



AEROSPACE INFORMATION REPORT

SOCIETY OF AUTOMOTIVE ENGINEERS, Inc.

485 Lexington Ave., New York, N. Y. 10017

Cancelled
AIR 938

Issued 8-15-66

Revised

GUIDE FOR PREPARATION OF OPERATIONS MANUALS BY AIRFRAME MANUFACTURERS

1. **PURPOSE** - The purpose of this information report is to provide a guide for airframe manufacturers to use in the preparation of operations manuals to be used by flight deck crews for safe and efficient aircraft operation.
2. **INTRODUCTION** - It is recognized that the Federal Aviation Agency (FAA) Approved Airplane Flight Manual establishes and specifies the certificate limitations, normal and emergency operating procedures for each aircraft. That this manual must be prepared in accordance with FAA regulation and format is also known. In addition to the data supplied in the FAA Approved Flight Manual, airframe manufacturers need to support the operators with detailed information for the safe and efficient operation of the aircraft. This supplemental information is contained in an airplane operations manual. This general guide is provided to assist the aircraft manufacturer in preparing a useful and complete operations manual for efficient operation of his aircraft. Variations in size, type, and complexity of aircraft will, of necessity, dictate the deletion and/or inclusion of some items in the guide for specific purposes.
3. **SCOPE** - The operations manual should cover the aircraft and systems description, operational procedures (normal and abnormal), and operational performance of the aircraft in a form usable by the flight crew.

Coverage should be limited to information that is used in flight. By eliminating reference to ground procedures (except preflight responsibilities), many system procedures such as engine trimming, ground run check, etc. can be eliminated. The emphasis then centers on in-flight procedures. The depth of system coverage in the manual is determined by examining the controls and equipment readily available to the flight crew in flight. System coverage is "as required" since it is presented from "what you do when..." or "how can you do..." This policy also results in maximum "wheat" and minimum "chaff" in the manual. The manual contains what is needed and usable, not a blanket system coverage.

The manual should be aimed at in-flight use by qualified crew members. The flight crew receives initial ground and flight training in a comparatively short and concentrated period and then operates the aircraft for years. Therefore, an operations manual should be composed of material to be used by a qualified crew man. Material, such as basic power plant, basic electrical, etc., should be a training supplement and not a part of the operations manual. Obviously, the operations manual is a major portion of the training program. After qualification, however, the supplemental information can be left at home. Another advantage is the reduced bulk which allows a crew member to rapidly find specific information in the manual. This is no small item, since time is usually a factor when the crew seeks information from a manual in flight.

Information should be written using an "operational" approach that is practical to use. The coverage supplied by the aircraft manufacturer should be "practically" usable in flight, considering not only the system involved but also the ability of an average crew member to remember the procedural philosophy, flow pattern of control manipulation, and ability to complete many procedures during the critical phases (takeoff and landing) of flight.

Material should be logically laid out and easily found. A wealth of information contained in a manual is useless unless it can be readily found by a crew member in flight under adverse conditions. The size of the manual is not the prime consideration but is nevertheless a consideration. Previously listed policies of providing operational information usable in flight by qualified crew members provide the major contribution to meeting this objective.

SAE Technical Board rules provide that: "All technical reports, including standards approved and practices recommended, are advisory only. Their use by anyone engaged in industry or trade is entirely voluntary. There is no agreement to adhere to any SAE standard or recommended practice, and no commitment to conform to or be guided by any technical report. In formulating and approving technical reports, the Board and its Committees will not investigate or consider patents which may apply to the subject matter. Prospective users of the report are responsible for protecting themselves against infringement of patents."

The FAA approved flight manual may be inserted in the operations manual if desired by the operator. Tab dividers will be provided by the manufacturer for this purpose.

4. PHYSICAL REQUIREMENTS - The operations manual should be prepared as follows:

4.1 Size - The manual pages should be no larger than 8-1/2 x 11 inches.

4.2 Type - The pages should be typewritten, using standard elite or comparable type face and carbon ribbon. Text material should be typed in double column, single spaced format.

Pages containing text material should use 9-point type size as a minimum. Component identification or operational information used on illustrations should be proportioned to the rest of the material on the page.

Printing with royal blue ink will provide maximum clarity when read under cockpit lighting conditions.

4.3 Page Format - Each page of material should contain a representative manual mast head in the upper center of the page. Each page should also contain a section, page number, and date located on the lower outside corner of the page. The section title should be located in the upper outside corner of the page. The page data, including an identifying code number, can be located on the lower inside corner of the page for revision service identification. All section numbers and page numbering should be in arabic numerals. A sample is attached.

4.4 Manual Binding - The pages should be edge-punched with 7 holes arranged 3-1-3 for binding in an adequate binder. The binder should be large enough to accommodate the operations manual and FAA flight manual.

5. ARRANGEMENT

5.1 Sections - The operations manual should contain section tab dividers entitled with the subject of each section and arranged as described herein. Four of the tabs designate the location for insertion of the FAA approved manual sections if the operator so desires.

<u>Tab Color</u>	<u>Section No.</u>	<u>Subject</u>
-	0	PREFACE
Yellow	1	FAA LIMITATIONS (Reserved for insertion of FAA Manual Section)
Red	2	FAA EMERGENCY PROCEDURES (Reserved for insertion of FAA Manual Section)
Orange	2A	ABNORMAL PROCEDURES
Yellow	3	FAA NORMAL PROCEDURES (Reserved for insertion of FAA Manual Section)
Yellow	3A	AMPLIFIED NORMAL PROCEDURES

5.1 Sections (Continued)

<u>Tab Color</u>	<u>Section No.</u>	<u>Subject</u>
Yellow	4	FAA CERTIFIED PERFORMANCE (Reserved for insertion of FAA Manual Section)
Yellow	4A	OPERATIONAL PERFORMANCE
White	4A-1	Flight Planning (including diversion)
White	4A-2	Takeoff, Climb and Cruise
White	4A-3	Holding, Descent and Landing
White	4A-4	Engine-Out Performance
White	4A-5	Supplemental Performance Information
Yellow	5	Air Conditioning and Pressurization
Yellow	6	Auxiliary Systems (including APU, water and waste)
Yellow	7	Communications and Navigation (including A/P, Flt. Inst.)
Yellow	8	Electrical (including lighting)
Yellow	9	Emergency Equipment (including Oxygen, Fire Protection, and Warning System)
Yellow	10	Hydraulic Systems (including L. G. and Flight Controls)
Yellow	11	Ice and Rain Protection
Yellow	12	Power Plant (including Fuel and Bleed Air)

Other sections may be added as the need arises.

6. COVERAGE - The FAA approved flight manual, together with the operations manual, will provide the operator with completely detailed information and procedures for the safe and efficient operation of the airplane. Coverage within each section, other than the FAA approved flight manual, is described briefly as follows:
 - 6.1 Section 0, Preface - This section includes an introduction to the manual, instructions on its use, intent and scope of the information and a general aircraft description.
 - 6.2 Section 2A, Abnormal Procedures - The abnormal procedures in this section are those that require immediate crew action to either counteract major system malfunctions or prevent an emergency condition developing, such as loss of hydraulic fluid, in-flight engine start, landing with one or more landing gear retracted, etc. Passenger and crew evacuation procedures should be contained in this section.

Certain necessary information regarding actions to be performed after the emergency no longer exists is found in this section, such as procedures to be followed after an engine fire has been extinguished in flight or after an electrical fire has been isolated. These procedures are abnormal because, even though the emergency has been taken care of, the airplane is in an abnormal condition and effort must be made to restore as much of a normal condition as possible.