附件一

行政院及所屬各機關出國報告

（出國類別：國際會議）

參加國際運輸安全協會二〇〇一年年會報告

服務機關：行政院飛航安全委員會

出 國 人 職　　稱：執行長、飛航安全官

姓　　名：戎　凱、周　光　燦

出國地區：

出國期間：民國 90 年 2 月 23 日至 3 月 1 日

報告日期：民國 90 年 3 月 5 日

附件二

行政院及所屬各機關出國報告提要　　系統識別號

出國報告名稱：參加國際運輸安全協會二〇〇一年年會報告

頁數：　含附件：是　否

出國計畫主辦機關：行政院飛航安全委員會

聯絡人：鄧嵐嵐　　電　話：(02) 2547-5200 分機 175

出國人員姓名：戎　凱、周光燦

服務機關：行政院飛航安全委員會

單位：

職稱：執行長、飛航安全官　　電話：(02) 2547-5200

報告日期：

民國 90 年 3 月！ 系統識別號

分類號/目

H2　C09001063

關鍵詞：ITSA、國際會議、國際運輸安全協會、

內容摘要：(二百至三百字)

「國際運輸安全協會」International Transportation Safety Association - ITSA 係一國際性專業組織，由負責運輸工具失事調查之獨立政府機關所組成，宗旨在分享各會員國之失事調查經驗以改善各種運輸系統安全。

該協會目前會員包括：加拿大、獨立國協、芬蘭、印度、荷蘭、紐西蘭、瑞典、英國、美國、澳洲及中華民國等十一個國家之失事調查機關。

我國係在去年獲得入會許可，二〇〇一年年會為本會首度參加國際運輸安全協會正式活動。本會為慎重其事，特別指派執行長戎凱博士率飛航安全官周光燦出席是項會議。

本次會議討論事項包括：如何從意外事件中學習、協會會員之互助、與警方合作調查失事、如何處理改善建議、協助會員處理爭議性調查報告、網站連接與資訊交流、各會員之調查進度、安全教育等。

本文電子檔已上傳至出國報告資訊網

附件三

行政院及所屬各機關出國報告審核表

出國報告名稱: 參加國際運輸安全協會二〇〇一年年會報告
出國計畫主辦機關名稱: 行政院飛航安全委員會

出國人姓名：戎　凱、周光燦
職稱：執行長、飛航安全官
服務單位:行政院飛航安全委員會

出國計畫主辦機關審核意見:

☐1.依限繳交出報告
☐2.格式完整
☐3.內容充實完備
☐4.建議具參考價值
☐5.送本機關參考或研辦
☐6.送上級機關參考
☐7.退回補正,原因:
　☐(1)不符原核定出國計畫
　☐(2)以外文撰寫或僅以所蒐集外文資料為內容
　☐(3)內容空洞簡略
　☐(4)未依行政院所屬各機關出國報告規格辦理
　☐(5)未於資訊網登錄提要資料及傳送出國報告電子檔
☐8.其他處理意見：

層轉機關審核意見:

☐同意主辦機關審核意見
　☐全部　☐部份_____(填寫審核意見編號)
☐退回補正,原因:_____(填寫審核意見編號)
☐其他處理意見:

目　　次

壹、目　　的

「國際運輸安全協會」International Transportation Safety Association（ITSA）係由美國、加拿大、荷蘭及瑞典等四國之運輸安全委員會在一九九三年成立，為一國際性政府調查機構組成之專業組織，宗旨為分享各會員國之失事調查經驗以改善各種運輸系統安全。

該協會之會員為各國負責運輸工具失事調查之獨立政府機關所組成，目前會員包括：加拿大、獨立國協、芬蘭、印度、荷蘭、紐西蘭、瑞典、英國、美國、澳洲及中華民國等十一個國家之失事調查機關。該協會特別強調失事調查機關之獨立性，亦為加入該會之必要條件。因為，唯有透過獨立而不受干預之調查，方能真正發掘失事肇因並且提出有效之安全改善建議。

我國係在去年獲得入會許可，二〇〇一年年會為本會首度參加國際運輸安全協會正式活動。本會為慎重其事，特別指派執行長戎凱博士率飛航安全官周光燦出席是項會議。

貳、議　　程

2 月 26 日

10：00~15：00	會議前活動（遊覽威靈頓灣）
19：00~22：00	歡迎酒會

2 月 27 日

08：30	第一次會議（確認上次會議記錄）
10：00	茶　　會
10：20	第二次會議（會員雙年會務報告）
12：00	午　　餐
13：00	第三次會議（會員雙年會務報告）
15：00	茶　　會
15：20	第四次會議（會員雙年會務報告）
18：30	晚　　餐

2 月 28 日

08：30	第五次會議（綜合討論）
10：00	茶　　會
10：20	第六次會議（綜合討論）
12：00	會議結束

※ITSA 2002 年會訂於五月底在芬蘭首都舉行。

參、心　得

一、 國際運輸安全協會成立方才八年，入會條例相當嚴格，目前僅有十一會員國。但出席年會之代表層級甚高，幾乎均為各國運輸安全機關之首長。在我國與外國政府機關之交流與互動一直遭受中共阻撓情況下，能藉此一國際會議與外國，尤其是美加等先進國家之政府首長會晤並交換第一手資訊，實在是不可多得之機會。

二、 本次年會係我國首度出席，在提出我國在最近兩年之會務報告後，與會人士一致對於本會在短短兩年餘時間內，建立相當良好之調查能量，且在新加坡航空公司 SQ006 班機失事之調查過程中之獨立、客觀與專業，表示肯定與推崇。另外，該協會亦希望本會能在亞太地區扮演較積極角色，透過雙邊合作及擴大 ITSA 會員國組織，以推動及促進本區之運輸安全。

三、 儘管出席人士之位階甚高，但會議中卻能依專業需要充分討論，對於有疑慮處坦率質問，而且能就個別議題提供自身經驗或國際慣例作為參考，被詢者均能暢所欲言，毫無保留，令人印象深刻。

四、 會議中除專業方面之交流外，亦不遺餘力地倡導或推動多

重運輸模式安全調查組織（Multi Modal Investigation）之理念。因為所有運輸工具之失事案件均有相似原因，調查程序及作業亦有相同之處。如能併為同一獨立而且不受干預之機關，經濟與效率得以兼顧。此一理念已經廣為國際社會接受，美、加、澳、紐等國已行之有年，歐盟各國亦紛紛朝此方向進行。

五、 澳洲運輸安全局自從改組後，任命非專業人士擔任首長，其後果十分遺憾。在內部其領導及管理風格無法服眾，造成專業人才流失，員工士氣低落。出席國際會議時，首長因專業不足，僅能照本宣科而不能參與討論，與以往首長在此專業領域經常主導之地位，不可同日而語。此一現象再次顯示出調查機關獨立與專業之特殊需要。

肆、建　　議

一、 各會員國出席國際運輸安全協會每次年會之代表多係首長或主要部門主管，建請以後年會活動由本會主委或執行長出席為宜。

二、 目前我國為亞洲地區唯一會員國，ITSA 主席特別在會中敦請本會執行長協助推廣該協會組織及協助聯繫與我相鄰之日、韓與中國大陸。本會委員會議亦有決議，指示本會在國外聯繫工作中，除計畫中之美、法、紐、星等國簽訂飛安合作協議書外，建請亦對日、韓、印尼、馬來西亞及大陸等列入本年計畫。

三、 我國在八十七年五月二十五日亞洲率先成立獨立之飛航安全委員會，顯示出政府積極改善飛航安全之決心。在短短兩年多時間內，能獲得國際同業之肯定，實為全體同仁戰戰兢兢，黽勉從公有以致之。今後除應繼續努力提昇調查能量累積經驗外，並須認真考慮如何整合國內各種運輸模式之調查機關，將「多重運輸模式安全調查組織」之理念落實於政府之中。

四、 本會係依民用航空法成立，此與先進國家依失事調查法之作法迥異。本會之運作迭遭困頓即在法律方面之扞格有

關。建請儘速延請法律專家協助研擬制訂我國之「失事調查法」，將本會之任務、權責、組織，人力，與其他政府機關之聯繫與互動等予以法制化，以為根本解決之道。

伍、附　　錄

一、 出席人員名單

二、 國際運輸安全協會雙年報告

三、 美運輸安全委員會對「客機緊急逃生」專題研究報告

附錄一

國際運輸安全協會出席人員名單

國際運輸安全協會出席人員名單

	姓　　名	職　　稱	備　　註
1	Pieter van Vollenhoven	荷蘭運輸安全委員會主席	國際運輸安全協會主席
2	John Stoop	荷蘭運輸安全委員會	國際運輸安全協會秘書
3	Henk Pongers	荷蘭運輸安全委員會	國際運輸安全協會秘書
4	Barry Sweedler	荷蘭運輸安全委員會顧問	
5	Kathy Sweedler	荷蘭運輸安全委員會顧問	
6	戎凱	行政院飛安委員會執行長	
7	周光燦	行政院飛安委員會飛安官	
8	R. Rajamani	印度鐵路安全局局長	
9	Ann-Louise Eksborg	瑞典失事調查局局長	
10	Sven-Eric Sigfridsson	瑞典失事調查局副局長	
11	Kim Bills	澳大利亞運輸安全局局長	
12	Pirjo Valkama-Joutsen	芬蘭失事調查委員會處長	
13	Carol Carmody	美國運輸安全委員會代理主席	
14	Jack Orlando	美國運輸安全委員會主席特別助理	
15	John Clark	美國運輸安全委員會航空安全處長	
16	Elaine Weinstein	美國運輸安全委員會安全建議處長	
17	Jon Pran	挪威航空調查委員會副主席	
18	Bill Jeffries	紐西蘭運輸調查委員會主席	
19	Shona Jeffries	紐西蘭運輸調查委員會	
20	John Britton	紐西蘭運輸調查委員會執行長	
21	Benoit Bouchard	加拿大運輸安全委員會主席	
22	Bill Tucker	加拿大運輸安全委員會執行長	
23	Prof.Oetarjo Diran	印尼航空調查委員會主席	觀察員

附錄二

國際運輸安全協會雙年報告

ATSB Biannual Report, 1 June - 30 November 2000 for the ITSA Meeting February 2001

Ongoing Investigations

Aviation

- *11 November 1998, VH-LPI Saab 34O: RPT enroute to Melbourne. While manoeuvring at 15,000 ft the aircraft departed controlled flight due to icing and a consequent loss of airspeed. The crew regained control at about 12,700 ft.*

- 12 March 1999, VH-CZL Boeing 737 RPT. Landing at Melbourne. Right main landing gear failed on extension but landing safely completed. Examination of components found stress-corrosion fractures.

- *04 April 1999, VH-TAK Boeing 737 RPT. Landing at Melbourne. Right main landing gear failed on extension, but landing safely completed. Examination of failed components found stress-corrosion fractures.*

- *28 April 1999, VH-IMA and VH-IMH, RPT Beechcraft 1900 37 km south Port Macquarie NSW. Close proximity between the aircraft OCTA, one on climb, the other descending.*

- 04 July 1999 and 09 October 1999, VH-FWI Fokker 100. RPT landing at Norfolk Island. Landing gear and main wheel failures.

- *10 September 1999, VH-NTL Beechcraft 1900: RPT landing at Williamtown NSW. A fire in the left main landing gear wheel well became apparent as the aircraft cleared the runway. Electrical wiring contact with fuel pipes led to the fire.*

- *23 September 1999, VH-OJH Boeing 747: RPT landing at Bangkok. Overran the wet runway.*

  As the investigation is being conducted by the ATSB on behalf of the Thai authorities, close liaison is being maintained with the Thai Department of Aviation Investigation Committee.

- *06 January 2000. Investigation into aviation gasoline production and distribution quality control following severe contamination of aircraft fuel systems.*

- **13 February 2000, VH-NTL Beechcraft 1900: Training occurrence simulating engine failure during take-off. The crew experienced difficulty in controlling the aircraft. Near collision with several stationary aircraft.**

- *18 February 2000, ZS-JIY, Lockheed L382G (Hercules): Aircraft was engaged in UN operations in East Timor and was landing at Darwin. The crew made a 'gear-up' landing after the left main landing gear extension mechanism seized.*

- **21 April 2000, VH-EBW Boeing 747: Main landing gear failed while aircraft was being manoeuvred for take-off. Italian aviation authorities conducting investigation, with an ATSB investigator as an accredited representative.**

- **05 May 2000, VH-NMQ Cessna 402, RPT: Fuel exhaustion on landing at Darwin.**

- **23 May 2000, VH-FMU Piper Navajo: Charter flight with 6 passengers enroute to Brisbane. Fuel exhaustion resulted in landing at Amberley RAAF base with both engines shut down.**

- **31 May 2000, VH-MZK Piper Navajo, RPT: Night flight from Adelaide to Whyalla. Both engines failed and the aircraft crashed into Spencer Gulf. All eight occupants died.**

- *06 July 2000, Sydney airport power failure. During systems testing by technicians the Terminal Control Unit power supply was lost for 14 seconds, however ATC was unable to provide a control service for 7 –10 minutes while the computers were rebooting .*

- 04 September 2000, VH-SKC Beechcraft 200: Charter flight with 7 passengers, Perth for Leonora in Western Australia. Air Traffic Control lost communications with the pilot. The aircraft continued beyond Leonora, and eventually crashed near Burketown, Queensland. All eight occupants died.

Marine

Twelve investigations are ongoing. These include:

- the investigations into the death of a fisherman run down by a bulk carrier (independent of a prosecution being undertaken by Australian Maritime Safety Authority/Australian Federal Police);
- the grounding of the container ship *Bunga Teratai Satu* on the great Barrier Reef on 2 November 2000;
- the failure of an on-load lifeboat release mechanism on the Panama flag bulk carrier *Washington Trader.* – in close cooperation with Canada TSB who are investigating a similar failure on a Bahamas flag vessel.

Rail

Nil

Finalised major investigations

1 July – 30 November 2000

Aviation

During the period no 'major' investigations were finalised. Reports for several significant investigations have been compiled and are either undergoing internal review or have been sent to Interested Parties for comment.

Draft reports undergoing Interested Party Review are listed in **bold italics** under the heading ongoing investigations, aviation.

Marine

- The investigation into the contact damage at Wallaroo by the Maltese flag panamax *Amarantos*. On 10 April, 2000 *Amarantos* stuck the Wallaroo jetty within 15° of the perpendicular. The port was put out of action for about six months.

- The Singapore bulk carrier *Padang Hawk* experienced a shift of cargo through liquefaction, while on passage from New Caledonia to Australia with a full cargo of nickel ore.

  Close liaison was maintained with the Singapore Marine Authorities. The report has been submitted to IMO as a "Marine Incident" under the provisions of the International Maritime Organisation MSC/Circ.827, MEPC/Circ.333 of 9 December 1997

Rail

Nil.

Recommendations issued by ATSB

1 July 2000 to 30 November 2000

Aviation

There are currently over 70 recommendations in draft form awaiting reports to be approved by the internal review panel or awaiting Interested Party comment. These recommendations include those arising from the B747-400 accident investigation in Bangkok and the fuel (AVGAS) contamination investigation.

Seven recommendations were issued.

R20000095
The Australian Transport Safety Bureau recommends that the Gliding Federation of Australia in conjunction with its member clubs incorporate the use of radio for effective traffic alerting into standard operating practices as a matter of priority.

R20000096
The Australian Transport Safety Bureau recommends that the Civil Aviation Safety Authority review the assessment process for the issue of a radiotelephone operator certificate of proficiency or equivalent, as specified by Civil Aviation Regulations sub-regulation 83A(2) and sub-regulation 83E(1)(a) and establish competency standards for those applicants for whom English is a second language, especially in respect of a candidate's ability to effectively communicate and comprehend traffic information.

R20000097
The Australian Transport Safety Bureau recommends that the Gliding Federation of Australia adopt measures to make all aircraft engaged in gliding activities more conspicuous.

R20000098
The Australian Transport Safety Bureau recommends that the Gliding Federation of Australia consider the development of procedures that permit segregation of aero towing and gliding activity.

R20000248
The Australian Transport Safety Bureau recommends that the Civil Aviation Safety Authority amend Civil Aviation Order section 20.11 paragraph 5.1.2 to remove the restriction that it only applies to aircraft authorised to carry more than nine passengers.

