



Asiana 214: Initial Organization Charts the Course of a Major Accident Investigation

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Introduction

On July 6, 2013, Asiana Airlines flight 214 crashed short of the runway at San Francisco International Airport. It was the first fatal in-flight accident of a Boeing 777, and the first major passenger carrier fatal accident in the U.S. in 5 years. Public and industry interest, domestically and internationally, was extremely high and attention was even more intense following the eyewitness videos showing a dramatic impact, and the tragic events surrounding a fire fighting vehicle rolling over one of the victims; a sixteen year-old girl.

The full NTSB met in June of 2014 to consider the report (1) including 26 recommendations, and determined the probable cause was “the flight crew’s mismanagement of the airplane’s descent during the visual approach, the pilot flying’s unintended deactivation of automatic airspeed control, the flight crew’s inadequate monitoring of airspeed, and the flight crew’s delayed execution of a go-around after they became aware that the airplane was below acceptable glidepath and airspeed tolerances.”

The accident was an “all hands on deck” event for the NTSB, involved participants and observers from dozens of organizations, and had intense and constant media, legal, and political attention. The report thoroughly lays out the events and safety issues, but this paper will describe and discuss lessons learned, successful and not, throughout the initial stages of the investigation, including the response and management of the complex on-scene activities while under scrutiny from many quarters.

“A mass casualty event”

In the midst of a summer holiday weekend, word came in of a major disaster at SFO. Initial media reports and second hand information were reporting a B777 “cartwheeled” on landing at SFO, “a mass casualty event” was reported, and a large post crash fire was apparent (figure 1).

The dramatic videos showing the “pirouette” after impact triggered comparisons to the Sioux City, Iowa DC-10 accident, but as more information came in it was more confusing. Traditional communications, and accounts cropping up in social media, showed a very large number of relatively uninjured occupants.

Other early reports did not pan out – one claimed the tail section was in the water, did this mean a water recovery to get the recorders? A report came in claiming over 60 fatalities trapped in the fuselage, what did that mean regarding post-crash fire? As it turned



Figure 1 - Initial Media Reports

out, neither was true, but the initial go-team response had to be prepared for these possibilities. The modern communication technology can be a mixed bag for investigators. Social media can provide a useful initial “eyes on” an event, but the low signal-to-noise ratio may not make it as helpful during the immediate on-scene phases.

The Geography of the Investigation

The composition of an investigative team of IIC and subject matter experts is very familiar, but this accident response benefited greatly from integration of numerous non-investigative functions, including liaison with other government authorities from the first responder through the local elected officials, legal interactions, and the press and media.(2) The investigator must strike an effective balance between the technical aspects of the case, and the necessary overlap with these functions. The organization of the investigation needs to account for the geography of the accident, the multiple environments in which the investigative activities take place. In this situation, geography means more than the typical assessment of the physical or natural environment. We have all had occasions where we needed to assess a difficult mountainside access, or perhaps a water recovery, but the geography of an event takes on far more aspects. The physical geography may include the built environment, man-made aspects whether urban or industrial, taking into account transportation access. We must also consider the human geography as a critical component – who is involved with the accident. Aviation is the epitome of a globalized industry, those involved in the investigation will almost certainly come from different nationalities, but beyond that, participants will have associations and outlooks of their own, forming another layer of interactions. An event the size of the Asiana accident will generate a political geography all of its own – not necessarily in the political sense of cities and countries, although that does play a role, but in the competing or overlapping interests of different authorities or groups. Especially in an airport environment, we will certainly have a security geography – who can and can’t access what areas, gatherings, or information. Press and media create a geography of their own as well, whether information distribution by the investigative authority, or coverage of the event by various media providers. While major aviation accidents have always captured the attention of the media, this is an aspect of the environment that has taken on rapid changes in recent years. The intense media pressures and demands, and the effects of floods of commentary from outside sources must be dealt with. An accident does not occur in a vacuum, and these various facets are part of the investigation’s geography; just as investigators might find the wreckage site buried by a blizzard, tangled in a jungle full of snakes, or sunk in pirate-infested waters, we must deal with all of these factors to effectively organize the work.

Location, Location

Clearly the access, at least to the main wreckage, was not going to be a physically difficult prospect, but it is critical in the first hours to connect as closely as possible with local authorities or other officials in order to eliminate the information distortion, ensure the site is appropriately

secured, in effect gaining an initial understanding of your environment. Although the team was launching all the way across the country, we determined an NTSB regional investigator was nearby and able to respond quickly to the location, make initial contact with the responders and find that the rumors of the tail section being submerged were not true. The investigator secured the flight recorders, while the go-team coordinated for air marshals to hand-carry them in an airline cockpit on a red-eye flight back to Washington. This effective use of NTSB and other agency resources dramatically expedited getting recorder data into the hands of investigators.

