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CAPACITÉS' EXPERTS INSTRUMENT HELICOPTER BLADES

#fiber-optic #mechanical engineering #aeronautics

Helicopter blades are subject to high strain that must be measured. For this, Airbus Helicopters asked Capacités to conduct a detailed study of the blades' behavior under mechanical strain and incorporate the results into a digital model. Capacités' experts in mechanics and material performance used their experience with fiber optical instrumentation to meet the manufacturer's needs.

FIBER OPTICS AS A MEASUREMENT TOOL

Numerical analysts from Airbus Helicopters needed an experimental database to build a digital model of helicopter blade behavior. They contacted Capacités to instrument one blade and then conduct measurement campaigns. Capacités' experts first developed fiber optical instrumentation, with a gauge every five millimeters. It was installed directly on the blade that the manufacturer provided. Tensile and torsion stresses were applied to the blade to reproduce the stresses it would withstand in real conditions in an outdoor environment. The optical fiber was examined to measure the strain and temperature changes of the blade. A digital image correlation system was then used to conduct a second series of strain measurements.

Capacités' experts compared the results from both measurement techniques; this allowed them to calibrate the optical fiber to obtain a real state of the structure and populate the anticipated digital model.

Their work was conclusive, and Airbus Helicopters has signed on for a three-year thesis with researchers from the University of Nantes in order to obtain more in-depth results.

To complete this project, the Capacités' experts benefited from support and technical equipment from the GEM laboratory (Research Institute in Civil and Mechanical Engineering), joint research unit of Nantes Université and the CNRS. ■

Project carried out for:



Linked expertises:

- Mechanical engineering
- Fiber-optic Instrumentation

CAPACITÉS SAS :

CAPACITÉS SAS is engineering and research valorisation subsidiary of Nantes Université. Working in the field of innovation, it employs near by hundred staff members and carries out over 350 projects per year. CAPACITÉS works alongside with the researchers in scientific laboratories in order to provide tailor-made solutions and expertises.