THE INVESTIGATOR

Air Accident Investigation Sector
UAE General Civil Aviation Authority

Volume 1 Issue 9 December 2017

INCLUDED IN THIS ISSUE:

24 Hour AAIS Duty Investigator Contact Details

To make an immediate notification of an Aircraft Accident or Incident:

Hotline: +971 50 641 4667

This number is to be used only for notification of an Accident or Incident

E-mail: aai@gcaa.gov.ae

REPORTING OF SAFETY INCIDENTS

RISE HIGH WITH SAFETY

VOLUNTARY REPORTING SYSTEM

www.gcaa.gov.ae/en/vorsy/eform.aspx

REPORT SAFETY HAZARDS

Table of Contents

Editor in Chief

H.E. Saif Mohammed Al Suwaidi
Director General
General Civil Aviation Authority

GCAA Publisher

Eng. Ismaeil Al Hosani
Assistant Director General
Air Accident Investigation Sector
iwahed@gcaa.gov.ae

GCAA Editor

Tom Curran
Chief Air Accident Investigator
tcurran@gcaa.gov.ae

GCAA Corporate Communication

Eman Abduljabbar
Communication Specialist

The Investigator is a non-profit GCAA publication and is published solely in the interest of Aviation Safety.

Comments and suggestions are very welcome. Please contact:
Tom Curran; tcurran@gcaa.gov.ae

Foreword by H.E. Saif Mohammed Al Suwaidi

Director General - UAE General Civil Aviation Authority

The ownership of safety in an aviation organization is worthy of consideration. Who owns safety, who is responsible for safety and who is accountable for safety? Is safety owned by the management, the pilots, the engineers, the operations and ground operations personnel or the regulator? What is the role of the Board members in safety?

All aspects of safety start at the top of the organization. This is where the tone is set. It is from here that the safety performance of the organization will be determined. The level of interest of the Board in safety will be reflected by the time, effort and resources donated by the senior management to continuously improving safety across the organization. In turn, the emphasis on safety displayed by senior management will be replicated by supervisory management and ultimately by those working on the front line.

The importance attached by the Board members to safety and the actual emphasis they place on safety will reach down to every level of the aviation organization. The interest of the Board members and their visible commitment to a safe operation is important in establishing and maintaining a safety culture. The willingness of the Board to promote safety will provide a clear message to all in the organization that the foundation of the prosperity of the aviation organization is based on safe operations.

The answer to the question posed at the beginning of this article is that everyone in an aviation organization owns a share of safety. Everyone is accountable for knowing the policies and procedures they must use in order to carry out their duties safely. Each employee is accountable for his or her actions and is responsible for reporting incidents and accidents. The management are responsible for the operation of a non-punitive safety reporting system. All employees work within the culture of the organization. They are bound by the cultural norms of their workplace.

Ultimately, the safety message received from the highest level of the organization is most important in establishing and maintaining a positive safety culture. Within the safety culture the Safety Management System with its components including risk management, safety promotion, data analysis and incident investigation is the engine of the overall safety effort.

The GCAA fully supports the efforts expended in ensuring safety of operations by board members, management and staff who form the vital element in the achievement of incident and accident free operations.

Foreword by Eng. Ismaeil Al Hosani

Assistant Director General - AAIS

The fifth annual MENASASI Seminar and Workshops took place in Jeddah from 7 to 9 October. The Kingdom of Saudi Arabia Accident Investigation Bureau, under the leadership of Abdulelah Felimban, was responsible for the organization and arrangements of the events. The excellent work of the AIB staff resulted in a well-managed Seminar whose theme was Investigation Organization & Management.

The Workshops were held before the Seminar and covered Investigation Management and Accident Site Safety, including bio-hazard training. Both Workshops provided much valuable information and were attended by 92 people.

The Seminar agenda included; Lessons Learnt from Investigation Cases, Investigation Tools and Techniques, and Effective Co-operation and Co-ordination and was attended by more than 100 delegates. There were many interesting presentations, most of which are available on the new MENASASI website. Also, I am delighted to report that new corporate and ordinary members joined ISASI/MENASASI during the events.

As President of MENASASI I would like to congratulate Abdulelah and the staff of the KSA AIB whose professionalism and dedication resulted in a very successful Seminar and Workshops. All of the attendees were appreciative of their efforts.

This is the final issue of The Investigator for 2017. I would like to thank all those who donated some of their valuable time to write articles for this publication and so help to maintain safety awareness in the MENA region. I wish the authors and readers alike a happy and safe 2018.

MENASASI 2017 Attendees, Jeddah, Saudi Arabia

Khalid Al Raisi
Director GCAA-AAIS

Memorandum of understanding between the Investigation Authorities of the Kingdom of Saudi Arabia and the United Arab Emirates

The UAE AAIS has entered into a cooperation agreement with the KSA AIB covering aviation accident and incident investigation with the signing of a memorandum of understanding (MoU). The MoU was signed during the Middle East and North Africa Society of Air Safety Investigators (MENASASI) Seminar which took place in Jeddah, Saudi Arabia, from 7 to 9 November 2017.

Among the areas of cooperation are: sharing of information, expertise and training. The MoU also contains a provision for investigators from either authority to participate, as observers, in investigations conducted by the other authority, and for either authority to request investigators from the other party to support an investigation.

The significant increases in the number of registered commercial aircraft and the number of air operators in both countries has placed a focus on the most efficient use of aircraft accident investigation resources and the employment of the most modern investigation techniques.

Both States look forward to the positive contribution that the provisions of the MoU will make in enhancing their accident investigation capabilities. Also of benefit to the UAE and Saudi Arabia is the fact that both countries are members of the ICAO Air Accident Investigation Panel (AIGP) which holds annual meetings to discuss the main investigation subjects of global concern. The two states are also driving a project to establish organized cooperation among the Middle East and North Africa States.

The MoU was signed by Mr. Khalid Walid Al Raisi and Mr. Abdulelah Felimban, representing the AAIS and AIB, respectively."

Robert L. Sumwalt

Chairman of the NTSB

Investigations: Do They Make a Difference?

Chairman Sumwalt's address to the 2017 ISASI Seminar:

Good morning and thank you for having me! On a week when much of the United States was marveling over the solar eclipse, we are in sunny San Diego. It's great to be in the sunshine with others who share a passion for air safety investigations.

The theme for this year's ISASI seminar is: "Investigations: Do they make a difference?"

Well I certainly hope so, because I've been going to accident scenes since I was 17. On that day, I heard about a plane crash on my car radio, and decided to try to find it. As I approached the crash site, I saw the coroner and decided to tuck in close to him. As the law enforcement officers on scene raised the yellow tape and cleared the way for him, I ducked in with him.

Don't ask me how this happened, but on the way home, I drove by the airport and stopped at a flight school and signed up for flying lessons. So, yes, I sort of got into aviation by accident.

In college, instead of studying whatever I was supposed to be studying, I would spend countless hours sitting on the floor of the government documents library, reading NTSB accident reports. As I read those reports, I even had a secret dream that one day I would be a Member of the NTSB. But, like many dreams, I never really believed it would happen.

I also never imagined that I would have the opportunity to address an international audience of preeminent air safety investigators – let alone be the Chairman of the agency that produced those reports that I read as a college student.

When I began flying for an airline in 1981, there was still some distrust of big brother and companies using Flight Data Recorders and Cockpit Voice Recorders (CVRs) to "spy" on pilots.

Look how far we've come. For years now, not only are CVR's in every airline cockpit, but now, airlines and several business aviation operators routinely monitor hundreds of parameters from flights to look for exceedances or deviations. And, to top it off, these operators actually share their data with government and industry to look for potential problems so the problems can be addressed before they lead to accidents. It's a system that is built on trust. Honestly, I believe this is one of the big reasons our aviation safety record has gotten as good as it is in the US.

As mentioned, I started reading aircraft accident reports more than 40 years ago, and I've been actively involved in the aviation safety business for more than 30 years. During that time, I've developed the belief that an effective, credible investigation needs three critical elements.

First, the investigation needs to be independent and objective. Quite simply, we need to ensure the investigation remains independent from outside influences. Independence is one of the NTSB's core values, and I truly believe it is one of our greatest virtues.

As I believe many of you know, when the NTSB was established 50 years ago, it was administratively part of the US Department of Transportation. In 1974, however, Congress moved NTSB completely outside of DOT and made it independent of all other agencies. Although I've understood why Congress made that change, it was only last week – while working late in my office preparing this speech – that I located the official records that more fully explained what prompted those changes. It was truly a fascinating read.

According to the Senate Committee on Commerce's report, "The Board was intended by Congress to be independent so that it would be free (and feel free) to criticize activities of the Federal Aviation Administration, where its investigations indicated that the FAA was at fault." [1]

"In retrospect, the arrangement specified in 1966 has not worked out well," said the Senate report.

The Senate report noted that in 1970, the then-FAA Administrator and Deputy Administrator tried to pressure the NTSB to rewrite the draft report of a mid-air collision that occurred the year before and claimed more than 80 lives.

According to the report, "The Board planned to point out the fact that the FAA had not acted upon many of [the] recommendations [that may have prevented the accident]." The Senate report asked rhetorically: "How

can a Board retain independence if its members are threatened if they vote to support comments critical of DOT?"

"The most important single aspect of the National Transportation Safety Board must be its total independence from those governmental agencies it oversees in regard to their transportation regulatory functions. If the Board is under pressure from any administration to pull its punches or to tone down it's reports or to gloss over Government errors in transportation safety, then its watchdog function has been fatally compromised" stated the Senate report.

So, my charge to you is to ensure your investigations are free from external pressures. The traveling public deserves independent and objective investigations.

The second critical element of effective investigations, in my opinion, is to keep your eye on the goal – prevention. Remember that according to ICAO Annex 13: "The sole objective of the investigation of an accident or an incident shall be the prevention [emphasis added] of accidents and incidents. It is not the purpose of this activity to apportion blame or liability."

As soon as the investigation starts seeking to apportion blame or liability, the focus on true safety improvements can get derailed. Granted, there are those who are in the business of litigation – and that's not a bad thing – but for air safety investigators, remember that we are not in the business of pointing fingers, laying blame, or assigning fault. Our goal is the prevention of future mishaps.

Prevention of future accidents is the core component of an investigator's mission; a thorough investigation which determines the cause of an accident is of little value to the public if the knowledge does not prevent future accidents. Successful adoption of safety recommendations is the forward-looking fulfillment of the work we all do.

The third point critical element of effective investigation is that that we must not be satisfied at superficial findings. We must look for the underlying issues. If we focus only on the obvious error, we may miss valuable accident prevention opportunities because systemic flaws may remain undetected and thus, uncorrected. It is one thing to say a person committed an error. It is quite another to try to understand all of the factors that may have influenced that error. Where was the rest of the system that should have prevented a simple error from being catastrophic? If we are really interested in improving safety, then we must look at the entire system, not just focus solely on the front-line personnel.

In my office, I have the framed cover of ISASI Forum magazine. On the cover, it states: "The discovery of the human error should be considered as the starting point of the investigation, not the ending point." I placed this magazine in my office to serve as a reminder of the importance of going beyond simply stating that someone committed an error. We need to answer why the error was made.

So, the three points are: maintaining independence and objectivity; keeping focused on prevention, and; seeking underlying issues.

As I head toward the ending of this discussion, allow me to put a different twist to the theme of this conference. Instead of asking if investigations make a difference, I'd like to put the focus on the dedicated men and women who actually conduct air safety investigations. The question now becomes: "Investigators: Do they make a difference?"

Sometimes we gather wisdom from unexpected places. A few years ago, I had a visit from a 15-year-old. His grandfather was a renowned meteorologist who was a leading researcher in windshear and microbursts. The grandson was interested in the NTSB and we gave him a tour of our labs, and we introduced him to a few of our investigators. A few weeks later, I received a handwritten letter from him. Let me share a few of his thoughts:

Dear Mr. Sumwalt,

In October, you gave me, my father, and my grandfather an inside look at the NTSB. I just wanted to write you to let you know how much that visit has impacted my life. Getting a more focused look at what the NTSB is all about has impacted me even more to pursue a career in aviation, and possibly aviation safety…..

Most children think of Superman and Batman when somebody says 'Hero.' To me, a 'Hero' is someone who does all of their best efforts to make sure everybody is safe from harm. To make sure a recently married couple may enjoy a honeymoon. To make sure our USA team can compete. To make sure our soldiers can return home safely to their families for Christmas. These are all the things the NTSB does. To make sure we can travel safely.

