

Australian Government Civil Aviation Safety Authority

TRAINING & EXAMINATION WORKBOOK for DAY VFR SYLLABUS Version 3 - 01 July 2011

[formerly titled VFR (Day) Work Booklet]

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EXTRACT FROM COMPANY OPERATIONS MANUAL

Fuel Reserves

Fuel Reserves (for all flights) shall be carried in accordance with Civil Aviation Advisory Publication, CAAP 234-1 (1) dated November 2006.

Aeroplane Landing Areas

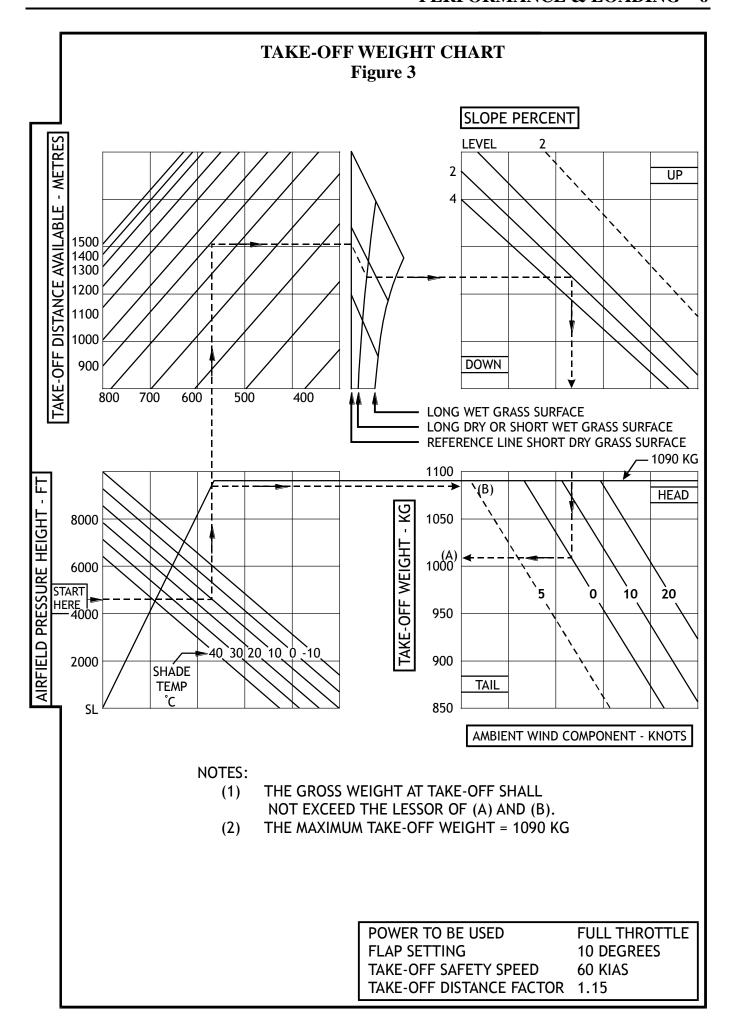
Selection of and operation into landing areas other than licensed aerodromes, shall be in accordance with Civil Aviation Advisory Publication, **CAAP 92-1** (1) **dated July 1992**.

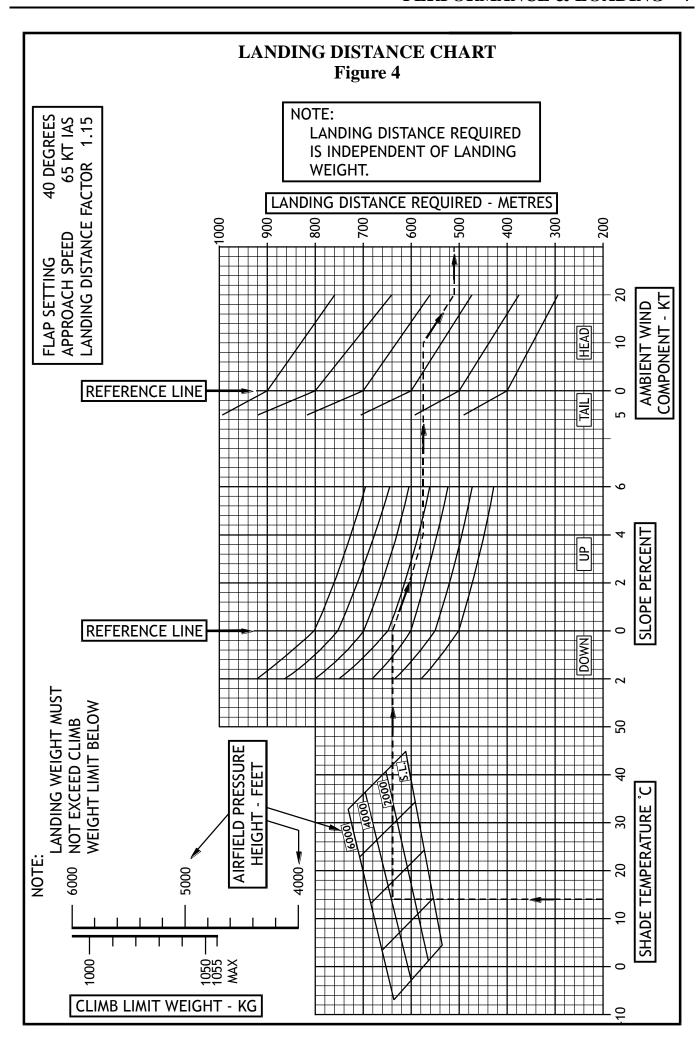
Helicopter Landing Sites

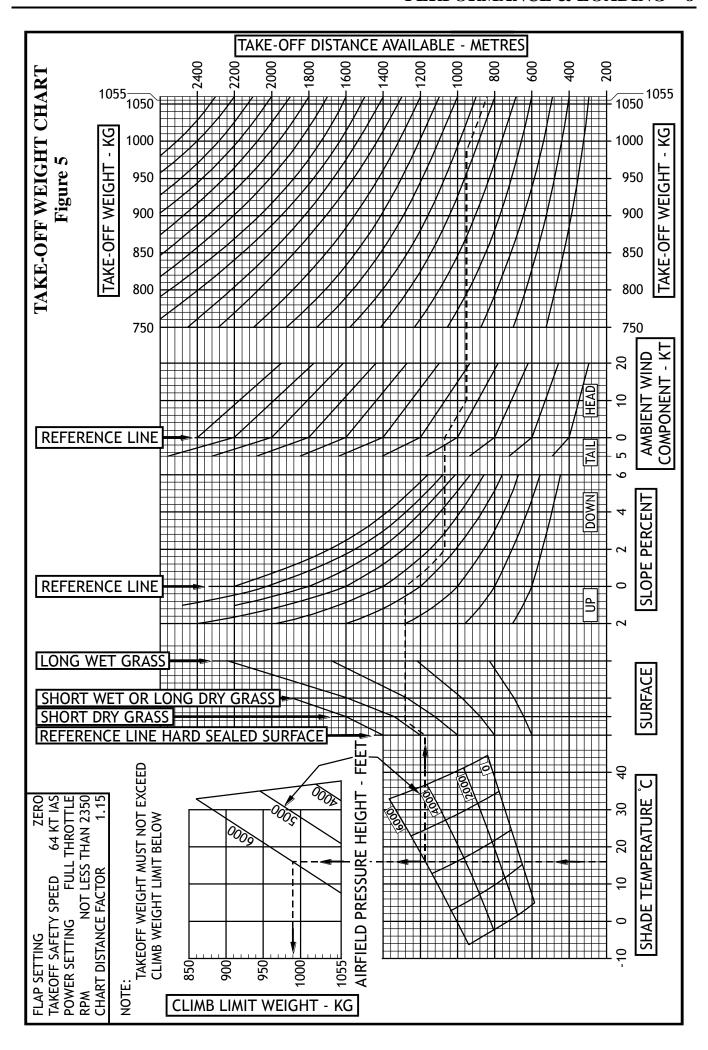
Selection of and operations into helicopter landing sites (HLS), which are not licensed aerodromes, shall be in accordance with the Civil Aviation Advisory Publication, CAAP 92-2 (1) dated January 1996.

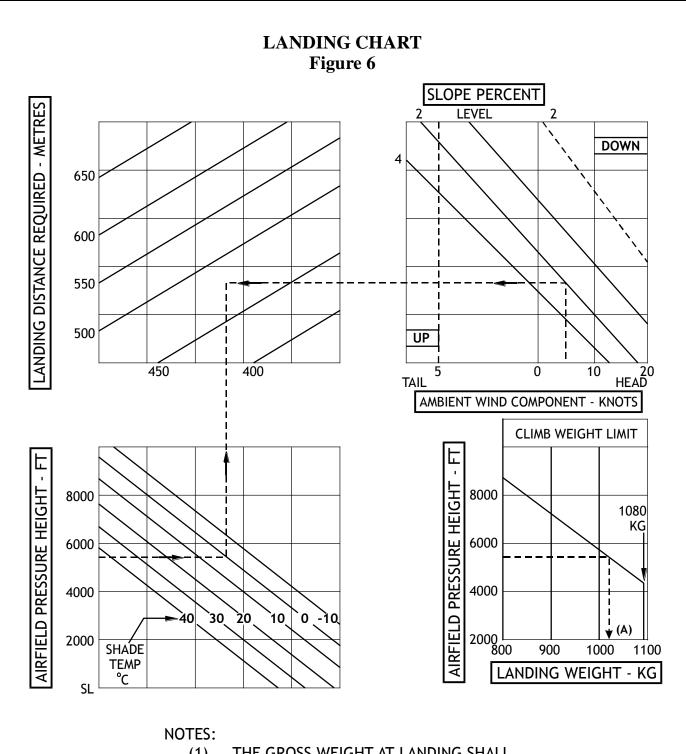
AERODROME AERODROME MARKERS MARKINGS Figure 1 Figure 2 **(i) (i)** (ii) (ii) (iii) (iii) (iv) (iv)

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- (1) THE GROSS WEIGHT AT LANDING SHALL NOT EXCEED (A).
- (2) LANDING DISTANCE REQUIRED DOES NOT VARY SIGNIFICANTLY WITH WEIGHT

