Table of Contents

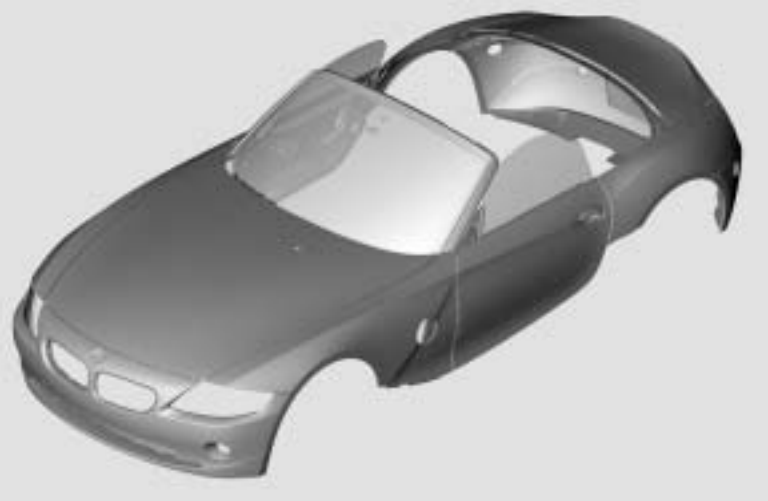
Body Shell

Subject **Page**

Bodyshell

New features of body structure

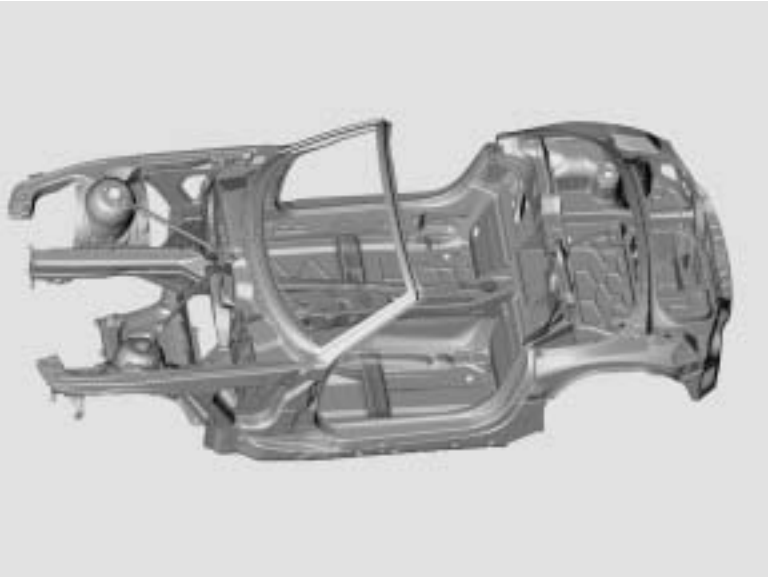
The development process for the E85 bodyshell placed particular importance on crash safety and ease of repair. The outside panel of the A pillar is a load-bearing component.
Between the outer and inner plates of the A-pillar there is a reinforcing tube. The rigidity of the body if the car overturns has been improved by the reinforcement of the A-pillar and the profile of the windscreen top rail.



Crash scenarios

Frontal impact

In the event of a frontal impact, the force is distributed as follows:
The force is passed from the aluminum-section bumper crossmembers via two deformation elements to the engine subframe members. From there, the forces are channeled into the sills and the transmission tunnel ("Y" structure). The transmission tunnel is reinforced by 4 tunnel side members.
Each of the sills is reinforced on the inside by 4 bulkheads. This also helps to prevent deformation of the passenger compartment.

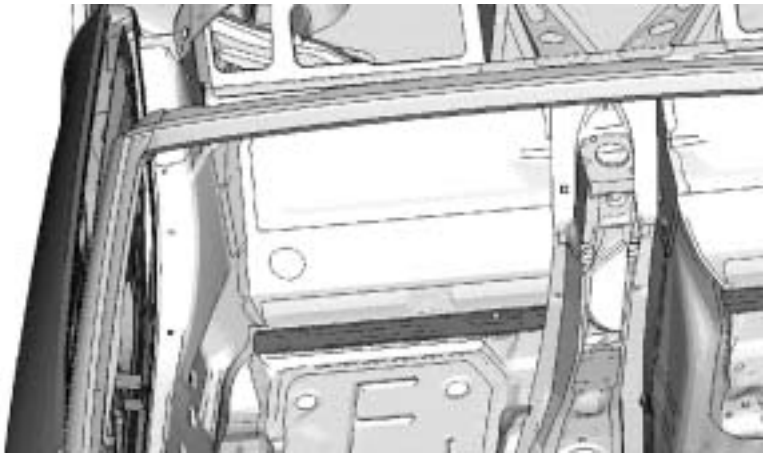


Side impact

In the event of a side impact, the forces are absorbed by a number of components:

- At the front of the vehicle, the bulkhead absorbs the force.
- In the door area, the force is channeled into the sills. The doors themselves are strengthened by reinforcing plates. They absorb only a small amount of the force so that they can still be opened after a crash.
- In the area of the fuel filler pipe, the forces are channeled from the sill through the heel plate and into the transmission tunnel. Lateral transfer in the tunnel is provided by the rear thrust plate. This function was previously performed by a bridging plate. Attachment of the thrust plate to the rear suspension has only a minimal effect on rigidity. Therefore, in the event of a crash, very little energy is transmitted to the rear suspension.

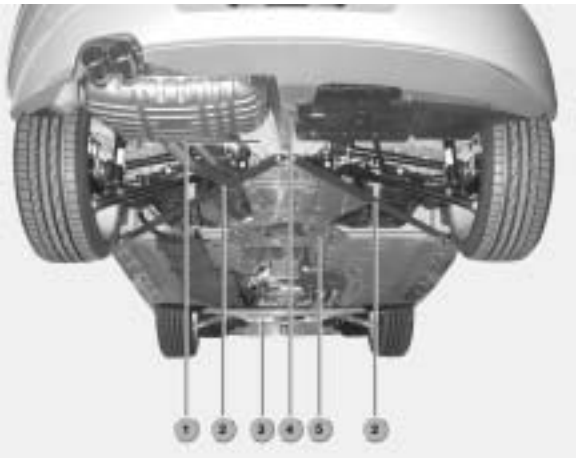
Rear impact



The distribution of forces in the event of a rear impact is as follows:

- The force is passed from the bumper mountings via two deformation elements to the rear body panel support. From there, the forces are channeled via longitudinal members to the transmission tunnel. Relatively small forces can also be transferred by the center brace. However, the primary purpose of the center brace and cross-braces is to increase torsional rigidity. But since they do not have a predetermined fracture point, they can also absorb relatively small compression forces.

Roll-over crash

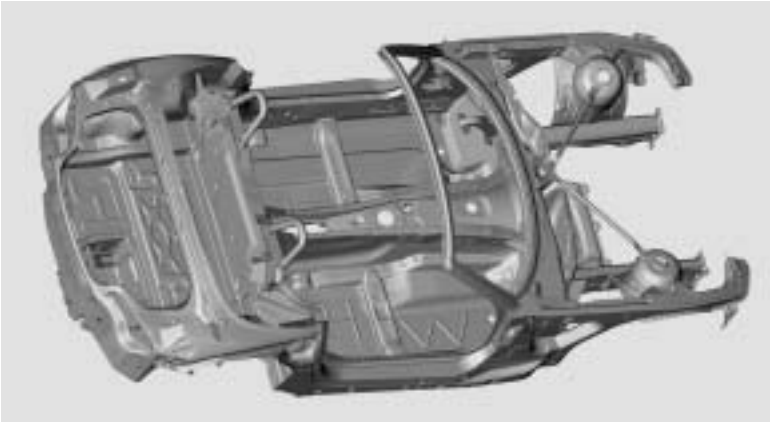


1. Brace Mounting
2. Right/Left Cross Braces
3. Front Thrust Plate
4. Center Brace
5. Rear Thrust Plate

If the car overturns, the forces are distributed as follows:

- At the front, the forces are channeled via the A-pillars (with internal reinforcing tube) into the bulkhead and the sills.
- At the back, the force passes through the roll-over bars into the roll-over bar subframe and from there to the side panels

Rigidity



Although the E85 is larger than its predecessor, the E36/7, the rigidity has been substantially increased without increasing the weight.
The dynamic rigidity has been increased from approx. 17.5 Hz on the E36/7 to approx. 21 Hz on the E85.
The static rigidity has been more or less doubled. The figure has risen from approx. 7 kNm/° on the E36/7 to approx. 14 kNm/° on the E85.

Torsional rigidity

There are extra cross-braces between the suspension-strut mountings and the engine-compartment bulkhead. These increase the torsional rigidity. In the event of a serious impact, the braces bend at a designed buckling point.
There are also additional reinforcing components for increasing torsional rigidity at the rear (cross-braces) and in the underbody area (2 thrust plates).