Journal of Hazardous Materials 111 (2004) 111–114

Journal of Hazardous Materials

www.elsevier.com/locate/jhazmat

Credible investigation of air accidents

K. Smart*

Air Accidents Investigation Branch (AAIB), Department for Transport, Great Minster House, 76 Marsham Street, London SW1P 4DR, UK

Abstract

Within the United Kingdom the Air Accidents Investigation Branch (AAIB) has been used as a model for the other transport modes accident investigation bodies. Government Ministers considered that the AAIB's approach had established the trust of the public and the aviation industry in its ability to conduct independent and objective investigations. The paper will examine the factors that are involved in establishing this trust. They include: the investigation framework; the actual and perceived independence of the accident investigating body; the aviation industry's safety culture; the qualities of the investigators and the quality of their liaison with bereaved families those directly affected by the accidents they investigate.

Keywords: Air accidents; Aviation industry; Accident investigation

1. Introduction

Aviation accident investigation practice and procedures are generally recognised as providing a good model for investigation practice in the other modes of transport. This is certainly the case in the United Kingdom, where the Air Accidents Investigation Branch (AAIB) has been used as a model for the Marine Accidents Investigation Branch (MAIB) and the shortly to be established Rail Accidents Investigation Branch (RAIB). The fundamental reason why the aviation model has been used in the other modes is because it has been able to establish public and industry trust its ability to conduct thorough and objective investigation into the circumstances of aircraft accidents. This trust extends to a confidence that the process will swiftly address the public safety issues arising from any accident while at the same time meeting the needs of survivors and bereaved families by keeping them updated on the progress of the investigation.

If we have an understanding of the factors that lead to this trust being established. We will then have the opportunity of building the same level of trust in other transport modes. There are a number of factors that I consider contribute to the establishment of trust in the investigation process and I will consider them in turn. Before that however it may be helpful to have an understanding of the history of safety development in the aviation industry.

2. History of safety regulation and accident investigation in the aviation industry

Powered flight is just approaching its hundredth birthday. The civil public transport sector in the United Kingdom, however, dates from the years immediately following the end of the First World War.

The UK Air Navigation Act of 1920 gave the Secretary of State for Air, powers to regulate the new civil aviation industry and to make separate provision for the investigation of civil air accidents. The first regulations made for this purpose were the Air Navigation Order of 1922 and the Air Navigation (Investigation of Accidents) Regulations 1922. The aviation regulator and the Air Accidents Investigation Branch have been associated with many Government Departments since that time. Today the aviation regulator, the Civil Aviation Authority, is an independent corporate body. The AAIB's status as an independent inspectorate has continued throughout.

The fact that the international aviation industry is able to operate with common safety standards recognised and enforced in just about every country in the world is no mean achievement. It is an enduring testimony to a relative handful of enlightened individuals who, during the last years of the Second World War, dedicated themselves to that end. This

* Present address: Air Accidents Investigation Branch, Berkshire Copse Road, Aldershot, Hampshire GU11 2HH, UK.
E-mail address: sduffin@aaib.gov.uk (K. Smart).

0304-3894/$ – see front matter © 2004 Elsevier B.V. All rights reserved.
doi:10.1016/j.jhazmat.2004.02.018

small group, with representation from both sides of the Atlantic, initiated studies into the problems that civil aviation would face in the immediate post war years. These studies, conducted mainly in the United States, concluded that unless a framework was established, on an international basis, aviation would not be able to play its part as one of the principle elements in the economic development of the world in the post war years.

The United States Government extended an invitation to 55 States to attend an International Civil Aviation Conference that was held in Chicago in 1944. The Conference was attended by 54 States and culminated in the signing of the *Convention on International Civil Aviation* (known as the *Chicago Convention*) on 7 December 1944.

