



Using Simulation Technology to Evaluate and Demonstrate the Benefit of Laminated Glass

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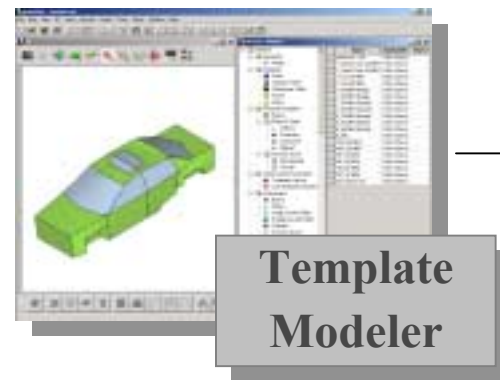
Detroit AutoSEA2 Users' Conference 2002

Motivation

- Develop customized AutoSEA2 Graphical User Interface and related SEA models to predict the acoustical contribution of glass laminates to the interior sound quality.



Custom GUI



**Template
Modeler**



Sound Quality results

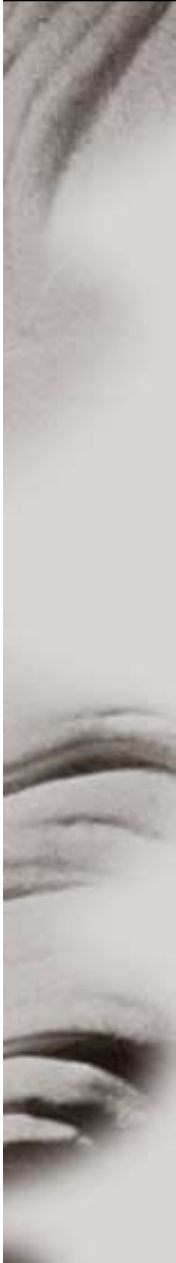
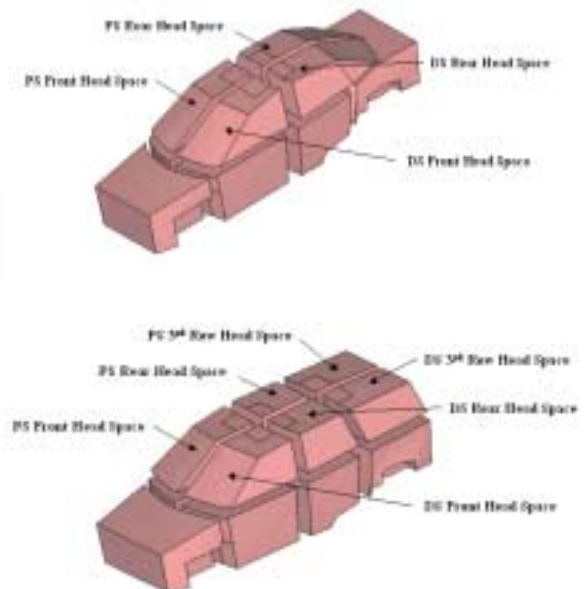
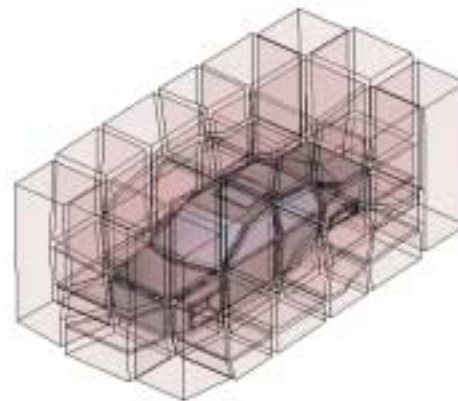
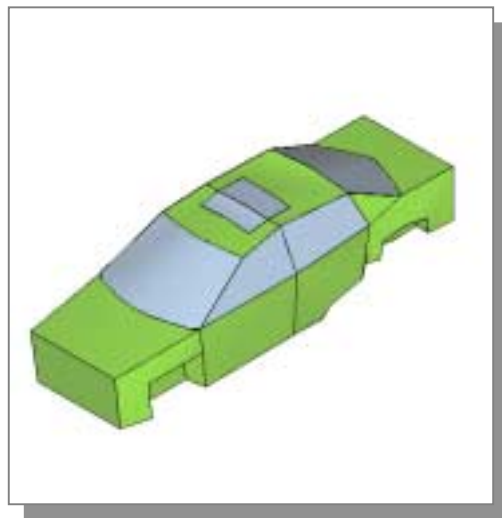
General Specifications

- Graphical User Interface
 - Multi-tab Wizard type interface
 - Used to:
 - Introduce Solutia and glass products
 - Define glass properties, type of vehicle, operating load,
 - Visualize acoustic and solar results
 - Generate report and results data file
 - Visual Basic Language
 - Full Control of AutoSEA2, TemplateModeler, MS products



