6 MARKET AND MANAGEMENT   **Simulation**

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More Complex Tasks, More Easily Solved?

The Future of Simulation: Questions and Answers at the Moldflow User Meeting "Connect!"

The injection molding simulation becomes more comprehensive and precise, starting with the material data up to the prediction accuracy. As this year's Moldflow User Meeting has shown, Autodesk Moldflow can link with more and more CAD programs, significantly increasing the benefits of predictive results. What does this mean for the simulation engineer? Dr. Franco Costa, Development Manager Autodesk Moldflow Simulation Codes, and Thomas Wittmann, Managing Director of PEG GmbH, Darmstadt, Germany, dare to look ahead.

T he last presentation of the Moldflow User Meeting "Connect!" in Frankfurt Höchst, Germany, which was organized by MF Software GmbH, Darmstadt, Germany, at the beginning of June, traditionally belongs to Dr. Franco Costa. The title Senior Research Leader for Autodesk Moldflow Simulation Codes is adorning his business card. He did not only give a forecast, concerning the innovations of the upcoming releases, which will be improved thanks to users' feedbacks at many points – such as tiger strip prediction, sink marks in 3D or API solver extensions – but also gave examples about the design of Moldflow in the Autodesk CAD environment with reference to the Fusion 360 system, which can be used in a cloud with an access to many different programs, without purchasing licenses and from any connected PC worldwide (**see Interview page 8**).

This fits in perfectly to the overview in the welcome speech, given by Seth A. Hindman, Senior Manager Product Strategy & Management at Autodesk, where he clarified, in what connection Autodesk will put the simulation in "World Class Manufacturing Solutions". The name Moldflow is in the same line with companies such as Delcam (CAD/CAM software solutions for production), Magestic Systems (draping software for carbon structures) and Netfabb (software for additive manufacturing), to manage offering flexible solutions for future tasks with the help of networks.

Fig. 1. More precision: Susanne Kugler from Bosch uses the Developer Tool in the Solver API to optimize prediction accuracy with the help of extensions (© H.-J. Rottig)

André Hau of MF Software followed up on these remarks and listed the partner firms of the company in Darmstadt. Among others there are cooperation's with e-Xstream engineering (Digimat), Trexel (MuCell), gom (component measurement), recently also with Beaumont Technologies (material tests, Therma-flo, MeltFlipper) and Volume Graphics (evaluation software for industrial computed tomography). Moldflow product manager Rahul Patil reveals the goal in his contribution "4th Industrial Revolution": the cross-linking of all persons and programs involved in the product development process.

Multi-Purpose Use: the API Interface

No other Moldflow user meeting before had shown to this extensiveness the scope of the development of the simulation software or which details can be considered and individualized, so that sometimes outside of the lectures arose the question of an "overview" or the "end of the flagpole". During the breaks many participants sought direct contact with the cooperating companies. A total of 24 workshops in two rooms were offered parallel to 20 lectures; the decision was not always easy, although overlapping of topics was mostly avoided. In addition to foam injection molding, gas injection technology and the processing of glass fiber reinforced materials, the main topics were API interfaces, which played a role in three presentations.

Susanne Kugler from Robert Bosch GmbH demonstrated a self-generated solution how to use the Developer-Tool in the Solver API, to simplify the coupling of flow phenomenon and user-defined fiber orientation, in order to improve the

prediction accuracy (**Fig. 1**). Paul Borger and Bartlomiej Piotrowski, BSH Haus-geräte GmbH, were more down-to-earth and used the application programming interface Synergy API to automatically manage Moldflow projects, also for archiving and evaluating large models for report generation. That could be a pioneer model.

Hours instead of Days

The company Novo Nordisk will also find followers. Rasmus Knudsen has demonstrated remarkable success in the standardization of simulation projects, and this, as the heir of the "Moldflow veteran" Mogens Papsoe emphasized, is also necessary, considering the volume of the Danish medical supplier. He intends to increase the current number of 150 Moldflow analyses per month by a factor of 10 and reduce the simulations' processing time from two days to two hours at an average (**Fig. 2**).
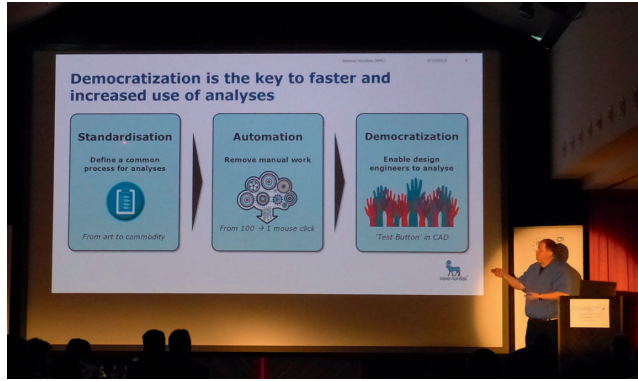
Fig. 2. According to Rasmus Knudsen, product development at Novo Nordisk takes too long. He wants to drastically reduce simulation processing time with a new tool from MF Software
(© MF Software)

