

# ANALYSIS OF S&R PHENOMENA THROUGH SIMULATION IN ABAQUS

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*Abstract: In recent years car manufacturers have been working intensively on new ways to improve the quality of the interior trimmings because they are extremely important to the perception of quality by customers and can be a source of after-sale complaints. Consequently, the study of squeak and rattle has become one of the main concerns for car manufacturers. Generally, S&R problems (mainly produced by interior trimmings) are solved in the final development phases when the trimming geometry has already been frozen and so any modification means extra cost. Furthermore, countermeasures at this stage of the development are normally proposed after intensive testing work. Simulation of S&R phenomena is one of the most complicated issues to reproduce virtually, because it is difficult to study using methods based on eigen-modes due to the impossibility of using contacts in this type of FE model, since modal theory is based on the hypothesis of linearity. In this frame, IDIADA has developed a simulation protocol that can help in the detection of potential S&R problems during the development phase. The main objectives of this protocol are the following: use of common software packages used in normal NVH analysis in the company, minimum modification of NVH models and simplicity of pre/post-processing. This paper describes the main points of such a methodology. The core of the protocol has been implemented in ABAQUS by using a specific element of this solver as virtual contact sensor in the frequency domain simulation.*