

Cloud-based design of ultra-clean containers for high-purity chemicals

Fortissimo Experiment Facts:

- Industry Sector: **Manufacturing**
- Country: **Germany**
- Software Used: **MpCCI**



ORGANISATIONS INVOLVED

RIKUTEC is a German company which is a leading developer and manufacturer of high volume blow moulded containers.

Fraunhofer SCAI (Germany) is a non-profit R&D institute which provided the expertise in software development.

Hagen Stiftung and Hagen Engineering, both from Germany, are domain experts in plastic parts and blow moulded articles.

Accuform is a Czech software manufacturer. One of their products is the process simulation software B-SIM.

Gompute (Sweden) provided the HPC resources and expertise.

THE CHALLENGE

Extrusion blow moulding is the standard manufacturing method for hollow plastic parts such as bottles, cans, fuel tanks and large containers. A specific example is ultra-clean containers for the microelectronic device industry.

Companies that manufacture these products need faster, more reliable, and more efficient design methods.

Before this experiment, automated optimization was not possible. The individual design and simulation steps had to be carried out manually. The simulations were performed on standard workstation systems, with one single design loop taking up to 2 days.

THE SOLUTION

The partners have developed a standardized and automated workflow incorporating different simulation tools so that manual intervention is no longer necessary. This involved extension to the multi-physics interface software MpCCI from Fraunhofer. Through utilization of cloud-based HPC and parallelization of the simulation, the time required to create a new design can be reduced significantly.

The combination of this new workflow and the use of HPC means the automated simulation of blow moulded parts is possible for the first time.

As a result, the development times have been shortened and more design variants can be tested in the same time. Additionally, expensive physical moulds are needed less, and material usage is reduced, further lowering the cost of manufacture.

Fortissimo Experiment Partners:

- Rikutec (End User)
- Fraunhofer SCAI (HPC Expert)
- Accuform (ISV)
- Hagen Stiftung (Application Centre)
- Hagen Engineering (Engineering Service Provider)
- Compute (HPC Provider)

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BUSINESS IMPACT

RIKUTEC will benefit from this experiment as it will have access to more reliable and more efficient design methods with faster response times. The number of (physical) design loops can be reduced, and the quality of products is enhanced. Through the application of simulation methods, substantial cost savings have been made in the development process.

Hagen Engineering will use the experiment results to expand its market position as a provider of simulation services. It expects more companies to use CAE-methods in the design process of plastic parts in the near future, so access to an automated, integrative CAE workflow will make them more competitive.

The extension of its multi-physics software solution will help Fraunhofer to find further customers in the plastic moulding domain. Over the next 2-3 years Fraunhofer expects 5-10 new users with licence revenues of €30,000 to €60,000 per year. In the medium term, Fraunhofer expects to see a rapidly increasing market for integrated manufacturing simulation solutions. Interface tools like the MpCCI Mapper will benefit from that market growth.

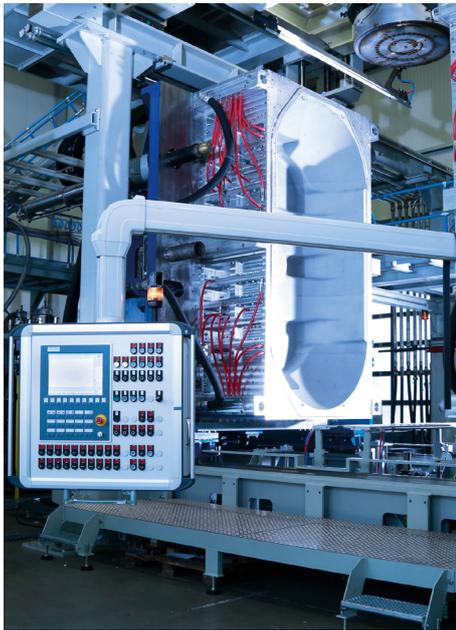
BENEFITS

For RIKUTEC, the benefits are:

- Reduced costs for each design loop can amount > € 20,000.
- Optimization of item weight could reduce the total costs by several thousand euros per year.
- Through the utilization of HPC, computation times are shortened by a factor of 4x – 5x.

THE FORTISSIMO PROJECT

Fortissimo is a collaborative project that enables European SMEs to be more competitive globally through the use of simulation services running on a High Performance Computing cloud infrastructure. The project is coordinated by the University of Edinburgh and involves more than 100 partners including Manufacturing Companies, Application Developers, Domain Experts, IT Solution Providers and HPC Cloud Service Providers from 14 countries. These partners are engaged in over 90 experiments (case studies) where business relevant simulations of industrial processes are implemented and evaluated. The project is funded by the European Commission within the 7th Framework Programme and Horizon 2020 and is part of the I4MS Initiative.



I4MS Fortissimo is part of I4MS ICT Innovation for Manufacturing SMEs: www.i4ms.eu



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