FLAP SETTING	30 DEGREES
APPROACH SPEED	58 KIAS
LANDING DISTANCE FACTOR	1.15

LOADING SYSTEM ALPHA CONFIGURATION: 6/7 SEATS

INSTRUCTIONS FOR USE OF LOADING SYSTEM

- Obtain Basic Empty Weight and Index Units from current Section of 6.2 of Flight Manual.
- 2 Mark Basic Empty Weight Index Units on top scale. Enter Basic Empty Weight at top of right-hand column.
- 3 Enter weights of load items required for flight in appropriate squares of right-hand column. Maximum weights for load items are indicated on Index Unit scales.
- 4 Total weights in right-hand column to obtain Zero Fuel Weight and Take-Off Weight. **
- 5 Draw horizontal lines on CG Envelope graph corresponding to Zero Fuel Weight and Take-Off Weight.
- 6 Draw a line vertically down from point marked on Basic Empty Weight Index Units scale to first load item scale.
 - * Move to the left or right on this load item index scale as per arrow directions, and mark point as appropriate to the load indicated in the right-hand column. (e.g. 154 KG load @ 77 KG/div. = 2 div.).
- Draw a line vertically down from the point marked on the first load item index scale to the second load item index scale and continue as per * above. Continue down the scales to "Rear Baggage". Draw a line vertically from the "Rear Baggage" point down to intersect the Zero Fuel Weight line and Take-Off Weight line previously marked on the CG envelope graph.
- The two intersection points as per 7, above must not exceed the boundaries of the CG envelope graph. If they do, re-organise the load in the aircraft and start again with steps 3 to 7.

** DO NOT EXCEED MAXIMUM TAKE-OFF WEIGHT AS SHOWN ON CG ENVELOPE DIAGRAM OF THIS LOADING SYSTEM.

EXAMPLE:

Basic Empty Weight 1050 KG Empty Index units -260

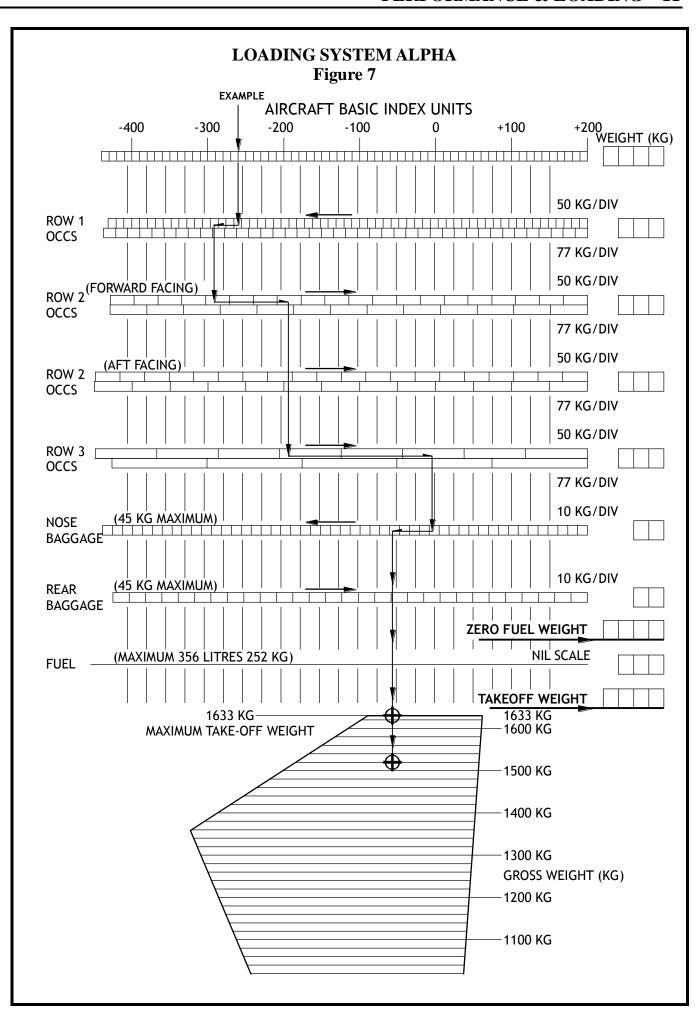
Row 1 150 KG (2 persons) Row 2 (forward facing) 160 KG (2 persons) Row 3 120 KG (2 persons)

Nose baggage 40 KG ----- Zero Fuel Wt = 1520 KG

Rear baggage Ni

Fuel 113 KG ----- Take-Off Wt = 1633 KG

Note: Basic Empty Weight includes unusable fuel and full oil.



LOADING SYSTEM BRAVO CONFIGURATION: 4 SEATS

INSTRUCTIONS FOR USE OF LOADING SYSTEM

To check the loading of the aircraft before take-off, calculate the total weight and total moments as shown in the example below.

Plot the total weight and moment on the "Centre of Gravity Envelope" chart, and if the intersection point is within the envelope, the loading is acceptable.

AIRCRAFT LIMITATIONS

Maximum take-off weight

Normal category: 1000 KG / 2200 lbs Utility category: 841 KG / 1850 lbs

Maximum baggage compartment baggage: 53 KG / 120 lbs

Notes:

- 1 The aircraft is fitted with standard tanks (37 US Gallons at 6 lbs / gallon)
- 2 Empty weight includes unusable fuel and undrainable oil
- 3 Obtain Moment / 1000 inch pounds from the loading graph

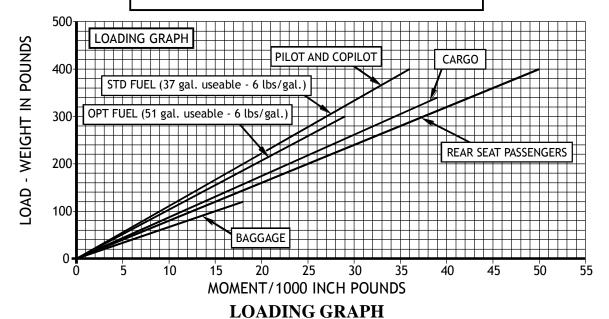
EXAMPLE:

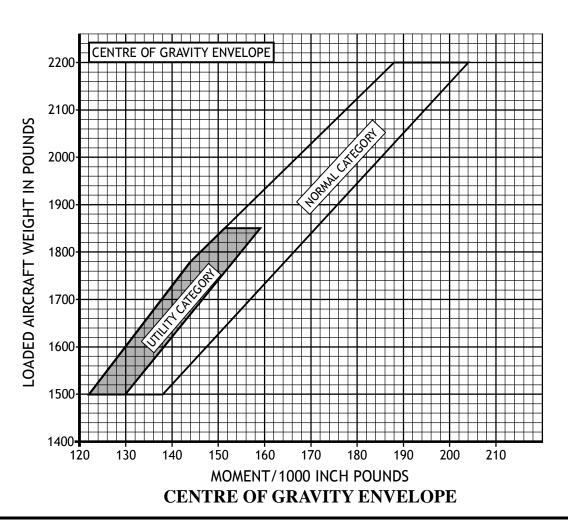
	WEIGHT (LBS)	ARM (IN)	MOMENT/1000 IN LB
Empty weight	1260	80	100.80
Oil	15	32	.48
Fuel (141 litres)	222	91	20.02
Pilot & Co-Pilot	320	91	29.12
Rear seat passengers	350	126	44.10
Baggage	25	151	3.78
Take-Off Weight	2192		198.30

Check CG is within the envelope

LOADING SYSTEM BRAVO Figure 8

Add weight of items to be carried to aeroplane licensed empty weight. Add moment/1000 of items to be carried to total aeroplane moment/1000. Use Centre of Gravity Envelope to determine acceptibility.





LOADING SYSTEM CHARLIE CONFIGURATION: 4 SEATS

INSTRUCTIONS FOR USE OF LOADING SYSTEM

To check the loading of the aircraft before take-off, carry out a summation of weight and index units as shown in the example below. Check the centre of gravity of the aircraft at Zero Fuel Weight and Take-Off Weight by use of the formula:

CG (mm aft of datum) =
$$\frac{\text{Index unit x } 100}{\text{Weight}}$$

The CG must be within the envelope given at all times.

AIRCRAFT LIMITATIONS

Maximum take-off weight

Normal category: 1115 KG
Utility category: 925 KG
Maximum baggage compartment baggage: 122 KG

Notes:

- 1 Aircraft empty weight includes unusable fuel and undrainable oil
- 2 All arms are in mm aft of datum
- 1 index unit = 100 KG mm

EXAMPLE:

	KG	IU
Aircraft empty weight	687	19,522
Full oil	7	86
1 pilot + 1 passenger Roy	w 1 140	3,850
2 passengers Roy	w 2 160	5,760
Baggage	20	842
Zero Fuel W	Veight 1014	30,060
Fuel 140 litres	99	2,920
Take-off W	Veight 1113	32,980

- CG check 1. At Zero Fuel Weight = $(30,060 \times 100) / 1014 = 2965 \text{ mm OK}$
 - 2. At Take-Off Weight = $(32,980 \times 100) / 1113 = 2963 \text{ mm}$ OK

LOADING SYSTEM CHARLIE

INDEX UNITS

<u>Fuel</u>	ARM	: 2950	BAGGAGE	ARM: 4210
20	14	413	10	421
40	28	826	20	842
60	43	1,268	30	1,263
80	57	1,682	40	1,684
100	71	2,095	50	2,105
120	85	2,507	60	2,526
140	99	2,920	70	2,947
160	114	3,363	80	3,368
180	129	3,806	90	3,789
200	142	4,189	100	4,210
216	153	4,513	110	4,631
			122	5,136