R20000249
The Australian Transport Safety Bureau recommends that the Civil Aviation Safety Authority ensure that Civil Aviation Orders provide for adequate emergency and life saving equipment for the protection of fare-paying passengers during over-water flights where an aircraft is operating beyond the distance from which it could reach the shore with all engines inoperative.

R20000250
The Australian Transport Safety Bureau recommends that the Civil Aviation Safety Authority alert operators of aircraft equipped with turbo-charged engines to the potential risks of engine damage associated with detonation, and encourage the adoption of conservative fuel mixture leaning practices.

Marine

Recommendations relating to GPS receivers, bridge resource management and GBR surveillance are being discussed with various parties.

Rail

Nil

Safety Studies/Data Analysis

Aviation

The ATSB is currently undertaking the following safety studies:

1. Fuel Exhaustion/Starvation Study
2. Birdstrikes
3. General Aviation Occurrences over the past 30 years
4. Charter Operations

ATSB undertook data analysis of safety occurrences involving heavy jets and other sectors of the industry and presented the results to a Senate Committee and on the ATSB web site.

An analysis of 1999 occurrence data based on the SIAM database model (which is based on the James Reason methodology) was undertaken.

ATSB is completing analysis of maintenance issues based on the PhD work of one of its senior investigators. This work included a survey of LAMEs, the results of which were provided to a Senate Committee investigating maintenance issues.

Marine

Active radar reflector study for small vessels is being undertaken in conjunction with AMSA. This ATSB initiative is in response to a series of large ship/small fishing vessel collisions.

Rail

Nil

Changes in legislation/investigation & report processes/litigation

The ATSB currently operates under the Air Navigation Act (1920) Part 2A as amended in December 1995 for aviation safety investigation, and the Navigation (Marine Casualty) Regulations amended 1991 for marine safety investigation.

A new multi-modal Transport Safety Investigation Bill is currently being drafted for introduction in the Autumn 2001 (March to May) sittings of Parliament. The Bill will provide for independent, no blame, transport safety investigation.

The first module of the Bill will specifically introduce provisions for the investigation of rail accidents by the Commonwealth on those areas of the national rail network which fall within Commonwealth jurisdiction. Subsequently, the aviation investigation powers and functions and mandatory reporting provisions of the Air Navigation Act, and the marine investigation provisions of the Navigation Act and Regulations, will be consolidated in the new Act.

The ATSB is currently negotiating an MOU with State Coroners with respect to cooperation in investigations across all transport modes. Other MOUs are also being progressed.

Aviation

Several amendments to the Air Navigation Act are also to be introduced in the Autumn 2001 sittings. These amendments include provisions for liability protection, revised reporting arrangements and extending the definition of air safety records.

A trial of new categorisation and investigation processes that commenced on 1 April 2000 was evaluated leading to some fine tuning. The basic elements of the trial continue including utilising part time non-investigator aviation experienced staff to input minor (category 5) occurrence data into the OASIS database, reducing the volume of category 4 occurrences that are investigated (increasing category 5s) to improve timeliness and better meet resource availability, pooling occurrence and deficiency investigators in a more flexible team structure, and utilising an internal review panel for quality assurance before investigation reports are released by the Director (low profile) or Executive Director (high profile).

Several exercises to improve ATSB's major accident preparedness were undertaken and a consultancy let to assist with improvements to the documentation.

Marine

Navigation (Marine Casualty) Regulations are being amended to:

- transfer the power to terminate an investigation from the Minister/Secretary to Executive Director ATSB;
- allow the removal of "things" from a ship/premises for testing or scientific examination;
- make provision for examination and protection of Voyage Data Recorders; and
- ensure compliance with IMO Resolution A.849(20).

A memorandum of understanding has been developed between the Australian Federal Police/Australian Maritime Safety Authority/ATSB that recognises ATSB's:

- safety role; and
- confidentiality of information

while allowing ATSB access to all evidence gathered by the enforcement agencies.

Rail - Refer to lead statement this section.

Litigation - Nil this period

Resources, Staffing, and Organisational Structure

Staffing - Projected average staffing level 2000/2001

Classification Level	**No**
SES Band 2	1.0
SES Band 1	2.5
Transport Safety Investigator 4	3.0
Transport Safety Investigator 3	7.0
Transport Safety Investigator 2	35.5
Transport Safety Investigator 1	6.0
Executive Level 2	6.0
Executive Level 1	10.0
Australian Public Service 6	13.0
Australian Public Service 5	10.0
Australian Public Service 4	10.0
Australian Public Service 3	7.0
Australian Public Service 2	5.0
TOTAL	**116.0**

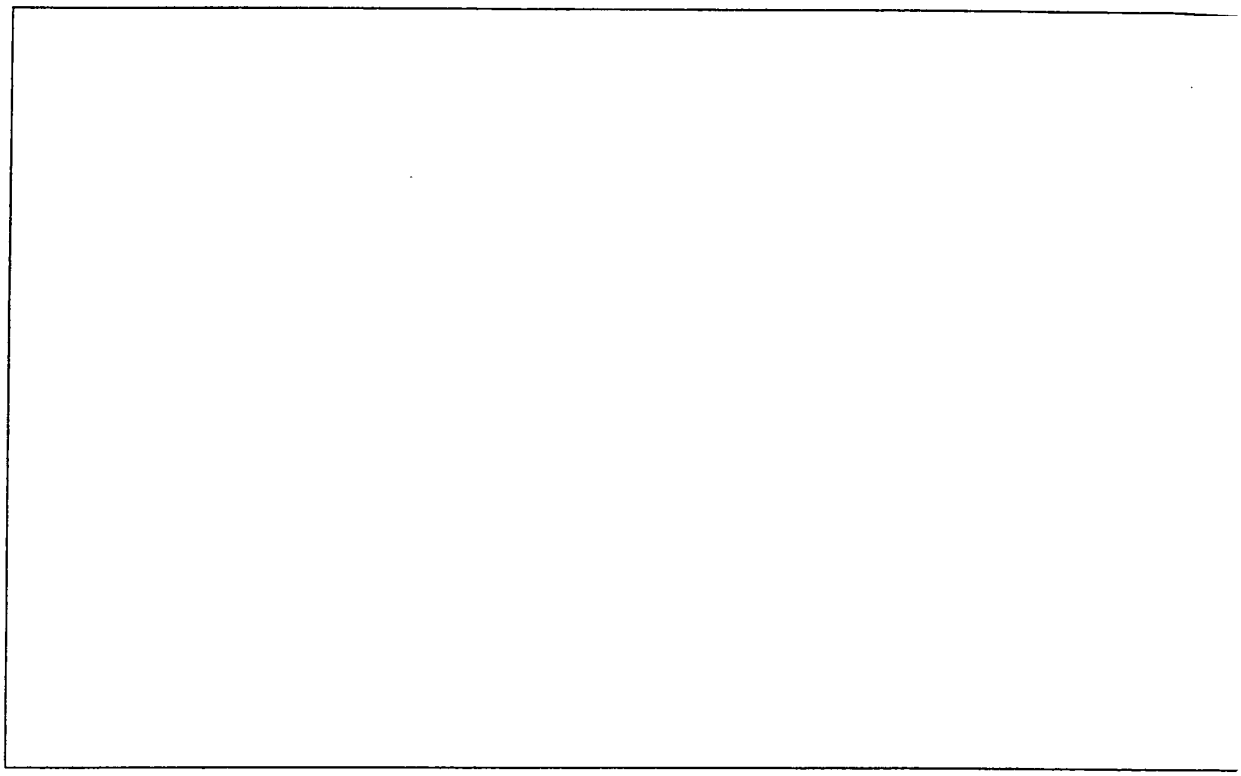
Financial Resources

	1999-2000 (a)	**2000-2001(Est) (b)**
	$m	**$m**

ATSB Departmental expenses		
Salary related	7.421	8.572
Administered	4.298	4.292
Depreciation/Amorisation	0.119	0.132
Other expenses	0.287	-
Total Departmental Expenses	*12.125*	*12.996*
Revenue	(0.166)	(0.085)
Net Cost to Department	***11.959***	***12.911***
Administered Expenses		
Black Spot Program	34.404	40.535
ATSB – Road Safety Communications	0.498	0.500
Inventory write down	0.376	-
OECD – road transport	0.028	-
Total Administered Expenses	***35.306***	***41.035***
Capital Expenditure		
Plant & Equipment	0.370	-
Average Staffing Level	**112**	**116**

Source: (a) ATSB Annual Review 2000, page 91
(b) ATSB Strategic Business Plan 2000-2001; includes $1.2m of funding that was previously made by the Department.

Current Organisation structure



Other matters

In October 2000 ATSB's first Annual Review was released covering the Australian financial year period 1 July 1999 to 30 June 2000 that was also the first 12 months from formulation of the ATSB. Copies of the 174 page Review will be available at the ITSA meeting.

ATSB commissioned a consultancy to develop a formal accredited training course for transport safety investigators and will be implementing the report's recommendations in 2001.

Australian Transport Safety Bureau
January 2001

REPORT BY THE TRANSPORTATION SAFETY BOARD OF CANADA
TO THE
INTERNATIONAL TRANSPORTATION SAFETY ASSOCIATION
JUNE 2000 TO FEBRUARY 2001

Part 1. Investigations - ongoing

Aviation:

1. A98H0003 - SWR 111. The investigation of the Swissair Flight 111 accident continues as our largest investigation in process. The team is now located in temporary accommodation adjacent to the TSB-C Engineering Lab in Ottawa. The focus of the work is now completion of the analysis and preparation of the draft report for consideration by senior management and then the Board. Significant safety action continues to result from this ongoing investigation. Work is progressing well to organize our records for an expected deluge of requests during external review of the confidential draft and, especially, when the Board's public report is released.

2. A99A0036 - The crew flew a missed approach in the Twin Otter when they were unable to land because of low weather conditions. They then commenced another approach with the intention of flying below the minimum descent altitude if either pilot saw the ground during approach. They saw the ground intermittently and continued the approach. A go-around was attempted just before impact. The first officer died in the crash.

The investigation is assessing safety issues related to the actions of the crew and to the Department of Transport's regulatory overview of company practices.

3. A98Q0087 - The Swearingen SA-226 took off from Montreal-Dorval. About 13 minutes later the crew started experiencing difficulties: there was something wrong with the controls, then there was a loss of hydraulics, then there was fire in the left engine nacelle area, and then the left engine caught fire and exploded. Just prior to touch down at Montreal-Mirabel, the left wing broke off after being weakened by fire and the aircraft crashed on the runway. All 12 persons on board were killed.

The initiating event was determined to be dragging and overheating of the left brakes, which led to hydraulic leaks and fire in the left nacelle.

The TSB-C made five interim safety recommendations a few months after the accident. They related to amendments to flight manuals regarding brake overheating, overheat detection, hardening of hydraulic and fuel lines, and the danger of mixing hydraulic fluids.

Marine:

1. M00C0033 - "TRUE NORTH II". In June 2000, a small sight-seeing vessel with a class of teen-aged students sank suddenly in rough seas in one of the Great Lakes. Two of the students drowned. There was considerable media interest and a petition calling for a public inquiry was signed by thousands of citizens. The issue was defused, at least temporarily, by a TSB-C public information program, including a "town-hall" type meeting in the community involved. The Board's confidential draft report is expected to be ready for external review before the end of February 2001.

2. M99L0098 - "NORWEGIAN SKY". On 24 September 1999, the 260-metre passenger vessel "NORWEGIAN SKY" was en route from Quebec City to Halifax, Nova Scotia, by way of the Saguenay River where a scenic tour was taking place. Whales were observed on the return trip at the mouth of the fjord. To prolong the whale-watching

activity in the Saint Lawrence River, a turn-around manoeuvre was carried out under the conduct of a pilot, but the vessel ran aground on Ile Rouge shoal while completing the manoeuvre.

Safety issues being addressed in the investigation include: pilot/navigation officers interface; bridge resource management; use of integrated navigation systems; basic navigation principles.

Rail:
R99H0007 - VIA Rail, Thamesville. In April 1999 there was a high profile accident involving a VIA Rail passenger train. An eastbound train, travelling at about 80 mph in dual-track non-signalled territory, encountered a reversed switch. Several cars derailed as the train swerved toward the south track. The two front-end crew were killed when their locomotive collided with stationary cars on an adjacent storage track. The crew of a westbound VIA train only about 2 minutes away heard an emergency broadcast from the accident train and were able to make a controlled stop. Almost 400 people were on the two trains. The Board's public investigation report is very close to completion.

Part 2. Significant reports released

Aviation:
1. A98Q0114 - A student and instructor were practising spins in a Cessna 152. After several successful spin-recovery manoeuvrers, the aircraft entered a spin from which the pilots could not recover. The aircraft remained in the spin until ground impact. The instructor died in the accident. The investigation determined that during the spin recovery attempt, the rudder jammed hard over. The jammed rudder was the result of a missing spring on the rudder control mechanism, control rigging, elevator position (full up), and general condition and alignment of all related parts.

2. A99W0061 - During flight in an Aerospatiale 355 helicopter, the battery temperature light illuminated, and the battery was turned off. About three minutes later all electrical power was lost, and the cabin and cockpit began to fill with smoke and fumes. The pilot landed in a field and all occupants got out. Flames were observed in the vicinity of the right baggage compartment. The helicopter was destroyed by fire.

The investigation determined that, during maintenance, an auxiliary battery cable had not been attached to the main battery. The fire occurred when the unattached battery cable arced through the battery compartment forward bulkhead and ignited the flammable nylon survival gear bags in the adjacent baggage compartment.

Marine:
M98L0149. The Board has just completed a wide-ranging investigation into the November 1998 sinking of the fishing vessel "BRIER MIST" with the loss of her five crew. The investigation dealt with the importance of watertight hatch covers, life-raft release mechanisms, emergency position indicating radio beacons(EPIRBs), water-level detectors, immersion suits, and crew training in emergency duties. The Board's public report with several Safety Recommendations is expected to be released in February or early in March.

Part 3. Recommendations

Aviation:
Cessna 152 - Four recommendations (re A98Q0114, above)
They dealt with short term notification and longer term fix of a design/maintenance problem that can permit rudder over-travel and jamming. The fourth related to the importance of proper maintenance of aircraft journey logbooks.

Aerospatiale 355 -Two recommendations (re A99W0061, above)

The Board's Safety Recommendations related to flammability of packaging materials and to maintenance control systems for private operators.

SWR III, MD-11 - Five more interim recommendations were issued in December 2000 from the ongoing investigation of the Swissair Flight 111 accident. The investigation identified safety deficiencies related to several aspects of current government requirements and industry standards (internationally) involving in-flight fire detection and control in a highly time-sensitive environment.

Marine:
The "BRIER MIST" - Four Safety Recommendations are to be released with this investigation report. The Board also expressed three "Safety Concerns". Further details will be available for the next ITSA meeting.

Part 4. Studies, data, analysis

The TSB-C has released its accident/incident statistical summary for 2000. The results are quite favourable in all modes. The data are available from our web site http://www.tsb.gc.ca (English) or http://www.bst.gc.ca (French).

Part 5. Changes in legislation, investigation and report processes, litigation, etc.

We have completed a change in report format that eliminates the use of a "Cause(s)" statement. Board Findings are now grouped as: Findings as to Causes and Contributing Factors; Findings as to Risk; Other Findings.

The review of the Board's regulations is ongoing. A draft is almost ready for consultation with external stakeholders.

Part 6. Resources, staffing and organization structure

Our resource review has been completed and we are now preparing our submission to the Government for an increase in resources.

Chairman Bouchard and one of our most senior Board Members were re-appointed for 2 years, effective July 2000. Staffing of two senior staff positions (Director of Investigations - Air, and Director of Corporate Services) was completed in August. A new Executive Director (David Kinsman) was appointed in January 2001, replacing Ken Johnson (who is retiring).

BIANNUAL REPORT DECEMBER 2000 - FINLAND

1. Ongoing investigations

Aviation.
On 15 December 2000, an airprox incident involving loss of separation between a Finnair MD-80 and an Aeroflot IL-62 occurred in Helsinki TMA. The two aircraft passed each other on opposite courses at FL 75 and FL 80 . The vertical separation was approximately 500 ft, when the vertical separation should have been 1000 ft. It has been confirmed from three different and independent radar systems that the altitudes of the aircraft were as mentioned above.

The transponder identification of the IL-62 did not appear on any of the radar systems until approximately 5 sec before the aircraft passed each other. The IL-62 appeared on the MD 80's TCAS display at the same moment, when it was 500 ft below the MD-80 in level flight and at a very close distance. The crew of the MD 80 elected not to take evasive action according to TCAS instructions. The pilot of the IL-62 has stated that a transponder was on onboard his aircraft.