In my eyes, that is the most incredible thing anybody can do: Sacrifice their time for the good sake of others. That is something I want to be a part of….

I just wanted to say thank you again for everything you and your fellow workers have done. I am 100% inspired by what you guys do. Thank You. Thank You. Thank You.

Sincerely,
Brandon

Let me leave you with one final thought. I, like many of you, have been doing safety work for a long time. I know there can be trials and tribulations. I know there can be disappointments, setbacks, frustrations. Perhaps sometimes you feel your work is all for nothing.

And, why do I suspect you may sometimes feel that way? Because, as one safety professional to another, I know from experience that when we care about something as much as we all do, it can be frustrating when we feel our input is ignored; when we know there is more that can be done; when we see things that should be changed, but aren't; when we feel others really don't care.

You may occasionally ask yourself: “Is it all worth it? It is really worth all of the time I have spent on these safety initiatives?”

Well, to answer that and keep it all in perspective, one of my favorite inspirational sayings is: “And whoever saves a life, it is considered as if he saved an entire world.”

In other words, to make a significant difference, you don’t have to solve world hunger or find the cure for cancer. You only need to keep one person from getting into trouble in an aircraft. If you have done that, it is as if you have saved an entire world. Admittedly, the paradox is that you probably never will be able to fully appreciate just what you’ve done. You will probably never receive the direct satisfaction of knowing that you have helped someone.

But let me assure you … the work you are doing… it does matter. It does make a difference. It is important. And yes, it does keep people from dying.

So, as one professional air safety investigator to another, thank you for your tireless efforts. I guarantee, your work is saving an entire world.

Thank you and keep up the great efforts!

1. Transportation Safety Act of 1974. Report of the Senate Committee on Commerce Together with Supplemental and Additional Views on S. 4057. Senate Report No. 93-1192. September 30, 1974. Washington, DC: US Government Printing Office.

The author:

Robert L. Sumwalt was sworn in as the 14th chairman of the National Transportation Safety Board on August 10, 2017, after being nominated by President Donald J. Trump and confirmed by the U.S. Senate. Mr. Sumwalt began his tenure at the NTSB in August 2006 when President George W. Bush appointed him to the Board and designated him as Vice Chairman of the Board. In November 2011, President Barack Obama reappointed Mr. Sumwalt to an additional five-year term as Board Member.

Since joining the Board, Chairman Sumwalt has been a fierce advocate for improving safety in all modes of transportation, including teen driver safety, impaired driving, distractions in transportation, and several aviation and rail safety initiatives.

Call for Papers –
ISASI Seminar 2018

The annual seminar of the International Society of Air Safety Investigators will take place at the Intercontinental Hotel, Festival City, Dubai, from 29 October to 1 November 2018.

The theme of the Seminar is **"The Future of Aircraft Accident Investigation".**

Presentation topics to support the theme may include;

Future of aircraft data capture and retrieval and protection of safety information.

Development of new investigation techniques for aircraft, helicopter and UAS accidents.

Potential future developments in underwater wreckage recovery.

Investigation of aerospace vehicle accidents.

Future evolution of human factors investigation methods.

Recent accidents/incidents of particular interest.

Future investigator selection criteria and training needs.

Implications for investigation of future developments in aircraft, engine and avionic systems design, including manufacture and automation.

Future evolution of Family Assistance.

Presentations must be in English and should be 25 minutes long. There will be an additional 5 minutes for questions at the end of each presentation.

Important dates:

15 March 2018 - Last date for receipt of abstracts

1 May 2018 - Presenters informed of acceptance

15 July 2018 - Last date for receipt of completed papers and presentations.

15 August 2018 - The 2018 Seminar Technical Program will be published

Note: Papers and presentations, and government requirements that are not received by July 15, 2018, will be removed from the program.

Important note:

The government of Dubai requires the following information for each presenter:

1. Clear color scanned passport copy - first 3 pages (more than 500kb ≤ 1 MB)
2. Passport size photograph - solid color background and not more than 6 month old (more than 500kb ≤ 1 Mb)
3. Brief biography

This information will be required before the 15 July cutoff date.

ISASI looks forward to welcoming participants to the annual Seminar and Tutorials in Dubai.

Kas E. Beumkes

Senior Investigator/Project Manager
Dutch Safety Board

Organizing the MH17 Crash Investigation

The 2016 ISASI seminar theme was “Every Link Is Important.” In this paper, the Dutch Safety Board describes why and how the MH17 investigation was organized, the involved parties and agencies, and the cooperation with external institutions and experts. Aviation disasters shock the world. In today’s society, an incredible amount of information, including the circumstances, the possible causes, and who could be responsible, is shared immediately after a crash. An important objective of the investigation was to provide the international community and the victims’ relatives an accurate and truthful picture of the causes of the crash of Flight MH17 on July 17, 2014. Another objective of the Dutch Safety Board was to draw lessons for the future, based on the findings of this investigation.

From the start of the investigation, the Dutch Safety Board applied four principles: maintaining independence, achieving a high-quality investigation, focusing on determining the causes as accurately as possible to exclude other scenarios, and achieving as much international acknowledgment as possible for the investigation.

The investigation was carried out under exceptional circumstances. The Dutch Safety Board was not blind to the geopolitical implications of the crash but in the investigation deliberately kept its distance from international politics. The facts were leading in the investigation, and the views of parties were evaluated against those facts, a proven protocol that is used worldwide for aircraft accident investigations under the guidelines of the International Civil Aviation Organization (ICAO) Annex 13–Aircraft Accident and Incident Investigation.

The four different investigations were organized as four different projects, each project with its own project manager. For the investigations that were conducted in accordance with Annex 13, one investigator-in-charge was appointed who worked together with the project managers.

Investigation into the causes of the crash of MH17

The investigation into the causes of the crash of Flight MH17 was conducted in accordance with the provisions of Annex 13 of the Chicago Convention by an international investigation team in which, after the initial phase, the following states were represented by an accredited representative during progress meetings:

- Netherlands - State conducting the investigation
- Ukraine - State of occurrence
- Malaysia - State of registry/operator
- United Kingdom - State of design / manufacture (engines)
- United States - State of design/manufacture (airplane)
- Australia - State providing information (photos)
- Russian Federation - State providing information (radar data) Six other states that suffered fatalities were invited to view the wreckage parts; of these, representatives from Belgium and Germany were present. An observer of ICAO was present during different phases of the investigation.

Investigation into the flight route of MH17

The fact that two judicial regimes apply, namely the Kingdom Act Dutch Safety Board and Annex 13 of the Chicago Convention, was especially noticeable in the investigation into how the decision-making related to the flight route of Flight MH17 was organized, and how decisions about flying over conflict areas are made in general. For the investigation into flying over conflict areas, the Dutch Safety Board approached various parties in and outside the Netherlands to request their cooperation in the investigation.

Figure 1.

It was not always clear to these parties whether the Dutch Safety Board requested them to cooperate on the basis of Annex 13 of the Chicago Convention or on the basis of the Kingdom Act Dutch Safety Board. These parties, such as sister organizations and airlines, provided information to the Dutch Safety Board and cooperated with this part of the investigation anonymously and on a voluntary basis.

During the investigation, it became increasingly clear that parties all over the world attach great value to improving the safety of civil aviation regarding flying over conflict areas. This was demonstrated, for example, by a joint declaration (on July 29, 2014) from ICAO, the branches from air transport (IATA), airports (ACI), and air navigation service providers (CANSO). Following the crash, various international initiatives were undertaken to reduce the chance of an accident, such as that involving Flight MH17, from occurring in the future.

Figure 2.

In August 2014, ICAO set up a task force to advise on adapting roles and procedures focused on limiting risks that conflict areas pose to civil aviation. On Oct. 27, 2014, ICAO also adopted a resolution advocating for the investigation into the crash of Flight MH17 to be used to improve international standards and to share best practices for the safety of civil air traffic flying over conflict areas. The subject was also on the agenda of ICAO's high-level safety conference in Montreal, Que., in February 2015. Flying over conflict areas and MH17's flight above the eastern part of Ukraine were recurring themes in the news media, too.

In the investigation into the decision-making related to flight routes, the Dutch Safety Board attempted to do justice to these international developments and included them in its investigation where possible. The Dutch Safety Board involved representatives of sister organizations where possible and when necessary for the investigation. The investigation into the general decision-making related to flying over conflict areas made it possible to place the outcomes of the investigation into Flight MH17's route in an international perspective and created the opportunity to learn deeper and broader lessons from this tragic accident.

Investigation of the occupants of MH17

According to Annex 13 of the Chicago Convention, the investigation should include the injuries suffered by the victims, medical and pathological information, and their chances of survival, depending on the circumstances of the accident. The Dutch Safety Board decided to conduct a more thorough investigation into the consequences of the crash for the occupants than is customary on the basis of Annex 13. Apart from the aspects listed there, the Dutch Safety Board attempted to answer the question as to what conditions the occupants were exposed to during the crash and what the influence of this was on their bodies, consciousness, and awareness. In addition, the Dutch Safety Board investigated how the human remains were handled following the crash. The investigation into these questions was conducted on the basis of the authority provided by the Kingdom Act Dutch Safety Board.

Investigation of the passenger information about MH17

The investigation into passenger information looked at the time needed to provide the relatives of the Dutch victims

of Flight MH17 with official confirmation that their loved ones were on board the airplane. This investigation was conducted fully within the authority granted to the Dutch Safety Board by the Kingdom Act Dutch Safety Board. On the basis of this authority, the Dutch Safety Board can conduct an investigation into the way the Netherlands has managed the consequences of accidents abroad of which the impact extends to the territory of the Netherlands.

Figure 3.

Conducting the investigations

The Dutch Safety Board conducts its investigations within the applicable legal framework respecting its core values: independent, professional, and transparent. In the following sections, the Dutch Safety Board explains how these terms in general are put into practice and what this meant for the investigation into the crash of Flight MH17.

Independence

The Dutch Safety Board's objective in conducting its investigations is to provide a definite answer about what happened and how, and to draw authoritative conclusions and lessons from this. From that objective, it is important that the Dutch Safety Board is able to formulate its own autonomous opinion about the facts and their interpretation. In this respect, the legal framework offers several guarantees.

In the context of an accident investigation, independence is not absolute. First, there is always a certain interdependency between the investigator and the subject of the investigation, because parties directly involved have knowledge of unique facts and circumstances that are necessary for understanding the accident. Although the Dutch Safety Board benefits from legal powers it can use to enforce cooperation with its investigation, that does not totally eliminate the type of dependency referred to above. Second, due to the scope of its field of work, the Dutch Safety Board will always depend on the expertise of others to effectively conduct its investigations. Third, in order to arrive at authoritative conclusions, it is important that the Dutch Safety Board also takes into account the views and interests of others.

The Dutch Safety Board therefore cannot and does not wish to wholly isolate itself in conducting its investigation. It is rather a matter of the Dutch Safety Board guarding its conclusions against the disproportionate influencing by other parties while ensuring observance of the aforementioned dependencies. The Dutch Safety Board must at all times be able to formulate an autonomous and impartial perspective, fed by the perspectives of others.

The investigation into the crash of Flight MH17 took place in an extraordinary context. The large number of victims, the considerable news media attention and the public involvement in the crash, the simultaneous occurrence of an international criminal investigation, and the geopolitical interests involved made it even more important for the Dutch Safety Board to safeguard its independence.

Reflection meetings

From the very beginning of the investigation into the crash of Flight MH17, the Dutch Safety Board was aware that the risk of political influence could be higher than usual, given the tense international relations. To effectively identify and manage this risk, the Dutch Safety Board held two reflection meetings with experts having extensive experience in conducting investigations in a political playing field. These meetings focused on obtaining advice about the right strategy for working and interacting with parties in this context. The meetings also aimed to explore what the Dutch Safety Board could do to ensure that the results and recommendations of the investigation optimally matched the expectations of the outside world. The Dutch Safety Board used the results of these meetings in its decision-making processes throughout the investigation.

Figure 4.

Stakeholder analysis

To arrive at independent and authoritative conclusions in a complex array of forces, it is important that the investigative body has an effective understanding of these forces: what interests do the various parties have, how could they influence the course of the investigation, and how can the investigative body best deal with those forces? A stakeholder analysis was performed to systematically answer these questions.

