

# ICAO

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### THE CONTINUING AIRWORTHINESS OF AIRCRAFT IN SERVICE

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### METHODS OF HANDLING AIRCRAFT DEFECT REPORTS

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THE CONTINUING AIRWORTHINESS OF AIRCRAFT IN SERVICE  
METHODS OF HANDLING AIRCRAFT DEFECT REPORTS

Foreword

In order to assist the Air Navigation Commission of ICAO in a study regarding the maintenance of continuing airworthiness of aircraft in service, Contracting States have been asked to forward to ICAO information on the practices they employ in matters concerning the methods adopted for reporting, analyzing and taking appropriate action in cases of recurring failures or defects on aircraft in service.

The information received from Contracting States was considered to be of general interest to all Contracting States. However, since the information submitted was not originally intended for general publication, it was circulated in 1953 in the form of Draft ICAO Circular 34-AN/29 with the request that Contracting States suggest any amendments or amplifications that they would like to see incorporated in the final text of an ICAO Circular.

This Circular contains the material originally issued in Draft Circular No. 34-AN/29 with the suggestions for amendments and amplifications incorporated.

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## THE CONTINUING AIRWORTHINESS OF AIRCRAFT IN SERVICE

### METHODS OF HANDLING AIRCRAFT DEFECT REPORTS

#### 1. - Introduction

Practically every new type of aeroplane introduced into service is subject to miscellaneous mechanical difficulties. This is particularly true of larger and mechanically more complicated aeroplanes.

The aeroplane presents to the designer a multitude of problems regarding dependability of its various components, accessories and equipment, problems that he cannot always solve with complete confidence. In this respect the aeroplane does not differ from other complicated machines, for example, the motor car. No matter how much care is exercised in the initial design there are nearly always some weaknesses that can only be revealed after the machine has been put into service.

As a result, when the aeroplane enters service, there are revealed mechanical difficulties of which some may critically affect safety of operations, some may cause delays in scheduled operations, and others may cause undue wear and tear that shorten the period between inspections and complicate maintenance operations.

Thus the problem of mechanical dependability in service is not solved by the initial issue of a certificate of airworthiness and adherence to the initial maintenance code issued early in the life of an aeroplane. In fact, the next and extremely important step in making an aeroplane safe throughout its operating life is the correction without delay of any developing defects and mechanical difficulties. This process does not end with the first few years in service but extends throughout the total operating life.

The generally accepted procedure of controlling such mechanical difficulties involves reporting, classifying and analyzing them and taking appropriate corrective action. This action is normally closely co-ordinated between operators, manufacturers and appropriate government agencies. The detailed methods of taking such action must of course vary from State to State according to the organization of civil aviation in each particular State, to the many different types and methods of operation and to the size and state of development of the national aviation industry.

The following text summarizes information from Contracting States regarding their methods for reporting, taking appropriate action and exchanging information on recurring failures or defects on aircraft in service.

## 2. - Reporting Methods

There appear to exist three principal means of collecting information on defects and failures that occur on aircraft during operation. One is the analysis of reports of accidents and forced landings. These reports normally are required by States on a mandatory basis, for all accidents of air carrier and non-air carrier aircraft. A second means is the reporting and recording of defects and malfunctioning detected in flight or on the ground that are considered to be hazardous. These reports are normally required on a mandatory basis for all aircraft engaged in commercial air services. In some States provisions exist for the collection of such reports for non-carrier aeroplanes also. The third means consists in collecting reports on those incidents of mechanical malfunctioning that may not be individually hazardous, but that caused a delay in departure or otherwise interrupted a flight. The latter reports are normally required only for aircraft engaged in scheduled air services.

The defects and malfunctionings are reported in individual letters or on special forms established by large operators or by the State of Registry. They provide information such as the following: date and place of occurrence, aircraft registration, overhaul history, responsible maintenance personnel, description of defect or difficulty, circumstances under which they occurred and were detected, opinions as to the causes, immediate action taken, suggestions as to the prevention of recurrence.

The detailed procedures adopted by the various Contracting States for the submission by aircraft operators of defect and malfunctioning reports however appear to vary widely. They may depend on the number of operators, the number and types of aircraft, the maintenance and inspection procedures adopted and on the general organization and development of civil aviation in a particular country.

In general, operators are required to transmit the defect reports to the appropriate government authority as soon as possible after the detection of an incidence. Some States prescribe, for this purpose, specific periods of time within which a report should be submitted. In addition to the reports on each individual defect monthly or three monthly reports summarizing and classifying individual reports are required. In some States those summary reports are compiled by the State of Registry and in others by the operators. Below are given some specific examples of reporting procedures.

In AUSTRALIA aircraft defects are classified as "major" or "minor". Major defects are those defects which in themselves reflect on safety and warrant individual study, while minor defects are those which are regarded as being significant only when a greater number of the same type of defect occurs.



Major defects are reported to departmental regional offices within 24 or 48 hours (according to the type of operator). The defect reports are then immediately transmitted onwards to the departmental head office. Major defect reports are published in a weekly summary which is circulated to all operators.

Minor defects are reported on monthly summaries in a statistical form (see Figure 1) - i. e. , merely as a record of the total number of defects or non-scheduled removals happening to each item of equipment.

In CEYLON it is mandatory for all aircraft operators to report delays, defects, engine failures, aircraft incidents and accidents as soon as possible after the detection of same to the Director of Civil Aviation. Immediately after an accident the operator or the owner of the aircraft involved submits a notification of the accident to the Director of Civil Aviation on the form shown in Figure 2. The accident is investigated by the Aircraft Accident Investigation Board and reported on the two forms shown in Figures 3 and 4. On so called Daily Mechanical and Delay Report forms (see Figures 5 and 6) any defects and delays are notified to the Aeronautical Inspectorate. Major defects on airframe and on engines are reported on forms shown in Figures 7 and 8 respectively.

The procedure in INDIA requires all aircraft operators to report defects of aircraft to the Director General of Civil Aviation on the forms shown in Figures 9 and 10. Such forms must be completed in all cases of forced landings or accidents due or partly attributable to failure of any part of the aircraft or engine. Together with those reports, the defective parts should be forwarded to the Controller of Aeronautical Inspection of the Area concerned. Reports of the occurrence of other material defects detected on inspection and not resulting in an accident or a forced landing should also be forwarded together with the defective parts.

In addition to the above procedure, India requires that all mechanical delays occurring in scheduled airline operations be reported to the Office of the Director General of Civil Aviation, in interim reports on a monthly basis. In cases where the mechanical delay exceeds 30 minutes, the special form shown in Figure 11 has to be completed in addition to the interim reports.

In INDONESIA all operators submit on a mandatory basis reports on forced landings, on accidents and on defects or malfunctionings that directly affect the airworthiness of the aircraft.

Scheduled air carriers also report mandatorily each defect and malfunctioning that affected the regularity of the operations.

Non-air carriers and non-scheduled air carriers in addition submit on prepared forms monthly reports on matters concerning continuing airworthiness.

All operators submit on a non-mandatory basis reports on defects and malfunctioning that are not covered by the mandatory reports.

In ITALY, the operator or pilot-in-command is required to report immediately any defect or malfunctioning of a civil aircraft to the Registro Aeronautico Italiano (RAI). He is also required to report all occasions on which the aircraft was operated under conditions for which that particular category of aircraft has not been certificated.

Incident reports are prepared by the local office of the RAI on incidents of malfunctioning that are considered to constitute a potential hazard to flight safety. In scheduled airline operations, mechanical delays at take-off exceeding 15 minutes are considered as incidents.

For commercial transport aircraft, the RAI has adopted a system of "continuous supervision", which consists in keeping a small staff of RAI personnel at the most important centres, and particularly at airline maintenance bases. Special arrangements and agreements between airlines and the RAI ensure that all matters affecting the safety of aircraft in service come immediately to the knowledge of such RAI staff. Any defect or malfunctioning and any removal of a part or unit for reasons other than completion of service time must be reported to the RAI which endorses the report.

In NEW ZEALAND a defect in relation to an aircraft is defined as any failure or malfunctioning of an aircraft or aircraft component whether in flight or on the ground. Within this definition defects are grouped into two categories. A category "A" defect is one which is of such character that the immediate safety of the aircraft is impaired. A category "B" defect, though not affecting the immediate safety of the aircraft, is one which necessitates a change in maintenance procedure, frequency of inspection or major modification of an aircraft. The latter category includes also such defects as might arise from abnormal wear or circumstances.

The Air Navigation Regulations require the reporting of all defects as defined above and the civil Airworthiness Requirements of New Zealand state that the operator is responsible for ensuring that defects are reported within the specified time limit. All category "A" defects must be reported as soon as possible and in any case within 24 hours to the appropriate Regional Aircraft Surveyor. This original notification is immediately forwarded to Head Office.

Category "B" defects must be reported in writing to the appropriate District Aircraft Surveyor within seven days. This normally takes the form of a completed Defect Report form on which the operator states the nature of

the defect, the results of his investigation into the cause, and the remedial action taken.

Major airlines maintain their own defect investigation unit and are granted the concession of reporting their category "B" defects in the form of a monthly summary.

In NORWAY the Air Navigation Act requires all owners of aircraft to report damage which has an effect on airworthiness. This includes all accidents and serious defects. Commercial operators also must report all other defects. Accidents are reported on a special form. While there are no official forms for defect reports, some operators have established their own forms. An example is the one of SAS (see Figure 14) which is used in the three Scandinavian countries.

In PAKISTAN a notice by the Government requires that any defects found on aircraft, possibly as a result of inspections called for in approved maintenance schedules must be reported to the Aeronautical Inspection Division at the earliest opportunity. A special form (see Figure 12) is used for reporting such defects which include also incidents and minor accidents to aircraft.

