

Appendix A. List of persons killed

Flight crew

Captain S J L Key
S/O J W Keighley
S/O S Ticehurst

Cabin crew

S/Steward F Farey
Steward A Lamb
Stewardess J K Mowat

Passengers

Captain J Collins
F/O C K Ware
F/O R E Wilde

Mrs M Abrams
Mr P Abrams
Mrs Adams
Mr F W Adams
Mr A J Alabaster
Mrs H Benjamin
Mrs Borgmans
Mr A Borgmans
Dr I M Campbell
Mr M J Cesar
Mr M J Clarizio
Mr E A Coleman
Mrs de Haes
Mr E F de Haes
Miss A de Waele
Mr R G Driver
Mrs D W Everitt
Mr D V Everitt
Mr F P Farmann
Mr Felix
Mr R P Field
Mr S P Frederick
Mr C Gascou
Mr P Glennie-Smith
Dr M Golomb-Fingenbaum

Mr E J Gray
Mr J D Gray
Mrs A F Haerle
Mr H O Halstengaro
Mrs S Hansen
Miss G Hansen
Miss H Hansen
Miss K Hansen
Master P Hansen
Mrs J D Harlowe
Mr A J Harrison
Miss E Hawthorn
Mrs K Hoehn
Mr K W Hoehn
Mr B Husapongasa
Mr G P Jackson
Mr L Jackson
Dr S W Kadleigh
Dr G Kandalla
Dr K Kandalla
Mr G Keogh
Mr P Kilfeather
Mrs M A Kolby
Mr F Kolby
Dr V L Lanza
Mr L M Lohrin
Mr G A Lucy
Mr V K Malik
Miss H McClure
Mr J L Meyers
Mrs A Michiels
Mr E E Michiels
Mr L Miller
Mr M Miller
Mr F M Mooney
Mr W R Murray
Mrs H F Obst
Mr M Obst
Mr C Offie
Mr M W O'Reilly
Mr V O Paseku
Mr G C Poplett
Dr R J Raeside
Mr S Ranger
Mr O Reusch
Mr M Rigby-Jones
Dr J N Ruben
Mrs C Sabini
Mr R Sabini

Lt Cmdr H J Sampson
Mr P M Simon
Dr R L Slinger
Mrs M Smith
Mr W E Smith
Mr C A Smith
Dr E S Stewart
Dr T F Stewart
Dr M Y Stevenson
Mrs R Strang
Mr G Strang
Mr E C Stivers
Mr M J Sweetman
Mr J J Tirou
Mr G L Towne
Mr G Turner
Mrs V P Underhill
Mr C A M van Bavel
Mr J L van Beurden
Mr C van de Put
Mr J Vandavelde
Mrs M van Haeran
Master E van Haeran
Mr H van Meines
Mr H Vergara
Mrs C S Warmoes
Mr P Warmoes
Mr R W Weaver
Mr I Webb
Mr R P Wold
Mrs B J Wynn
Mr J D Wynn
Miss D Wynn
Miss S E Wynn
Mrs M Wynn

Appendix B. Appearances

HM Attorney General (The Rt Hon Sir Peter Rawlinson, QC, MP)

Mr Anthony J L Lloyd, QC and Mr Michael Thomas (instructed by the Treasury Solicitor) appeared on behalf of the Attorney General

Mr John Griffiths, QC and Mr T R A Morison (instructed by Mr Michael Lester) appeared on behalf of the British European Airways Corporation

Mr Peter Webster, QC and Mr Anthony Barrowclough (instructed by Messrs Simmons & Simmons) appeared on behalf of Hawker Siddeley Aviation

Mr Bruce Coles (instructed by Mr Alan Smith) appeared on behalf of Smiths Industries

Mr Norman Tapp, QC and Mr Gordon Slynn (instructed by the Treasury Solicitor) appeared on behalf of the Department of Trade and Industry

Mr D Henry (instructed by Messrs Stanleys and Simpson North) appeared as Counsel for the Civil Aviation Authority

Mr Patrick Phillips (instructed by Messrs Evan Davies & Co) appeared as Counsel on behalf of Captain S J L Key (deceased) Captain of the Aircraft

Mr T Scott Baker (instructed by Messrs Evan Davies & Co) appeared as Counsel on behalf of Mr J W Keighley (deceased) Second Officer and Mr S A Ticehurst (deceased) Second Officer

Mr M W T Nott (instructed by Mr Timothy Walker) appeared on behalf of the British Airports Authority.