There had been several similar cases during 2000. An investigation is underway to identify why the aircraft "disappear" from the radar screen.

Maritime.
FAIB has begun an investigation into the capsizing on 23 December 2000 of the German registered containership m/s Janra. The accident occurred in Finnish territorial waters. As the coastal state, Finland assumed responsibility for the investigation and proposed to the flag state authorities (Wasser und Schifffahrtsdirektion Nord) a concerted investigation in accordance with the relevant IMO resolution. This is the first time a concerted investigation is being carried out according to the resolution.

Railways.
Cross level accidents are classified as road accidents and are not usually investigated by the AIB. We have investigated a couple of serious cases in which a passenger train derailed after colliding with a heavy vehicle. The Board recommends that the technical regulations and instructions concerning visibility and signs be modified.

The number of accidents at railway crossings has increased and the Ministry of Transport and Communications has appointed a working group to study improvements in railway crossings safety and perhaps even elimination of level crossings.

2. Recently finalised reports

Nothing to report.

3. Safety studies.

During the summer of 2000 FAIB began to pay attention to the news about an increase in the number of fires in busses. In August we decided to start a safety study on such bus fires. The alarm centres and police throughout the country were asked to inform FAIB about all bus fires. Between August and December, we received information from them about 32 cases and from other sources about 20 cases. Roughly one thirds of these were due to petrol leaks, 1/3 to short circuits and 1/3 to other causes. This project will continue until the end of 2001.

4. Changes in legislation

At the beginning of December 2000, a new Act on the Publicity of Documents entered into force in Finland. The investigation of accidents has received a special reference in this Act.

In Finland official documents shall be public unless specially otherwise provided. For this reason documents gathered in an investigation can be kept confidential only to limited extent.

Everyone has the right of access to an official document that is public. The parties also have access under certain conditions to the contents of a document which is not public if it may influence or may have influenced the consideration of their matter.

As to accident investigation, the Act on the Openness of Government Activities (21 May, 1999/621) states as follows

"Section 24
Secret official documents

Unless specifically otherwise provided, the following official documents shall be secret:
.....
8) documents concerning readiness for accidents and emergency conditions, civil defence and the investigation of accidents, if access would breach or compromise safety, the realisation of civil defence or readiness for emergency conditions, compromise the investigation of accidents or violate the rights of the victims or the memory of victims or cause distress to persons closely involved with them, unless the granting of access is necessary for the purpose of carrying out an official task."

In respect of investigations of an international character, the following information can be kept secret (24 §):

...
"(2) the documents, other than those referred to in subparagraph (1), concerning the relationship of Finland with a foreign state or an international organisation; documents concerning a matter pending before an international court of law, an international investigative body or some other international institution; as well as documents concerning the relationship of the Republic of Finland, Finnish citizens, Finnish residents or corporations operating in Finland with the authorities, persons or corporations in a foreign state, if access to such documents could damage or compromise Finland's international relations or its ability to participate in international co-operation; ..."

Annex 5A Indonesia

NATIONAL TRANSPORTATION SAFETY COMMITTEE
Department of Communications
Ged.Karsa lt-2, Departemen Perhubungan, Jl Medan Merdeka Barat 8, Jakarta
Phone / Fax ++ 62 21 3517606

Jakarta, 26 January 2001

Subject: NEW ZEALAND MEETING

Mr. Pieter van Vollenhoven,
Email: itsa@rvtv.nl

Dear Sir,

Re your message of 05-01-2001 I would like to inform you that I am interested to attend the New Zealand Meeting, although at this point in time I have not yet secured the costs associated with travelling to Auckland.

You mentioned that you would like to receive a written overview by every country on their current affairs. I do not know whether Indonesia's problems will be of interest to the ITSA member countries, nevertheless I would like to submit a background information brief on what we are facing in this part of the world. This may not be according your standard format for these affairs, as I do not know your biannual overview format.

· We have some difficulties of responses to the recommendations we have issued, due to the lack of regulations or rules requiring a feedback mechanisms. In the more significant and urgent cases, however, we have a splendid response (e.g. within hours after the Medan Airbus AB300B4 accident in Medan in 1997, we have asked the Directorate General of Civil Aviation to rescind an earlier rule on the visibility limits to land in smoke covered airports; after a sequence of overshoots at the Ujungpandang airport, we had the threshold areas rubber deposits cleaned within a few weeks, and reinstalled the wind-anemometer system to have more accurate results on wind direction and speeds).

· We have had no difficulties with cooperation with the police, although

the legislation on our work procedures are not yet in place. You may wish to know that the law in Indonesia required the police to investigate all accidents or incidents, when and where any person commits an offence if he unlawfully and intentionally causes death, injuries or material loss. We worked together based on an understanding that both the police and the NTSC has a job to do, although the objectives, approaches and methods may dramatically differ. The NTSC has no significant problems with the access to the accident sites, wreckage or evidence. In fact, we have collected all needed evidence in our investigations, and the police never took evidence in custody: they usually rely on the evidence we have found, although the analysis, findings and conclusions are not given to them.

· I am now working on the legislation of transportation safety, in which our role, function, objectives, responsibilities, etc. will be legally protected. In this legal area we would like to have the help or support from the members of the ITSA. I.e. to undertake comparative studies in different countries and the way they are doing it. We started in 1997 as an independent organization within the Department of Communications, and we are still working on the meaning and or definition of 'independent'. After so many accidents, the working definition of independent is taking shape, and a initial understanding among the players in the transportation community has been formed.

· One of the difficulties we met was the limited awareness of transportation safety in our society, and we would therefore like to have a public awareness development program in the future. We do also need advise, help and support to organize such a program.

· The most important problems we are facing is the lack of human resources and funding. However, we had excellent cooperation with other national safety agencies, including but not limited to the AAIB, ATSB/BASI, NTSB, BEA, etc. We have had accident investigations where investigators and facilities of other national safety agencies although they are not involved in the accidents. Their support was and is greatly appreciated.

· We have had experienced in the difficulties- as a developing countries without investigating credibility and with scarce resources -, to handle a large scale major accident investigation (the MI185 SilkAir B737 crash, 19 December 1997). We had to show that the general public would want to have a sense that the investigation was handled competently and thoroughly and that the people conducting the investigation were free to act impartially. Our solution is to arrange for the involvement, in key positions, of outside or agencies experts (e.g. ATSB/BASI, AAIB, the Bandung Institute of Technology, the University of Indonesia, etc.). The NTSC has still

responsibility for making findings and determining what, how and why the occurrence happened. The support is given in the form of providing expert investigators, the use of laboratories and facilities, etc, without incurring costs.

Finally, I would like to give some statistics of the aviation accidents and incidents in 1999 and 2000 as an information, as follows

Year 1999	Number of accidents/incidents	31
	Serious injuries	10 persons
	Fatalities	12 persons
	Factors contributing (percentage of total accidents)	
	Human factors	67.7%
	Technical	61.3%
	Environment	12.9%
Year 2000	Number of accidents/incidents	12
	Serious injuries	-- persons
	Fatalities	2 persons
	Factors contributing (percentage of total accidents)	
	Human factors	75.0%
	Technical	75.0%
	Environment	16.7%

I hope that the information above will be of some use to the ITSA and the New Zealand Meeting.

I thank you for your kind attention.

Sincerely yours.

Oetarjo Diran
Chairman
National Transportation Safety Committee
Email: diran@attglobal.net

Biannual report of the Netherlands, 30 January 2001

Summary for ITSA members

1. Independent investigations

In January 2001, the Netherlands decided to introduce independent investigations in all sectors. The Government first intended to establish three separate Boards, one for defence, one for transport and one for other sectors, such as industry, health care and the environment, but in response to pressure from Parliament finally decided to establish a single Board for all sectors. Work on new legislation will soon begin.

2. Independent investigations vs investigations to establish liability

The Netherlands has launched a study to determine how to make a statutory distinction between independent investigations and inquiries to establish liability or civil proceedings. Dutch law currently stipulates that the Dutch Transport Safety

Board may decide which documents can be made public and that the Board's reports may not be used as evidence in court proceedings (whether criminal or civil). This study could lead to the organisation of an ITSA symposium that would follow up the NTSB symposium "Safety and the Law", which was held in April 2000.

3. World Congress on Transport Safety

Delft University of Technology has been approached about working with ITSA again to organise a Third World Congress on Transport Safety.

4. Cooperation with Dutch police

The Dutch Transport Safety Board has entered into contracts with a number of regional Dutch police forces to equip police officers with the skills needed at the first, fact-finding stage of investigations. Selected police officers will receive training from the Board. These officers, advised by the Board and the police, will decide jointly what cases the Board should investigate.

This is an important step because the police are the first to arrive at the scene of an accident. Experience has shown that, to prevent tailbacks, the wreckage has to be cleared from the road as soon as possible and the Board's investigators do not have the wherewithal to arrive at the scene as quickly as the police. Generally, it takes them at least two or three hours.

The police send their reports to the Board and the public prosecution service. The ITSA symposium will focus on how other countries handle this step.

5. Air transport

5.1 A serious incident took place at Amsterdam's Schiphol Airport when the control tower cleared one of Delta Airlines' aircraft for takeoff even though it had already given a tractor permission to tow another aircraft across the same runway, because it did not ask the right questions about the tractor's position. The pilot was able to abort takeoff at the last minute. Not all of the blame can be placed on the tower for faulty communication; safeguards to compensate for human error were not in place. The tower believed that the tractor was going from A to B, but in fact it was going from B to A. The radar showed that the tractor was at point B and this led to the assumption that it had already crossed the runway.

5.2 In the Netherlands, an accident took place that involved a low-flying F-16 and a recreational aircraft, a Piper, at a height of 1100 feet and a speed of 455 knots. The Board believes that in the future, air traffic should be divided into separate streams in uncontrolled airspace. The see-and-avoid principle simply does not work at such high speeds.

5.3 A Transavia accident involving strong crosswinds of 45 knots led to the decision to open up other runways so that crosswinds cannot exceed 20 knots. In the past, these runways had been closed in order to meet environmental standards.

5.4 The Board is going to carry out further studies of electrical wiring, fires and smoke in aircraft. Many serious incidents hinge on these factors. (Would this be an appropriate common concern for ITSA? Or for the Third World Congress on Transport Safety?)

6. Road transport

The Board is still having difficulty finding a method of selecting road accidents for investigation. It has arrived at the following conclusions on the basis of the road accidents most recently investigated.

-The competent authorities do not maintain roads properly. Too many guidelines are non-obligatory.The infrastructure consequently lacks uniformity.

- Fatigue is a major issue, even among professional drivers of passenger vehicles. Important questions include how to monitor whether or not drivers have had enough sleep.

In one case, the driver of a Mercedes minibus fell asleep. The accident that ensued when he collided with an obstacle on the road left many casualties, because the seats broke away from the floor. The seat belts were attached to the seats and not the floor. In future it will be mandatory to attach them to the floor but an exception was made for this bus as a transitional measure. Do you need to warn the passengers when an exception like this has been made?

- We will perform a safety audit focusing on what happens when automobiles fall in the water. The doors and windows generally lock automatically, making it impossible to get to the passengers from the water outside the vehicle.

7. Rail transport

Major issues in the field of rail transport include the following.

- Level crossings

- The outdated train protection system

In the Netherlands, trains travelling at less than 40 kph may pass through red lights. This is prohibited under the new European Rail Traffic Management System. The question is, when will the new system be introduced? In the Netherlands the number of incidents of trains passing through red lights has increased sharply, from 150 to 300.

- Fractures

Fractures can form in wheels. The cracks are difficult to detect during standard inspections. The problem is usually detected during major repairs but mechanics did not know how fast such fractures form. Aircraft mechanics do know this.

- Tunnels

There are more and more tunnels in the Netherlands and they form an escalating safety risk. Firefighters have even been heard to say that they are reluctant to enter tunnels during fires because of the smoke and heat. This creates a problem for both rail and road traffic (another possible common concern for ITSA?). In the Netherlands we have high-speed trains that can carry 2000 passengers at speeds of up to 300 kph. A recent investigation showed that there are limited facilities for disabled passengers, that people could be trampled to death if there is a panic and that it is difficult to get heavy firefighting equipment to the scene.

- Fires in underground railway stations

A small fire producing a lot of smoke started in an underground railway station when a wheel jammed after the brakes had been applied. This problem had arisen before but always above ground, so it had received little attention. The vehicle had a wooden floor (a poor choice of material, to say the least) and inadequate safety features. The traffic controllers were used to letting everything run automatically (under computer control) and had great difficulty using the manual controls. Finally, firefighters were poorly informed about where they needed to go.

- Tram accidents

A study of tram accidents revealed that there are few legislative provisions regulating trams (speed, braking deceleration, provision, disorganised infrastructure). The conclusion was that trams form a much greater threat to pedestrians and cyclists than automobiles.

- Radio frequency interference.

Probably due to a radio interference, a shunting cargo train made an emergency stop causing serious injuries to a crew member. Recommendations focused on a redesign of the radio control equipment regarding interference characteristics and handsfree operation as well as improvement of operating and planning procedures.

8. Shipping traffic

The Board does not yet deal with Dutch shipping traffic. Many serious accidents occur on inland waterways. Two particular concerns are:

- the stability of the vessels and
- the reliability of their steering mechanisms.

On recreational vessels, safety devices such as life jackets are often not suitable for the boat's passengers (because they are too small, too large or intended for lighter or heavier people, for instance). Often mobile phones are seen as a useful precaution. However, vessels at sea are usually outside the range of the network.

ITSA activities

The ITSA secretariat has sent numerous letters to governments - often via their ambassadors to the Netherlands - requesting information about independent investigations in their countries (Germany, Austria and Norway, for example).

In Italy and Brussels, lectures were given on the subject of independent investigation under the auspices of the European Transport Safety Council.

We are still using the connections we forged at the 1999 congress in Japan to promote independent investigations.

The ITSA will also promote independent investigations in the EU member states. We have been in close consultation with the United Kingdom to promote independent investigations there, particularly in the rail sector, and to encourage the establishment of a multimodal transport safety board. One result of the correspondence with embassies mentioned above has been communication with the Indonesian authorities.

The Belgian parliament has called for the introduction of independent investigations in Belgium. Closer cooperation within the Benelux is a real possibility. Steps are also being taken to promote independent investigations in Germany. For the time being, we will focus on Japan, Indonesia, South Africa, Brazil and the EU member states.

The ITSA offered to provide assistance after the accident in Austria (the funicular) and the earlier accident in Germany involving a high-speed train.

Annex 5A New Zealand

Transport Accident Investigation Commission
BIANNUAL OVERVIEW COVERING JUNE 2000 TO JANUARY 2001
FOR ITSA MEETING NEW ZEALAND FEBRUARY 2001

1. INVESTIGATIONS – ONGOING

None of the new investigations under way are likely to be of international significance.

Aviation: 10 investigations under way. TAIC is participating in an investigation by the NTSB of an airspace incident near Los Angeles airport. TAIC is also re-evaluating the performance of a GPWS system fitted to a De Havilland DHC-8 aircraft, one of which was involved in an CFIT accident in 1995. In that case the GPWS warned of terrain for about 4 seconds before impact, and less than the predicted by the manufacturer of the GPWS (12 – 18 seconds) which may have been sufficient to avert the accident.

Rail: 19 investigations under way. Single line train control (track warrant control) continues to have a high profile, together with an at-grade crossing accident between a scenic trip passenger train and a stock truck. The locomotive overturned and several passenger cars were derailed, but there were no fatalities.

Marine: 10 investigations under way.

2. RECENTLY FINALISED REPORTS ON MAJOR INVESTIGATIONS

The following are not major investigations in the international sense, but may be of interest to some ITSA members.

TAIC report 00-006 covers a accident involving a Fairchild SA227-AC Metro III when upon landing its left undercarriage drag braces both failed, causing the left undercarriage to collapse aft. A go-around was carried out and the aircraft flown to another airport for a wheels-up landing. The 2 pilots on board the aircraft were not injured.

The undercarriage failure resulted from a fatigue crack that had developed and grown to a critical length in the left undercarriage outboard lower drag brace. The crack was not detectable during normal maintenance procedures. Safety issues identified included the need for improved design and inspection requirements for Metro aircraft undercarriage drag braces. The manufacturer and the United States and New Zealand safety authorities addressed the safety issues. No safety recommendations were required.