International collaboration in aviation accident investigation

Annex 13 of the Chicago Convention provides for the participation of states having a special interest in the investigation into a civil aviation accident. Depending on the nature of their involvement in the occurrence, states can participate in the investigation through an accredited representative or an expert. The rationale behind involving various states in the investigation is that parties with potentially conflicting interests have the opportunity to take note of the facts firsthand and present their views in the investigation.

The fact that the interests of the states most involved in the investigation are represented in this manner enables the state that conducts the investigation to formulate autonomous conclusions based on the various views.

In international aviation accident investigation, it is customary for the state that is conducting the investigation to organize progress meetings with the participating states. The objective is to share relevant information within the team. Holding such meetings is not required, nor is the number of meetings or their frequency set. The investigator-in-charge invites the accredited representatives and their advisors. In the investigation into the causes of the crash of Flight MH17, this was done on three occasions.

Figure 5.

Guidance committee

To be able to form autonomous conclusions, the Dutch Safety Board obtained advice about the weighting of the findings drawn up by the investigation team. For this, it employed a guidance committee. A separate guidance committee was set up for each of the four different investigations regarding the accident of Flight MH17. For this organized critique, the Dutch Safety Board attempted to incorporate all the required expertise in the committees.

The members of the guidance committees have relevant expertise and are appointed in a personal capacity. Each committee convenes several times in the course of an investigation and advises the Dutch Safety Board on the focus and the findings of the investigation, the comments from the parties concerned on the draft final report, the conclusions to be formulated, and the recommendations, insofar as applicable. On occasion, guidance committees met jointly when this was helpful to the investigation.

Bringing the outside world inside

During the course of the investigation, the Dutch Safety Board consistently tried to keep an open eye to facts, information, investigations, suspicions, and theories presented by “outsiders” pertaining to the crash of Flight MH17. It did so with the conviction that the quality of its conclusions would be improved if all kinds of perspectives were incorporated into its formulation. The perspectives of parties other than the states and parties already involved and their experts can add great value to the process. In order to identify what statements were circulating about the causes of the accident and the flight route, the Dutch Safety Board asked Publistat, an organization that monitors media, to analyze the reports in international social media. This analysis served as the basis for the hypotheses that the Dutch Safety Board included in the investigation.

Regarding the results of investigations into the accident conducted by other parties, the Dutch Safety Board examined the sources that formed the basis of these investigations as much as possible. If the sources were accessible, the Dutch Safety Board assessed whether it was useful to incorporate the findings of the other parties in its investigation.

Composition of the investigation teams

The Dutch Safety Board strives to have all the necessary knowledge and skills among its own personnel and tries to realize this through recruitment, selection, and training. The investigation teams for each project are multidisciplinary and consist of investigators who possess the knowledge and skills required for the investigation at hand. For the investigation into Flight MH17, the Dutch Safety Board called upon investigators having expertise on the subject of aviation, defense, health, crisis management, administrative processes, and risk management.

The investigation into Flight MH17 was an exceptionally large and complex project for the Dutch Safety Board. The project took up a great deal of the available resources: approximately three-quarters of the 72 staff members were at some point assigned to the investigation or to activities in support of it.

Figure 6.

Involving external investigators and support

The Dutch Safety Board is an organization with a broad scope of activity. Thus bringing in specific external expertise is unavoidable, especially for extensive investigations such as that into the crash of Flight MH17.

The most relevant selection criteria when involving external staff are relevant expertise, proven quality, and impartiality of the external employee. The Dutch Safety Board prefers to use its own network in the sector related to an investigation, including contacts in sister organizations and independent knowledge institutions such as universities, when recruiting external investigators.

Transparency

The Dutch Safety Board attaches great value to conducting its investigation in a way that is comprehensible to others so that in turn they can form their own opinion on the investigation’s validity and reliability. Moreover, it is important that the Dutch Safety Board informs the different stakeholders (relatives, other parties involved, the general public) about the investigation and its findings in such a way and at such times that they are not unnecessarily obstructed from coming to terms with their grief or drawing lessons from the event.

Figure 7.

The extent to which the Dutch Safety Board can practice transparency is limited due to the legal obligation to protect its sources. Other than the information in the final report, the Dutch Safety Board does not release any underlying source information related to the investigation, except in exceptional cases. The purpose of this source protection is to enable those involved in an accident to give the Dutch Safety Board full disclosure without fearing any disciplinary measures or criminal prosecution. This means that the Dutch Safety Board is in an optimal position for discovering the true causes of an accident and for drawing lessons from it.

The following part of this section describes how the Dutch Safety Board, taking into account the limitations mentioned earlier, achieved transparency in the investigation into the crash of Flight MH17.

Preliminary report

Given the scope of the accident and its impact on Dutch society and on other nations that suffered fatalities in the accident, the Dutch Safety Board chose to publish the preliminary report after a consultation period. In publishing the preliminary report, the Dutch Safety Board aimed to provide the relatives of the victims, while the investigation was still in progress, with factual information about the crash and the findings up until that time.

Dutch relatives received the preliminary report an hour before it was published on Sept. 9, 2014, under embargo via the family liaison officers deployed by the national police. This allowed the relatives to become acquainted with the report's content before it was released by the news media.

Consultation and review

Both Annex 13 of the Chicago Convention and the Kingdom Act Dutch Safety Board include provisions concerning to which parties and in what manner the draft final report must be presented for consultation, as well as the way in which the resulting comments are to be processed. The objective of these provisions is to ensure that the final report does not contain any factual inaccuracies and to be informed of interested parties' views on the findings and conclusions that the Dutch Safety Board has drawn on the basis of the facts investigated.

Communication policy

The needs, expectations, and perceptions in the outside world have influenced the choices the Dutch Safety Board made concerning the type and scope of its reporting. During the investigation, the Dutch Safety Board publicized information about the investigation process more than had previously been customary. The Dutch Safety Board also published a number of relevant documents on its website to provide clarity about some of the agreements that were made. This concerns the agreements between the Dutch Safety Board and other parties with regard to taking charge of the investigation into the crash of Flight MH17 and with regard to the recovery of the wreckage.

The press and news reports published by the Dutch Safety Board were not shared with other parties in advance, with some exceptions. In certain cases, the Dutch Safety Board believed it was necessary to supply parties with the information that it was going to publish prior to the moment of publication. In particular, in cases where information was directly related to a (joint) mission carried out by (or with) another party, the content of the news report was shared in advance with the party concerned.

Figure 8.

Informing the relatives

The Dutch Safety Board wanted to keep the relatives of the victims informed of the progress of the investigation as effectively as possible. Never before did the Dutch Safety Board have to deal with such a large group of relatives originating from so many different countries during an investigation. The Dutch central government organized information meetings for the relatives, and the Dutch Safety Board attended these meetings to provide information about the process of the investigation and to answer the questions of relatives.

During the investigation, the Dutch Safety Board maintained contact with the MH17 Aviation Disaster Foundation (Stichting Vliegramp MH17), Victim Support the Netherlands (Slachtofferhulp Nederland), and the family liaison officers and sought their advice prior to having meetings, publicizing reports, or undertaking other kinds of communications. The relatives of the victims received information via a special forum before it was shared with the news media. Where possible, questions asked of the Dutch Safety Board by relatives via a dedicated forum, family liaison officers, or via Victim Support the Netherlands were answered immediately.

Other reports

Part of the transparency policy of the Dutch Safety Board is to include information about how the investigation is conducted. Normally one appendix in the final report contains this information. For the MH17 investigations, the Dutch Safety Board dedicated a separate report to this purpose.

The Dutch Safety Board is obliged to publish the comments from the consultation phase of the investigation that were not adopted with counter arguments. The parties concerned are informed of this procedure during the consultation. These comments are presented in a table that is appended to the final report.

The Dutch Safety Board also published a book with the stories behind the investigations into the crash of Flight MH17 (see Figure 6). For this purpose, an investigative journalist and writer was commissioned to record these stories from inside—from the perspective of the board members and some of the investigators—to disclose the manner in which the investigation was conducted, the choices that were made, and how the investigation was experienced, both as an organization and as human beings. This book is an “answer” to the long amount of time the investigation was going on without releasing information to the families of the victims.

Cooperation with other authorities

During the recovery missions, the Dutch Safety Board worked in close cooperation with other Dutch authorities. This was done for security reasons and because the missions for recovering human remains, personal belongings, and wreckage pieces were combined. That is why the Dutch Safety Board joined the operational meetings concerning the missions for as long as deemed necessary to carry out the recovery work. These meetings were organized by the Dutch Ministry of Defense and were attended by the Dutch authorities that took part in the recovery missions, namely the Ministry of Defense, the Royal Netherlands Marechaussee, the national police, the Ministry of Foreign Affairs, and the Dutch Intelligence and Secret Services—the MIVD, the AIVD, and the NCTV. For the purpose of coordinating the activities, there were also bilateral consultations between the Dutch Safety Board and the involved public bodies.

Concurrence with the criminal investigation

Following the crash of Flight MH17, an international criminal investigation started on Aug. 7, 2014. This investigation was conducted by a joint investigation team, in which police and judicial authorities from the Netherlands, Australia, Malaysia, Belgium, and Ukraine cooperated. The Netherlands coordinated the investigation. The objective of the criminal investigation differed from that of the investigation conducted by the Dutch Safety Board. The Dutch Safety Board focused on the question of what happened and what could be learned, and not on the question of who was to blame. The joint investigation team, on the other hand, focused on the causes of the crash in response to the question of whether punishable offenses had been committed and who could be held responsible in terms of criminal law.

Since both investigations considered the same events, they partly relied on the same evidence, each from their own perspective. This situation required coordination between the crash investigation and the criminal investigation to prevent both investigations, each responding to a legitimate social need, from frustrating each other. This necessary alignment was achieved through agreements between the Dutch Safety Board, being the accident investigation authority, and the Dutch Public Prosecution Service as coordinator of the joint investigation team.

The agreements constitute a detailed elaboration of the existing Dutch Safety Board–Dutch Public Prosecution Service Coordination Protocol (Afstemmingsprotocol Onderzoeksraad voor Veiligheid–Openbaar Ministerie). This protocol regulates the coordination between both organizations in a general sense if a criminal investigation and an investigation by the Dutch Safety Board into an occurrence are conducted simultaneously. Additional agreements were required given the complexity of both investigations, their concurrence, and the international context in which these investigations took place. These agreements related to the reciprocal exchange of investigative information, the seizure of physical evidence and documents, the examination of the pieces of wreckage, and the fragments and periodical coordination consultation.

Sharing information related to investigations

In order to determine the causes of an accident or crash, it is of great importance that those involved can speak freely and are able to provide the Dutch Safety Board with information without having to fear prosecution under

criminal law. Both Annex 13 of the Chicago Convention and the Kingdom Act Dutch Safety Board include various provisions on the subject of maintaining the confidentiality of information related to the investigation.

Insofar as these provisions offered this possibility, information that was also needed for the success of the international criminal investigation was shared with the Dutch Public Prosecution Service. The idea was not to withhold information if that would hinder the progress of the criminal investigation. Thus the Dutch Safety Board continually considered whether sharing information could in any way be detrimental to its own investigation. Vice versa, the Dutch Public Prosecution Service also shared information proactively if it was relevant to the accident investigation.

Examination of the wreckage

The Dutch Safety Board was responsible for recovering the wreckage pieces and their transport to the Netherlands. The recovered material was inspected and sorted at Gilze-Rijen Air Base in the presence of the Dutch Public Prosecution Service, which indicated which pieces could be relevant to the criminal investigation. These pieces were marked. After this, the material became available for examination to both parties simultaneously. Destructive examination (i.e., an examination of an irreversible nature) could only take place once both parties had investigated the relevant material for damage patterns and traces, and after both parties consented. All pieces of wreckage, parts, or secured evidence were only to leave the hangar in Gilze-Rijen for investigation after the Dutch Safety Board and the Dutch Public Prosecution Service had agreed. This applied, for example, to material analyses that were performed by external agencies.

Examination of the human remains The Dutch Public Prosecution Service seized the human remains when they arrived in the Netherlands, after which the injuries and the fragments that were found in the bodies were forensically examined. The Dutch Safety Board was informed of the results of these examinations and used these for its own investigation. The Dutch Safety Board did not perform its own examination of the human remains.

Recorders from MH17

During the investigation, the Dutch Safety Board provided the Dutch Public Prosecution Service with the data files from the flight data recorder and some of the data from the cockpit voice recorder. The Dutch Safety Board was very cautious about providing the recordings in order to guarantee the cockpit crew's privacy.

