

Toyota Gosei Europe Cuts Lead Times in Half Using Virtual Prototyping



Challenge

Constant changes to automotive safety regulations put pressure on suppliers to build better products with shorter lead times. For Toyota Gosei Europe, the lead time to build Complex Folded Knee Airbag models (KnAB) became a big challenge. It was imperative to optimize their folding process, improve the quality of their products, lower costs, and deliver in less time than before.

Benefits

Once Toyota Gosei Europe (TGE) implemented ESI Virtual Performance Solution's airbag module into their process, the accuracy and lead time for building complex folded Knee Airbag (KnAB) simulation models improved drastically. Additionally, with access to parametrization, TGE could now conduct tolerance studies and develop robust KnAB modules virtually.

Story

Ever changing automotive safety regulations constantly put pressure on suppliers to build better products within shorter lead times. For Toyota Gosei Europe (TGE), faced with the challenge of shortening the lead time to build Complex Folded Knee Airbag models (KnAB), they turned to Virtual Prototyping to optimize their airbag. This virtual prototype had to account for manufacturing by virtually modeling the airbag's folding and sewing processes.

Initially, TGE was creating their models using various simulation codes, which resulted in long lead times because they had to conduct iterations with code modifications and model exchanges. Additionally,

they were not using the same tools as their colleagues overseas and therefore had to deal with time-consuming communication and multiple data exchanges.

Using ESI Virtual Performance Solution (VPS), TGE built a detailed KnAB model with high accuracy and in less time, accounting for the airbag folding process. They were able to provide their customer with predictable simulation models for various types of crash simulations, even for Out-of-position (OOP) scenarios. Additionally, TGE investigated the robustness of the complete KnAB module as well as the robustness of single parts within the KnAB assembly early in the developmental state. This level of prediction of the simulation model has been the basis for several product decisions and improvements at TGE since the deployment of VPS.

Proven by CT scans, the accuracy of the models exhibits the high-quality achieved by the newly implemented modeling process and confirms the capabilities of VPS. Besides reducing their costs – by limiting the number of physical prototypes, increasing the accuracy of their models, and by implementing a new assembly procedure – using the VPS airbag module allowed TGE to cut the time needed to build complex folded KnAB by half, while at the same time increasing the quality of their product. The team can now allocate more time to tasks that are important to their customers rather than struggling to exchange data between departments or countries.



Robustness study of protection cloth; physical test (left); with ESI Virtual Performance Solution (right)

"By using ESI Virtual Performance Solution's airbag module for airbag folding and sewing, the accuracy and lead time for developing complex Knee Airbag (KnAB) have improved drastically. Besides the advanced and user-friendly software products, ESI's outstanding support allowed Toyota Gosei Europe to further improve our simulation-driven development process significantly."

Alexander Diederich
Group Leader CAE
Toyota Gosei Europe



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