



SUSTAINABLE DEVELOPMENT

Virtual engineering

The possibilities of virtual engineering (VE) are being applied systematically in the development of new Škoda cars. The area of virtual engineering integrates virtual reality, simulation and calculations.

The initial phase of virtual engineering consists of creation of a vehicle model in data format. The model so created is evaluated by experts from many aspects and allows for simulation and calculations. For objective evaluation of the emergent model, the created computer data is displayed in a form, which is closest to reality. We use virtual reality (VR) methods to display the data.

Modern quality VR makes it possible in the concept car design phase to evaluate the design and functionality of the applied technical solutions and subsequently choose a suitable solution without the need to produce a functional model. In this way, we attain a saving in the consumption of material, energy and labour used in the production of the physical model and its subsequent liquidation.



The newest virtual reality station makes it possible to evaluate models on a real scale.

Areas of VE application in the development of a car:

- Design presentation

The most common application of VR is in the area of exterior and interior design. A great advantage of this visualisation is display in a real scale. The quality and quick decision-making relating to new projects at an early development phase is supported by the possibility of displaying several alternate solutions. Development time is substantially reduced without the need to build exacting and costly real models. With the aid of VR, the number of models for evaluation of the design has been reduced by up to 50%.



Display of various versions of wheel disks used



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- Interior ergonomics

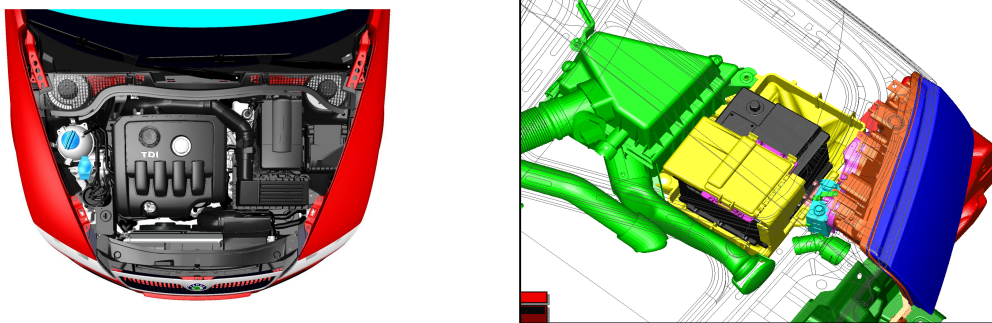
The evaluation of interior ergonomics is by default performed on built models. The production costs of such a model are very high and production is time-consuming. By using special peripherals and software, it is possible to design and evaluate the ergonomics already in the initial development phase. This mainly involves views, reach and control of interior equipment. A further advantage is the possibility of evaluating various versions and equipment levels directly from the passenger position.



During VR evaluation of interior ergonomics, special peripherals are used, such as projection helmets, data gloves and systems for sensing the position of a person in space.

- Engine compartment

The high concentration of parts in the engine compartment places high demands on design solutions and collision-free arrangement. We use the benefits of VR to evaluate the optimal assembly of parts. In this way, we avoid possible problems when building prototypes, minimise expenses and speed-up subsequent building of individual prototypes.



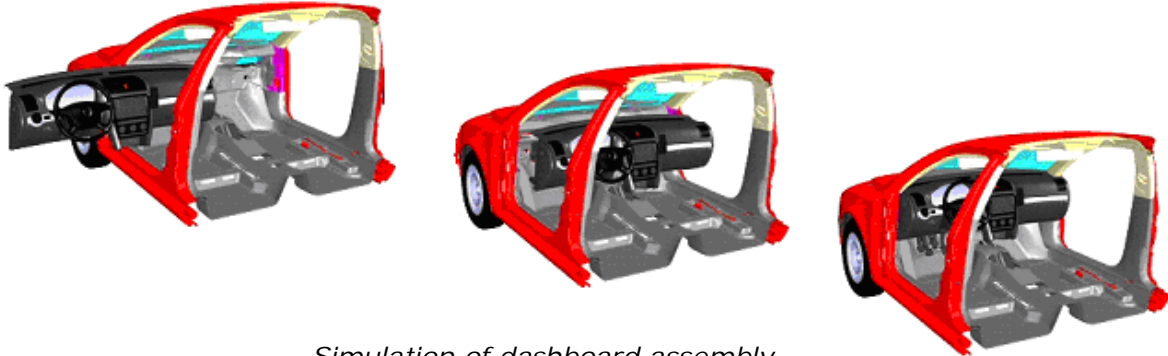
Display of the car engine compartment using VR

- Virtual assembly

Virtual assembly makes it possible to simulate the part assembly and removal procedures on a CAD data basis. The assembly possibilities of a car are evaluated prior to actual construction. This makes it possible to avoid complications in the production and production line planning phase. The result is an optimised assembly procedure, shorter service times and easy user maintenance of the car (e.g. easy replacement of the headlamp bulb on the Octavia car).



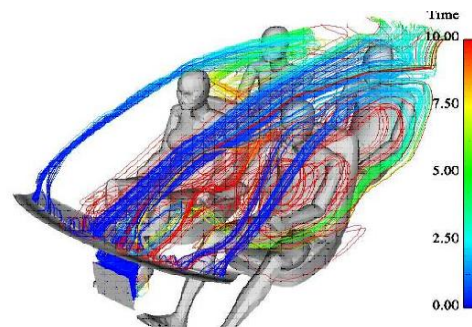
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Simulation of dashboard assembly

• Aerodynamics

Even before production of the first prototypes, CFD simulation of the airflow in the interior and over the exterior of the car is done using CAD data. This involves complicated three-dimensional flow-phenomena. With the aid of CFD, it is possible to analyse these phenomena, present the results and draft the optimal technical solutions.

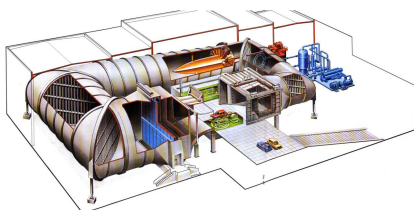


Comparison of virtual techniques with experimental development in the wind tunnel:

Experimental Aerodynamics



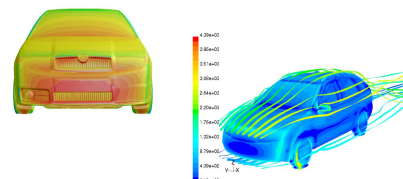
- Energy (Wind tunnel \approx 2,6 MW)
- Transport (People, Prototypes)
- Prototype Building & Recycling



Virtual Aerodynamics



- + Less Energy (> 1 kW)
- + No Transport (People, Prototypes)
- + No Prototypes needed



Similar results by different means with less cost, effort and environment-friendly



SUSTAINABLE DEVELOPMENT

Using virtual engineering, we offer the following to our customers:

- attractive products
- lower fuel consumption (optimal aerodynamics)
- greater safety
- optimal ergonomic layout
- shorter new car development cycles
- minimisation of influences on the environment due to reduction of the material and energy demands of car development and production

Virtual engineering is an integral part of the Škoda Auto approach in the area of sustainable development.

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