MF Software Managing Director Sven Theissen comments on this improvement in efficiency: "We used the Synergy API and created a program called 'Gate and Go', so that the designer can use Moldflow without having to run it". The handling of the user interface is easy and fast to learn, but the highly productive software works in the background. "Standardization and automation produce democratization," sums up Rasmus Knudsen with a beaming smile. This will be a path for the future of simulation engineers as well: comprehensive standardized processes on the one hand, and a few, but demanding developments for specialists on the other.

Distribution of Work

It is no wonder that with these experiences at the tenth event of the "Con- **»**

Five Questions to …

… Dr. Franco Costa, Senior Research Leader for Autodesk Moldflow Simulation Codes, Autodesk, Inc.

Dr. Costa, this year's Moldflow Meeting "Connect!" has shown, that simulation is getting evermore complex. More and more solutions, that are easy to manage, are desired. How does Autodesk intend to reconcile?

Costa: Our company cooperates with many institutions and major industrial concerns worldwide. Just as development and design, simulation is a very complex issue, and the demands for accuracy and error-free design are constantly increasing. We invest a lot to achieve both goals: To capture and depict the greater complexity and to simplify usability of the software. Nevertheless, the gap between the opposing goals can only decrease slowly, otherwise we hazard inaccuracies and errors.

The Cloud Fusion 360 is teeming with CAD and simulation programs. One must be very well versed in it, to be able to look through it, right?

Costa: With Fusion 360, we want to bring together the data and models, that were previously isolated from each other in separate software products for design and simulation, into a single environment.

Do you want to create the allrounder?

Costa: We will improve the networking of the programs through feedbacks. The aim is, to make the entire process of part development, design and simulation easier and faster to use. To do this, the programs must work very well together.

And also the people who work with these programs?

Costa: Of course. The developer of parts must be optimally supported. He doesn't want to deal with simulation results, he just wants to know whether his idea is feasible. Ideally, he will be offered an alternative solution for the "no go".

Is the goal to minimize the designer's iteration steps, thus? Or even a fully automatic process?

Dr. Franco Costa (© Autodesk)

Costa: Exactly. The development of complex and high-quality products must proceed as quickly as possible. Full automation is a vision. But we are not there, not today and not tomorrow, and that is not our primary goal either. Since that means "rapid development of a product with high reliability in the quality, demanded by the customer". And only experienced people with reliable software and extensive databases, together with many people working on it, can organize this.

nect!" series during the private discussion sessions arose the following questions: How and who should use the higher performances and ancillary programs of Moldflow? More work for the simulation engineer? Or the designer? Can automated processes compensate or even minimize it? Can a specifically qualified staff take over a part of the work?

The topics at the eleventh User Meeting 2020 could respond the questions above. Sven Theissen has already got one of those answers: "In the Moldflow Academy, which our company recently launched, even experienced users can deepen their knowledge in specialist fields. PEG Managing Director Thomas Wittmann adds: "We are starting up a project of qualifying specialists, who will be able to understand complex tasks within the interconnected structure and the simulation and solve them in a team via the allocation of responsibilities. Thereby, the above-mentioned trend has reached Darmstadt as well: Autodesk CAD design and Moldflow simulation are growing together evermore.

Changes with Open Output

"Due to global trade conflicts it is difficult to predict how fast design and simulation in plastic injection molding will develop.

The market has not yet decided which companies whom and in what sector will employ, for example concerning the home office," says Thomas Wittmann. However, there are also obvious positive trends, for example in automation. The Synergy API still offers many possibilities here. A prototype for report generator has just been developed and released for free testing, that can save up to 50 % of time.

"The initial feedback has been very positive", says Wittmann and reveals another innovation: "Tolerance analysis parallel to the development ". This means an analysis that checks and evaluates all tolerances of a part already after the first simulation and before the mold. "One approaches the final mold in simulation steps and always has an eye on the tolerances," summarizes Sven Theissen, admitting that he is looking forward to the feedback at the Düsseldorf K fair in Germany. And who is doing the job? The answer comes fast: "Everyone, whom the commissioning company sends to us for training". ∎

The Author

Heinz-Jürgen Rottig is a freelance journalist for plastics engineering topics.

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