18th International Conference
ENGINEERING MECHANICS 2012
Svratka, Czech Republic, May 14 – 17, 2012

pp. 128–129
Paper #72

SIMULATION OF VEHICLE TRACK DYNAMIC LOADING

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Abstract: *The paper describes possible design of the vehicle track computational model and basic testing procedure of the track dynamic loading simulation. The proposed approach leads to an improvement of safety of running achieved by improvement of track vehicle course stability. The computational model is built for MSC. ADAMS, AVT computational simulating system. Computational model, which is intended for MSC computational system, is built from two basic parts. The first one is represented by geometrical part, while the second one by contact computational part of the model. The aim of the simulating calculation consist in determination of change influence of specific vehicle track constructive parameters on changes of examined qualities of the vehicle track link and changes of track vehicle course stability. The work quantifies the influence of changes of track preloading values on the demanded torque changes of driving sprocket. Further research possibilities and potential are also presented.*

Keywords: ***tracked vehicles, track, computational simulation, dynamic loading simulation.***

1. Introduction

The mathematical simulation model is built for computational simulating system MSC.ADAMS.TVT, that can be used for the computational modelling and dynamic loading simulation.

The aim of the work is to carry out the composition of a computational model not only of the vehicle track but also for the dynamic properties of the complete vehicle and to suggest ways of other use of this mathematic model for computational simulation experiments to find out the essential information about individual undercarriage parts behaviour during the vehicle drive.

General objective of the work is to define main possibilities of track vehicle directional improvement by simultaneous increase of vehicle maximum speed. It is used now for collecting of undercarriage design parameters with whatsoever influence on vehicle directional improvement.

2. Methods

The computational system MSC.ADAMS.TVT is used for the computational modelling. This system can be used for the analysis of kinetic and dynamic characteristics of the modelling mechanic system and its animation. The computational model is built for computational simulation system MSC.ADAMS.TVT and consists of geometrical and contact computational parts of model.

The geometrical part of computational model consists of basic parts of vehicle undercarriage movable organs (road wheels, supporting rollers, driving sprocket, idle wheel). Track line, on which individual track links are connected by a couplings.

The contact part of computational model consist of impact and frictional forces system. To guarantee the highest accuracy and practically, the impact and frictional forces of individual undercarriage parts are defined in such a way, that the whole model resembles the reality as much as possible.

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3. Results and discussion

This article describes the suggestions of the way and using of simulation calculation of the track behaviour results during various operational programmes and undercarriage geometry changes, which are done for the examination of individual selected parameters of the construction track links and track dynamic and hanging properties on general track behaviour.

The aim of the simulating calculation is the determination of change influence of specific constructive parameters of the vehicle track (track preloading) on changes of examined qualities of the vehicle track link (reaction forces against motion) which are determined especially by intensity changes of the reaction force of the carrying elements of track links bodies. It is evident that the results of simulation computations have proved the assumption that changing the constructional parameters of undercarriage parts it is possible to improve dynamical behaviour of some parts of track vehicle undercarriage and to optimise dynamic properties of the vehicle in motion.

After obtaining of sufficient quantity simulation results of different parameter influence, it will possible to determine the universal relation dependence of different construction parameters on dynamic loading of the track.

4. Conclusion

The presented paper describes one of the possible ways of real track vehicle movement mechanism computational model setting in MSC:ADAMS.TVT. It is computation system with emphasis on vehicle track design and recommendation for upgrading mathematical model with a view to make the computation simulation attempts for the purpose of finding basic information on track component parts and undercarriage performance of the moving vehicle.

On the grounds of the analysis outcome it will be possible to state which constructional changes will lead to objective accomplishment. This objective can be defined as track vehicle directional improvement at simultaneous maximum speed increase, limited, apart from other things, not only by track construction, but also by the whole track kinetic and suspension track vehicle undercarriage mechanism.

Acknowledgement
The paper was written with the support of Research plan 0000401 of Faculty of Military Technologies of University of Defence in Brno.

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