TAIC also released three reports into jet boat accidents (one a fatality) and at time of writing had another 3 accidents under investigation or about to be reported on. Training, operating procedures, and maintenance are recurring issues.

3. SAFETY RECOMMENDATIONS

No safety recommendations likely to be of international interest have been made. However the TAIC is now taking a greater interest in follow up on safety recommendations. This is described in greater detail later in this report.

4. SAFETY STUDIES / DATA ANALYSIS

The Commission's legislation does not empower it to carry out safety studies or data analysis except as prompted by an investigation into an accident. This is an area of work the Commission may be asked to take on but not for some years.

5. CHANGES IN LEGISLATION, INVESTIGATION AND REPORTING PROCESSES

No new changes of legislation have occurred.

A significant step for TAIC was the introduction, after persistent lobbying, of a system for publishing the status of safety recommendations (SRs).

TAIC's legislation requires it to frame SRs to prevent accidents. Cost and benefit, sustainability and risk are not addressed in TAIC's legislation: the TAIC's purpose is to

issue preventive SRs. Transport legislation includes costs and benefits in the regulator's role of providing safe sustainable transport at reasonable cost.

In October 2000 TAIC introduced a system to publish on its web site the implementation status of SRs made since approximately November 2000 (the actual date depends on the date of the preliminary SR). The status will be updated as new information is provided. The status reporting system relies on the SR recipient's cooperation and sensitivity to public scrutiny, since TAIC has no power to compel recipients to implement SRs, and has no power to require recipients to advise it of any change of SR status.

The Commission accepts that not all SRs should be implemented because detailed analysis may show that the cost of implementing an SR may exceed the benefit. TAIC does not have the detailed knowledge of operations and operators, nor the resources to pay for economists to carry out cost benefit analyses. The Commission's policy is to leave it to the regulator or the recipient to assess risk, sustainability, cost and benefit[4] and to implement any SR.

The status system encourages regulators and operators to show, to the Commission's satisfaction, that they implemented the SR, or have shown that the SR is not viable. Until the Commission receives reasonable proof of one of these two outcomes, the SR status reported by TAIC remains open.

Another recent improvement is the conversion of TAIC's occurrence records of SRs and responses to a searchable database. Accident or incident details, reports abstracts, SRs and/or responses, and SR recipients meeting nominated criteria can be printed out for accidents and incidents for the last 10 years and sometimes earlier. This will help us ensure that the lessons of the past are not forgotten. The reports themselves are not capable of being searched in the same way, rather, we have to use Microsoft Word to search report files. This identifies which reports contain the key words, but then we have to open each Word file to extract the information.

6. CHANGES IN RESOURCES, STAFFING, ORGANISATION STRUCTURE.

No significant changes.

7. OTHER

The only significant litigation has arisen from the 1995 accident involving a Dash 8 aircraft near Palmerston North. The police are attempting to introduce the CVR as evidence in the trial of the captain, and may appeal a High Court decision that the CVR was inadmissible. TAIC's legislation makes it unlikely that such arguments will occur over any CVRs of post September 1999 accidents.

The Commission is expected to undergo a three yearly independent performance review later in 2001 or early 2002. The review had been planned for a year earlier, but was deferred by the MoT due to other workload. The MoT's other workload includes a review, planned for mid 2001, of accident investigation in New Zealand generally. The terms of reference are being drafted.

John Britton
CEO

25 January 2001

[4] Cost benefit analysis from the point of view of whether the cost to NZ is greater than the benefit. Analysis requires financial, economic, and operational expertise depending on the nature of the SR.

Annex 5A Sweden

Biannual report December 2000 – Sweden

1 Ongoing investigations

1.1 Disco fire

The investigation on the disco fire in Gothenburg is still going on. Presently, it would seem as if a report could be finalised before summer next year.

1.2 Bus fires

Of the three investigations into bus fires that was mentioned in the last biannual report two are still going on while one is finalised (see below). In one of the cases there is also a question of dynamic stability of buses in adverse wind conditions.

1.3 Accident with a jet fighter

In autumn 1999 an accident with a jet fighter (JAS 39 Gripen) occurred above the lake Vänern in southern Sweden. The pilot could not control the aircraft and ejected uninjured. The crash protected memory was recovered in December 2000. The unit was undamaged and the data have been retrieved. The analysis of the data will with all probability be available in January 2001.

1.4 Accident with a rescue helicopter

On the 9th of August 2000 a search mission was initiated to locate two men missing in connection with climbing in the mountain Kaskasapakte (2 043 m above sea level). The day after a military SAR helicopter (AS xx) joined the search team. The missing men were located in the evening the same day. They were in a relatively bad state and had to be lifted out by helicopter. The weather conditions were not favourable. At 0100 hrs the commander of the military helicopter agreed to start a mission to rescue the men. They were airborne at 0130 hrs. They flew climbing directly towards the site with search lights on. At 0136 hrs the main rotor hit the mountain side and the helicopter crashed. The two persons on board (flight crew) were killed.

2 Recently finalised reports

2.1 Incident involving smoke in cabin

A report is recently released on an air incident on the 28th October 1999 involving smoke development in cabin. The aircraft, an ATR-42 with British registration, was wet-leased by a Swedish airline to fly a scheduled flight between Stockholm and Jönköping. The crew, employees of the British owner, consisted of one commander, one first officer and one flight attendant. On board was also one purser from the airline, who was not qualified on the aircraft type with the task to conduct the PA announcements to the passengers in Swedish.

Ten minutes after take off the purser informed the commander that a white smoke had entered the cabin. A little later, when the aircraft had levelled out on FL 100, the aircraft smoke warning system was activated. According to the commander's written report, measures were then taken in accordance with the applicable emergency checklist. The commander then decided, due to safety reasons, to land at Linköping airport. Subsequently the aircraft was landed without problem and without any discomfort to the passengers.

The Swedish purser has stated that the information that they would be landing in Linköping came without forewarning and concurrent with on-going food service in the cabin. The time available to retrieve the food trays and prepare the cabin for landing was not sufficient. The purser felt himself to be forced to assist in this despite that he

was not qualified on the aircraft type. In spite of this the cabin was not fully prepared when the landing took place. Among other things an emergency exit was partially blocked.

An aircraft technician from the company ascertained that the smoke in the cabin was probably caused by a minor oil leak in the left-hand engine. The day after the incident the aircraft was flown, without passengers, to England for trouble shooting and repairs. Before the aircraft departed Sweden a representative from the British owner promised that the company would provide the necessary factual information so that SHK could investigate the incident. Despite several reminders from SHK, this information has not been made available, thus a complete investigation has not been possible to achieve.

The lack of promised factual information has resulted in the fact that SHK has not been able to with certainty establish the cause of the smoke build-up in the cabin, but there is no reason to doubt that it was caused by the oil leakage that was observed in an engine after the incident.

SHK's investigation has instead been concentrated on the conditions of the actual leasing and the working situation in the cabin.

The leasing appears to have been undertaken according to applicable regulations and routines for so-called wet leasing. Even if it probably had no consequence upon the sequence of events, SHK notes that the Swedish Civil Aviation Administration's approval of the leasing expired on the 24th of September 1999 with the possibility of extension to the 25th of October 1999 and that therefore there was no valid leasing authorisation when the incident occurred.

When the commander decided to land immediately there was not sufficient time for the cabin attendant to prepare the cabin before the landing took place, which was serious from the standpoint of safety. It is difficult for SHK to judge whether the necessity of landing immediately was motivated. Any consultation with the cabin attendant as to the status of the cabin prior to the landing does not seem to have taken place, which can be considered a deficiency.

The peculiar situation also arose that in a critical situation two uniformed cabin crew were on duty but only one of them had the authority to perform flight safety tasks. The circumstances where there are uniformed but unqualified personnel on duty in the cabin could involve, in a critical situation, that a passenger in need of help might not receive the help he or she asked for and expected, or that this help could be delayed.

Within The European Union work is presently under way to create a directive concerning the qualifications of cabin personnel. Also included in this work are elements that aim at what status and competence extra cabin personnel with purely service functions shall have.

2.2 In flight generator failure

A Saab SF340A was on a regular flight between the Örebro and Malmö on the 3rd of December 1999. The commander was the flying pilot for the leg and the flight experienced moderate turbulence. Other aircraft in the Malmö area had reported lightning but the crew was unable to see any storm activity on their weather radar.

After the crew had received clearance to commence an ILS approach to runway 17 and was established inbound on the LLZ, the aircraft was hit by lightning, causing both engine driven electrical generators to trip off. The aircraft was at an altitude of approximately 2700 ft. and 9 nautical miles from the runway. All instruments except for the standby flight instruments and the emergency lighting ceased to function and the crew was unable to communicate with ATC.

The crew continued the approach using the standby instruments while trying to reset the generators by cycling the switches from ON to OFF-RESET and then back to ON, with no success. By using a similar procedure with the radio they were however able to re-establish contact with ATC, and informing them of the difficulties they were experiencing and ask for radar vectors during the approach. The commander decided to continue the approach using the standby instruments and land as soon as possible after making some small turns to see that they were indeed indicating properly and giving correct information.

When extending the landing gear the crew was unable to get three green down-and-locked indications, even though the lamps tested correctly. They tried to retract and extend the gear several

times, but the result was the same. It was first when the emergency gear extension procedure was used that the crew was able to get three green safe indications. The flight was at this point at 2000 ft. established on the ILS.

The air traffic controller asked if they were declaring an emergency, which the crew confirmed. The controller then alerted all the concerned parties as outlined in their instruction booklet "Green Checklist- Risk for Accident".

When the aircraft was struck by lightning the cabin had already been prepared for landing and the cabin attendant was seated with her seat belt fastened at her station. She contacted the pilots and received information about what had happened and that the flight would shortly be landing. This information was then passed on to the passengers.

The pilots made visual contact with the runway at an altitude of about 1000 ft. and carried out an uneventful landing. After landing they were finally able to reset both engine driven generators. All instruments began to function normally except for the EFIS screens, which had a somewhat paler colour scheme. After having reached their parking stand the commander informed the passengers about what had happened and made sure that no one had been injured.

A visual inspection of the aircraft showed a 40–50 cm long crack in the upper part of the nose radome.

The aircraft type is equipped with two independent electrical systems, each consisting of a generator and a battery, with each generator having automatic overvoltage protection. The two systems are normally connected through a Bus Tie Relay, which opens and disconnects the two systems from each other automatically should an electrical fault arise in one of the systems, thus protecting the remaining and intact system. The first action in the malfunction checklist for the loss of both generators is to manually open the Bus Tie Relay.

Lightning strikes have on earlier occasions caused the overvoltage protectors to automatically disconnect both generators on this aircraft type. Experience has shown that the generators can be reset to ON after a period of about 15 seconds. The aircraft manufacturer is producing a modification that will reduce the risk for unnecessary generator disconnects.

After the incident the landing gear system was found to be without fault. No proper explanation has been found to explain why the crew did not get a correct down-and-locked green indication

A double generator failure during flight has serious consequences for flight safety. All electricity needed to power the remaining standby and emergency systems is then provided from the aircraft batteries for a limited amount of time only. When a fault occurs in flight, as in this incident, the normal procedure is to follow the malfunction checklist provided onboard.

The fault occurred in connection with a lightning strike during the final part of an instrument approach. In this case the crew would have had to initiate a go-around and conceivably proceed to a holding pattern to find the time to correctly perform the malfunction checklist.

It is understandable that the crew chose to continue the approach and land as soon as possible after having first determined that the standby instruments were functioning correctly, given that the batteries would provide power for a limited time only and that a successful completion of the malfunction checklist was uncertain. A manual disconnect of the Bus Tie Relay would in this case not have solved the problem.

The problem experienced in extending the landing gear was most probably caused by too low pressure in the hydraulic system, as a result of the power loss to the electrically driven hydraulic pump.

Based on the circumstances it was correct to declare an emergency.

The incident was caused by both the aircraft's generators being automatically disconnected after a lightning strike.

2.3 *Railway accident in an at-grade crossing*

In June 1999 a collision occurred in an at-grade crossing involving a freight train and a private car. The crossing was equipped with half-gates. Five persons (all in the private car) were killed. The rail traffic on the line had recently been changed allowing for trains to meet in the near-by station.

The private car arrived at a crossing (equipped with full gates) near the station. The gates were down. Shortly afterwards a train arrived and stopped in the station. The gates remained down. The driver of the private car turned around and left for the crossing where the accident occurred.

SHK defined the cause of the accident as follows. The immediate cause of the accident was the fact that the driver of the private car drove into the crossing in spite of the fact that the half-gates were down. Contributing factors have been that the driver probably was not aware of the recently introduced changes in the rail traffic and that the visibility did not allow the engineer to stop the train when he saw the private car.

SHK recommended the Railway Administration to consider the need for information in connection with major changes in the rail traffic.

2.4 *Overshooting on slippery runway*

In March 2000 an aircraft (HS748) overshot the runway on landing in Jönköping. The pilots departed Stockholm/Arlanda Airport at 01.34 hrs. Prior to the landing, Jönköping ATC reported braking values of 0.30, 0.32 and 0.32 and that the runway was covered with a thin layer of wet snow. Somewhat later ATC reported that the wind was 020 degrees, 4 knots and one minute later that the airport floodlights were switched on to 100% effect, and that the aircraft was cleared to land on runway 19.

The commander, who was flying the aircraft, thought that the approach and touchdown on the runway were normal. When he braked after touchdown he thought that the aircraft's retardation on the runway was small and insufficient to prevent it running off the runway. The ATC saw the aircraft land and considered it to be going unusually fast when it passed the taxiway to the station area. No technical deficiency was found in the aircraft.

SHK deemed the incident to have been caused by the touchdown speed probably being too high and the true runway friction being lower than reported to the crew.

SHK recommended the Swedish CAA to supplement current provisions for measurement of runway friction regarding measurements taken during continuous snow clearance in precipitation and to introduce as routine when reporting runway friction during precipitation and risk of deterioration of runway friction, notification of the time when the measurement was taken.

2.5 *Fire in a bus*

In January 1999 an engine fire occurred in a bus in scheduled passenger service. The driver had noted smell and minor smoke development during the trip. After contacts with the workshop it was though decided that he should continue. After about one hour and a half, when he was coming to a bus stop to let some passengers debark, he noticed an acrid smell. Suddenly the engine stopped and all lamps on the instrument panel were illuminated. He restarted the engine but it stopped again after a few seconds. In the rear view mirror he saw heavy smoke coming from the lower part of the bus abreast of the engine. He decided to evacuate the bus. The actuators for the doors by the driver's seat did not work and he opened the forward door with the emergency door opener. After having evacuated the passengers and having seen open fire under the engine compartment, he went back into the bus to check that nobody was left there. When passing the engine compartment on his way out he heard a loud bang. He hurried out and found that fire had gone through the floor to the passenger compartment. A few minutes later the bus was completely on fire.

The occurrence was caused by a foreign object damaging the fuel lines to the engine. Contributing to the effects of the fire was insufficient equipment for detection and suppression of the fire.

SHK recommended the Road Administration to promote the development of regulations for equipment for fire detection, fire suppression and emergency evacuation in buses.

2.6Accident with a Navajo

In December 1999 an accident occurred with a Piper PA 34 Navajo after take off from Sundsvall for a private IFR-flight to Gothenburg. On board were the pilot and seven passengers. All were killed on impact. The take off was made in bad weather conditions –overcast on 300 ft above ground, heavy snowfall and strong winds. The pilot, although qualified, did not have more than 800 flight hours in total.

The flight was a non-commercial business flight. The pilot was hired as a consultant by the company employing the passengers. The day before the accident he flew from Gothenburg to Sundsvall, where he worked together with the passengers during the afternoon. After a dinner together, they spent the night in a hotel. They worked the following morning and went directly to the airport for the flight back to Gothenburg.

SHK recently released the report concluding that the accident was caused by the pilot loosing control when flying in IMC. Contributing factors were

- adverse weather conditions,
- available time for preparation of the flight was insufficient,
- the navigation system was probably incorrectly adjusted,
- the pilot disbelieved the instruments,
- the aircraft was heavy with the CG near or aft of the aft limit,
- the pilot was probably under pressure to perform the flight and
- the medical state of the pilot may have reduced his capacity.

SHK recommended the Swedish CAA

- to carefully consider the possibilities to find methods to ascertain the competence of private pilots that fly with passengers on business and
- to inform, to the extent possible, company leaders on the differences in competence between private and professional pilots.