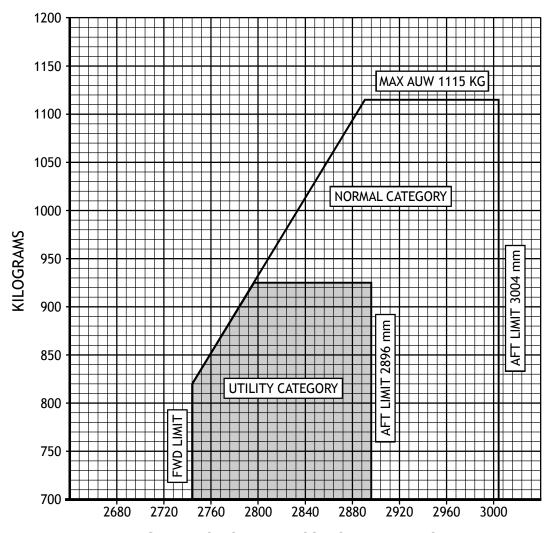
OCCUPANTS

KG	ROW 1	ROW 2
NG	ARM: 2750	ARM: 3600
40	1,100	1,440
45	1,237	1,620
50	1,375	1,800
55	1,512	1,980
60	1,650	2,160
65	1,786	2,340
70	1,925	2,520
75	2,062	2,700
80	2,200	2,880
85	2,338	3,060
90	2,475	3,240

OIL ARM: 1230

US Quarts	LITRES	KG	INDEX UNITS
6	5.7	5.0	62
7	6.6	6.0	74
8	7.6	7.0	86

LOADING SYSTEM CHARLIE Figure 9



CENTRE OF GRAVITY POSITION (mm AFT OF DATUM)

ALLOWABLE CENTRE OF GRAVITY ENVELOPE

CONVERSION FACTORS

1 inch = 25.4 mm

1 foot = 0.305 metre

1 lb = 0.454 KG

1 Imp gal = 1.201 US gal = 4.546 litres

100/130 aviation gasoline: Specific Gravity = 0.71

LOADING SYSTEM ECHO CONFIGURATION: 6 SEATS

INSTRUCTIONS FOR USE OF LOADING SYSTEM

- Moment Index chart (fig 10, page 20) may be used to determine the balance of the aeroplane. Locate the weight (in KG) of a particular load item on the vertical scale and move horizontally to the line representing the location of that item. From that point drop vertically to read off the Moment Index for that item.
- Obtain the aeroplane basic empty weight and index units from the examination question. Add up the required total weight (Gross Weight) of the aeroplane and the corresponding Total Moment Index.
- Refer to the Centre of Gravity chart (fig 11, page 21). Locate the Gross Weight of the loaded aeroplane (in KG) on the vertical scale and move horizontally to meet the vertical line representing the Total Moment Index of the loaded aeroplane. If the point of intersection, which represents the Centre of Gravity, falls in the shaded area, the aeroplane is correctly loaded.

Note: The Centre of Gravity must lie in the shaded area at ALL stages of flight.

Weight Limitations:	Maximum Take-off Weight	2950 KG
	Maximum Landing Weight	2725 KG
	Maximum Zero Fuel Weight	2630 KG

Balance Data: The Mean Aerodynamic Chord (MAC) data is as follows:

Length of chord 1900 mm

Location of leading edge 2190 mm aft of datum

Centre of Gravity range is a follows:

2400 mm to 2680 mm at 2360 KG or less

2560 mm to 2680 mm at 2950 KG

Linear variation between the points given

Loading Data:

Location	Maximum Permissible Load	Load Arm (mm Aft of Datum)
Seating:		
Row 1 (Seats 1 & 2)	Pilot + 1 Passenger	2290
Row 2 (Seats 3 & 4)	2 Passengers	3300
Row 3 (Seats 5 & 7	2 Passengers	4300
Cargo & Baggage Compts:		
Forward Compt	55 KG	500
Left wing Compt.	55 KG	3550
Right wing Compt.	55 KG	3550
Rear Compartment	155 KG	5000
Floor loading intensity	(All Compts) 450 KG/m ²	
Fuel:		
Left main tank	50 gal	1780
Right main tank	50 gal	1780
Left auxiliary tank	40 gal	2800
Right auxiliary tank	40 gal	2800

LOADING SYSTEM ECHO (continued)

Note: All passenger seats weigh 5 KG each and may be removed to permit the carriage of additional cargo or baggage in the cabin.

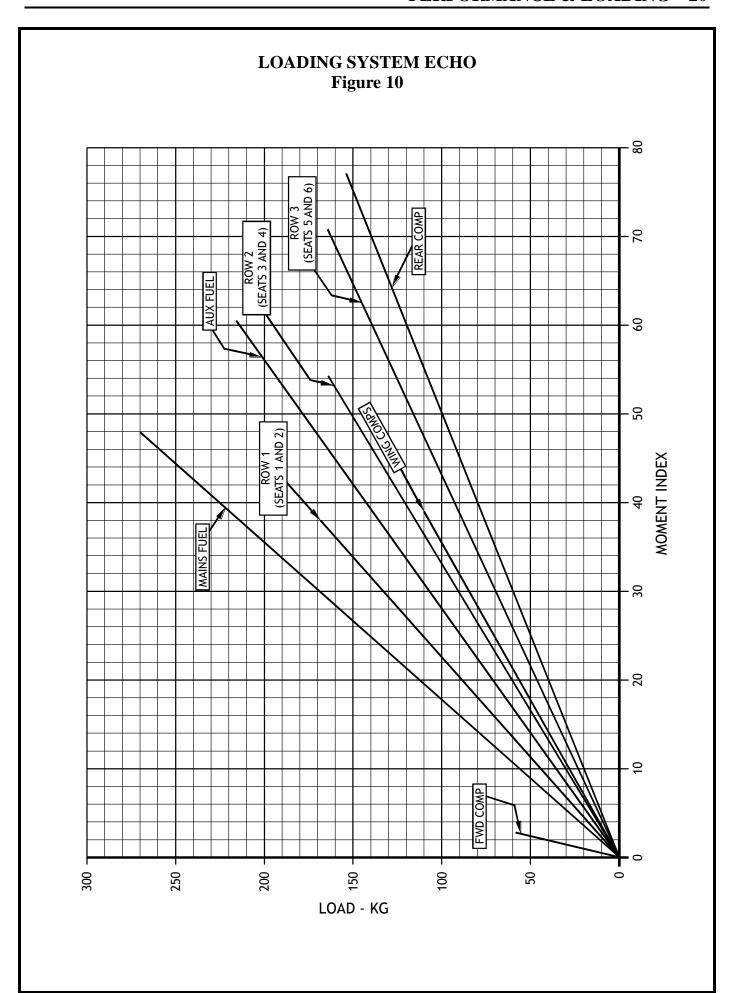
The maximum permissible load in the area otherwise occupied by a passenger seat is 82 KG.

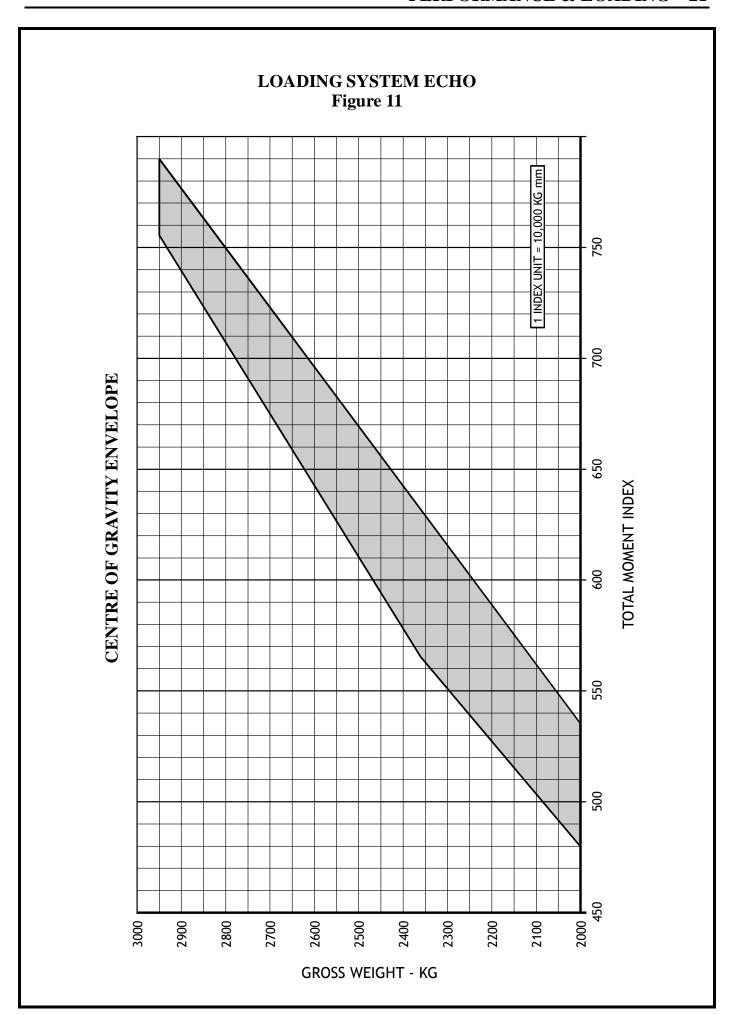
If a passenger seat is removed, adjust the empty weight and empty moment.