In SWEDEN all owners of aircraft are required to submit accident reports to the Board of Civil Aviation. In addition all persons engaged in commercial air services are required to report all failures or defects occurring on their aircraft to the Board. As far as scheduled air services are concerned the measures adopted are also based on failure statistics compiled every three months. Specimen forms of the usual reports notifying defects are reproduced in Figures 13 and 14.

In the UNITED STATES the operators of civil aircraft submit to the Civil Aeronautics Board or to the Civil Aeronautics Administration:

a) on a mandatory basis:

i) Accident Reports covering all accidents that occur to U.S. Air carrier and non-air carrier aircraft; (Figures 15 and 16);

ii) Daily Mechanical Reports covering any failure, malfunctioning or other defect detected in flight or on the ground in air carrier aircraft that may reasonably be expected by the air carrier to cause a serious hazard in the operation of any aircraft;

iii) Flight Interruption Reports covering aircraft occurrences due to known or suspected malfunctioning or mechanical difficulties that result in an interruption to a scheduled flight.

b) on a voluntary basis:

Malfunctioning and Defect Reports for other than scheduled air carrier aircraft covering difficulties experienced with aircraft structures, engines propellers and equipment of other than scheduled air carrier aircraft (see Figure 17).

Aircraft Accident Reports

Immediately after an accident the operator or owner of the aircraft involved submits by the most expeditious means of communication available a notification of the accident to the Civil Aeronautics Board or Civil Aeronautics Administration. Such notification includes the following information as far as immediately available: location, date, time of day, number of persons involved, injuries to each, aircraft identification including registration number, aircraft make and model, names of crew members, operator, and briefly the nature or circumstances surrounding the accident.

Subsequent to this notification a written accident report is prepared by the operator involved. This report is made on a report form furnished by the Civil Aeronautics Board or Civil Aeronautics Administration (see Figures 15 and 16). The original and one copy of such a report is then mailed or delivered to the office or representative of the Civil Aeronautics Board or Civil Aeronautics Administration nearest to headquarters of the operator who will immediately transmit the original copy of the report directly to the appropriate office. The report must be made as soon as possible and in the absence of a good cause for a delay must be submitted within ten days after the accident in the case of an air carrier aircraft and within seven days in the case of all other aircraft. Such written accident reports are normally not required for occurrences involving minor injuries or minor damage, or in the case of air carrier aircraft if the accident was not incident to flight.

Daily Mechanical Reports

Whenever a failure, malfunctioning or other defect is detected in flight or on the ground in an aircraft of a scheduled air carrier that may reasonably be expected to cause a serious hazard in the operation of an aircraft, notice thereof is transmitted through the air carrier's principal maintenance agent to the Civil Aeronautics Administration maintenance agent-in-charge. The failures and malfunctioning or other defects that are reported comprise generally the following basic items: fire hazards, structural hazards, serious system or component malfunctioning or failure, unsafe procedures or conditions, and defects in design or quality of parts and materials found installed on aircraft or intended for such installation. The reports cover the 24-hour period from midnight to midnight of each day. They are transmitted to the accident-

maintenance agent of the Civil Aeronautics Administration before noon on the following working day, except that reports on Fridays, Saturdays and Sundays may be submitted not later than noon of the following Mondays. The reports are transmitted in a manner and on a form convenient to the air carrier's system of communications and procedures. They normally include the following information: identification of aircraft, airline and trip number, emergency procedure affected, nature of condition, (fire, structural failure, etc.) identification of part and system involved, apparent cause of trouble (wear, cracks, design, personal error, etc.), disposition (repaired, replaced, aircraft grounded, etc.), brief narrative summary to supply any other pertinent data required for a more complete identification, determination of seriousness etc.

Such daily reports are not withheld pending presentation of all specific details pertaining to the above-mentioned items of information. As soon as the additional information is obtained, it will be submitted as a supplement to the report.

#### Flight Interruption Reports

Air carriers normally prepare daily summaries on any mechanical malfunction or suspected malfunction occurring in flight or on the ground during scheduled operation that results in a change in the aircraft schedule, regardless of cause. Copies of such daily summaries of mechanical delays are submitted by the scheduled air carrier to the assigned aviation safety agents of the Civil Aeronautics Administration. The period covered by each daily summary is the preceding 24 hours during which reports of pertinent occurrences are received by the air carrier's main base. No such daily summaries are submitted for those periods during which no interruption to schedule were experienced. Each summary is identified numerically to maintain continuity. The daily summaries include the following data:

- i) identification of the daily summary including a consecutive number of the summary, name of operator and date of occurrence of the items reported;
- ii) type of registration of aircraft to which each item pertains;
- iii) brief statement describing or identifying the difficulty experienced. Such statements identify the parts and system involved and any available related information, where possible, that can reasonably be expected to add to the value of the report from an informative or analytical standpoint. They may also include such items as corrective action, extraordinary conditions, whether or not difficulty was induced by personal error or other extraneous occurrence, and recommendations.

### Malfunctioning and Defects Report of other than a Scheduled Air Carrier

In order to provide information that will enable the Civil Aeronautics Administration to take steps to prevent the recurrence of mechanical difficulties on other than air carrier aircraft the Civil Aeronautics Administration requests the co-operation of all owners, pilots, operators, mechanics, inspectors and investigators in reporting mechanical difficulties experienced with aircraft structures, engines, propellers and equipment of non-air carrier aircraft. Such reports are made on a special form and mailed to the Civil Aeronautics Administration, Safety Analysis. A copy of such a malfunctioning and defects report is reproduced in Figure 17.

### 3. - Analysis of and Action on Defect Reports

The characteristics and causes of defects are so numerous as to render the duties of categorization of details and analysis of reports a highly specialized and skilled technical activity. Airlines or government agencies that have the responsibilities of making such analysis normally have established a special office for this purpose. The analysis of individual or daily reports and the summary report determine the nature of necessary remedial action.

In order to facilitate the determination of such remedial action and to estimate trends in mechanical reliability of aircraft, the defect analysis offices include sometimes a statistics unit which classifies the data collected and establishes failure statistics. Classification of defects varies greatly from chronological filing of defect reports to the breaking down of the items and factors of interest by means of punch cards. A procedure between these extremes is to classify defects according to the type of aircraft, the type of failure and the part of the aircraft concerned (airframe, power-plant, brake system, hydraulic system, etc.).

The results obtained from the collection and analysis of data concerning defects and mechanical malfunctioning are in most cases acted on through the co-operative effort of the government agencies concerned, the manufacturers and the operator.

In countries with a limited number of major airlines that have an aeronautical engineering staff approved by the Government with the authority to approve major repairs and modifications, corrective action is usually determined directly by the airline. In this case, the airline normally is expected to consult the manufacturer or other airlines with similar flight material and to notify the government of the action taken, for approval or confirmation. The Government may assist airlines, if necessary, in obtaining adequate information through the State of origin and may disseminate instructions to other airlines concerned.

Remedial action for potentially recurrent defects is taken through the accomplishment of revised operating or maintenance or inspection procedures, the issuance of "Service Bulletins" by manufacturers, operators or government, or in the case of urgent or potentially hazardous defects, the issuance by the Government of "Airworthiness Directives" or "Notices to Airmen" that are mandatory upon the operators of the aircraft involved. Other action that sometimes results is revisions to airworthiness requirements or the specification of special training and educational programmes.

The action determined is notified to all interested parties and in particular to the operators and responsible maintenance personnel concerned.

For the purpose of checking that this has been proper implementation of the action determined, most governments maintain or supervise an inspection organization. Inspectors regularly receive all the Airworthiness Directives and check implementation at appropriate times.

Some examples of the action taken on defect reports by individual States are given in the following paragraphs.

In AUSTRALIA major defects are investigated either by Departmental Surveyors, or by those airline engineering sections which have been approved for this purpose. The results of these investigations are also reported briefly in weekly summaries of major defects together with a cross reference to the initial defect report to which they refer.

Minor defects are only investigated in detail when the statistical monthly returns (see Figure 1) indicate any disturbing trends. The investigations are then carried out in the same way as for major defects.

Major defects (see examples of major defects in Figure 18) are classified according to type of aircraft and type of failure and are then recorded on cards (examples in Figures 19 and 20) under this appropriate classification.

As major defects are closely allied to aircraft incidents and, in fact, are often the subject of incident reports, the information resulting from their investigation is also recorded on Hollerith punch-cards in the accident and incident statistical system; this facilitates the study of trends in major defects.

Minor defects are not normally classified or recorded except when a detailed investigation is made.

In CEYLON in order to maintain continuing airworthiness of aircraft in service, all modifications both major and minor, whether proposed by the aircraft manufacturer or operator on the basis of defect reports have to be approved by the Director of Civil Aviation (see Forms in Figures 21 and 22). In addition any concession that is required by the operator is approved on the Form shown in Figure 23.

In INDONESIA aircraft accident reports are drawn up and analyzed by a special organization in the Directorate of Civil Aviation. On the other hand the analysis of defect reports is substantially carried out by the operator himself, if necessary in close co-operation with the Directorate of Civil Aviation.

In INDIA defect reports are examined and analyzed by the Civil Aviation Department. If the cause of a defect cannot be conclusively established, the matter is taken up with the manufacturer of the particular part involved. In certain cases the defective components are forwarded to them for investigation. On receipt of their report and recommendation, remedial action is determined.

In ITALY the "Registro Aeronautico" is responsible for the examination of defects and for the investigation of their causes. Defect and malfunctioning reports filed with local offices are routed to the Head Office where they are analyzed. A sample of the coded form used for this purpose is attached (see Figure 24).

