



**FACULTY
OF MECHANICAL
ENGINEERING
CTU IN PRAGUE**

Continuous education as a success factor of strengthening the company competitiveness

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Main megatrends influencing manufacturing in Europe



Strengthening physical production for manufacturing independence on other regions; and concurrently green transition

Population ageing, retirement of whole generation of skilled people; and concurrently digital transition.

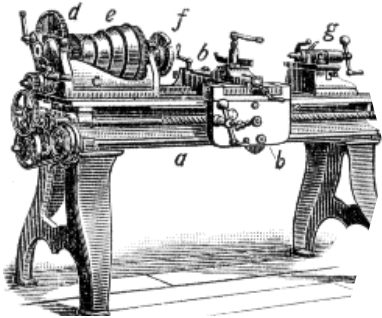
Increasing complexity of production processes and also whole supply chains.

Challenging situation for all types of companies related to the manufacturing.

Example: development of machine tool concepts

- All types of production machines (machine tools, forming machines, robots etc.) have been in every period key enabler of innovations for higher effectivity, productivity and quality of production.

since 19. century



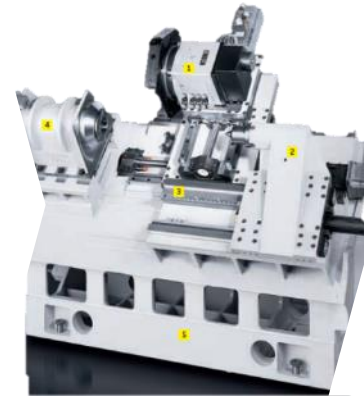
mechanical devices, fully manually operated

since 50s of 20. cent.



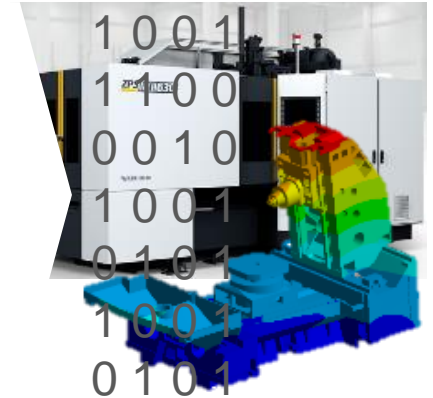
electromechanical devices with numerical control

since 90s of 20. cent.



mechatronic devices with numerical control and additional SW

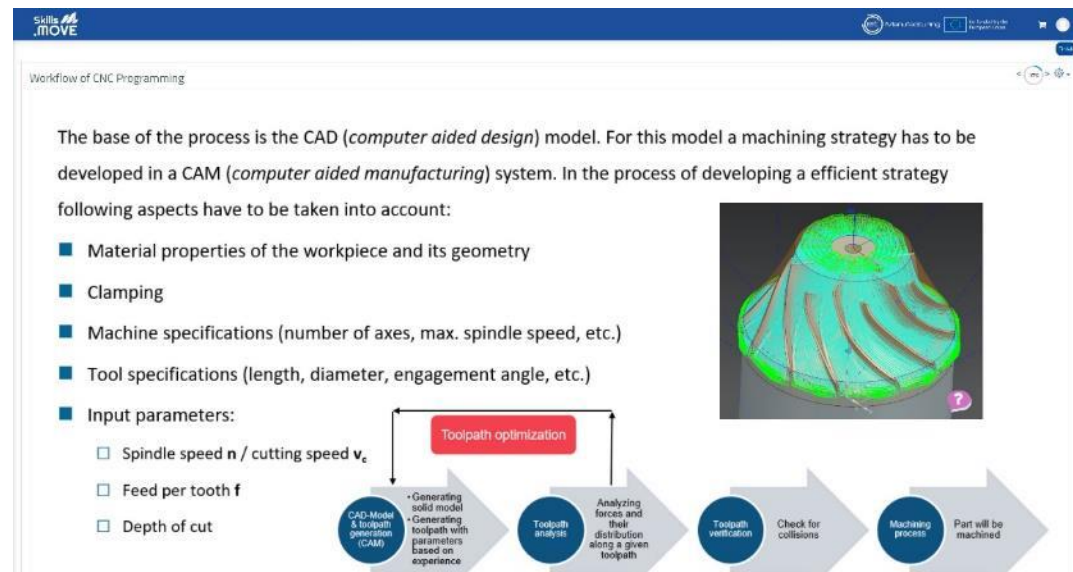
since 10s of 21. cent.