The Conference also led to the setting up of a permanent International Civil Aviation Organisation (ICAO) as a means of securing international co-operation and the highest possible degree of uniformity of regulation and standardised procedures in international civil aviation. An interim organisation, the Provisional International Civil Aviation Organisation (PICAO) was set up from 1945 to 1947 and ICAO formally came into being on 4 April 1947. In October that same year ICAO became a specialised agency of the United Nations. The organisation set up its headquarters in Montreal, Canada, and set about its work that was to address two major tasks. The first task was to establish International Standards and Recommended Practices for all aspects of aviation activity so that a truly world-wide system of international air navigation could become a possibility. This it achieved through the 18 Annexes to the Convention which lay down Standards and Recommended Practices for all the different activities that impact on aviation safety. The second task was to harmonise the practical application of air navigation services and facilities by the different countries and to ensure their co-ordinated implementation throughout the world.

Someone in the early days of ICAO must have had a sense of humour because of the 18 Annexes, aircraft accident investigation is conducted under the provisions of Annex 13 to the 'Chicago Convention'. This provides an international framework that ensures that all States understand their responsibilities for ensuring that safety lessons are disseminated internationally such that the appropriate safety action is taken. While framework and structure for a transport modes regulation and accident investigation practice are important factors in building public and industry trust, there are a number of other factors involved and I want to consider those individually.

3. The aviation industry's safety culture

Each transport mode has its own unique culture. The aviation, maritime and rail industries carry with them elements of their history and development that can be found in these industries today and which have an influence on what we often call the safety culture of that industry.

The aviation industry benefits from being the youngest and probably the most dynamic in terms of safety performance. This has been driven by industry and public perceptions of the inherent risks in the industry and unacceptable outcomes when things go wrong. The aviation industry also benefits from a simple international and national regulatory structure and the fact that major safety developments are, in general, driven on the international stage rather than by individual States or companies. The industry has an open, generally blame free, reporting culture (often referred to as a 'just' reporting culture). Most people in the industry are relatively well paid and are well motivated.

4. The independence of the investigating body

Perhaps the most important prerequisite for public and industry trust is independence. In the immediate aftermath of any major transport accident one of the first questions put to Government Ministers is "will there be an independent investigation?" This is a very obvious reflection of the public's interest in ensuring that circumstances of these events are subject to a thorough and objective examination. An independent accident investigation body ensures that there can be no perception of conflict of interest which reduces the scope for "cover-up" or conspiracy theories.

Since the end of the Second World War there have been three Government Reviews of aircraft accident investigation procedure and practice in the UK. Each of these reviews have shaped aviation investigating practice and in some cases influenced international practice in this area. The '*Shelmerdine*' Committee reported in Shelmerdine (1945) [3]. This was a Departmental Committee that was tasked with considering whether the pre-war accident investigation arrangements were likely to be adequate for the post-war global expansion of the industry. The '*Shelmerdine*' report was not published but among its recommendations were calls for all accidents to be the subject of a published report and for the UK to take the lead in devising international arrangements for aircraft accident investigation. This final recommendation was a recognition of the fledgling Provisional International Civil Aviation Organisation (PICAO) arrangements that the UK had made a significant contribution.

In Newton (1948) [2], the '*Newton Committee*' reviewed the history of accident investigation in the United Kingdom and the relevant legislation up to that time. In particular it embedded, into UK practice, the fundamental principals of accident investigation adopted by the fledgling Provisional International Civil Aviation Organisation 1 year before in 1947. Another important aspect covered by the Newton Committee was the reinforcing of the independent status of the Accident investigation body and it's position within the Governments Departmental structure.

The last major committee of inquiry into aircraft accident investigation took place in 1961 under the Chairmanship of the Honourable Mr. Justice Cairns [1] the '*Cairns Report*' was probably the most comprehensive of the Committees of

Inquiry, in that it also examined accident investigation procedures in the United States of America, Australia, France and Germany and looked at accident investigation processes in other transport modes such as railways and shipping. The '*Cairns Report's*' recommendations laid the foundation for legal framework and practice that is in place in the United Kingdom and to some extent in Europe today. An important tenet of all three of these Committees of Inquiry was that the independence of the accident investigation body should be firmly established and recognised by the public and everyone within the industry.