Mr Anthony Evans, QC and Mr Jonathan Gilman (instructed by Messrs Lovell, White & King) appeared on behalf of certain passengers' representatives

Mr Lee S Kreindler (of the New York Bar) (Messrs Frere Cholmeley & Co London Solicitors) appeared on behalf of certain passengers' representatives

Mr Morris Finer, QC* and Mr Andrew Collender (instructed by Messrs Evan Davies & Co) appeared as Counsel on behalf of the British Airline Pilots Association

Mr Ronald L M Goldman (of Messrs Goldman, Gangloff & Boehme, Beverly Hills, California, USA) appeared as Counsel on behalf of the heirs of the estate of Hilde Benjamin.

* Mr Finer was during the course of the Inquiry appointed to the Bench. Mr Collender thereafter continued to represent BALPA.

Appendix C. List of witnesses

Mr R Ashford	CAA, Airworthiness Division
Dr G Bennett	CAA, Chief Medical Officer
Mr D G Brinjes	BEA, Air Safety Branch
Mr A E R Broomfield	AIB, Senior Inspector
Mr C S Caliendi	HSA, Chief Systems Engineer
Mrs A Cass	Eye Witness
Mrs F M Castledine	Eye Witness
Capt G W Childs	BEA Line Captain
Mr G C Chouffot	CAA, Director Flight Operations
Mr R H Chowns	BEA Principal Noise Engineer
Capt D P Clifton	BEA Base Training Captain
Mr J Coleman	Eye Witness
Mr A J Cope	BEA Chief Design and Development Engineer
Capt J A Corbishley	BEA, Flight Manager No 1 Trident Flight
Sqn Ldr S A Cullen	RAF Pathologist
Mr J Cunningham	HSA, Chief Test Pilot
Mr D Cuthbertson*	AIB (deceased), Senior Inspector
Mr D P Davies	CAA, Airworthiness Division
Mr R A Davies	BEA, Senior Development Engineer
Capt F H Dell	BEA, Flight Manager No 4 Trident Flight
Mr D H Dykins	HSA, Assistant Chief Aerodynamicist
Capt D Evans	BEA, Flight Manager No 3 Trident Flight
Mr R G Feltham*	AIB, Senior Inspector
F/O R A Flavell	BEA Line Pilot
Capt J C Forshaw	CAA, Senior Flight Operations Inspector
Dr M M Gertler	Consultant Cardiologist, USA
Mr H K Gordon-Burge	BEA, Air Safety Branch
Capt G A C Gray	BEA, Assistant Flight Manager No 2 Trident Flight

* Statement read

Capt K Hagyard	BEA Line Captain
Mr J A Hancock	CAA, Operations – Training/Licensing
Capt F B Hazard	BEA Line Captain
Mr I Heller	Eye Witness
Mr H D Henniker	BEA, Principal Development Engineer (Mechanical Systems)
Capt L F J Holdstock	BEA, Flight Manager Training
Mr J G Holton	AIB, Senior Inspector
Mr J R D Kenward*	BEA, Manager Performance Engineering
Mr B J Lee	BEA, Principal Development Engineer (Electrical Systems)
Mr J H Lett*	AIB, Senior Inspector
Capt E W Lowden	BEA, Operations Director
F/O W W Macdonald	BEA Line Pilot
Capt A R Martin	BEA Deputy Flight Manager Training
Gp Capt J F K Mason	RAF Pathologist
Mr J R Neill	CAA, Director of Flight Safety
AVM P J O'Connor	RAF Consultant in Neuropsychiatry
Capt C Owens	BEA, General Manager Flight Operations
Mr J G M Pardoe	CAA, Director General Safety (Airworthiness)
Capt W C Parke	BEA Line Captain
Mr W H Perry	CAA, Training and Licensing
Capt E Poole	BEA, Flight Development Manager
Dr F S Preston	Senior Medical Officer (Air) Air Corporations Joint Medical Service
Mr B E Roberts	BEA, Flight Simulator Instructor
Dr H P Ruffell-Smith	Consultant
Mr T C Ryan	CAA, Transcription Unit
Dr A J Salmon	Family Doctor, Captain Key
Capt R Seed	BEA, Flight Manager No 2 Trident Flight
Mr A Sherring	CAA, Inspection Surveyor
Dr W Somerville	Consultant Cardiologist
F/O J E Spain	BEA Line Pilot
Capt G K A Thorne	BEA Line Training Captain
Mr P Waller	BEA, Assistant Development Engineer (AIDS & ATE)

