

Selecting Production Processes with CES EduPack: it helps if you know a bit more

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Content

- Introducing our university and school:
40 years of industrial design engineering excellence
- The CES Edupack and our curriculum:
where and how do we use it
- Production processes:
how we teach about them, and why we know our approach works
- Closing words:
towards a better structure for production processes?

Delft University of Technology

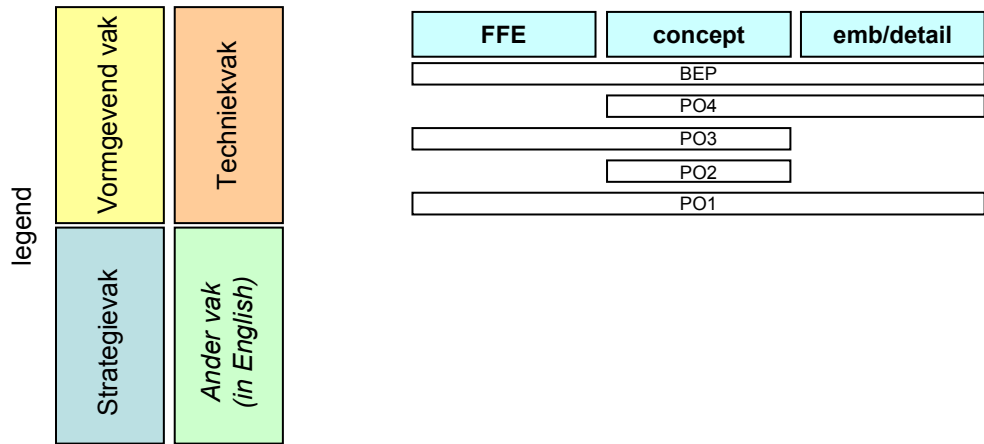
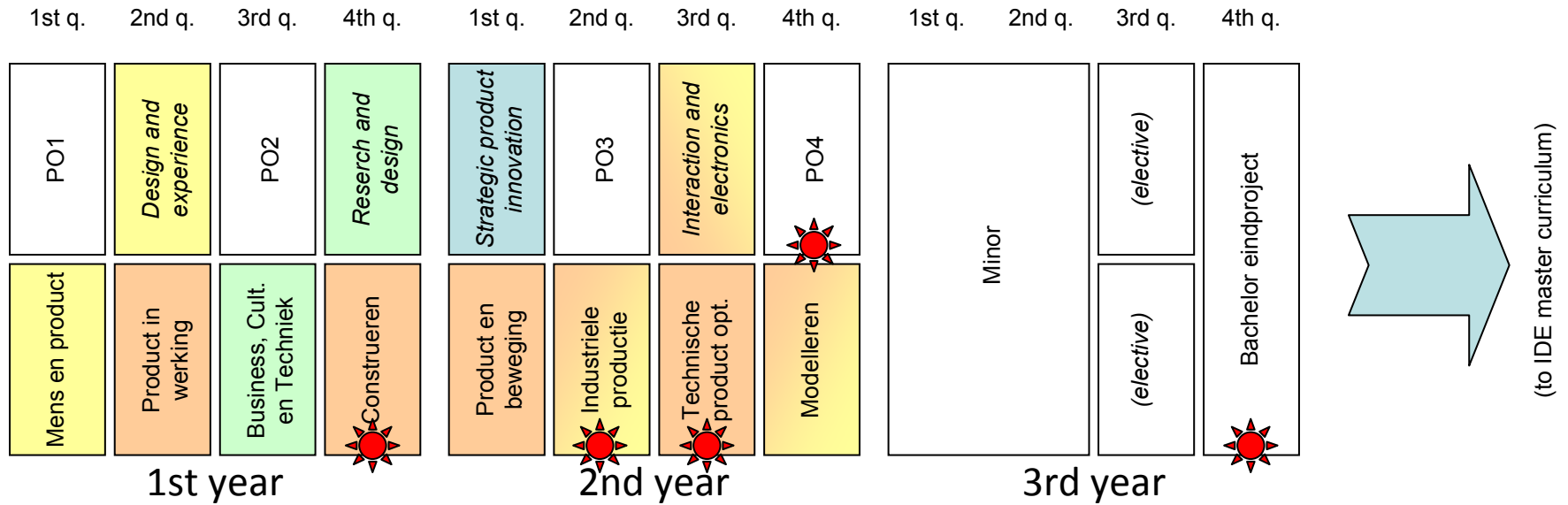
- Established in 1842
- Over 15,000 students in 14 BSc and 41 MSc programs
- 2750+ academic staff, 200+ PhD's per year
- Eight schools: AE, AS, A, CEG, EEMCS, **IDE**, 3ME, TPM