Since the '*Cairns Report*' there has been just one review of accident investigation procedure that has led to significant change in the legislation governing accident investigation. This was a study conducted by the European Commission into the fundamental principles governing aircraft accident investigation. The Commission sponsored two reports, the first was conducted by Mr. Geoffrey Wilkinson, CBE, a former Chief Inspector of Air Accidents for the UK, who was tasked with looking at investigation practice and procedure across the then 12 States of Europe. In parallel, Professor Lucian Rapp was tasked with examining the differing legal frameworks across the European Community in the context of the conduct of aircraft accident investigation. The two reports informed the European Commission's work on a '*Directive*' entitled 'Establishing the Fundamental Principles Governing the Investigation of Civil Aviation Accidents and Incidents' (*Council Directive* 94/56/*EC*) which came into force on 21 November 1994. It is worthy noting that the fundamental principles referred to in the title of this '*Directive*' were to a large extent based upon UK accident investigation practice put in place by the '*Cairns Report*'. The core articles in the '*Directive*' deal with the matter of independence for the investigating body and the legal status of the investigation. In particular, Article 6 paragraph 1 entitled 'Investigating Body or Entity' say's that:

> Each Member State shall ensure that technical investigations are conducted or supervised by a permanent civil aviation body or entity. The body or entity concerned shall be functionally independent in particular of the national aviation authorities responsible for airworthiness, certification, flight operation, maintenance, licensing, air traffic control or airport operation and, in general, of any other party whose interests could conflict with the task entrusted to the investigation body or entity.

Article 6 paragraph 3 goes on to say that:

> "... the body or entity referred to in paragraph 1 shall be given the means required to carry out this responsibility independently of the authorities referred to in paragraph 1 and should be able to obtain sufficient resources to do so. Its investigators shall be afforded status giving them the necessary guarantees of independence".

The subject of independence is dealt with in different ways in other national administrations. The United States of America and some other States deal with this by having 'boards of political appointees' and a relatively large and expensive bureaucratic superstructure. Other States such as Sweden and Finland deal with by positioning the organisation within the framework of the Ministry of Justice. The Netherlands has an unusual structure insofar as it has a relatively small number of professional investigators who are supported by a large Board drawn from experts across the transport modes.

Irrespective of the arrangements made for independence in the end it comes down to the public's and the industry's perception of the independence of the organisation itself. This needs to be consistently demonstrated by the investigating body in their reports. They need to show that they have objectively examined all the circumstances, including systemic causes, which in many cases will include looking into company management, the regulatory framework and sometimes the Government Department responsible for transport policy issues.

5. The quality of the investigation body

In my view, one of the most important factors in establishing trust in the investigation process is that of the professional qualities of the individual investigators. They represent the public face of the accident investigation body. They are the one's who will interview those involved and who will act as the interface for the survivors and bereaved families. If they are unable to establish their credibility, expertise and knowledge of the subject area, then crews and others involved will not feel inclined to open up to the investigator and the evidence we are able to gather is less than optimum. If they are unable to deal sensitively with the survivors and families, these groups may well feel alienated from the investigation process.

The ICAO Manual of Accident Investigation contains the following guidance on the qualities needed by the investigator:

5.1. Qualities of the Investigator

> Aircraft accident investigation is a highly specialised task which should only be undertaken by 'trained personnel' possessing many qualities, not the least important of which are an inquisitive nature, dedication to this kind of work, diligence and patience. The investigator must have a good sound working knowledge of aviation and factors which affect operations as a whole. Technical skill, perseverance and logic are the tools of his profession; humility, integrity and respect for human dignity his guiding rules.

It goes on to say that:

> 'It is not sufficient to nominate', as the occasion arises, a person with specialist aviation knowledge as the investigator, for aircraft accident investigation is a 'specialist task itself'. The standard of the investigator assigned

to an accident inquiry determines the thoroughness and class of results obtained more than in any other field of aeronautics and the longer a well-qualified member serves, the more expert he becomes. Wherever possible, therefore, 'at least one experienced investigator should be assigned to each inquiry' so that a continuing thread of experience may maintain the standards of accident investigation and reporting.

