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PROGRESS REPORT NO. 1

Research and Development on Methods for Structural Testing of High-Speed Aircraft and Missiles

1 April 1954 to 1 August 1954

H. F. ALLEN

July, 1954



Department of the Air Force
Wright Air Development Center
WPAFB, Ohio

Contract No. AF33 (616) -2437

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PROGRESS REPORT NO. 1

RESEARCH AND DEVELOPMENT ON METHODS FOR STRUCTURAL
TESTING OF HIGH-SPEED AIRCRAFT AND MISSILES

1 April 1954 to 1 August 1954

H. F. ALLEN

Project 2250

DEPARTMENT OF THE AIR FORCE
WRIGHT AIR DEVELOPMENT CENTER
WPAFB, OHIO
CONTRACT NO. AF33(616)-2437

July, 1954

PROGRESS REPORT NO. 1

RESEARCH AND DEVELOPMENT ON METHODS FOR STRUCTURAL
TESTING OF HIGH-SPEED AIRCRAFT AND MISSILES

PURPOSE

This project covers theoretical analyses and laboratory tests to establish relationships which may exist between room-temperature tests and various types of elevated-temperature tests of aircraft structures, and to develop means of producing rapid temperature changes in aircraft structural components.

STATUS

In accordance with Reference 1, this report covers a period of four months instead of two months. A starting date of 1 April 1954 is specified in the contract, but due to contractual delays, the project was not established until 24 May 1954. The necessary rescheduling of other duties could not be done in advance and delayed the actual start of work on the project until approximately 1 June 1954.

Progress since that date has been slow due to vacation schedules and inability to obtain student assistance during the summer months. A box beam has been designed and fabricated which may serve as the prototype for the test specimens to be utilized in Phase I, and a room temperature test jig is being designed.

WORK ACCOMPLISHED

During the period covered by this report, studies were initiated which are expected to lead to the selection of the type of structure and the size of the test specimen to be used in the Phase I investigations. The structure should not be large, in order to minimize costs, and preferably should fail by buckling of skin and stringers. The design must be sufficiently simple so that it will not be difficult to construct a fairly large number of specimens which will be substantially identical, geometrically, and which will be fabricated from the same batch of material.

A rectangular box beam will be tried first, as such a cross section is easily duplicated to close tolerances. A 4-inch by 11-inch aluminum-alloy box beam has been designed and constructed of material on hand. A room-temperature test setup is being designed to subject this specimen to bending tests at room temperature. A similar beam will then be constructed and subsequently tested at elevated temperature. A conference with the project engineer at Wright Air Development Center will be scheduled before adopting a type of specimen for the entire test program of Phase I.

REFERENCE

Wright Air Development Center letter WCLSS(WCLSS-6) dated 22 July 1954 to the Engineering Research Institute, University of Michigan.

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