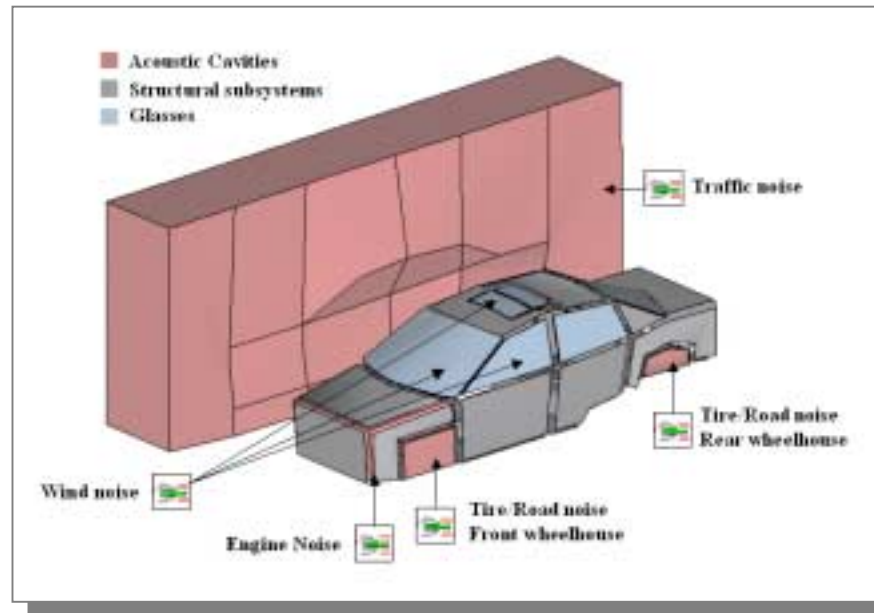
General Specifications

- SEA Model: subsystems
 - Coarse SEA model of different vehicle types
 - Glasses modeled as resonant subsystems
 - Other vehicle components modeled as TL and α
 - Interior and exterior acoustic subsystems
 - SIF to simulate free field conditions
 - Sound package level definition



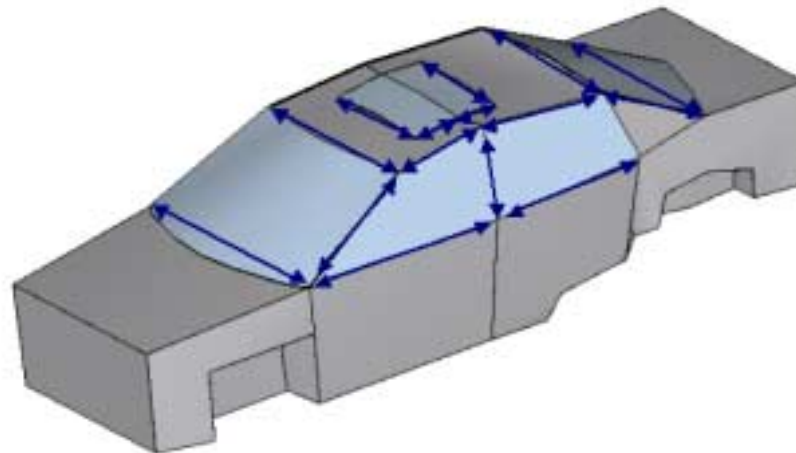
General Specifications

- SEA Model: operating conditions
 - Engine noise
 - Tire/Road noise
 - Wind noise
 - Environmental noise
- *All spectrum obtained from measurements**



