Aerospace Medicine Course

SOUTH AFRICAN CIVIL AVIATION AUTHORITY

Aircraft Accident and Incident Investigation

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MANAGER:
SAFETY INFORMATION

AGENDA

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Mandate

The AIID's primary purpose is to enhance safety through the investigation of civil aviation accidents and incidents with the aim to prevent recurrence. This is aligned to ICAO annex 13 requirements.

- **The purpose of accident and incident investigation is NOT to apportion blame or liability.**
- **The AIID investigates incidents and accidents within the South African and its territorial land and seas.**
- **We also assist in investigations of occurrences accidents and incidents which involve a South African-registered aircraft in other international States as Accredited Representatives.**

Mandate

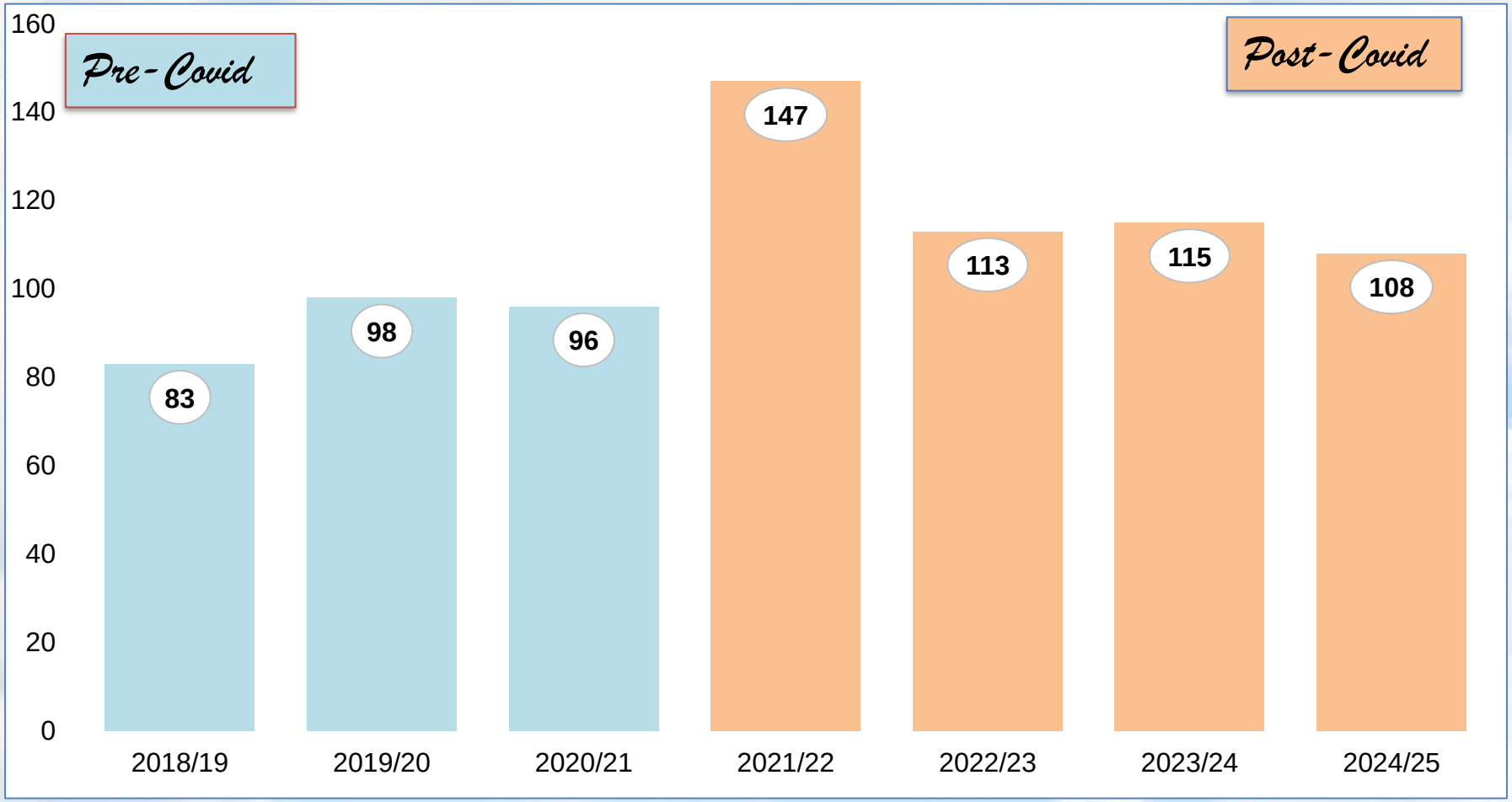
The mandate is achieved by:

- **The investigation of aviation accidents and serious incidents determining the causes**
- **Recording and analysis of safety data**
- **The Management of Confidential Aviation Hazards Reports (CAHRS)**
- **Reviewing occurrences reported through the Central Occurrence Reporting System (CORS)**
- **The Issuing and Management of safety recommendations**
- **Implement advocacy initiatives**

Recorded Manned Aviation Occurrences

Manned Aviation Occurrences			
Occurrence Category	2022/23	2023/24	2024/25
Accidents	113	115	108
Serious Incidents	16	27	26
Incidents	2312	2861	2610
CAHRS	52	68	81
YTD TOTAL per FY	2493	3071	2825
FULL YEAR TOTAL	2985	3741	

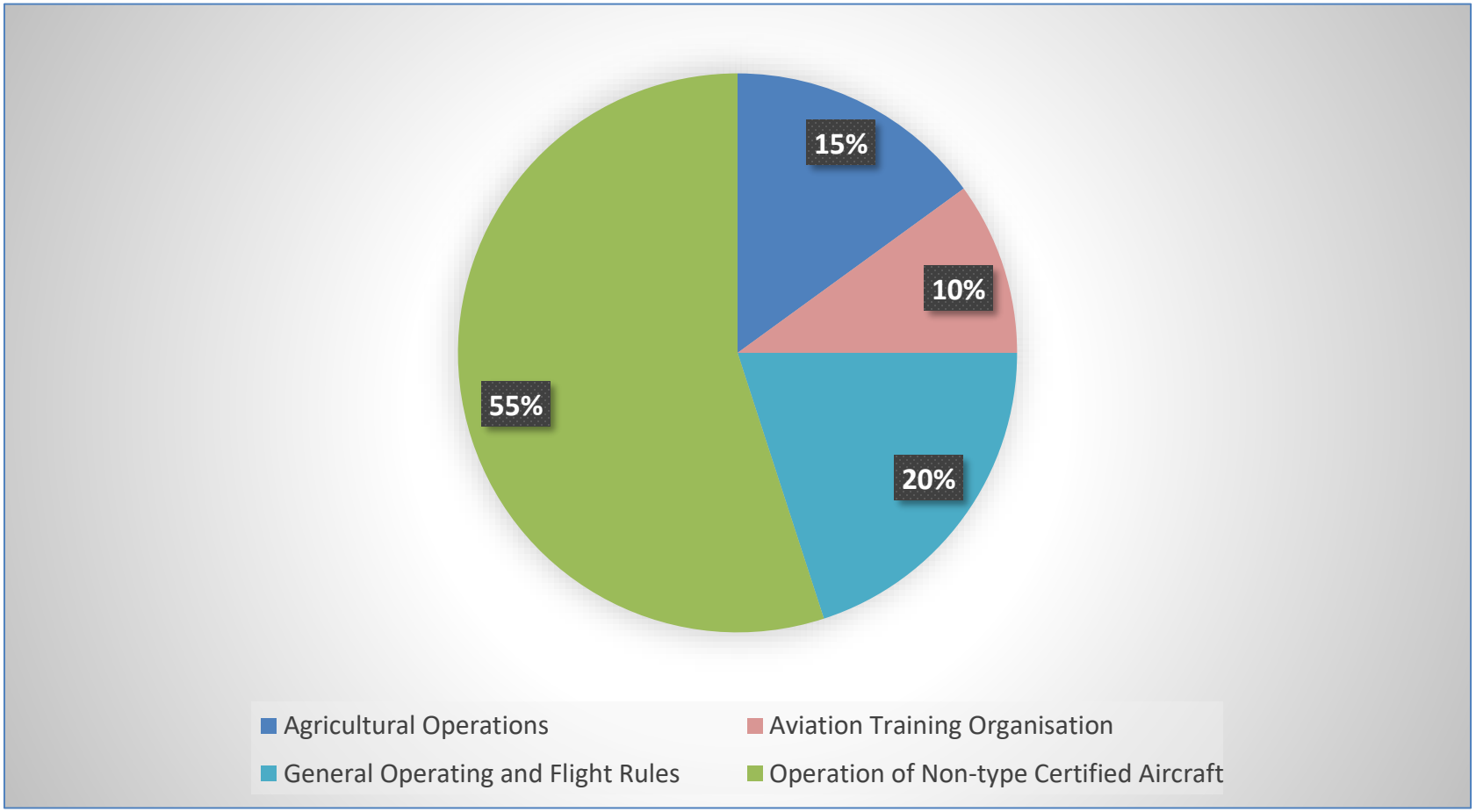
Pre-Covid and Post-Covid Accident



