Machine Design

MEC-E1060 – Week 6

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9.10.2023

Aalto University
School of Engineering

Status

Zulip discussion board
- 54 students and 5 teachers

Status Survey Week 5
- 17 answers
- DL this Monday

FEM Report
- Earliest return Saturday 15:13
- Latest return Monday 0:40

Lectures

Week	Monday 10-12 @ K213a	Visiting lecturer
36	PLM in Industry	Tuomas Ruippo, Kone Oyj
37	MBS	Milla Vehviläinen, VTT Oy
38	Design Automation	Harri Taskinen, Evian Oy
39	FEM in Industry	Tuomo Kuusi, Entop Oy
40	Case from Industry	Niko Tapanainen, Bluefors Oy
41	Cases from research and education	Panu Kiviluoma, Aalto University

Group Work

Topic	Deliverables	DL
Preliminary Design	Analyzed case chosen, requirements list, and free-body diagram	10.9.
Mechanism Analysis	Multi-body simulation model of the concept MBS models, results, and plan how to validate	24.9.
Strength Analysis	Updated geometry of the concept FEM models, results, and plan how to validate	8.10.
Detailed Design	Selected machine components (bearings, motors etc.) Final assembly with updated geometry	15.10.

Detailed Design Tasks

Based on previous phases (for ex. requirements, MBS simulations) select suitable machine components and materials for your product from manufacture's catalogs

- Bearings, actuators, gears, cylinders etc.
- Justify why these components were selected
- Select also suitable lubricants for your product

Calculate lifetime of one selected component (for ex. bearing)

Render a picture and a video of your mechanism

- Rendering program can be selected freely

Analyze how the final product meets the requirements set in the preliminary design phase

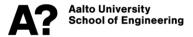**Describe your design process and how the computer tools supported it**

Create BOM (Bill of Material) with picture and balloons as appendix

- Include selected components and lubricants

Calculate a rough cost estimate of the final product

- Both components and labor

Learning outcomes from both this phase and from the course, and self-evaluation

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Detailed Design Report

(DL 15.10.2023)

Returnables (2 pcs)

- A PDF report to containing all detail design tasks/phases.
- A rendered video of the mechanism.

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