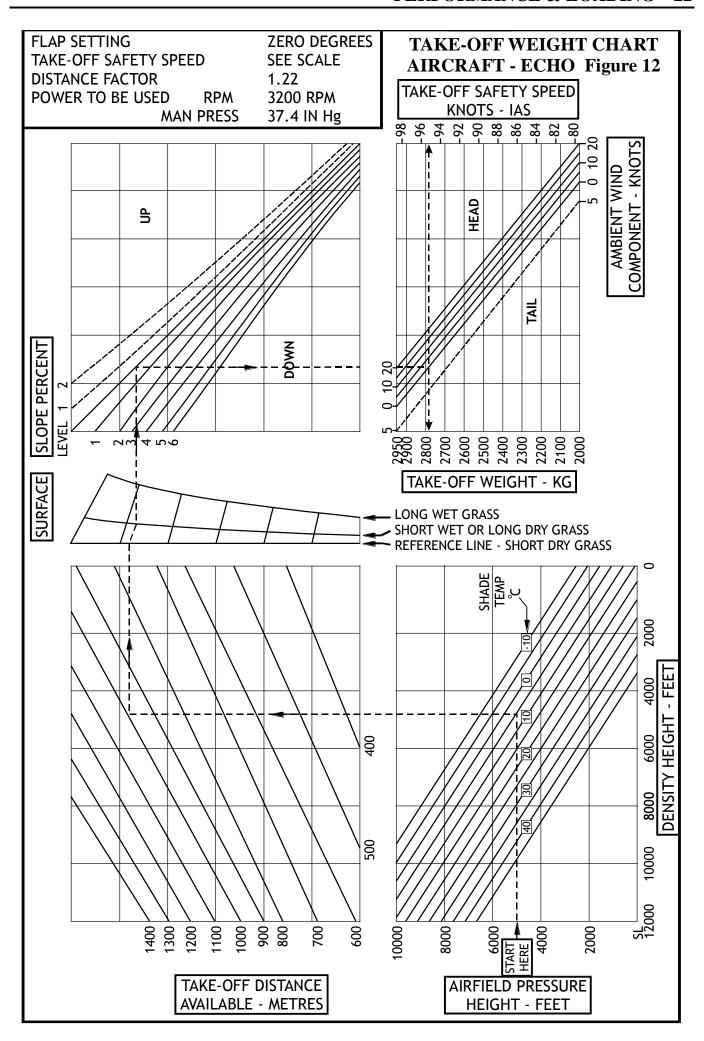
EXAMPLE:

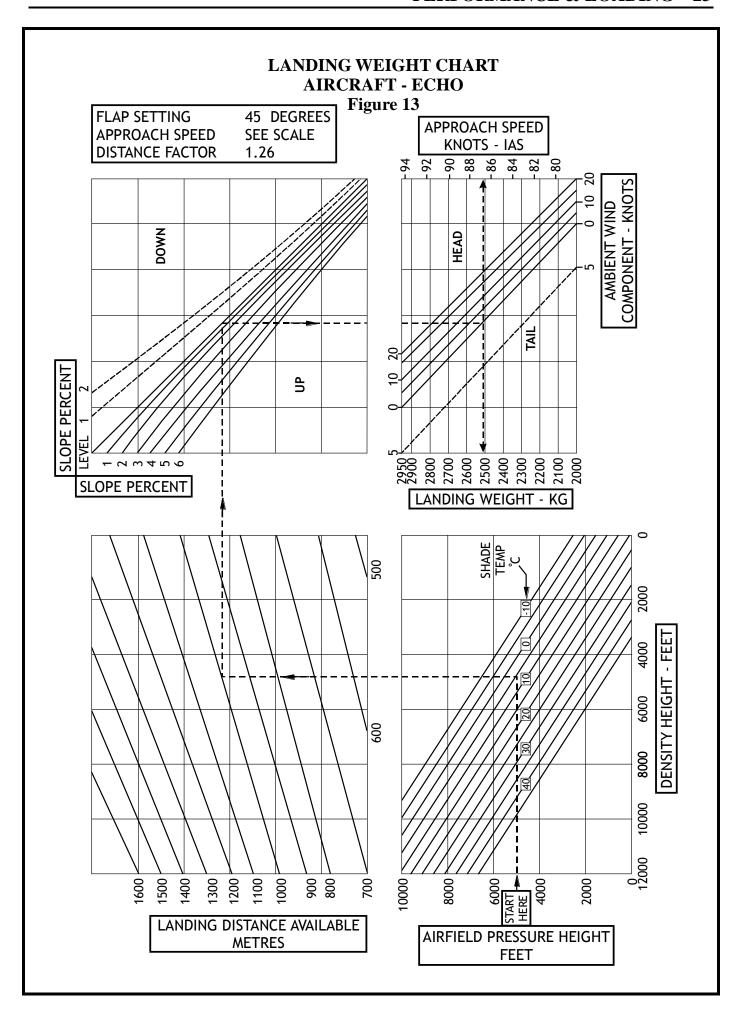
	WEIGHT	MOMENT INDEX
	(KG)	(Refer to Figure 10)
Aeroplane Basic Empty Weight	1970	478.0
Row 1 (2 passengers)	150	34.0
Row 2 (2 passengers)	140	46.3
Row 3 (2 passengers)	130	56.0
Rear compartment	100	50.0
Zero Fuel Weight	2490	664.3
Fuel in Main tanks	200	35.5
Take-off Weight	2690	699.8
Fuel Burn-off	80	14.3
Landing Weight	2610	685.5

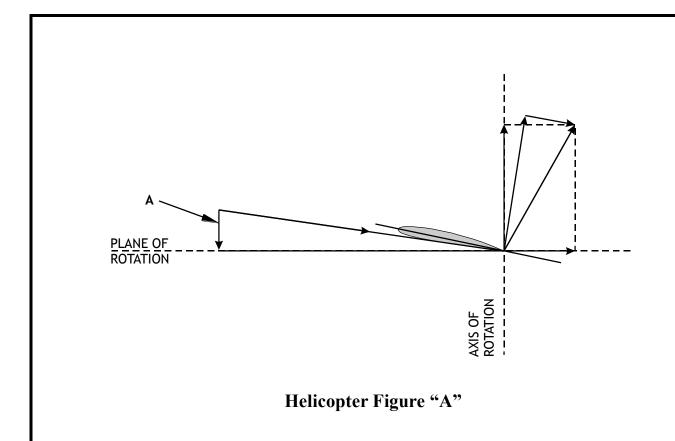
Refer to the Centre of Gravity Chart (Fig 11, page 21) to assess whether the horizontal line from the "Gross Weight" in question intersects the vertical line from its corresponding Total Moment Index in the shaded area.

