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ROYAL AUSTRALIAN AIR FORCE

AIRCRAFT RESEARCH AND DEVELOPMENT UNIT

MEASUREMENT OF WINJEEL AIRCRAFT STRUCTURE LOADS

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ENCLOSURE TO
ARDU 2535/3/1547/Tech
DATED SEP 66

TEST SCHEDULE 1547/85/10
MEASUREMENT OF WINJEEL AIRCRAFT STRUCTURE LOADS

LETTER REPORT

1. Introduction

1.1 Tests were made to record Winjeel aircraft flight loads. The data obtained supplemented the results of Test Schedule No 1449/85/8 dated 17th August 1962. From these results the safe-life of the Winjeel may be increased.

1.2 Test Schedule No 1547/85/10, dated 18th March 1966, required joint action between Aircraft Research and Development Unit (ARDU) and Aeronautical Research Laboratories (ARL) who are responsible for preparing a technical report.

1.3 This project was divided into three phases:-

- (a) landing load tests;
- (b) wing strain flight tests;
- (c) modified vertical stabiliser tests.

Work required of ARDU by this Test Schedule has now been completed. This letter report covers the wing strain flight test phase; no reports will be submitted by ARDU on the other two phases.

2. Test Conditions

2.1 Airframe. The test aircraft was A85-456; the general surface condition of its airframe was good. The outer wing sections had completed their normal safe-life period and had been granted an extension of 10 hours for the purpose of the tests. The total airframe life was 1,327 hours 30 minutes at the beginning of the trial.

2.2 Weight and Centre of Gravity

Maximum permissible all up weight for take-off :	4,600 lb
Maximum permissible CG range, aft of datum :	33" to 29"
Mean test weight of A85-456 :	4,200 lb
CG of A85-456 at 4,200 lb :	30.63" aft of datum

2.3 Airframe Limitations. The following limitations were significant to the tests made:-

Maximum IAS :	220K IAS
Maximum positive g :	+6.5 g
Maximum negative g :	-2.5 g

2.4 Instrumentation. 32/ strain gauges were fitted at significant points on the wing. SFIM and CEC recorders were used to obtain the following information:-

- (a). Strain measurements (only six gauges per flight)

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- (b) Indicated Airspeed
- (c) Normal acceleration (g)
- (d) Roll rate
- (e) Elevator deflection
- (f) Aileron deflection
- (g) Rudder deflection

Also, a fatigue meter was included in the instrumentation pack which occupied the rear seat position.

2.5 Weather, Time and Place. All test flights were made from RAAF LAVERTON between 6th July 1966 and 5th August 1966 in smooth air, clear of cloud. The total flying time used for the trial was 9 hours 20 minutes.

2.6 Project Pilots. The project pilots for the wing strain measurement section of this test schedule were:-

Sqn Ldr J.E.C. Mayes, RAF

Flt Lt S.C. Fisher

3. Results of Tests

3.1 Strain measurements were made at significant points within the aircraft's manoeuvre envelope. The following flight conditions were achieved:-

IAS (KTS)	g	Manoeuvre
150	+5	Straight pull up
150	+4	Straight pull up
150	+3	Straight pull up
150	+2	Straight pull up
150	+1	Slight dive
120	0	Straight bunt
120	-1	Inverted flight
120	-2	Outside diving turn

IAS	g	Manoeuvre
150	+4)	Diving turns at constant IAS to left and right
150	+3)	
150	+2)	
115	+3	Straight pull up
90	+2	Straight pull up
65	+1	Straight and level
65	0	Straight bunt
85	-1	Inverted

Since only six gauge readings could be recorded per flight, the above

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schedule was repeated six times with an adjustment made to the instrumentation circuit between each sequence. This ensured that information from each of the 32 strain gauges were recorded for each test point. Also, take-off and landings were recorded. No unusual handling characteristics were noticed by either of the project pilots.

4. Conclusions

4.1 The aircraft handling characteristics were satisfactory and all manoeuvres were performed within existing Service limitations.

4.2 The flight trials for this Test Schedule have now been completed.

5. Recommendations

5.1 It is recommended that:-

(a) Winjeel A85-456 should be returned to standard form.

(b) A copy of the ARL final report should be forwarded to ARDU.

DETAIL

Project Officer (ARDU)	:	Sqn Ldr J.E.C. MAYES (RAF)
Project Officer (ARL)	:	Mr P. BRUCE
Test Schedule No	:	1547/85/10
HQSUPCOM File No	:	2601/85/60
RESDEVU File No	:	2535/3/1547/Tech

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SIGHTED BY PROJECT OFFICER: *K*

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ENCLOSURE TO
ARDU 2535/3/1547/Tech
DATED
28 SEP 1966

TEST SCHEDULE 1547/85/10
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