The NETHERLANDS regulations require an owner of a registered aircraft to report all major defects and repairs of an aircraft to the Department of Civil Aviation. The number of registered aircraft in the Netherlands being small and the major part of all transport aircraft being operated by one air transport operator, the Department of Civil Aviation has no specific methods for recording and analyzing recurring failures or defects. For aircraft owned by that air transport operator, the analyzing is done by the operator. If necessary, a further analysis of the failures or defects is performed by the Department of Civil Aviation in close co-operation with that operator. For all other aircraft the failures are investigated, more or less on an ad hoc basis by the Department of Civil Aviation as far as possible in co-operation with the operator.

In NEW ZEALAND the responsibility for reporting and investigating of defects is placed on the operator, while the recording and analysis is done by the Defect Investigation Unit at the head office of the Civil Aviation Branch of the Air Department. This unit studies the reports of the operator's investigations and where necessary submits proposals for preventive action.

A card index is used for classifying the defect reports. The index is divided into sections, each section being allotted to a major part of the aircraft. The sections are arranged alphabetically, e.g.

- Section A - Airframes
- Section B - Brake Systems
- Section H - Hydraulic Systems
- Section P - Powerplants



Each section is further subdivided numerically into aircraft types and each type subdivided numerically into components. Thus Section A-2 is the subsection devoted to Airframe-Lodestar Aircraft and Card A-3-7 indicates Airframe "DH Heron"-Ailerons. All the relevant information is summarized on the appropriate card and a cross reference is made to the detailed report held on file.

In NORWAY accident and defect reports are sent to the Directorate of Civil Aviation which analyzes them and is responsible for the appropriate action. The small number of aircraft in Norway makes it however impractical to employ statistical methods in the analysis.

In PAKISTAN each defect is analyzed by a member of the technical staff of the Aeronautical Inspection Division and classified roughly as follows:

- a) Defects, incidents, etc., considered everyday occurrences;
- b) Defects, incidents, etc., which may be caused by poor initial design, workmanship or maintenance, but are considered isolated cases.
- c) Defects, incidents, etc., which will not seriously affect safety, but are considered likely to re-occur.
- d) Defects, incidents, etc., which may seriously affect safety, and/or are considered likely to re-occur.

In the cases a) and b) above no further action is taken by the Aeronautical Inspection Division, but in the cases c) and d) manufacturers are notified immediately with a request for necessary remedial action; and in addition, in the case d) the controlling airworthiness authority of the country of origin of the aircraft is notified.

In the UNITED STATES the accident reports, the daily mechanical reports, the daily flight interruption reports and the malfunctioning and defect reports are collected at the headquarters of the Civil Aeronautics Board and the Civil Aeronautics Administration. A Division of the Bureau of Safety Investigation is concerned with the over-all evaluation and analysis of all Aircraft Accident Reports and this group prepares the official accident statistics that are published yearly. In addition, the analysis of these statistics and related material leads to special studies in the interest of increased safety. These statistics also form the ultimate yardstick by which progress in air safety is measured. Another Division of the Bureau, the Technical Division, reviews and evaluates from an engineering viewpoint all accident reports wherein airworthiness matters are involved, and recommends corrective action as indicated.

The malfunctioning and defect reports submitted by other than air carriers are collected and classified by the Civil Aeronautics Administration. These reports are analyzed and submitted to specialists within the CAA for initiating appropriate action. The material in the reports is then classified so as to permit at short notice the establishment of the history of a defect, the number of its occurrence, action already taken, etc.

The daily mechanical reports submitted by certificated air carriers are transmitted by the assigned maintenance agent by telegraphic means, on an expedited basis, to the Office of the Air Carrier Maintenance Branch of the Civil Aeronautics Administration where they are acted upon daily by a specialized staff. The action taken on such reports involves three principal functions as follows:

a) Pertinent information from the reports is edited and distributed to all air carriers operating similar types of equipment in order to advise the operators of the occurrence of specific incidents and as a means of alerting such operators to the possibility of similar occurrence on their aircraft. This function is handled on a daily expedited basis so that operators may be aware of hazardous incidents with a minimum of delay.

b) Supplementary information referring to each such incident is published as soon as available and includes such information as: apparent cause of the incident, interim corrective action when necessary, permanent corrective action as found to be required and any other information which might be of aid to the operators.

c) All information related to specific hazardous incidents is collected and referred as necessary to appropriate specialist groups within the CAA and industry for analysis, corrective action on an immediate or long-range basis, and for study with respect to design criteria for future aircraft. All information related to each reported incident is indexed and recorded in a manner which ensures availability for future reference and analysis. When found advisable, immediate corrective action is taken on incidents in the daily mechanical reports in the form of telegraphic directives, alert bulletins, or by specifying mandatory changes.

The daily summaries of the flight interruption reports submitted by scheduled air carriers are summarized and recorded in a monthly report by the Civil Aeronautics Administration. Such summary reports cover all aircraft occurrences due to known or suspected malfunctioning or mechanical difficulties that result in an interruption to a scheduled flight or a change of aircraft, they also record the number of engines removed prematurely because of mechanical trouble, listed by make and model, and the number of propeller featherings effected for any reason, indicating the flight stage at the time of

feathering, such as take-off, climb, cruise, etc. These monthly reports provide a means for the determination of the efficiency of maintenance procedures and frequently are also used as a basis for statistical evaluation of certain types of failures occurring in scheduled aircraft operation.

#### 4. - Exchange of Information

A great number of States operate aircraft purchased in another State. In order to maintain their aircraft on a level of airworthiness similar to the one achieved in the State of origin, the purchasing State tries to obtain regularly any information, in particular, Airworthiness Directives and Service Bulletins issued by the State of origin or by the manufacturers, that pertains to the continuing airworthiness and the prevention and remedying of recurrent defects on purchased material. On the other hand, some of the purchasing Governments and operators have made it a rule to submit to the State of origin or to the manufacturer concerned any information from their defect reports that may be of interest to the State of origin or to the manufacturer. This exchange of information is considered to constitute the best way of keeping imported aircraft in up-to-date airworthy condition and it appears that States that follow this practice are satisfied with the way this exchange of information is accomplished.

The procedure for the exchange of information is somewhat dependent on circumstances, in general the major airlines refer their problems directly to the manufacturer or its agencies. The smaller airlines and private operators refer such matters normally to their government, which takes the matter up with the manufacturer or, in some cases, with the national authority of the country concerned.

In INDIA whenever a defect occurs, the cause of which cannot be readily established, the matter is taken up with the manufacturer of the engine, aircraft or accessories involved. Sometimes the defective components are forwarded to them for investigation. On receipt of their report and recommendation, action is taken to inform all the operators of the particular type of aircraft. Any information received from the manufacturers regarding defects or failures on their products is circulated through the medium of notices to aircraft owners and ground engineers. Technical information is supplied by the manufacturers directly to the operators. A close watch is kept by the Government technical officers at the operators' base that all mandatory measures are immediately complied with.

In INDONESIA there is a special representative of the manufacturer of the principal aircraft used by the airline attached to the technical department of the airline to handle the problems relating to the particular type of aircraft. The representative acts as the liaison man between the manufacturer and the airline. All modifications and repairs to the aircraft are executed only after

consultation with the manufacturer's representative. For serious problems contact is usually made with the manufacturer first. In this way the manufacturer is always kept informed of all the work that is done to the aircraft in Indonesia. Beside this channel, the airline also reports to its office in the Netherlands all the experience obtained with this particular type of aircraft. For other types of aircraft the procedures of exchanging information are almost the same except that there is no permanent representative of the manufacturer. Information concerning one particular American type does not go to the United States directly but goes via the manufacturer's representative in Europe. In addition to the current bulletins of the manufacturers, the airline receives periodical publications issued by the manufacturer. These documents are used as a guide for maintenance and operation of the aircraft. Exchange of information with other States is still at a minimum.

In ITALY exchange of information between manufacturers and operators whether national or foreign is normally carried out through the respective technical and commercial agencies which provide for the sending of technical personnel or informative material. The Government keeps in touch with this exchange, either through direct contact with the technical experts of manufacturers or through official technical authorities. It is thus possible to check whether Italian operators are using foreign equipment in accordance with the technical specifications issued for such equipment. Exchange of information between Italian manufacturers and foreign operators, whenever any modifications are introduced, is ensured by means of "modification forms", samples of which one for aircraft and one for engines are given in Figures 25 and 26.

In the NETHERLANDS it is the practice for operators to report all major defects to the manufacturer, in some cases through a representative, if a foreign manufacturer is involved. If, in the opinion of the Department of Civil Aviation, certain information may be of more general interest, the Civil Aviation authorities of the State of origin involved are given full detailed information, and it is left to that State to check or complete the information and distribute it to all Governments concerned.

In NEW ZEALAND the responsibility for the investigation of defects rests on the operator. It is therefore normal for him to take the matter up with the manufacturer if the problem cannot be solved locally. When there are serious difficulties, it has been the practice of the Civil Aviation Branch in New Zealand to notify the Civil Aviation authority of the country of origin of the aircraft involved.

In NORWAY nearly all aircraft are of foreign manufacture. The Directorate of Civil Aviation receives Airworthiness Directives or similar publications from the countries of origin, and in most cases also manufacturers Service Bulletins, and calls the attention of the owners to those which must be incorporated.

Defects which are thought to be of interest to the State of origin or the manufacturer are generally reported to them by letter. Besides this, there is a steady exchange of information between the manufacturers and the operators by letters, visits to factories and service representatives.

In PAKISTAN the Aeronautical Inspection Division receives the manufacturer's technical bulletins and steps are taken to ensure that local operators concerned comply with the recommendations of the manufacturers.

