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Index to FAA Office of Aviation Medicine Reports: 1961 through 1997 *Introduction*

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16. Abstract An index to Federal Aviation Administration Office of Aviation Medicine Reports (1964-1997) and Civil Aeromedical Institute Reports is presented for those engaged in aviation medicine and related activities. The index lists all FAA aviation medicine reports published from 1961 through 1997: chronologically (pp. 1-43), alphabetically by author (pp. 45-52), and alphabetically by subject (pp. 53-75). A foreword illustrates historical aspects of the Civil Aeromedical Institute's 35 years of service, describes the index's sections, and explains how to obtain copies of published Office of Aviation Medicine technical reports.					
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Foreword

INDEX TO FAA OFFICE OF AVIATION MEDICINE REPORTS: 1961 THROUGH 1997



Staff members gathered in front of the CAMI Building in October 1997 to commemorate the 35th anniversary of the building's opening (October 21, 1962).

CAMI, THE CIVIL AEROMEDICAL INSTITUTE, is the medical certification, research, education, and occupational health wing of the Federal Aviation Administration's Office of Aviation Medicine (OAM).

Our mission has not changed over the years: Our only purpose is to further *aviation safety*.

At CAMI, we study the factors that influence human performance in the aviation environment, find ways to understand them, and communicate that understanding to the aviation community.

Communicating research findings to the public is achieved in several ways: published reports in professional journals and newsletters,

proceedings reports, and formal technical reports. *OAM Reports* is the major part of the communications effort. Published since 1961, these reports are the distillation of FAA aeromedical research efforts in aviation safety.

We have published 811 reports on a wide range of subjects, from *Angular Acceleration* to *Workload Effects on Complex Performance*.

The *Index* is provided as a reference for those engaged in aviation medicine and related disciplines. We do so because sharing significant findings contributes to the body of aeromedical knowledge through the synergistic effects of others, leading to understanding and the application of appropriate solutions.

Historical Vignette

ORIGIN OF THE JET PASSENGER DROP-OUT OXYGEN SYSTEM AND THE DOUBLE PANE PROTECTIVE DECOMPRESSION WINDOWS

by Stanley R. Mohler, M.D.
and William E. Collins, Ph.D.

JOHN J. SWEARINGEN retired from the Civil Aeromedical Institute (CAMI) as Chief of the Protection and Survival research program in 1971. His many accomplishments in the areas of crash injury protection, human tolerances to abrupt acceleration forces, and proper restraint system design are widely known in the aerospace safety field.

Somewhat less well known is his earlier work (1950s) that anticipated the need in the evolving generation of jet passenger aircraft for passenger drop-out emergency oxygen equipment and his passenger window designs that afforded protection should a window under pressurization forces be lost.

On October 15, 1957, John Swearingen and colleague Ernest B. McFadden patented an "adhesive-type oxygen mask" and an automatic drop-out mechanism, both of these for airline passenger protection in the event of a decompression at altitudes where passenger oxygen is desirable (U.S. Patent 2,809,633). Both Swearingen and McFadden were researchers at the Civil Aeronautics Medical Research Laboratory, a forerunner of the Civil Aeromedical Institute, located at various times in Columbus, Ohio, and Oklahoma City, Oklahoma. The mask and automatic drop-out apparatus were first described in a presentation on April 15, 1956, at the 27th annual meeting of the Aeromedical Association (now the Aerospace Medical Association) held in Chicago. The presentation was published (1) in the February 1957 issue of the *Journal of Aviation Medicine* (now *Aviation, Space, and Environmental Medicine*).