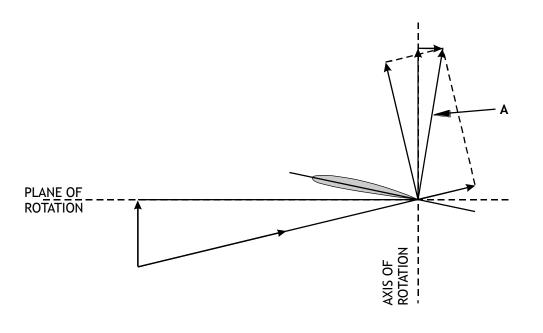




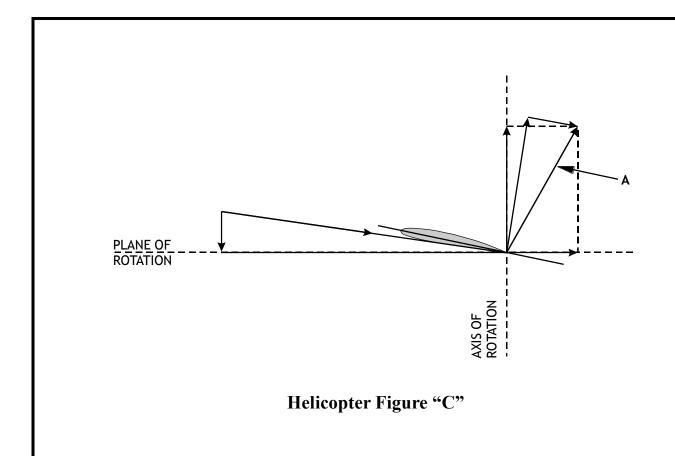


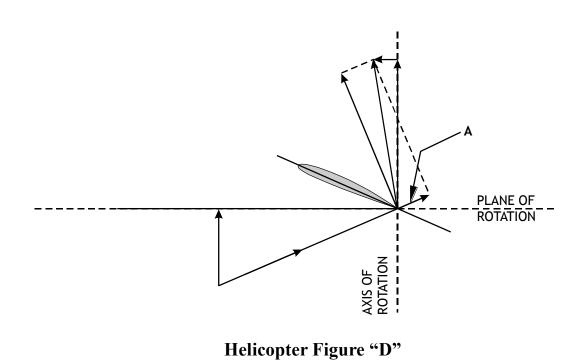


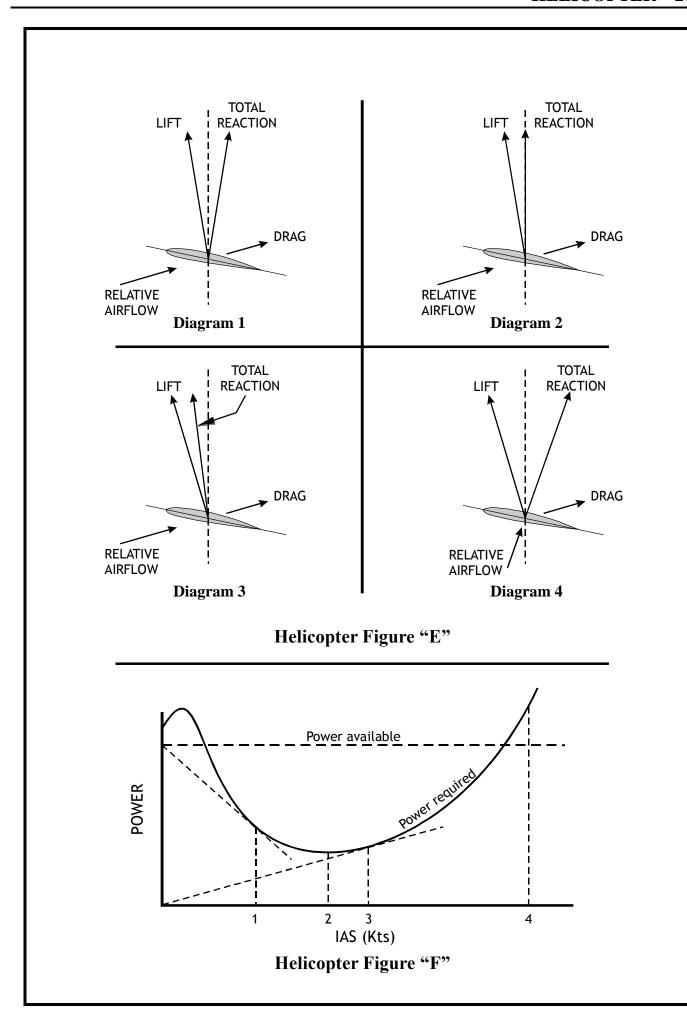


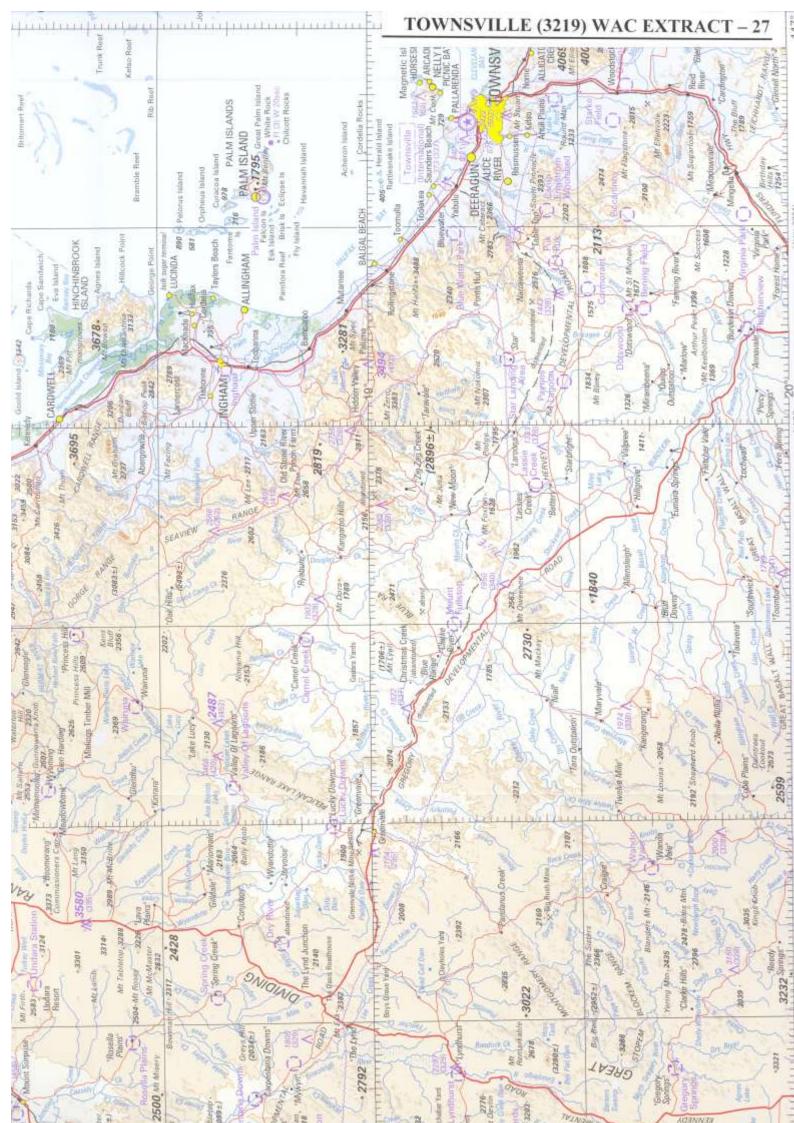


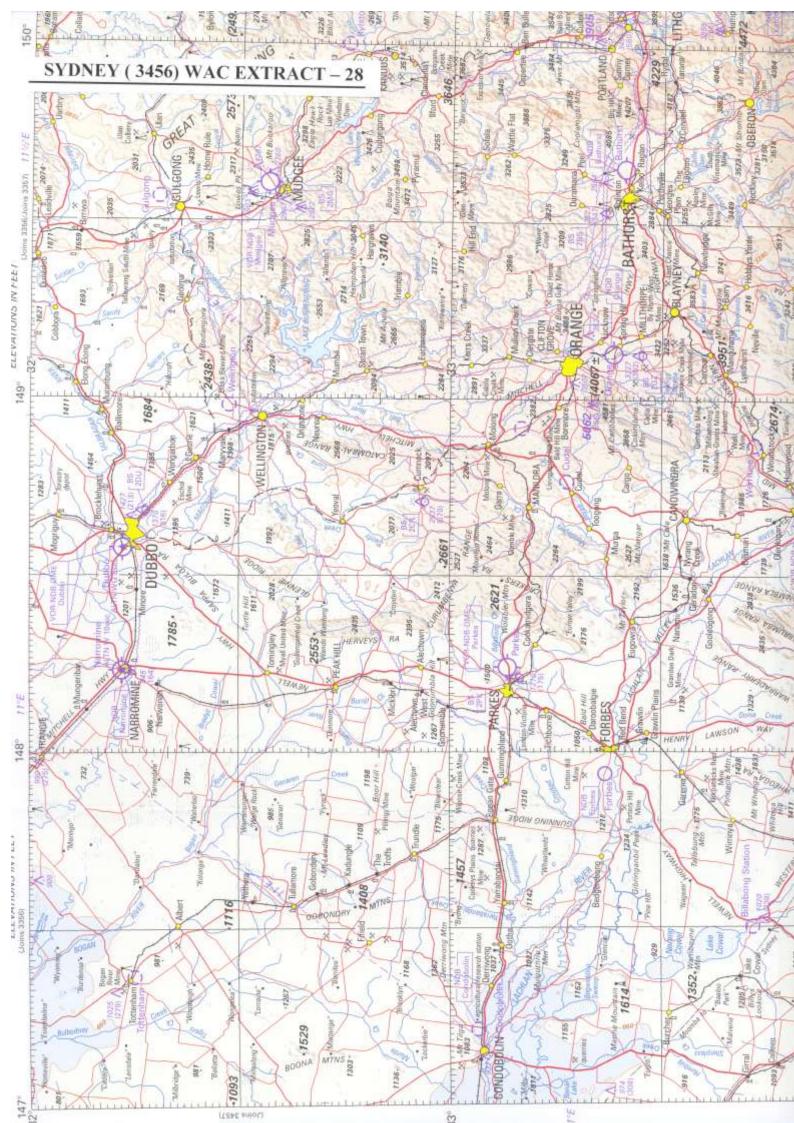
Helicopter Figure "B"

