



Tetra Pak

Optimizing process solutions with Dymola

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Tomas Skoglund
Research Project
Senior Manager
Tetra Pak

Challenge

Tetra Pak needed to reduce costs by verifying that its process solutions work according to customer specifications before customer plant start-up.

Solution

Tetra Pak uses Dymola to develop tailored process solutions for customers and to validate their efficiency through simulation.

Benefits

Dymola has enabled Tetra Pak to reduce equipment configuration and delivery costs and improve the performance of its equipment.



Tailored solutions for each customer

Tetra Pak is the world's leading food processing and packaging solutions company. Working closely with its customers and suppliers, Tetra Pak provides safe, innovative and environmentally sound products that each day meet the needs of hundreds of millions of people around the world. Tetra Pak has over 20,000 employees and operations in more than 170 countries. The motto, PROTECTS WHAT'S GOOD™ reflects Tetra Pak's vision to make food safe and available everywhere.

Optimizing its processing solutions is vital as Tetra Pak wants to avoid production downtime and inefficiencies for its customers. This is why the company's Processing Systems' division, which develops customized processing solutions for food industry customers who pack their products in Tetra Pak or third-party packaging, must verify the viability of its solutions before a production unit is shipped to the customer. "We simulate what we are going to supply to be sure it will function optimally," said Tomas Skoglund, Research Project Senior Manager, Tetra Pak. "Each solution we supply to customers is unique in some respects. We build them on a standardized platform but since the specifications vary from customer to customer, it's valuable to be able to verify and validate the entire configuration with simulation." Skoglund's team even tests entirely new concepts with simulation to verify that they work well.

Optimum processing with Dymola

Tetra Pak chose Dymola, Dassault Systèmes multi-engineering modeling and simulation solutions based on the open Modelica modeling language, to optimize equipment configuration. "We chose Dymola because it is based on the powerful open object-oriented Modelica language, and because of its user-friendly graphical user interface," said Skoglund.

Trend toward desktop simulation with Dymola

Tetra Pak is putting greater emphasis on desktop design and simulation of new alternative designs and technologies. "We are beginning to replace workshop testing with desktop testing using simulation, which costs less," said Skoglund. "We use Dymola to verify and optimize a process particularly when we are designing completely new solutions or a new way of processing something," said Skoglund. "It's an efficient way to validate function and optimize the different options."



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simulation," he said. "We are able to split the work between modeling and simulation engineers, each with their respective know-how. This means that simulation can be performed by a much wider group of users."

Hardware-in-the-loop – realistic virtual testing

Tetra Pak recently developed a Dymola-based solution for hardware-in-the-loop (HIL) simulation for the food processing industry. Normally, food processing units are functionally tested by running them with water before they are shipped to the customer. This is carried out to ensure the high quality of the equipment but cannot be done before the machine is manufactured, increasing delays before delivery. To enable shorter delivery time at a lower cost, an alternative to functional testing is to run a real-time HIL simulation where the real Programmable Logic Controller (PLC) system is connected and operated with the process model. Since the process model enables simulation with real fluids and not just water, the HIL simulation can be more realistic.

Furthermore, water tests often cannot be performed on special equipment, such as centrifugal separators, due to practical considerations. However, this limitation seldom exists in simulations. In addition, simulations also enable Tetra Pak to virtually monitor any dynamic variable (pressure, flow rates or temperature) in the system without the need for sensors, which can be of great help to quickly understand and resolve issues.

Training operators – a future for simulation

Skoglund considers simulation as the future for operator training. "I see a trend where we will use simulation to train operators who are going to run a plant. Customers can train new staff without disturbing production. We have been talking to them about simulation and they are quite keen on getting their staff up to speed in this way before installation and commissioning."

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