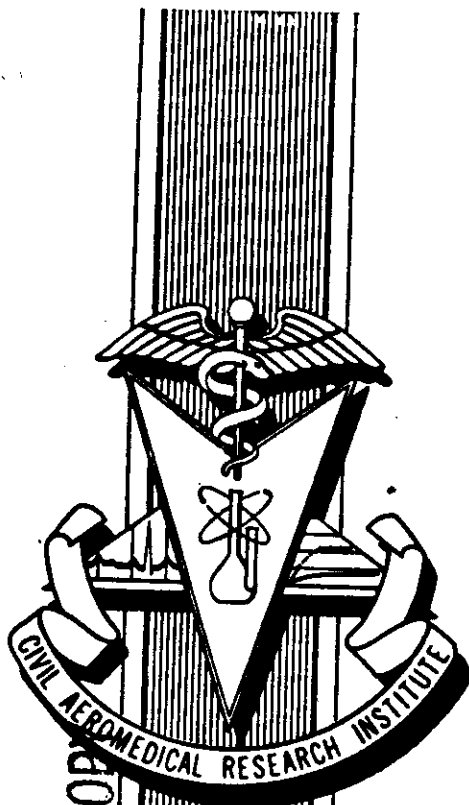


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RÉSUMÉ AND INDEX OF REPORTS  
 OF THE  
 CIVIL AEROMEDICAL RESEARCH INSTITUTE  
 1961 - 1962



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FEDERAL AVIATION AGENCY  
 AVIATION MEDICAL SERVICE  
 AEROMEDICAL RESEARCH DIVISION  
 CIVIL AEROMEDICAL RESEARCH INSTITUTE  
 OKLAHOMA CITY, OKLAHOMA

FEBRUARY 1963

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**RÉSUMÉ AND INDEX OF REPORTS  
OF THE  
CIVIL AEROMEDICAL RESEARCH INSTITUTE  
1961 - 1962**

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## **FOREWORD**

This Résumé and Index is prepared as a quick reference for use by those engaged in civil aviation and related activities. It provides, in capsule form, a descriptive statement of each CARI Report published in 1961 and 1962.

Requests for copies of the reports listed should be forwarded to the Director, Civil Aeromedical Research Institute.

## I. CARI REPORTS

1961

- 61-1 David K. Trites. Problems in Air Traffic Management: I. Longitudinal Prediction of Effectiveness of Air Traffic Controllers, Dec. 1961.

This report discusses the contribution of psychological testing to the screening of applicants for air traffic control work. The significance of ATC school instructors' evaluations in predicting future job performance as controllers is also reported.

1962

- 62-1 John J. Swearingen, C. D. Wheelwright, and J. D. Garner. An Analysis of Sitting Areas and Pressures of Man, Jan. 1962.

Heretofore, a paucity of information has been available to the design engineers relative to the seat pressures exerted by occupants of aircraft. Uncomfortable and fatiguing seats have resulted. This report provides seat pressure distribution data which is being utilized by certain helicopter and aircraft designers in an effort to fabricate seats which better accommodate themselves to the occupant. The implications concerning the protection these newer seats afford the occupants during impacts are quite significant in impact survival.

- 62-2 Bart B. Cobb, Jr. Problems in Air Traffic Management: II. Prediction of Success in Air Traffic Controller School, Feb. 1962.

Specific information is provided concerning CARI's successful research program on the selection of air traffic controller students. As a result of this study, the Civil Service Commission incorporated in

"Announcement 281-B, Career Opportunities in the FAA for Air Traffic Control Specialist," dated May 22, 1962, certain tests recommended by this research. It is estimated that more than two million dollars will be saved through this study since potentially unfit persons will be eliminated from entrance into training.

- 62-3 David K. Trites and Bart B. Cobb, Jr. Problems in Air Traffic Management: III. Implications of Age for Training and Job Performance of Air Traffic Controllers, Feb. 1962.

The data in this report confirms conclusively the existence of an inverse relationship between chronological age upon entry into ATC training and school and later job performance.

- 62-4 John J. Swearingen and Stanley R. Mohler. Sonotropic Effects of Commercial Air Transport Sound on Birds, Mar. 1962.

Repeated difficulties experienced by certain turboprop aircraft with regard to starling ingestion may be, in part, due to the sonotropic effects of various frequencies for these small birds. Suggestive observations are discussed and possible remedies provided.

- 62-5 P. F. Iampietro and Ralph F. Goldman. Prediction of Energy Cost of Treadmill Work, Apr. 1962.

The utilization of the treadmill as an instrument to determine physical fitness has become a widespread activity. Certain considerations relative to the interrelationships between rate, load and incline are reported for the utilization of those conducting these studies on airmen.

- 62-6 Bruno Balke. Human Tolerances, Apr. 1962.

The ultimate limitations in flight performance and in future civil air carrier equipment are limitations imposed by what may be termed "human tolerances." The first effort by airline personnel to determine the most desirable crew composition and methods of selection, with respect to the Supersonic Transport, have been based, in part, upon this report (see the paper by Mr. J. G. Brown of United Airlines, ASME-AHGT-84, March 1963).

- 62-7 A. Howard Hasbrook and John C. Earley. Failure of Rearward Facing Seat-Backs and Resulting Injuries in a Survivable Transport Accident, Apr. 1962.

Rearward facing seats are generally superior to forward facing seats with respect to impact survival. However, improperly installed aft facing seats can be hazardous. This report describes one such case. As a result of this report, all Military Air Transport Service aircraft were checked, and corrections made to all aft facing seats found improperly installed.