All of these facets benefit from a clearly defined structure beyond the groups and parties, but a physical grounding as well. An investigation of this size requires an effective core command post. The location and composition of the command post can set a tone for how much the various participants are integrated into the investigative process. In the case of SFO, once again, the team leveraged resources long distance, while en-route to coordinate for suitable space. A Board staff member specifically assigned to liaise with other agencies, coordinated with the local airport FBI liaison, who from there quickly arranged with the airport authority and major airline code-share (United Airlines) to obtain secure space for the investigative command post.

Focal Point for the Investigation

The team arrived close to midnight, and a select group took a brief walk-through of the accident site, an initial assessment of that part of the geography. As the sun rose on the first full day of activity, it was clear there was a massive task ahead. The investigation needed to form up and get to work, and the support structure and logistics needed to stand up immediately. The main wreckage was on or very close to runway 28L, it was clear that would be the center of activity, but pieces of wreckage were also obstructing the parallel runway, severely impacting the operation of one of the world's major airports. It was critical that we could begin effectively and efficiently start the investigative activity.



Figure 2 - Command Post with Parties

The investigative command post was established in an airline maintenance building (*figure 2*), which had advantages and drawbacks. San Francisco airport is built in a very urbanized area, on a peninsula, severely limiting the ground space, however, there are many major facilities on the field. The command post room was large enough and had good support for audio-visuals and internet access, and had secure access from public parking lots. Unfortunately, the secure access cut both ways – although the command post was not accessible to the public, the initial flood of participants

overwhelmed the security staff. As the investigation continued, and other individuals and organizations were added to the team, there needed to be a way to communicate access

authorization between the investigator and the airline's security staff. This points out the value in assigning a member of your team to specifically work security and access issues (we'll see this come up again.)

The investigator must ensure that the location of the command post is clearly described and appropriately disseminated among the parties and other appropriate participants. Directions, GPS-friendly addresses, descriptors, all can help. The NTSB Response Operations Center is our clearinghouse for this type of information, and all parties should proceed to the command post, not the wreckage.

The command post in SFO served us very well as our "high ground" in centering the investigation activities. It was a good working space with all the support needed. Without a well-defined and equipped command post, the multiple participants and associated other on-going activities present a risk of distracting and leading to parallel and uncoordinated partial investigations, or confusion and inappropriate overlap with the responders ICS post, locations selected for press briefings, or family assistance centers.

Organizing the Investigation Activities

The organizational meeting is the first step in ensuring a cohesive and thorough investigation is working in coordination with the first responders, airport operations, and other activities. While by law in the U.S., the NTSB safety investigation takes precedence, it is simply not possible to freeze all other activities while the investigation forms up. On day one, we already had a large and rapidly growing team, and we knew it would get larger and more complex as the participants from Korea arrived. The investigator needs to strike a balance between delaying the organization meeting while waiting for key participants to arrive, which can lead to wasted time as the early arrivals "kick tin" in a disorganized manner; versus getting started but possibly having to repeat the same material possibly multiple times.

During our org meeting, there was a very clear, and understandable, pressure hanging over our heads to get the structures group out onto the parallel runway to get it documented and cleared so operations could resume. After the group was identified and formed up, I made the tactical error of releasing them to head to the runway. As soon as that happened, the org meeting dissolved – it was just too distracting. The extra five or ten minutes to complete the org meeting would not have made much difference, and it cost more in "catch up" later on.

Day to Day at the Command Post

Who and what does need to be in the command post? In our case, the attendance log at the post reached over 110 people at certain times, all legitimate participants. Besides the core investigative team of NTSB, party, and Annex 13 participants, the various support staff of the Board also needed access and participation. The Board Member, staff assistants, Public Affairs, and Government Affairs all needed access and workspace in order to keep up on the activities,

prepare briefings and stay in close contact with the IIC. In recent years, on major investigations, the Board has also included a staffer from our General Counsel office. While this can take a bit of explaining, since we make it clear that lawyers from the various parties are not allowed to participate, the NTSB lawyers are not involved in litigation, and they can provide valuable service in ensuring procedural compliance, obtaining subpoenas, dealing with contract and insurance issues, etc. This is part of dealing with the political geography of a modern investigation – having this type of resource at hand is critical.

Retasking of investigators or other staff can also be a very helpful method to effectively manage the project. In SFO, we had a number of regional investigators respond within the first day or two, and some group chairs whose tasks rapidly dropped off. Rather than sending them home, they were retasked for such necessary functions as assisting with in-briefs of late arrivals or VIPs, coordinating with the information technology specialists to organize data and contact lists, and very importantly, we were able to assign a specific staffer to handle the airside site access and control. Normally, the structures group chair would manage the immediate site, but in this case, it would not have been at all practical, as he was dealing with wreckage spanning almost a half mile along the runway.