In SWEDEN national manufacturers of aircraft, parts and equipment are held responsible for providing all persons known to be owners of the aircraft - both in Sweden and abroad - with their Service Bulletins established according to a prescribed system. Airworthiness Directives for aircraft manufactured in Sweden are transmitted to the aeronautical authorities of the countries to which Swedish aircraft are exported.

In SWITZERLAND the registration of an aircraft is subject to the presentation by the applicant of a statement certified by the official authority and issued by the manufacturer of the aircraft involved, stating that all the pertinent information, modification notices, service bulletins and eventually the revision to the bulletins will be delivered by automatic distribution to the technical section of the Federal Air Office. A copy of such a statement is reproduced in Figure 27.

The UNITED STATES Government furnishes to other States the information on continuing airworthiness material that requires action of a mandatory nature: Airworthiness Directives, which contain this information are circulated to most foreign governments through their Embassies in the United States. Emergency information is supplied by telegram. Service information and other remedial procedures not of a mandatory nature are supplied by the manufacturer directly to operators both domestic and foreign.

#### 5. - Conclusion

It has not been attempted to give in this Circular an account of the methods adopted in some Contracting States. Although the objectives are the same and the general principles governing the reporting and analysis of defects and the subsequent action to not vary much there is considerable variation in the detailed procedure followed. This is inevitable because the nature and scale of operations and other relevant circumstances differ from State to State.

It is hoped that the information that has been collated will give a broad picture of present practices and of how variations in local conditions have been taken into account. More details of the practices adopted can often be found in official notices issued by the State concerned.

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FIG. 1

## MONTHLY STATISTICAL ANALYSIS— DEFECTS AND UNSCHEDULED CHANGES

### DOUGLAS DC-4

Component	Total Defective or Changed
<b>I — Aircraft</b>	
A. Ailerons and Wing Flaps	
Aileron Tab and Cont. Assembly	3
Wing Flap	1
B. Fuselage	
Cabin Doors	1
Cargo Doors	3
Door Locks	5
Inspection Doors	1
Nose Wheel Doors	1
Cabin Windows	2
Fuselage Skin	1
C. Wings	
Wing Skin	2
Main Gear Doors	1
<b>II — Aircraft Accessories</b>	
A. De-icer and Anti-icing System	
Alcohol Tanks and Filter	1
Anti-icer Pump and Motor	1
B. Electrical System	
Batteries	3
Inverters	1
Voltage Regulators	2
C. Fuel System (aft of F/W)	
Booster Pump and Motor	2
F/W Shut-off Valves	1
Filter Caps and Gaskets	3
D. Hydraulic System	
Accumulator	1
Cowl Flap Actuator	1
Brake DeBooster	1
E. Landing Gear	
Main Brake Assy.	1
Main Gear Shock Strut	3
<b>III — Instruments</b>	
A. Auto-Pilot System	
Dir. Gyro Unit	5
Servo Unit	1
B. Engine Instruments	
Fuel Flow Transmitter	1
Manifold Pressure Gauge	3
Thermocouple Installation	6
Oil Temperature Gauge	1

**APPENDIX 100.8.4.1.4**

<b>C.</b>	<b>Flight Instruments</b>	
	Air Speed Indicator	2
	Altimeter	1
	Flux Gate Compass	1
	Gyro Horizon	1
	Turn and Bank Indicator	2
<b>IV —</b>	<b>Power Plant</b>	
<b>A.</b>	<b>Cowling</b>	
	Accessory Cowling	2
	Carb. Scoop	1
	Oil Cooler Door	1
<b>B.</b>	<b>Engines</b>	
	Cylinders	9
	Intake Pipes and Gaskets	3
	Push Rod Housing and Gaskets	4
	Misc. Seals and Gaskets	5
	Oil Lines	3
<b>C.</b>	<b>Engine Accessories</b>	
	Starter	2
	Generator	3
	Hydraulic Pump	1
	Vacuum Pump	2
	Fuel Pump	4
<b>D.</b>	<b>Engine Controls</b>	
	Blower Controls	1
	Carb. Mixture Controls	1
	Propeller Controls	2
<b>E.</b>	<b>Exhaust System</b>	
	Ball Joint Assy.	2
	Collector Rings	1
	Tail Pipes	1
	Attach. Brackets	3
<b>F.</b>	<b>Fuel System (Fwd. of F/W)</b>	
	Carburettor	1
	Primer System	1
	Miscellaneous	3
<b>G.</b>	<b>Oil System</b>	
	Oil Coolers	2
	Oil Temp. Regulator	1
	Oil Tanks	1
<b>H.</b>	<b>Ignition System</b>	
	High Tension Leads	4
	Ignition Harness	2
	Magnetos	1
	Spark Plugs	9
<b>I.</b>	<b>Propellers and Accessories</b>	
	Dome Assembly	1
	Propeller Assembly	1
	Propeller Governor	3





Fig. 3

A. I. D. No. 32.

AERONAUTICAL INSPECTION DIRECTORATE.

**PRELIMINARY REPORT ON A DEFECT OR AN INCIDENT OR ACCIDENT  
TO A CEYLON REGISTERED AIRCRAFT.**

Registration Marks .....

Registered Owner .....

Type of Aircraft .....

Type of Engine .....

C. of A. Number .....

Place, Time and Date of Occurrence .....

Brief details of Occurrence .....

Was fire associated with the occurrence? Give details if known .....

DAMAGE TO AIRFRAME:    \*Undamaged:                    Minor:                    Serious:\*

DAMAGE TO ENGINE:       \*Undamaged:                    Minor:                    Serious:\*

AIRCRAFT:    Has Been:                    Is Being:                    Transported:                    Flown To:\* .....

**NOTE:** Any additional information should be given overleaf:

Signed .....

Designation .....

Date .....

\* Cross out the words which are not applicable.  
HW.

Fig. 4

Confidential

Form C.A. 39 (Revised)  
(LR. 292)

GOVERNMENT OF CEYLON

AIRCRAFT ACCIDENT INVESTIGATION FORM

1. ACCIDENT DETAILS:

- a) Location: .....
- b) Date and time: .....
- c) Type of Flying: .....
- d) Object of flight: .....
- e) Date and time of receipt of notification by investigator: .....
- f) Date and time of arrival of investigator at scene: .....

2. SUMMARY OF ACCIDENT (Category):-

3. AIRCRAFT INFORMATION:

- a) Registration Marking: .....
- b) Aircraft type and maker's Serial No: .....
- c) Engine types, airframe positions and maker's Serial Nos: .....
- d) Certificate of registration No. and Validity: .....
- e) Certificate of airworthiness No. and date of expiry, and Flight Manual No: .....
- f) Certificate of safety date and time of issue and period of validity: .....

g) Date of construction of airframe: .....

h) Name and address of owner: .....  
.....

i) Gross Weights:- Maximum permitted by C. of A. for this flight,  
and at time of accident: .....

j) Loading:- Centre of gravity limits in C. of A. and centre of gravity  
position at accident and commencement flight: .....  
.....

k) Airframe history:-

l) Engine history:-

m) Accessory history:-

n) Defects:-

**4. CREW INFORMATION:-****a) Particulars:**

Name of Crew member	Duty	Age	Licences and Ratings			Experience		
			Type	No.	Expiry Date	Total	On Type	
							Total	Within 90 days

**b) Addresses of all crew members:****c) History of crew members concerned with accident:****d) List of injuries:**

e) Medical investigation:

f) Details of relevant previous accidents:

5. PASSENGERS:-

a) Particulars:

<u>Passengers' Names</u>	<u>Nationality</u>	<u>Address</u>

b) List of injuries:

c) Medical investigation:

---

6. WEATHER CONDITIONS:-

a) Ceiling, visibility, wind direction and velocity, temperature, dew point, etc., at time and scene of accident:

b) Weather forecasts and whether pilot was aware of these:

c) Actual weather conditions over the route of the flight:

d) Conditions which might produce icing:

7. NAVIGATION AIDS:-

a) Aids available on this flight:

b) Aids fitted to aircraft:

c) Aids used and their effectiveness:

d) Remarks of investigator:

**8. FIRE FIGHTING EQUIPMENT:-**

- a) Was there any fire?
- b) Cause of fire:
- c) Fire fighting equipment used and its effectiveness:

**9. WITNESS:-**

- a) Names and addresses of witnesses:

Name

Address

Remarks

- b) Witnesses' statements: (to be attached)

**10. OTHER STATEMENTS:-**

Other statements which it might be necessary to add to those of witness.

**11. EXAMINATION OF WRECKAGE AND TECHNICAL INVESTIGATION:-**

- a) Location of Wreckage:

- b) General Observations:

- c) Condition of wreckage:



d) Technical examination of wreckage:

e) Parachute equipment:

f) Special technical investigation and tests:

12. GROUND INSTALLATION:-

Condition of aerodrome and installation, length of runways used:

13. COMMUNICATIONS:-

Data on communications and their functioning:

14. DISCUSSION OF EVIDENCE:-

15. RECONSTRUCTION OF FLIGHT UP TO ACCIDENT:-

16. OPINION AS TO THE CAUSE OF THE ACCIDENT:-

17. RECOMMENDATION ( ):

.....  
Signature of the investigating Officer:

Designation: .....

Date: .....

18. PHOTOGRAPHS:-

Fig. 5

Form ACO I

**SPECIAL REPORT  
TO THE OPERATIONS MANAGER**

**№ 2550**

Date : .....

Aircraft *CY* ..... *FH. No.* ..... *Section* ..... *No. of Pass* .....

