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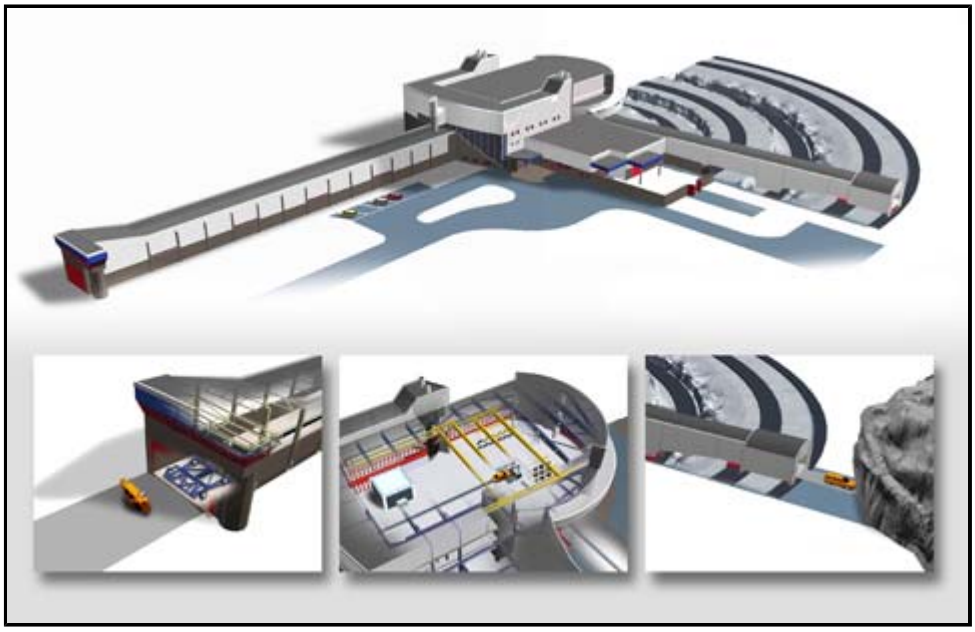
World-leading crash test technology in Volvo Cars' safety development

The crash laboratory at Volvo Cars Safety Centre is the technically most advanced in the world. It features one fixed and one movable test track, which can be combined to recreate collisions with different impacts, angles and speeds. Volvo Cars also uses a supercomputer for virtual crash tests, and a crash simulator that recreates different collisions without destroying the car body.

- The knowledge we gain from the real traffic environment together with various crash tests is used in our continuous safety development, says Thomas Broberg, Senior Technical Advisor at Volvo Cars Safety Centre.
Volvo Cars Safety Centre was inaugurated in year 2000 and hosts the world's most advanced crash test laboratory. This full scale crash laboratory features one fixed track of 154 metres and one 600 tonne track of 108 metres that can be moved from 0 to 90 degrees using air-cushion technology. It also contains a unique crash simulator and a supercomputer where a car and its interior can be tested without being destroyed, over and over again.

Volvo Cars' technically advanced collision barrier weighs 850 tonnes and can also be moved with air cushion technology into different positions opposing the tracks.
- The movable track can be turned from 0 to 90 degrees. That gives us the ability to recreate realistic frontal collisions, both head-on and offset collisions which often cause severe injuries due to high speed in real life accidents, as well as broadside collisions with two vehicles from different angles, says Thomas Broberg.

Each track is powered by two electric motors connected with steel cables. Two laser instruments measure the cars' positions and feed the data to the motors, which direct the impact to exactly the right position and time. The cars are released and run free from the cables a couple of metres before the point of impact.
- Other types of crash tests that we perform are for example roll-overs and rear-end collisions, says Thomas Broberg. The crash laboratory also has the capacity to recreate accidents in various traffic environments and outdoor settings.



Crash laboratory and supercomputer
More than 400 cars are tested in full-scale crash tests at Volvo Cars Safety Centre each year.
- We run these tests to learn how the human body is affected in different types of collisions and to verify the calculations in our computer simulated crashes, says Thomas Broberg.

The crash tests are filmed with up to 30 high-speed cameras located above, alongside and beneath the impact site, and onboard the cars - both inside and outside. Volvo Cars uses the films when evaluating the tests by comparing the footage with the information from the car sensors. The crash test dummies are also equipped with advanced electronics that read how the human body responds in different accident situations.

- Crash test dummies are regulated by international standards, says Thomas Broberg. At the safety centre we use dummies of different ages and sizes, from infants to adults. There are also different dummies used for various crash situations, such as frontal crash test dummies, side impact dummies and specific dummies for rear-end collisions.

Volvo Cars also has a supercomputer that enables crash testing without destroying any cars. A crash situation can thereby be simulated any number of times with different parameters on very short notice - cars can be safety tested virtually before there is even a prototype. The supercomputer has the capacity to carry out more than 45 simulated car crashes per day.

Crash simulator
Volvo Cars also performs crash tests in a unique crash simulator using a reinforced car body with the actual interior that is to be tested. The crash simulator can also recreate the tipping, or pitch, in real life collisions without destroying the car body. It can also simulate penetration into the passenger compartment, using ten pistons representing different parts of the car.

- When you witness a full-scale crash test in the crash laboratory, supercomputer or simulator, you realise how crucial it is for all occupants of the car to be restrained properly, says Thomas Broberg. It is the driver's responsibility to make sure that everyone is using the appropriate restraint - a simple thing to do that can make a life's difference.