https://doi.org/10.1016/j.jclepro.2016.12.073
- Pahl, G., Beitz, W., Feldhusen, J., & Grote, K. H. (2007). *Engineering design: A systematic approach*. *Engineering Design: A Systematic Approach* (pp. 1–617). Springer London. https://doi.org/10.1007/978-1-84628-319-2