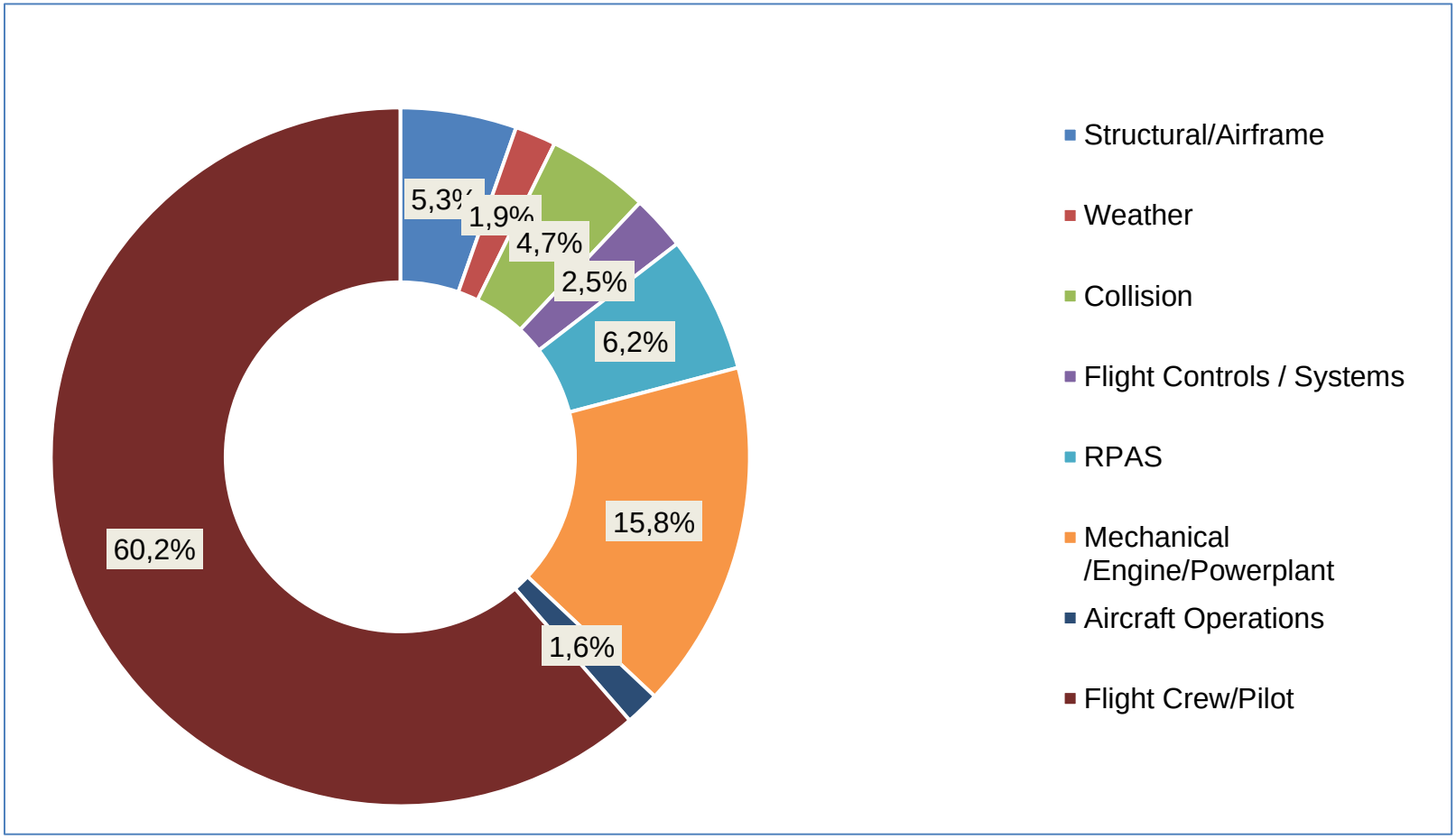
Accidents Per Operation Category

Operations Category	2022/23	2023/24	2024/25
Agricultural Operations	8	10	4
Air Transport Operations: Carriage on aeroplanes of more than 19 passengers or cargo	0	0	0
Air Transport Operations: Small Aeroplanes	2	3	0
Aviation Training Organisation	38	30	23
Commercial Helicopter Operations	0	2	2
Operation of Parachutes	1	2	0
General Aviation and Operating Flight Rules	28	27	29
Agricultural Operations	8	10	0
Maintenance Rules - Non-type Certificated Aircraft	0	0	1
Operation of Non-type Certified Aircraft	36	41	49
Air Transport Operations: Carriage on aeroplanes of more than 19 passengers or cargo	0	0	0
Air Transport Operations: Small Aeroplanes	2	3	0
Grand Total	**113**	**115**	**108**