* Statement read

Capt L Wallis	BEA, Flight Manager No 5 Trident Flight
Mr J L Weston	Smith's Industries
Capt D B White	BEA Line Captain
F/O K J Whitehead	BEA Line Pilot
Mr G C Wilkinson	AIB, Senior Inspector
Mr J W Wilson	HSA, Chief Operations Engineer
Capt E R Wright	BEA Line Captain

Appendix D. Abbreviations

AIB	Accidents Investigation Branch (DTI)
A/P	autopilot
ARB	Air Registration Board
ASI	airspeed indicator
ASB	Air Safety Branch (BEA)
ATC	Air Traffic Control
auw	all-up weight
BAA	British Airports Authority
BALPA	British Airline Pilots Association
BEA	British European Airways Corporation
BOAC	British Overseas Airways Corporation
CAA	Civil Aviation Authority
CAADRP	Civil Aviation Authority Data Recording Project
CVR	cockpit voice-recorder
CWS	central warning system
DFS	Directorate of Flight Safety
DTI	Department of Trade and Industry
EAS	equivalent airspeed
ECG	electrocardiogram
FDR	flight data recorder
F/O	First Officer
FSIB	Flying Staff Information Bulletin
GMFO	General Manager Flight Operations
GMT	Greenwich mean time
HSA	Hawker Siddeley Aviation
IAS	indicated airspeed
ILS	instrument landing system
MHz	megahertz
NDB	non-directional beacon

P1	first pilot
P2	second pilot
P3	third pilot
P4	fourth pilot
QFE	barometric pressure at airport level
R/T	radio-telephone
S/O	Second Officer
SFO	Supervisory First Officer
V2	safety speed for take-off
VDF	very high frequency direction finding
VHF	very high frequency
VNA	safety speed at noise-abatement
VOR	visual omni-range

Appendix E. BEA Operations Manual Instructions on Pilot Incapacity

CREW INCAPACITY IN FLIGHT

These procedures should be followed unless the situation clearly indicates that some deviation is justified.

Captain Incapacitated:

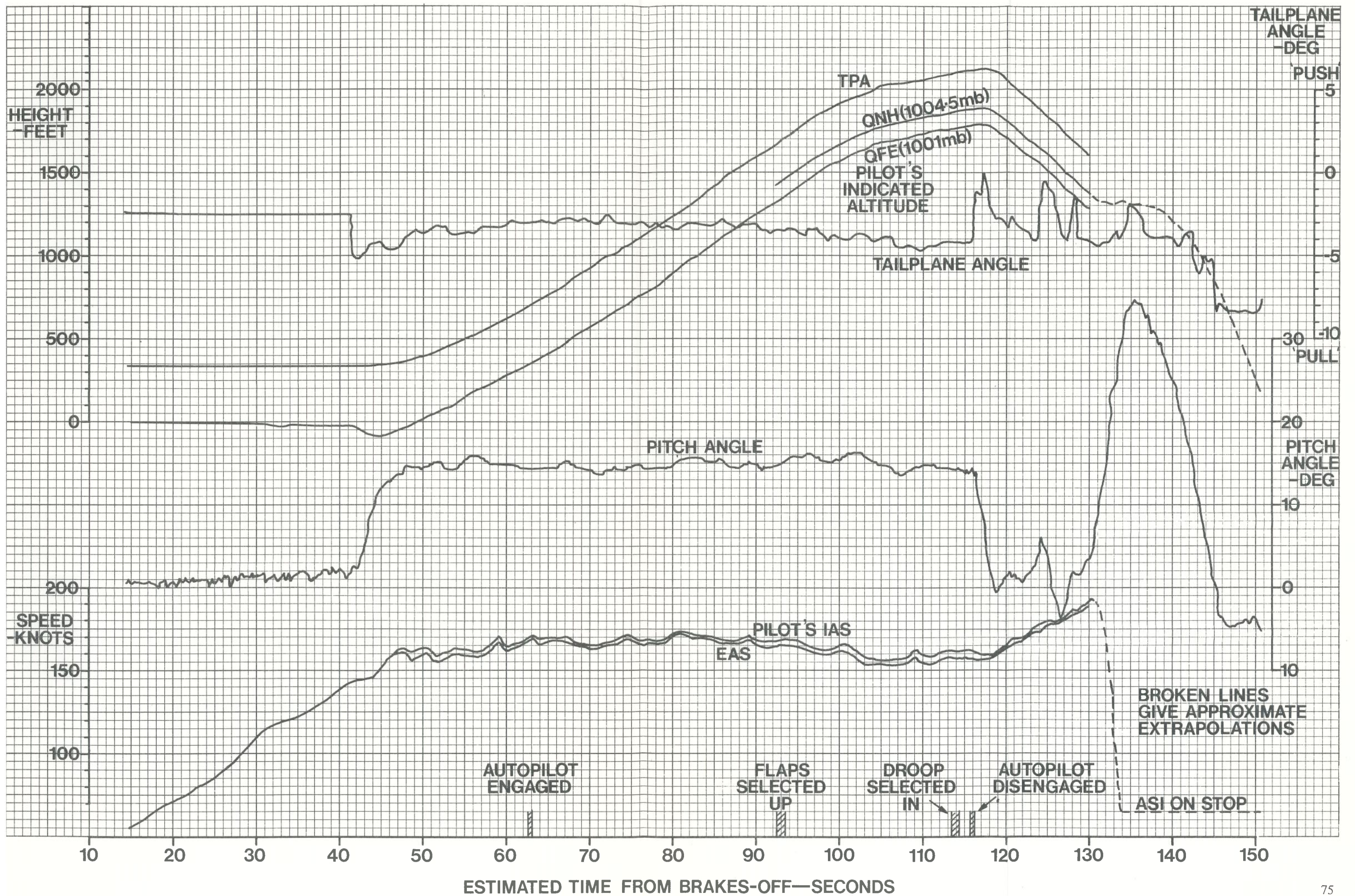
1. Captain to be strapped into the P1 seat.
2. Command to be assumed by second-in-command and both ATC and the crew notified of this.
3. Command function to be exercised from either P2 or P3 seat, depending on the phase of flight.

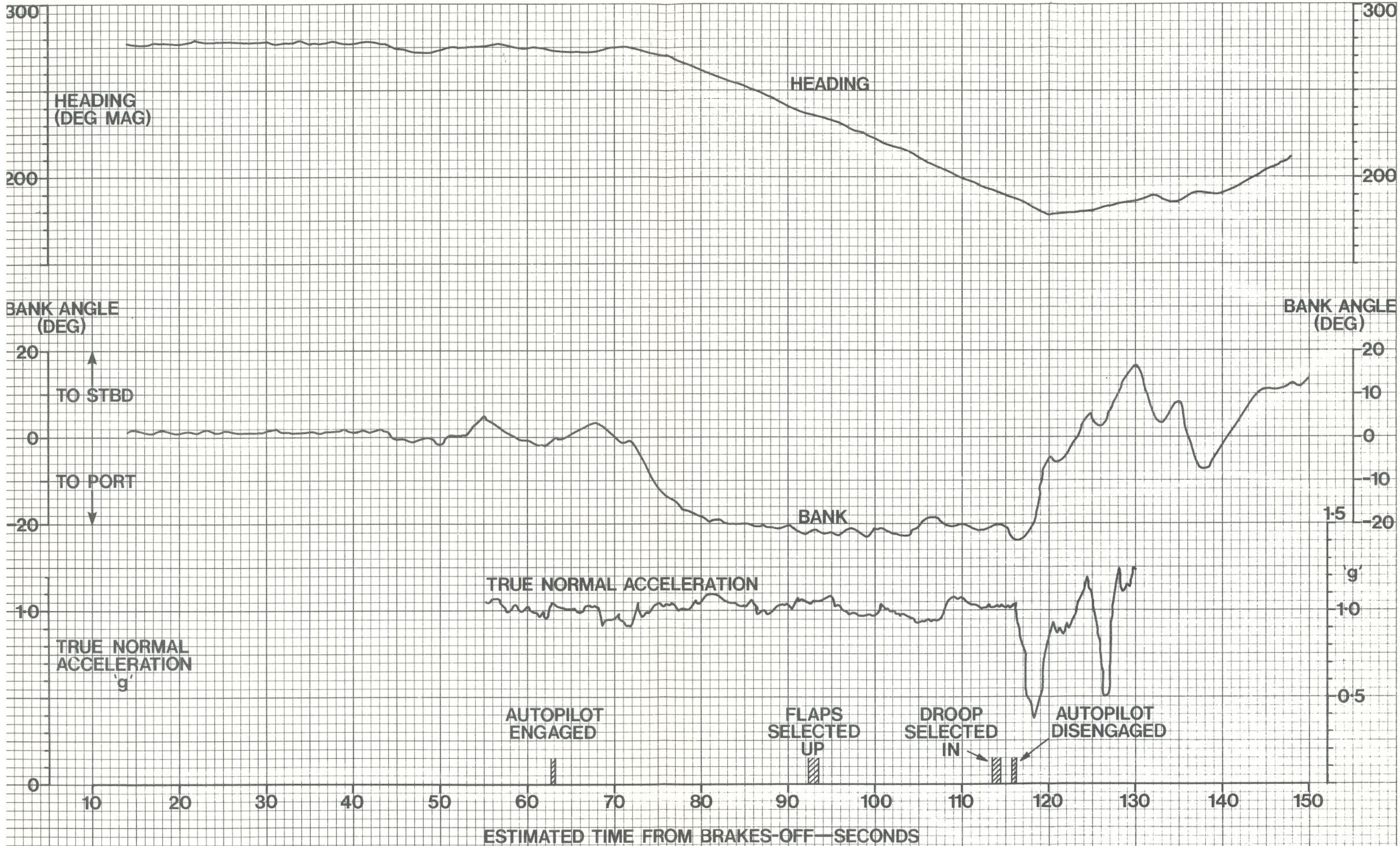
P2 Incapacitated:

1. P2 to be strapped into P3 seat.
2. Co-pilot duties to be carried out from the P2 seat.
3. ATC to be advised of the incapacitation.

P3 Incapacitated:

1. P3 to be strapped in P3 seat if on final approach, but, if time permits, to be removed from seat and P2 re-positioned in P3 seat.
2. ATC to be advised of the incapacitation.





TABULATED CHRONOLOGY OF LAST FLIGHT OF TRIDENT G—ARPI 18 JUNE 1972

Derived from Flight Recorder and R/T transcription information

Seconds from start of take-off	Events	Time			Pilot's indicated alt QFE	IAS knots	Hdg °M	Pitch att	Bank angle ⁵
		Seconds from start of take-off	dT	GMT					
0	Brakes off ¹	0	0	1608:30	0	54 ⁴	277	0.4	-0.7
42	Rotation	42	42	1609:12	2 ²	144	277	4.6	-0.7
44	Unstick	44	2	1609:14	79 ²	145	276	11.6	-0.4
54		54	10	1609:24	99	163	275	14.4	+2.8
63	Autopilot engagement	63	9	1609:33	355	170	272	14.4	-0.7
74	Start of left turn	74	11	1609:44	690	170	272	14.4	-10.5
83	* <u>Be</u> alines 548 is climbing as cleared	83	9	1609:53	989	172	256	15.5	-20.0
85	* <u>5</u> 48 airborne at 09 contact 12 <u>8</u> .4 Goodday	85	2	1609:55	1064	171	252	15.5	-20.7
90	* <u>R</u> oger	90	5	1609:60	1239	169	241	14.8	-21.8
93	Flap selected up (start of noise-abatement)	93	3	1610:03	1339	168	236	15.5	-22.5
100	* <u>Be</u> alines 548 is climbing as cleared passing 1500	100	7	1610:10	1566	165	221	16.2	-22.1
103	* <u>5</u> 48 climb to FL 60 squawk 6615 (flap fully retracted)	103	3	1610:13	1637	160	215	15.8	-23.2
108	* <u>U</u> p to 60	108	5	1610:18	1708	158	203	14.1	-20.7
114	Droop selected up	114	6	1610:24	1772	162	191	14.4	-21.4
116	Autopilot disengagement — stick-shake and first stick-push	116	2	1610:26	1788	162	188	13.4	-24.3
122	Droop retracted ¹	122	6	1610:32	1637	170	179	0.7	-4.6
124	Second stick-push ¹	124	2	1610:33	1562	177	180	5.6	+3.5
127	Third stick-push ¹	127	3	1610:36	1403	182	182	-2.5	+4.6
128	Stick-push 'dump' operated ¹	128	1	1610:37	1360	187	184	1.8	9.5
130	Last reliable IAS and altitude	130	2	1610:39	1276	193	186	3.5	+16.2
134	IAS on lower stop	134	4	1610:43	1200 ³	54 ⁴	185	31.3	+ 6.7
150	Impact	150	16	1611:00	—	54 ⁴	217	-6.0	+14.1