In the presence of the Dutch Safety Board and the Public Prosecution Service, specialized staff listened to the sound recordings on the Dutch Safety Board's premises, with the objective of determining what information could be essential to the criminal investigation. The entire 30-minute recording was found not to be relevant in that respect, with the exception of the final milliseconds, the moment when the airplane was hit. After consultation with the Dutch Public Prosecution Service, it was decided, for the above-mentioned reasons, to hand over only the recording of this short period of time. The data carriers themselves were not handed over. These remained in the hands of the Dutch Safety Board.

Examination of the fragments

Both the Dutch Public Prosecution Service and the Dutch Safety Board arranged for the fragments found in and on victims' bodies and in and on the pieces of wreckage to be analyzed (see Figure 9). Both parties outsourced this process separately to external agencies but jointly coordinated this process since the outcomes constituted a substantial source of information for both the criminal investigation and the Dutch Safety Board's investigation.

With regard to the fragments found in the victims' bodies, a selection of human remains was made of which scans revealed that they contained "foreign" fragments. The selection included the human remains of the crew in the cockpit. The fragments were removed from the bodies by forensic investigators commissioned by the Dutch Public Prosecution Service. The fragments were removed from the wreckage pieces by the Dutch Safety Board and the Dutch Public Prosecution Service. The Dutch Public Prosecution Service and the Dutch Safety Board shared the results of the different analyses that they had arranged.

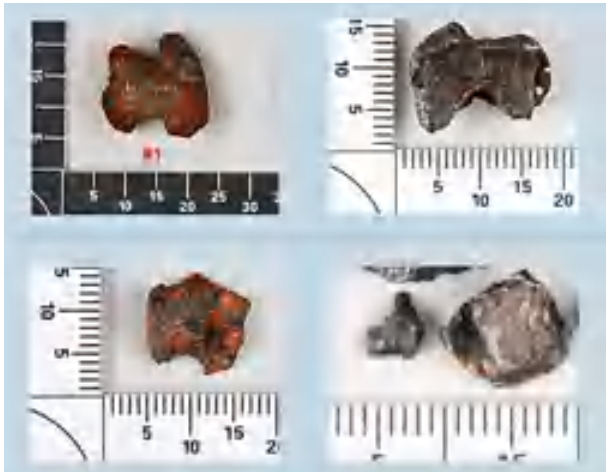


Figure 9.

Other evidence

In addition to the aforementioned information, the Dutch Safety Board provided the Dutch Public Prosecution Service with the following information: photographs of the wreckage area, lists of the parts of the airplane that had been seized, and information about the damage patterns on the wreckage pieces. Statements from individuals as well as medical and private information collected by the Dutch Safety Board were not shared with the Dutch Public Prosecution Service. In addition to the results of the forensic analyses of the fragments, the Dutch Public Prosecution Service shared other information with the Dutch Safety Board, such as the autopsy and inspection reports of the victims, photographic and video material, and the results of the analyses concerning the found objects that probably originated from a missile.

Figure 10.

Periodic consultation

Throughout the investigation, frequent consultations took place between the Dutch Public Prosecution Service and the Dutch Safety Board, during which they discussed the progress of the investigation activities and matters related to this.

Classified information

All the Dutch Safety Board's investigation material is of a confidential nature. However, in the investigation into the crash of Flight MH17, confidential information was used that the Dutch authorities had categorized as "classified" and that the Dutch Safety Board was not able to access at all times or could not include in its reports. The central government of the Netherlands adopts different levels of classification, from "departmentally confidential" to "top state secret." It is unusual for the Dutch Safety Board to work with this type of material and to not have all the source material in its possession.

This is why additional explanation of the working methods concerning classified information is given in the report.

The Kingdom Act Dutch Safety Board stipulates that the minister of the Interior and Kingdom Relations, the minister of Defense, and the minister of Security and Justice, or persons under their jurisdiction, may provide confidential information to the Dutch Safety Board. How to handle classified information in the investigation into Flight MH17 was determined in consultation with the organizations that were owners of the information. The central question in this consideration was whether use of this information could endanger the security of the Netherlands. An additional consideration was the extent to which the information was necessary for arriving at a conclusion or whether the information could also be used in a supporting capacity.

In the investigation into the crash of Flight MH17, classified information was used in several ways:

- There were classified documents that the Dutch Safety Board had requested in the context of the investigation and that it kept copies of at its The Hague office.
- There was classified information that was available to the Dutch Safety Board for inspection only. The Dutch Safety Board was able to see relevant classified information regarding Flight MH17 that was in the possession of the MIVD and the AIVD.

The findings of the Dutch Safety Board as described in the report about the crash of Flight MH17 agree with this classified information. Because of national security reasons, this classified information could not be publicized.

Since it is unusual for the Dutch Safety Board to make use of classified military information, an agreement

was concluded between the Dutch Safety Board and the MIVD for this specific investigation. This agreement stipulates that both organizations may provide the other with the information it needs to perform its legal tasks. The Dutch Safety Board was allowed to discuss classified information under strict confidentiality. Consultation of the secret information was limited to board members and a small number of Dutch Safety Board employees who had undergone an extensive security screening for handling secret information.

Figure 11.

Lastly, classified information was included in the investigation that the Dutch Safety Board neither had access to nor was able to see. This concerned information from the Dutch Intelligence and Security Services (AIVD and MIVD) related to the armed conflict in the eastern part of Ukraine. At the Dutch Safety Board's request, the minister of the Interior and Kingdom Relations and the minister of Defense asked the Dutch Review Committee on the Intelligence and Security Services (CTIVD) in a letter dated Nov. 21, 2014, to examine this information.

The ministers asked the CTIVD to report the findings directly to the board members of the Dutch Safety Board. The letter also mentioned the agreement that the Dutch Safety Board would first submit the CTIVD report to both ministers to check it for any state secrets prior to the Dutch Safety Board making it public. Before finalizing its report, the CTIVD submitted it with references to underlying classified sources to the AIVD and the MIVD for verification of the facts. Both intelligence services made only a few minor comments, and on April 10, 2015, the CTIVD handed over the still-classified report to the Dutch Safety Board members without any references to classified sources. In conformity with the letter of Nov. 21, 2014, the Dutch Safety Board subsequently submitted the report to both ministers to have it checked for potentially classified information. The ministers did not find any state secrets in the report, which was then declassified.

Reprinted with permission of ISASI Forum July - September 2017 issue.

Adapted with permission from the author's technical paper entitled Organizing the MH17 Crash Investigation presented during ISASI 2016, in Reykjavik, Iceland. The full presentation with references can be found on the ISASI website at www. isasi.org in the Library tab under Technical Presentations.-Editor

Photos: Courtesy of the Dutch Safety Board

Kas E. Beumkes, born in 1964 in the Netherlands, has been involved in aviation safety investigation since 1990. He started as an aircraft accident investigator for the Netherlands Aviation Safety Board and became chief investigator in 1998. After the board merged into the multimodal Dutch Transport Safety Board, he became the secretary of the Aviation Commission in 2001. When this board merged into the multisectoral Dutch Safety Board in 2005, he became senior secretary of aviation. Since 2008, Beumkes has served the board as senior investigator/project manager. Beumkes has two Bachelor of Science degrees, one in aeronautical engineering (1986) and the other in industrial engineering (1988). He attended the Cranfield Aircraft Accident Investigation Long Course in 1991, the SCSI HFAI in 1999, and the AAAI in 2000. In 2006, he obtained a master's degree in management of safety, health, and environment at the Technical University Delft, the Netherlands.

Fazal Alibaksh

Senior Air Accident Investigator
GCAA-AAIS

Boeing 737 Takeoff from Taxiway

On 24 September 2015, Shaheen Air International scheduled passenger flight SAI791, operated by a Boeing 737-400 Aircraft, registration AP-BJR, departed from Sharjah International Airport (OMSJ), United Arab Emirates, at 0239 UAE local time for Bacha Khan International Airport (OPPS), Pakistan. The Aircraft took off from taxiway Bravo which was parallel to the assigned take-off runway 30.The Air Traffic Controller witnessed the takeoff from the taxiway.

There were 156 persons onboard the Aircraft comprising two flight crewmembers, one observer pilot, five cabin crewmembers, and 148 passengers.

The Commander, who had served in the military as a pilot with the rank of captain, was the pilot flying and he was seated in the left cockpit seat. He had flown just over 11 hours during the 72 hours prior to the Incident flight and he had accumulated a total flying time of 4,079 hours, of which 1,236 hours were on the Boeing 737 series.

The Copilot was performing the pilot monitoring function and was communicating with the Air Traffic Controller. At the time of the incident his total flight hours were 1,019, of which 182 hours were on the Boeing 737 series. He had flown a total of 14 hours during the 72 hours prior to the Incident flight.

There was also a third pilot occupying the observer seat in the cockpit. This pilot was not an active crew member for the incident flight. His total flying hours were 3,165, of which 388 hours on the Boeing 737 series aircraft.

The same crew had flown the three and a half hour inbound flight from Pakistan which landed at OMSJ at 0130 LT, with a transit time of approximately 60 minutes before the return flight to Pakistan. All three pilots had level four english language proficiency.

The Aircraft entered service in 1993 and had been operated by several airlines before being registered in Pakistan in September 2015. There was no runway awareness advisory system (RAAS) installed on the Aircraft.

The aircraft commenced taxiing at 0233 and took off at 0240 LT. During the nighttime departure, there was no moonlight as the moon had set at 0153. There was no significant weather and visibility was good. The airfield temperature was 28 degrees Celsius.

For the departure, air traffic movements were light as there was one arrival and no other immediate departures. The taxiway green centerline lights, taxiway signage, and stop bar lights were functional as the Aircraft taxied to the runway.

During the departure, the Air Traffic Controller was performing the combined functions of ground and tower monitoring and communication.

Clearance for taxi and full length runway after pushback and engine start was requested at 0233:26 by the Copilot. The Air Traffic Controller gave clearance to taxi to Alpha, Alpha two zero, holding point Bravo two zero, runway three zero. Read back by the Copilot was “Alpha to holding point runway three zero”.

The Aircraft commenced taxiing at 0234:04 and approximately 58 seconds later, the Aircraft entered taxiway Alpha on a heading of 121 degrees.

At 0237:54, with the Aircraft continuing on taxiway Alpha at an average ground speed of 10 knots, the Air Traffic Controller instructed the crew to change to the Tower radio frequency.

At 0238:10 the Copilot advised the Tower Air Traffic Controller that they would be holding short of runway three zero. Thirteen seconds later, the Air Traffic Controller instructed the crew to hold short of Bravo two zero to which the Copilot replied that they would hold short of “three zero”.

With the Aircraft still in the turn and before reaching taxiway Alpha two zero, at 0238.49 the Air Traffic Controller gave the Copilot clearance for takeoff with the instruction “Cleared for takeoff runway three zero, Bravo two zero without delay clear takeoff, surface wind is one three zero degrees five knots. Bye bye”. The read back by the Copilot confirmed runway three zero for takeoff without mention of Bravo two zero. The Aircraft was approximately 200 meters from the runway CAT I/II holding point and 360 meters from the entrance to the runway.

As the Aerodrome was not equipped with surface movement radar (SMR), the only means available to monitor ground maneuvering of an aircraft was visually, aided by binoculars. The Air Traffic Controller had noticed that the Aircraft speed had slowed as it taxied towards Alpha two zero and communicated to the Copilot to keep the speed up until cleared onto the runway.

Shortly after the Aircraft had crossed the OFF stop bar at Alpha two zero, the Air Traffic Controller again repeated takeoff clearance by transmitting ‘…without delay cleared for takeoff runway three zero...” The Copilot responded by repeating the takeoff clearance.

At 0239:16, the Aircraft started a left turn, following the green lead-on lights, towards the Bravo taxiway and away from taxiway Alpha two zero on a heading of 30 degrees.

At 0239:28 the Aircraft had entered taxiway Bravo and the Air Traffic Controller requested the Copilot to expedite the takeoff as there was traffic turning onto the final approach to land. The Copilot informed the Air Traffic Controller that they would expedite.

During this phase of the Aircrafts’ movement, the Air Traffic Controller had stated that visual watch of the Aircraft was not maintained due to the window frame design in the visual control room of the watch tower which obscured the Air Traffic Controller’s view. The Aircraft was approximately 1 km away from the control tower.