Site Access and Control



Figure 3- Command Post vs. Wreckage Location

Although the physical aspects of wreckage access were not difficult, the logistics, the man-made environment of airport facilities, and the security environment, all created hurdles for the investigation. The wreckage was very close to a runway, which had an active parallel and two crossing runways nearby, inside the secure area but

on the other side of the field from the command post (figure 3). Getting from the post to the wreckage site required going through secure, operating areas of the maintenance facility, and using airport rental car shuttle buses with certified drivers to bring the team to the site. Although somewhat complicated and time consuming, it was necessary and helped keep work organized considering the large number of investigative participants who had various needs and timelines. Transportation issues notwithstanding, a technique that worked very well for our team was a two-IIC scheme. One of us would take the wreckage site duty, and the other would man the

command post and work with the Board Member, and then the next day we would switch. With good communication between us, this worked out very effectively, and ensured we both had a good handle on the overall big picture and entire progress throughout the day.



Figure 4 - Site Access and Control

Similarly to the command post, the site also needed support and access control (figure 4). This seems like it ought to be automatic with the wreckage inside the perimeter of the airport, and that did keep out the general public or media, but there were still a number of different activities on-going, a complex

geography of its own. The first responders had their own

access capabilities and requirements, and in the early few days following the accident, local law enforcement had their own perimeter as they conducted the initial investigation into the possibility of a fatality due to the fire-fighting vehicle, a perimeter within a perimeter. In the U.S., first responders to major disaster event work under a standardized approach to incident management called Incident Command System (ICS). ICS is an operational concept for standardized, on-scene, all-hazards incident management. This allows for integration within a common organizational structure, and coordinated response and management of resources. Although the accident investigation organization does not come under this specific structure, the investigation team should understand how the responders are organized, and will relate to the ICS agencies under an umbrella guideline called National Incident Management System (NIMS) which provides for effective interactions. The NTSB also has a standing agreement with the Federal Bureau of Investigation (FBI) to leverage some of their resources, especially the Evidence Response Team. Seeing FBI uniforms on scene does not imply that a crime is suspected, but that the resources of a much larger agency, with applicable skills and equipment can be used to support the investigation.

We established multiple perimeters with accountable access on site as well as at the Command Post. All persons who arrived at the general perimeter that did not have permanent airport badges needed to be escorted by an NTSB staffer, and one of our people kept a running log. This allowed only access to the outer ring, in order to coordinate with investigators and other personnel. An inner perimeter for access to the wreckage itself and runway area was established (*figure 5*), managed by FBI staff and had a sign in log, and used a “buddy system” of accountability, due to the physical hazards associated with the wreckage, and the sheer size of the accident perimeter. The inner perimeter also handled personal protection and decontamination procedures. The system remained in place to help the family assistance group provide a viewing, and the Government Affairs staff to provide observation for local elected officials.



Figure 5 - Inner Perimeter

Challenges and Lessons Learned

We learn best from mistakes and things that could have gone better, and this on-scene was not unique. We don't necessarily have good answers to these issues, but hopefully these can help other investigators avoid some bumps in the future.



Figure 6 - Press Briefing

Time is a scarce commodity on an accident scene, and investigators can come under a great deal of pressure to provide specific response to many non-associated externals hungry for information (*figure 6*). This could be the media, other liaison functions, management levels, regulators, government officials both elected or administrative, etc. All of these entities can create time pressure on an investigator or group chair and potentially influence their activities. For example, in the first days in San Francisco we had some, but not nearly all, the FDR

plots in hand. The investigative team need to have a basic idea of what the data was saying in order to understand how the relevant airplane functions were affected, and make gross decisions about the progress of the investigation. But the initial on-scene phase was not the place and time to “get to the bottom of” the autoflight parameters. As investigators, of course we were going to

fully understand the autoflight data, but that was not perishable evidence. Time used trying to prematurely explain those aspects, was both a distraction from the investigators activities, and in fact not very effectual at getting to the bottom anyway. Disseminating information to the public, especially if relevant to a safety issue, is certainly important, but initial information is very persistent – in training, the “law of primacy” tells us that things learned first create a strong impression that is difficult to erase. It is critical for investigators to avoid chasing down threads that may look interesting or photogenic, but aren’t really perishable, at the expense of more time-critical activities, such as interviews and wreckage work.