3 Safety recommendations

See above.

4 Safety studies

Nothing to report.

5 Changes in legislation etc.

Nothing to report.

6 Changes in resources etc.

SHK has recruited three part-time rescue specialists and one part-time railway specialist. In connection with the retirement of the full-time employed military pilot, when the same pilot will be part-time employed, SHK will recruit an assistant investigator to assist in all investigations.

ASC BIANNUAL REPORT JUNE 2000-DEC. 2000/12/30

1. ONGOING INVESTIGATION

* On October 31, 2000, approximately 2318 Taiwan local time (UTC 1518), a Singapore Airlines Flight SQ006, with Singapore registration number 9V-SPK, a Boeing 747-400 airplane entered the incorrect runway at Chiang-Kai-Shek(CKS) Airport, Taiwan. Heavy rain and strong wind from typhoon "Xiang Sane" prevailed at the time of the accident. The airplane was destroyed by its collision with the runway construction equipment and by post impact fire. Prior to the accident, a NOTAM was issued on August 31, 2000 indicated that portion of the runway 05R between N4 and N5 was closed for construction. There were a total of 179 people on board with 159 passengers, 3 flight crewmembers and 17 cabin crews. At the time of this report, 83 people died (including 4 cabin crews), and 45 people injured.

According to ICAO Annex 13 and Taiwan Civil Aviation Law article 84, Aviation Safety Council, an independent government organization of Taiwan responsible for civil aviation accident and serious incident investigation, has immediately formed a team to conduct the investigation of this accident. NTSB of US, and MCIT of Singapore joined the investigation team as the Accredited Representatives. The investigation is focused on the human factor issue relating to the crew situation awareness, SIA's CRM training, the environmental issues including ATC and airport facility, and the survivor factors. Factual report will be published at the end of February and the final report is estimated to be published towards the end of 2001.

* On October 31, 2000, approximately 2150 Taiwan local time (UTC 1350), a Mandarin Airlines Flight AE 838, with Taiwan registration number B-18603, a Boeing 737-800 airplane had a runway excursion when landing on runway 05L of Chiang-Kai-Shek Airport, Taiwan. Heavy rain and strong wind from typhoon "Xiang Sane" prevailed at the time of the accident. The airplane skipped from the runway destroyed four runway edge lights and then back to the runway. The airplane suffered no damage with no personnel injury reported. According to ICAO Annex 13, this incident is classified as a serious incident and the investigation by ASC is currently underway. The investigation is focused on the flight operation in bad weather.

* On Sept. 4, 2000, approximately 1125 Taiwan local time (UTC 0315) an air police helicopter AP 018, type AS356-N2, plunged into river when conducting demonstration of rescue exercise at Cheng-yen River located on the southern part of Taiwan. While the plane was hovering in demonstration of the rescue, one of the two engines lost power and the plane hit the surface of the water. After an initial attempt to raise the plane, the plane dived and submerged into the water again. Three passengers and the pilot were rescued but the co-pilot died during the accident. At the request of the Ministry of Interior, ASC is conducting the investigation of this accident. Preliminary finding indicated a detached nut of the No. 2 engine intake valve caused a sudden decrease of the engine power. Final report is expected to be released on April 2001.

* On May 8, 2000, an Daily Air Bell 412 helicopter with registration number B-55531, flew charter mission with 2 crew members and 8 passengers on board, stroke two conveying cables while searching for the landing area. The helicopter crew flew their first mission without conducting prior survey of the flight route and the landing area. The airplane was destroyed but all passengers and the two crewmembers suffered only minor injury. ASC is conducting the investigation with emphasis on the planning of the flight route, CAA's approval procedure, and dispatching.

* On 22 August, 1999, 1844 Hong Kong local time (UTC 1044), a China Airlines flight CI642, Boeing MD11 airplane, registration number B-150 from Bangkok to Hong Kong with 300 passengers and 15 crew on board flipped over when landed at Hong Kong International Airport. At the time of the accident, the airport was affected by a servre tropical storm with strong and gusty wind. The airplane made a hard landing initially on its right main

wheels; its number three engine then contacted the runway surface, an outbreak of fire and the right wind detachment followed. The airplane rolled over and ended up in an inverted position adjacent to the runway. Three passengers died with 45 passengers and 5 crewmembers seriously injure. The Hong Kong CAD is conducting the investigation with ASC and NTSB of US as accredited representatives. According to CAD, the final report will be completed in August 2001.

2 + 3. **FINALIZED REPORTS ON MAJOR INVESTIGATIONS AND RECOMMENDATIONS**

During the period of interest, ASC published one major accident report and three serious incident reports and a general aviation accident report as described in the following:

UNI 873 accident report

On 24 August, 1999, approximately 12 36 Taiwan local time (0436 UTC), an UNI air transport MD 90, registration number B17912 with flight number UNI 873 from Taipei to Hualien exploded after landing roll. One passenger died and 13 seriously injured According to Taiwan's Civil Aviation law article 84, ASC are responsible for the investigation. Because of the nature of the accident, Criminal Investigation Bureau (CIB) was immediately informed and both CIB and ASC jointly conducted the investigation. After one year of the investigation effort, the council has determined the probable cause of the accident as follows: one passenger carried a bleach bottle containing gasoline that passed the security checkpoint without notice. The gasoline leaked through the sealed silicon gel that created a flammable fuel air mixture that was ignited from spark of a motorcycle battery that was also been carried on board. The council issued recommendations in the area to the airline, the CAA, as well as the civil aviation police in their emergency rescue, fire fighting, check point procedure, the organizational issues related to CAA and the civil aviation police, as well as the procedure and recognition with respect to the dangerous goods.

Three Serious Incident Reports

- On 24 April 2000, a Far East Transport MD 90 had a runway excursion when landed on Chai-Yi airport located on the south side of Taiwan. At the time of the incident, heavy rain and gust wind condition prevailed. The aircraft lost its visual reference with respect to the runway at an altitude of 50 ft prior to touchdown due to a sudden down pour together with a shift of the wind direction. The pilot veered off to the right of the runway. There were no CVR data because the pilot pulled the incorrect circuit breaker and the ground operations personnel failed to check when on board the airplane. The FDR data was also incorrect due to the incorrect setting of the database. Recommendations were issued to the operators and CAA re. the airport weather information, as well as the procedure re. the preservation of the flight recorder data.
- On May 8, 2000, a China Airlines A300-600R aircraft had a captain incapacitation during a scheduled flight from Taipei to Ho-chi-ming City. The captain suffered heart attack 15 minutes into the flight and become incapacitated. The first officer (PF) returned the airplane to the original airport, Cheng-Kai-Shek International Airport. After the plane touched down, it took the medical personnel 44 minutes to finally reach the incapacitated captain. The captain later pronounced dead at the hospital. Recommendations were issued to both the operators and CAA re. to the communication and coordination of airport's emergency handling, the standard emergency call-out procedure by the crew, and the surveillance of health status of the high-risk group of the flight crew.
- On 24 August 2000, an UNI Air MD 90 airplane ran off the runway at Kaoshung International airport on a rainy day. It was a scheduled passenger flight from Taipei to Kaoshung with 127 passengers on board. The airplane landed on wet runway with one thrust reverser non-operative. The airplane stopped 31 meters beyond the end of the runway. Recommendations were made primarily to the operators on pilot's decision-making, and crew coordination during the landing phase of the flight.

Emerald Pacific Airline Crop Dusting Accident

On 29 November 1999, an Emerald Pacific Airlines UH12E helicopter with registration number B31007 plunged into the river after finished the crop dusting operation. When returning to the maintenance depot after the operation, the pilot flew the plane approximately 30 meters above the water surface in poor visibility. The plane struck the water due to pilot's loss of situation awareness. The pilot drawn while tried swimming to the shore. Recommendations were issued to both the operators and CAA in training, and the CAA surveillance in general aviation.

4. SAFETY STUDIES

A safety study regarding the CRM (Crew Resource Management) and the corporate culture was commenced in June 2000. This project is sponsored by ASC, and was performed by the Institute of Aeronautics and Astronautics of National Cheng Kung University together with Taiwan's ALPA and all the major operators including China Airlines, EVA Air, Far East Transport, TransAsia, Mandarin Airlines and UNI Air. The project is divided into two phases; the first phase focused on a survey on Taiwan pilot's perception on CRM and their own company's culture. The second phase will focus on the development of guidelines for the operators of an effective CRM training. Out of the 2000 pilots in Taiwan, the survey collected 1154 returns that represents 57% of the total pilot population. Study results will be published in future flight safety conference.

5. Legislation

*On April 5, 2000, the Taiwan government has changed the civil aviation law that has major impacts to Taiwan's independent investigation organization, ASC;

a. The law specifically designated ASC as an independent investigation organization that shall conduct its investigation of civil aviation accident and serious incident without any interference.
b. The law stated that when ASC is conducting its investigation, all relevant organizations should provide full cooperation to the investigation.
c. The purpose of the investigation shall be used solely for the purpose of safety improvement, not for the purpose of apportioning any blames or responsibility.

* In following the change of the civil aviation law, a regulation entitled " Civil Aviation accident and serious incident investigation regulations" was also published on 27 July 2000. The published regulation primarily follows the ICAO Annex 13 for the conduction of the accident and serious incident investigation.

* Because of the SQ006 accident investigation, it became evident in Taiwan that there is a conflict between the aviation safety investigation organization and the prosecutors. Although it was made clear to both the prosecutors and the public that the intend of the investigation as stated by ICAO Annex 13, the acceptance of such notion is still far from successful. As the consequence Memorandum of Understand is currently in preparation between ASC and the Ministry of Justice. The intend of this MOU is to delineate the responsibilities and the methods in information sharing between the two governmental organizations. It is expected that this MOU will be signed in spring, 2001.

6. RESOURCES, STAFFING, STRUCTURES, ETC.

ASC was born in May 25, 1998 as an independent government organization for the purpose of investigation of civil aviation accidents and serious incidents. Currently, it has a total of 18 people including 13 technical staff. The council has five council members in policy making and to publish the investigation reports, It has a complete flight recorder lab that is capable to read all recorders used by the operators in Taiwan. So far, the council has investigated 12 accidents and serious incidents and has published 5 reports.

Other than investigating the accidents and serious incidents and to issue recommendations, the council also involved in active preventive measures in safety improvement such as confidential safety reporting systems, safety data base

development, and relevant safety related researches. In addition, the council has also held two international safety conferences, one on May 25-26, 1999 and the others on 4-5, December 2000. Speakers from different nations were participated in those two conferences. The council also has an active web site; www.asc.gov.tw

Annex 5 A United Kingdom

FEBRUARY 2001 ITSA MEETING

NEW ZEALAND

Contribution from John Lang

General

I offer my sincere apologies for my absence. I don't surrender an opportunity to visit New Zealand lightly but events in UK are already showing that the decision not to attend was correct. I send my best wishes to everyone present.

Despite my absence for the New Zealand meeting I intend playing as full a part as I am able in the 18 months left to me as the UK's Chief Inspector of Marine Accidents. I relinquish the appointment on 31 Jul 2002.

Suggested Agenda Items

1. **Interim Reports.** I would be very interested in hearing other delegates' views about the advisability of producing an interim report early in any investigation. There are huge pressures from both politicians and the media for instant answers that are, of course, almost impossible to satisfy. There are arguments both for and against producing an interim report but the MAIB produced a one page summary of early findings in a recent accident investigation with a measure of success. The summary, termed by the MAIB as a Safety Bulletin in that it issued a number of immediate recommendations based on the initial findings, was issued about three weeks after the accident. We have however noticed some interim reports that do not satisfy the public, are issued without adequate thought or consultation and have generated their own problems. **What are people's experiences and would ITSA feel able to offer some guidelines?**

2. **The Blame Culture.** Like anyone else in the accident investigation business, the MAIB is well aware we live in an age where the blame culture is on the increase. A recent press article commenting on a particular accident in the UK included the following statement by the widow of an accident victim. "Someone has to take responsibility for my husband's death." She is 'seeking justice for her dead husband,' and is suing for £1m. The media tend to support such positions and make frequent references to the need for 'thorough public inquiries' and on 'managerial and corporate responsibility.' A recent leader in a British newspaper commenting on the desirability of prosecuting people stated, "The power of an exemplary case would be very great and would concentrate the minds of all those responsible for safety on the roads, at sea and in the air, as well as on the railways." The problem is that this attitude, once again, is making people extremely reluctant to co-operate fully with accident investigators for fear of incriminating themselves. **Is there a case for ITSA to make a public statement, yet again, that the most effective way of preventing transport accidents is to seek the full co-operation of everyone involved rather than pursue the prosecution option that tends to do the opposite. Such an approach does more to identify the true causes so that appropriate action can be taken to prevent them happening again.**

3. **The Beleaguered Crew.** Accident fatalities are beginning to introduce a new factor into the public reaction to transport accidents. Whenever there are suggestions that the actions of a crew might have been responsible for their own deaths, their next of kin will mount vigorous campaigns to clear their names. If on the other hand passengers are killed, there are just as vigorous arguments to blame the crew. The UK has seen both positions exposed during 2001. In both situations there are indications to suggest that such fiercely argued positions by both groups are actually contributing to a failure to identify certain underlying causes. **Is this a topic for discussion with a view to ITSA adopting a position on this very contentious and emotive issue.**

4. **ITSA Meetings.** Is it worth discussing the frequency of ITSA meetings. We currently gather once every 8 months. When two such meetings fall into the same financial year, it can take quite a toll on scarce resources. Do we actually need to meet so frequently? I am reasonably ambivalent but think it should be discussed. **Is there a case for reviewing this interval and perhaps agreeing to having just one meeting per year?**

5. **Next Meeting.** As a follow up from the previous item, it is understood the next meeting is likely to be held in October or November.

When it comes to selecting a date for the next meeting I would ask delegates to note that I am unavailable on the week beginning 15 October, 23 Oct, 2 November, or the week beginning 26 November.

MAIB Biannual Report - February 2001

General

After three years of relentless change in the way the UK's MAIB carries out its business, the past 8 months have seen a period of consolidation. The main features are the move towards investigating as many accidents as possible, to making all reports publicly available and to devoting as much time and effort as possible to identifying, and publishing, the lessons to be learned from accidents.

Accident Investigation

About 1500 accidents were reported to the MAIB in 2000. There is compelling evidence to indicate that many personnel injury accidents, especially among fishermen, are not being reported. It is thought that this was part ignorance of the need to report such incidents and part fear that it would lead to unwanted interference by a government body.

About 3% of all reported accidents are currently being investigated. Put another way this amounts to the MAIB starting, and finishing, one new investigation each week. The target time for the completion of an investigation report is nine months but this can be extremely difficult to achieve. A more realistic timescale is 12 months.

The chief inspector has been successful in arguing for additional members of the staff and there are now 10 (rather than 6) full time professional field inspectors in the branch. This means it is now possible to deploy two, if not more, inspectors on each investigation. One of them is a professional fishing vessel skipper and this has greatly enhanced the MAIB's credibility among the fishing community.

In deciding which accidents to investigate, many factors are taken into account with a high priority being given to those where there are fatalities. In practice a wide variety of accidents are investigated with fishing vessels taking a high priority. Leisure craft accidents are investigated from time to time.

The most high profile incidents to be progressed or started in the review period include a very detailed investigation into the loss of the fishing vessel *Solway Harvester* in the Irish Sea in January 2000 with the loss of seven lives: the sinking of the cargo vessel *Global Mariner* in the River Orinoco in August: and the grounding of the coaster *Lagic* in a narrow river on the English east coast when she managed to jam herself between opposite banks. She broke her back in two places when the tide went out.

The most common factor in all accidents is the human one. In the MAIB's opinion there is still a fundamental lack of understanding about human factors in seafaring and too many people are ignoring, for instance, the realities of excessive fatigue. Commercial pressures continue to play a large part in the underlying causes of accidents.

Learning the Lessons

The MAIB pays much attention to learning the lessons from accidents. Its principal means of publishing these is through its Safety Digest which it produces three times every year. It is distributed free to anyone who asks for it and it sent to people around the world.

It is also available on the MAIB website: www.maib.detr.gov.uk

Safety Digest articles are very much directed at seafarers and couched in terms that they would understand.

Three groups of readers are targeted, merchant mariners, fishermen and leisure craft users.

A special fishermen's edition is produced each year in March.

