

'BACK TO THE FUTURE' CRASH TEST REVEALS HUGE ADVANCES IN CAR SAFETY FROM 20 YEARS AGO

- **Rover 100 inflicts 'life-threatening injuries' at just 40mph**
- **Honda Jazz occupants 'walk away' from identical crash**
- **Crash test results are testament to 20 years of close co-operation between Euro NCAP and motor industry, says Thatcham Research**

Twenty years of endeavour to make cars safer in a crash were graphically illustrated in a split-second this week, when a 1997 Rover 100 and a current Honda Jazz were crashed at speed, by experts at Thatcham Research.

The dramatic results - which in real life would have seen the Rover 100's occupants killed or seriously injured - highlight the poor protection offered to drivers and passengers before Euro NCAP launched its crash test programme two decades ago.

In stark contrast, occupants of the latest Honda Jazz would have walked away with just probable bruising after the head-on crash into a barrier at 40mph, staged at Thatcham Research to mark the 20th anniversary of Euro NCAP.

"Wherever you were sitting in the Rover 100 it was bad news", says Matthew Avery, Director of Research at Thatcham Research. "In a head-on crash at 40mph, you definitely do not walk away. And you have a very high likelihood that you are no longer with us.

"These crashes demonstrate how incredibly far we have come in 20 years and show why we have seen a 63 per cent reduction in car occupant deaths and injuries since 1997, when Euro NCAP began.

Life threatening injuries in Rover 100

In the Rover 100 Supermini (formerly the 'Metro'), the crash forced the steering wheel sharply into the cabin, pushing the airbag to one side as the passenger 'safety cell' dramatically collapsed. This left the driver with serious head injuries as he smashed into the hard dashboard and A-pillar – instead of the airbag.

The force on the driver's head registered a shocking 3,000 on Thatcham Research's HIC (Head Injury Criteria) scale - way above the 1,000 HIC 'high risk' threshold.

The Rover 100's bulkhead – separating the engine from the passenger compartment – also collapsed and the driver's seat gave way, leaving the 'driver' with severe injuries to his legs as they were rammed hard into the dashboard.

The dummy's left femur registered a force of nine kilonewtons (kN) with 18 kNs on the right, 10 times higher than considered 'reasonable' by Thatcham Research.

One of two 'children' in the back seat of the Rover also suffered life-threatening injuries. The crash hurled the three-year-old forwards, ramming its head into metal pillars supporting the head restraint and the driver's head.

The frontal offset crash - which resulted in the metallic red Rover 100 crumpling like a tin can - shocked even Thatcham Research's experts.

Within the space of one quarter of a second - the Rover 100 sustained such serious damage that it would have left its driver and passengers trapped inside with life-threatening injuries, as revealed by the crash dummies. Instead of protecting the occupants, the Rover 100's vital 'safety cage' was crushed almost in half.

"There was a very, very heavy head strike in the Rover 100 - the risk of life-threatening injury was very high," said Thatcham's Director of Research, Matthew Avery, who helped oversee the tests. "With the collapse of the bulkhead and dashboard, the driver's knees were completely wedged into the dashboard, forcing the legs forward.

"The dashboard exerted a very high load on the femurs. A load of 18 kN is horrendous; high loads on the femur can rupture the femoral artery in your pelvis. You could bleed to death internally. This is not just about breaking your legs - it's about you being killed because the forces on your pelvis are so high."

Thatcham Research chose the 1997 Rover 100 because it was a top-selling car when the Euro NCAP programme was launched and because it was among the first batch of seven cars to undergo the new tests, scientifically designed to be far tougher than those demanded by legislation. Then, the Rover 100 scored only One Star in the Euro NCAP Rating scheme.

The £14,000 Honda Jazz was chosen because it's one of the top-performing Superminis on sale in 2017 and costs the same as the Rover did in 1997, adjusting for inflation, scoring Euro NCAP's top-rated five stars thanks to cutting edge safety systems developed through 20 years of rigorous testing.

The 40mph impact was chosen because it replicates one of the most common serious crashes on UK roads.

Significant areas of the driver dummy in the Rover 100 - the femurs, lower legs and head - were rated as 'red' in the test, signalling Euro NCAP's highest risk to life.

