

Realistic Driving Experience of New Vehicle Concepts on the BMW Ride Simulator Using MBS Complete Vehicle Models



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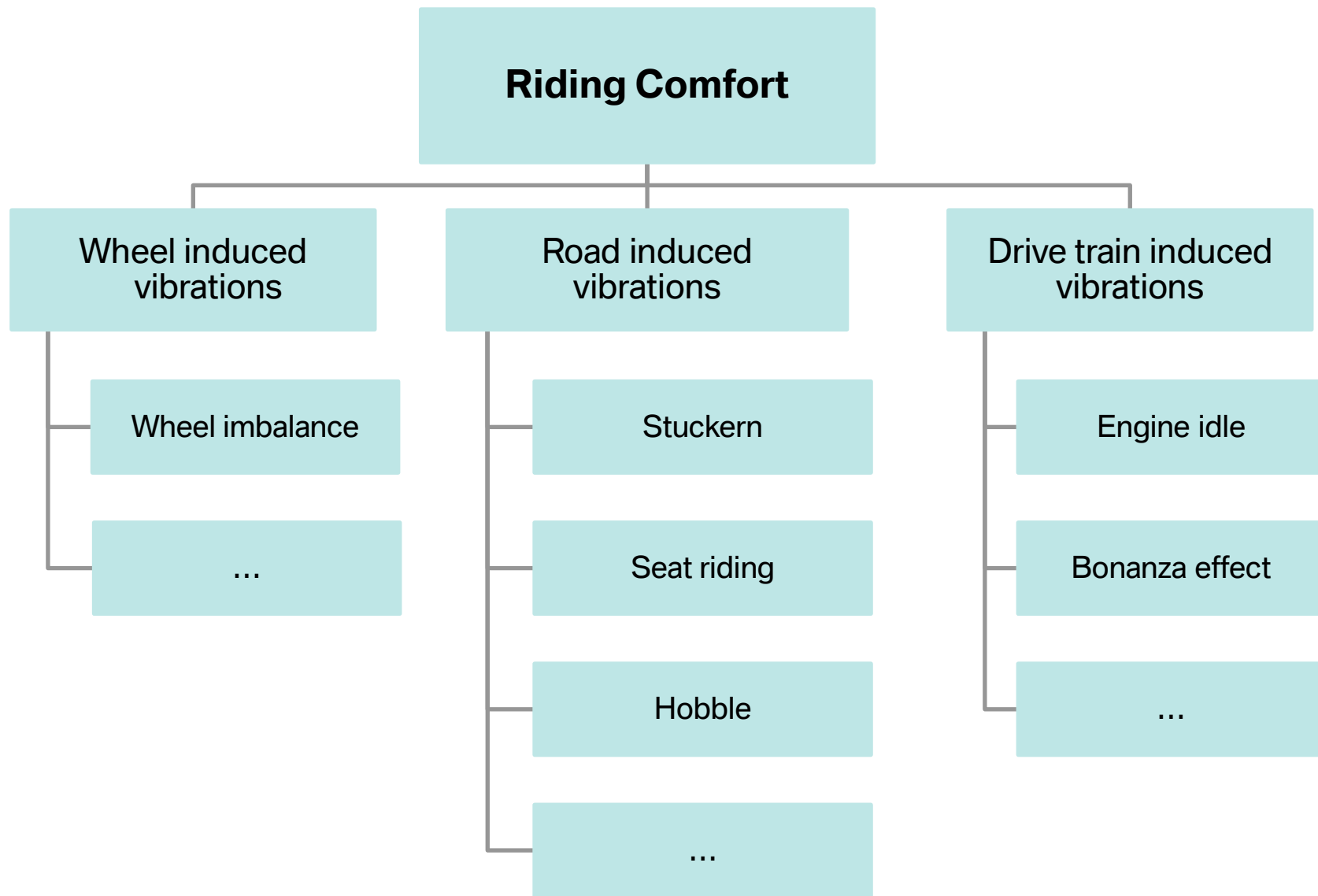
Realistic driving Experience on the Ride Simulator.

Contents.