School of Industrial Design Engineering

- Established in 1969
- Leading in education: 300+ BSc and 200+ MSc per year
- Leading in research: 50+ PhD students
- Broad industrial network with 4100+ alumni



The CES Edupack and our curriculum



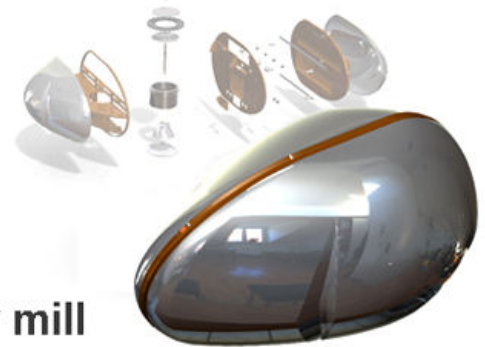
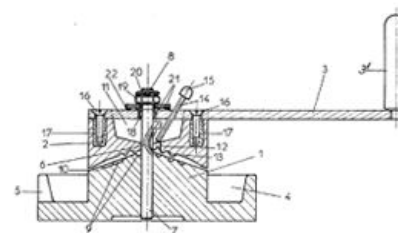
Current IDE bachelor program

one block = 7.5 EC = 210 hrs

= CES used here

Production processes: how we teach them

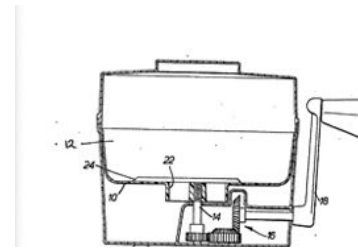
- 1st year course: structural design
lectures + design assignments with increasing complexity (mathematics, statics, mechanics, materials, production processes, + integration)
- 2nd year course: industrial production
lectures + projects. Key: not 'a little bit of everything' but in-depth coverage of a small number of processes (incl. joining + assembly)
- 2nd year design project: PO4
focus on embodiment design



Hand operated flour mill
© IO1010 Group 41 FWD

Production processes: why we know it works

- Typical first-year mistakes with CES:
 - selecting 'drilling' as process for 3D plastic shapes
 - extruding *everything*, including tool steels
 - designing a solid 5 x 30 x 60 cm injection moulded part
 - etc, etc.



Why we know it works: research project

- What we did:
comparing the performance of PO4-student with and without prior knowledge from 'industrial production'
- How we did it:
student surveys, staff interviews, grade analysis. Two-year period, average of 240 students/year
- What we found:
9% grade point difference (... plus many ways to improve the course!)

Full details: "Strengthening the link between theory and practice in teaching design engineering: An empirical study on a new approach",
Int. J. of Technology and Design Education (in print)