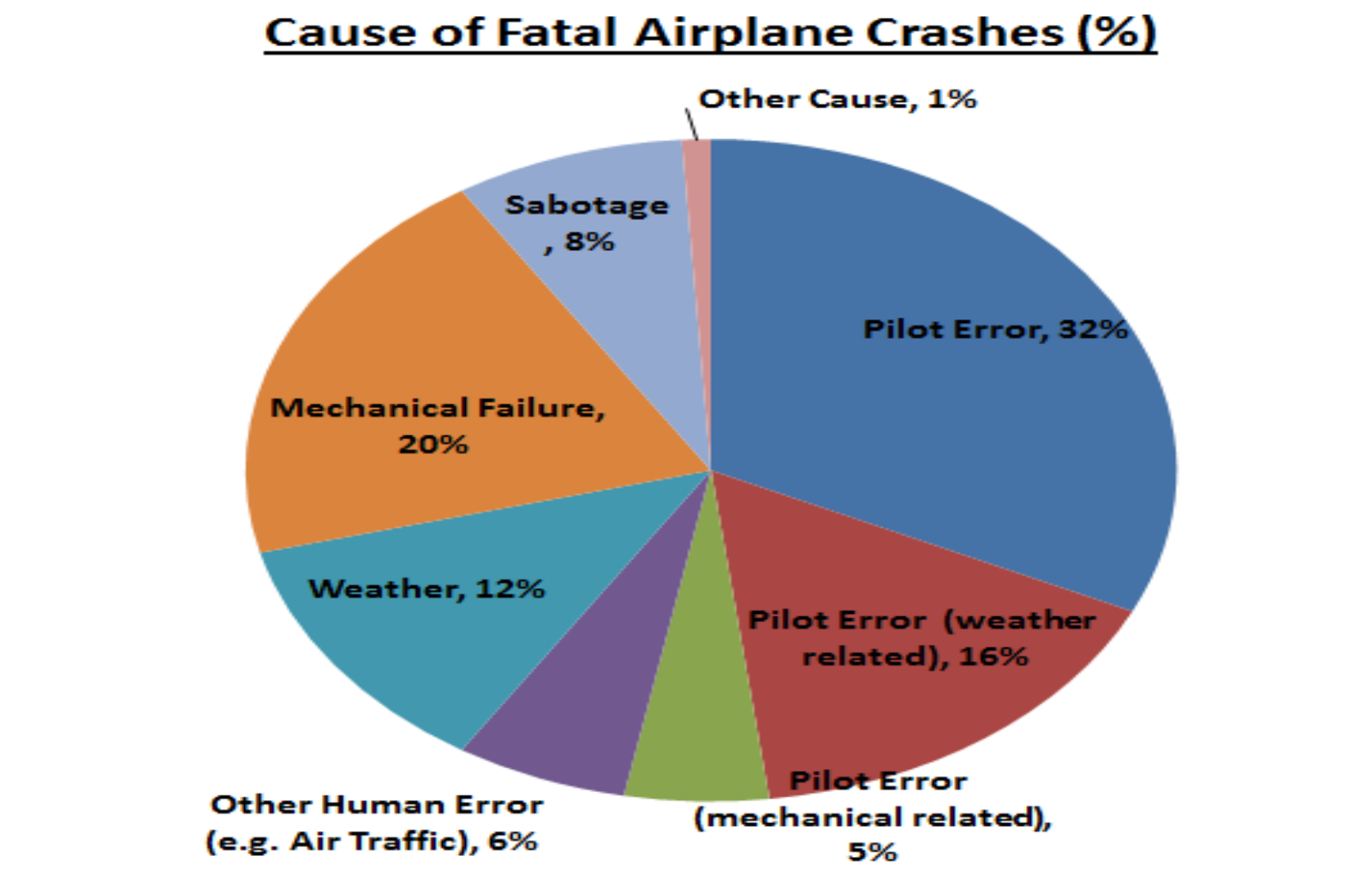
Fatal Accidents Per Operations Category (2022/23 to Current FY)



Accident Causal Factors (2022/23 to current)



Causal Factors Worldwide



Regulations

Autopsy examinations

12.04.8 An investigator-in-charge shall ensure that a complete autopsy and toxicology examination of the fatally injured passengers, flight crew and cabin crew, if applicable, is conducted by a pathologist who is experienced in accident investigation.

Medical examinations

12.04.9 When considered necessary or appropriate following an accident or incident, the Executive responsible for aircraft accident and incident investigation shall arrange for medical examination of the crew, passengers and involved aviation personnel, by a suitably qualified physician.

Autopsy in Accident Investigation

- Autopsy provides critical medical insights into pilot incapacitation.
- Helps determine whether medical factors contributed to the accident.
- Identifies pre-existing conditions that may have impaired pilot performance.
- Confirms if injuries were sustained pre- or post-impact.
- Enhances understanding of physiological risks associated with aviation safety.
- Supports safety recommendations aimed at preventing future occurrences.

Autopsy in Accident Investigation

- **1.13 Medical and Pathological Information**

