Guide to the Harlan D. Fowler Papers MSS.1995.04

Sara Chabino
SJSU Special Collections & Archives
© 2004
Dr. Martin Luther King, Jr. Library
San José State University
One Washington Square
San José, CA 95192-0028
special.collections@sjsu.edu
URL: http://library.sjsu.edu/sjsu-special-collections/sjsu-special-collections-and-archives
The Harlan D. Fowler Papers (1920-1980) document the career of Harlan D. Fowler, inventor and aviation engineer. The collection consists of his professional papers including technical reports, blueprints, original data, technical publications, drawings, and photographs, as well as airplane models relating primarily to the Fowler flap and the Fowler-designed air cargo container.

Access
Collection is open for research, however, the negatives and the Fowler drawings are restricted. Written permission is required to access these drawings, and usage of the materials is subject to approval by the San Jose State University Library Director of Special Collections & Archives.

Separated Material
All large-scale blueprints noted in the collection are stored separately in flat-file storage. A model of an airplane cargo container, which was previously part of this collection, is owned by the SJSU Aviation and Technology Department.

Publication Rights
Copyright is assigned to the San José State University Special Collections & Archives. All requests for permission to publish or quote from manuscripts must be submitted in writing to the Director of Special Collections. Permission for publication is given on behalf of the Special Collections & Archives. Copyright restrictions may apply to digital reproductions of the original materials. Use of digital files is restricted to research and educational purposes.

Preferred Citation
Harlan D. Fowler Papers, MSS-1995-04, San José State University Library Special Collections & Archives.

Processing Information

Biographical History
Born June 18, 1895, Harlan Davey Fowler grew up in Sacramento, California. Fowler married twice and had two children. He spent his professional life as an aeronautical engineer and inventor. He died on April 27, 1982.

The year 1917 marked the beginning of Fowler's life-long career as an aeronautical engineer and inventor. Fowler worked as an independent consultant and also for a number of aeronautical firms including: Fokker, The Glenn L. Martin Co., Convair, Douglas Aircraft Co., Fowler Aircraft Co., the Bureau of Aeronautics, and the U.S. Air Force. He also patented twenty inventions, the most significant of which include: Variable-Area Wing, 1921, patent #1392005; Cargo Container for Airplanes, 1948, patent #2442459; and Convertible VTOL Aircraft, 1963, patent #3093347, and 1967, patent #3312426.

His greatest professional achievement was the development of the variable area wing, commonly known as the Fowler flap. The Fowler flap is a high-lift device located on the trailing edge of an airplane wing that increases wing area and lift. During the late 1910s and early 1920s, many engineers experimented with wings, slots and flaps to improve airplane performance. Fowler developed a flap that slid back from the wing and rotated down, creating a slot. This flap increased the curvature and area of the wing, which tunes it to operate more efficiently at lower speeds occurring during take-off and landing. The design and testing of the Fowler flap was performed as a private venture, using Fowler's own time and funds.

In the summer of 1927, Fowler and airplane mechanic Stanley Crowfoot first tested the Fowler flap. Several years of tests followed, after which the National Advisory Committee for Aeronautics (NACA) concluded that the Fowler flap would reduce landing speed, decrease landing and take-off runs, and improve climbing ability. In 1937 Lockheed added the flap to the Lockheed 14 twin-engine airliner. Previously the flap had been used on German planes such as the Fieseler Fi 97. Later it was used on Boeing B-29 bombers, some versions of the Lockheed P-38 Lightning, and the Boeing B-17. Today, variations of the Fowler flap are still being used on many commercial aircraft.

In 1949 the Franklin Institute of Philadelphia, Pennsylvania awarded Fowler with the John Price Wetherill Medal for the development of the "Variable Lift Airplane Wing." In 1971 the Institute elected him to Life Fellow Membership. Fowler was
active in the Society of Automotive Engineers and was elected to the status of Fellow in 1977. Fowler wrote a comprehensive text on flap design, *Fowler Flaps for Airplanes: An Engineering Handbook* (1948). He also published three books outside his field: *Camels to California* (1950), *Three Caravans to Yuma* (1980), and *Behold the Flaming Sword* (1983).

1910 Built man-carrying kites of Cody/Hargrave type.
1917 Signal Corps; Aeronautical Engineer Production.
1919-1920 McCook Field, Dayton, OH; Engineering Division; Assistant Engineer in charge of design.
1921 Mather Field, Sacramento, CA; Assistant Engineer; Aerial Forest Fire Patrol.
1927 U.S. Army Air Corps; Engineer.
1928 Miller Corp., New Brunswick, NJ; Chief Aeronautical Engineer.
1929-1936 Glenn L. Martin Co., Baltimore, MD; Staff Engineer.
1943 Fowler Aircraft Co., San Diego, CA.
1946 Independent Consulting Aeronautical Engineer. Whittier, CA.
1951 McCook Field, Dayton, OH; Engineering Division.
1956-1957 Independent Consulting Aeronautical Engineer. Longmont, CO.

