

FAA William J. Hughes Technical Center

Dynamic Vertical Drop Test Facility Building 214

The FAA is responsible for airplane crashworthiness standards. These standards increase the possibility of occupant survival in case of an accident and were established empirically using the results of prior airplane crash test programs.

In development of those standards, it was noted that the full-scale airplane impact test database did not include airplanes representative of commuter category. To provide data for those size airplanes, the FAA initiated a full-scale vertical impact test program of 14 CFR 23 commuter category airplanes. As part of this program, a test of a Metro III aircraft was conducted in April 1992, a Beech 1900 airplane was tested in October 1995, and a Shorts 330 in September 1998. The tests were structured to assess the impact response characteristics of airframe structures, seats, and the potential for occupant impact injury.

In addition, the Aircraft Safety Research Plan calls for the vertical impact test on a series of transport category fuselage sections. These tests are conducted to determine the impact response characteristics of some typical items of mass such as overhead stowage bins, auxiliary fuel tanks, and seats/occupants installed onboard a transport airplane to assess the adequacy of their design standards and regulatory requirements.

The FAA's Dynamic Vertical Drop Test Facility, located in the Safety Research and Development area at the FAA William J. Hughes Technical Center, Atlantic City International Airport, New Jersey, is used to obtain the empirical data needed to set crashworthiness standards and to obtain



other crashworthiness data as described above. The data from tests conducted at this facility will enable a quantitative evaluation of the effects of crash events on occupant survivability.

The Technical Center drop test facility, shown below and on the back page, is comprised of two 50-foot vertical steel towers connected at the top by a horizontal platform. An electrically powered winch, mounted on the platform, is used to raise or lower the test article and is controlled from the base of one



R&D Facilities



of the tower legs. The lifting capacity of the winch is 30,000 pounds. Attached to the winch is a cable which is used to raise or lower the test article. A sheave block assembly hanging from the free end of the reeved cable is engaged to a solenoid operated release hook. A cable/tumbuckle assembly connects the release hook to the airframe with hooks bolted to the fuselage section. A 15- by 36-foot wooden platform is located below the winch cable assembly and between the tower legs. The platform rests on I-beams and is supported by 12 independent load cells. The load cells are used to measure the fuselage impact on the platform.

The data collected in future tests will be added to existing databases. Scheduled vertical drop tests include a commuter aircraft from the current fleet and one

transport category narrow-body fuselage section with overhead stowage bins. The data obtained in these tests will be used to improve standards for overhead stowage bins and auxiliary fuel tanks.

To find out more about the Dynamic Vertical Drop Test Facility, contact:

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