

TMeasy - a Tyre Model „Easy to Use“

TMeasy is an easy to use tyre model designed specifically for efficient standard driving dynamic simulations and for finding a vehicle's handling limits. *TMeasy* is already used as a user routine by SIMPACK users in the automotive industry. Please contact INTEC if you would like to receive more detailed information on *TMeasy* with SIMPACK.

When modeling vehicles for dynamics simulation, special attention has to be paid to the tyre models.

With given tyre models experimental tyre data is often incomplete, missing or only available for a similar dimension of the desired tyre type. Therefore, expensive tyre-testing is usually necessary to satisfy the MBS modeling requirements in vehicle dynamics.

TMeasy has mainly been developed to meet both the requirements of user-friendliness and sufficient model accuracy.

The development goals of *TMeasy* were mainly identified as:

- Reduction of the input quantities, defined as “physical understandable” parameters which can easily be determined from measurement data.
- Sufficient accuracy of the model for practical demands.
- Maximum computation efficiency of the algorithms with respect to possible real time applications.
- Full compatibility to the STI interface, e.g. provided by SIMPACK.
- Easy implementation of road models based on the STI road interface with road wavelengths greater than the diameter of the tyre.

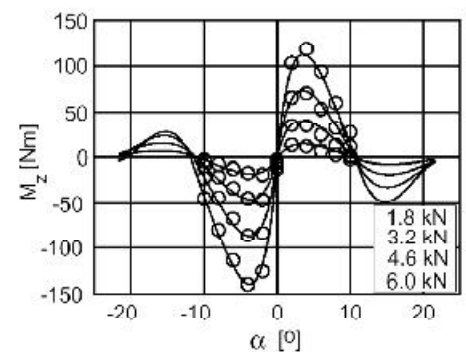
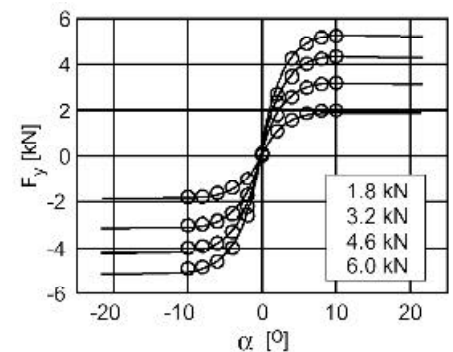
For the adjustment of the model parameters, a graphics utility for the data visualisation is available.

The tyre force computation done by *TMeasy* is based on a semi-physical method which is sufficiently simplified in order to get an analytical description of the acting tyre forces and torques. With a maximum of 46 input parameters, the following tyre quantities are computed:

- Combined longitudinal, lateral and vertical tyre forces.
- Self aligning torque with respect to different adhesion conditions.
- Bore, roll and tyre resistance torque.
- Camber influence on the lateral force and the self aligning torque.

To evaluate a vehicle's driving stability it is well known, that the degressive influence of the normal force F_z must be depicted. Furthermore, *TMeasy* computes the actual dynamic tyre radius in order to deliver the right angular wheel speed.

Previous applications of *TMeasy* include simulations of agricultural vehicles and passenger cars. Recently, the model has been used for modelling heavy trucks in SIMPACK with respect to driving stability in limit situations.



Lateral Force and Self Aligning Torque at $\gamma=2^\circ$ for a Car Tyre



Double Lane Change Manoeuvre in the Limit Range