Simulation of laser-based welding in the automobile and machine tool sectors

COMPANIES

Lasersystemtechnik Bollinger & Ohr (**LBO**) is an SME founded in 1999, specialising in laser-welding technology.
Lauer & Weiss (**L&W**) is an expert in the development of software solutions for the automobile and machine tool industry.

THE PROBLEM

Many components of automobiles and machine tools are welded elements which suffer thermally-induced stress in the manufacturing process, resulting in flaws. The impact of these flaws on the durability of components has to be assessed.

SUCCESS STORY DETAILS

HPC provider: HLRS
Domain Expert: L&W, HLRS
Country: Germany
Link

THE HPC PROBLEM DOMAIN

There are few, if any, simulation tools to model welding processes. This is because such processes are highly complex and difficult to observe. Accurate simulations require significant computing power due to the non-linear behaviour of materials and the highly transient conditions. These imply high levels of discretisation, resulting in very large models.

THE SOLUTION

Lauer & Weiss (L&W), an expert in the development of software solutions for the automobile and machine tool industry, has developed a simulation of laser-welding processes based on the commercially available **ABAQUS** package.
The resulting large model requires significant compute resources, which have been made available by the cloud-based HPC resources from HLRS.

THE BENEFITS

Using cloud-based-HPC simulations for welding trials, L&W can generate a significant cost reduction of ca. **€40K EUR per year**. For each new client like LBO, L&W sees a further benefit of €20K to €30K.

Design inspiration NCC Austria

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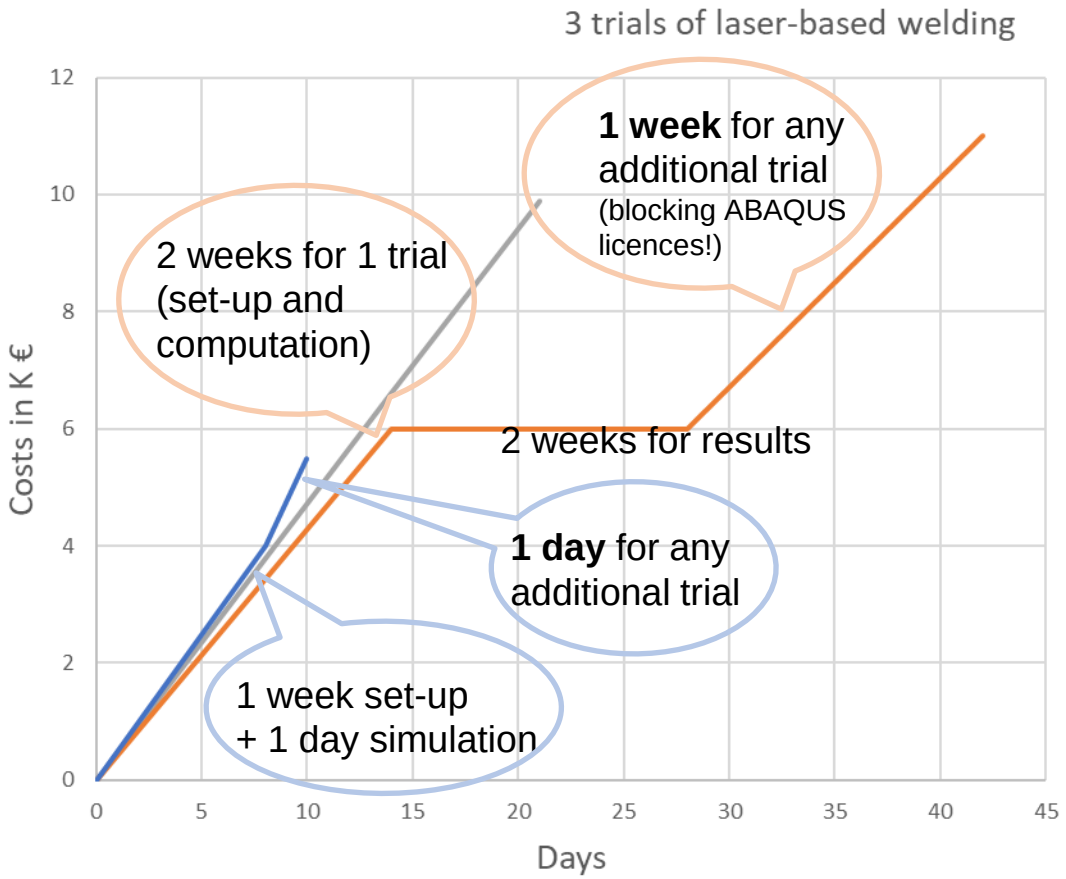

Physical trial at LBO

Simulation at L&W

Simulation at L&W and HLRS