1. What is riding comfort?
2. MBS as an important method in the phase of definition and the phase of monitoring the riding comfort
3. Realistic Driving Experience of New Vehicle Concepts on the BMW Ride Simulator

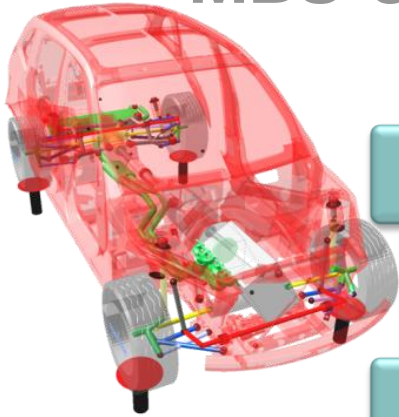
Riding Comfort - Overview.

Basis of an efficient concept development through all ranges.



Introduction of the MBS-method in the product development process.

MBS-simulation in riding comfort.



MBS-modelling & fitting using real measurements show an universal applicability

elimination fitting

validation potential MBS-method

fixing modelling method

general MBS modular design

agreement of data delivery with all developer of subsystems

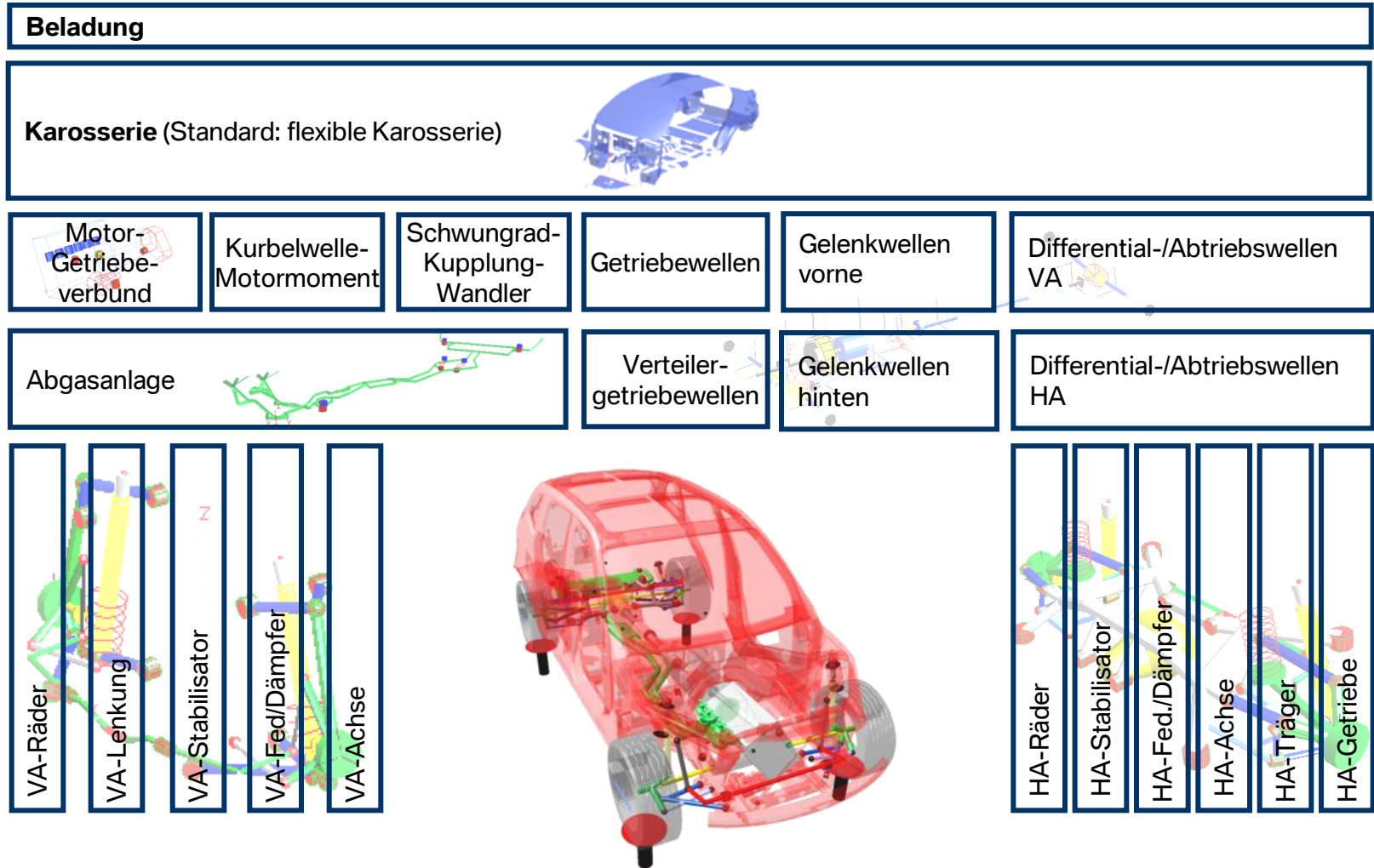
fast modelling with high quality

steadily process

MBS-simulation as accepted partner in development

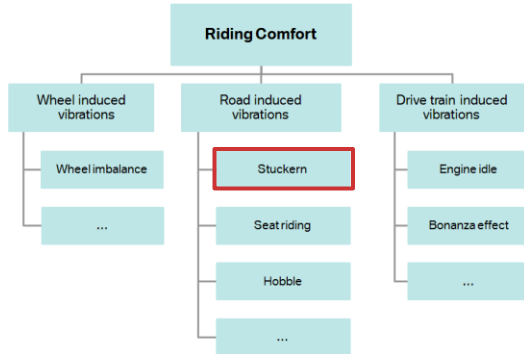
Implementation of a MBS modular design for enhancement of quality and efficiency.

Reduction of failures within the process of modelling.

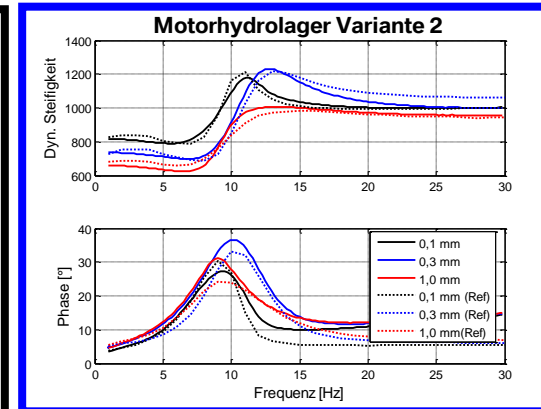
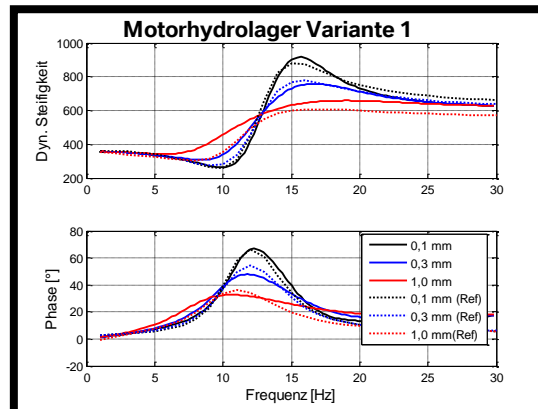
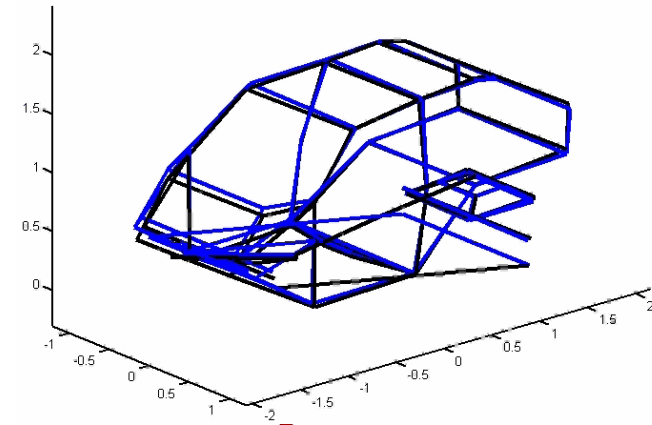
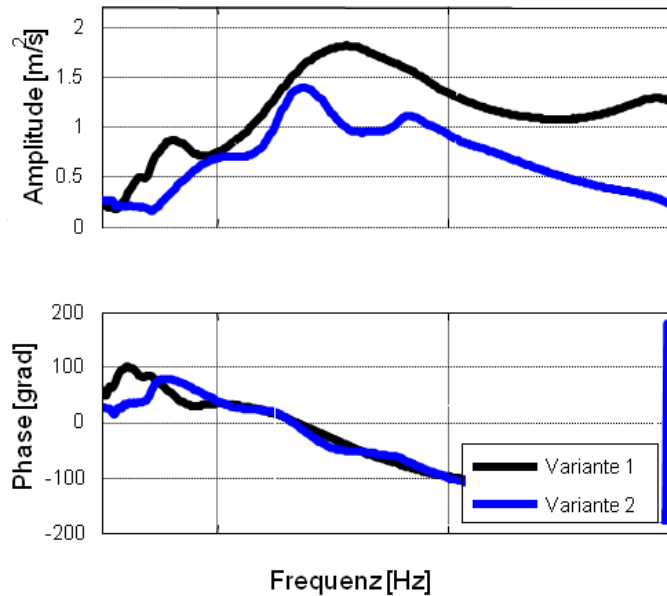