- **1.13.1 The pilot was fatally injured during the accident sequence. The Medico-Legal post mortem report concluded that the cause of death was due to multiple blunt force injuries during impact and burns sustained during post-impact fire. ZS-XAT (CFIT)**

- **1.15 Survival Aspects**
- **1.15.1 The accident was considered not survivable due to the damage caused by impact and post-impact fire to the cabin and cockpit areas of the aircraft. The pilot was also trapped inside the wreckage due to the tail section folding onto the cabin section. The aircraft caught fire after impact, engulfing the cabin area.**

Autopsy in Accident Investigation

- **1.13. Medical and Pathological Information Of a Final report**

- **1.13.1. The pilot sustained serious injuries to his face and left hand; he was taken to the hospital in an ambulance after the accident. ZS-IBN (runway excursion)**

- **1.13 Medical and Pathological Information**
- **1.13.1 To be discussed in the final report. ZU-BEA (on-going investigation)**

Intersection of Aerospace Medicine and Accident Investigation

- Aerospace Medicine (AVMED) plays a key role in accident investigations.
- Evaluates pilot health, incapacitation, and human performance limitations.
- Medical factors often contribute to aviation occurrences, necessitating ongoing medical surveillance.
- Ensures only fit and well-monitored pilots are granted certification

Medical Emergencies Onboard

Medical emergencies can affect both crew and passengers.

