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SYMPOSIUM ON PARACHUTE TEXTILES

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FOREWORD

This report covers a symposium which was sponsored by the Materials Laboratory, Directorate of Research, WADC, with Lt. Colonel R. W. Conners as Chairman, under the project identified by Research and Development Order No. 612-12, Textiles for High Speed Parachutes.

The individual papers presented herein were prepared by the respective authors for presentation at the Air Force-Navy-Industry Symposium on Parachute Textiles on 21 and 22 September 1953. Papers prepared in conjunction with Air Force Contracts are identified in the Table of Contents by the listing of the Contract No. The work presented by all other papers was accomplished by respective organizations without Air Force Contracts and are not necessarily subscribed to by the U. S. A. F.

ABSTRACT

Technical papers concerning recent developments and future requirements of parachute textile problems were presented at a WADC Symposium on 21 and 22 September 1953. In particular, recent developments in the studies of friction damage, effects of high temperature, air flow through cloth, and design data for use in developing parachute textile materials which will operate at high speeds were discussed.

PUBLICATION REVIEW

This report has been reviewed and is approved.

FOR THE COMMANDER:

M. R. WHITMORE
Technical Director
Materials Laboratory
Directorate of Research

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INTRODUCTION AND OBJECTIVE

Textiles have played an increasingly important part in the science of flight from the earliest time to the present. Major technical advances and applications were made during the first World War in the use of cotton and linen and the subsequent development of silk for parachutes. Also in the years just prior and during World War II, when the development of synthetic materials played such a vital part in the successful functioning of this piece of life saving equipment.

In the problems resulting from the development and use of textile materials in parachutes it is necessary to have a cross flow of information between the Air Force, designers, manufacturers and research contractors. The coordination of effort in design data and the development of textile materials are also important.

The cross flow of information and ideas from industries and services benefit the Air Force through more effective and correct utilization of current and newly developed materials. Data are provided with which to guide research and development effort, reveal operating problems, provide for preliminary coordination of new specifications, and aid in the standardization of textile materials.

To attain the maximum in design and performance of a fabricated article requires familiarity with the characteristics and properties of materials employed. That there is a keen appreciation of these facts is evidenced by the use of new and improved materials and processes throughout the industry. The development of textiles has kept pace with general progress, yet the designer in aeronautics is relatively uninformed as to the characteristics and limitations of textile materials as compared to his information on metals, heat treatments, protective coatings and the like. As long as textile materials are used in parachute canopies, they must necessarily be subject to the same careful scrutiny as other structural materials with reference to design and performance of the fabricated article. Specifications for textile materials are widely known and thoroughly appreciated, thanks to the excellent work of Engineering, Technical and Commercial organizations, and Governmental Agencies. The interpretations of these specifications and an appreciation of the limitations of the material specified however, are apt to be faulty.

The main objective in the discussions concerning these problems is to present effectively to industry and to parachute designers the problems involved in present and future parachute requirements.

DISCUSSION

A joint Air Force-Navy-Industry Parachute Textile Symposium, sponsored by the Materials Laboratory, Directorate of Research, WADC, was held at W-P AFB, Ohio, on 21 and 22 of September 1953. In attendance at this meeting were approximately 150 persons representing the aircraft industry, textile industry, parachute fabricators, and the Air Force, Navy, Bureau of Aeronautics, Office of the Quartermaster General, Office of Naval Research and Army Field Forces. Also present were representatives of Canada and England.

The bringing together in this manner of as many people as possible who are interested in parachute textiles and the finding out and helping to solve parachute problems resulted in a cross flow of information that could not be obtained by individual discussions. The wide range of subjects discussed during the two day meeting, by highly competent men in their particular field, will show benefits to the Air Force, not only in time and money but in increased interest in the various problems related to parachute items.

To conduct progressive research in the development and evaluation program for parachute textile materials required in the fabrication, operation and maintenance of parachutes, is one of the prime functions of the Textiles Branch, Materials Laboratory. However, without the aid of research and industrial organizations many of the Air Force Parachute problems would not be solved.

The ever increasing speeds of aircraft and missiles have necessitated a program to obtain design data for use in developing parachute textile materials which will operate normally at these increased speeds. It is apparent then that an exchange of information, such as effects of temperature, friction damage and air flow through cloth, between textile manufacturers, parachute fabricators and that portion of the aircraft industry involved in the development of missiles and aircraft utilizing recovery or drag parachutes is of vital importance to the continuing effort of the USAF.

The papers prepared and presented herein cover many of the present day as well as indicated future requirements for parachute application such as:

a. Development of improved webbing.
b. The incorporating of design data into new fabrics.
c. Friction problems at high speeds.
d. Parachute requirements and problems of parachute design.
e. Air permeability.
f. Textiles for use in free air facility test programs and in aircraft deceleration and missile recovery.
g. Temperature and humidity problems.

The papers presented in this report, however, reflect the individual authors and the ideas of the individual authors. Their presentation in this report should not be construed as constituting Air Force agreement with every statement.

New Personnel Emergency Parachute of the United States Air Force.