INCREASING DEPTH, FAIRNESS AND EFFECTIVENESS OF SAFETY INVESTIGATIONS

Dr. Nektarios Karanikas, CEng, PMP, GradIOSH, MRAeS, MIET, Lt. Col. (ret.)
Associate Professor of Safety & Human Factors

Aviation Academy

Tutorial, Safety Officers and Investigators Course, Hellenic Air Force, 10th November 2017

SAFETY INVESTIGATIONS: EXPECTATIONS & REALITY

www.international.hva.nl

SAFETY INVESTIGATIONS

- Implicit or explicit boundaries: scope, schedule and costs
- Scope: Can it include everything?
  - Yes, the scope is open, meaning:
    - no bottom, up, left, right, in, out limits
    - but, also no criteria to assess the depth and extent of the investigation
  - Is the scope really widely open?
    - Political influences
    - Emotional effects
    - Etc.
- Is there a schedule?
  - There is always a starting date
  - Can the completion date been really decided beforehand?

SAFETY INVESTIGATIONS

- Are there any cost limits?
  - Yes and no: it depends on the organisation
  - Military aviation records investigation costs more frequently than civil aviation
- Any other limits?
  - Your and your team's skills, experience and human performance
  - The techniques and methods you use
  - The quality of evidence and data and their processing

SAFETY INVESTIGATIONS

- In reality:
  - Boundaries exist but not explicitly stated: safety is over all – who dares to constrain the investigators?
  - All investigations have inherent, predefined or emerging limitations
  - Limitations means assumptions
  - Assumptions means imperfections

SO WHAT…?

- If limitations and their corresponding assumptions are not documented:
  - We actually claim that we performed a perfect investigation
  - Our investigation report can be less credible and more open to disputes
  - We do not give the opportunity for meta-studies to collect information to be used for decreasing limitations
  - People involved do not understand why we stopped at them and we did not proceed further, deeper etc.: they view our report as "unfair".

LET'S BECOME PRAGMATIC

- What is the purpose of an investigation?

  - "A process conducted for the purpose of accident prevention which includes the gathering and analysis of information, the drawing of conclusions, including the determination of causes and, when appropriate, the making of safety recommendations". (ICAO, Annex 13).

- What is the purpose of an investigator?

  - We can't prevent any accident or incident: we do not implement the recommendations!

  - Our ultimate purpose is to convince stakeholders that it's important to apply the safety recommendations.

  - We cannot fully convince anyone if our report is of poor quality: unless we write what the others want to read!

EVEN FURTHER...

- Investigators hold in their hands a huge power and responsibility:
    - Their report is and will be the main source now and for the generations to come to learn from the past.
    - They actually write a piece of history!

HERE IS THE QUESTION

How can we improve the depth, fairness and effectiveness of investigations within given and emerging limitations?
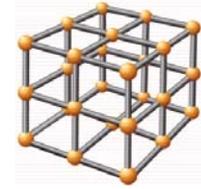
THE ROAD TO IMPROVEMENT

EVOLUTION IN SAFETY THINKING

- Accident causation models: from root cause, to epidemiological and systemic approaches.
- New views on human error: from blaming, to understanding end-user's decisions and actions.

HUMAN ERROR SEEN AS SYMPTOM

Traditional View	New View
Human Error is seen as the principal cause of accidents.	Search for factors that led to Human Error.

(Dekker, 2006)

- **Thinking further:** Traditionally, factors are named as causal or contributing.
 - What is the value of that distinction?
  - What does it imply?
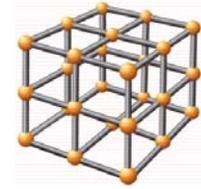
HINDSIGHT BIAS AVOIDANCE

Traditional View	New View
Looking to the event backwards and simply recording errors, inaccurate assessments and wrong decisions.	Consider why choices made sense to users at that time, and what options they had prior to the accident.

(Dekker, 2006)

- Reminder: People act under given resources and capacity
- Maybe if they hadn't done something wrong, they could have done something else wrong, which now was performed right!
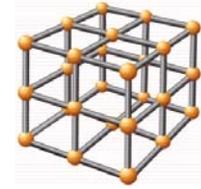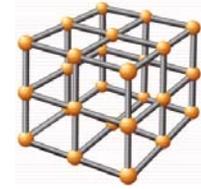
SHARED RESPONSIBILITY

Traditional View	New View
Focus on end-user(s) without exploring influences of other organizational levels.	End-user is not the focal point; organizational factors are also investigated.

(Catino, 2008; Dekker, 2006)

- **Reminder:** Rasmussen discussed also about the effects of regulators, authorities and governments

NON-PROXIMAL APPROACH

Traditional View	New View
Shared responsibility might be discussed, but investigators persist on investigating in detail the end-user level.	Proportional investigation depth of all organizational functions.

(Dekker, 2006)

- Check: How much time have is spent and how much space has been devoted in the reports when addressing organisational and other layers?

