NH 90
A Successful Crash Test

On 24 October 2002, the NH 90 came through a crash test at Eurocopter's Ottobrunn site in Germany with flying colors.

On test was the NH90 center fuselage section with the landing gear extended and 13 instrumented dummies in the cabin. The design gave proof of its crash-resistant qualities in the vertical impact, which was programmed at 10.6 m/s.

The overriding goal of the test was to demonstrate that the helicopter's occupants will enjoy maximum impact safety. Specifically, the test was designed to verify the airframe integrity, the energy-absorption of the cabin sub-floor structure, the specific load-absorption mechanisms, and the serviceability of the troop seats.

In fact, the test, which had to meet stringent requirements, proved to be an across-the-board success. The integrity of the fuselage structure was unaffected, and its components collapsed, as designed, in a controlled manner. As for the interior of the cabin, 85% remained intact during all the crash phases, as required by the specifications, and the weights representing the engines and the gearbox did not break away. To clinch it all, the seat troops behaved exactly as planned: the "occupants" were not subjected to excessive accelerations, and the uniform energy absorption of the sub-floor structure eliminated any rebound upon impact.

Thanks to this test, Eurocopter has once again demonstrated the quality of its advanced materials and airframe technologies, as already evidenced in a similar test on the Tiger helicopter. ■

Eurocopter

The top priority: to demonstrate the helicopter's occupants enjoy maximum crash protection.

Technological Mastery Makes the Difference

The NH 90 is the biggest NATO military helicopter program, and one of the most ambitious of the last decade. The NH 90 is also by far the most advanced, high-performance versatile helicopter for naval and land missions in the 10-15 ton class. Read on to find out why the NH 90 is slowly but surely becoming the unrivaled standard throughout the world.

Eurocopter / Wolgang Obrusnik

Thanks to its small diameter rotor, the NH 90 can fly through narrow breaks in the terrain, where competing helicopters cannot venture because of their different rotor diameters and engines.

Two engines or three? For helicopter design, this question is no longer an issue. Modern turboshaft engines are so reliable and powerful that twin-engine architecture offers power-to-weight ratios that meet even the most demanding performance requirements. Nothing was more natural then for the four European partners in the NH 90 program to opt for the twin-engine design when they drafted the NH 90 program specifications.

After NATO Headquarters decided to adopt the NH 90 as the future transport and assault helicopter of the alliance countries, the design choices and technical options (profile, avionics architecture, cabin size, and powerplants) were focused on the future helicopter's high maneuverability and controllability (fast acceleration, high Vz, tight turning capability). Another priority was to provide innovative functions for terrain flight (electromagnetic and infrared stealth, short exposure time to enemy observation resources, ability to fly through narrow gaps, etc.).

The NH 90 has been designed to operate jointly with the Tiger in the toughest theaters of operations.

The only way of satisfying the various operational requirements was to break with conventional design practices. For example, the NH 90 has an unusually small diameter rotor that is counterbalanced by highly efficient rotor blades. The helicopter can thus fly through narrow breaks in the terrain and gaps in tree cover, where competing helicopters cannot venture because of their different rotor diameters and engines. Other breakthroughs are unquestionably the Automatic Flight Control System (AFCS), and particularly the Fly-By-Wire (FBW) controls on the NH 90 – a 'first' on a production helicopter. The specificity of FBW controls is their ability to optimize the piloting laws and to 'decouple' the axes, both of which improve the helicopter's handling qualities. What's more, the pilot inputs to the FBW computers are filtered for easier piloting and for extremely precise holding of the flight path. No other helicopter in the world can lay claim to such qualities, and none of its competitors in the 10-15 ton category can hold a candle to the NH 90's power-to-weight ratio. This ratio is all the more important as it counteracts a physical law that defines the inertia of a body as proportional to the fourth power of its size. In other words, the heavier the helicopter, the more slowly it reacts to pilot inputs. Despite its weight, large-sized cabin and capacity to carry 14-20 commandos, the NH 90 can still be classed as a medium helicopter. And thanks to this tradeoff, it is virtually in a class of its own. ■