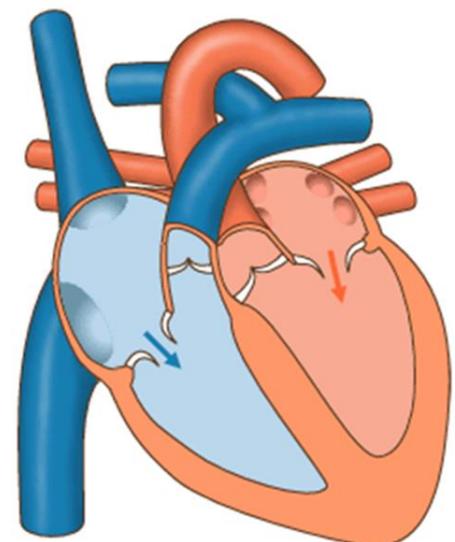


Accident Investigation

Causal Analysis using System Theory

A pilot incapacitation

Presented by: Elias Nikolaidis



Disclaimer

CAST is a different Mindset

3

If you act the same way you will have the same results

Aristotle
(384 to 322 BC)

Our beliefs and our way of thinking is learned during our childhood and guide us how we act

Plato (427 to 347 bc) and
Aristotle (384 to 322 BC)

An accident where innocent people are killed is tragic, but not nearly as tragic as not learning from it.

Nancy Leveson
CAST HANDBOOK

The CAST

Assemble Basic Information

Model Safety Control Structure

Analyze Each Component in Loss

Identify Control Structure Flaws

Create Improvement Program

My first investigation with the new mindset

5

A Commander had his annual medical check in the morning.

He flew as a crew member of a flight to Amsterdam with a scheduled cargo flight operated by a Boeing 777 freighter aircraft.

Onboard were two flight crewmembers, one loadmaster and a corporate security officer.

The Commander collapsed while trying to pull his meal tray in the galley, during cruise. The security officer started immediately CPR.

On being informed that the Commander was incapacitated, the Copilot declared a MAYDAY and advised air traffic control that the flight would divert to an enroute alternate.

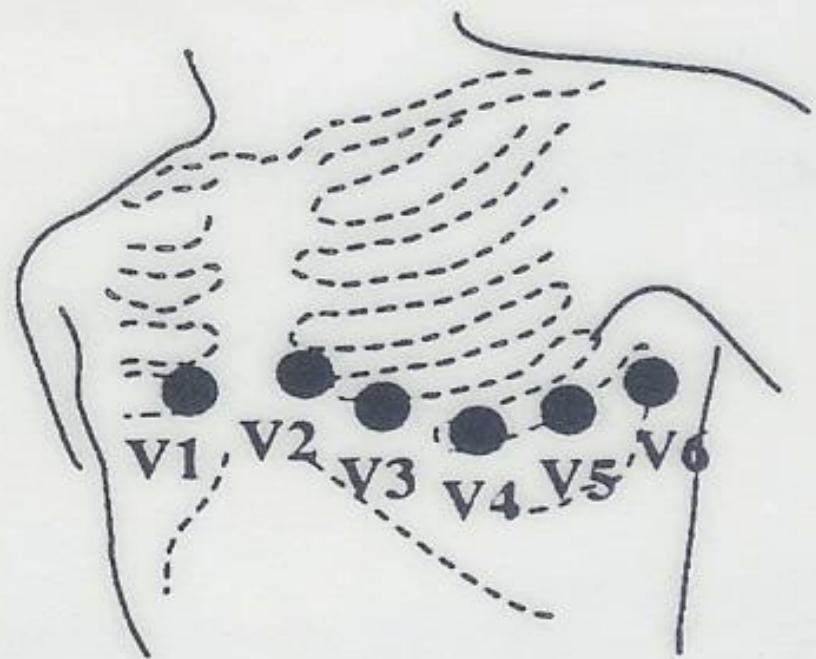
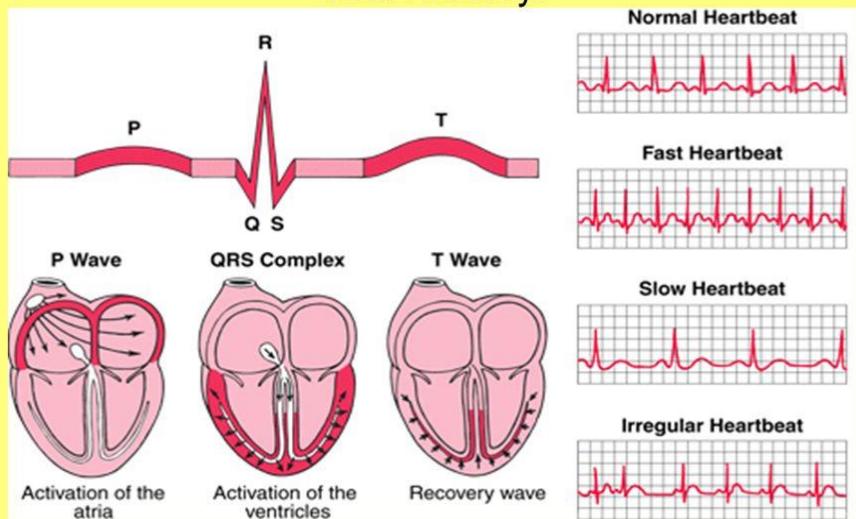
After landing paramedics came on board and they continued the CPR for approximately 15 minutes and they then pronounced the Commander dead.

The investigation report

The Commander's blood lipid levels were identified as being high approximately two years before the event

He was found with vitamin supplements, aspirin, painkillers and statin tablets.

Interpret and explain electrocardiogram (ECG) traces with reference to normal and abnormal heart activity.