(Enter here details of any incidents, etc., other than "Delays or off schedule operation" and "Mechanical defects" which in the Captain's view should be taken up by the Operations Department with the proper authorities. The word "NIL" should be written across whenever there is nothing to report.)

CAPTAIN'S SIGNATURE .....

**MECHANICAL DEFECT REPORT FOR ENGINES, AIRFRAMES & RADIO**

Pilot's Report	Engineer's Corrective Action
PORT	PORT
Signature	Signature Date
PORT	PORT
Signature	Signature Date

**SPECIAL REPORT FROM ENGINEERING TO OPERATIONS**

Sgd. ....

Designation : .....

Fig. 6

C. A. 103

DIRECTORATE OF CIVIL AVIATION  
(CEYLON)

AIRCRAFT DELAY REPORT

Type of Aircraft: .....

Registration Marking CY-: .....

Owner: .....

(1) Component Reported Defective: .....

(a) Type .....

(b) Part Number .....

(c) Serial Number .....

(d) Hours since O/H .....

(e) Total Hours .....

(2) Defect Reported: .....

Date: ..... Port: .....

(3) Duration of Delay: .....

(4) Mechanic or Engineers Report: .....

.....  
.....  
.....  
.....  
.....

Signature: .....

(5) Action taken to remedy Defect or prevent recurrence:

.....  
.....  
.....  
.....

Chief Inspector: .....

(On Behalf of): .....

Date: .....

D:



Fig. 8

C.A. 101

ENGINE DEFECT REPORT

AIRCRAFT:

Aircraft Type: ..... Registration Marks CY-: .....  
Date of Accident or forced landing .....

ENGINE:

Engine Type: ..... Position: ..... Serial No: .....

\*Defective Parts: { Description: .....  
                          { Part Nos: .....

Total time the part or parts have run : Hrs..... Mins .....

Running time since last complete overhaul: Hrs..... Mins.....

Date of last inspection: .....

Aircraft Engineer           (Name:.....  
Certifying last            {  
Inspection                 (Licence No:.....

Opinion as to the cause of the failure:-

.....  
.....  
.....  
.....

Any recommendations to obviate or minimize the recurrence of such failures in the future: -

.....  
.....  
.....  
.....

Signature: .....

Chief Engineer/Chief Inspector

.....

Airline Operating Co./Firm

Date: .....

\* (Defective Engine part or parts should be forwarded to the Chief Aeronautical Inspector, together with a copy of this form duly completed).

DG:

C. A. 31.

**AIRCRAFT DEFECT REPORT**

Aircraft Type \_\_\_\_\_ Serial No. \_\_\_\_\_  
 Owner \_\_\_\_\_  
 Registration Marks \_\_\_\_\_

Defect {
 

{	Forced landing
	Minor Accident
	Notifiable Accident

 } at (place) \_\_\_\_\_  
 on (date) \_\_\_\_\_  
 was found on inspection by Ground Engineer (name) \_\_\_\_\_  
 \_\_\_\_\_ on (date) \_\_\_\_\_

Defective Parts {
 

{	Description _____
	Part Nos. _____
	Component Nos. (if any) _____

 }

Total time the part or parts have flown: Hrs. \_\_\_\_\_ Mins. \_\_\_\_\_  
 Flying time since last overhaul: Hrs. \_\_\_\_\_ Mins. \_\_\_\_\_  
 Date of last inspection \_\_\_\_\_  
 Ground Engineer certifying last inspection {
 

{	Name _____
	Licence No. _____

 }

Opinion as to the cause of failure \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Any recommendation to obviate or minimize the recurrence of such failure in the future \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

State how defective parts have been disposed of \_\_\_\_\_  
 \_\_\_\_\_

Remarks \_\_\_\_\_  
 \_\_\_\_\_

Certified that the above particulars are correct in every respect.  
 Date: \_\_\_\_\_ Signature \_\_\_\_\_  
 Designation \_\_\_\_\_

(P. T. O. for instructions.)

C. A. 31.

**INSTRUCTIONS**

A copy of this form should be filled in in respect of accidents or forced landings due to failure of any part of the aircraft, aircraft instruments or installation. After completion the form should be signed -

- (a) In the case of aircraft operating companies by the senior member of their engineering personnel, directly responsible for the maintenance of the aircraft,
- (b) In the case of Flying Clubs, by the Secretary of the Club, and
- (c) In the case of aircraft operating under other conditions, by the owner of the person in charge of the aircraft,

whereafter the form should be forwarded to the Civil Aviation Directorate, New Delhi/Simla.

It is requested that this form should also be used for notifying the Civil Aviation Directorate of any serious structural or mechanical failures, or failures of a less serious nature which owing to the frequency of such occurrences may indicate the desirability of taking steps to obviate or minimise them.

In many cases it is considered desirable for the Civil Aviation Directorate to inspect the parts responsible for such failures, but the forwarding of such parts is left in the first instance to the discretion of the persons submitting the forms. When, however, such parts are submitted, they should be addressed to Civil Aviation Directorate, New Delhi/Simla.

E. P. W. Ltd. --31-5-48--650.





C. A. 30.

**REPORT ON MECHANICAL DELAYS OCCURRING ON AIRLINES.**

Aircraft Registration	Issuing Office
Owners of Aircraft	Office Serial No.
Service	

1. Place at which delay originated.	
2. Date and time of arrival of aircraft at .....station.	Date.                      Time.
3. Scheduled date and time of arrival.	
4. Description on parts affected. (Part No. if possible.)	
5. Nature of defect	
6. Opinion as to cause of defect.	
7. Action taken to render aircraft serviceable.	
8. State any irregularities in respect of material (s) used or operations carried on.	

9. Has any concession been granted or requested in respect of such repairs or replacements.	
10. Total delay involved.	Hours.                      Minutes.
11. Remarks:-	
Certified that the above entries are correct in every respect.	
Date	Signature
	Designation
E. P. W. Ltd, - --2300--21-4-48--	

FIG. 12

AERONAUTICAL INSPECTION DEPARTMENT.

C. A. 31

PRELIMINARY REPORT ON A DEFECT OR AN INCIDENT OR ACCIDENT TO A  
PAKISTAN REGISTERED AIRCRAFT.

Registration Marks \_\_\_\_\_

Registered Owner \_\_\_\_\_

Type of aircraft \_\_\_\_\_

Total No. of hours flown \_\_\_\_\_

Type of engine \_\_\_\_\_

If engine defect, give no. of hours since last major overhaul \_\_\_\_\_

Place, Time and Date of occurrence \_\_\_\_\_

Details of Occurrence \_\_\_\_\_

Brief description of damage \_\_\_\_\_

What action is being taken for repair \_\_\_\_\_

**NOTE** :—Additional information should be given on other side of this page.

Signed \_\_\_\_\_

Date \_\_\_\_\_

FIG. 13

Specimen a/

To the Royal Board of Civil Aviation Division of Civil Aviation Inspection Stockholm 12.	Aircraft SE- _____ Type _____ Operator _____
<p><u>Report on Failures and Defects.</u></p> <p>This report shall be sent in as soon as possible after a failure has occurred which necessitates a change in a flight plan or reduces the airworthiness of the aircraft irrespective of whether the defect is of a mechanical or radiotechnical character or otherwise affects the equipment required for safety in flying.</p>	
<p>1. Nature of flight _____ Pilot _____ from _____ to _____ date _____ 19__</p> <p>2. Landing at _____</p> <p>3. The defect occurred on the ground <input type="checkbox"/> at take-off <input type="checkbox"/> climb <input type="checkbox"/> cruising <input type="checkbox"/> landing <input type="checkbox"/></p> <p>4. The defect affected _____ Ser. No. _____ (type of aircraft, engine, prop., radio- el.-equipment) _____</p> <p>5. Constructional detail _____ No. _____ Operating time _____ total hrs.; after overhaul _____ hrs.; after last inspection _____ hrs.</p> <p>Note _____</p> <p>6. Short description of the character and probable cause of the defect _____ _____ _____</p> <p>7. Action taken _____ _____ _____</p> <p>8. Suggestions for safety measures to prevent re-occurrence, comments _____ _____ _____</p> <p>9. Report from the technical head, <sup>follows</sup> _____ <del>does not follow</del> _____</p> <p>10. Copies sent to _____ _____ _____ date _____ 19__</p>	
Remarks made by the Board _____ _____ _____	

FIG. 14

Specimen b/SCANDINAVIAN  
AIRLINES SYSTEM

Report on Failures and Defects

To		
aircraft	aircraft type	operator SAS
nature of flight	pilot	date
from	to	landing at
the defect occurred <input type="checkbox"/> on the ground at <input type="checkbox"/> take-off <input type="checkbox"/> climb <input type="checkbox"/> cruising <input type="checkbox"/> descent <input type="checkbox"/> landing		
the defect affected		
constructional detail		
operating time, total hrs.	after overhaul, hrs.	after last inspection
the character and the cause of the defect and action taken		
Further report <input type="checkbox"/> does not follow <input type="checkbox"/> follows		
this report sent to		
Stockholm 40, SCANDINAVIAN AIRLINES SYSTEM		

FIG. 15

CAB Form 448 (Rev. 1-52)

Budget Bureau No. 19-R017.8. Approval expires 8-1-54.

CIVIL AERONAUTICS BOARD BUREAU OF SAFETY INVESTIGATION WASHINGTON 25, D. C.

(State Copy)

NON-AIR-CARRIER AIRCRAFT ACCIDENT REPORT

The Civil Air Regulations require that all aircraft accidents be reported on the form provided. This form (CAB-458) is to be used in reporting all accidents incident to flight involving civil aircraft of United States registry engaged in non-air-carrier operations wherever they may occur if such accident results in fatal or serious injury to any person and/or damage to the aircraft of \$100 or more. Fill out in triplicate immediately and deliver or mail to the nearest CAB Investigator, CAA Agent, or the State Aeronautical Investigator for the State in which the accident occurred.

