

USAGE OF BETA CAE TOOLS FOR A BIOMECHANICAL APPROACH TO ERGONOMIC COMFORT DESIGN FOR SEATING

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ABSTRACT–

The recent development in computational power and in modelling capability of Finite Element software offers greater opportunities for biomechanical simulation with industrial applications. Biomechanical simulations allow us to study the interactions between the human body and different apparatus. This technique is used, to a certain extent, in crash analysis with dynamical simulation of simplified dummy models. However, these models are not intended for the study of ergonomic comfort of seating.

This paper describes the modelling of more detailed and anatomically accurate FE models of human bodies using ANSA 17, to study automotive seats in terms of ergonomic and comfort. In order to achieve reasonable accuracy, it is important to develop anatomical models presenting complex bone structures, to differentiate tissues such as skin, fat and muscle, to account for anisotropy and non-linearity of these biological materials, to model proper contact interactions, and finally, to consider individual variabilities in terms of sizes, ages, genders and physiologies. The results from such analysis allow us to study strains and stresses inside the soft tissue, and thus enables a scientific approach to ergonomic design based on comfort and health analysis.

Biomechanical and computational-based design optimization of automotive seats could allow simple and fast improvements of user experiences.