



**Aviation Safety Council
Taipei, Taiwan**

CI611 Accident Investigation

Factual Data Report

June 03, 2003

ASC-AFR-03-06-001

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SUMMARY

On May 25 2002, 1529 Taipei local time (Coordinated Universal Time, UTC 0729), China Airlines (CAL) Flight CI611, a Boeing 747-200 (bearing Taiwan Registration Number B18255), crashed into the Taiwan Straits approximately 23 nautical miles northwest of Makung, Penghu Islands of Taiwan, Republic of China (ROC). Radar data indicated that the aircraft experienced an in-flight structural breakup at about 35,000 feet. The aircraft was on a scheduled passenger flight from Chiang Kai-Shek (CKS) International Airport, Taipei, Taiwan, ROC to Chek-Lap-Kok (CLK) International Airport, Hong Kong, China. All 225 occupants on board the CI611 flight, including 209 passengers and 16 crewmembers, were killed.

According to Article 84 of the Civil Aviation Law, ROC, and Annex 13 to the Convention on International Civil Aviation (Chicago Convention), which is administered by the International Civil Aviation Organization (ICAO), the Aviation Safety Council (ASC), an independent agency of the ROC government responsible for civil aviation accidents and serious incidents investigation, has immediately launched a team to conduct the investigation of this accident. The investigation team included members from the Civil Aeronautical Administration (CAA) of ROC, and the CAL. Based on the Annex 13, National Transportation Safety Board (NTSB) of USA, the state of manufacture, was invited as the Accredited Representative (AR) of this investigation. The NTSB team included members from the Federal Aviation Administration (FAA), the Boeing aircraft company, and Pratt and Whitney. Based on the nature of this accident, the investigation team was organized into the following groups: Air Traffic Services, Flight Operations, Wreckage Recovery and Transportation, Recorders, Injury Documentations, Systems, Structure, Security, Maintenance Records and Procedures, Later on, three more groups were added to the investigation team: Organizational and Management Factors, Wreckage Reconstruction, and Database groups.

After a year of factual data collection of the CI611 accident including wreckage recovery and examination, recorders recovery and readout, and other activities such as laboratory tests conducted in both Chung-Shan Institute of Science and Technology (CSIST), and Boeing Materials

Technology (BMT) Laboratory and Equipment Quality Analysis (EQA) Laboratory, the investigation team presents the factual data collected relevant to this accident.

It should be noted that this report contains only factual data verified by the investigation team members. As the result of thorough review of all the factual data collected this far, the investigation team has found no evidence in the areas of air traffic services, weather, flight operations, and power-plant that can be related to the causal factors of this accident. The investigation team also found no evidence in fire, smoke, explosives, external forces, and any security related matters that are relevant to this accident. This accident has been confirmed as an in-flight break-up accident.

The analysis portion of the investigation process will commence immediately after the release of this report. It is expected that a preliminary draft report and the final draft will be furnished in December 2003 and June 2004 respectively to the Accredited Representative, the CAA/ROC and CAL for their comments. The final report will be published towards the end of 2004. Should it be any new factual data surface after the publishing of this report, ASC shall immediately inform the Accredited Representative, CAA/ROC, and CAL and this report will be modified accordingly.

This report contains the group reports from the investigation team. Individual group report contains the names of group members and their affiliates, major activities, relevant factual data collected by group members, and data list. Each group report follows the format of Chapter 1 of the ICAO Annex 13. It should also be noted that since each group conducted its own data collection process, similar information might appear in several group reports. Text of the report and its appendices will be posted on ASC Website: <http://www.asc.gov.tw>.