Both engine thrust levers were advanced at 0239:30 and the Aircraft speed increased. At 0239:52, both thrust levers were at takeoff thrust as the Aircraft passed the intersection of taxiway Bravo and taxiway Alpha 18. The Aircraft speed had passed 69 knots and was quickly approaching 80 knots.

Initially the Air Traffic Controller thought that the Aircraft was on runway 30 during the takeoff roll but he then realized that the lights of the Aircraft appeared to be on taxiway Bravo and that the Aircraft was passing the taxiway Alpha 18 holding point towards Bravo 14. The

Figure 1. Aircraft taxi and take off route

Aircraft speed was approximately 128 knots as it passed the taxiway Bravo 14 intersection.

The on-duty ATC supervisor also witnessed the Aircraft on Bravo taxiway. Between the Air Traffic Controller and the supervisor, a decision was made to allow the Aircraft to continue the takeoff, as they could not determine how fast the Aircraft was moving and there was no threat to the Aircraft from vehicles or obstructions on taxiway Bravo.

At 0240:25, the Aircraft was airborne, and at 0241:15, the Copilot informed the Air Traffic Controller that they were switching over to Dubai ATC. The message was acknowledged by the Air Traffic Controller. There was no discussion between the flight crew and the Air Traffic Controller about the takeoff from the taxiway.

The Aircraft continued to its destination for an uneventful landing.

Communications

As the Aircraft taxied, clearance was given to the flight crew by the Air Traffic Controller, over the ground frequency, to taxi via "…Alpha, Alpha two zero, holding point Bravo two zero, runway three zero". The read back from the Copilot was "Alpha to holding point runway three zero…"

Upon reaching the end of the straight section of taxiway Alpha, the Air Traffic Controller had switched to the Tower frequency and instructed the Copilot "…to hold Bravo two zero." The response from the Copilot was "Hold short of three zero…"

Soon after, the Air Traffic Controller issued the takeoff clearance and stated "…Runway three zero Bravo two zero without delay clear takeoff surface wind is one three zero degrees five knots…" The read back from the Copilot was "Cleared for takeoff runway three zero Shaheen seven niner zero wind copied."

As the Aircraft started to turn to a heading of 31° on taxiway Alpha 20, the Air Traffic Controller instructed the Copilot to "…keep your speed up until you've cleared the runway." The Copilot did not hear this communication and requested that the message be repeated.

Shortly after, the Air Traffic Controller again communicated the take-off clearance by stating "…without delay cleared take off runway three zero…" which the Copilot read back correctly.

After the Aircraft had entered taxiway Bravo, the Air Traffic Controller communicated to the crew to "… expedite please I've got traffic turning final". The Copilot acknowledged the message, and stated that they would be expediting.

There was no further ATC communication with the Aircraft until airborne, and ATC did not pass any information to the flight crew that they had taken off from the taxiway.

The Aerodrome

Sharjah International Airport has one runway orientated southeast/northwest with runway designations 12/30. The Aerodrome has two parallel taxiways, Alpha and Bravo, which are also parallel to the single runway 12/30. Prior to October 2014, there was one taxiway (Alpha) parallel to the runway. A new runway became operational in October 2014 and the old runway was designated as a taxiway and is now known as taxiway Bravo. The Aerodrome was not equipped with a Runway Incursion Monitoring and Conflict Alerting System (RIMCAS) or surface movement radar (SMR) monitoring equipment.

The taxiways were designated, prior to the introduction of the new runway, mostly by a single letter. From October 2014, there were several changes to the taxiway identification system with many taxiways being assigned an alphanumeric designation. Examples of changes included taxiway Golf to Alpha 20; taxiway Foxtrot to Alpha 18; and taxiway Charlie to Alpha 6.

All taxiway centerline lights and lead-in lights to the runway were green. However, it was noted by the Investigation that, at nighttime, there was a difference in the green shade and level of brightness used only for the centerline lead-on lights from taxiway Alpha 20 to taxiway Bravo. The same condition existed at the western end of the taxiway Alpha with taxiway Alpha 2 lead-on lights to taxiway Bravo.

Taxiway Bravo also had two intermediate holding point red stop bars, Bravo Golf (BG) at the eastern end adjacent to the taxiway Alpha 18 intersection, and Bravo Alpha (BA) at the western end. These two holding points on taxiway Bravo were not activated during the night of the Incident. Subsequently, the air traffic service provider issued procedures to the Air Traffic Controllers requiring use of the stop bars.

Figure 2. Aerodrome parallel taxiways with Runway 30

In this Incident, the Aircraft was approximately one kilometer away from the control tower as it taxied passing taxiway Alpha 20 towards Bravo.

The Tower visual control room (VCR), together with the Airport, was constructed in the 1970s at the eastern end of the passenger terminal building. The VCR is elevated above the ground and surrounded by nine equally sized angled transparent glass panels which are retained

by segmented metal strips. As stated by the Air Traffic Controller, when the controller is at the assigned seat for Ground or Tower positions, the metal strip obscures the view of taxiway Alpha 20 and the lead-on to taxiway Bravo. The VCR is not equipped with Aerodrome cameras and monitors.

Figure 3. Visual Control Room

The Tower visual control room (VCR), together with the Airport, was constructed in the 1970s at the eastern end of the passenger terminal building. The VCR is elevated above the ground and surrounded by nine equally sized angled transparent glass panels which are retained by segmented metal strips. As stated by the Air Traffic Controller, when the controller is at the assigned seat for Ground or Tower positions, the metal strip obscures the view of taxiway Alpha 20 and the lead-on to taxiway Bravo.

Crew Performance

The Commander stated that he was familiar with OMSJ as he had operated flights there prior to the Incident flight. His last flight into OMSJ was three months before the Incident, on 24 June 2015.

The flight crew statements indicated that the instruction from the Air Traffic Controller was to taxi Alpha, Alpha two zero, Holding Point three zero. They did not recollect holding point Bravo two zero being mentioned. During the taxi to Alpha two zero, the Commander mentioned that he was monitoring the approach and runway clearance. The Commander stated that there was no pressure from the Air Traffic Controller to depart. The crewmembers also stated that during the rolling take off, there was no doubt but that they were on runway 30.

With clear visibility during the nighttime departure, the Investigation could not determine why the lack of situational awareness was not recognized by the crewmembers after they had lined up on taxiway Bravo. With the Aircraft take-off lights turned on, their cognitive ability failed to recognize that the only lighting visible was a row of green centerline lights along the taxiway yellow painted centerline. In addition, even though runway 30 has a displaced threshold, after an aircraft turns towards the runway, the runway white edge lights and white centerline lights would become visible.

The Investigation could not confirm whether there was any communication amongst the flight crewmembers to verify the Aircraft position prior to takeoff, or whether there was distraction that may have diverted their attention away from the serviceable visual external cues on the taxiway.

The rolling takeoff reduced the crew's time to conduct a thorough outside visual check and to verify runway alignment before initiating the take-off roll. It is possible that the Commander was fixated on the taxi and takeoff of the Aircraft along the centerline lights and together with a confirmation bias mindset that the Aircraft was on the runway, the lack of edge lights on taxiway Bravo and the visible centerline green lights did not trigger an alert in his mind as he processed the available information.

From the Commander's position in the left seat, he would not have noticed the signage and the red RWY AHEAD painting for the runway holding point at taxiway Bravo 20. During this phase of the taxi as well as during the takeoff, the Copilot was probably concentrating his watch inside the cockpit especially as they were performing a rolling takeoff, thus he would have missed the opportunity to notice the line up on the taxiway together with the lack of runway edge lighting and the green taxiway centerline lights.

There was no evidence to indicate that the flight crewmember's performance was influenced by fatigue, but at the time of the Incident, the flight crew had been on duty for approximately six hours and had been awake for at least eight hours. Their body clock at 0239 (0339 Pakistan time) coincided with the phase of deepest sleep together with lowest body temperature (circadian low). This could have resulted in a reduction in mental ability and memory lapses.

Air Traffic Controller influence

During the communications between the flight crew and the Air Traffic Controller, the Controller did not request that the Copilot correct his read back omissions. Initial clearance for taxi by the Air Traffic Controller on the Ground frequency included "Alpha, Alpha two zero, holding point Bravo two zero, runway three zero." The Copilot read back the message, but omitted the reference to Bravo two zero. This occurred again, when on the Tower frequency, as the Aircraft had started to turn towards taxiway Alpha 20, the Copilot was instructed by the Air Traffic Controller to "Hold Bravo two zero." The

Copilot responded by saying “Hold short of three zero”.

The same read back error happened for the third time at a critical phase of the taxi. As the Aircraft was approaching the taxiway Alpha 20 holding point, takeoff clearance was given and the Air Traffic Controller stated “Shaheen seven niner one, runway three zero, bravo two zero, without delay clear takeoff, surface wind is one three zero degrees, five knots, bye bye.” The Copilot read back the clearance, but again left out Bravo two zero. Soon after, the Commander started to turn the Aircraft towards taxiway Bravo.

A pilot read back presents the first and most efficient opportunity to catch miscommunications. It provides a verification to the controller that the pilot heard and understood the instruction, and it gives an opportunity to the controller to reaffirm the instructions given. An effective read back can mitigate the effects of expectation because it gives the controller an opportunity to correct any error.

It is possible that the crew mistakenly understood that the holding point at Alpha 20 was the actual runway holding point, as Bravo two zero was never repeated by the Copilot. As the Air Traffic Controller never informed the crew that the read back was incorrect, this may have confirmed the mistaken perception the crew had. The crew may have developed an erroneous mental model that the taxiway Alpha two zero holding point led to the runway. Contributory to this would have been that the red stop bar lights at taxiway Bravo 20 CAT I/II holding point to runway 30 were probably OFF.

ATC can negatively affect the decision making process of flight crewmembers leading to errors. An increase in cockpit workload can occur when instructions to expedite the takeoff are given, especially when the aircraft is still taxiing and has not yet reached the runway holding point. For this Incident, the mental readiness of the flight crew should not have been a factor for the takeoff even if they had issues within the cockpit. However, the Investigation believes that the nature of the clearance given over a 43 second period which included the words “Depart without delay.”, “Keep the speed up.”, and “Expedite.”, could have influenced the flight crew in making the incorrect decision to turn onto and eventually take off from the taxiway.

Aerodrome factors

The published Jeppesen plates for the Aerodrome do not mention that there are any hot spots that require special attention on the part of the flight crew.

When the Aircraft had passed the OFF intermediate holding point stop bar at taxiway Alpha 20, it continued to follow the green curved lead-on lights towards taxiway Bravo. The color of these lights, at nighttime, is a different shade of green to the green lights along the taxiway centerline. This may have led the Commander to add to the perceived confirmation bias that the Aircraft was now entering the runway. The Commander stated that at this phase of the taxi, he was monitoring the approach and runway clearance. Thus, the Commander had a confirmation that the Aircraft was correctly positioned and was about to enter the runway. The crew did not recognize that the straight taxiway centerline lights directly ahead of the Aircraft led towards the runway holding point. The processing of information during this phase of the taxi allowed the situational awareness of the flight crew to be significantly affected. The flight crew understanding of the information that they were gathering never raised any doubt that it was incorrect.

As the Investigation confirmed, especially during nighttime, the metallic structure within the visual control room hinders the controller’s view of a departing aircraft. The GCAA had raised several audit findings related to the condition of the visual control room prior to the Incident flight.

The Air Traffic Controller was standing in order to have a better view of the departing Aircraft. However, the Controller had lost visual watch of the departing aircraft at a critical stage of the taxi, jeopardizing the safety of the departing and arriving aircraft.

The Investigation calculated that for a period of approximately 36 to 39 seconds, the Controller did not have a view of the Aircraft position. This was calculated from the time the Controller had lost visual contact with the Aircraft from the intersection of taxiway Alpha 20 with taxiway Bravo, until just past the intersection of taxiway Bravo with taxiway Alpha 18. The speed of the Aircraft at that stage was approaching 80 knots. Had there been any equipment on the taxiway, the Incident had the potential to be catastrophic.