Closing words: towards a new structure? ^{1/2}

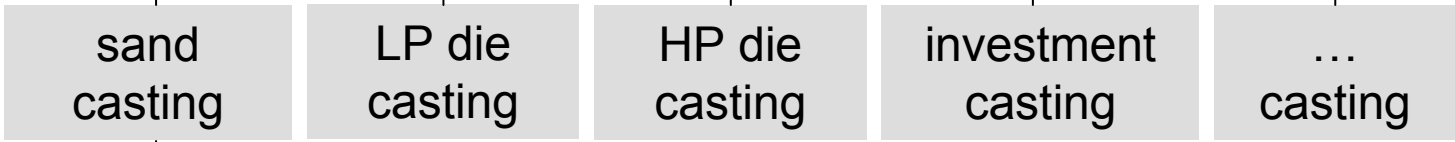
PRODUCTION PRINCIPLE

concept

metals casting

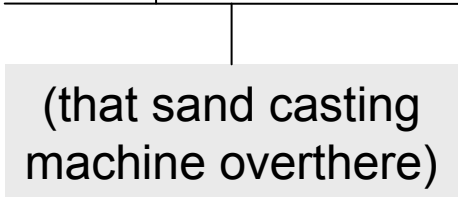
PRODUCTION METHOD

embodiment



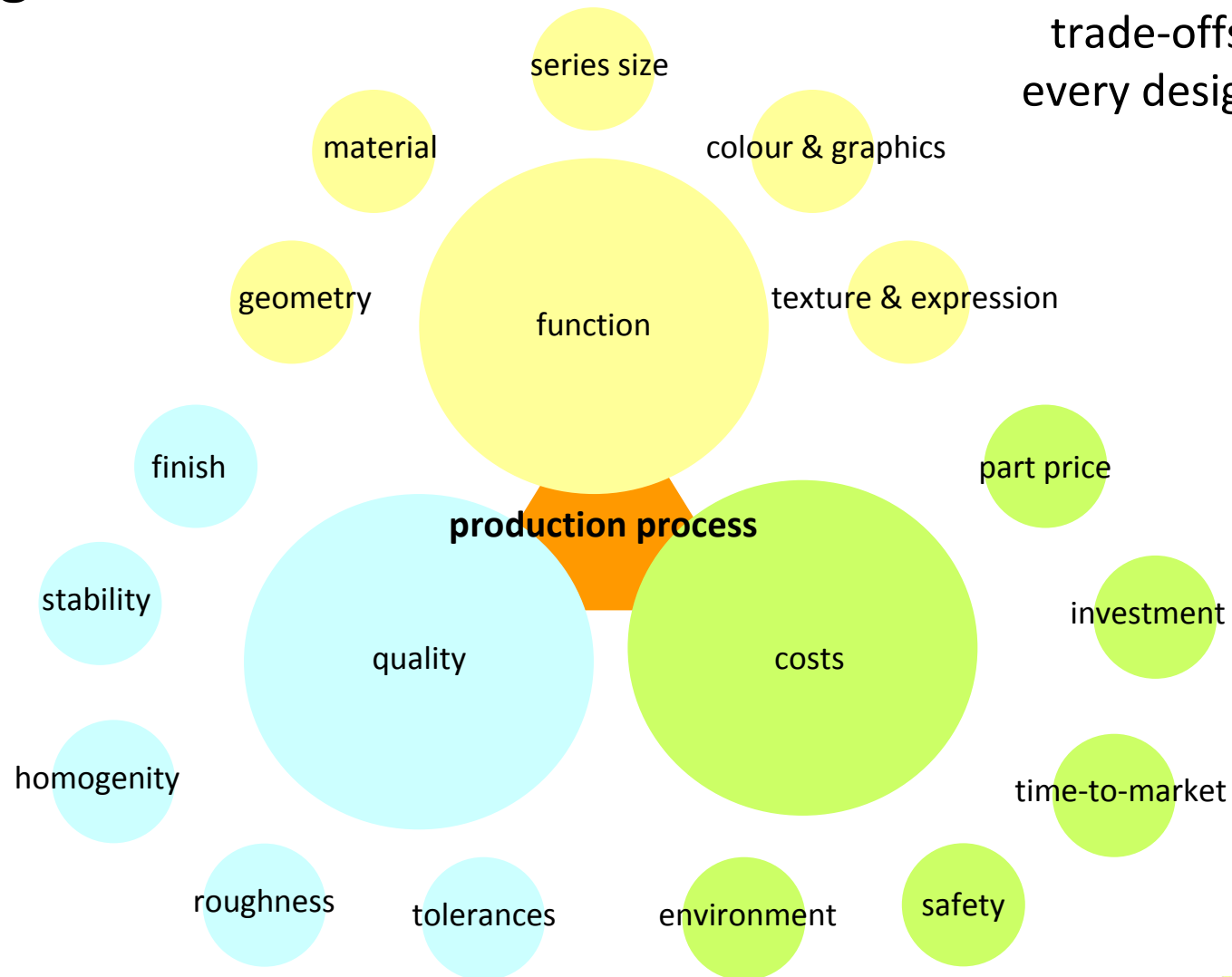
PRODUCTION EQUIPMENT

detail



Closing words: towards a new structure? 2/2

trade-offs during
every design phase!



Questions, anyone?

PS: make 'tolerances'
size-dependent please!