Major Milestones

2002	
05/25	Initial notification (1536 Taipei local time)
05/25	Internal preparation meeting
05/26	Go team launched, set up on-site Command Post
05/27	U.S. team arrived Taipei
05/28	The 1 st Organization Meeting at Makung
05/29	Detected Flight recorders' signal & main wreckage
06/03	Received radar data from Mainland China
06/14	Global Industry salvage vessel Jan Steen arrived Makung
06/18	Cockpit Voice Recorder (CVR) recovered
06/19	Flight Data Recorder (FDR) recovered
06/20	Investigation Lab Completed initial FDR/CVR readout
07/31	Metallurgy test at CSIST
08/17	Commenced wreckage transfer from Makung to Taipei Harbor
08/25	Commenced 2D hardware reconstruction
09/02	Tele-conference of Repair Assessment Program (RAP) with NTSB/FAA/Boeing
09/03	Completed 2D hardware reconstruction
09/14	Commenced trawling for remaining wreckage
09/15	The salvage vessel - Jan Steen decommissioned
09/28	The 1 st Technical Review Meeting (TRM)
10/18	Commenced 3D software reconstruction project (3DSWRP)
10/21	Completed all wreckage transport to Taoyuan Air Force Base (TAFB)
11/05 ~ 11/06	Technical meeting on metallurgical/system components at Boeing

12/17 ~ 12/18	The 2 nd Technical Review Meeting
2003	
03/11	Issued interim flight safety bulletin (IFSB)
03/13	Commenced construction of 3D hardware reconstruction
04/18	Completed 3D hardware reconstruction
04/23	Completed 3D software reconstruction
04/22 ~ 04/24	The 3 rd Technical Review Meeting postponed due to SARS
05/14	Internal Factual data review
06/03	Published Factual Report

Preliminary Report to the ICAO

Distribution :

State of Registry/Occurrence: Republic of China

State of the Operator: Republic of China

State of Manufacture: USA

ICAO

00 – OCCURRENCE IDENTIFICATION

FILING INFORMATION

State Reporting 0001 •	Code	TAIWAN, CHINA REPUBLIC OF
State File number 0002		

WHERE

State/Area of occurrence 0004 •	Code	TAIWAN, CHINA, REPUBLIC OF
Location N(x) Near 0005		MAKUNG

WHEN

Date of occurrence 0008	2002 05 25 Year Month Day
Local time of occurrence 0009 (24h clock)	15 29 Hour Min

AIRCRAFT

Manufacturer 0010 •	148 Code	BOEING
Model 0011 •	14 Code	B747-200
Registration 0012		B-18255
State of registry 0013 •	Code	TAIWAN, CHINA, REPUBLIC OF
Operator's name 0014 40 () 40 () 40 ()	Code	CHINA AIRLINES

01 – HISTORY OF FLIGHT

AIRLINE OPERATION (AIR TRANSPORT OPERATIONS)

Type of Operation		
0101		
1 (<input checked="" type="checkbox"/>) Passenger	2 () Cargo	3 () Passenger/Cargo
4 () Ferry/Positioning	5 () Training/Check	6 () Other
Z () Unknown		
0102		
S (<input checked="" type="checkbox"/>) Scheduled	N () Non-scheduled	Z () Unknown
0103		
D () Domestic	I (<input checked="" type="checkbox"/>) International	Z () Unknown

GENERAL AVIATION

Type of Operation		
0104		
Instructional		
10 () Dual	11 () Solo	12 () Check
1Y () Other	1Z () Unknown	
Non-commercial		
20 () Pleasure	21 () Business	22 () Government/State
23 () Aerial work	24 () Off-shore operation	2Y () Other
2Z () Unknown		
Commercial		
30 (<input checked="" type="checkbox"/>) Aerial application	31 () Fire control	32 () Aerial observation
33 () Aerial advertising	34 () Construction/Sling load	3Y () Other
3Z () Unknown		
Miscellaneous		
40 () Test/Experimental	41 () Illegal(smuggling/	42 () ferry
43 () Search & rescue	44 () Airshow/Race	45 () Demonstration
4Y () Other	4Z () Unknown	
Type of Operator		
0205		
1 () Flying club/School	2 () Corporate/Executive	3 () Gov.Agency
4 () Private owner	5 () Sales/Rental/Service	Y () Other
Z () Unknown		

ITINERARY

Last departure point 0106	CHIANG KAI-SHEK (RCTP)
Planned destination 0107	HONG KONG (VHHH)
Duration of flight (time airborne) 0108•	00 21 Hour Min or Y () if accident occurred on ground