Anchoring in process of development with standardized analysis of development status.

Review of riding comfort with alternative excitations.



Aggregatstuckern: Vergleich Motorisierungen



Anchoring in process of development with standardized analysis of development status.

Extension of review up to simulated road ride.

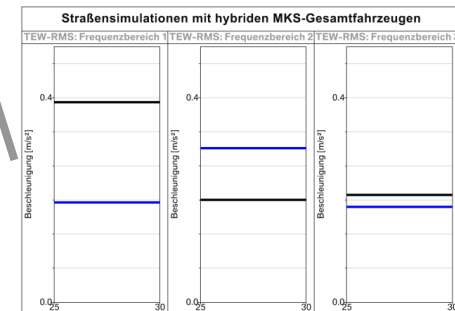
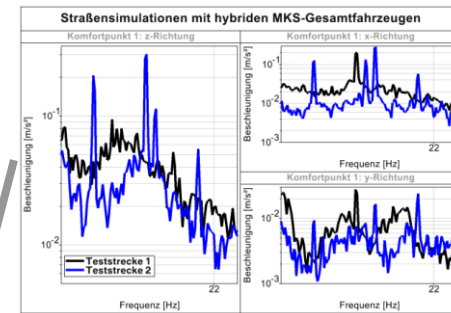
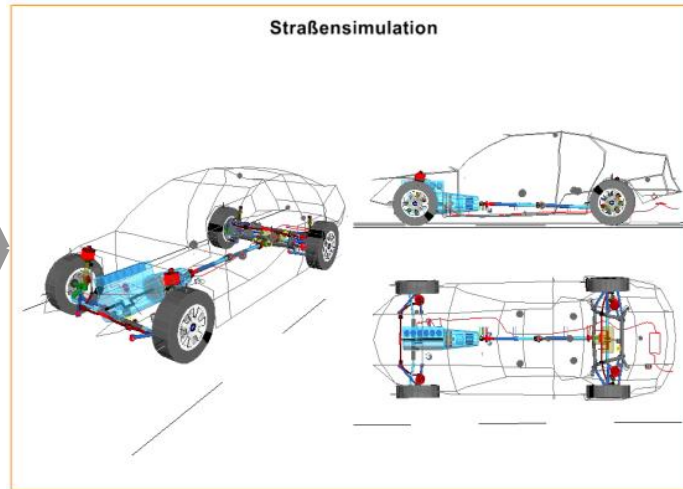
Test track – „good“ road



Test track – „bad“ road



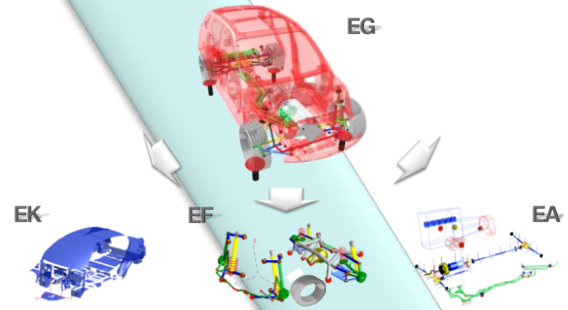
Test track – ...