**Related Material**
San José State University Department of Aviation and Technology Records, MSS-2010-06-08

**Scope and Content of Collection**
The Harlan D. Fowler Papers (1920-1980) document the career of Harlan D. Fowler, inventor and aviation engineer. Fowler is recognized for inventing the Fowler flap, a variable area wing high-lift device for aircraft still used on most commercial airplanes today. The collection consists of his professional papers including technical reports, blueprints, original data, technical publications, drawings, and photographs, as well as airplane models relating primarily to the Fowler flap and the Fowler-designed air cargo container. This collection documents the history of technology, the history of aviation, and the development of the aircraft industry during World War II.

**Arrangement**
The collection is arranged into nine series: Series I. Commercial Uses of Fowler Designs; Series II. Fowler-Designed Aerodynamic Flow Control Devices; Series III. Original Fowler Aircraft Designs and Data; Series IV. Air Cargo Reports and Data; Series V. Miscellaneous Reports; Series VI. Aircraft Conversion Reports and Data; Series VII. Artifacts; Series VIII. Publications; and Series IX. Images.

**Immediate Source of Acquisition**
Donated by Harlan D. Fowler in 2004.

**Subjects and Indexing Terms**
Airplanes -- Design and construction -- History
Aerfoils
Fowler flaps
Aeronautics -- Research -- United States -- History
Aeronautics -- History -- 20th century
Fowler, Harlan Davey, 1895-
San José State University. Library. Special Collections & Archives
Series I: Commercial Uses of Fowler Designs Series I: 1920-1966

Series Scope and Content Summary
This series documents the commercial use of Fowler's designs, specifically the Fowler flap. Included are photographs that illustrate the use of the flap on various airplanes in different modes of extension. Items of note include a negative of the first working model of a Fowler variable area wing constructed in 1920, photographs of the first experimental airplane using a Fowler flap, the Canuch and other early experimental planes. This series also includes a limited number of press releases, correspondence, and technical reports of tests on Fowler flaps.

Access Note
Access to negatives is restricted.

Box 1, Folder 1  Photos of XC-99 and XB-47 and Press Release Clippings (1 of 2)
Box 1, folder 2  Photos of XC-99 and XB-47 and Press Release Clippings (2 of 2)
Box 1, Folder 3  Photos of Flap Installations on Various Aircraft (1 of 2)
Box 1, Folder 4  Photos of Flap Installations on Various Aircraft (2 of 2)
Box 1, Folder 5  Photos of Fowler Flap Installations including 1st Installation and Brief History (1 of 2)
Box 1, Folder 6  Photos of Fowler Flap Installation including 1st Installation and Brief History (2 of 2)
Box 1, Folder 7  Photos of Flap Installations (1 of 5)
Box 1, Folder 8  Photos of Flap Installations (2 of 5)
Box 1, Folder 9  Photos of Flap Installations (3 of 5)
Box 1, Folder 10 Photos of Flap Installations (4 of 5)
Box 1, Folder 11 Photos of Flap Installations (5 of 5)
Box 1, Folder 12 Blueprints for C-119H
Box 1, Folder 13 Full Scale Wind Tunnel Test of Fairchild F-22 equipped with Fowler Flap (1 of 2)
Box 1, folder 14 Full Scale Wind Tunnel Test of Fairchild F-22 equipped with Fowler Flap (2 of 2)
Box 1, folder 15 Breguet 941 STOL Aircraft Transition Velocities (1 of 2)
Box 1, folder 16 Breguet 941 STOL Aircraft Transition Velocities (2 of 2)


Series Scope and Content Summary
This series is comprised primarily of National Advisory Committe for Aeronautics (NACA) technical notes and test reports, many of which contain blueprints and/or photographs. The series includes photographs depicting various flap installations, as well as newspaper clippings and correspondence, such as correspondence with NASA Ames Research Center concerning scheduled tests of Ames Fowler Model propellers. Items of note include photographs of boundary layer control gloves, and a letter from The Smithsonian Institution National Air Museum with a photograph of a Fowler airplane model on display at the museum.

Arrangement
The series is arranged according to its original order into six subseries: Boundary Layer Control, Flaps, Ailerons, Ducted Fans and Deflected Slipstream, Dragulator, and Miscellaneous.

Folder 1/17-56, 2/1-21  Fowler-Designed Aerodynamic Flow Control Devices 1932-1970
Box 1, folder 17  Method for Improving the Inherent Weaknesses of Supersonic Airplane
Box 1, Folder 18  Boundary Layer Control, Detachable Boundary Layer Control Gloves
Box 1, Folder 19

Guide to the Harlan D. Fowler Papers MSS.1995.04
Boundary Layer Control, Description of Boundary Layer Control Gloves

Box 1, Folder 20

Boundary Layer Control, Description of Detachable Boundary Layer Control Gloves

Series III: Original Fowler Aircraft Designs and Data Series III: 1927-1966

Series Scope and Content Summary
This series contains Fowler's original research, data and designs, documented by blueprints, reports, and charts. Also included are original drawings, also known as lofts. In addition, this series includes test reports by Fowler and by the University of Washington Aeronautics Laboratory regarding tests performed on Fowler-designed models. Items of note include photographs of full-size mockups of containerized air cargo planes, as well as photographs showing the "correct" method of handling cargo containers on the Fowler sky-truck. Of special interest are drawings and photographs of special uses Fowler proposed for the sky-truck such as a mobile surgical unit during World War II. Also of note are photographs of test models of the Fowler flap dating as early as 1927.