07 – METEOROLOGICAL INFORMATION

General weather in the area of occurrence		
0705		
1 (<input checked="" type="checkbox"/>) Visual meteorological conditions	2 () Instrument meteorological conditions	Z () Unknown
Light conditions		
0706		
1 () Dawn	2 (<input checked="" type="checkbox"/>) Daylight	3 () Dusk/Twilight
4 () Night – moonlight	5 () Night – dark	Z () Unknown

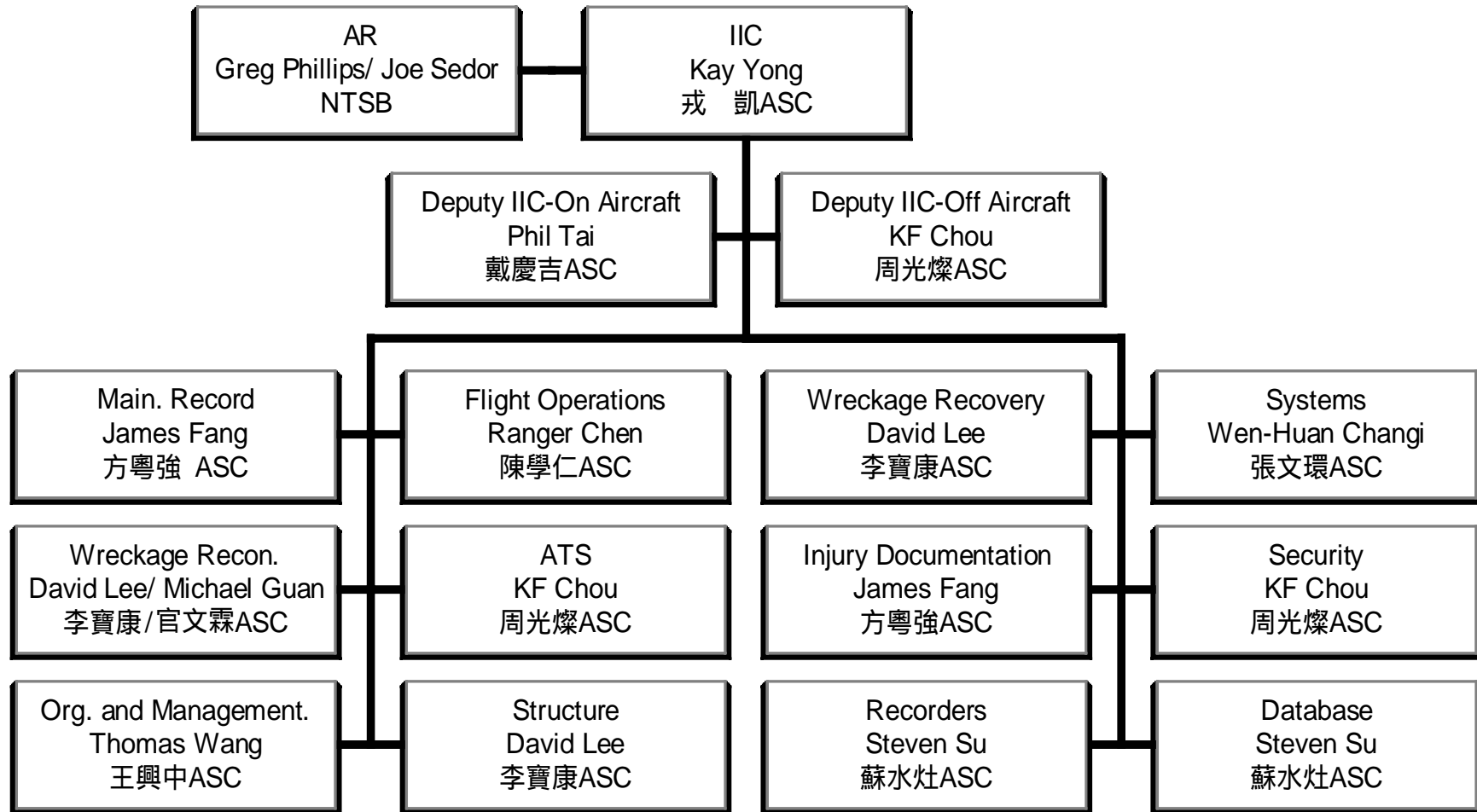
SEQUENCE OF EVENTS

EVENTS		PHASES	
1. 016	DISINTEGRATION	1. 041	CLIMB TO CRUISE
2.		2.	
3.		3.	
4.		4.	
5.		5.	