The MAIB has also launched one further initiative to ensure the lessons are learned. During the year its inspectors lecture at a number of nautical and fishing colleges, and to other professional audiences to ensure that as many people as possible have an opportunity to hear first hand about what goes wrong at sea, and to ask questions direct. Feedback shows this to be both a popular and welcome step. The service is provided free.

Trend Analysis

Much effort has recently been put into updating the MAIB's data base and this work is scheduled for completion in April. This data base is the UK's sole depository of marine accident information and certain data is made available to anyone who asks for it. Declarations and other evidence submitted in confidence is not revealed but basic information is available.

Progress is being made on carrying out a degree of trend analysis and it is hoped to publish two Safety Studies in the near future. The first looks at the poor record with accidents to ships' lifeboats, and the second looks at why so many fishing vessels are foundering.

Formal Investigations

During the year there have been three public inquiries into marine accidents. Two have been completed, the third has been formally opened but adjourned.

The concept of the Formal Investigation (FI) is a relic of pre MAIB days. It is the public inquiry which used to be ordered by ministers into the most serious accidents. The FI remains on the statute book and old cases can be re-opened if there is new and important evidence. Three old investigations have been opened or re-opened on this basis.

The first, with far reaching effects on bulk carrier safety was the FI into the loss of the UK registered bulk carrier *Derbyshire* which sank with the loss of 44 lives in 1980. The report issued after the inquiry made several important recommendations on hatch covers.

The second FI was into what lessons can still be learned from the collision in August 1989 when the aggregate dredger *Bowbelle* collided with a river passenger vessel *Marchioness* on the River Thames with the loss of 51 lives. The report is expected to be released in early March.

The third FI is looking into the causes of how the trawler *Gaul* was lost in the Barents Sea in 1974 with the loss of 36 lives. The Investigation is currently adjourned while preparations are made to revisit the wreck either this summer or next. The MAIB is managing the return visit.

The common theme in all three FI's is that in each case pressure by the families for more thorough investigations led to them being looked at again. At the time they all occurred there was no meeting between accident investigators and victims' relatives. Family liaison is now a feature of all investigations.

The cost of these various accidents with legal representation is much higher than is ever given to the accident investigation organisations. The cost of the *Derbyshire* and *Marchioness* investigations is assessed at around £15m. The MAIB's total budget for a year is £1m.

The International Scene

The MAIB continues to feature on the international scene. There are three aspects that the Branch consistently attempts to put across; the importance of independent investigations together with publicly available reports, the urgent need for Voyage Data Recorders to be fitted in all merchant ships, and the relevance of the human factor. The Branch is also trying hard to improve international co-operation which is still far from satisfactory.

The chief inspector regularly speaks at a number of international conferences on marine safety and in the past few months has visited Greece and the United States as well as London. There are planned visits to the USA in March, the Netherlands in April and, later in the year, Hong Kong and Korea.

Looking elsewhere on the marine accident front, the chief inspector can't but help reflect on the number of knee-jerk reactions by politicians to marine casualties. The only thing that ever seems to attract any form of action are dead sea birds and oil washing up on beaches, and then the proposed solution rarely has anything to do with preventing it happening again.

There is a continuing need to improve international co-operation with marine accident investigations and advocate the need to publish reports without any interference from vested interests.

There is far too much secrecy and opaqueness in marine activities. Independent accident investigations provide one of the very few organisations capable of exposing shortcomings if the inspectors do their job properly and the reports are made publicly available. The problem is that too many flag states fail, in the opinion of the MAIB, to achieve this.

Non Marine Accident Investigation – The UK

Apart from the joint Anglo-French investigation into the loss of the Air France Concorde in Paris in 1999, the main focus of attention on transport accidents in the UK in recent months has been the ongoing investigation into two railway accidents. The first, known as the Ladbroke Grove (Paddington) accident in October 1999, involved a head on collision between two trains and, more recently, the Hatfield Crash when a mainline high speed train came off the rails and killed four people.

Running parallel with these two investigations conducted by the Railway Inspectorate of the UK's Health & Safety Executive, Lord Cullen is also conducting an Inquiry into rail safety. There is no means of knowing what his report might say but it would come as no surprise to many observers if it concluded that there should be an independent railway accident investigation branch.

If this is confirmed there will be widespread interest to see if he goes further and recommends the creation of a multi-modal accident investigation organisation.

Summary

The MAIB is attempting to make a contribution to improving safety at sea by carrying out thorough and independent accident investigations. Its success cannot be quantified but it takes very great strength from like-minded organisations from around the world that are trying to achieve the same results.

Marine accident investigation tends to be the poor relation in transport accident discussions. It is the least well represented and worst resourced of all accident investigation modes and is often conducted by people without any training.

The MAIB does its best to maintain the objectives of ITSA. It does so on a small budget with a tiny staff. There is no over arching board and all decisions are taken by the chief inspector who is given total freedom to act in whatever way he feels is most appropriate.

He is required to make a public statement of his activities once a year in his Annual Report. It is published each year in June.

National Transportation Safety Board

Biannual Report to ITSA of Significant Activities

June 1 - November 30, 2000

Recommendations

The NTSB issued 158 safety recommendations and closed 72 recommendations, of which about 80% were "closed - acceptable action." Here's a breakdown:

Recommendations issued: Aviation: 77; Highway: 18; Intermodal: 7; Marine: 28, Pipeline: 19; Railroad: 9.

Recommendations closed: Aviation: 27; Highway 6, Intermodal: 1; Marine 20; Pipeline: 5; and Railroad: 13. Examples of recommendations issued:

Marine: ***Cruise ship fires.*** In response to fires on three cruise ships in the Gulf of Mexico, and off the coasts of Florida and Alaska, the NTSB held a June public meeting and issued this recommendation to cruise line companies:

- Install automatic local-sounding smoke alarms in passenger and crew accommodation areas on passenger ships so passengers and crews receive immediate warning of smoke and will have maximum escape time during a fire. *Current classification: open – acceptable (6 of 18 cruise lines have officially responded in the affirmative).*

Also, the NTSB issued this recommendation to the International Council of Cruise Lines:

- Withdraw your opposition to the amendment of the Safety of Life at Sea Convention to require automatic local-sounding smoke alarms in passenger and crew accommodation spaces on board passenger ships and support a full discussion of the technical issues and any further U.S. Coast Guard actions on this matter before the International Maritime Organization. *Current classification: open – acceptable (pending official notification by the council to the IMO.)*

Aviation: ***Runway incursions.*** Reducing runway incursions at airports is a top priority of the NTSB. In response to several incidents discussed at a June public meeting, the NTSB issued additional recommendations to the US Federal Aviation Administration to:

- Adopt the landing clearance procedure recommended by International Civil Aviation Organization (ICAO). *Current classification: open – unacceptable.*
- Require the use of standard ICAO phraseology for airport surface operations, and emphasize to controllers the need to use this phraseology and to speak at reasonable rates when communicating with all flight crews, especially those whose primary language is not English. *Current classification: open – unacceptable.*
- Require, at all airports with scheduled passenger service, a ground movement safety system that will prevent runway incursions. The system should provide a direct warning capability to flight crews. In addition, demonstrate through computer simulations or other means that the system will, in fact, prevent incursions. *Current classification: open – acceptable.*
- Require that all runway crossings be authorized only by specific air traffic control clearance, and ensure that all US pilots, foreign pilots flying into the US, and ground personnel responsible for the movement of aircraft, receive adequate notification of the change. *Current classification: open – acceptable.*
- Require that, when aircraft need to cross multiple runways, air traffic controllers issue an explicit crossing instruction for each runway after the previous runway has been crossed. *Current classification: open – acceptable.*
- Discontinue the practice of allowing departing aircraft to hold on active runways at nighttime or at any time when ceiling and visibility conditions preclude arriving aircraft from seeing traffic on the runway in time to initiate a safe go-around maneuver. *Current classification: open – unacceptable.*

Investigator-Inspired Safety Improvements. NTSB investigators generated 35 safety improvements through the Safety Proposal Review Board (SPRB), a program to acknowledge and account for safety improvements that are brought about through direct dealings with technical staff and industry representatives without requiring formal NTSB recommendations.

Example: A Dassault-Breguet Mystere Falcon, owned by a US corporation, experienced a series of violent pitch oscillations during descent into the airport at Grand Rapids, Michigan, in October 1999. The

aircraft landed safely, however a flight attendant was seriously injured. Investigators found similarities in an accident in Europe one month earlier when a Falcon, operated by Olympic Airways for the Greek government, also experienced violent pitch oscillations, but for a much longer time, during its descent into the Bucharest, Romania, airport. That aircraft also landed safely, but of the 13 passengers and crew on board, seven passengers were killed and two were seriously injured. As a result of NTSB investigators' analysis of the two accidents, investigators alerted the manufacturer to disparities in procedures about maximum speeds when the "pitch feel" annunciator illuminates and when the aircraft is dispatched with the "pitch feel" system inoperative. The manufacturer immediately issued a temporary change to the Falcon's automated flight management procedures to reduce airspeed when the "pitch feel" annunciator illuminates. Discussions with the FAA resulted in the FAA issuing an airworthiness directive incorporating the manufacturer's speed limits.

Investigations

Accident Reports Completed

Aviation

Long Island TWA 747 Explosion. The NTSB issued a final report on its investigation of the crash of TWA flight 800. On July 17, 1996, the 747 broke up in flight and crashed in the Atlantic Ocean off Long Island, New York. The passenger jet was on a flight from New York to Paris. All 230 people on board were killed and the airplane was destroyed. The NTSB said the probable cause was an explosion of the center wing fuel tank resulting from ignition of the flammable fuel-air mixture in the tank. The source of ignition energy for the explosion could not be determined with certainty but, of the sources evaluated by the investigation, the most likely was a short circuit outside of the center wing tank that allowed excessive voltage to enter it through electrical wiring associated with the fuel quantity indication system. Contributing factors were the design and certification concept that fuel tank explosions could be prevented solely by precluding all ignition sources; and the design and certification of the 747 with heat sources located beneath the center wing tank with no means to reduce the heat transferred into the center wing tank or to render the fuel vapors in the tank nonflammable.

Recommendations issued: 15, including 11 issued during the investigation.

Report adopted: August 23, 2000

New Jersey Federal Express MD-11 Crash Landing. The NTSB issued a final report on a Federal Express MD-11 cargo accident. On July 31, 1997, a MD-11 crashed while landing on a runway in Newark, New Jersey. The flight originated in Singapore with intermediate stops in Malaysia, Taiwan and Alaska. All five occupants received minor injuries and the airplane was destroyed by impact and a postcrash fire. The NTSB said the probable cause was the captain's overcontrol of the airplane during the landing and his failure to execute a go-around from a destabilized flare. A contributing factor was the captain's concern with touching down early to ensure adequate stopping distance.

Recommendations issued: 12

Report adopted: July 25, 2000

Celebrity Aviation Accidents

Payne Stewart Learjet Fuel Exhaustion. The NTSB issued a final report on a Learjet 35 that crashed near Aberdeen, South Dakota, on October 25, 1999. The two-person crew and four passengers, including golfer Payne Stewart, were killed. The airplane departed Orlando, Florida, for Dallas, Texas, then air traffic control lost radio contact with the airplane and it proceeded northwest for more than four hours when it ran out of fuel. The NTSB said the probable cause was incapacitation of the flight crewmembers as a result of their failure to receive supplemental oxygen following a loss of cabin pressurization, for undetermined reasons.

Recommendations issued: 11

Report adopted: November 28, 2000

JFK, Jr. Piper Aircraft Crash. The NTSB issued final report on the crash of a Piper Saratoga II aircraft that killed the pilot, John F. Kennedy, Jr., his wife and her sister on July 16, 1999, near Martha's Vineyard, Massachusetts. The NTSB said the probable cause was the pilot's failure to maintain control of the airplane during a descent over water at night, which was a result of spatial disorientation. Contributing factors were haze and the dark night.

No recommendations issued.

Report adopted: July 6, 2000

Highway

New York School Bus-Dump Truck Accident. The NTSB issued a final report on a school bus-dump truck accident on October 21, 1999, in Schoharie County, New York. The bus was transporting 44 students, 5- to 9-year-olds, and eight adults on an Albany city school field trip. As the bus approached an intersection, it failed to stop as required and was struck by the dump truck. Seven bus passengers were seriously injured, and 28 passengers and the truck driver received minor injuries. The NTSB said the probable cause was the school bus driver's failure to stop for the stop sign due to his degraded performance or lapse of attention as a result of factors associated with aging or his medical condition or both.

Recommendations issued: 6
Report adopted: November 14, 2000

Marine

Mississippi River Casino Boat Ramming. The NTSB issued a final report on the April 4, 1998, accident a in which a tugboat pushing barges and traveling upriver on the Mississippi River through St. Louis Harbor, struck the left pier of the center span of the a bridge. Eight barges broke away and three struck the *President Casino on the Admiral*, a permanently moored gaming vessel, causing most of its mooring lines to break. The *Admiral* then rotated away from the Missouri riverbank. No deaths resulted from the accident, but 50 people were examined for minor injuries. The NTSB said the probable cause was the poor decision-making of the captain of the tug boat in attempting to transit St. Louis Harbor with a large tow, in darkness, under high current and flood conditions, and the failure of the management of company to provide adequate policy and direction to ensure the safe operation of its towboats.

Recommendations issued: 27
Report adopted: September 8, 2000

Pipeline and Hazardous Materials

Minnesota Natural Gas Pipeline Rupture and Explosion. The NTSB issued a final report on a December 11, 1998, natural gas pipeline rupture and explosions in St. Cloud, Minnesota. Utility workers and emergency response personnel were taking preliminary precautions and assessing the rupture when an explosion occurred, killing four people, injuring 11, and destroying six buildings. The NTSB said the probable cause was the lack of adequate procedures by a cable contractor to prevent damage to nearby utilities when its anchor installation crews encountered unusual conditions such as striking an underground obstacle. Contributing to the accident's severity was the delay by the cable contractor in notifying the proper authorities.

Recommendations issued: 13
Report adopted: July 11, 2000

Alabama Natural Gas Line Rupture, Explosion and Fire. The NTSB issued a final report on a natural gas service line rupture, explosion and fire that occurred in Bridgeport, Alabama, on January 22, 1999, killing three people and seriously injuring five others. Three buildings were destroyed and several buildings in a two-block area were substantially damaged. The NTSB said the probable cause was the failure of a construction company to establish and follow safe procedures for excavation activities, resulting in damage to a natural gas service line, and the failure of the city's utilities board to provide appropriate emergency response to the resulting natural gas leak.

Recommendations issued: 4
Report adopted: November 28, 2000

Michigan and Kentucky Hazardous Materials Accident. The NTSB issued final reports on two similar hazardous material accidents in Michigan and Kentucky. In a June 4, 1999, accident in Whitehall, Michigan, a tank truck cargo of a sodium hydrosulfide solution was introduced into a leather company storage tank containing ferrous sulfate. The reaction between the different chemicals produced a toxic gas that killed the truck driver and caused over $400,000 in damages. The NTSB said the probable cause was the failure of the leather company to have adequate unloading procedures, practices, and management controls in place to ensure the safe delivery of chemicals to storage tanks.

In a November 19, 1998, accident at a Ford Motor Company plant in Louisville, Kentucky, a liquid mixture of nickel nitrate/phosphoric acid and sodium nitrate resulted in the evacuation of about 2400 people from the plant and surrounding businesses and cause over $190,000 in damages. The NTSB said the probable cause was inadequate training of Ford Motor Company's employees on the

company's procedures for unloading bulk hazardous materials. Contributing to the accident was the similar labeling of adjacent pipe connections, which made it possible for the pipefitter to confuse the two connections. Contributing factors in both accidents was the failure of the U.S. Department of Transportation to establish, and oversee compliance with, adequate safety requirements for unloading hazardous materials from highway cargo tanks.

Recommendations issued: 7
Report adopted: June 20, 2000

Railroad

Kansas Freight Train Derailment and Evacuation. The NTSB issued a final report on a September 2, 1998, freight train derailment at Crisfield, Kansas. The derailment resulted in a pileup involving four articulated multiplatform cars carrying intermodal shipping containers. Some containers were breached, resulting in the release of hazardous materials and fires. About 200 people were evacuated. No injuries resulted from either the derailment or the hazardous materials releases, but damage was estimated at $1.3 million. The NTSB said the probable cause was the structural failure of an intermodal articulated, five-platform, 125-ton double-stack car due to fatigue cracking initiated when a container was misloaded onto a foreign object. The misloading of the container occurred because of the railroad industry's inadequate preloading inspection procedures for double-stack well cars. A contributing factor was the improper and undocumented repair of the car.