I spend a considerable amount of time and money each year ensuring that we only appoint individuals as investigators who can meet these high ideals. In my experience it is a relatively straightforward process to establish a candidates professional qualifications and experience. Far more difficult is to get a good assessment of a candidates personal qualities. For the last 18 years the AAIB has used a series of psychometric tests to examine candidates in this area. Over that period we have been able to refine and effectively calibrate the process to assist us in the search for individuals with the qualities we need.

6. Treatment of those affected by accidents

Perhaps more than any other aspect that I have referred to so far, the treatment of the bereaved families and the survivors of transport accidents has probably the greatest impact on the reputation of the accident investigation body. In particular, it has a very direct impact on whether or not an atmosphere of trust can be established between these groups and the investigators. If it is perceived that the organisation is not capable of conducting an independent and objective investigation and meeting the needs of the families, then there will be conflict between the investigation body and the affected families which will destroy confidence and trust in the process.

A recent UK Government Inquiry recommended that the Rail Accidents Investigation Branch (RAIB) be established with a similar constitution to that of the AAIB and MAIB. The Inquiry accepted that there was a strong argument for an investigating body that enjoyed real and perceived independence and one where the needs of the families were integrated into the investigation process.

The Inquiry commented favourably on the AAIB's policy and practice for keeping those affected by aircraft accidents informed of progress during an investigation. However, for many years the AAIB's practice in this area was somewhat ad-hoc and although our investigators answered the survivors and bereaved families questions throughout the investigation, there was no policy or procedure covering this area. This changed following the tragic accident at Manchester Airport in 1985. Fifty five people died in that accident and the affected families formed themselves into an action group that campaigned on aircraft passenger cabin safety. The group asked to be regularly updated on the progress of the investigation and this led to the policy and practice that has been in place ever since.

Today the AAIB's policy is very simple. "*We will treat survivors and bereaved families with respect and sensitivity and in a way that we would all wish to be treated if we were subjected to the same tragic circumstances*". We provide each affected individual or family with a leaflet that explains the AAIB investigation process. In most cases, this leaflet is passed to the families, within 1 or 2 days of the accident, using the UK Police Family Liaison Officers network. The leaflet promises to keep them informed about the progress with the investigation and encourages them to contact the investigation team at any time if they have any questions. The names and contacts for the Investigator in Charge and members of the team are included on the leaflet. It also promises specific briefings before Coroners Inquests and publication of interim and final reports. At any stage during the investigation, but most usually before the publication of the final report, the survivors and bereaved families will visit the AAIB at Farnborough to be briefed on the investigation. The basic concept is that there should be no surprises for those affected by the accident when the media pick up on information published or presented by the AAIB's Investigators.

This simple process has served us well over the years and many hundreds of individuals and family groups have been helped to understand the circumstances of the accidents that have so dramatically affected their lives. In most cases, their primary interest is in making sure that no other family has to go through the same experience. In that regard, their interests and the interests of the AAIB and the aviation industry are directly aligned.

7. Conclusions

Establishing an accident investigating body that can gain the trust of the public and the industry in this important safety field is vital. There are many different political and organisational structures to be found among the worlds accident investigation organisations, but the factors that are most important in building trust and credibility are those that impact on the quality and culture of the organisation. Like any other organisation, the accident investigation body will be able to establish and maintain a reputation for excellence if it recruits highly motivated, professionally qualified staff that have the right balance of personal qualities to equip them for this important role.

References

[1] D. Cairns, Report of the Committee on Civil Aircraft Accident Investigation and Licence Control, 1960.
[2] C.M. Newton, Report of the Committee of the National Civil Aviation Consultative Council on Accident Investigation Procedure and Memorandum by the Minister of Civil Aviation, 1948.
[3] F.C. Shelmerdine, The Shelmerdine Report, 1945; Annex 13 to the Convention on International Civil Aviation "Aircraft Accident and Incident Investigation", 9th ed., 2001; Establishing the fundamental principles governing the investigation of civil aviation accidents and incidents, Council Directive 95/56/EC, Off. J. Eur. Commun. (1994).