The investigation report

the cause

Investigation determined that the Commander's incapacitation and subsequent death was due to a cardiopulmonary system collapse, caused by a stenosis in the coronary artery.

The Commander's high cholesterol level caused the coronary artery disease and contributed to the stenosis in the coronary artery. The Commander's undeclared use of OTC medication likely contributed to a reduction in his lipid levels. This treatment was not managed by an aeromedical examiner.

... determined that it was not possible for the aeromedical examiner to predict the imminent incapacitation of the Commander.

Safety Actions Taken

The Civil Aviation Authority introduced a number of initiatives to educate aeromedical examiners on blood lipid level management based on international medical information and standards.

The Operator introduced CPR training for loadmasters and corporate security officers, and amended the operations manual to include incapacitation procedures for freighter operations.

Poll 1

Was the system improved?

CAST

10

Gather the information and understand what happened

Understand the interactions (Safety Control Structure)

Understand why the controls that were in place did not work (why they were ineffective)

Analyze the individual interactions and find ways to make controls effective
(create safety recommendations)

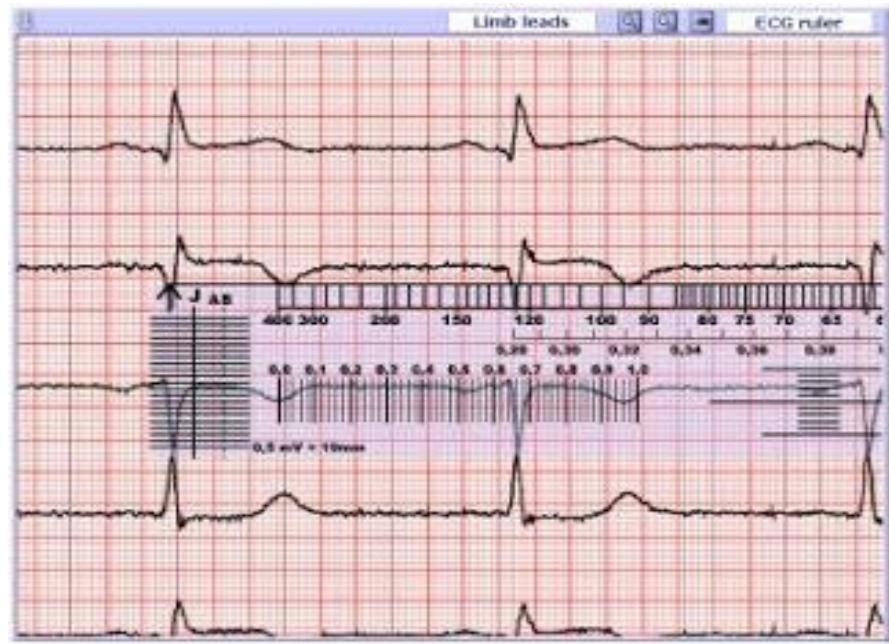
Structure your recommendations for continual improvement

Poll 2

11

What do you think we should be looking?
Where do we need to concentrate?

- We should be mapping all the interactions and controls in place so we may examine all the components of our system



Poll 3

12

What are the components of our system for this pilot incapacitation ?

Please type in your answers in zoom chat

The Commander,

The aeromedical examiners,

The Operator,

The Civil Aviation Authority

(areas of the flight operations and aeromedical examiners oversight)

The State Legislator

The International Civil Aviation Organization

	Questions
Commander interacting with the Aeromedical examiner	How was the examination performed? How was the ECG performed? Who reviewed the ECG? Was the person or software which reviewed the ECG trained/approved? How often is the training reviewed? How often is the training repeated?
Commander's Medical examination	What was the training for the aeromedical examiner? Which entity organized the training? Which entity approves the training? Which entity examines and how often the training received by the aeromedical examiner? Is there any exam? Is there any oversight? Is there any quality system seeking to continually improve the system?
Identify Hazards	

Controls in place

14

What Controls do we have in place for the Commander's medical examination?

Why were the Controls Ineffective?

The CAST

Assemble Basic Information

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Safety Recommendations

- to review the possibility of establishing regional coordination accident investigation aviation pathologists for States
- to review the possibility to publish the responsible person for accident investigation aviation pathologist similar to the other positions shared such as the person responsible for Accident Investigation, in relevant publications, and/or web site.
- to review the possibility to ensure that AMEs repeat their initial training in a certain time frame.
- to consider creating an aeromedical task group to continuously review and update relevant documents and address aeromedical updates/issues.

Safety Recommendations

17

- Engage the industry to review the pilot incapacitation during the freighter flights, with the aim to identify if cabin crewmembers duties and responsibilities are not addressed during the freighter flights.
- Ensure that all persons onboard the freighter flights are adequately trained in CPR and first aid.
- Review the possibility to conduct and publish a study to assess the prevalence of what could be over-the-counter and prescription medication use amongst UAE pilots not involved in accidents/incidents and assess the safety risks of using those drugs while flying and make pilots aware of less impairing alternative drugs if they are available.

Safety Recommendations

18

- Ensure that pilot incapacitation statistics are monitored, on a regular basis.
- Review the current pilot incapacitation statistics, in order to better understand if there are medical concerns that could affect aviation safety within each State.
- Review the possibility to study and identify potential age groups with potential trends so the State could proactively approach, pilot incapacitations.

Safety Recommendations

19

- Review the possibility to form a group of aeromedical experts in order to constantly review safety critical medical requirements and consult the State with change requirements, pro-actively.
- Review the possibility for all AMEs to repeat their initial training within a certain time frame.

Thank you

20

The future is common for everyone, however is unknown

Isocrates (436 to 338 BC)