Recommendations issued: 9
Report adopted: July 17, 2000

Major Ongoing Investigations:

Here are highlights of some major ongoing investigations:

Aviation

EgyptAir 767 Crash into Atlantic Ocean. The NTSB continues to investigate the October 1999, crash of EgyptAir flight 990. The scheduled international 767 flight from New York to Cairo, crashed in the Atlantic Ocean 60 miles south of Nantucket Island, Massachusetts. All 217 crew and passengers were killed. In August, the NTSB released a pubic docket of hundreds of pages of factual information gathered during the investigation.

Alaska Airlines MD-80 Crash into Pacific Ocean. The NTSB continues to investigate the crash of Alaska Airlines flight 261 on January 2000. The MD-80 crashed off the coast of California north of Los Angeles while en route from Puerto Vallarta, Mexico, to San Francisco. All 83 passengers and 5 crewmembers were killed. The NTSB held a three-day public hearing at in Washington December 13 - 15, 2000, on the crash. Issues discussed included: Alaska Airlines' maintenance organization and procedures, and its safety program; the design and service history of the MD-80 series aircraft longitudinal trim system, and FAA's certification and oversight of the ongoing airworthiness of that system; industry lubrication practices of the horizontal stabilizer jackscrew; and FAA's surveillance of Alaska Airlines.

American Airlines MD-82 Runway Overrun. The NTSB continues to investigate the June 1999 crash of an American Airlines MD-82 at Little Rock, Arkansas. There were thunderstorms and heavy rain in the area at the time of the accident. After landing, the airplane departed the end of runway, went down an embankment, and hit approach light structures. There was a crew of 6 and 139 passengers on board the airplane. Eleven were killed.

Emery Air Freight DC-8 Crash after Takeoff. The NTSB continues to investigate the crash of an Emery Worldwide cargo DC-8 in February 2000. The flight, scheduled cargo service from Sacramento, California to Dayton, Ohio, crashed shortly after takeoff from Rancho Cordova, California. The three crew were killed. The NTSB announced it would hold a public hearing on the accident in 2001.

Southwest Airlines 737 Runway Overrun. The NTSB continues to investigate a March 2000 accident involving a Southwest Airlines 737. The flight from Las Vegas, Nevada, overran the end of a runway while landing at Burbank, California. The airplane traveled through a fence and came to rest on a highway outside the airport perimeter near a gas station. There were no fatalities to the 137 passengers and 5 crew aboard.

AirTran DC-9 Emergency Landing. The NTSB continues to investigate the August 2000 emergency landing of an AirTran (formerly ValuJet) DC-9 that returned to Greensboro, North Carolina, shortly after takeoff when crewmembers reported smoke in the cockpit. The crew reported that the

smoke became very dense and restricted their ability to see the cockpit instruments, the visual references outside the airplane, and even each other.

Piper Midair Collision. The NTSB continues to investigate the August 2000 midair collision of a Piper Navajo and a Piper Seminole over Burlington Township, New Jersey. Both aircraft were destroyed. Seven passengers and both pilots aboard one aircraft were killed, and the certified flight instructor and the private-certificated student pilot onboard the other plane were also killed.

Jetstream Charter Crash and Fire. The NTSB continues to investigate the crash of an Executive Airlines British Aerospace Jetstream 3101 crashed at Bear Creek Township, Pennsylvania. The airplane, on a charter flight from Atlantic City, New Jersey to Scranton, Pennsylvania, was destroyed by impact forces and post-impact fire, and the 17 passengers and 2 flightcrew members were killed.

General Aviation

During the reporting period, the NTSB initiated about 1,400 general aviation accident investigations. In July, for example, NTSB began more than 250 general aviation accident investigations. The NTSB issued about 1,300 final accident briefs on general aviation accidents investigated in 1998, 1999 and 2000. Here's an example on an ongoing investigation:

Missouri Governor Cessna Crash. The NTSB continues to investigate the October 2000 crash of a Cessna 335, which killed Missouri Governor and U.S. Senate candidate Mel Carnahan, his son and an aide, near Hillsboro, Missouri. The airplane was destroyed. Instrument meteorological conditions prevailed and the airplane was operating on an instrument flight plan. The business flight had departed St. Louis and was en route to New Madrid, Missouri. While en route to New Madrid, the pilot reported to air traffic control that he was having problems with the primary attitude indicator and he requested to climb to a higher altitude. The airplane was in the process of diverting when the accident occurred.

Highway

Nebraska Dump Truck Accident. The NTSB continues to investigate an October 2000, accident in Lincoln, Nebraska, in which a Freightliner dump truck lost primary braking capability and struck two vehicles, killing the two occupants. Although ongoing, the investigation revealed that a brake pin had fractured, rendering the brakes inoperable. Our investigators have learned that related incidents have been reported elsewhere. Further examination of other Freightliner trucks has revealed that the potential for the brake pin to fracture exists and the problem was not limited to the accident truck. Based on the information gathered in the investigation, Freightliner announced a voluntary recall of approximately 133,000 vehicles that may be affected.

Louisiana Bus Accident. The NTSB continues to investigate the May 2000, crash of a Custom Bus Charters tour bus in New Orleans, Louisiana, which killed 22 passengers.

Georgia School Bus-Train Accident. The NTSB continues to investigate a March 2000 passive grade crossing accident involving a freight train and a school bus in Georgia, on the border of Tennessee. Three children in the bus were killed.

Marine

Florida 'Ecstasy' Cruise Ship Fire. The NTSB continues its investigation into the July 1998 fire aboard the cruise ship *Ecstasy*. Just minutes after the *Ecstasy* departed Miami for a four-day cruise, a fire alarm from the ship's laundry room sounded on the bridge and a fire broke out on the aft mooring deck. The vessel, operated by Carnival Cruise Lines, lost propulsion and steering as a result of the fire, which was extinguished several hours later. There were no fatalities or serious injuries.

Pipeline and Hazardous Materials

Washington Pipeline Rupture and Explosion. The NTSB continues to investigate the June 1999, rupture of a 16-inch gasoline pipeline in Bellingham, Washington. The gasoline ignited, resulting in a fireball that traveled down a nearby stream from the pipeline failure location. Two 10-year-old boys and an 18-year-old man were killed. The release of approximately 250,000 gallons of gasoline caused substantial environmental damage to the waterways.

Louisiana Train Derailment and Hazardous Materials Release. The NTSB continues to investigate the derailment of a Union Pacific freight train and release of hazardous materials in Eunice, Louisiana, in May 2000. There was a major fire and 3,000 people were evacuated. Of the 113

cars, 33 derailed and contained 14 hazardous materials, including toluene diisocyanate; acrylic acid; methyl chloride; molten phenol; dicyclopentadiene; pentanes; hexanes; and a corrosive liquid.

New Mexico Pipeline Explosion. The NTSB continues to investigate the August 2000 explosion and fire of a natural gas pipeline near Carlsbad, New Mexico, the deadliest pipeline accident in the continental United States in almost 25 years, taking the lives of 11 people.

Maryland Pipeline Fuel Leak. The NTSB continues to investigate the April 2000 electric power company pipeline fuel leak at an electric generating plant near Aquasco, Maryland, releasing of 3,000 barrels of a mixture of #2 and #6 fuel oils into a stream.

Railroad

Illinois Train-Truck Grade Crossing Accident. The NTSB continues to investigate a March 1999 fatal grade crossing accident in Bourbonnais, Illinois. Amtrak's passenger train, *The City of New Orleans*, collided with a semitrailer truck at a grade crossing, killing 11 passengers and injuring 122 passengers and crew. Damage was estimated in excess of $14 million. This is the second grade crossing accident investigation at the same area.

Kansas Passenger Train Derailment. The NTSB continues to investigate March 2000 the derailment of Amtrak's *Southwest Chief* near Carbondale, Kansas. Four passenger cars, three mail cars, and eight truck trailers mounted on railroad wheels were derailed. There were no fatalities and about 31 injuries.

Maryland Airport Light Rail Accident. The NTSB continues to investigate the derailment of a light rail transit train operated by the state of Maryland following its collision with a barrier at its terminus at Baltimore-Washington International Airport in February 2000. Twenty-two people were transported to local hospitals following that accident.

International Aviation Accidents. The NTSB is offering assistance to other nations in 25 aircraft accidents outside the U.S. Here are some examples of ongoing investigations.

Singapore Airlines 747 Accident. The NTSB continues to provide assistance to Singapore authorities in its investigation of the December 2000 crash of a Singapore Airlines 747 as it attempted to takeoff from Taipei, Taiwan, and struck a barrier. There were 82 fatalities among the 179 passengers and crew.

GulfAir A320 Accident. The NTSB continues to provide assistance to the government of Bahrain in its investigation of the August 2000 crash of a GulfAir A320. The aircraft crashed at sea after an attempting a go around on approach to Manama, Bahrain, killing 143.

Air France Concorde Accident. The NTSB continues to provide assistance to French authorities in its investigation of the July 2000 crash of an Air France supersonic Concorde as it attempted to takeoff from Charles DeGaulle Airport, Paris. All 109 on board were killed and five others on the ground were killed.

Swissair MD-11 Accident. The NTSB continues to provide assistance to the Transportation Safety Board of Canada in its investigation of the September 1998 crash of a Swissair MD-11 off the coast of Nova Scotia, Canada. Flight 111, enroute from JFK Airport, New York, to Geneva, Switzerland, crashed in the North Atlantic killing all 229 passengers and crew.

Korean Air MD-11 Cargo Accident. The NTSB is assisting Chinese authorities in its investigation of an April 1999, Korean Air accident. The MD-11 crashed shortly after takeoff from Shanghai, China. The airplane was destroyed, and the 2 pilots and 1 mechanic on board were killed. Additionally, 5 persons on the ground were killed, and 37 others were injured. The flight was a regularly scheduled cargo flight from Shanghai to Seoul, Korea.

SilkAir 737 Accident. Indonesia's National Transportation Safety Committee (NTSC) issued a final report on the crash of a SilkAir 737 passenger plane in Indonesia, which killed all 104 people on board, and said it has been unable to determine the cause of the disaster. Flight 185, cruising at an altitude of 35,000 feet, was en route from Jakarta to Singapore when it plunged into the Musi River near Palembang in southern Sumatra in December 1997. In the report, the NTSC listed a series of conclusions and said the technical investigation yielded no evidence to explain the cause of the accident. The report said the probe was very extensive, exhaustive and complex, and hampered by the degree of destruction of the aircraft resulting in highly fragmented wreckage, difficulties at the accident site, and lack of information from the flight recorders during the final moments of the accident sequence. "Given the limited data and information from the wreckage and flight recorders," the report said, "the NTSC is unable to find the reasons for the departure of the aircraft from its cruising altitude and the reasons for the stoppage of the flight recorders." In comments to the NTSC, the NTSB said pertinent facts

developed during the three-year probe were not included in the Indonesian report and not fully analyzed in the report. NTSB investigators represented the US and participated in the investigation. In its comments to Indonesia, the NTSB said no airplane-related mechanical malfunctions or failures caused or contributed to the accident and that the accident can be explained. The NTSB also said that the accident airplane's flight profile is consistent with sustained manual nose down flight control input and said the evidence suggests that the cockpit voice recorder was intentionally disconnected. It further stated that recovery of the airplane was possible, but not attempted, and that it is more likely that the nose-down flight control inputs were made by the captain instead of the first officer.

Safety Studies and Data Analysis

Safety Studies/Reports:

Aviation Recorder Committee. The RTCA Future Flight Data Collection Committee grew out of an agreement between the NTSB chairman and FAA administrator, announced during the May 1999 International Symposium on Transportation Recorders, which was cosponsored by ITSA. It is co-chaired by NTSB and FAA recorder technical experts, and has held four plenary sessions and several of meetings of its three working groups. Working Group 1 has focused on the needs of data consumers (accident investigators, manufacturers, operators, regulatory agencies, and maintenance engineering organizations); and identification of parameters and data capture, storage and analysis capabilities, which must be provided. This group has considered other efforts underway by ICAO, JAR OPS, EUROCAE, and CAA. Working Group 2 has focused on the technical feasibility of aircraft condition monitoring and methods for local storage, remote storage, information transfer within and outside the airplane, and issues of real-time monitoring and analysis. This group is considering sensor technologies, methods of data recording (including image recording), data analysis, and system considerations such as survivability. Working Group 3 is concerned with the proper use and protection of data. This group will make use of lessons learned during the recent FAA Flight Operations and Quality Assurance notice of proposed rulemaking process. Manufacturers, industry groups, airlines, US military organizations, and other government organizations, including the TSB of Canada, have participated in the work. The committee's final report is expected in October 2001.

Emergency Evacuation of Commercial Aircraft. The NTSB issued a safety study that analyzed 46 evacuations of scheduled air carriers. The evacuations occurred as a result of both accidents and incidents, and on average, an evacuation occurred every 11 days during the period. The study examined several safety issues including certification issues related to airplane evacuations; the effectiveness of evacuation equipment; the adequacy of air carrier guidance and airport rescue and firefighting training; and communication during an evacuation. Based on data collected, the NTSB concluded that passengers continue to have problems opening overwing exits. It was also concluded that stowing the hatch created problems with the reliability of emergency slides. In 37% of the evacuations where slides were deployed, there were problems with at least one slide. The report revealed communication problems between cabin and flight crews when initiating evacuations. In several evacuations the cabin crew reported that the flight crew had not adequately communicated the nature of the emergency or the need to evacuate the aircraft.

Recommendations issued 20

Study adopted July 27, 2000

Actions to Reduce Fatalities, Crashes of Hard Core Drinking Drivers. The NTSB issued a safety report on "hard core drinking drivers," including repeat offender drinking drivers and high-blood alcohol concentration (BAC) offenders with a BAC of 0.15 percent or greater. From 1983 through 1998, at least 137,338 people died in crashes in the U.S. involving hard core drinking drivers. This report identifies the highway safety problem involving hard core drinking drivers, discusses research on control measures, and proposes solutions. The report advocates a program incorporating following elements: Frequent and well-publicized statewide sobriety checkpoints that include checking for valid driver's licenses. Vehicle sanctions including license plate actions (impoundment, confiscation, or other actions); vehicle immobilization, impoundment, and forfeiture; and ignition interlocks for high-BAC first offenders and repeat offenders. State and community cooperative programs involving driver-licensing agencies, law enforcement officers, judges, and probation officers to enforce suspension and revocation. Legislation to require that offenders who have been convicted or administratively adjudicated maintain a zero blood alcohol concentration while operating a motor vehicle.

Recommendations issued: 2

Report adopted: June 27, 2000

Several safety studies are in progress. They include:

Survivability of Air Carrier Accidents. This study will be presented to the board at a public meeting in February. It looks at Part 121 air carrier operations in the U.S. from 1983 through 2000. Data from accident reports and survival factors factual reports were used to perform an analysis of aircraft survivability.

Intrastate Trucking. The purpose of this study is to explore intrastate truck operations and their impact on highway safety. Because so little is known about the operation of this segment of the industry, this study will provide new and valuable information about the trucking industry. The study will document how some of the operations may differ between interstate and intrastate truck operations.

Improvements in Transportation Safety Data. The study will focus on the current state of transportation safety data and will examine where there may be deficiencies. The databases examined are primarily limited to the accident/incident databases, although some exposure data will be addressed. Staff anticipates intermodal recommendations as well recommendations to specific modal administrations to improve the quality and quantity of transportation-related data.

FAA Certification Procedures. The study will examine how the FAA incorporates technological changes into its airworthiness standards; how the safety of derivative models are evaluated; and the relationship between type-certificated and supplemental-certificated aircraft to clarify the appropriate degree of design change.

Public Use Aircraft. The goal of the study is to provide the U.S. Congress with an unbiased assessment of the relative safety of government-operated aircraft and privately-owned aircraft operated for the government.

Planned studies are:

Overview of Pipeline Control and Data Systems. The study would examine supervisory control and data acquisition systems that have become critical to the management and operation of most large pipeline transportation systems in the U.S. These systems would be examined in detail to determine their range of functionality, controller usability factors, system reliability and false alarm rates, instrument calibration, and operator training.