Notes:

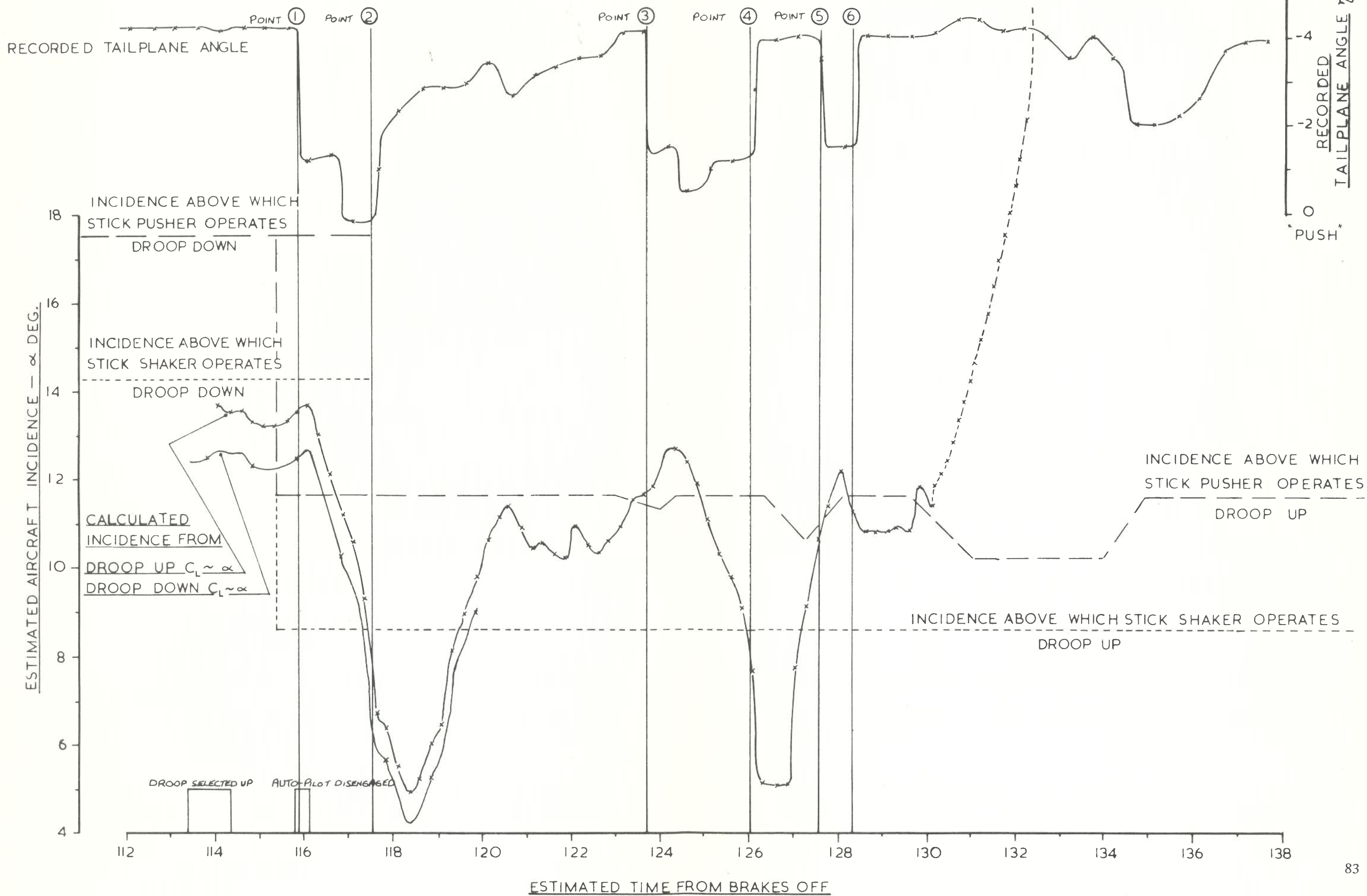
1. These events deduced from flight recorder data.
 2. Inaccurate IAS due to aircraft attitude change.
 3. Estimated altitude.
 4. Lowest figure that can be recorded.
 5. Minus indicates left bank. Plus indicates right bank.
 6. Underlined words indicate timing points.
- * Radio calls.