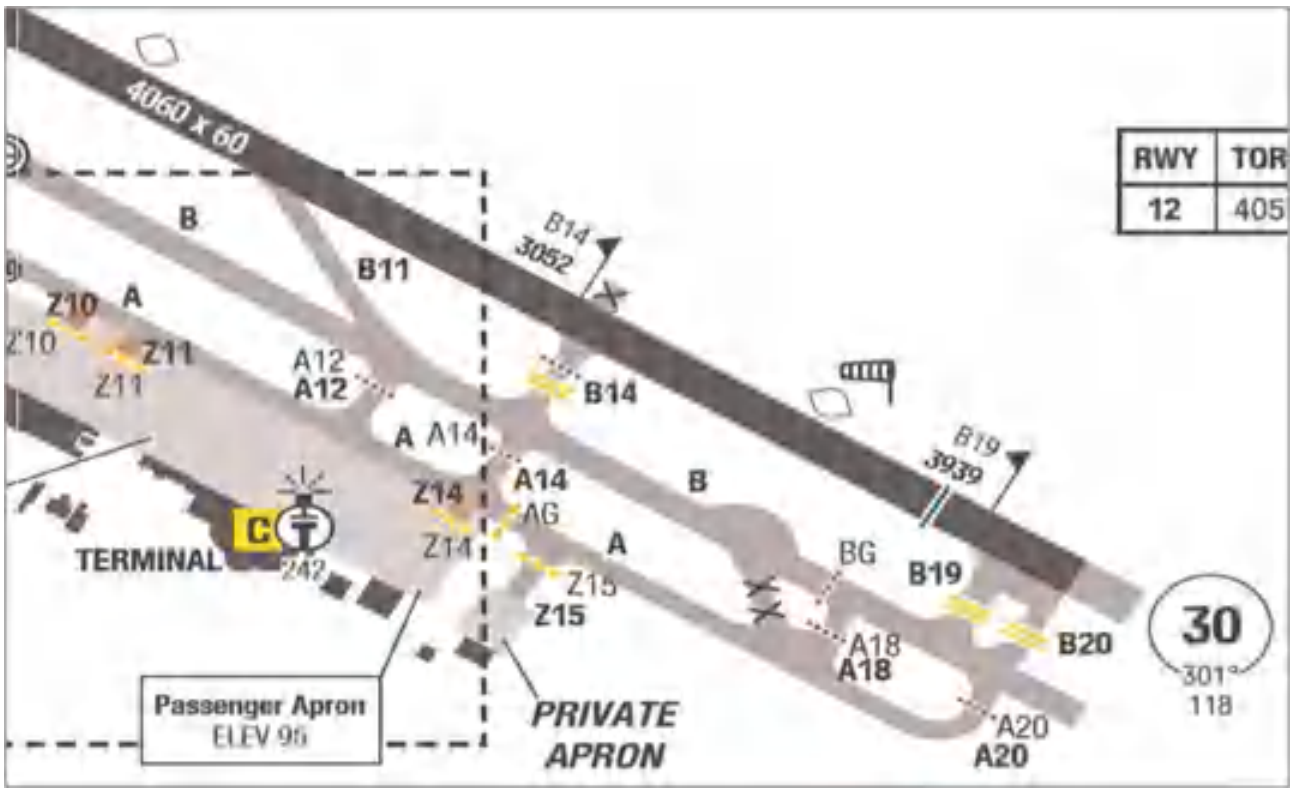


Figure 4. OMSJ Tower location in the Aerodrome

Conclusion

The Air Accident Investigation Sector determines that the cause of the Serious Incident was that, most probably, the flight crew did not devote sufficient attention to the Air Traffic Controller taxi clearance and the taxi route lighting and signage. Their mental model allowed the flight crew to loose situational awareness of the Aircraft position resulting in a takeoff from the taxiway.

Contributory factors to the serious incident included;

- The Aircraft Operator standard operating procedures (SOP) did not require verification by the crew that the aircraft was lined up on the correct runway before commencement of takeoff;
- The early takeoff clearance given by ATC when the Aircraft was approximately 200 meters away from runway 30 holding point;
- The urgency of the Air Traffic Controller for the Aircraft to depart;
- The red stop bar lights at the CAT II/III holding point for runway 30 were already OFF;
- The brighter green lead-on lights for taxiway Bravo were probably mistakenly interpreted by the crew as the lead-in lights for the runway; and
- The Air Traffic Controller losing visual watch on the Aircraft for some time.

ROYAL AERONAUTICAL SOCIETY
UAE Branch

YOUNG PERSONS' LECTURE COMPETITION 2018

The Lecture Competition is an excellent opportunity for young professionals to be recognized for your work and enhance your career. The goal is to encourage oral presentation skills among young people. To this end, the UAE Branch will hold a local Young Persons' Lecture competition, subject to the following rules:

1. The candidate shall be below 30 years of age (One to each of the age groups – Below 22 and below 30)
2. The candidate will present the topic using a power point presentation for 10 minutes to industry professionals, followed by Q&A
3. The topic of the presentation must be related to aerospace/aviation domains
4. Judging criteria to include – Time keeping, content, oral presentation skills, visuals, presentation of case, and engagement with audience
5. The winning candidate will receive a prize, and a chance to get nominated for the N E Rowe award in London, UK

For all those who are interested to participate, kindly register by sending the following details **before 10th January 2018**:

1. Name and Age
2. A draft layout of the presentation

For more info and to register, please write to:
info.raesuae@gmail.com

DETAILS

First round of the competition:

Date: 5th February 2018 Time: TBA

Venue: Emirates Aviation College, Al Garhoud, Dubai, UAE.

Please note finalists will present their work again, for the **Final round** on 5th March 2018 , further details for which will be announced accordingly.

*Open to all members and non-members of RAeS Society

Hans Meyer

Air Accident Investigator
GCAA - AAIS

Passenger Behavior during Aircraft Evacuations

The Air Accident Investigation Sector is investigating a recent accident in which the evacuation aspect was an important part of the investigation. This provided an excellent opportunity to explore what had been researched and published on the topic of passenger behavior during an emergency evacuation. The aim was to better understand passenger behavior and to apply this knowledge to the investigated situation.

Why do people on an aircraft act in often apparently irrational ways? Can it be explained that a passenger would walk away from an open exit into a smoke filled cabin? Why do some passengers grab their bags before they make their way to the emergency exit while the aircraft is on fire and smoke and fumes are filling the cabin? How is it still possible that passengers are not wearing seat belts during landing and are the only ones to die in the accident? Why are the majority of passengers not listening to safety announcements and why do they not read safety cards? Are passengers sufficiently situationally aware to know where their three closest emergency exits are after a 13 hour flight? Would any passenger in their right mind re-enter an aircraft after a successful evacuation?

Many accident reports, articles and safety studies have been published covering this topic. While this article does not focus on exit door or aircraft design and does not claim to have all the answers, here are some discoveries.

It appears that many answers start with the common perception of the travelling public, that while aircraft accidents are extremely rare, when they do occur, most are non-survivable. Footage of aircraft debris in a field, or on a mountainside, would seem to confirm this theory. Other images that make the news are from aircraft emergency evacuations at airports. A safe landing with an engine on fire, doors opening, passengers evacuating down the escape slides, running away from the aircraft, the crew the last persons exiting the aircraft and the fire service extinguishing the blaze in minutes. Will you survive if you are involved in the second accident scenario? There are many reasons, some overt and some subtle, on which your survival will depend.

Aircraft evacuation research video

Accident Survivability

First of all let us be optimistic and examine the statistics. There has not been much recent research into aircraft accident survivability rates, but in 2000 the NTSB examined all US accidents that had occurred over the years since 1983. For this study, an accident was classified as an event where the aircraft was seriously damaged, or a passenger was seriously or fatally injured.

The study found that in those 18 years there had been:

- One accident per 261,697 flights
- At least one fatality every 2,093,579 flights
- One total loss of all occupants accident every 18,580,519 flights

These numbers put the chances of an airline passengers' involvement in an accident into perspective. But what about passenger survivability once involved in an accident?

For this purpose, the NTSB looked at technically survivable accidents, where at least one person survived. Only 20 accidents, involving 2,143 occupants, were considered in the timeframe, of which:

- 71.1% of the occupants survived
- 21.6% of the occupants died from impact-related injuries
- 6.1% of the occupants died from exposure to smoke or fire
- 1.2% died from other causes, such as drowning, etc.

In 60% of technically survivable accidents, more than 80% of the occupants survived, while in only 15% of such accidents, less than 20% of the occupants survived.

According to the NTSB study, this results in one technically survivable accident in every 7,432,208 flights, with a 71.1% survival chance of each occupant.

So, good news for passengers, particularly considering that most recent numbers show that the global aviation industry has succeeded in reducing the fatal accident rate since 1997 by around 80%.

Survivability during an evacuation

What do we know about the survivability aspects of aircraft accident evacuations and how did the industry learn lessons in this area? One significant accident that contained lessons for the aviation industry and led to changes occurred in 1985 at Manchester Airport in the United Kingdom. During take-off, at a speed of approximately125 knots, the left engine of a B737 suffered an uncontained failure which caused a fuel leak.. The leaking fuel ignited and burned directly behind the left engine. The take-off was abandoned and the aircraft exited the runway on the right hand side onto a taxiway, which resulted in the wind directing the fire towards the aft fuselage. The airport fire service attended the accident site promptly, but within 5 and a half minutes after the aircraft came to a stop, of the 137 passenger and crew onboard, 55 persons had lost their lives.

“The major cause of the fatalities was rapid incapacitation due to the inhalation of the dense toxic/irritant smoke atmosphere within the cabin, aggravated by evacuation delays caused by a forward right door malfunction and restricted access to the exits.” [AAIB Report 8/88]

A number of recommendations were proposed, including changes to crew procedures, the cabin layout, cabin material certification and regulatory requirement for evacuation certification.

As a result of the accident, extensive industry studies into crowd behavior and behavioral aspects of emergency evacuations were undertaken. It became clear that for the occupants involved in an evacuation, one aspect is most critical; Time.

Evacuation delays

A review of accident reports has shown that as much as a minute can pass before the flight or cabin crew initiates the evacuation. In this time, the purser may have checked on the condition of the pilots, who are trying to make sense of what just happened, evaluate the aircraft status and any fire, and complete the evacuation checklist. This scenario considers that the evacuation checklist is found quickly, the pilots are uninjured and are capable of initiating the evacuation. One finding of interest from the B777 accident at London Heathrow in 2008;

”Finding 36. The operator’s evacuation check list split the actions between the commander and co-pilot and was on a placard on the control column.

The commander operated the engine run/cutoff switch and the co-pilot the engine fire switches. The engine fire switches were operated first.”

[AAIB Report 1/2010]

Evacuation checklist on control column

One minute is a very long time for passengers to endure if it is obvious that an emergency situation exists. While cabin crew may instruct the passengers to remain seated and the seat belt signs are still illuminated, if the aircraft is stationary and no fire or smoke is visible, passengers will most likely revert to practice and retrieve their carry-on baggage from the overhead bins. This action will be very difficult to prevent when the cabin crewmembers are required to remain at their stations near the emergency exits. Retrieved carry-on bags will also add a significant time factor to the rest of the evacuation, as it will slow down and interrupt the passenger flow in the aisles. Other passengers will be prompted to retrieve their baggage also, adding to the evacuation delay.

If family members have been allocated seats in different parts of the cabin they may remain in the cabin after the signal to evacuate has been given, looking for fellow family members, when they should be focusing on exiting the aircraft.

The assertiveness of the cabin crew and their ability to exchange information is a critical aspect discussed in many accident reports and evacuation studies. Not only

can it become critical to prevent passengers from opening certain emergency exits due for instance to a danger of smoke entering the cabin; but assertiveness will also be necessary in redirecting passengers towards the closest usable exit.

Single family members separated from the group during the evacuation can create another evacuation blockage. The recent accident investigation referred to at the beginning of this article has shown that it fell to a cabin crewmember to convince a family to evacuate without their seven-year old daughter, who was subsequently found to have evacuated the aircraft safely.

Retrieved carry-on baggage will inevitably reach the emergency exits and cabin crewmembers are then faced with the decision to either attempt to remove the baggage from the passengers and possibly create a blockade of baggage near the exit, or let passengers evacuate with their baggage and risk injuries, or damage to the escape slide. Both options with potentially bad outcomes are likely to create evacuation delays.

