# HUMAN FACTORS NEWS

Issue 10 November 2014

## INVESTIGATIONS

Human Factors Training Solutions

In this newsletter we will look at how investigations play an important role in aviation safety. It will include some key points for someone acting in a safety investigator role/

Whenever there is an incident or accident in our industry, an investigation usually follows. In your role you may need to be the investigator. This sounds simple enough, but unless you have been specifically trained and have had an opportunity to gain some experience, the task will be daunting.

If you are sitting on the other side of the table, being questioned about an incident, you may find the whole investigation process quite daunting as well.

What is important to remember is that a professional investigation is a bonus because it will result in improved safety for everyone.

HFTS will be transferring its popular classroom Incident Investigation Course to an online program early in 2015. Details will be available soon.

## Loss of Virgin Galactic Spacecraft


Early reports from the NTSB investigation into the loss of the Virgin Galactic spacecraft indicate that a locking lever was pulled prematurely and subsequent aerodynamic forces deployed a feathering mechanism, which resulted in the in-flight separation of the wings from the vehicle. Will the investigation find out *why* the lever was pulled prematurely?

## The Failure of Big Blue

On July 14, 1999, while lifting a 500 tonne section of the roof for the Milwaukee Brewers new stadium, a crane nicknamed 'Big Blue' suddenly collapsed. As a result of the collapse, three workers died and five others were injured. A safety inspector filmed the accident – see: http://www.youtube.com/watch?v=Gjib_I_ab84

(Photo courtesy of NIOSH FACE report 99-11 with credit to John A. Thraen)

Law firms spent over 15 months preparing for the subsequent trial. 122 depositions were taken, and over 150,000 pages of documents were reviewed. After a 7 week trial, the jury found the crane's operator, Mitsubishi Heavy Industries America, Inc., was 97% responsible for the accident. They decided that the crane load charts did not include provisions for wind loads on the piece being lifted, only on the crane itself. They also noted the crane's wind speed meter, which monitored site wind conditions, was not at the height of the actual load.

So, after a multi-million dollar trial, we know what happened - the wind blew the crane over. But several questions remain: Who calculated the wind charts? Why didn't they include the effect of wind on the load? Why was the wind speed meter located several hundred feet below the load? Who made the decision to make the lift? How was that decided upon? And so on.

The answers to these questions are critical in fully understanding this tragedy and in preventing the same thing happening again. Crane operators familiar with the Big Blue collapse are no doubt wary of lifting large loads in windy conditions. But they need to know precisely how to make the decision to lift safely.

A good investigation would have revealed this. A good investigation establishes what happens but more importantly determines why it happens. Only by knowing why, can you prevent history from repeating itself.

Unfortunately many safety investigators do not establish why events occur. Until recently, many of aviation's incidents and accidents were simply attributed to pilot error. This is not helpful to you and me. We want to know why a pilot made a poor decision, why they lost awareness, why they failed to understand a seemingly simple communication, etc. This is the key to reducing error rates.

Being a good investigator is not only for the ATSB. It is also relevant for safety officers, chief pilots, line pilots, ground crew, and cabin crew. In short, everyone connected with flying needs to be able to work out why things go right and why they go wrong. Every time you realise that you have made an error, make a deliberate attempt to work out why.

## Changes at HFTS

Alison Meyer has relinquished her position as Training Manager with HFTS and has taken on the role of Human Factors Specialist with Emirates Airlines in Dubai. Emirates received almost 300 applicants in a global search for the position. This is obviously a great opportunity for Alison and shows that her talent and experience is widely valued in the industry.

Alison was a founding member of HFTS and has provided tremendous input into the original and current programs. We wish her well.


## Looking for Errors

Detecting errors is the first step in the investigation process. You can only start asking "Why?" after you realise you have made an error.

In a study conducted by Matthew Thomas from the Centre for Applied Behavioural Science at the University of South Australia, it was found that an average of 2.41 errors were made on a typical flight sector during normal line operations of a commercial aviation operator.

**Where the error occurred:**

| | |
|---|---|
| Pre-departure | 13.4% |
| Take-off and Climb | 18.7% |
| Cruise | 16.3% |
| Approach / Landing | 42.7% |
| Taxi in | 8.9% |

**Who made the error:**

| | |
|---|---|
| Captain | 41.1% |
| First Officer | 45.5% |
| Both Crew | 13.4% |

**Who detected the error:**

| | |
|---|---|
| Captain | 26% |
| First Officer | 10.2% |
| Other | 6.9% |
| **Nobody** | **56.9%** |

**How the error was detected:**

| | |
|---|---|
| Aircraft Warning System | 4.5% |
| Aircraft Performance | 2.4% |
| Cross-Check | 23.6% |
| Scan (self-monitoring) | 9.3% |
| Checklist | 0.8% |
| Other | 2.4% |
| None | 56.9% |

**What was the outcome of the error:**

| | |
|---|---|
| Inconsequential | 94.7% |
| Additional Error | 3.3% |
| Undesired Aircraft State | 2.0% |

*2% of 2.41 errors per sector equals **1 undesired aircraft state per 21 sectors.** How many sectors will you fly this year?*

# Setting up an Interview

During the investigation of an incident you will often be talking to the people directly involved in the event.

Don't take anyone's word as gospel. Incidents often involve a very stressful event and adrenalin and fear can alter the person's memory of that event. Very few witnesses will be deliberately deceptive, however you must look for supporting evidence for their claims.

Recollections can also be tainted by talking to other people or the person's mind 'filling in the blanks' for parts they don't actually remember.

## Who?

Decide who you need to interview. Select the people who had a key role in the event to interview first. If you have two flight crew it is a good idea to interview both of them as the pilot flying and the pilot monitoring often have different recollections of the event.

## Why?

Tell them why you would like to talk to them and outline the investigation process. It's important that they understand that the role of the safety officer / department is not to apportion blame, but to improve safety.

## When?

It is important to set the interview up as soon as possible, so that details of the event are more easily recalled. However, if the person has been injured or involved in a fatal accident, it may be best to wait until they have recovered and are comfortable talking before you interview them. If this is the case, ask them to write down everything they can recall about the event in as much detail as possible, as soon as possible, to try and capture the details of the event before they are forgotten.

## Where?

It is easier and more natural to interview someone in person, however if that's not possible, over the phone is fine too. Contact the person to set up an interview time and location, don't just ring them and launch into the interview. You need to be professional but approachable. Be accommodating of their needs and aware that they have been through a stressful and possibly traumatic event.

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