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MECHANICS OF TIRES AND PAVEMENTS: MATERIAL AND COMPUTATIONAL MODELING

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ABSTRACT

The three-dimensional modeling of the structural components of the tire-pavement-system is a complex task. The coupled description and realistic interaction of the sub-systems represent even a larger challenge to computations. Usually, one of the components, either pavement or tire, is strongly simplified. Thus, the outcome of the investigation is limited according to the modeling constraints.

The mechanical behaviour of tires is generally investigated by a steady state rolling structure on a rigid surface involving nonlinear material formulations at finite strains in an ALE reference system (see Kaliske et al. [1]). Pavement computations are usually based on a phenomenological description of the temperature-, stress- and time-dependent behaviour of pavement materials (see Oeser, Möller [2]). The computational framework generally used for the numerical analysis of pavements founds upon Lagrangian formulations that allow for the development of small as well as finite strains. A realistic description for both sub-systems yields the relevant influence factors on the counterpart. A structural understanding of the mechanics of the separate and the coupled systems will be developed which will give insight into detailed sub-systems.

With the proposed minisymposium at hand, the focus is on the state of the art of the characterization of the materials employed, on investigations of both components in general as well as on the coupled approach in order to bring together the leading experts in the field and to overcome the current restrictions.

REFERENCES

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