I. LOCATION AND TIME OF ACCIDENT:

- 1. City or place State Date Hour
2. If on airport, name same
3. If off airport, give distance (miles), direction, and name of the nearest airport

II. PILOT, INSTRUCTOR, OR SOLO STUDENT:

- 1. Full name Age Male Female
2. Injuries
3. CAA certificate, kind and number
4. Ratings Medical—Date and class
5. Flying time: Total Night Instrument In type involved
6. Now enrolled in approved school? Yes No Approved school graduate? Yes No
7. If yes, give name and location of school
8. Name your instructor in this type aircraft in last year Certificate No.
9. Name instructor who recommended you for present pilot certificate His Cert. No.
10. Who flight-tested you for your present pilot certificate? (a) CAA Agent: Name (b) Designated examiner: Name No. (c) Date of test

III. CREW OTHER THAN PILOT (copilot, dual student, other—denote which):

- 1. Full names, addresses, CAA certificate numbers, ratings, injuries

IV. PASSENGERS (denote whether revenue or nonrevenue):

- 1. Names, addresses, injuries

V. INJURY TO GROUND CREW, SPECTATORS, ETC.:

- 1. Names, addresses, injuries

VI. PROPERTY DAMAGE (structures, power lines, crops, livestock, etc.):

- 1. Describe damage in detail (dollar estimate necessary)

VII. TYPE OF FLYING ENGAGED IN AT TIME OF ACCIDENT (check or answer each item applicable):

- Day X-C Advanced training Noncommercial
Night Student dual Pilot check Other special program (describe)
Local Student solo Commercial
Describe purpose of flight

VIII. WEATHER CONDITIONS (check items applicable):

- Ceiling (feet) Dew point
Visibility (miles) Temperature
Wind velocity and direction
Were icing conditions encountered?
Clear HEAVY LIGHT
Rain
Sleet
Snow
Hail
Fog

IX. AIRCRAFT:

- 1. Trade name Model Identification No.
2. Age of aircraft Mfr's serial No. Total flying time
3. Present owner (name and address)
4. Purchased from (name and address)
5. Engine make Model Horsepower
6. Aircraft damage
7. Does owner intend to rebuild aircraft? Yes No

**X. COLLISION ACCIDENTS** (if accident involved collision with other aircraft complete following information pertaining to other aircraft):

1. CAA number ..... Make ..... Model .....
2. Damage .....
3. Pilot's name and address .....
4. Owner's name and address .....
5. Attach sketch showing flight paths and point of collision .....

**XI. MECHANICAL FAILURE REPORT:** Complete if mechanical failure occurred prior to impact with ground or objects. Complete (a) in all such cases. Complete (b), (c), or (d) if such item is directly involved.

ITEM	MAKE AND MODEL	SERIAL AND PART NO.	HOURS SINCE OVERHAUL	TOTAL TIME (HOURS)
(a) Aircraft.....				
(b) Engine.....				
(c) Propeller.....				
(d) Accessories.....				

2. Describe specific parts involved in sufficient detail to identify failure positively. (Attach sketch or photographs of failed part if practicable) .....
3. Are failed parts held for examination? Yes  No  If yes, where? .....

**XII. CRASH-INJURY DETAILS:** To be completed by CAB Investigator, CAA Agent, or State Investigator.

1. Mental or physical condition of pilot:

OCCUPANTS' NAMES	SEAT POSITION	INJURY (See Key)				STRUCTURE CAUSING
		Loc.	Type	Deg.	Treat.	

2. Coroner's report:

**KEY-LOCATION:** hd—head, tr—trunk, a—arm, lg—leg. **TYPE:** sp—sprain, fr—fracture, bn—burn, lac—laceration. **DEGREE:** ml—mild, sv—severe, ft—fatal. **TREATMENT:** 0—none, 1st—first aid, hos—hospital.

**XIII. PILOT'S DESCRIPTION OF ACCIDENT:** Give detailed account including flight or maneuvers immediately preceding the accident, nature of difficulty, speed, altitude, etc. Draw diagram if necessary for clarity. If pilot is incapacitated, owner or operator should complete other items of report and forward pilot's description of accident at earliest possible date.

Date of this statement: ..... Signature of pilot .....

..... Type or print name .....

Mailing address for next 30 days .....

**XIV. OWNER'S OR OPERATOR'S STATEMENT:**

1. I have read the pilot's statement above and believe that it is substantially correct.
2. I disagree with the pilot's statement and have attached a statement of my own.

Date of this statement: ..... Signature of owner or operator .....

..... Type or print name .....

Mailing address for next 30 days .....

**XV. DISTRIBUTION** (This space reserved for Agency or State use):

Copies distributed to CAB  CAA  State  by ..... (Name) ..... (Title)

FIG. 16

Budget Bureau No. 39-R009.6; Approval Expires March 1, 1958

FD-302, CAB-454 (2)		UNITED STATES OF AMERICA CIVIL AERONAUTICS BOARD BUREAU OF SAFETY INVESTIGATION WASHINGTON, D. C.		<b>INSTRUCTIONS</b> This CAB Form 454 is to be used in reporting all civil aircraft accidents involving aircraft that exceed 12,500 pounds maximum gross takeoff weight; helicopters; and all Alaskan air carrier aircraft regardless of weight. Part 62.35 of the Civil Air Regulations require that all aircraft accidents as defined be reported on the Form provided. Fill out all pertinent items and mail or deliver (in duplicate) to the Civil Aeronautics Board office nearest your company's headquarters.	
<b>AIRCRAFT ACCIDENT REPORT</b> <b>(Submit in duplicate)</b>					
<b>Section I - LOCATION AND TIME (24-hour clock) OF ACCIDENT</b>					
1. Nearest city			3. Date		
2. State			4. Hour		
5. Proximity to airport: (Check one)					
a <input type="checkbox"/> On the airport		c <input type="checkbox"/> Within 1/2 mile		e <input type="checkbox"/> Within 1 mile	
b <input type="checkbox"/> Within 1/4 mile		d <input type="checkbox"/> Within 3/4 mile		f <input type="checkbox"/> Within 2 miles	
				g <input type="checkbox"/> Within 3 miles	
				h <input type="checkbox"/> Within 4 miles	
				i <input type="checkbox"/> Within 5 miles	
				j <input type="checkbox"/> Beyond 5 miles	
6. Phase of operation		Takeoff		En route	
				Landing	
7. Identify airport					
8. Exact location of accident					
<b>Section II - IDENTIFICATION OF FLIGHT</b>					
1. Name of operator			2. Headquarters		
3. Class of operator: (Check appropriate items)					
a <input type="checkbox"/> Scheduled		c <input type="checkbox"/> Contract		e <input type="checkbox"/> Business	
b <input type="checkbox"/> Irregular		d <input type="checkbox"/> Intrastate		f <input type="checkbox"/> Industrial	
				g <input type="checkbox"/> Other (Specify)	
4. Type of operation this flight (Check appropriate items)					
a <input type="checkbox"/> Passenger		c <input type="checkbox"/> Cargo		e <input type="checkbox"/> Charter	
b <input type="checkbox"/> Mail		d <input type="checkbox"/> Company		f <input type="checkbox"/> Test	
				g <input type="checkbox"/> Training	
				h <input type="checkbox"/> Other	
				i <input type="checkbox"/> Revenue	
				j <input type="checkbox"/> Nonrevenue	
5. Origin of flight			Destination		
List en route stops, if any _____					
6. Location of last takeoff					
<b>Section III - CONDITIONS OF FLIGHT</b>					
1. Day		3. IFR		5. Was flight plan filed?	
2. Night		4. VFR		<input type="checkbox"/> Yes <input type="checkbox"/> No	
6. Type of clearance					
<input type="checkbox"/> IFR <input type="checkbox"/> VFR <input type="checkbox"/> None					

Section IV - CREW MEMBERS					
1. LIST ON SEPARATE SHEET AND ATTACH: For each member of the crew, exclusive of cabin attendants, give titles, full name, age, address, CAA certificate (including type, number, and rating) total hours of flying time and hours in type of aircraft involved in the accident.					
2. Total number in crew	Number injured and extent of injuries	Fatal	Serious	Minor	
	Item	Pilot (a)	Copilot (b)	Flight engineer (c)	
3. Hours flown by pilot, copilot, and flight engineer involved in this accident during 24-hour period prior to this flight.					
4. Hours flown by pilot, copilot, and flight engineer during this flight.					
5. Duty time (flight and stand-by) of pilot, copilot, and flight engineer in last 24 hours.					
6. Rest periods (hours) in 24-hour period prior to this flight.					
7. At what point en route was crew change effected (If any)				8. Number of takeoffs on this flight by crew involved in the accident	
9. State wording of CAA physical waiver, if any, held by following:					
a. Pilot _____					
b. Copilot _____					
c. Flight engineer _____					
Section V - PASSENGERS					
1. Number aboard	2. Number injured and extent of injuries:				
	Item	Fatal	Serious	Minor	None
a. Revenue	a. Revenue				
b. Nonrevenue	b. Nonrevenue				
Section VI - OTHER PERSONS					
1. Number injured and extent of injuries to other persons as a result of this accident, such as spectators, ground crew, occupants of vehicles or residences, etc.					
Identify		Fatal	Serious	Minor	
a.					
b.					
c.					
d.					
Section VII - EVACUATION OF AIRCRAFT					
1. Assistance received: (Check methods used)					
a <input type="checkbox"/> Outside persons      c <input type="checkbox"/> Slide      e <input type="checkbox"/> Ladder					
b <input type="checkbox"/> Auxiliary lighting      d <input type="checkbox"/> Rope      f <input type="checkbox"/> Other (Specify) _____					
2. Method of exit (State approximate number of persons using each of the following):					
a. Main door.....	Aft	Forward		Belly	
b. Auxiliary door.....	Aft	Forward		Other	
c. Emergency exit.....	Aft of wing	Over wing		Cockpit	
d. Other (Specify).....					



