SOUTH AFRICAN
CIVIL AVIATION AUTHORITY

Tel: (011) 545-1000
Fax: (011) 545-1465
E-Mail: mail@caa.co.za

REPUBLIC OF SOUTH AFRICA

CIVIL AVIATION AUTHORITY

AERONAUTICAL INFORMATION CIRCULAR

CAA
Private Bag x 73
Halfway House
1685

AIC
18.55
09-06-04

GENERAL

LEGISLATION MATTERS

PUBLICATION IN TERMS OF THE SOUTH AFRICAN CIVIL AVIATION ACT NUMBER 40 OF 1998 AND THE CIVIL AVIATION REGULATION PART 11.01.2, FOR THE DEVELOPMENT AND IMPROVED UNDERSTANDING OF CAR 21.08.1A (REQUIREMENTS FOR C OF A AND CONTINUED VALIDITY)

1. ***PURPOSE***

This AIC provides information which may be used by approval holders, certificate holders, and their suppliers, hereafter referred to as the Operators. This information may be applied to Operators involved in the controlling and the continuing validity of the aircraft Certificate of Airworthiness. The establishment of a program which will identify and control the electrical systems is encouraged by the South African Civil Aviation Authority (SACAA).

2. ***APPLICABILITY***

This AIC is applicable to all aircraft and helicopters certified in any category (CAR 91, 121, 127, 135, 137 and 138).

3. ***EFFECTIVE DATE***

The requirements for an electrical load analysis shall become effective from 1st August 2009.

4. ***BACKGROUND***

The requirements of ICAO Annex 8, Part IIIB, Sub Part F, states the following:

The design of the instruments, equipment and systems required by Annex 8 and their installation shall be such that:

a) an inverse relationship exists between the probability of a failure condition and the severity of its effect on the aircraft and its occupants, as determined by a system safety assessment process;

b) They perform their function under all anticipated operating conditions; and

c) Electromagnetic interference between them is minimized.

The design of the electrical power supply system shall be such as to enable it to supply power loads during normal operations of the aeroplane and essential power loads after failures that affect the electrical generating system and under expected environmental conditions.

The clause stated above alludes to the fact that, all systems are required to be monitored for their performance and the Certificate holders are required to ensure at all times that the possibility of failures and their severity is known at all times. The SACAA has published guidance material called: ***Electrical Load Analysis numbered CA AOC-AW-025*** *to provide assistance and guidance on how to meet this international standard. This guidance material is available from the CAA website at www.caa.co.za.*

5. ***SUMMARY***

a) In accordance with CAR Part 21 read together with SA-CATS,AR, and in order to show compliance to airworthiness standards, Compliance for type certification must be shown with the Federal Aviation Administration (FAA) airworthiness requirements as stated in the United States Federal Aviation Regulation (FAR) 23.1351, 25.1351, 27.1351 and 29.1351 each electrical system must be adequate for the intended use. This would include all electric power sources, their transmission cables and their associated control and protective devices. A determination also has to be made of the electrical system capacity, dependent on operational conditions, being able to provide sufficient power to critical aircraft systems. This can be done by either test or analysis and is typically demonstrated by the compilation and submission of an electrical Load Analysis (ELA).

b) *The main purpose to the ELA is to estimate the system capacity (including generating sources, converters, contactors, busses etc.) needed to supply the worst-case combinations of electrical loads. This is achieved by evaluating the average and maximum demands under all of the applicable flight conditions.*

c) *A summary can then be used to relate the ELA to the system capacity and can establish the adequacy of the power sources under normal, abnormal and emergency conditions (as defined in the Definitions section of this guidance material).*

Note: *It is important to note that the ELA is a 'living' document and as such should be maintained throughout the life of the aircraft to record changes to the connected loads, which may be added or removed by modification or changes in operational procedures.*

d) *The ELA that is produced for Aircraft Type Certification is the baseline document for any subsequent changes. If possible, the basic format for the ELA should be maintained to ensure consistency in the methodology and approach.*

e) *In some cases, the original ELA may be lacking in certain information, for instance, 'time available on emergency battery', and as such, it may be necessary to update the ELA using the technical guidance material for* ***Electrical Load Analysis numbered CA AOC-AW-025.***

6. *CONCLUSION*

This communication is to advise and prepare the industry on this requirement which will be called for on all C of A issuance and continued surveillance as from 1st August 2009. Aviation safety is best served with sound processes that control issues of this nature.

This AIC is an explanation of the said Regulations (CAR 21.08.1A) and an indication of the Regulatory intent.

for COMMISSIONER FOR CIVIL AVIATION