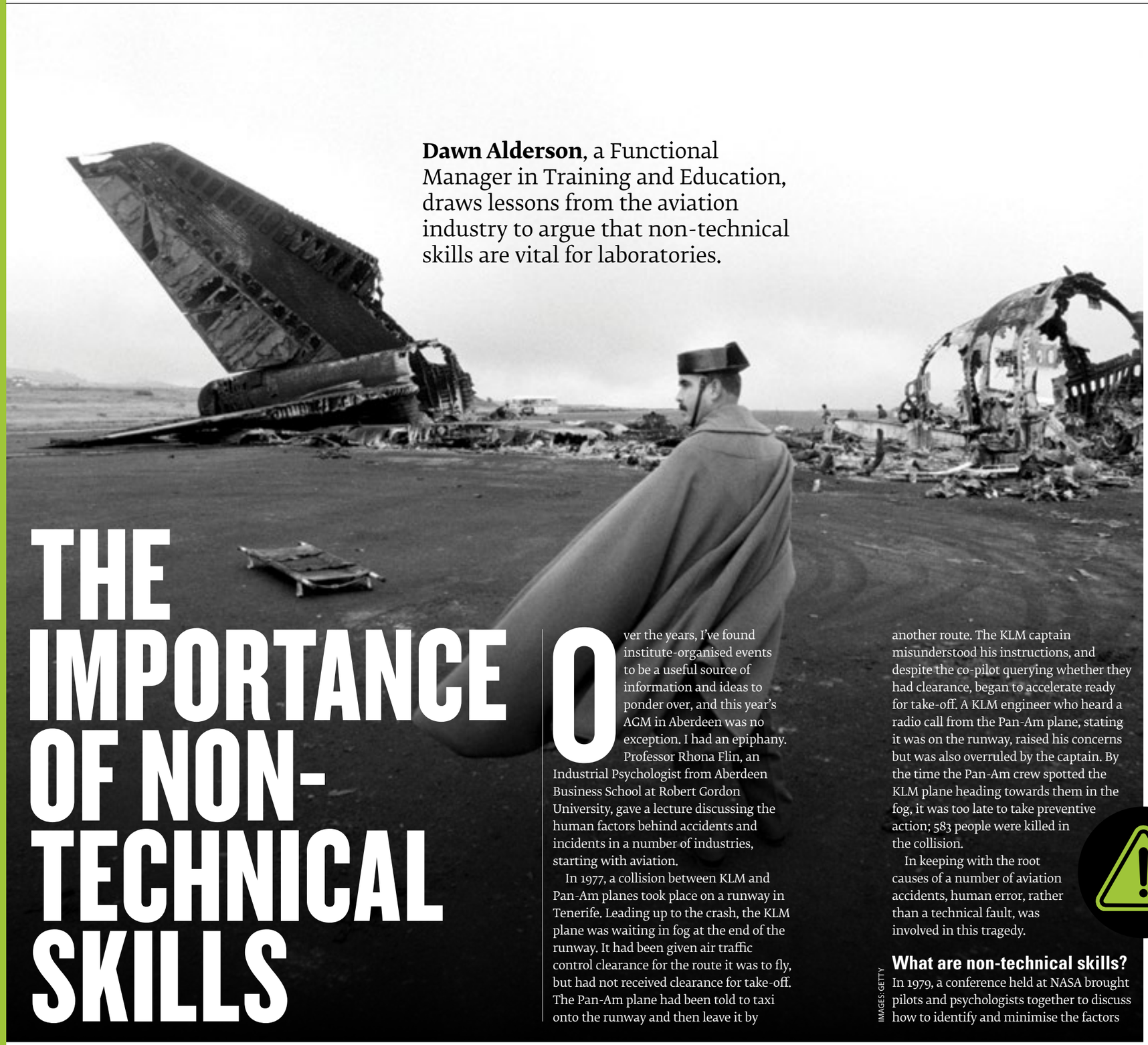

Dawn Alderson, a Functional Manager in Training and Education, draws lessons from the aviation industry to argue that non-technical skills are vital for laboratories.

THE IMPORTANCE OF NON-TECHNICAL SKILLS

Over the years, I've found institute-organised events to be a useful source of information and ideas to ponder over, and this year's AGM in Aberdeen was no exception. I had an epiphany.

Professor Rhona Flin, an Industrial Psychologist from Aberdeen Business School at Robert Gordon University, gave a lecture discussing the human factors behind accidents and incidents in a number of industries, starting with aviation.

In 1977, a collision between KLM and Pan-Am planes took place on a runway in Tenerife. Leading up to the crash, the KLM plane was waiting in fog at the end of the runway. It had been given air traffic control clearance for the route it was to fly, but had not received clearance for take-off. The Pan-Am plane had been told to taxi onto the runway and then leave it by another route. The KLM captain misunderstood his instructions, and despite the co-pilot querying whether they had clearance, began to accelerate ready for take-off. A KLM engineer who heard a radio call from the Pan-Am plane, stating it was on the runway, raised his concerns but was also overruled by the captain. By the time the Pan-Am crew spotted the KLM plane heading towards them in the fog, it was too late to take preventive action; 583 people were killed in the collision.

