



AUTOMATING DROP TEST SIMULATIONS

ALTAIR'S SOLUTION FOR DROP TEST SIMULATIONS SPEEDS GOOGLE'S DESIGN PROCESS

About the Customer

Google is an American multinational technology company that specializes in artificial intelligence (AI), online advertising, search engine technology, cloud computing, computer software, quantum computing, e-commerce, and consumer electronics. The Google Consumer Hardware CAE team has full in-house research and development capabilities for the design, computer-aided engineering (CAE), prototyping, and testing of electronic products. The team embraces virtual design validation, making extensive use of simulation tools, including those within the Altair® HyperWorks® design and simulation platform.

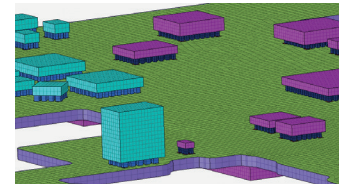
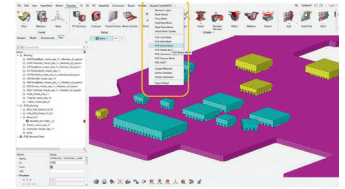
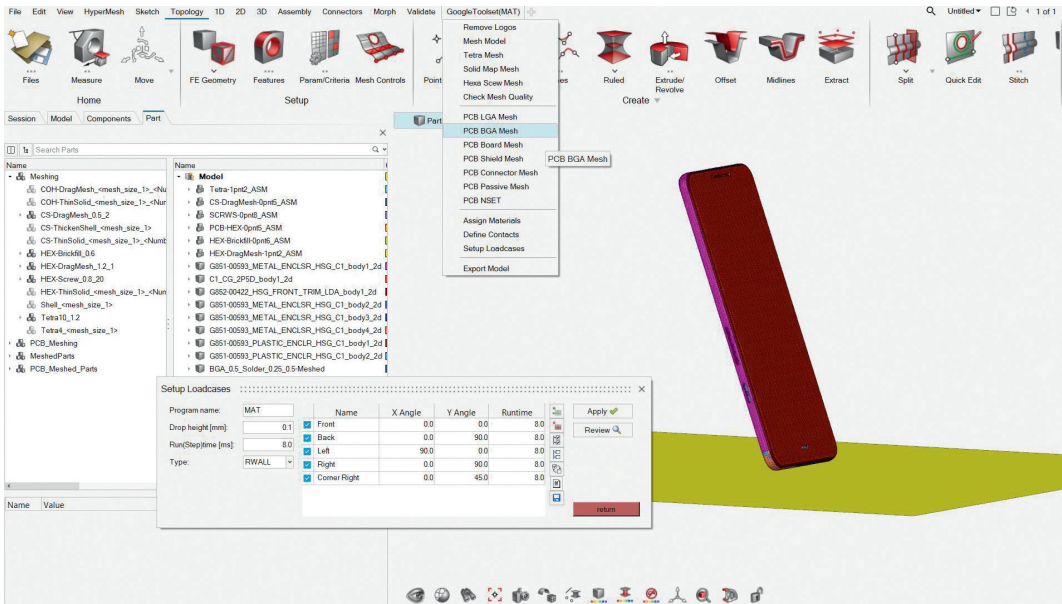


With Altair's MAT, we've reduced drop test simulation pre-processing from a week to just hours, ensuring faster, more reliable results while maintaining the highest quality standards.

Aiman Shibli, lead structural engineer, consumer hardware, Google



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Their Challenge

Staying competitive in the fast-paced consumer electronics industry means rapidly meeting market demands and speeding time to market. Replacing physical drop tests, drop simulation – also known as impact analysis – is one of the most important stages of product design and development. However, preparing CAE models for these simulations is labor intensive; it can take up to a week to pre-process models, clean CAD files, generate meshes, assign materials, and organize solver inputs. This is a significant bottleneck. This laborious process not only delays development timelines but also reduces simulations' reliability and repeatability. Google needed a solution that could streamline the drop test process, improve consistency, and accelerate simulation preparation without compromising quality. For this, the Google Consumer Hardware department turned to Altair. The goal was to create a custom automation solution to make pre-processing quick, easy, reliable, more accurate, and more efficient.

Our Solution

To address this challenge and reduce the manual effort of pre-processing, Google collaborated with Altair to develop a **modeling automation tool (MAT)**, a customized solution built on the foundation of Altair® HyperMesh®. Leveraging Altair HyperWorks' open and programmable architecture – which supports customization through scripting and APIs – Altair extended HyperMesh's core capabilities to create the MAT. The MAT was designed to embed Google's long legacy of engineering expertise directly within the MAT tool's core functionalities – which would transform the drop test simulations pre-processing stage into a quick, guided, and efficient process. Overall, Altair ensured a reliable, repeatable workflow that reduced errors and enhanced efficiency. MAT incorporated several tailored features, including:

- A **personalized workflow** designed for Google's unique simulation requirements.
- Simplified **CAD cleanup tools** and automatic **mesh generation**, adhering to Google's quality standards.
- Automated **PCB and solder mesh creation** with pre-defined entity sets for precision.
- Seamless **material and attribute assignment** from Google's standardized library.
- Automatic generation of **drop simulation load steps** and modular solver file exports.
- Robust model organization, with standardized naming conventions and renumbering.

Results

The introduction of the MAT revolutionized Google's drop test simulation workflows. Altair's automation capabilities and engineering expertise streamlined the team's routine drop test simulation processes, increased reliability and repeatability, and better captured knowledge and best practices.

Crucially, the Google team can now complete tasks that used to take a week in just a few hours.

The CAE department significantly reduced manual effort and errors, enabling faster iteration and decision-making during product development.

LEFT: Altair's custom Modeling Automation Tool (MAT) enabled Google to make preprocessing quick, easy, reliable, and efficient.
TOP: Custom MAT in HyperMesh.
BOTTOM: PCB mesh creation with solder elements

REDUCED
PRE-PROCESSING
TIME BY

70% ▼

STREAMLINED DROP
TEST SIMULATION
PROCESS