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ORGANIZATION CHART



ABBREVIATION

AACERC	Aircraft Accident Central Emergency Response Center
AATF	Airworthiness Assurance Task Force
AAWG	Airworthiness Assurance Working Group
ACP	Azimuth Change Pulses
AD	Airworthiness Directives
ADF	Automatic Direction Finder
ADI	Attitude Director Indicator
AFB	Air Force Base
AIDS	Aircraft Integrity Data System
ALTSEL	Altitude Select
AMD	Aero Material Department
AMP	Aircraft Maintenance Program
ANWS	Air Navigation and Weather Services
AOM	Airplane Operations Manual
AP	Asia Pacific
A/P	Airframe/ Power-plant
APG	Airframe Power-plane General
APU	Auxiliary Power Unit
ARAC	Aviation Rulemaking Advisory Committee
ARINC	Aeronautical Radio Inc.
ARSR	Air Route Surveillance Radars
ASC	Aviation Safety Council
ASI	Air Speed Indicator
ASM	Aircraft Structure Manual
ASRD	Aeronautical System Research Division
A/T	Auto Throttle
ATA	Air Transport Association
ATC	Air Traffic Control
ATCAS	ATC Automation System
ATPL	Air Transport Pilot License
ATSB	Australian Transport Safety Bureau
ATSMO	Air Traffic Services Management Office
AUSS	American Underwater Search and Survey
BFSTPE	Boeing Service Representative at Taipei

BFU	Bundesstelle für Flugunfalluntersuchung
BL	Buttock Line
BMS	Boeing Material Specification
BMT	Boeing Materials Technology
BOECOM	Boeing Communication
CAA	Civil Aeronautics Administration
CAF	Chinese Air Force
CAL	China Airlines
CAM	Cockpit Area Microphone
CAS	Commercial Aviation Service
CASCC	China Aerial Surveying and Consulting Company
CDI	Course Deviation Indicator
CDL	Configuration Deviation List
CDR	Continuous Data Recording
CFP	Computer Flight Plan
CKS	Chiang Kai-Shek International Airport
CLB	Climb
CLK	Chek-Lap-Kok International Airport
CLM	Capability List Manual
CPCP	Corrosion Prevention and Control Program
CSD	Constant Speed Drive
CSIST	Chung-Shan Institute of Science and Technology
CVR	Cockpit Voice Recorder
DANTE	Data Analysis Numerical Toolbox and Editor
DFDAU	Digital Flight Data Acquisition Unit
DME	Distance Measuring Equipment
DP	Dynamic Positioning System
DSG	Design Service Goal
DV	Digital Video
EDS	Energy Dispersive Spectrum
EDX	Energy Dispersive X-ray Spectroscopy
EGT	Exhaust Gas Temperature
EMD	Engineering and Maintenance Division
EO	Engineering Orders
EOC	End of Cracking
EPR	Engine Pressure Ratio
EPRL	Engine Pressure Ratio Limit
EQA	Equipment Quality Analysis