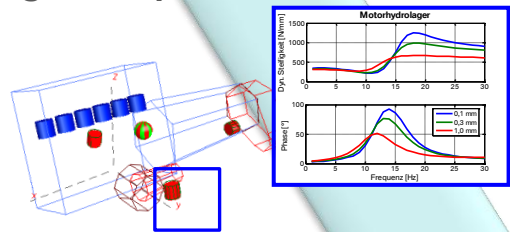
Experience of riding comfort using a simulator as an advanced method of analysis.

MBS-simulation at riding comfort.

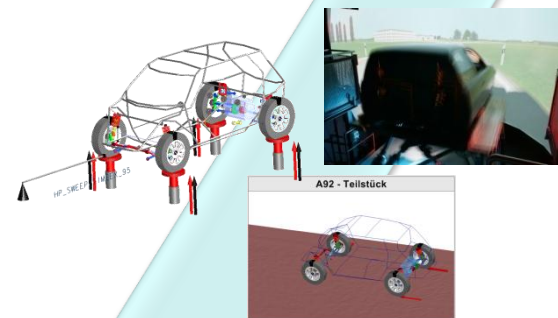
Setting system of aims



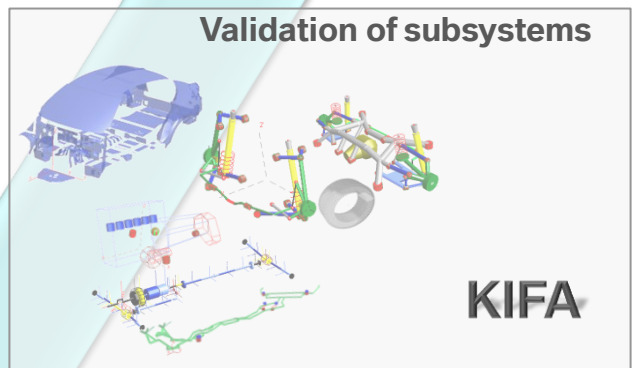
Dimensioning of components



Validation of full vehicle

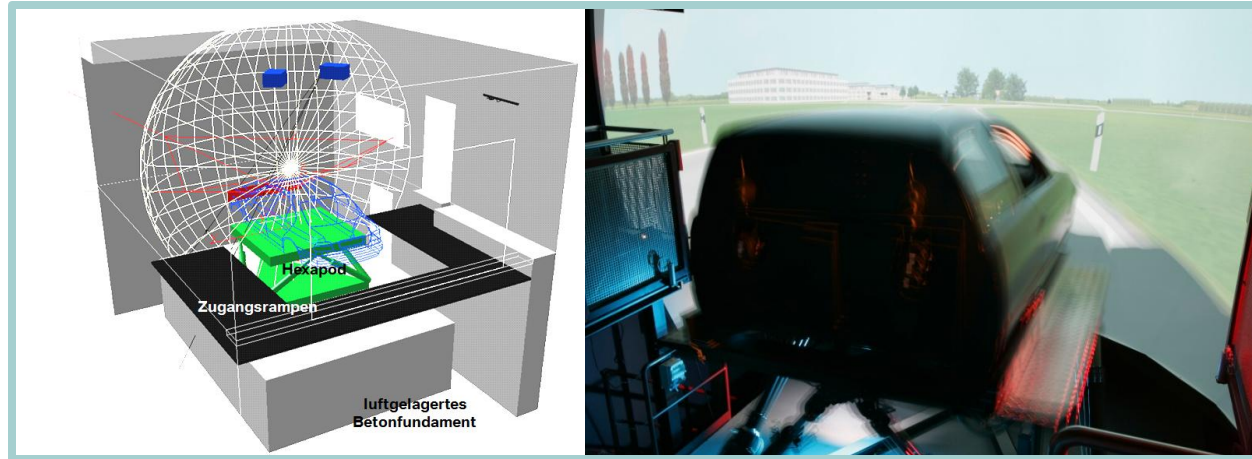


Validation of subsystems



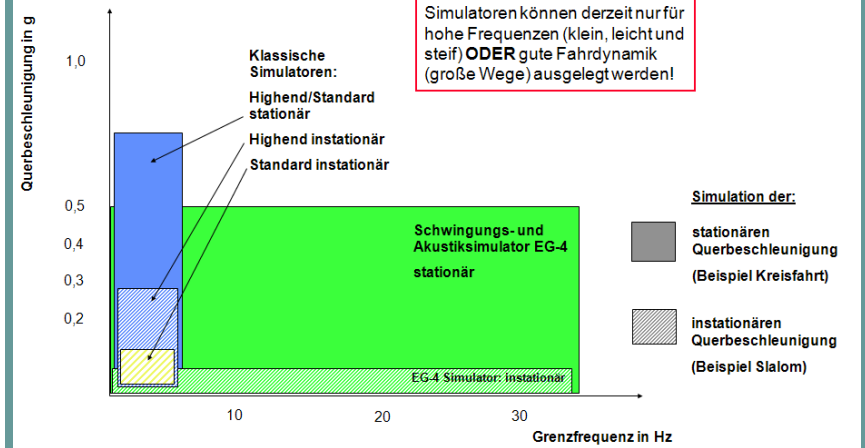
Experience of riding comfort using a simulator.