Access Note
Access to the drawings is restricted due to limited processing, and requires special permission from the Director of Special Collections & Archives.

Folder 2/22-41, 3/1-22

Original Fowler Aircraft Designs and Data 1927-1966

box 12-17

Original Fowler Aircraft Drawings n.d.

Series IV: Air Cargo Reports and Data Series IV: 1937-1979

Series Scope and Content Summary
This series contains materials documenting air cargo transport, including articles, reports by Fowler, blueprints, and photographs of the Fowler-designed air cargo transport container and sky-truck. One item of note is a drawing of an air cargo container titled "Future Air Freighter for Carrying Express and Mail," indicating an unrealized use of Fowler's sky-truck and air cargo containers. A model of the air cargo container is owned by the SJSU Department of Aeronautics and is housed at the Mineta International Airport in San José.

Folder 3/23-37

Air Cargo Reports and Data 1937-1979

Series V: Miscellaneous Reports Series V: 1940-1969

Series Scope and Content Summary
This series contains reports and blueprints, and includes the minutes of the second meeting of the Technical Subcommittee of the Prototype Aircraft Committee.

Folder 3/38-42, 4/1-18, 5/1-4

Miscellaneous Reports 1940-1969

Series VI: Aircraft Conversion Reports and Data Series VI: 1958-1980

Series Scope and Content Summary
This series is primarily comprised of technical reports. Many of the reports include folded blueprints. Also included is a small amount of correspondence related to the technical reports.
Series VII: Artifacts

Series Scope and Content Summary
This series contains models of airplanes equipped with Fowler flaps, as well as a few working models of aircraft devices by Fowler. Some of the airplane models are on display in the Special Collections Reading Room.

Sub-Series 1: Aircraft Models
On Display

Lockheed Ventura Military Aircraft Model
On Display in Reading Room

Lockheed Ventura Military Aircraft Model
On Display in Reading Room

Lockheed Military Aircraft Carrier Model
On display in reading room.

Lockheed Military Aircraft Carrier Model
On display in the Reading Room.

Consolidated Vultee xB32 Model
On top of Flatfile 2.

Sub-Series 2: Model Cases

Fowler Flap Model
On top of flatfile 6 in Vault 1.

Box 8
Green Aircraft Model
Fowler Wing Pieces
Boundary Layer Control Wing Section
Lockheed P-38 Lightning Model
Box 9
N2000S Aircraft Model Presented to Professor Thomas E. Leonard
Consolidated B-24 Model.

Series VIII: Publications

Series Scope and Content Summary
This series is primarily comprised of materials published by NASA and the precursor organization, NACA. Also included in this series is Fowler’s seminal 1948 book on flaps, entitled Fowler Flaps for Airplanes: An Engineering Handbook (1948). This series is organized by publisher in the following order: NACA, NASA, and Other Publishers. In addition, the NASA publications are organized by type. NACA and NASA publications are arranged alpha-numerically. Other publishers are arranged alphabetically by author surname.

Box 5/25-27
Sub-Series 1: NACA Publications ?-1958

Box 5/28-41, 6/1-49, 7/1-20
Sub-Series 2: NASA Publications 1959-1974
Box 7/21-36  
Sub-Series 3: Other Publications 1928-1974  

Series IX: Images Series IX: 

Series Scope and Content Summary  
This series contains images that were originally in frames, as well as oversized images and slides. Many of the images were used to illustrate Fowler's text on airplane flaps. In addition, there are photographs and lithographs of commercial airplanes that incorporate the use of the Fowler flap. There are also approximately 150-35mm slides depicting aircraft and aircraft models from WWII to the 1960s, as well as a caricature drawing of Fowler riding on an airplane wing model.

Box 10  
Additional Images  
Box 11, folder 1  
Boeing XB-47  
Box 11, Folder 2  
Consolidated B-24  
Box 11, folder 3  
Consolidated Vultee Model xB32  
Box 11, Folder 4  
Consolidated Co. Vultee xB-46  
Box 11, Folder 5  
Consolidated Vultee Model 240  
Box 11, folder 6  
Lockheed Constellation  
Box 11, Folder 7  
Lockheed Constitution  
Box 11, folder 8  
Lockheed P2V  
Box 11, Folder 9  
Lockheed P-38  
Box 11, folder 10  
Slides (1 of 2)  
Box 11, Folder 11  
Slides (2 of 2)