cyber-physical devices with numerical control and digital twin

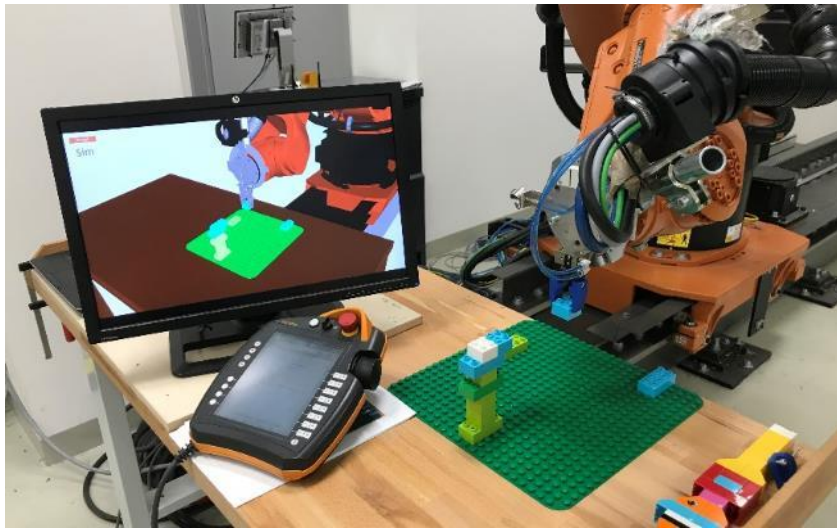
Continuous education as key enabler of success

- The world of technologies is developing very fast. The continuous learning of people in industry is necessary to follow the speed of changes to stay competitive.
- Concurrently, the university curricula is updated. The students have a chance to feel the realistic company challenges. The solution approaches are beneficial for both sides.
- EITM consortium is developing the SkillsMove platform as a central knowledge resource and key part of future business in education. The education is not just virtual using offline data, but also hybrid with real process experience.



ManuLearn

- **Scope of the project:** Strengthen innovation capacity of participating EIT RIS Countries by improving remote educational schema with Teaching and Learning Factories, boosting soft and digital skills and supporting gender balance within the manufacturing sector. Consortium of 4 countries.
- **Project results:** Realisation of 6 Teaching and Learning Factory projects and 3 webinars or workshops for at least 100 participants in total.
- **Implementation:** 32 master students attended national Learning factory on machine tool precision, international teaching factory challenge on production improvement and webinar on robotics, with the support of 2 companies.



Pathfinder

- **Scope of the project:** The PATHFINDER project aims at developing new hybrid teaching methodology combining synchronous and asynchronous learning and on-site and online teaching. This methodology is tested by teaching of advanced machining topics such as digital twins, cryogenic cooling, cutting process parameters optimization etc. in 4-module pilot course.
- **Project results:** 45 nuggets created and distributed in 6 learning paths and used in 1 course divided into 4 standalone modules
- **Implementation:** 60 master students and company specialists attended a training course in total duration of 80 hours (all 4 modules combined)



FlexMan

- **Scope of the project:** Implementation of courses focused on new team buildings within companies. Teams capable of supporting the implementation of I4.0 digital technologies and solutions for flexible and resilient manufacturing that will mitigate emerging risks in supply chains and global markets. Consortium of 4 countries.
- **Project results:** training of 64 employees from 8 companies in the first year 2022 and 96 employees from 16 companies in the second year 2023 of the project.
- **Implementation:** 33 specialists from 5 companies attended 2022 CTU transformation program in total duration of 48 hours. Viable business model for universities.