The NVH-simulator at BMW.



Optimisation for NVH

Movement:	+/- 0,3 m, +/- 24°
Acceleration:	+/- 0,8 g
Moved mass:	ca. 1200 kg
Load capacity:	ca. 700 kg
Drive train:	elektrisch
Cutoff frequency:	35 Hz



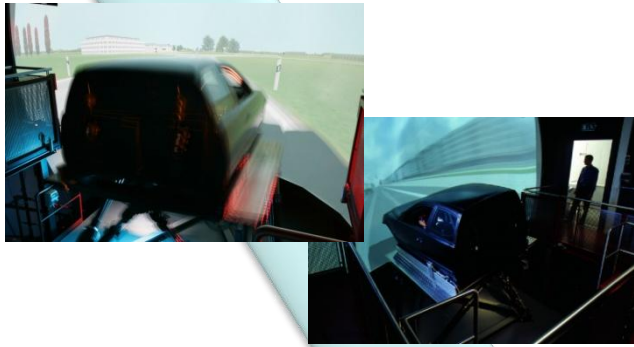
Experience of riding comfort using a simulator. The NVH-simulator at BMW.



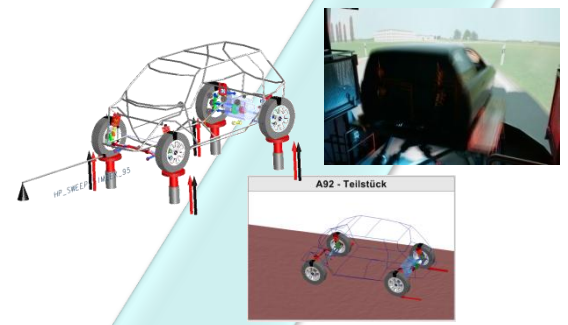
Using the simulator to analyse new vehicle concepts. The validated MBS-process as basis.

Development without prototyps – Vision?!