Section VIII - AIRCRAFT DATA					
1. Name of owner			Address		
2. Make		Model	CAA Identification No.	4. Time since last inspection	
3. Date of manufacture		Mfg. Serial No.	Total flying time	a. Major	b. Linemaintenance
5. Passenger capacity			Cabin seating configuration (Attach drawing)		
6. ENGINES	Number		Make		Model
	No.	Date of manufacture	Mfg. Serial No.	Total time	Hours since last overhaul
	1				
	2				
	3				
7. PROPELLER ASSEMBLIES	Number		Make		Model
	No.	Date of manufacture	Mfg. Serial No.	Total time	Hours since last overhaul or reassembly
	1				
	2				
	3				
8. Type of fire extinguishing system (Including hand types, if fire involved)					
9. Describe aircraft damage					
Section IX - PROPERTY DAMAGE					
1. Describe damage to buildings, power lines, crops, livestock, etc. (Dollar estimate not necessary.)					
Section X - WEATHER CONDITIONS					
1. Describe weather conditions at time and scene of accident					

**Section XI - COLLISION ACCIDENTS**

1. In the event of a collision with another aircraft the following identification data must be completed for the other aircraft:

a. Make	Model	CAA Identification No.
b. Name of pilot	Address	Certificate
c. Name of owner	Address	
d. Damage to this aircraft		

A Form CAB-454 must be submitted by the appropriate operator of each aircraft involved.

**Section XII - MALFUNCTIONING OR MECHANICAL FAILURE REPORT**

1. The following is to be completed ONLY if accident involves malfunctioning or mechanical failure in the aircraft structure, powerplant, accessories, instruments, etc. This does not include engine stoppages caused by lack of fuel or oil, or improper use of engine controls by crew.

a. Describe specific part in sufficient detail to identify it positively. Give make, model, and serial number; also total hours and hours since overhaul:

b. Describe circumstances under which failure occurred:

c. What is your analysis of cause? (Include as much evidence for your analysis as possible):

**Section XIII - OPERATOR'S STATEMENT**

1. In accordance with CAR 62.36, describe circumstances of the accident and provide any additional information which may assist in the analysis of this accident and the prevention of similar ones. (Use supplementary sheet if additional space is required.)

Operator \_\_\_\_\_ Signature of person filing \_\_\_\_\_

Date of this report \_\_\_\_\_ Type or print name \_\_\_\_\_

\_\_\_\_\_ Title \_\_\_\_\_

**Section XIV - STATEMENTS OF PILOT AND OTHER CREW MEMBERS**

1. In accordance with CAR 62.36, pilot and other crew member statements must be attached. In the event that any of the foregoing are incapacitated, statements must be submitted subsequently at the earliest possible date.

a. Statement(s) attached <input type="checkbox"/> Yes <input type="checkbox"/> No	b. Statement(s) will be submitted (Approximate date)
--	--

FIG. 17

<p>Form ACA-1226 (6-48) DEPARTMENT OF COMMERCE CIVIL AERONAUTICS ADMINISTRATION</p> <p style="text-align: center;"><b>MALFUNCTIONING AND DEFECTS REPORT</b></p> <p style="text-align: center;">(OTHER THAN SCHEDULED AIR CARRIER)</p>	<p style="text-align: right;">Form approved, Budget Bureau No. 41-R485.6.</p> <p style="text-align: center;"><b>INSTRUCTIONS: Fold, seal, and mail immediately.</b> No postage required.</p>				
<p>The Civil Aeronautics Administration requests the cooperation of all owners, pilots, operators, mechanics, inspectors, and investigators in reporting on this form difficulties experienced with aircraft structures, engines, propellers, and equipment, such as radio, instruments, fire extinguishers, brakes, instrument panel design, parachutes, improperly manufactured parts, etc.</p> <p><i>Its purpose</i> is to provide information which will enable the Civil Aeronautics Administration to take steps to prevent the recurrence of similar difficulties.</p> <p><b>DO NOT SUBMIT THIS FORM IF a report of the same incident has been reported on Form CAB-453, Aircraft Accident Report.</b></p>					
1. DIFFICULTY OCCURRED	DATE	PLACE (City and State)			
2. COMPLETE BOTH ITEMS IN THE FOLLOWING TABLE:					
Item	NO No.	Make and Model	Serial No.	Hours Since Overhaul	Total Time (Hours)
a. Aircraft					
b. Engine					
3. SPECIFIC PART WHICH CAUSED DIFFICULTY. (Please make sketch showing manner of failure on other side of page.)					
NAME OF PART		PART NO.		SERVICE TIME ON PART (Hours)	
				TOTAL	SINCE OVERHAUL
4. DESCRIBE IN DETAIL THE FAILED PART AND THE CIRCUMSTANCES UNDER WHICH THE DIFFICULTY OCCURRED. (Attach photographs which clearly show the failure, or ship failed part if practicable, to assure appropriate corrective action; if shipped parts are large send these under separate cover properly identified as in items 1 and 2 above to: Civil Aeronautics Administration, Aircraft Service Analysis Staff, A-297, Washington 25, D. C.)					
5. STATE PROBABLE CAUSE AND RECOMMENDATIONS TO PREVENT RECURRENCE. (In all cases include as much information as possible to indicate basis for analysis of cause.)					
6. NAME (Print)		ADDRESS			DATE OF REPORT
CHECK WHICH: OWNER <input type="checkbox"/> PILOT <input type="checkbox"/> OPERATOR <input type="checkbox"/> MECHANIC <input type="checkbox"/> CAA DESIGNER <input type="checkbox"/> CAA INSPECTOR <input type="checkbox"/> CAB INVESTIGATOR <input type="checkbox"/>					
7. OWNER OF PLANE: PRIVATE OWNER <input type="checkbox"/> FIXED BASE OPERATOR <input type="checkbox"/> IRREGULAR CARRIER <input type="checkbox"/>					
<b>Fold and seal, with CAA address on the outside. Mail immediately. No postage required.</b>					

FOLD HERE

DEPARTMENT OF COMMERCE  
CIVIL AERONAUTICS ADMINISTRATION  
WASHINGTON 25, D. C.  
OFFICIAL BUSINESS

PENALTY FOR PRIVATE USE TO AVOID  
PAYMENT OF POSTAGE, \$300  
(GPO)

CIVIL AERONAUTICS ADMINISTRATION  
AIRCRAFT SERVICE ANALYSIS STAFF, A-297  
WASHINGTON 25, D. C.

16-68847-9

FOLD HERE

AFTER FOLDING, MOISTEN GUMMED FLAP AND SEAL HERE

FOLD HERE

MAKE SURE SHOWING FAILURE

## FIG. 18

## Classification of Defects

As a guide to the classification of defects, examples of major defects are given below. The list is not to be regarded as exhaustive, and any defect not in the list but falling within the definition given in paragraph 2 of this Section shall be treated as a major defect.

- Power Plant:** Engine failure  
 Engine feathered  
 Significant quantities of water in fuel  
 Acute fuel starvation in flight  
 Inadvertant reversing of airscrew pitch  
 Failure to feather  
 Overheating  
 Fire warning (false or real)  
 Gross leaks of fuel, oil or hydraulic fluid  
 Serious damage to accessory or component.
- Structures:** Cracks in primary structure likely to affect structural strength  
 Serious corrosion of primary structure  
 Failure of undercarriage to retract or extend  
 Hydraulic failure  
 Failure of flight or engine controls or control circuits  
 Failure of actuating system for flaps, undercarriage, brakes, etc. (electric, hydraulic, pneumatic).
- Ancillary Systems and Miscellaneous:** Collective failure of a number of flight instruments.  
 Major A.C. or D.C. power system failure  
 Failure to function of emergency equipment  
 Gross failure of electronic equipment  
 Pressurisation failure  
 Bad vision in heavy weather.
- Radio:**
- (a) Defects revealing fire hazards, such as—
    - (i) Inadequate protection of circuits.
    - (ii) Operation of components or wiring beyond the capacity recommended by the manufacturers.
    - (iii) Exposed high voltage points or inadequate separation of them from surrounding objects.
    - (iv) Maloperation of controls.
  - (b) Defects revealing structural hazards such as—
    - (i) Structural defects in mounting racks and trays.
    - (ii) Improper methods of mounting which would give rise to detachment of units under flight conditions.
  - (c) Defects revealing a serious malfunctioning or failure of a system or component such as—
    - (i) Incorrect, ambiguous or unreliable operation of any system—particularly navigation systems—as a result of incorrect design or installation (e.g., reciprocal bearings on radio compass equipment caused by incorrect placement of aerial lead-in).
    - (ii) Incorrect, ambiguous or unreliable operation of any combination of switches and controls.
    - (iii) Intermittently incorrect, ambiguous or unreliable operation of any part of the aircraft radio system—particularly navigation systems—the cause of which has not been definitely established.

**APPENDIX 100.8.2**

- (d) Defects in design or manufacture of parts and materials installed in an aircraft, or intended for installation, such as—
  - (i) Application to components of voltages or currents in excess of ratings (e.g., 300 volts applied to a capacitor rated to work at 200 volts maximum).

AIRCRAFT REGISTRATION

TYPE

ENGINE

OPERATOR

Card No.