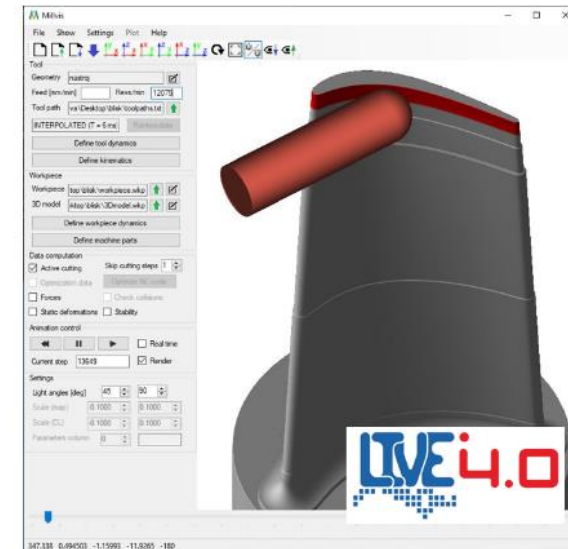
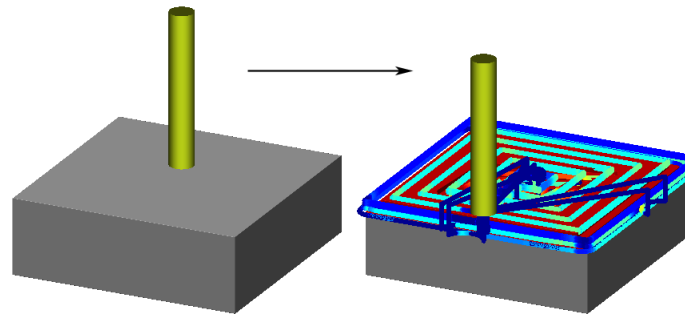


LIVE 4.0

- Scope of the project:** The LIVE4.0 project aims at improving SMEs' education in the machining field promoting a better use of Industry 4.0 instruments, such as technological digital twins, AI and big data, cutting process parameters optimization and stability prediction etc. This project provides learning materials and courses to teach the skills required to use them.
- Project results:** 30 nuggets created and distributed in 9 learning paths and used in 6 courses and webinars
- Implementation:** 5 company specialists attended an intensive training course in total duration of 25 hours, 30 company specialists attended a webinar in total duration of 2 hours (CTU only, totally ca 250 attendants of all project courses combined)

NC machining verification by simulation of digital twin

CTU in Prague, RCMT



CAMplus4.0

- **Scope of the project:** The aim of the project CAMplus4.0 is to develop an interactive training program for professional manufacturing engineers, to empower them in the field of CAM / NC-Code simulation and optimization methodologies. The project addresses a growing skills gap in manufacturing industry. The developed course supports the up- and reskilling of the current and future workforce for a strong manufacturing base in Europe.
- **Project results:** Developed 5 learning paths and 20+ learning nuggets in the field of CNC technology and CAD/CAM. Interactive training program for machining experts developed to broaden the horizon towards simulation and optimization methodologies
- **Implementation:** 8 company specialists (TU Wien), 16 company specialists (CTU), for 80 company specialists (hybrid event)



EITM Doctoral School

- **Scope of the project:** Parallel education for Ph.D. students in Innovation and Entrepreneurship ending with EIT-M labeled certificate. 7 partner universities
- **Implementation:** 11 Ph.D. students (3 from CTU) in regular 2-years program, average 9 external Ph.D. students and researchers admitted for individual events (Designe Sprint and Hackathons, Summer School, Winter School, online events)



Summary

- Continuous education is a success factor of strengthening the company competitiveness in the world of fast technology development.
- Within EITM activities, a various novel education schemas have been developed and successfully implemented in pilot cases. The results shows big potential in education collaboration between industrial companies and academia.
- It seems also to a successful business model for involved universities.



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