In keeping with the root causes of a number of aviation accidents, human error, rather than a technical fault, was involved in this tragedy.

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What are non-technical skills?

In 1979, a conference held at NASA brought pilots and psychologists together to discuss how to identify and minimise the factors behind human error in the aviation industry. Replaying conversations which took place in the minutes leading up to accidents highlighted a number of failures related to lack of assertiveness, stress, fatigue, team coordination, communication, leadership, decision-making and attention to the task. All of these factors were identified in the investigation into the Tenerife crash.

Aviation is not the only industry to be singled out. Investigations into accidents at the Chernobyl nuclear plant and the Piper Alpha oil platform, groundings of ships, and hospital adverse events, such as the removal of the wrong kidney, have revealed similar factors. The military, emergency services and high-risk industries, such as healthcare and the oil and nuclear industries, now consider competences other than technical skills to be important.

"Non-technical skills" (NTS), a term coined by European civil aviation regulator, The Joint Aviation Authorities, were described by Flin *et al*, in 2008 as: "The cognitive, social, and personal resource skills that complement technical skills, and contribute to safe and efficient task performance." Training in NTS, or crew resource management (CRM), as it is known in aviation, is now mandatory for most commercial pilots across the world.

Identification of NTS

Behaviours and skills regarded as required or hazardous in a given role may be identified by a number of means, including interviewing staff, observing teams at work, and reviewing accident reports. Once these behaviours and skills have been identified, training can be carried out to fill gaps in competences.

Assessment of NTS

Assessment of NTS is based on observations made when tasks are carried out by individuals within a team setting – NTS are related to behaviours at work, and not to an individual's personality.

Accidents and incidents can cause damage to people, property, environment and reputation

Importance of NTS

Accidents and incidents can cause damage to people, property, the environment and the reputation of an organisation, as well as creating costly downtime.

It's been estimated that around three-quarters of accidents have a root cause attributable to human error; consequently it makes sense for managers to understand the behaviours of those working in environments where safety is paramount. I suggest that the same can be applied to the quality of work carried out in a laboratory, where human factors are root causes of many of the anomalies documented and investigated via our quality management systems. Those working together in the same environment are best placed to spot and correct their own errors and omissions, and those of others and, in doing so, could prevent accidents and anomalies from occurring in the first place.

Research carried out in the aviation industry has shown the importance of

assertiveness in staff in junior roles; the Tenerife plane collision was such an example. Had the engineer and co-pilot been more assertive in raising their concerns, and had the captain listened and acted upon these concerns, disaster may have been averted. In healthcare, one's position in the hierarchy has been shown to affect behaviours such as the ability to speak up and challenge others' behaviour. However, job titles do not confer immunity against occasional lapses of judgement.

Repeatedly raising concerns about someone who is not following standard operating procedures (SOPs) is not a demonstration of a clash of personalities, for the reasons mentioned above. Perhaps a trainer is not following an SOP, setting a precedent that this is an acceptable behaviour. Would a new trainee have the confidence and assertiveness skills to challenge this behaviour, and is the trainee going to be told that they "have no right to challenge a manager" if they do? Perhaps they have been told that following SOPs turns people into robots who are unable to think for themselves.

While reviewing health and safety documents recently, I came across a 2012 HSE research report, compiled in response to findings from RIDDOR investigations in laboratories handling Category 3 biological agents. Non-compliance with SOPs was a frequent finding:

"An organisational culture where staff feel able to challenge management pressure was reported to be an important factor in compliance with SOPs.

"A progressive management approach should recognise this and be mindful that short-term productivity gains could compromise health and safety and set the tone within the work environment where non-compliance with SOPs may become the accepted way of working in order to get the work done in the time available."

Had the engineer and co-pilot been more assertive in raising concerns, disaster may have been averted

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Conclusions

Embedding SOPs in a quality system, and encouraging staff to suggest changes provides a vehicle for innovative methods to be brought into day-to-day use, once they have been validated. Non-compliance with SOPs impacts upon repeatability, undermines the quality of testing and potentially the safety of those involved. It is an example of poor behaviour in NTS terms.

Every team member needs to take responsibility for working safely and ensuring the quality of work carried out collectively; those who are on the Science Council's voluntary professional registers are required to demonstrate these competences.

My parting words are that Captain Chesley "Sully" Sullenberger – famed for safely landing his plane on the Hudson River after hitting a flock of geese shortly after take-off – was a technically competent pilot and also a CRM trainer. CRM skills allowed the crew to work together in a coordinated response to the incident, leading to everyone on board surviving.

Are you looking out for your crew and passengers every day? BMS

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