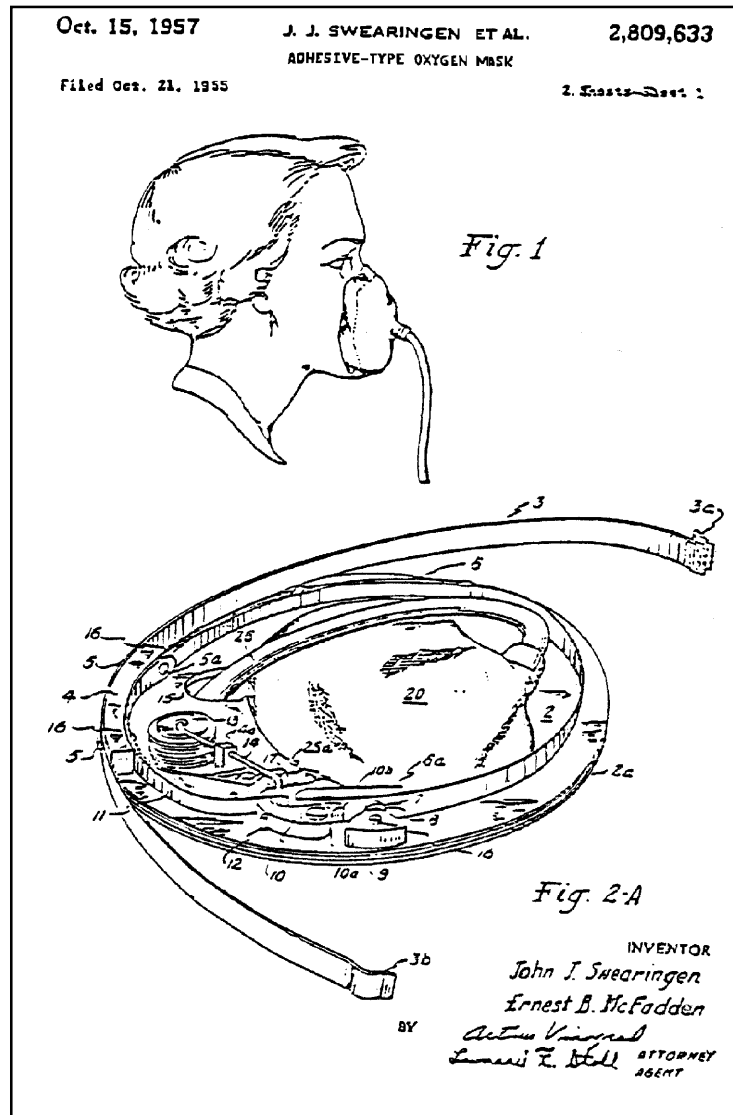


Figure 1. A replica of part of the Swearingen-McFadden original patent. The patent covers the total passenger emergency oxygen system, including the automatic drop-down mechanism triggered by altitude and the associated adhesive oxygen mask. The descriptive emphasis was on improving protection of the passenger, rather than on the release mechanism.

The accomplishments by Swearingen and McFadden in developing the oxygen drop-out mechanism with a proposed new passenger mask were reflected in the equipment carried by the first generation of passenger jets, the Boeing 707, the Douglas DC-8, and the Convair 880. Although the adhesive mask proposed by Swearingen and McFadden provided a superior seal to the passenger masks actually installed in those early flights, industry concern with the shelf life of the then-available adhesive material precluded introduction of the adhesive mask. However, the presentation aspects they developed, with automatic deployment of the mask should the cabin of an airliner exceed a given altitude (12,000 - 14,000 foot range), are in use today.

With respect to high altitude pressurized cabin flight, instances of occupant ejection through a failed window of a pressurized aircraft began to occur with the World War II era. Large pressurized piston engine aircraft retained the large, single pane window design of unpressurized aircraft. As altitudes increased, window failures occurred for one or another reason. The rapid outflow of the air from within would at times bring objects in the airflow path through the window to the outside, including any hapless human who was nearby and unrestrained.

Swearingen began his airflow studies in the 1950s and conducted further studies through the transition of the Civil Aeronautics Medical Research Laboratory to the Civil Aeromedical Research Institute to CAMI. His early work revealed the utility of utilizing double pane windows so that, should the outer pressure-bearing window fail, orifices at the perimeter of the inner window would allow the airflow to escape, leaving the inner window pane intact. This double pane safety concept was introduced in the first generation of jet passenger aircraft. Swearingen worked out a series of profiles that illustrated the safe distance of a passenger from a lost single pane window of various diameters. These profiles are published in the 1963 report, "Studies of Airloads on Man" (2). The report provided data for design engineers of aircraft with respect to specifications for windows that enhance air safety should an airliner decompress during its flight profile.

This historical summary is prepared in recognition of the pioneering work accomplished by personnel of the Civil Aeromedical Institute and its predecessor organizations. Other brief historical summaries regarding the Institute are available elsewhere (3, 4, 5).

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Figure 2. A typical work-setting photo of John Swearingen in CAMI's "high bay" area during 1963. Long-time associate J.D. Garner stands in the background.