

NUMERICAL SIMULATION APPLIED TO THE TIRE INDUSTRY

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Abstract. The modeling using the finite element method is a powerful tool to analyze a complex structure such as the one of the tires. The models used to evaluate the properties and performance of the tires take into account a high deformation and displacement of the structure. Usually, the materials are considered nonlinear, anisotropic and viscoelastic.

In this work, an overview of some projects developed by the FATE Tires Research Group is shown, which involve not only the finished product but also the stages of production such as extrusion of rubber compound profiles.

Some of the following applications are addressed: study of the influence of the tread pattern in the tire performance, characteristics functions of a tire obtained by simulation of a tire testing machine, swelling prediction of extruded rubber compounds applied to die design, design of tire mold cavity profiles, simulation of tire tests and modal analysis among others.

Many of the performed simulations were validated with experimental testing. Ongoing and future projects are presented.