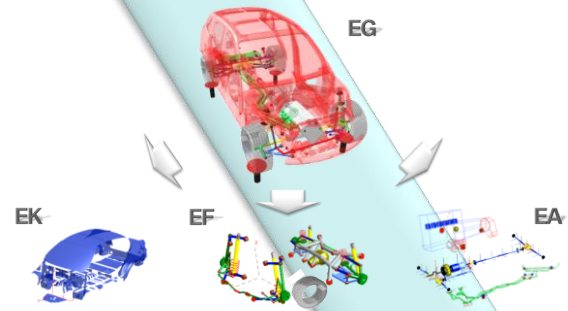
Positioning of riding comfort



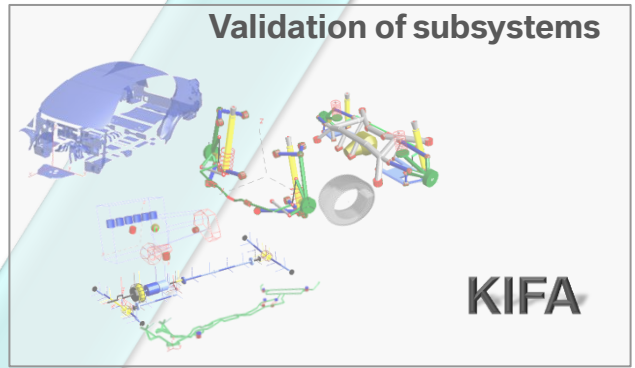
Validation of full vehicle



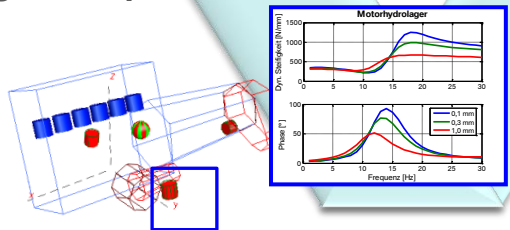
Setting system of aims



Validation of subsystems



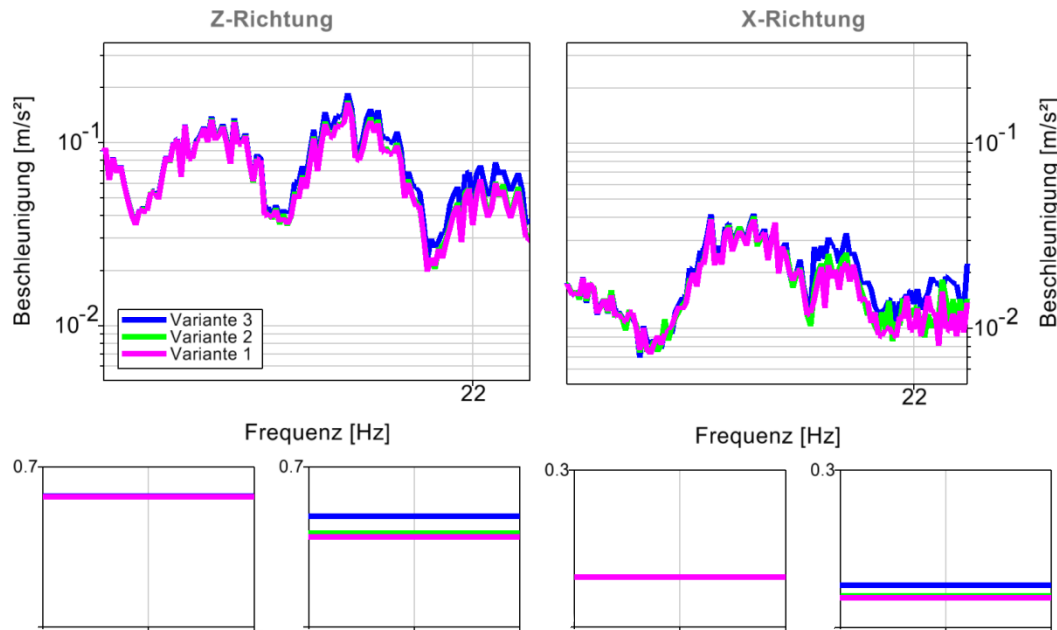
Dimensioning of components



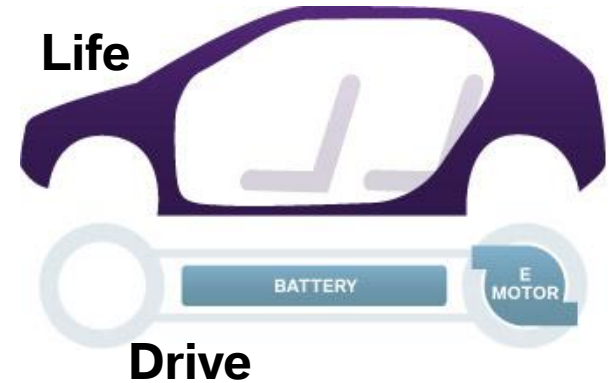
Analysis of new vehicle concepts.

As an example the joining technique of Life and Drive at the new BMWi.