General Aviation Pilots flying Visual Flight Rules into Instrument Flight Rule Weather Situations. The purpose of the proposed study will be to examine the incidence of IMC-related accidents in general aviation and to document the factors that cause these accidents. For the study, staff will review and analyze data from the NTSB's general aviation database. The study will also include any new investigations that focus on factors such as pilot training and proficiency, aviation meteorology, and interaction with air traffic control. Because of the high fatality rate of IMC accidents, the study will be a long-term study to ensure that a sufficient number of interviews with surviving pilots can be conducted.

1999 Transport Accident Statistical Report. The NTSB reported that only two fewer people died in transportation-related accidents in the United States in 1999 as compared to the previous year. Preliminary figures show that 43,986 persons died in highway, rail, marine, aviation and pipeline accidents, down from 43,988 in 1998. Increases in fatalities were registered in highway, aviation and pipeline accidents, while rail and marine fatalities declined.

Highway. Highway fatalities, which account for more than 94 percent of all transportation deaths, rose from 41,501 in 1998 to 41,611 in 1999. Fatalities at roadway/railway grade crossings declined from 431 to 402.

Rail. Rail fatalities declined from 831 to 805 on the strength of a large drop in pedestrian fatalities associated with intercity rail operations. Fatalities occurring on light rail, heavy rail and commuter rail rose from 192 to 218. Deaths among passengers on trains rose from 4 to 14.

Marine. Marine fatalities dropped from 950 to 853, with the largest drop in recreational boating, from 815 to 729. Commercial passenger fatalities rose from 17 to 36.

Aviation. Aviation deaths rose slightly, from 688 to 691. The vast majority of deaths in aviation occur in private aircraft (general aviation, 628 fatalities).

Pipeline. Pipeline fatalities increased from 18 to 26. Deaths related to gas pipelines increased from 17 to 22, while liquid pipeline fatalities rose from 1 to 4.

Aviation statistics are compiled by the NTSB. Numbers for all other modes are from the respective U.S. Department of Transportation modal agencies.

Investigation and Reporting Process

Pipeline safety hearing. The NTSB held a pipeline safety hearing November 15 and 16, 2000, in Washington, D.C. The forum examined technologies available to assess the integrity of pipelines, such as the use of internal inspection tools, and the capability of pipeline operating systems to identify leaks and to prompt timely responses. The hearing was prompted by the NTSB's past investigations of numerous pipeline accidents in which pipe with time-related defects failed, and its current investigations of six pipeline accidents that have occurred in 1999 and 2000, which include potential pipeline integrity issues. Five of those six accidents involve controllers who may have failed to promptly recognize pipeline ruptures and then initiate timely action to reduce the consequences of the spill.

General aviation accident prevention conference. The NTSB held a general aviation accident prevention symposium September 21-22, in Washington, D.C., to discuss operational, airworthiness, and maintenance issues involved in general aviation accidents. The symposium featured panel discussions on in-flight loss of control, visual flight into instrument meteorological conditions, inadequate aircraft maintenance, crew resource management, midair collisions, and helicopter operations.

Legislation and Advocacy

Major Policy Speeches: The NTSB chairman delivered 18 major policy speeches before numerous groups and organizations. Two office directors testified three times before legislative panels on two pipeline accident investigations and criminal charges stemming from aviation accidents. Topics of discussion by the chairman included a wide range of multimodal issues encompassing pipeline, aviation, highway, marine and rail safety. A frequent issue, emphasized in many speeches and presentations, advocated NTSB recommendations to make transportation safer for children and young people when they ride in cars, buses, airplanes and recreational boats. Issues include fitting stations to check for proper installation of child seats and restraints in highway vehicles, graduated licensing for young drivers, and personal flotation devices for children on recreational boats. Others included presentations to:

ICAO Air Navigation Commission, Montreal, Canada. Some remarks: "This trend toward more aggressive criminalization has the potential to affect our accident prevention efforts, limit our access to needed data, and prevent the issuance of critical safety recommendations. We will all need to quickly find ways to ensure that both the accident prevention and judicial needs of our society are fulfilled. The ANC continues to contribute to advances in the technical and operational development of aircraft, our understanding of human factors, communications and navigation systems, air traffic management, and accident investigation techniques. I hope that you will take a leadership role to help resolve this issue as well."

ECAC Family Assistance Symposium, Tallin, Estonia. Some remarks: "Family assistance is no longer just a U.S. initiative. It is a global issue in which every country, every service agency, and every transportation-related industry around the world should be involved. Many challenges undoubtedly await us. The tremendous growth in, and increasingly global nature of, passenger transport will require all of us to work together, to share lessons learned, and to ensure that everyone travels on our transportation systems and their families receive the assistance and support that they may require following an accident. Ensuring that the victims of transportation accidents and their surviving family members are treated with compassion and respect is not only our duty and responsibility – it is the right thing to do – as government officials, as members of the transportation community, and as fellow human beings."

Industry Training: The NTSB developed a two-day program that gives the transportation industry a brief history of the NTSB, how the agency investigates accidents and what is expected of a company that is involved in an accident being investigated by the NTSB. In October a training session was held for 23 executives and staff from US Airways, America West, TWA, Delta, Southwest, DHL, and American Airlines. The chairman presented an executive overview of the program to senior executives of 6 major air carriers and urged their staff's participation in the two-day program.

Child Safety Initiatives:

Safety info on the 'net. In August, the NTSB opened a new Internet web page to provide information to parents and caregivers about child transportation safety on our nation's highways. The

web page provides information about the need for proper use of child safety seats and booster seats in automobiles and features links to other web sites where consumers can get information on child safety seat fitting stations in their area.

Minority motorists campaign. In September in Memphis, Tennessee, the chairman participated in the kick-off of the 21-city National Campaign to increase proper child safety seat use by African-American children. The event was sponsored by General Motors, the United Auto Workers, the National Safe Kids Campaign and the National Association for the Advancement of Colored People. This followed an April event held in Los Angeles aimed at the Hispanic population sponsored by the same groups in addition to the National Council of La Raza.

'Putting Children First' Publication. In November NTSB published the booklet *Putting Children First.* The publication outlines past and current problems involving transportation safety for children and youth in the United States, and reviews transportation safety improvements brought about by NTSB recommendations. Issues discussed in the report include the dangers air bags pose to children, the need for permanent child safety seat fitting stations, car designs that focus on child safety, the need to strengthen construction standards of passenger vans used for school activities, the benefits of zero alcohol tolerance for drivers under age 21, and the need for child restraints in aviation.

Corporate safety awards. In June, the NTSB presented an award to DaimlerChrysler for its "Fit for a Kid" child safety seat inspection service. In November, NTSB presented an award to the National Safe Kids Campaign and General Motors to commemorate the 100,000th car seat safety check under the program.

State Advocacy: NTSB board members and staff continue to testify before state legislatures to encourage states to enact better highway and recreational boating safety laws. On numerous occasions staff has traveled to state capitals to push for state laws that would increase boating safety, require graduated driver licensing for young drivers, and toughen drunk and drugged driving and seat belt laws. Thirty-six states have graduated driver licensing laws, similar to New Zealand and Australia. Two states, Washington and California, enacted laws to require children up to age 6 to be in booster seats -- the first two to do so. Thirty-six states require mandatory use of personal flotation devices by children, and 20 states have mandatory boating safety education requirements for young children and young operators.

First Live Webcast. For the first time in August, the NTSB presented a public board meeting "live" via the World Wide Web. Because of the overwhelming public interest about the TWA 800 accident and the much-anticipated release of the final report, the NTSB made it possible for the general public to watch the meeting from their computers.

Resources

NTSB Funding. NTSB's budget for the 2000 fiscal year ended September 30, 2000, was $57 million with an authorization for 439 full time employees. Funding increased to $62.9 million for fiscal year 2001 with authorization for 458 full time positions.

NTSB membership. In June, *Carol J. Carmody* of New Orleans was sworn in as the 30th member of the National Transportation Safety Board. In January she was named acting chairman. *John J. Goglia* of Boston was confirmed to a second five-year term as a board member. Carmody fills a term that expires Dec. 31, 2004. Goglia, who continued to serve after his previous appointment expired, fills a term that ends on Dec. 31, 2003.

Accident investigation training academy. In November, the NTSB selected George Washington University to house its training academy for transportation accident investigators. The facility will be located on the school's Virginia campus adjacent to the U.S. Department of Transportation's National Crash Analysis Center. The facility is expected to be ready for operation in early 2003. The arrangement with GWU is for a 20-year lease for classroom and future laboratory space, and open yard space to house accident reconstructions and other equipment to be used in training accident investigators. The reconstructed wreckage of TWA flight 800 will be housed at the facility for training purposes.

Union contract. In November, NTSB union member ratified and NTSB management accepted the agency's its first three-year contract. About 150 NTSB employees are members of American Federation of Government Employees union. The contract includes changes in compensation under certain circumstances, a new grievance procedure and health club benefits.

Employee safety training. The NTSB trained 400 of its employees in required safety training. This training included heavy emphasis on operations in remote field sites, including proper use of blood borne pathogen suits and establishing a controlled environment during the accident

investigation. Supervisors received special training in risk management, a system that helps identify risks to the employees and the mission, develop countermeasures for those risks, and a process to fully understand those risks that can not be engineered out, but which must be worked with in performance of the mission. Additionally, administrative employees received training in office safety, avoiding slips, trips and falls, and ergonomics.

Prepared by Pat Cariseo
February 12, 2001

附錄三

美運輸安全委員會對「客機緊急逃生」專題研究報告

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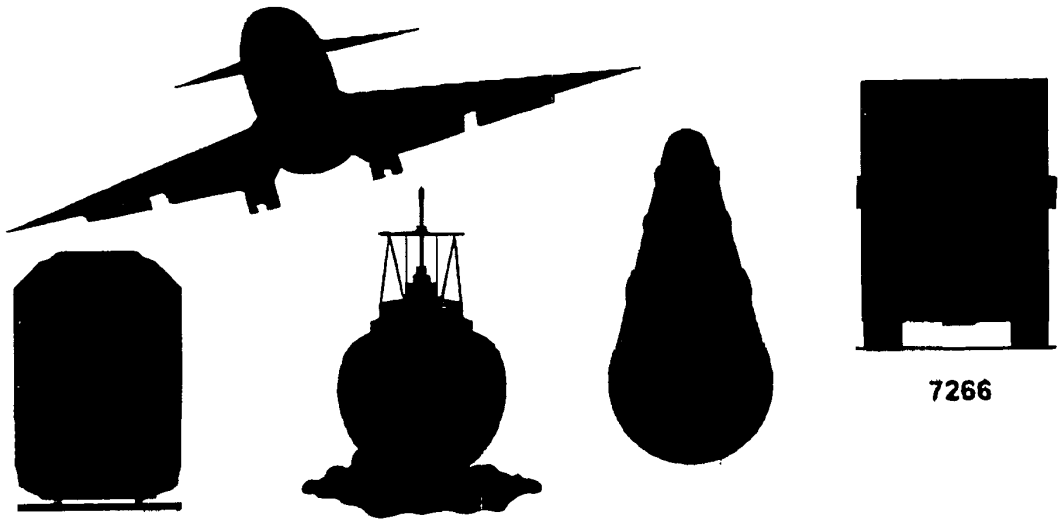
NATIONAL TRANSPORTATION SAFETY BOARD

WASHINGTON, D.C. 20594

SAFETY STUDY

Emergency Evacuation of Commercial Airplanes



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Findings

1. On average, an evacuation for the study cases occurred every 11 days. An average of 336,328 departures occurred every 11 days in 1998 by scheduled aircraft operating under Title 14 *Code of Federal Regulations* Part 121.

2. In the 46 study cases, 92 percent (2,614) of the 2,846 occupants on board were uninjured, 6 percent (170) sustained minor injuries, and 2 percent (62) sustained serious injuries.

3. The Federal Aviation Administration does not evaluate the emergency evacuation capabilities of transport-category airplanes with fewer than 44 passenger seats or the emergency evacuation capabilities of air carriers operating commuter-category and transport-category airplanes with fewer than 44 passenger seats. In the interest of providing one level of safety, all passenger-carrying commercial airplanes and air carriers should be required to demonstrate emergency evacuation cababilities.

4. Adequate research has not been conducted to determine the appropriate exit row width on commercial airplanes.

5. In general, passengers in the Safety Board's study cases were able to access airplane exits without difficulty, except for the Little Rock, Arkansas, accident that occurred on June 1, 1999, in which interior cabin furnishings became dislodged and were obstacles to some passengers' access to exits.

6. Emergency lighting systems functioned as intended in the 30 evacuation cases investigated in detail.

7. In 43 of the 46 evacuation cases in the Safety Board's study, floor level exit doors were opened without difficulty.

8. Passengers continue to have problems opening overwing exits and stowing the hatch. The manner in which the exit is opened and the hatch is stowed is not intuitively obvious to passengers nor is it easily depicted graphically.

9. Most passengers seated in exit rows do not read the safety information provided to assist them in understanding the tasks they may need to perform in the event of an emergency evacuation, and they do not receive personal briefings from flight attendants even though personal briefings can aid passengers in their understanding of the tasks that they may be called upon to perform.

10. On some Fokker airplanes, the aft flight attendant is seated too far from the overwing exits, the assigned primary exits, to provide immediate assistance to passengers who attempt to evacuate through the exits.

Recommendations

As a result of this safety study, the National Transportation Safety Board made the following safety recommendations to the Federal Aviation Administration:

Require all newly certificated commercial airplanes to meet the evacuation demonstration requirements prescribed in Title 14 *Code of Federal Regulations* Part 25, regardless of the number of passenger seats on the airplane. (A-00-72)

Require all commercial operators to meet the partial evacuation demonstration requirements prescribed in Title 14 *Code of Federal Regulations* Part 121, regardless of the number of passenger seats on the airplane. (A-00-73)

Conduct additional research that examines the effects of different exit row widths, including 13 inches and 20 inches, on exit hatch removal and egress at Type III exits. The research should use an experimental design that reliably reflects actual evacuations through Type III exits on commercial airplanes. (A-00-74)

Issue, within 2 years, a final rule on exit row width at Type III exits based on the research described in Safety Recommendation A-00-74. (A-00-75)

Require Type III overwing exits on newly manufactured aircraft to be easy and intuitive to open and have automatic hatch stowage out of the egress path. (A-00-76)

Require air carriers to provide all passengers seated in exit rows in which a qualified crewmember is not seated a preflight personal briefing on what to do in the event the exit may be needed. (A-00-77)

Require the aft flight attendants on Fokker 28 and Fokker 100 airplanes to be seated adjacent to the overwing exits, their assigned primary exits. (A-00-78)

Review the 6-foot height requirement for exit assist means to determine if 6 feet continues to be the appropriate height below which an assist means is not needed. The review should include, at a minimum, an examination of injuries sustained during evacuations. (A-00-79)

Require all newly manufactured transport-category airplanes operating under Title 14 *Code of Federal Regulations* Part 121 to be equipped with independently powered evacuation alarm systems operable from each crewmember station, and establish procedures and provide training to flight crews and flight attendants regarding the use of such systems. (A-00-90)

Document the extent of false indications for cargo smoke detectors on all airplanes and improve the reliability of the detectors. (A-00-91)

Also as a result of this safety study, the National Transportation Safety Board reiterated the following safety recommendations to the Federal Aviation Administration:

For a 12-month period, require that all operators of transport-category aircraft demonstrate the on-airplane operation of all emergency evacuation systems (including door opening assist mechanisms and slide or slide/raft deployment) on 10 percent of each type of airplane (minimum of one airplane per type) in their fleets. These demonstrations should be conducted on an airplane in a controlled environment so that the entire evacuation system can be properly evaluated by qualified personnel. The results of the demonstrations (including an explanation of the reasons for any failures) should be documented for each component of the system and should be reported to the FAA. (A-99-100)

Revise the requirements for evacuation system operational demonstrations and maintenance procedures in air carrier maintenance programs to improve the reliability of evacuation systems on the basis of an analysis of the demonstrations recommended in A-99-100. Participants in the analysis should include representatives from aircraft and slide manufacturers, airplane operators, and crewmember and maintenance associations. (A-99-101)

Modify the service difficulty reporting system so that it contains more complete and accurate information about component failures; for example, (a) revise the various Service Difficulty Report (SDR) forms and database to include cycles and times since last inspection for failed components; (b) relate to the operators who submit SDRs the need for complete and accurate information when they report component failures; and (c) remind Federal Aviation Administration inspectors assigned to Part 121 and Part 135 operators of their need to review the component failure reports for accuracy and completeness. (A-97-125)