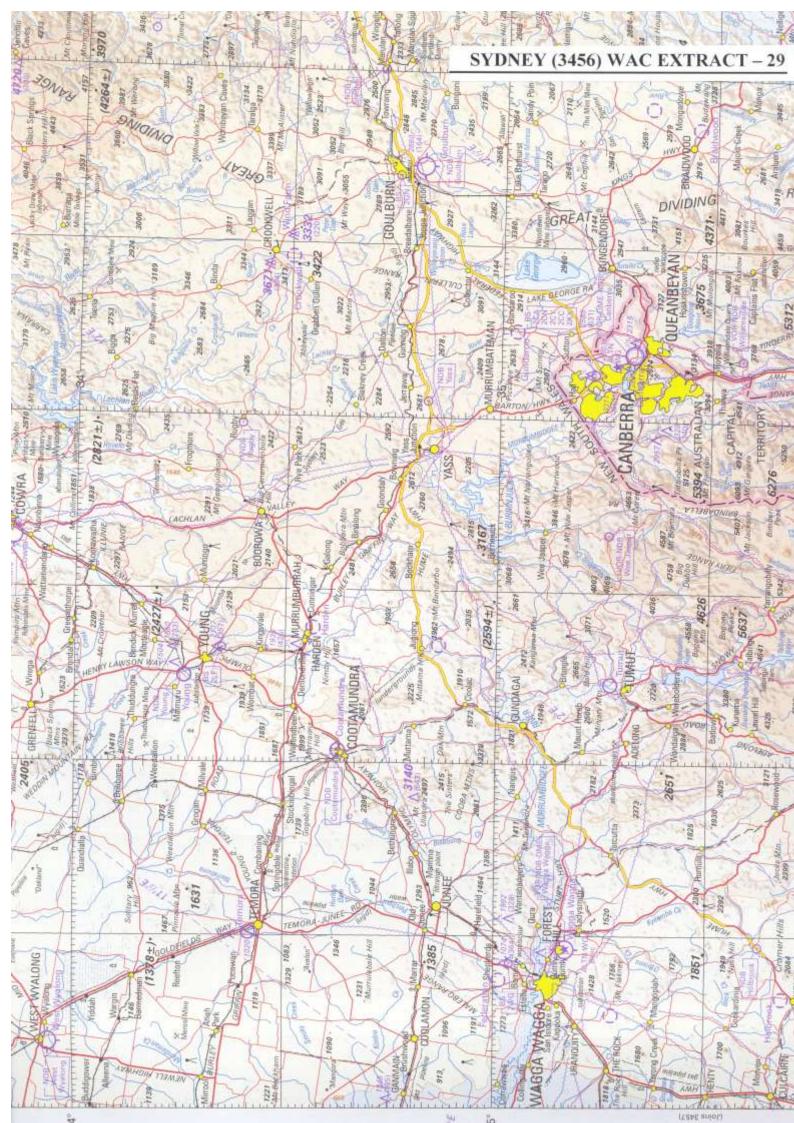


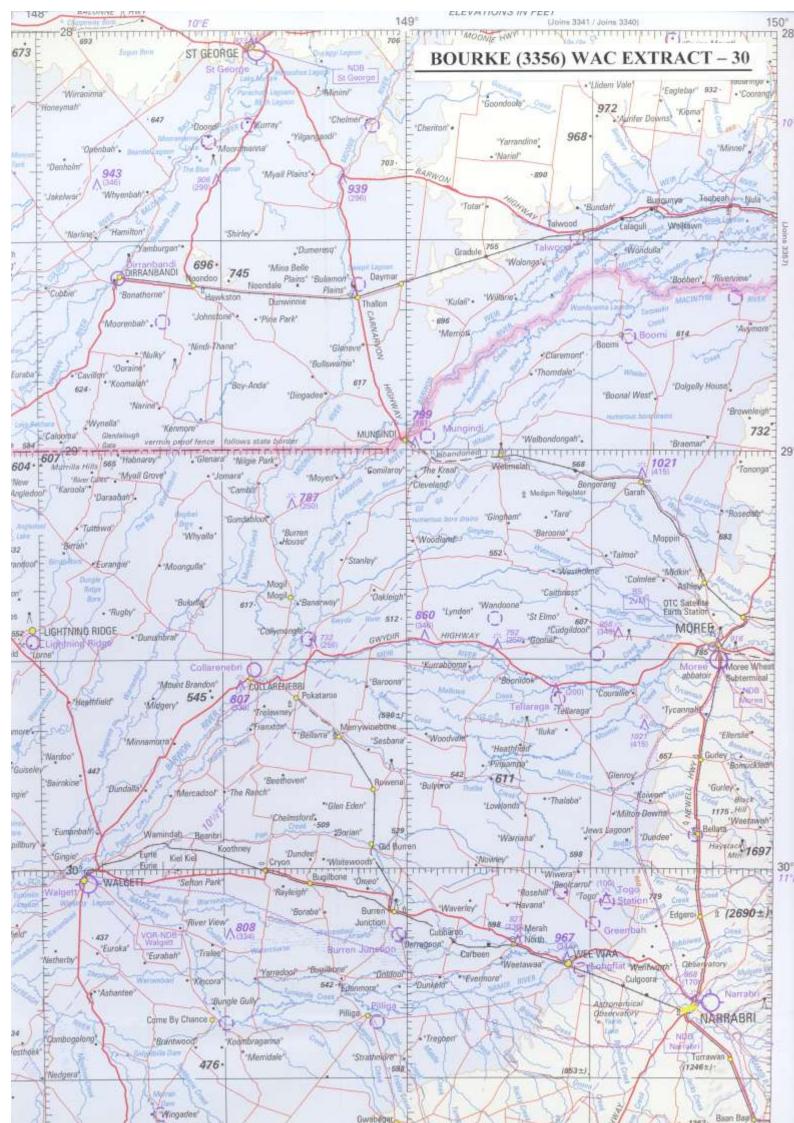


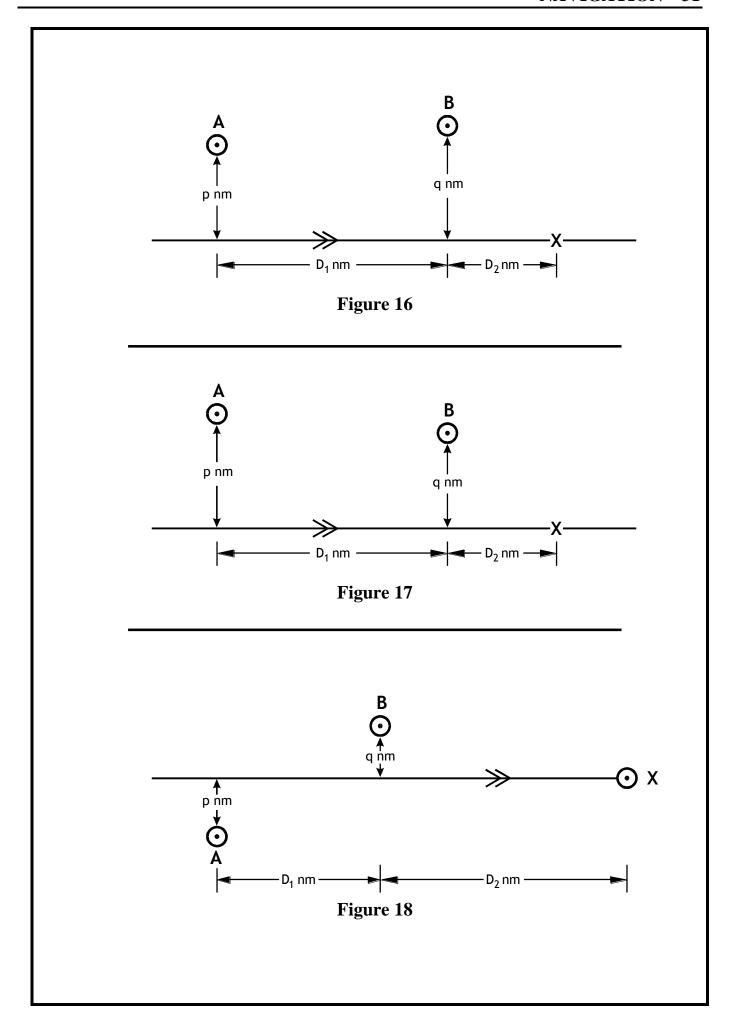


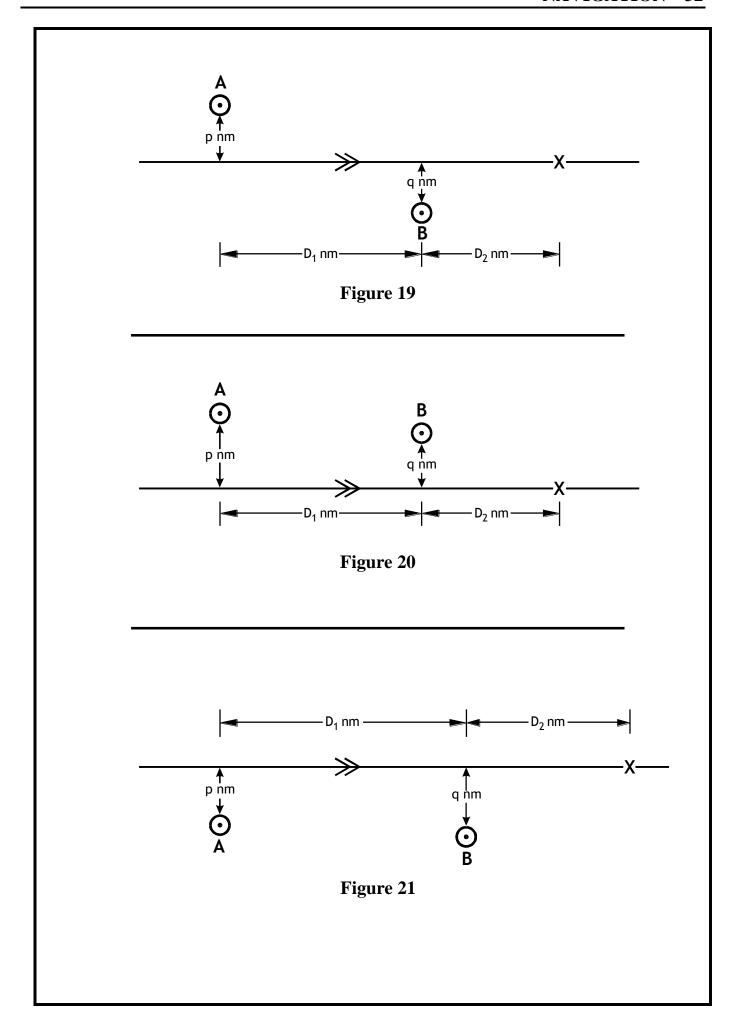


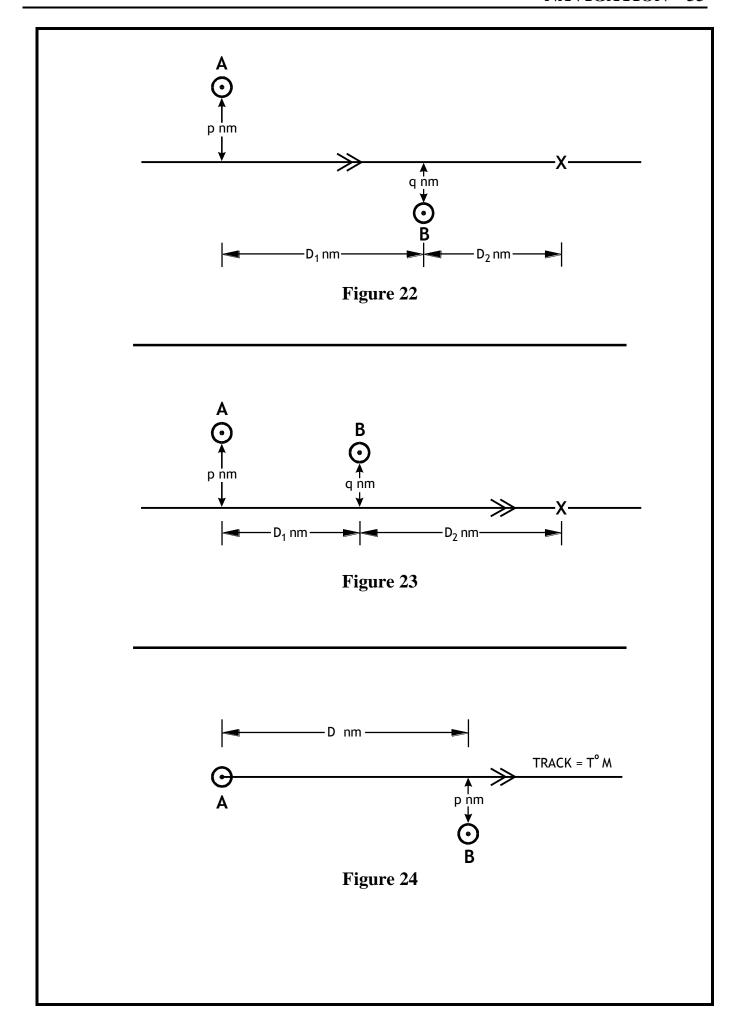


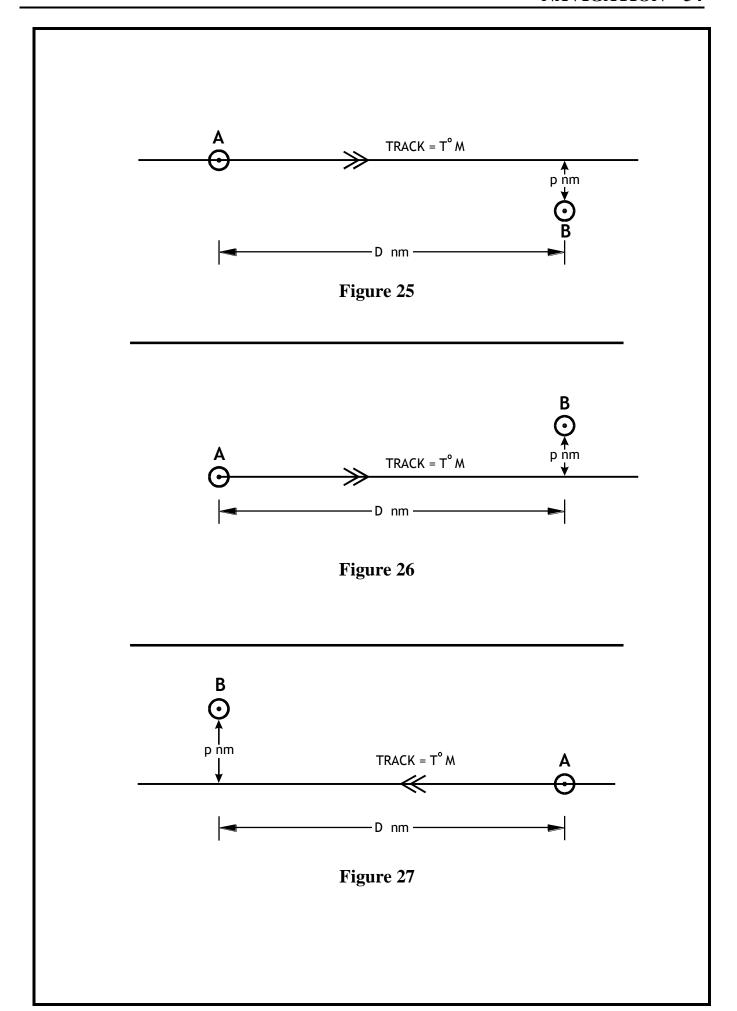


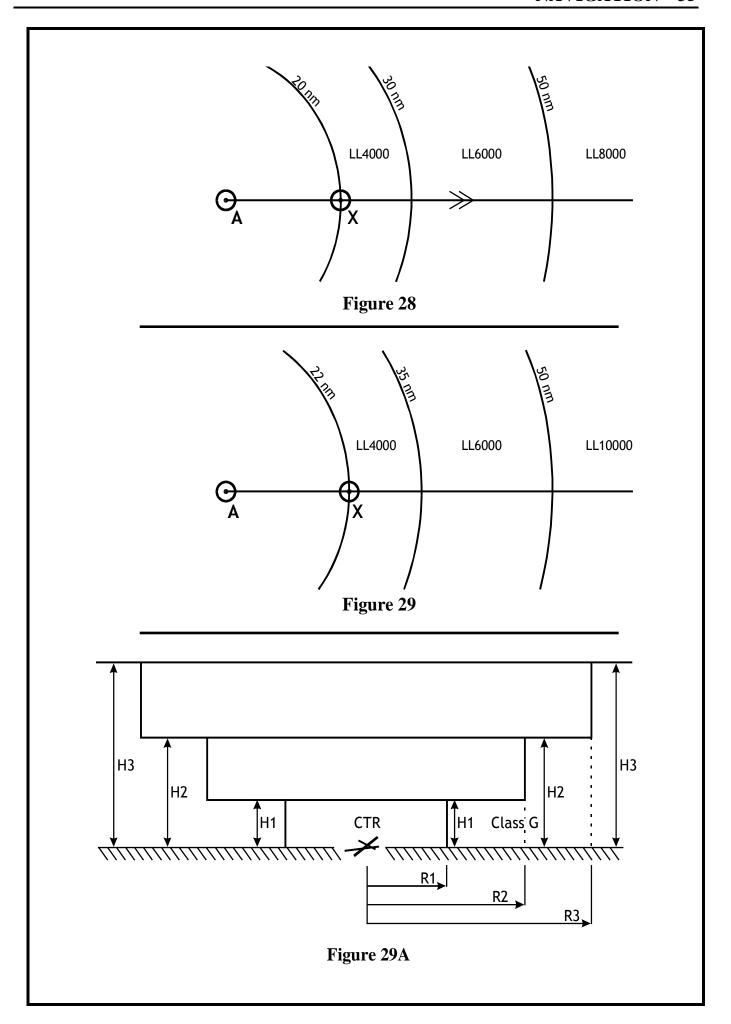












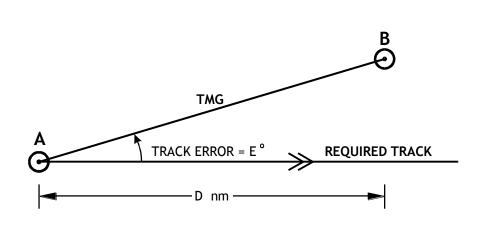


Figure 30