Date	Incident No.	Defect Report		Nature of Defect
		No.	Index	

ELECTRICAL SYSTEMS

Card No.

TITLE ANTI-ICING AND DE-ICING MOTORS

DEFECT REPORT CLASSIFICATION

Date	AIRCRAFT		Incident Report No.	Defect Report No.	Operator	CAUSE OF FAILURE	COMMENTS
	Registration	Type					

FIG. 20



Fig. 21

A.I.D.L.A.

AERONAUTICAL INSPECTORATE  
DEPARTMENT OF CIVIL AVIATION (CEYLON)

APPLICATION FOR APPROVAL OF MAJOR MODIFICATION

=====

Aircraft Type:

.....

Nationality and  
Registration Marks:

.....

C. of A. No.

.....

Name and Address of  
Registered Owner:

.....

Name and Address of  
Applicant:

.....

Nature of Modification:

.....

Original Drawings  
affected (to be attached)

.....

New Drawings  
introduced (to be attached)

.....

Whether amendment to  
C. of A. is necessary:

.....

=====

I hereby declare that the above particulars are true in every respect.

Date: .....

Signature of Applicant: .....

Approval granted for modification.

Remarks:

Date: .....

CHIEF AERONAUTICAL INSPECTOR.

Fig. 22

A.I.D.IB.

AERONAUTICAL INSPECTORATE  
DEPARTMENT OF CIVIL AVIATION (CEYLON)

APPLICATION FOR APPROVAL OF MINOR MODIFICATION

=====

Aircraft Type:

.....

Nationality and  
Registration Marks:

.....

C. of A. No.

.....

Name and Address of  
Registered Owner:

.....

Name and Address of  
Applicant:

.....

Nature of Modification:

.....

Sketch showing modification with  
specification of material used:

.....

Whether amendment to C. of A.  
is necessary:

.....

=====

I hereby declare that the above particulars are true in every respect.

Date: .....

Signature of Applicant: .....

Approval granted for modification.

Remarks:

Date: .....

CHIEF AERONAUTICAL INSPECTOR.

Fig. 23

A. I. D. 27.

TO:  
Chief Aeronautical Inspector,  
Civil Aviation Department,  
Colombo 1.

Serial No.

Date:

CONCESSION

Aircraft Type:

Nationality and  
Registration Marks:

C. of A. Number:

Name and address of  
Registered Owner:

Name and address of  
Applicant:

Nature of Concession:

Reasons for  
Application:

Length of time or  
period:

Drawings Introduced to  
accompany application:

Remarks:

Chief Engineer.

The above concession is granted for a period of ..... and is to be embodied subject to compliance with the Ceylon Air Navigations for the time being in force.

Date:

Chief Aeronautical Inspector.









FIG. 27  
Attestation

Le fabricant sous-signé, lequel a livré l'avion ci-après désigné:

Type d'avions	Type du moteur
No de série	Type d'hélice

déclare qu'il s'engage à envoyer à la section technique de l'Office fédéral de l'air et sans y être requis, toutes les annexes et amendements parus après la date de finition et se rapportant aux manuels de consignes de vol, d'entretien, de revision et de réparation, ainsi que celles relatives à la cellule, au moteur, à l'hélice et à l'équipement auxiliaire important; les bulletins de service et leurs modifications, les bulletins concernant le contrôle et l'exploitation qui sont nécessaires pour juger de l'état de vol et de la sécurité pendant l'exploitation doivent aussi être envoyés comme le reste en 4 exemplaires si un avion au moins est déjà immatriculé en Suisse et en 2 exemplaires si ce n'est pas le cas, et cela à temps voulu. Cette obligation cesse lorsque:

- a) l'Office fédéral de l'air informe le fabricant que tous les avions du type en question ont été ex-matriculés en Suisse,
- b) lorsque le fabricant informe l'Office fédéral de l'air qu'il a cessé toute activité, auquel cas l'O+A se réserve le droit de faire éventuellement des réserves concernant le certificat de navigabilité de l'avion.

Date: ..... Signature du représentant du fabricant:  
.....

L'autorité officielle ayant certifié l'avion sus-mentionné s'engage à informer l'Office fédéral de l'air de toutes les modifications qui pourraient être apportées au certificat de navigabilité ainsi qu'aux conditions d'exploitation de l'avion en question.

Date: ..... Autorité: .....

The undersigned manufacturer who delivered the following aircrafts:

Aircraft types	Engine types
Aircraft serie No:	Propeller types

states herewith that he is willing and intends to send by automatic distribution to the technical section of the federal air office all annexes and amendments published after the date of the completion of the aircraft pertaining to the operation, maintenance, overhaul and repair manuals, as well as those referring to the aircraft, engine, propeller and major equipment; the service bulletins, their modifications, the inspection and operation bulletins which are necessary to judge of the airworthiness of the plane and to supervise its safety when operated shall also be forwarded in four copies each if at least one of the said plane is matriculated in Switzerland and in two copies each if not, and that in due time.

This obligation ceases when:

- a) the federal air office informs the manufacturer that all the planes of the type involved are ex-matriculated in Switzerland,
- b) the manufacturer informs the federal air office that he has ceased his activity, in that case the said office may make reserves concerning the airworthiness of the plane involved.

Date: ..... Signature of the manufacturer's representative:  
.....

The official authority which certificated the above mentioned aircraft states that it is willing and intends to inform the federal air office of all the modifications which might arise concerning the airworthiness and the operation of the said plane.

Date: ..... Authority: .....



## ICAO TECHNICAL PUBLICATIONS

*The following summary gives the status, and also describes in general terms the contents of the various series of technical publications issued by the International Civil Aviation Organization. It does not include specialized publications that do not fall specifically within one of the series, such as the ICAO Aeronautical Chart Catalogue or the Combined Meteorological Tables for International Air Navigation.*

**INTERNATIONAL STANDARDS AND RECOMMENDED PRACTICES** are adopted by the Council in accordance with Articles 54, 37 and 90 of the Convention on International Civil Aviation and are designated, for convenience, as Annexes to the Convention. The uniform application by Contracting States of the specifications comprised in the International Standards is recognized as necessary for the safety or regularity of international air navigation while the uniform application of the specifications in the Recommended Practices is regarded as desirable in the interest of safety, regularity or efficiency of international air navigation. Knowledge of any differences between the national regulations or practices of a State and those established by an International Standard is essential to the safety or regularity of international air navigation. In the event of non-compliance with an International Standard, a State has, in fact, an obligation, under Article 38 of the Convention, to notify the Council of any differences. Knowledge of differences from Recommended Practices may also be important for the safety of air navigation and, although the Convention does not impose any obligation with regard thereto, the Council has invited Contracting States to notify such differences in addition to those relating to International Standards.

**PROCEDURES FOR AIR NAVIGATION SERVICES (PANS)** are approved by the Council for world-wide application. They comprise, for the most part, operating procedures regarded as not yet having attained a sufficient degree of maturity for adoption as Inter-

national Standards and Recommended Practices, as well as material of a more permanent character which is considered too detailed for incorporation in an Annex, or is susceptible to frequent amendment, for which the processes of the Convention would be too cumbersome. As in the case of Recommended Practices, the Council has invited Contracting States to notify any differences between their national practices and the PANS when the knowledge of such differences is important for the safety of air navigation.

**REGIONAL SUPPLEMENTARY PROCEDURES (SUPPS)** have a status similar to that of PANS in that they are approved by the Council, but only for application in the respective regions. They are prepared in consolidated form, since certain of the procedures apply to overlapping regions or are common to two or more regions.

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*The following publications are prepared by authority of the Secretary General in accordance with the principles and policies approved by the Council.*

**ICAO FIELD MANUALS** have no status in themselves but derive their status from the International Standards, Recommended Practices and PANS from which they are compiled. They are prepared primarily for the use of personnel engaged in operations in the field, as a service to those Contracting States who do not find it practicable, for various reasons, to prepare them for their own use.

**TECHNICAL MANUALS** provide guidance and information in amplification of the International Standards, Recommended Practices and PANS, the implementation of which they are designed to facilitate.

**ICAO CIRCULARS** make available specialized information of interest to Contracting States.

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# EXTRACT FROM THE CATALOGUE ICAO SALABLE PUBLICATIONS

## ANNEXES TO THE CONVENTION

<b>Annex 6 — Operation of aircraft—International commercial air transport.</b>	
(4th edition) May 1953 (incorporating amendments 1 to 134)	
26 pp. ....	\$0.25
<b>Annex 7 — Aircraft nationality and registration marks.</b>	
July 1949. 16 pp. ....	\$0.10
<b>Annex 8 — Airworthiness of aircraft.</b>	
(1st edition) December 1949. 112 pp. ....	\$0.60
(2nd edition) March 1951 (incorporating amendments 1 to 63)	
128 pp. ....	\$1.00
(3rd edition) April 1952 (incorporating amendments 64 to 83)	
150 pp. ....	\$1.50
Addendum to 3rd edition. May 1953 (incorporating amendment 84 and Attachment A) 12 pp. ....	\$0.25

## MANUALS

<b>Manual of aircraft accident investigation.</b>	
2nd edition (Doc 6920-AN/855). October 1951. 130 pp. ....	\$0.75
<b>Manual of ICAO Standard Atmosphere.</b>	
(Doc 7488). May 1954. 132 pp. ....	\$1.25

## ICAO CIRCULARS

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Methods of testing at constant attitude (Polar and longitudinal characteristics of aircraft) February 1951. 72 pp. ....	\$0.20
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Problems associated with the advent of turbine-engined airplanes, February 1952. 46 pp. ....	\$0.45

*N.B.—Cash remittance should accompany each order.  
Catalogue sent free on request.*

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