- **Cardiovascular events (e.g., heart attacks, strokes).**
- **Respiratory distress (e.g., asthma, hypoxia).**
- **Gastrointestinal issues (e.g., food poisoning, dehydration).**
- **Neurological conditions (e.g., seizures, fainting).**
- **Trauma-related injuries (e.g., turbulence-induced falls).**

Response Protocols

- **Crew initiates standard medical emergency procedures.**
- **Flight crew may contact ground-based medical support.**
- **Diversion decisions made based on severity and available medical facilities**

Stats

- **31 recorded on board medical emergencies passenger related this resulted in 5 diversions for urgent medical attention.**

Pilot Incapacitation as a Risk Factor

Definition

- Pilot incapacitation refers to the inability of a pilot to perform their duties due to the onset of physiological factors during flight.

Severity and Impact

- Death is the most extreme form of incapacitation, often caused by a heart attack.
- However, not all incapacitations are fatal, but they can still compromise flight safety and operational control.
- Cardiovascular disease is the leading cause of pilot fatalities in flight.
- The most common cause of in-flight incapacitation is gastroenteritis, which can impair a pilot's ability to operate the aircraft safely.

Case Studies: Pilot Incapacitation

Case Study 1: Challenger II (2015, Blouberg, Cape Town)

- Investigation determined that pilot incapacitation due to a pre-existing cardiac condition was the likely cause.

Case Study 2: Safair (January 2025, SFR711-FAGG-FAOR)

- Aircraft declared PAN PAN due to the captain's incapacitation mid-flight.
- Required immediate crew resource management adjustments and medical intervention.

Case study 3: British Airways (January 2025)

- Captain experienced severe indigestion, suspected to be gastro-related.
- Crew consulted MedLink for pain management and medical guidance.

Conclusion

- Pilot medical certification is a balancing act between individual rights and public safety.
- Over the years, medical policy has evolved, introducing stricter standards that were once unthinkable.
- Stringent medical criteria and continuous surveillance ensure that only well-controlled, fit, and motivated pilots are certified.
- Ongoing medical supervision is essential to maintaining flight safety and preventing incapacitation-related accidents.

Reporting to the AIID: A Quick Guide.

- Accidents & Serious Incidents
  - IMMEDIATE Contact
    - Email: AiidInbox@caa.co.za
    - Phone: +27 (0) 60 991 9915 (24/7)
    - Who: Anyone with knowledge of the event.
    - What: Aircraft details, location, casualties, description, etc. (See Form CA 12-07 on the SACAA website for full details).

    - Contact these managers in addition to the 24-hour contact:
      - Manager - Accidents and Serious Incident: Renisha Schoonraad (Schoonraadr@caa.co.za / +27 (0) 67 412 4868)
      - Manager: Safety Information: Soomesh Maharaj (Soomeshm@caa.co.za / +27 (0) 83 461 6027)
      - Senior Manager: Accident and Incident Investigations: Albert Phuti Morudi (morudia@caa.co.za / +27 (0) 83 461 6295)

Reporting to the AIID: A Quick Guide.

- **Hazards (CAHRS):Confidential & Voluntary**
  - **Report potential safety issues.**
  - **How:Online form (search "CAHRS" on the SACAA website)**
  - **Email: cahrs@caa.co.za**
  - **Phone: +27 (0) 11 545 1242 / +27 (0) 11 545 1063 / +27 (0) 11 545 1178**
  - **WhatsApp:**
    - **Lerato Sekhukhune: 071 600 8599**
    - **Lerato Boya: 083 451 2606**
    - **Soomesh Maharaj: 083 461 6027**

END

QUESTIONS