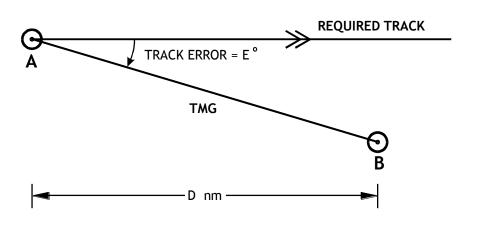


Figure 31

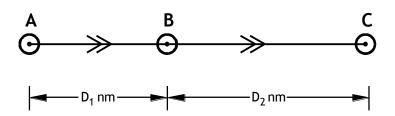


Figure 32

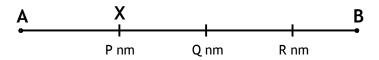


Figure 33

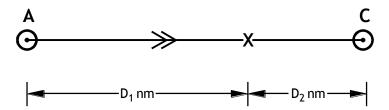


Figure 34

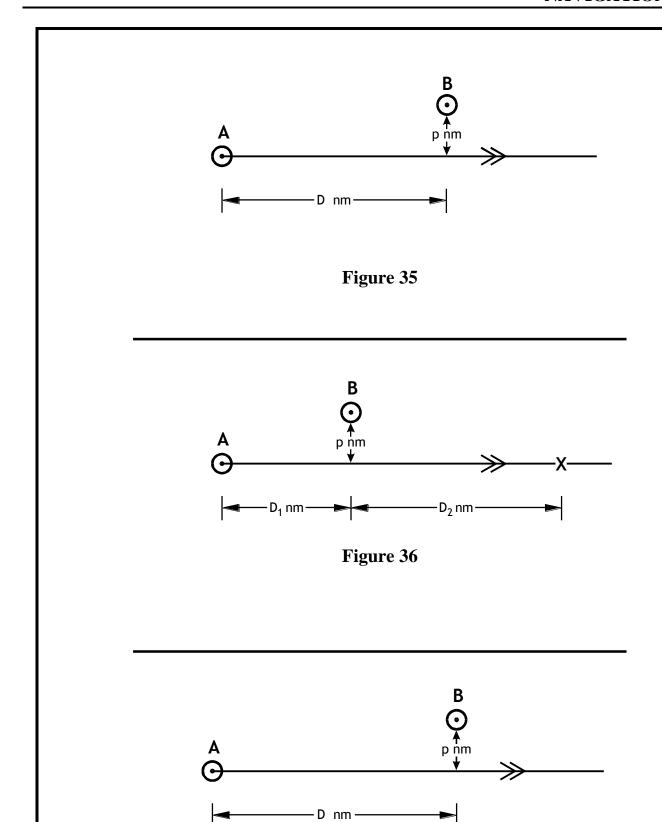


Figure 37

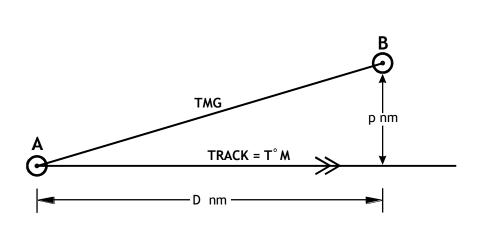
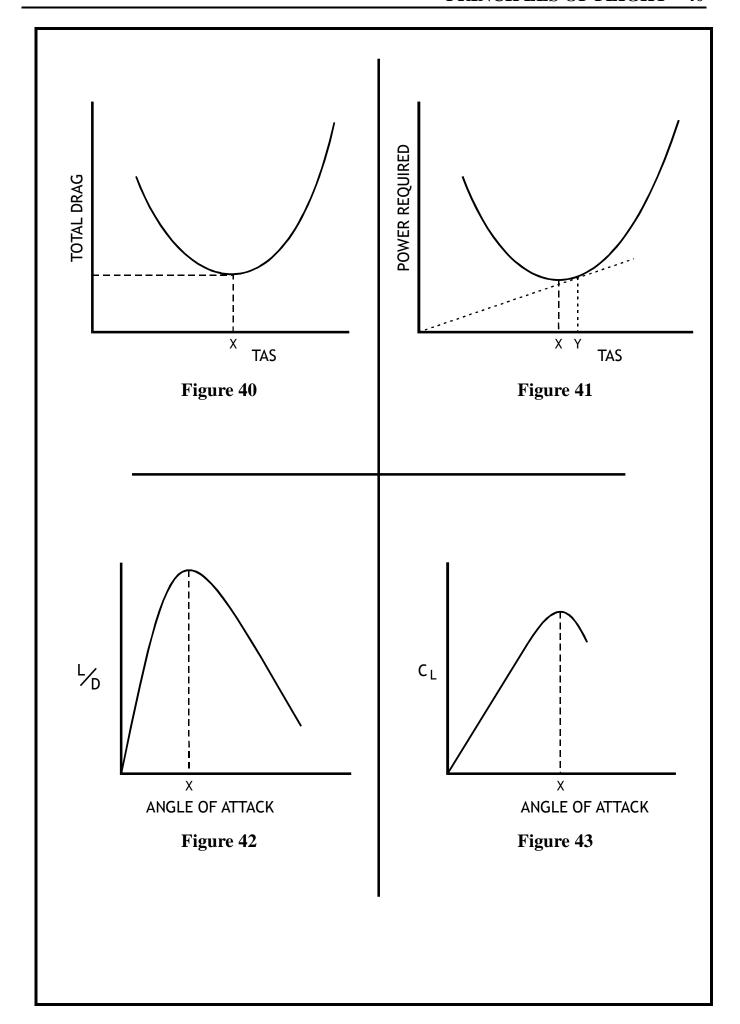
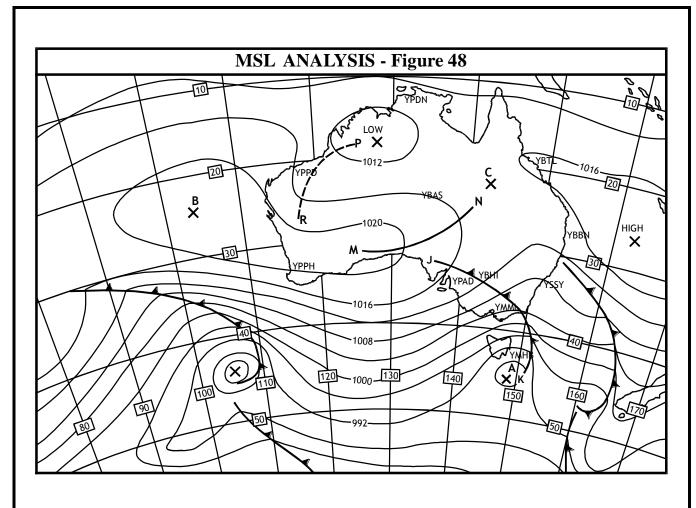