- 62-8 Paul W. Smith. Toxic Hazards in Aerial Application, Apr. 1962.

The Civil Aeronautics Board has provided all of its field accident investigators with copies of this comprehensive study of the toxic hazards in aerial application activities. In addition, the major organizations involved in crop dusting have requested copies of this report, and are utilizing the recommendations made in it.

- 62-9 A. Howard Hasbrook, J. D. Garner, and Clyde C. Snow. Evacuation Pattern Analysis of a Survivable Commercial Aircraft Crash, May 1962.

This study provides facts on the reasons for the failure of all occupants to evacuate a survivable jet aircraft accident. The major U.S. airlines have utilized the report, including its utilization as a textbook in crew emergency training courses.

- 62-10 Jack W. Daugherty, Dane Eugene Lacey, and Patricia Korty. Problems in Aerial Application: I. Some Biochemical Effects of Lindane and Dieldrin on Vertebrates, May 1962.

Investigation of the relatively unknown biochemical effects of organic insecticides is conducted at CARI. It is projected that these studies will result in preventive, protective, and therapeutic measures which will decrease the morbidity and mortality rates in the field of aerial application. The investigation of the chlorinated hydrocarbon insecticides lindane and dieldrin is discussed in this report.

- 62-11 Glenn R. Hawkes. Tactile Communication, May 1962.

Human skin is seldom used for message communication purposes but it can be — and usefully so. The use of tactile communication in aviation is relatively unexploited for situations when visual and auditory stimuli reach the saturation point. The report suggests possibilities in this regard plus the possibility of transmitting emergency warning signals.

- 62-12 J. Robert Dille, Norris L. Newton, and James F. Culver. The Effects of Simulated Altitude on Penetrating Eye Injuries, May 1962.

Air may exist in the human eye following injury or surgery. The effects of aerial flight, at reduced barometric pressure, upon these conditions are reported and guidelines are given for evaluating these cases for transportation by aircraft.

- 62-13 John J. Swearingen, A. H. Hasbrook, R. G. Snyder, and E. B. McFadden. Kinematic Behavior of the Human Body During Deceleration, June 1962.

This report describes the areas that may be traversed by the human head, trunk and extremities during flailing motions in crashes with seat belt restraint only. Lethal structures of present aircraft seating and cockpit arrangements are revealed by correlating crash injuries with these kinematic data.

Specific data for the use of aeronautical design engineers are provided, and are of significance in particular to the future SST and light plane designs, plus all other planes now on the drawing board.

- 62-14 John J. Swearingen. Determination of Centers of Gravity of Man, Aug. 1962.

During abrupt decelerations, the occupant tends to spin around his center of gravity. Consequently, the design of shoulder harnesses and other restraint systems must take this information into consideration. This report has provided the design engineers with the requisite facts for consideration in this regard.

- 62-15 Walter C. Gogel. The Visual Perception of Size and Distance, July 1962.

The perception of the size of objects and the depth between them is important in aviation. The importance of perception of absolute distance, convergence of the eyes, and accommodation is challenged. A different mechanism, the adjacency principle, is proposed as the key process in judging distance visually.

- 62-16 Glenn R. Hawkes. Absolute Identifications of Cutaneous Stimuli Varying in Both Intensity Level and Duration, Sept. 1962.

This report discusses the effects of spacing, intensity, and duration of the stimuli; immediate knowledge of results; and experience, upon the amount of information that can be transmitted by cutaneous communication. The implications have a bearing on tactile communication processes.

- 62-17 William E. Collins. Manipulation of Arousal and Its Effects on Human Vestibular Nystagmus Induced by Caloric Irrigation and Angular Accelerations, Oct. 1962.

Evaluations of the reactions to vestibular stimulation frequently show effects of drugs, frequency of rotation and general features of the response. The results of several experiments, in which methods of controlling the psychological attitude of the subject were evaluated, are reported here. Active mental work (such as oc-

curs during instrument flying) produces a heightened responsivity of the nystagmus (involuntary eye flicks to and fro). The study bears directly upon IFR vertigo problems.

- 62-18 Lerner B. Hinshaw, Charles M. Brake, P. F. Iampietro, and Thomas E. Emerson, Jr. Effect of Increased Venous Pressure on Renal Hemodynamics, Oct. 1962.

Pressure in the renal vein is increased during changes in body posture, congestive heart failure, and, relatively, in shock and low blood pressure. The resultant effects upon the kidney blood flow and urine composition are poorly understood, yet are important to the physical and laboratory evaluation of airmen.

- 62-19 Richard G. Snyder. A Case of Survival of Extreme Vertical Impact in Seated Position, Oct. 1962.

The envelope of impact survival forces for human beings is being determined at CARI, so that the concentrated effort can be given to providing for survival of all accidents falling within this envelope. Emerging from these studies is the fact that the outer limits of human impact survival are considerably greater than was heretofore recognized. The implications for crash impact survival are of the greatest significance.

- 62-20 Stanley R. Mohler. Civil Aeromedical Research: Responsibilities, Aims, and Accomplishments, Oct. 1962.

A comprehensive survey of the civil aeromedical research program of the FAA is provided, along with documented instances of specific contributions made to air safety.

- 62-21 Ernest B. McFadden, James W. Raeke, and Joseph W. Young. An Improved Method for Determining the Efficiency of Crew and Passenger Oxygen Masks, Nov. 1962.

A method of determining oxygen mask leakage is evaluated. This method successfully determined the deficiencies in a newly-designed passenger oxygen mask which was subsequently discarded.

## II. AUTHORS

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