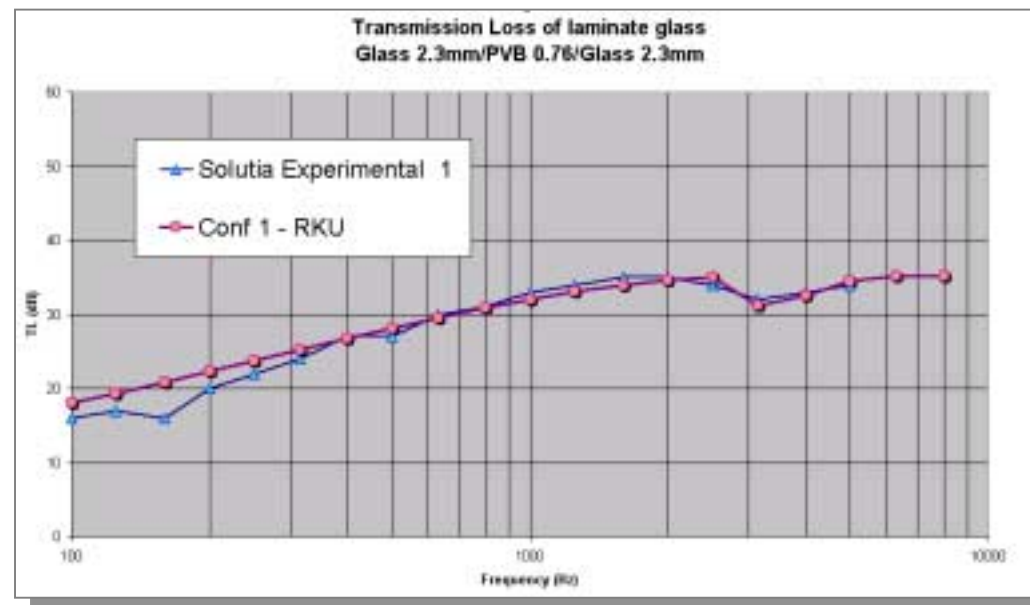
General Specifications

- SEA Model: Morphing geometry
 - Node locations are derived from the Glass Simulator GUI
 - TemplateModeler morpher updates the geometry



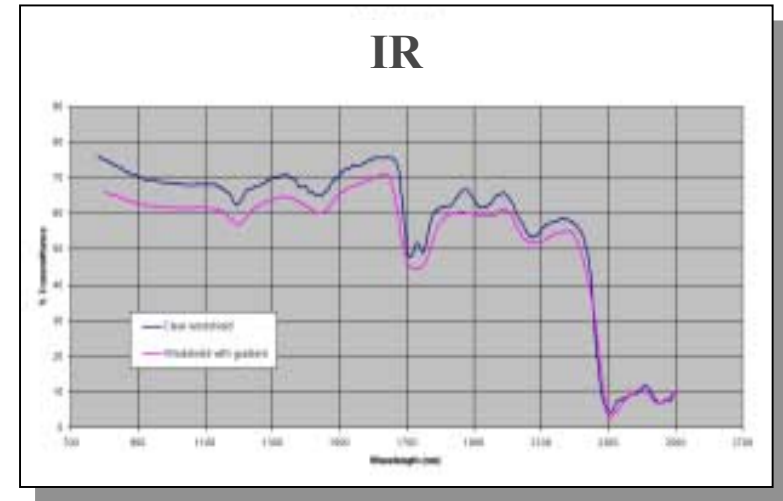
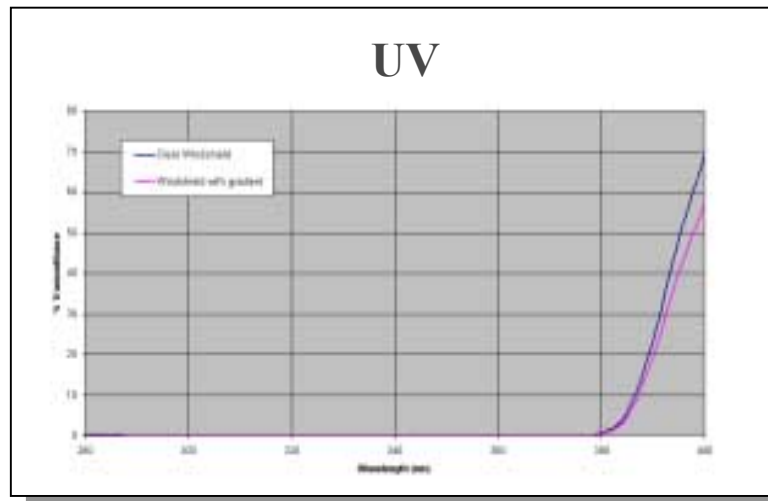
General Specifications

- SEA Model: Glass modeling
 - Monolithic: regular flat panel
 - Laminate: Constrained layer damping system
 - Equivalent properties derived from Damping Script (RKU)



General Specifications

- Solar calculation: UV, IR
 - Indication of discoloration and heat built up in vehicle
 - Data from Solutia's Database of glass transmittance
 - Different colors, patterns and gradient bands available for appropriate glass
 - Transmittance are plotted in the results section



Live demonstration

- Alpha version ...
 - Pay attention to the process, **NOT** the numbers!!!
 - Setup for validation of the GUI at the moment



Questions



The screenshot shows a software window titled "Solutia's Laminated Glass Evolution Tool". The window has three tabs: "Solutia", "EPG", and "Vanceva". The "Vanceva" tab is active, displaying the Vanceva logo and the text "ADVANCED SOLUTIONS FOR GLASS™". There are two sub-tabs: "Architectural" and "Automotive", with "Automotive" selected. The main content area features a 3D rendering of a car's dome-shaped roof, reflecting a cityscape. A purple sphere labeled "Automotive" is positioned in the center of the dome. Below the rendering, the text reads: "Two important questions to ask when contemplating the possibilities of glass:". At the bottom of the window, it states "Powered by Vibro-Acoustic Sciences' AutoSEA™ technology". There are four buttons: "Print", "Next >", "Finish", and "Exit". A progress bar at the bottom shows four stages: "Analysis" (highlighted in green), "Configuration", "Glasses", and "Results". Logos for "SOLUTIA" and "EPG" are also visible in the bottom left corner.