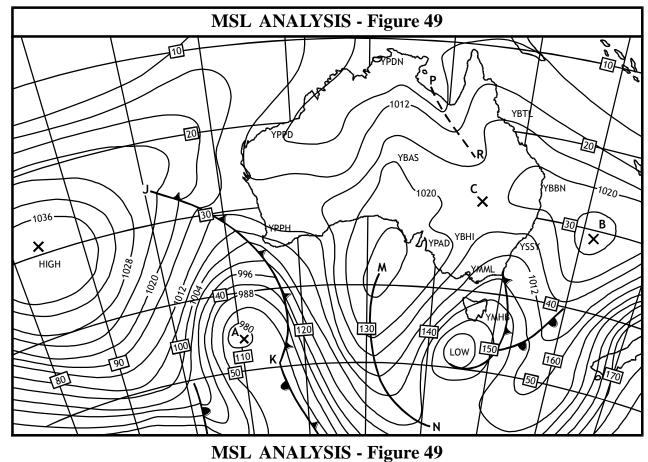
Figure 38



Figure 39







AREA 21 (21)

AMEND AREA FORECAST 090200 TO 091700 AREA 21

OVERVIEW

SURFACE TROUGH AT 2200 Z: THROUGH YYNG/YMER

0500 Z: YBTH/YSNW 1100 Z: EAST OF AREA

SCATTERED SHOWERS AND THUNDERSTORMS. INCLUDING ISOLATED HAIL. AREAS OF

RAIN. CONTRACTING EASTWARDS ISOLATED FOG AFTER 1100Z

REFER SIGMET RE SQUALLS AND HAIL.

SUBDIVISIONS:

A: E OF TROUGH: B: W OF TROUGH

AMD WIND

2000 5000 7000 10000 14000 18500

A: 350/25 340/30 340/35 340/40 340/50 MS04 340/55 MS14 B: 260/25 260/30 260/30 280/30 ZERO 280/40 MS08 280/60 MS17

AMD CLOUD

AREAS OF BKN ST 1000/3000 W SLOPES 3000/5000 RANGES.

ALSO WITH PRECIPITATION 1000/3000 COAST/SEA

BKN CUSC 2500/10000 W SLOPES 4500/11000 W RANGES

SCT CUSC 2500/10000 COAST/SEA 4500/11000 E RANGES

ISOL CB 5000/35000

BKN ACAS ABV 10000 CONTRACTING E

AMD WEATHER

RA CONTRACTING E SH/TS WITH HAIL FOG AFTER 11

VISIBILITY

5000M SH/RA 3000 TS

AMD FREEZING LEVEL

A: 12000 B: 9500

AMD ICING

MOD IN CU 9500/11000 AND AC

AMD TURBULENCE

MOD WITH CU AND AC

MOD TO ISOL SEV RANGES/COAST/60NM OFFSHORE

NOTE: REFER SIGMET RE SQUALLS AND HAIL

AREA 21 (21)

AMEND AREA FORECAST 090100 TO 091700 AREA 21

OVERVIEW:

SURFACE TROUGH AT 0400 Z: THROUGH YSWG/YMCO

1000 Z : YCWR/YMRY 1600 Z : EAST OF AREA

SCATTERED SHOWERS AND THUNDERSTORMS. INCLUDING ISOLATED HAIL. AREAS OF

RAIN. CONTRACTING EASTWARDS ISOLATED FOG AFTER 1600Z REFER SIGMET RE

SQUALLS AND HAIL.

SUBDIVISIONS:

A: E OF TROUGH B: W OF TROUGH

AMD WIND:

	2000	5000	7000	10000	14000	18500
A:	350/25	340/30	340/35	340/40	340/50 MS04	340/55 MS14
B:	260/25	260/30	260/30	280/30 ZERO	280/40 MS08	280/60 MS17

AMD CLOUD:

AREAS OF SCT ST 1000/3000 W SLOPES 3000/5000 RANGES.

ALSO WITH PRECIPITATION 1000/3000 COAST/SEA

BKN CUSC 2500/10000 W SLOPES 4500/11000 W RANGES

SCT CUSC 2500/10000 COAST/SEA 4500/11000 E RANGES

ISOL CB 5000/35000

BKN ACAS ABV 10000 CONTRACTING E

AMD WEATHER:

RA CONTRACTING E SH/TS WITH HAIL FOG AFTER 16

VISIBILITY

5000M SH/RA 3000 TS

AMD FREEZING LEVEL

A: 12000 B: 9500

AMD ICING

MOD IN CU 9500/11000 AND AC

AMD TURBULENCE:

MOD WITH CU AND AC

MOD TO ISOL SEV RANGES/COAST/60NM OFFSHORE

AREA 21 (21)

AMEND AREA FORECAST 092300 TO 101100 AREA 21

OVERVIEW:

WEAK SURFACE TROUGH THROUGH NSW SLOPING WEST WITH HEIGHT,

AT 23 Z: 10000FT ABOUT PARKES/MORUYA

18500FT ABOUT WAGGA/ORBOST

SUBDIVISIONS:

A: E OF TROUGH B: W OF TROUGH

AMD WIND:

	2000	5000	7000	10000	14000	18500
A:	240/25	250/25	250/25	280/35 MS04	280/50 MS11	280/70 MS20
B:	240/30	240/30	240/30	240/30 MS06	240/35 MS13	220/45 MS22

AMD CLOUD

SCT ST 1000/3000 SW SLOPES. BKN RANGES TILL 02

SCT CUSC 5000/7000 RANGES/SLOPES. BKN SLOPES IN S

SCT CU 4000/7000 SEA/COAST

AMD WEATHER

ISOL SHOWERS RANGES/W SLOPES S OF 35S

ISOL SHOWER SEA

VISIBILITY:

5000M SHOWERS

AMD FREEZING LEVEL:

6000 S OF 35S / 9000 N

AMD ICING

MOD IN CU TOPS

AMD TURBULENCE

MOD BLW 10000 RANGES/E

AREA 21 (21)

AMEND AREA FORECAST 092300 TO 101100 AREA 21

OVERVIEW:

WEAK SURFACE TROUGH AT 0200 Z: THROUGH YSWG/YORB

0700 Z : YPKS/YMRY 1100 Z : YBTH/YSNW SUBDIVISIONS:

A: E OF TROUGH B: W OF TROUGH

AMD WIND:

2000 5000 7000 10000 14000 18500 280/70 MS20 A: 240/25 250/25 250/25 280/35 MS04 280/50 MS11 220/45 MS22 B: 240/30 240/30 240/30 240/30 MS06 240/35 MS13

AMD CLOUD:

SCT ST 1000/3000 SW SLOPES. BKN RANGES TILL 08 $\,$

SCT CUSC 5000/7000 RANGES/SLOPES. BKN SLOPES IN S

SCT CU 4000/7000 SEA/COAST

AMD WEATHER:

ISOL SHOWERS RANGES/W SLOPES S OF 35S

ISOL SHOWER SEA

VISIILITY:

5000M SHOWERS

AMD FREEZING LEVEL:

A: 8000 B: 9000

AMD ICING

MOD IN CU TOPS

AMD TURBULENCE:

MOD BLW 10000 RANGES/E

AREA 21 (21)

AREA FORECAST 062100 TO 071100 AREA 21

OVERVIEW:

ISOLATED SHOWERS CHIEFLY ALONG COAST WITH AREAS OF LOW CLOUD TILL 04Z PATCHY RAIN NORTH OF ORANGE/SYDNEY. ISOL FOGS RANGES/EAST TILL 23Z SUBDIVISIONS:

NIL WIND

2000 5000 7000 10000 14000 18500

VRB/15 260/15 260/15 260/25 ZERO 270/30 MS08 270/40 MS17

CLOUD

AREAS OF BKN ST 1000/3000 SEA/COAST TILL04

3000/5000 RANGES IN E TILL 02

AREAS OF CU/SC 3000/8000 SEA/COAST ISOL TOPS SEA 20000

SCT CU/SC 4000/8000 RANGES, BKN IN S AND E

SCT SC 5000/8000 W SLOPES

AREAS OF BKN ACAS ABOVE 11000

WEATHER:

SH IN E. PATCHY RA N OF YORG/YSSY

ISOL FOG RANGES AND EAST TILL 23

VISIBILITY: 5000 SH/RA

FREEZING LEVEL

10000

ICING

MOD IN CU/AC TURBULENCE: MOD IN CU/AC

CRITICAL LOCATIONS: (HEIGHT ABOVE MSL)

MT VICTORIA: BKN SC 4000

FM23 5000M SH BKN CU 5000

BOWRAL: 500M FOG

FM22 5000M BKN ST 3000 FM00 8000M BKN SC 4500

AREA 22 (22)

AREA FORECAST 112300 TO 121100 AREA 22

OVERVIEW:

THUNDERSTORMS WITH HAIL (SMALL) DEVELOPING IN W AREA 22 EXTENDING E

SCATTERED SHOWERS/DRIZZLE

WIDESPREAD LOW CLOUD, BECOMING SCATTERED NW

ISOLATED SEVERE TURBULENCE BELOW 8000

REFER SIGMET FOR LATEST DETAILS OF SEVERE ICING

WIND:

2000 5000 7000 10000 14000 18500

270/40 270/35 260/40 270/45 MS10 270/50 MS18 260/60 MS28

CLOUD:

OCNL CB 2500/28000 W AREA 22 EXTENDING E

BKN ST 800/3000, BECOMING SCT NW

BKN CU 2500/15000

WEATHER:

TS (HAIL) SH/DZ

VISIBILITY:

4000M SH/DZ/TS

FREEZING LEVEL:

4000S/5000N

ICING:

REFER SIGMET

TURBULENCE:

ISOL SEV BELOW 8000