DEDUCED GROUND TRACK OF LAST FLIGHT OF TRIDENT G-ARP 1

Fig. 4



GRAPH OF TAIL PLANE ANGLES AND INCIDENCE



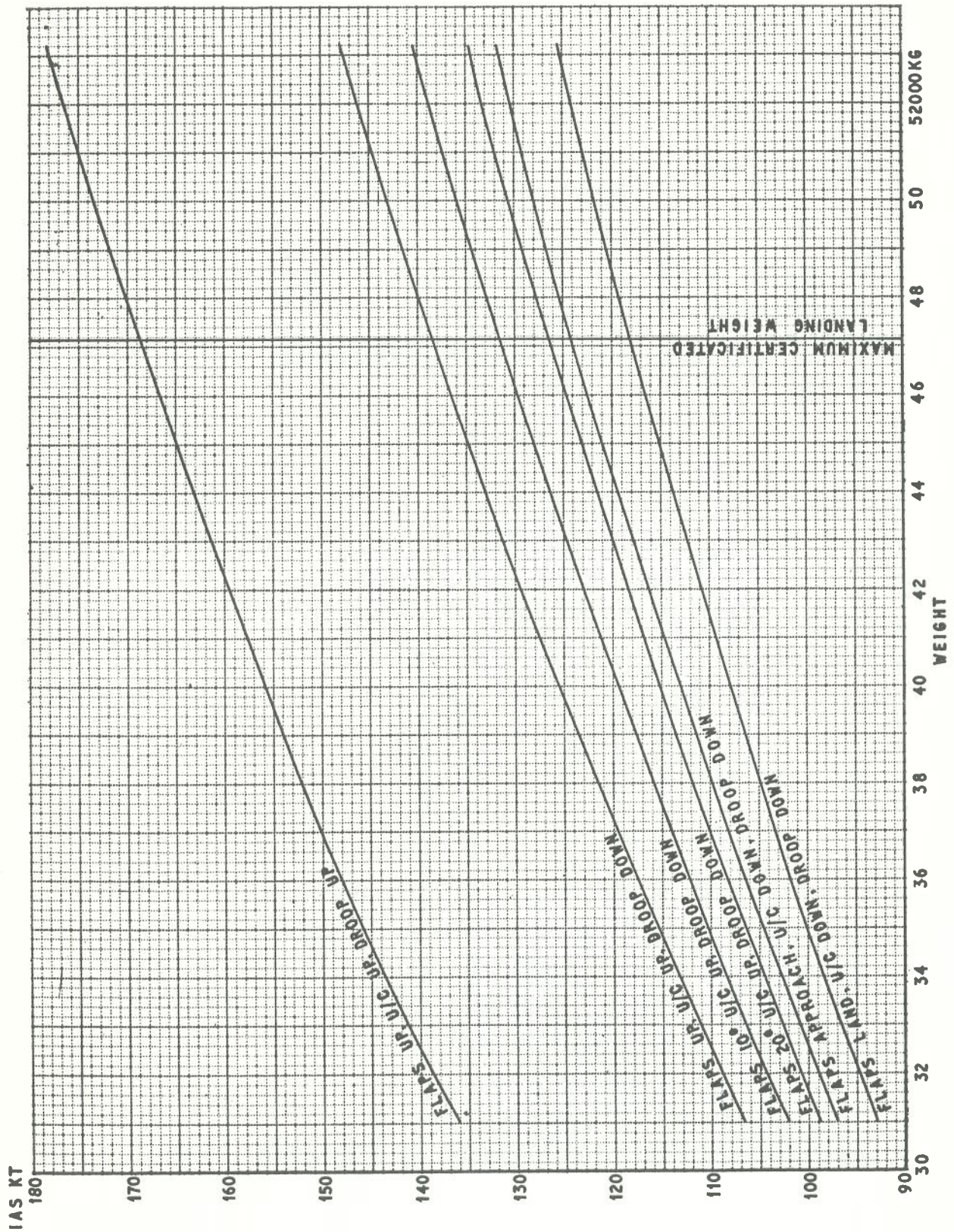


FIG. 6 POWER OFF STALLING SPEEDS