Media inquiries, and their time requirements spanned the globe. U.S. media outlets on the east coast drove queries in the middle of our workday on the west coast, and then shortly afterward, the day would begin in the Korean time zone, and further media coordination was required. And of course on top of all this, was social media which has no set time zone at all! Simply managing the timing of press conferences with the need to keep appropriate authorities informed, was a noticeable distraction to our Korean counterparts and worked against effective integration into the investigative work. A further distraction were the hoax flight crew names broadcast that were unfortunately (and wrongly) confirmed by NTSB public affairs.

Although everyone was present and had full access to the command post side, and the wreckage, these demands coming in on the “backside of the clock” often meant we were not linked as well as we would like. The timeline of information release must be carefully understood by the investigator as well; after the fact, we realized that certain information from the FDR had been released and broadcast prior to conducting some of the crew interviews. This could very easily have biased the discussion, although the FDR information released was accurate, it by no means gave a full and complete story. It is pointless for an investigator to rail against these type of occurrences – they will happen, it is part of that media geography of the investigation. The investigator can help manage these distractions and issues with awareness and planning. Ensure that your participants from far distant time zones are specifically and fully assigned to investigative activities. If there is a need to coordinate public releases and other information, ensure that is a task assigned to a specific individual, who will not be splitting time with investigative tasks.

One of the strongest techniques we use at the NTSB is the evening progress meeting. At the close of each work day, we gather all of the group chairs, technical specialists, coordinators and accredited representatives etc. for a frank and open exchange of the day’s findings and plans for on-going work. On numerous occasions, investigators saw that the non-investigative staff was in attendance (appropriately), but it gave the participants some reluctance to speaking freely for fear that they might say something that would be publically released. The exchange of technical information is central to a well integrated investigation, and the IIC must make the ground rules very clear – although the information presented helps the support staff and spokesperson better understand the accident scenario, only information specifically cleared by the IIC, and

specifically factual will be released. All levels of the investigation team must understand this concept and avoid a chilling effect on the open discussion.

As this was one of the largest airline events in the U.S. in many years, various AIBs from other, non-involved countries requested and were granted, observer status, as well as observers from the U.S. military and other cities' fire departments. This was obviously seen as an excellent learning opportunity for these attendees, but this writer will be the first to admit that we did not really have a suitable way to integrate the observers into the investigation. As discussed above, site access was not easy, and there were certain activities such as interviews, in which an observer would not be appropriate. In-briefings and updates would be out of synch with the on-going process. As noted above, although initially it looked as if there were too many people making up that 110 member sign-in log, this is an important challenge that could be taken up by someone whose initial duties might have spooled down.

Cleaning Up

Although the airport authority was quite supportive of the investigation proceeding in a thorough manner, clearly, time was limited and the wreckage would need to be cleared away from the runway as soon as practical. Not long into the on-scene activity, we had to begin the



Figure 7 - Wreckage Recovery

coordination with the airline, the insurance carrier, recovery contractors, airport authority, and storage provider. At SFO, we used a multi-step process to move the wreckage during the investigation, preserving access for investigative groups, maintaining custody and security, and accounting for potential future needs of the operator in litigation. The first step entailed clearing the wreckage in a few large segments away from the runway and to a temporary ramp storage area on the airport. The aft portion of the aircraft had lost all structural integrity from impact, so was mostly small sections, moved in large trucks. The wings were sectioned, and the remaining fuselage moved on flatbeds to the ramp. The fuselage was accessible for 3 weeks for the survival factors group to do work, while a final storage area was negotiated. At this point, it became quite complex, as the investigation team had examined or harvested what it needed, but different entities involved in possible litigation could not agree on whether to cut the wreckage into small sections, making it cheaper and easier to move to storage, or shrink-wrap the entire fuselage and barge it across San Francisco Bay, obviously a huge expense. With assistance from our legal staff, and clearly outlined requirements for the safety investigation and further needs, eventually the plan of small sectioning was agreed upon.

Conclusion

The Asiana 214 accident response had a geography that encompassed an airport, bridged an ocean, and incorporated a human and media environment that brought us many opportunities to coordinate an unprecedented number of participants in a wide span of activity. A clear and focused structure to the investigation, anchored to defined working areas, and supported with professional teamwork and effort, completed a thorough and accurate investigation of one of the world's largest airplanes, on a runway in the middle of one of the world's busiest airports with on-going operations, all the while under the unblinking eye of 24 hour attention.

- (1) <http://www.nts.gov/doclib/reports/2014/AAR1401.pdf>
- (2) *It is important to note that a large portion of the NTSB's work is conducted in the family and survivor assistance area, by the office of Transportation Disaster Assistance. Although the investigative structure does liaison with TDA to some extent, family and survivor assistance is beyond the scope of this article.*