Review vehicle concepts over road simulation



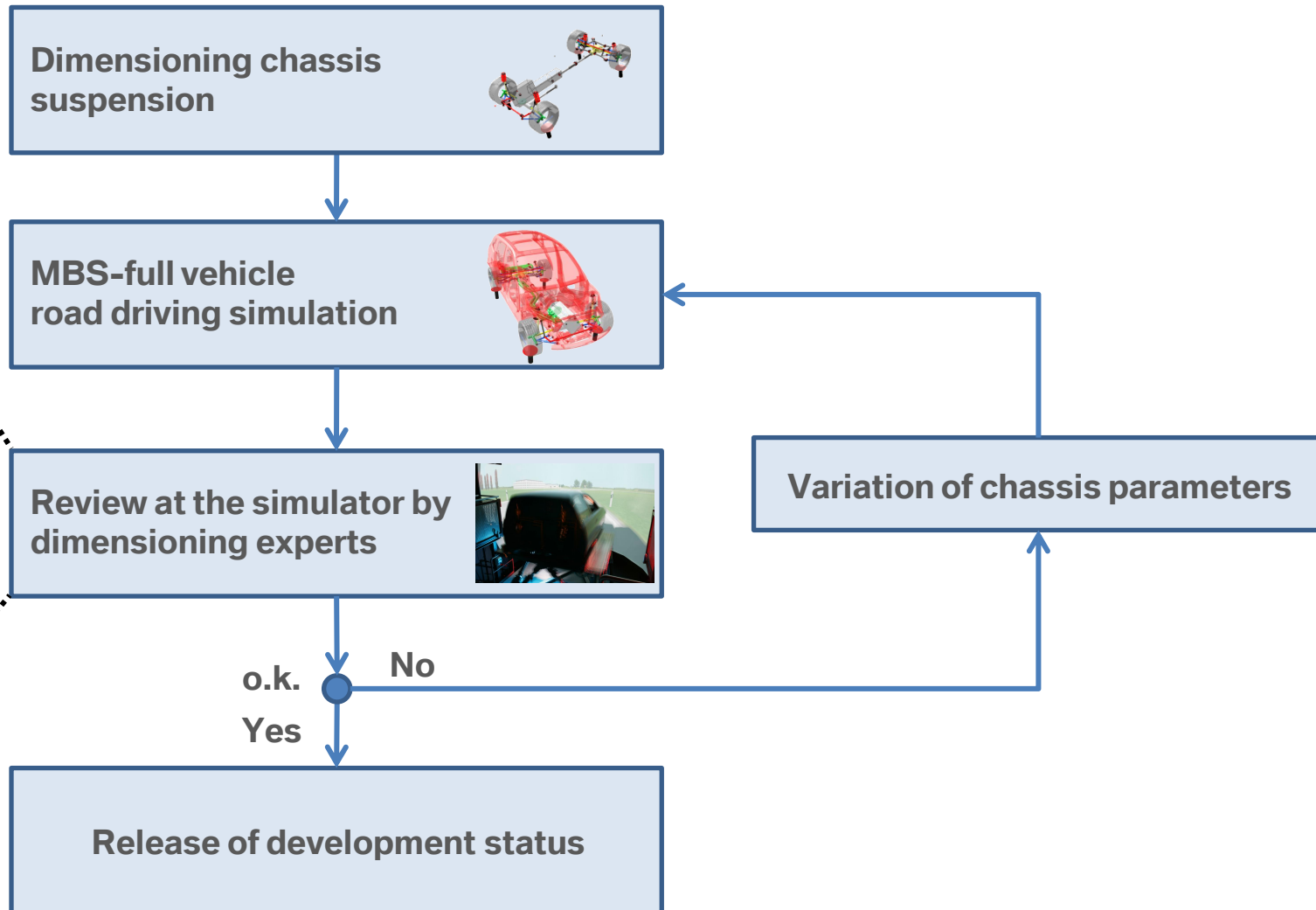
TEW-RMS: Frequenzbereich 1 TEW-RMS: Frequenzbereich 2 TEW-RMS: Frequenzbereich 1 TEW-RMS: Frequenzbereich 2



Very early decision of the joining technique by analysis of different scenarios

Analysis of new vehicle concepts.

Positioning of riding comfort by quick and efficient virtual variation of chassis suspension.



Phänomen
Aufbauanbindung
Sitzreiten
Stuckern
Stößigkeit
Zittern
...

Analysis of new vehicle concepts.

Conclusion & Marks.

- For realistic driving experience of new vehicle concepts on the ride simulator a validated MBS-method is essential.
- The realistic driving experience at the ride simulator enables a more complex review of existing virtual concepts.
- The validation with measurements shows a precise correlation to the MBS-simulation. This gives a very high quality of forecasts in reviews.
- In the future the transfer to the real time simulation within the ride simulator is planned, to be enabled to detect phenomenons of riding comfort with an uncertain excitation speed of the vehicle.

SIMPACK
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Thanks for your attention