"After commencement of the evacuation, it became difficult for the cabin crew to prevent passengers from evacuating without their personal belongings. The re-direction of passengers from blocked exits, combined with the bags that had been dropped in the aisles at the usable exits, led to increased congestion and pressure on the cabin crew. The movement of passengers onto the slides took priority over the requirement for passengers to remove sharp objects and leave their bags and belongings on the aircraft." [ATSB BO/200302980]

"Research has shown that, during evacuations, the safety of passengers and crew continues to be jeopardized by passengers (approximately 50 per cent) who retrieve their carry-on baggage before evacuating." [TSB Canada Report A05H0002]

The Flight Safety Foundation published a Cabin Crew Safety Circular in 2004 titled "Attempts to Retrieve Carry-on Baggage Increase Risks During Evacuation" and found that passengers may not perceive a life-threatening situation when they don't encounter smoke, fire or significant damage to the airplane. The study identified that "carry-on baggage brought to exits can set the stage for cascading problems." Retrieved and left-behind baggage reduce the flow and access to the exits, pile up in galleys and empty seats, and can block un-opened emergency exits which may become vital later in the evacuation. A shift of the aircraft attitude due to a collapsed landing gear or other factors also have the potential to shift this pile of baggage into the aisle, blocking further evacuation attempts.

The circular identified that forcefully removing baggage from passengers at the exits can jeopardize the cabin crewmembers' safe position and may result in a fall or a push out of the aircraft, causing potential injury and, importantly, leaving that exit unattended. Judging the correctness of cabin crew's decisions to remove baggage from passengers is a difficult or impossible task as stated in the circular, which concludes that cabin crew facing less-than-ideal options may be reduced to decide what will do the most good (or the least bad) at that time.

The National Transportation Safety Board published a 2001 safety study titled 'Emergency Evacuation on Commercial Airplanes' which examined safety issues including certification issues related to aircraft evacuations, the effectiveness of evacuation equipment, the adequacy of guidance and procedures related to evacuations and communication issues related to evacuations. Passengers with carry-on baggage were identified as the main obstruction to an evacuation, with nearly 50% of passengers attempting to take their carry-on baggage during the evacuation. The study found that emergency training did not provide cabin crew with enough strategies to deal with passengers who do not follow instructions and retrieve their baggage.

The NTSB concluded that "passengers attempting to evacuate the aircraft with carry-on baggage pose a serious risk to a successful evacuation and increase the potential for serious injuries or loss of life".

Is there a typical passenger behavior during an evacuation?

According to a study by Ed Galea, a professor and group director of the Fire Safety Engineering Group at the University of Greenwich, the U.K., passenger behavior is as varied and complex as the people themselves and the circumstances those people find themselves in. Typical human responses range from situational disorientation, where passengers remain in their seats in a state of disbelief; anxiety behavior, which may result in the inability to release the seatbelt or to open an over-wing emergency exit; social bonding behavior, which may result in passengers searching the cabin for friends or family members instead of evacuating; affiliative behavior, where passengers revert to familiar behavior, like collecting their baggage from the overhead bins; fear flight behavior, where passengers unbuckle the seatbelt and run to an exit before the evacuation is announced; physiological disorientation, in situations where the cabin is filled with smoke and the emergency exits cannot be located; altruistic behavior, where passengers attempt to be helpful even if they risk their own lives; behavior inaction, where passengers are unable to move; panic behavior, where potentially dangerous actions occur, such as pushing other passengers out of the way.

"Some of the passengers took personal items of luggage with them before exiting via the escape slides. One passenger, who had already evacuated the aircraft, climbed up the Door 4L escape slide to re-enter the cabin, and retrieve his personal belongings, and then exited the aircraft once more." [AAIB Report 1/2010]

Passenger statements and observations from a recent evacuation

A recent accident investigation by the Air Accident Investigation Sector, utilized a passenger and cabin crew

survey to better understand the evacuation flow and evacuation challenges.

It was found that the main delay in this evacuation was created by the failure of many of the aircraft emergency slides to provide a safe evacuation path, followed by passengers retrieving and then evacuating with carry-on baggage.

When smoke developed in the center of the cabin, it separated the occupants into two groups, one group in the forward cabin and the other in the aft cabin. This hindered the awareness of available exits and the flow of information between the cabin crewmembers. The smoke also separated some family groups when it became an impenetrable barrier. The prevailing environmental conditions resulted in wind affecting the escape slides on the safe side of the aircraft. The wind conditions also resulted in changes in slide availabilities throughout the evacuation.

The documented passenger flow identified persons attempting to evacuate from two or three different doors before they found a safe exit. A passenger seated in business class made her way towards the forward exit but, due to smoke outside, had to move towards the aft of the aircraft. She passed four closer but blocked exits, and eventually evacuated the aircraft using an aft exit on the side of the fire, exiting between fire trucks. A passenger from the left hand side of the economy class cabin identified a blockage at the aft exits and walked past five exits to evacuate from the right hand side of the business class cabin.

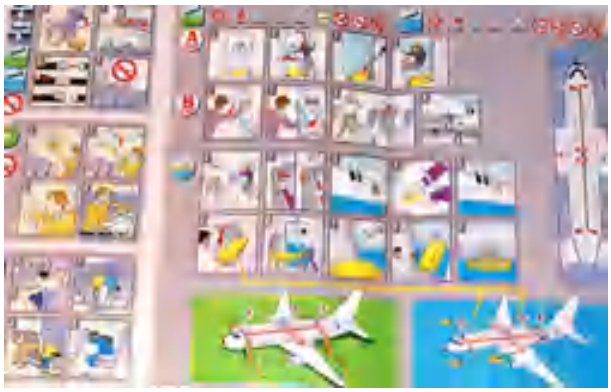
The results of the survey showed that, against all training, cabin crew had to evacuate 69% of the passengers towards the smoke-filled side, where fire-fighting activities were underway. 86% of all occupants evacuated from three of the ten aircraft emergency exits because the other seven exits were not available for periods of time, or throughout the entire evacuation.

From 54 passenger surveys received, representing 139 passengers, 48% answered “yes” to the question as to whether they took any belongings with them. The items brought by passengers during the evacuation varied from passports and wallets to one or more items of carry-on baggage. A review of videos and photos from the evacuation confirmed these numbers and showed many passengers with multiple pieces of carry-on baggage walking to the assembly point.

The investigation also looked at the distribution of the combined experience level of the cabin crewmembers. It revealed that 95% of the passengers, seated in economy, were attended by 8 out of 15 cabin crewmembers with 17% of the over-all aircraft cabin crew experience. The 1985 Manchester Airport accident investigation report included the following safety recommendation:

”Safety recommendation 4.13. Operators should adopt a policy of distributing the most experienced cabin crew throughout the passenger cabin.” [AAIB Report 8/88]

Safety cards and safety briefings



Safety Card

The provision of safety information to passengers is obviously important. However, an NTSB passenger survey indicates that 13% did not watch the safety briefings, while 48% claimed to have watched 75% of the briefing. 68% of the surveyed passengers indicated that they completely ignored the safety cards, with 89% of these claiming that they had read them before. A total of 44% of surveyed passengers, reported that they had neither listened to the safety briefing, nor read the safety card.

Adding interest to safety briefing

So, are safety cards and safety briefings too long, boring, confusing or irrelevant?

About 30% of passengers in published studies did not evacuate from their nearest available exit door, and the results of evacuation trials have shown that the opening of emergency doors by passengers was proven to be more successful when the passengers were familiarized with the instructions provided in the safety cards, or when a personal briefing was provided by a cabin crewmember.

"Less than half of passengers look at or read safety information cards, and under present regulations, this is the only means by which such information is provided to them before departure." [TSB Canada Report A05H0002]

Some airlines have introduced humor and entertainment into their safety demonstrations, which can be an effective way to gain passengers attention as long as the critical safety information is clear and understandable. Research undertaken by the Australian Transport Safety Bureau has found that gaining passengers attention for the pre-flight safety demonstration is a key factor in having passengers take responsibility for their own safety and for preparing themselves to take the correct action in an emergency situation. It is also a key factor in preventing injuries during the evacuation.

"Immediately after the impact, passenger 41D (seated in 41B) noticed that the seats where her fatally injured friends had been sitting (41D and 41E) were empty. All three students believed that their friends, passengers 41B and 41E, were ejected from the airplane during the impact." [NTSB/AAR-14/01]

While frequent flyers know where to find the bar on the upperdeck of an A380, how many know where to find the release mechanism to disconnect the slide raft from the aircraft, after a successful ditching?

Improving passenger behavior

Since the latest relevant passenger studies are from the 1990's and early 2000's, it appears that the industry has been distracted from further studying passenger evacuation behavior. Comprehensive survivability investigations, such as that conducted during the Asiana accident investigation are unfortunately rare.

New aircraft types have been added to the world fleet, existing aircraft have updated evacuation systems. These changes will lead to different passenger evacuation behavior, as the emergency exit door

height of an A380 Upper Deck would attest. The industry should ensure that updated aircraft evacuation studies are undertaken. Existing and future evacuation information must be considered during essential regular certification and design regulation reviews.

Adding interest to safety briefing

Many things are out of the operator's hands and must be addressed on an industry level. Here are some suggestions to consider:

- Adequate attention should be given to investigate emergency evacuations to gain a better insight into real passenger behavior, and to identify improvement opportunities in evacuation system design.
- Aircraft evacuation systems such as slides and doors must be certified for realistic operational environmental factors such as wind, rain, snow and non-normal aircraft attitude.
- Aircraft evacuation certification requirements must take realistic passenger compositions and behavior into consideration.
- Strategies should be developed to limit carry-on baggage to an industry acceptable size, weight and shape, taking into account existing evacuation experience.
- Crew evacuation training must consider and reflect information from actual evacuations.
- As far as possible, family members should be seated close together and not be separated during check-in.
- The before take-off and also the descent safety briefing should remind passengers to familiarize themselves with the closest exits; and repeat the requirement to leave baggage behind in case of an evacuation.
- Any evacuation must be initiated promptly and with a sense of urgency before passengers start to retrieve their carry-on baggage.
- Emergency exit rows should be occupied by passengers who understand the language and are physically able to open the emergency exits.
- Cabin crew experience levels could be distributed evenly throughout the cabin during the critical phases of flight.
- Other means of providing safety information should be explored.

References:

Ed Galea, Passenger Behavior in Emergency Situations, 2002

ATSB, Evacuation Commands for Optimal Passenger Management, 2006

ATSB, Sydney Aerodrome, Boeing 747-438, VH-OJU, 2 July 2003

TSB Canada, Toronto International Airport, Airbus A340-313, F-GLZQ, 2 August 2005

AAIB, Manchester International Airport, Boeing 737-236 Series 1, G-BGJL, 22 August 1985

AAIB, London Heathrow, Boeing 777-236ER, G-YMMM, 17 January 1988,

FSF, Specialist Study Evacuation Challenges of Very large Transport Aircraft, 2004

NTSB, San Francisco International Airport, Boeing 777-200ER, HL7742, 6 July 2013

Mohammad Athar Shams

Senior Safety Risk Specialist
GCAA

GCAA Voluntary Reporting System – VORSY

Aviation safety management today is about being proactive and predictive to the greatest possible extent so that safety concerns are addressed efficiently and adequately. As such, the activities of the aviation industry service providers need to be monitored so that any adverse precursors and trends that may lead to an incident or accident can be identified as early as possible.

UAE GCAA monitors industry activities through its regulatory framework supported by both mandatory and voluntary reporting systems. The mandatory reporting systems, which include ROSI, ROSB and RODGO, have been in place since 2010. The Voluntary Reporting System (VORSY) was introduced in January 2012.

The objective of VORSY is to collect reports on aviation safety hazards or incidents that may not have been captured through the GCAA mandatory reporting systems (ROSI, ROSB, RODGO etc.)

VORSY was established in line with the requirements of ICAO DOC 9859 (Safety Management Manual) and ICAO Annex 19 (Safety Management). A GCAA advisory publication, CAAP 57, provides guidance on the voluntary reporting program to individuals, UAE operators, foreign operators, and organizations.

All UAE registered operators, ANSPs, Aerodrome Operators and Maintenance Repair Organizations are required to promote VORSY within their respective organizations and they must ensure that the employees are aware of VORSY (Safety Alert – 09/2015 dated 14 May 2015).

VORSY is a reporting system, which anyone can use to voluntarily report any safety hazard, incident or violation relating to any area of aviation activity that may have the potential to affect the safe operation of the aircraft.

Reports relating to customer service, passenger baggage, and ticketing issues or any other information that do not constitute a hazard to the safe operation of aircraft, are not processed in the VORSY system and are rejected.

