CUSTOMER STORY // PROCESS ENGINEERING

SIMULATION WORKFLOW BUILDING USING ANSYS EKM AND OPTISLANG

At MANN+HUMMEL, simulation teams implement optiSLang in ANSYS Engineering Knowledge Manager (EKM) to include CAE-based design optimization in the development of their filtration products.

Introduction

Simulation Management plays an important role in sustaining a high quality standard of simulation results. Apart from people and hardware management, in simulation workflows other challenging areas of software administration has to be considered regarding data, process, quality, as well as knowledge management. Having become aware of these requirements, ANSYS has already come up with a software solution called ANSYS Engineering Knowledge Manager (EKM).

At MANN+HUMMEL, as a leading global specialist, engineers in Filter element team use EKM workflows to improve the team collaboration and the management of projects by implementing engineering workflows formerly limited to CAD related ecosystems.

ANSYS Workbench can manage various levels of interfacing software with user-friendly drag and drop options. In CAE simulations, a lot of data has to be handled regarding cleaned up CAD, meshes, boundary conditions, result files, post processing and reports. Thus, it is also important to access data on a real time basis by synchronizing it across

servers at different locations. The storage of data should also be ensured in a structured way similar to a PLM database to enable a seamless collaboration.

Simulation Management at MANN+HUMMEL

The simulation management at MANN+HUMMEL includes data as well as process, workflow, quality and knowledge management aspects. Here, the fundamental task is to keep track of the project management regarding time, resources and quality requirement. Using EKM workflows, engineers can create GUI driven workflows, control all areas of simulation management and include other supporting software like optiSLang. Quality checklists have been integrated which help in quality audits and implemented EKM sections supports the engineer with knowledge management.

In ANSYS EKM, every step of the simulation process, such as geometry cleanup, meshing, setup of boundary conditions, running simulations, post processing or report preparations can be generated as a node and be used for different projects. EKM displays these steps as check boxes in its user
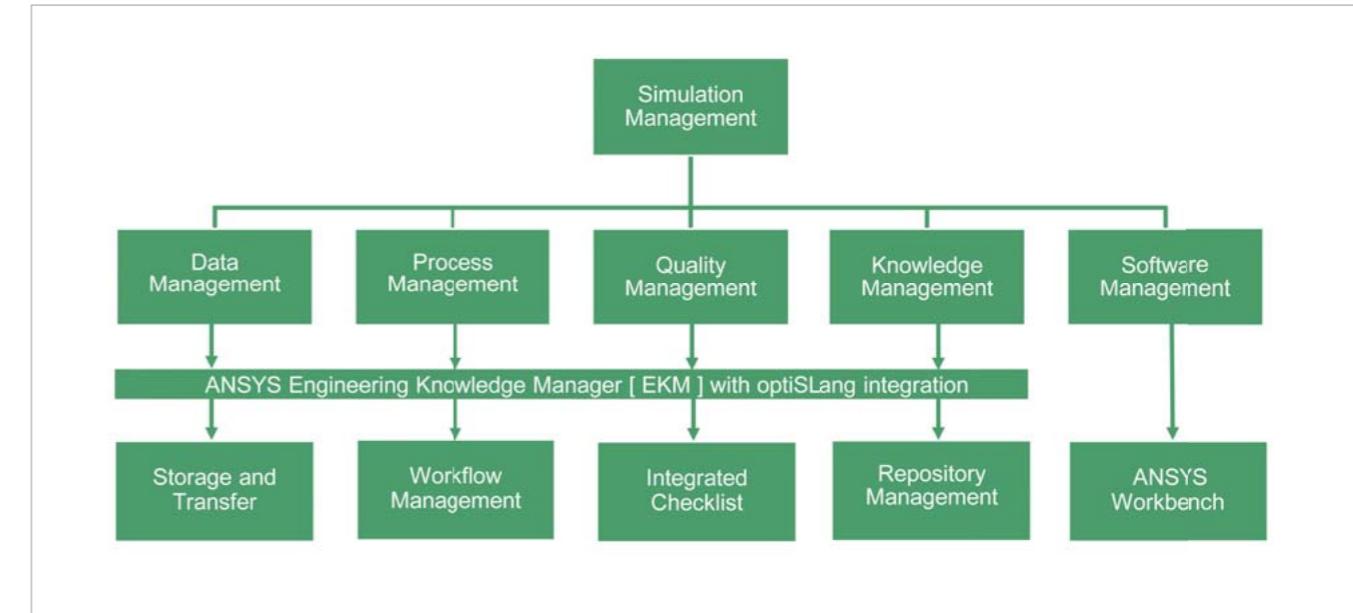

Fig.1: Simulation Management at MANN+HUMMEL

interface. Furthermore, engineers working on simulation projects can keep updating these workflows, which not only serves as a part of quality management for audit trials, but also shows the status of projects to all involved stakeholders.