Thatcham Research said the Rover 100 was 'very poor' in its structural stability and energy absorption. 'Very poor' occupant restraints failed to do their job after the safety cage collapsed and - unlike a modern car - there were no seat belt load-limiters to prevent excessive force being passed on to the occupants.

The Rover 100's door partially burst open in the crash, an instant Euro NCAP 'fail' as it means occupants are no longer safely 'contained'. After the crash, the dummies - just like real-life occupants - could only be removed by technicians using heavy cutting gear.

Honda Jazz occupants walk away

Occupants of the current Honda Jazz would have walked away from the same crash with just probable bruising, thanks to advanced safety measures demanded and tested by Euro NCAP and widely built into cars.

"The Honda's sophisticated body structure collapsed at the front," says Matthew Avery, "absorbing the 40mph impact, spreading the force around the car, but leaving the vital safety cage intact. Unlike the Rover 100's occupant compartment which caved in by 400mms, the Honda's barely distorted, deforming by just a few millimetres - well within acceptable levels. This enabled the car's restraint systems - its belts and airbags - to perform at their optimum level."

The metallic yellow Honda's seat belt load limiters reduced forces passed on to the occupants while its airbags - including a curtain airbag in the roof lining - offered high protection levels. The driver's head hit the centre of the airbag as intended, registering an HIC of just 448, less than half the threshold at which injuries occur. The driver's left femur registered just 0.36kN and the right femur just 1.73 kN's (compared to the Rover 100's 18kN).

"The Honda is a very good performer- especially for a small car," says Matthew Avery. "After the crash I was easily able to open the door. The windscreen was not even cracked following a 40 mph crash test, a very good result. These crashes demonstrate how very far we have come in 20 years.

"These tests show why we have seen a 63 per cent reduction in car occupant deaths and injuries since 1997, when Euro NCAP began. We could not be where we are today without vehicle manufacturers doing what they do, and would still be driving cars with the same safety levels as we saw with the Rover 100."

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Additional Information:

How were the cars crash-tested?

Both cars were separately rammed, straight on, into a deformable aluminium barrier, with a 40 per cent overlap on the driver's side. Just as in most real-life head-on accidents, this meant that only about 40 per cent of the car's front contacted the barrier on impact. It puts the car under greater strain than a full-frontal crash. It's a standard Euro NCAP test.

Were other tests carried out?

Yes. The Honda Jazz is fitted with life-saving AEB (Autonomous Emergency Braking). It alerts drivers to an imminent crash, helping them use the maximum braking capacity by 'priming' the braking system first. AEB can even automatically apply the brakes - if the driver doesn't - if the situation becomes critical. The Honda's AEB system successfully avoided the rear of a simulated stationary car in tests at Thatcham. The Metro - which did not have AEB - did not. In the 40mph crash test however, the AEB was disabled. To obtain Euro NCAP Five Stars today, a car must be fitted with AEB.

Where were the crash tests performed?

At the Thatcham Research Crash Laboratory in Berkshire, UK.

How long did it take to prepare the tests, once the cars were purchased?

It took two days to set up the tests, recording instruments, the lighting and the crash test dummies.

How long did the actual test take, from beginning to end?

The vehicles took approximately 15 seconds to accelerate to 40mph/64km/h. The actual impact took just 250 milliseconds to complete, all recorded on high-speed video and still photography.

How many technicians were required to set up and oversee the crash tests?

It required a team of 11 engineers and technicians, performing various tasks such as vehicle and crash dummy setup, instrumentation and data acquisition, high speed videos and photography.

Why was the Honda Jazz chosen?

It is Euro NCAP's benchmark 'supermini' car.

Are there more details on how the Honda Jazz - and Rover 100 - performed in official Euro NCAP tests?

Yes - visit <http://www.euroncap.com/en>

Where did the Rover come from?

It was bought from a private seller.

Where did the Honda Jazz come from?

It was bought direct from Honda UK.

What does it sound like when the cars strike the barrier?

Loud. Unlike the sound of smashing glass and shrieking metal you tend to hear in films, it's similar to the sound of someone stepping on a drinks can - magnified many times over. The firing of the airbags also results in loud, simultaneous, detonations.