VORSY facilitates online receiving, reviewing and processing of aviation safety reports and all the reports are securely centralized.

The VORSY administrator is responsible for managing and processing the VORSY reports received through the online management system. The VORSY online system is independent of all other GCAA reporting systems.

Significant VORSY Reporting Areas

VORSY reports can be submitted anonymously. It is the discretion of the reporter to reveal his/her contact details.

The confidentiality of reported data and the identity of the reporter are important in the VORSY process. All contact details are de-identified and the contents of the report are reworded prior to commencement of the investigation.

The identity of the reporter is not revealed at any stage of the VORSY investigation process, unless required by law, or if the reporter authorizes the disclosure. Where the reporter states that the issue is already reported to the organization, the system automatically cautions the investigator who will investigate the case.

The entire processing of a VORSY report from receiving the report, assigning the report for investigation and closing the report, is carried out through the VORSY online management system.

One or more departments may investigate a VORSY report. A period of 45 days is normally sufficient for the

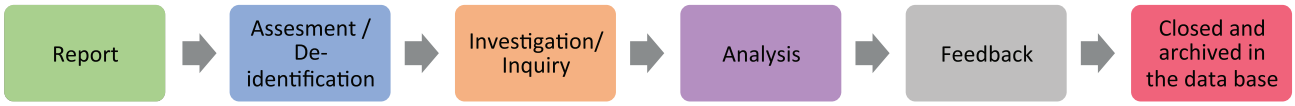
completion of an investigation. In complex cases, the investigation period may be longer.

The system automatically generates a target date when a report is initiated for investigation by the manager of the concerned department. The target date is 45 days from the date the report is initiated. The investigator can change the target date if more time is required by recording his justification in the system.

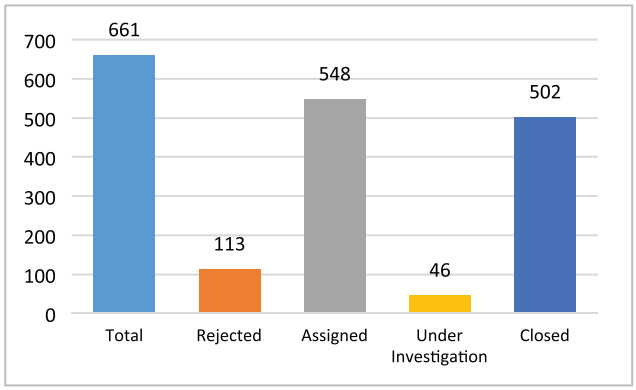
The VORSY online management system generates automatic reminders in case of "No Action" and "Overdue" reports.

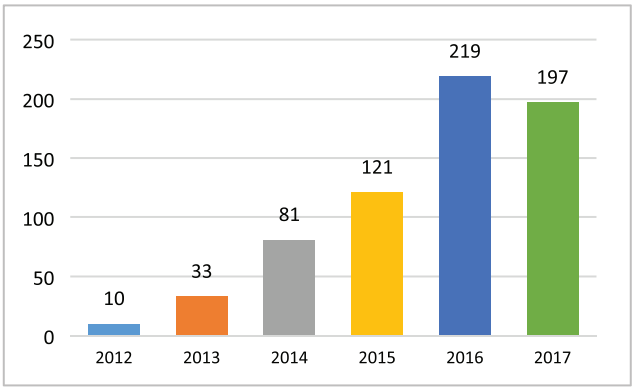
Feedback on VORSY reports is available when requested by the reporter if the reporter has provided their contact details.

Below is a schematic representation of the VORSY process;

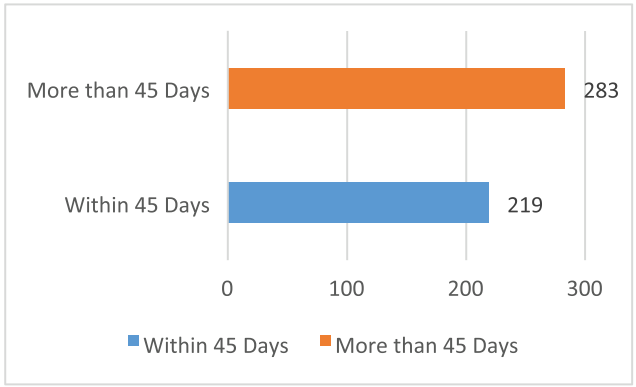


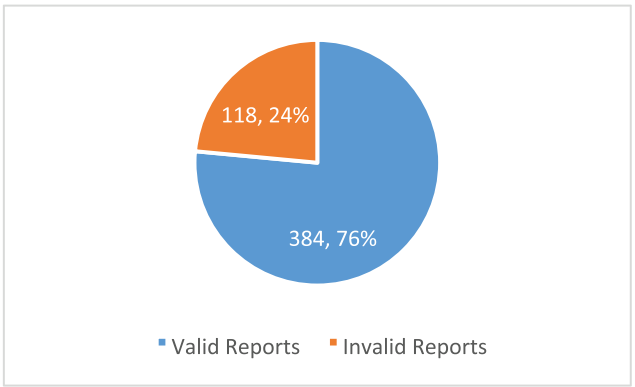
Analysis of the reports received through the VORSY online management system shows the following information as of 31 October 2017.



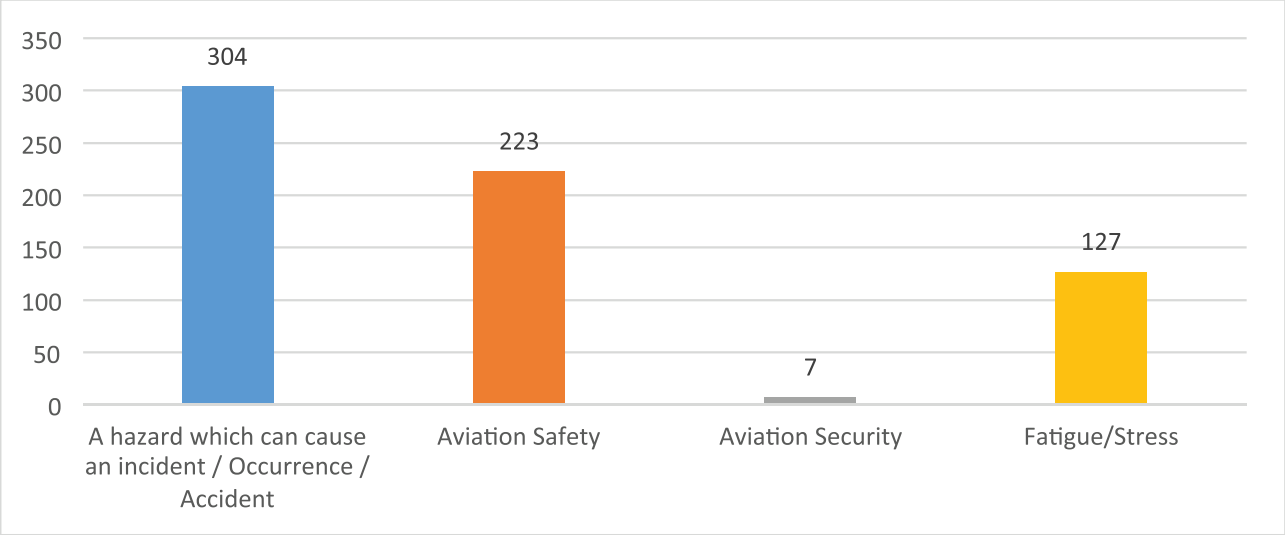


The period of the investigation depends on the nature of the report. The analysis reveals that nearly 57% of the reports investigated required more than 45 days for completion of the investigation. Based on the outcome of the reports investigated, 76% of the reports received were valid reports.

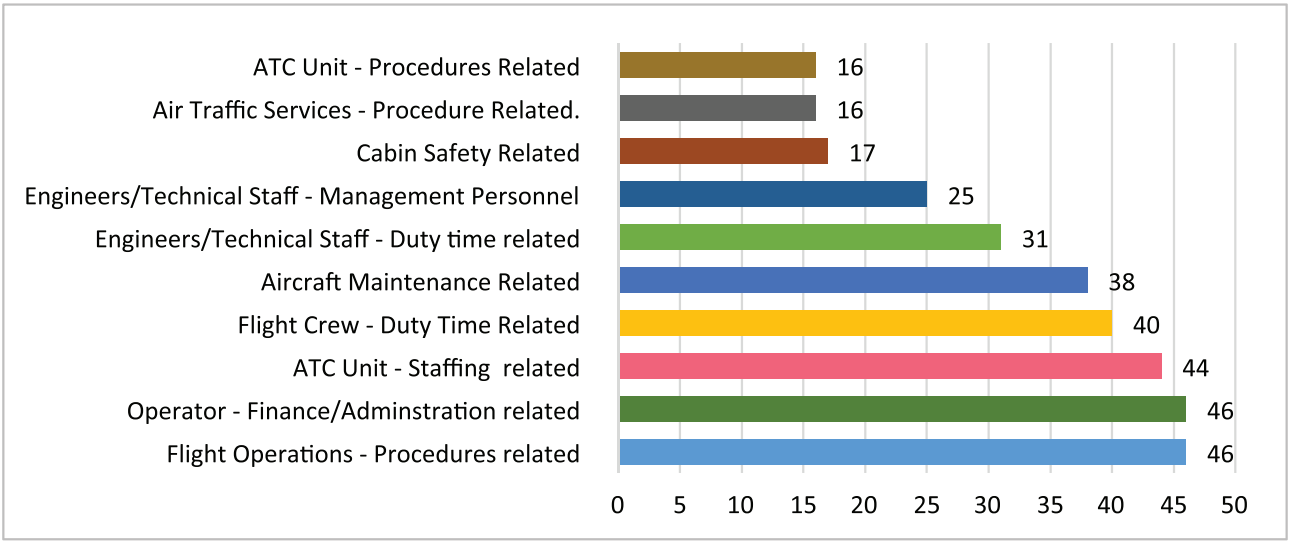




Below is the analysis of the classification of the report. 46 percent of reports were classified as a hazard which could cause an incident, occurrence, or an accident, followed by 34 percent of reports relating to aviation safety.



The reports received in the VORSY online management system are categorized based on the subject of the report and the outcome of the investigation. The graph below represents the top ten issues reported through the VORSY system.



Promotion and awareness of the voluntary reporting system in the aviation industry is very important. The SRM section develops promotional material and conducts awareness workshops for the industry.

Organizations that require promotional material or VORSY awareness sessions for their staff may contact the SRM section at vorsy@gcaa.gov.ae.

Report Hazards – Improve Aviation Safety

الهيئة العامة للطيران المدني
GENERAL CIVIL AVIATION AUTHORITY

United Arab Emirates

VOLUNTARY REPORTING SYSTEM (VORSY)

REPORT to improve aviation safety

To send a report, please visit: www.gcaa.gov.ae/en/vorsy/pages/vorsy_eform.aspx
or use GCAA SAMAE mobile application

SAMAE سمائي

- Scan this QR code to download GCAA SAMAE Application
- Refer to CAAP 57 - Voluntary Reporting System on GCAA website
- Communicate with a VORSY administrator: vorsy@gcaa.gov.ae

@GCAA_UAE FACEBOOK.COM/GCAAUAE GCAA_UAE GCAA.GOV.AE

الهيئة العامة للطيران المدني
GENERAL CIVIL AVIATION AUTHORITY

United Arab Emirates

CALL SIGN SIMILARITY - A SAFETY THREAT

Flight Crew Can Avoid Call Sign Confusion

- Use correct RTF procedures and discipline at all times.
- Use full RTF call signs at all times, unless call sign abbreviation has been introduced by ATC.
- Do not clip transmissions.
- Always use headsets during times of high RTF loading.
- Do not use readback for confirmation if in doubt about an ATC instruction.
- Positively confirm instructions with ATC if any doubt exists between flight crew members.
- Advise ATC if two or more aircraft with similar call signs are observed on the same frequency.
- Advise ATC if it is suspected that another aircraft has taken a clearance not intended for it.
- Advise ATC if it is suspected that another aircraft has misinterpreted an instruction.
- Always question unexpected instructions for any particular stage of flight.
- At critical stages of flight actively monitor ATC instructions and compliance with them.

هيئة اتحادية
Federal Authority

@GCAA_UAE
FACEBOOK.COM/GCAAUAE
GCAAUAE
GCAA_UAE
www.gcaa.gov.ae