ERI	Electric Radio Instrument
ET	Eddy Current Inspection
ETOPS	Extended-Range Two-Engine Operations
FAA	Federal Aviation Administration
FARs	Federal Aviation Regulations
FDR	Flight Data Recorder
FE	Flight Engineer
FIR	Flight Information Region
FLTDIR COMPTR	Flight Director Computer
F/O	First Officer
FODAS	Flight Operations Data Analysis System
FOQA	Flight Operation Quality Assurance
FPM	Feet Per Minute
FSRs	Field Service Representatives
FT-IR	Fourier- Transform Infrared Spectroscopy
GC-MS	Gas Chromatography- Mass Spectrometry
GIS	Geographic Information System
G/S	Glide Slope
GUI	Graphic User Interface
HFEC	High Frequency Eddy Current
HSI	Horizontal Situation Indicator
IAS	Indicated Air Speed
IASA	International Aviation Safety Assessment
ICAO	International Civil Aviation Organization
ICP	Induction Couple Plasma
IFSB	Interim Flight Safety Bulletin
IFSD	In Flight Shut Down
ILS	Instrument Landing System
INS	Inertial Navigation System
IP	Instructor Pilot
IPM	Inspection Procedure Manual
ITRI	Industrial Technology Research Institute
JAA	Joint Aviation Authorities
JARs	Joint Aviation Regulations
JCAB	Japan Civil Aviation Bureau
LBL	Left Buttock Line
LHS	Left Hand Side
LT	Long Transverse

MAC	Mean Aerodynamic Chord
MBS	Multi-Beam Sonar
MEL	Minimum Equipment List
MM	Maintenance Manual
MOC	Ministry of Communications
MOTC	Ministry of Transportation and Communications
MPD	Maintenance Planning Data
MPV	Mid Period Visit
MRS	Multi-Radar System
MSL	Mean Sea Level
MT	Magnetic Testing
MWF	Main Wreckage Field
NTAP	National Track Analysis Program
NCOR	National Center for Ocean Research
NDI	Non-Destructive Inspection
NM	Nautical Mile
NOTAM	Notice to Airmen
NORC	National Ocean Research Center
NPRM	Notice of Proposed Rulemaking
NTSB	National Transportation Safety Board
OEM.	Original Equipment Manufacturer
PMI	Principle Maintenance Inspector
POI	Principle Operation Inspector
PSR	Primary Surveillance Radar
PT	Liquid Penetration Inspection
P&W	Pratt & Whitney
QA	Quality Assurance
QC	Quality Check
QM	Quality Manual
QNH	The barometric pressure as reported by a particular station
QP	Quality Procedure
QR	Quality Regulation
RAG	Repair Assessment Guideline
RAI	Italian Aviation Registration Bureau
RAP	Repair Assessment Program
RAPS	Recovery Analysis and Presentation System
RBL	Right Buttock Line

RCB	Reliability Control Board
RCP	Reliability Control Program
RCPM	Reliability Control Program Manual
RFP	Requirement for Proposal
RHS	Right Hand Side
RIC	Reconstructed total Ion Chromatogram
RII	Required Inspection Item
RNP	Required Navigation Performance
ROC	Republic of China
ROV	Remote Operating Vehicle
RPM	Revolution Per Minute
RT	Radiographic Testing
RVSM	Reduced Vertical Separation Minimum
SARPs	Standards and Recommended Practices
SB	Service Bulletins
SCC	Stress Corrosion Cracking
SDR	Service Difficult Report
SEM	Scanning Electron Microscope
SL	Service Letter
SOB	Side of Body
SOP	Standard Operation Procedure
SRM	Structure Repair Manual
SRN	Sub-frame Reference Number
SSR	Secondary Surveillance Radar
SSS	Side-Scan Sonar
STA	Station
SWB	Span Wise Beam
SWRPS	Software Wreckage Reconstruction and Presentation System
TACC	Taipei Air Control Center
TAFB	Taoyuan Air Force Base
TAS	True Air Speed
TAT	Total Air Temperature
TFRI	Taiwan Fisheries Researcher Institute
TLB	Technical Log Book
TRM	Technical Review Meeting
TSB	Transportation Safety Board
TTM	Technical Training Manual

ULB	Underwater Locator Beacon
UT	Ultrasonic Testing
UTC	Coordinated Universal Time
VHF	Very High Frequency
VOR	Very High Frequency Omni-Range
VP	Vice President
V/S	Vertical Speed
VSI	Vertical Speed Indicator
WCS	Wing Center Section
WDM	Wiring Diagram Manual
WSTA	Wing Station

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