The software optiSLang enables the integration of procedures of CAE-based sensitivity analysis, optimization and robustness evaluation into EKM workflows. Nowadays, design engineers do not only require simulation plots indicating whether an analyzed component fulfills design criteria or not. To meet the pressure of cost and time efficiency in product development, every engineer wants to know what can improve the design and to what extent a product is sensitive towards scattering conditions requiring more iterative design studies. Here, MANN+HUMMEL simulation teams see an opportunity of helping designers by running required design optimization studies with optiSLang. In recent times, at least 50 % of simulation projects have been subjected to sensitivity analysis to efficiently explore practical design solutions and improvements. This collaboration between simulation engineers and designers opens up further optimization capa-
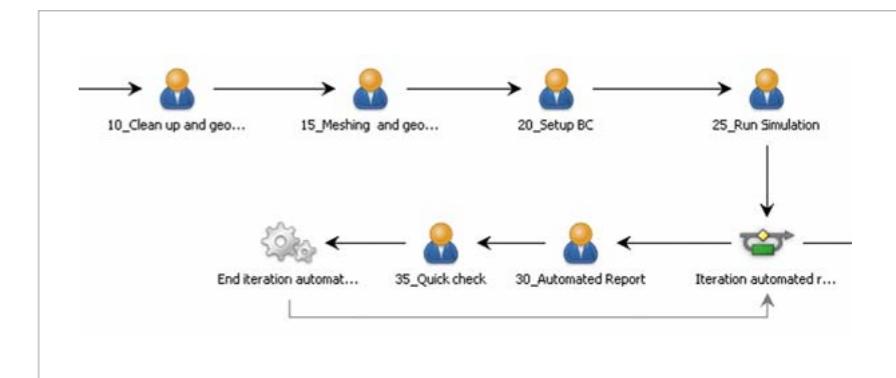

Fig.2: Creation of guided workflows in EKM

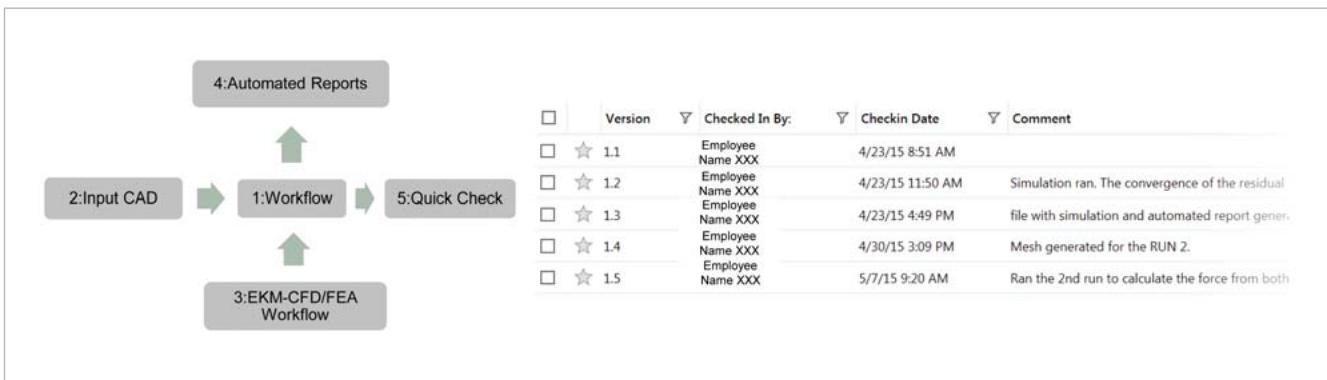Fig.3: Status control of workflows via EKM user interface

Fig.4: Meta data and version control

bilities by exploring larger design spaces. Furthermore, the resulting technical decisions save time and cost in proto- typing.

At Mann+Hummel, simulation teams not only help in virtual product evaluation, they also guide the product development through geometry optimization pointing out what param- eters can result in meeting complex design requirements. The output of optimization tools like optiSLang is extremely helpful for making precise design decisions. The sensitivity analysis supports the designers in time-constrained projects to identify efficiently relevant parameters with potential for optimization. The filter element teams at Mann+Hummel handle all simulation projects by using such workflows.

Future prospects

As a conclusion, CAE-based optimization is becoming a mandatory value adding activity in simulation studies and workflow modification. At MANN+HUMMEL, over the years,

the integration of parametric capabilities of ANSYS Design modeler and ANSYS Mesher has formed a strong base for optimization studies. Here, optiSLang can be used inside AN- SYS Workbench to enable strong roadmaps for optimization areas of any kind of CAE simulations. In the future, this will bring about an intensive collaboration between CAD/CAX, simulation, optimization, DOE environments, as well as re- spective databases. Thus, an iterative design process will be ensured which finalizes the design geometry before it is re- leased back to the CAD database. Completed manufacturing drawings will then be created with emphasis on modified workflows which can be easily implemented by optiSLang.

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