- Are these equivalent to the ones regarding the lower levels?
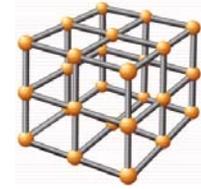
DECOMPOSITION OF FOLK MODELS

Traditional View	New View
Abstract statements are named as causes (e.g., culture, complacency).	Decomposing and explaining the contstucts.

(Dekker & Hollnagel, 2004; Dekker, 2006)

- **Advise:** there is almost no value to name constructs as causes: they don't really exist, so they cannot cause anything.
- It's convenient to use folk models as scapegoats, but this does not add anything to our knowledge.
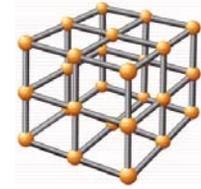
NON-COUNTERFACTUAL APPROACH

Traditional View	New View
Merely comparing human performance against standards and procedures.	Exploring the reasons for deviating from standards. Examining the assumptions that the standards were based on.

(Dekker, 2006)

- **Reminder:** standards cannot change with the pace of real life and cannot capture dynamic behaviours.
- There is little value in shifting the blame from end-users to managers and regulators: help the system understand and evolve safely!

17
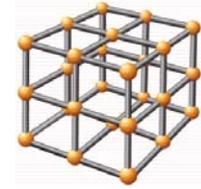
NON-JUDGMENTAL APPROACH

Traditional View	New View
Actions are compared with norms and expectations (e.g., knowledge, experience and training).	Exploring the reasons for not meeting expectations. Examining the validity of established norms and expectations.

(Dekker, 2006)

- **Reflect:** How frequently do you judge people based on unspoken and unwritten expectations?
- Remember that past success does not guarantee future performance.
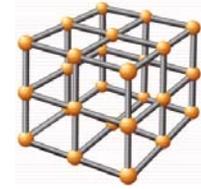
SAFETY-I TOGETHER WITH SAFETY-II

Traditional View	New View
Humans are predominantly seen as a hazard. Emphasis is on explaining failures.	Humans are seen as a resource necessary for system flexibility and resilience. Need to explain successes in addition to failures.

(Hollnagel, 2014)

- **Attention:** Safety-II can be misused!
- Since other people succeeded in the past under same conditions, then you are the problem!

19
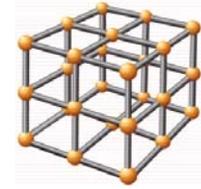
FEEDBACK LOOPS

Traditional View	New View
Feedback mechanisms not systematically investigated.	Feedback mechanisms are considered, so to examine whether/how system awareness and control were maintained.

(Leveson, 2011)

- **Attention:** Need for feedback does not mean bombarding the user with data/information and then blame for insufficient awareness and control!
- Recall: people have capacity limitations
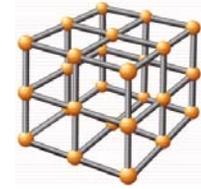
ACCIDENT MODELS

	Sequential models	**Epidemiological models**	**Systemic models**
Search principle	Specific causes and well-defined links.	Carriers, barriers and latent conditions.	Tight couplings and complex interactions.
Analysis goals	Eliminate or contain causes.	Make defences and barriers stronger.	Monitor and control performance variability.

(Underwood & Waterson, 2013; Hollnagel & Goteman, 2004; Leveson, 2004, 2011; Reason et al., 2006)

- Attention: Application of simple models to events just confirms that the events were simple!
- Everything can be as much complex or simple as much you want to see it.

WHAT ABOUT SOME PRACTICE?

IS THERE ROOM FOR IMPROVEMENT?

- Read the investigation report you brought and use the "check-list" provided to:
  - Detect points that new views on safety and human error were applied (or attempted!)
  - Indicate signals of traditional views and suggest how those would be improved.
- We will discuss your findings with the class.

CALL TO ACTION

- There is no right or wrong way of investigating as long as you state your limitations and assumptions.

- The application of new safety thinking means increased investment of resources: everything in life is a matter of trade-offs!

- You can use the safety thinking aspects to "self-check" your investigations process and report.

- Use the results of your self-check to improve the investigation (within the external boundaries!) and formulate the boundaries of your own work.

- New safety thinking is not only about investigations: it is about shifting our minds and changing ourselves and extents across all personal and vocational activities!

INCREASING DEPTH, FAIRNESS AND EFFECTIVENESS OF SAFETY INVESTIGATIONS

Dr. Nektarios Karanikas, CEng, PMP, GradIOSH, MRAeS, MIET, Lt. Col. (ret.)
Associate Professor of Safety & Human Factors

Aviation Academy

Thank you!

Tutorial, Safety Officers and Investigators Course, Hellenic Air Force, 10th November 2017

Contact: nektkar@gmail.com, n.karanikas@hva.nl

CREATING TOMORROW