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Introduction to Aviation System and Air Transport Regulation (AAE2004)
Lecture 09 – Safety Management Systems

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Agenda

- Safety
- Safety Culture
- Safety Management System
- Case Study

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Why human factors is a factor?

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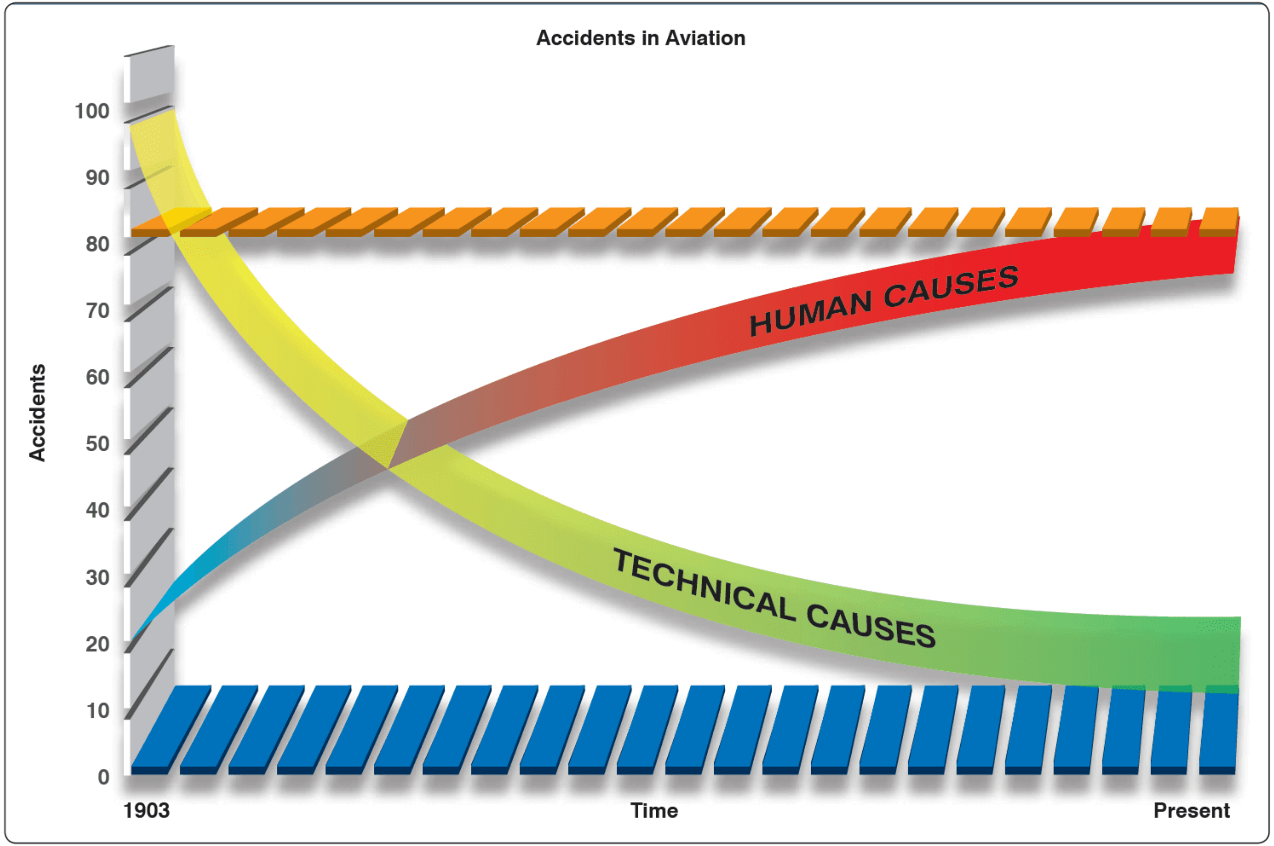
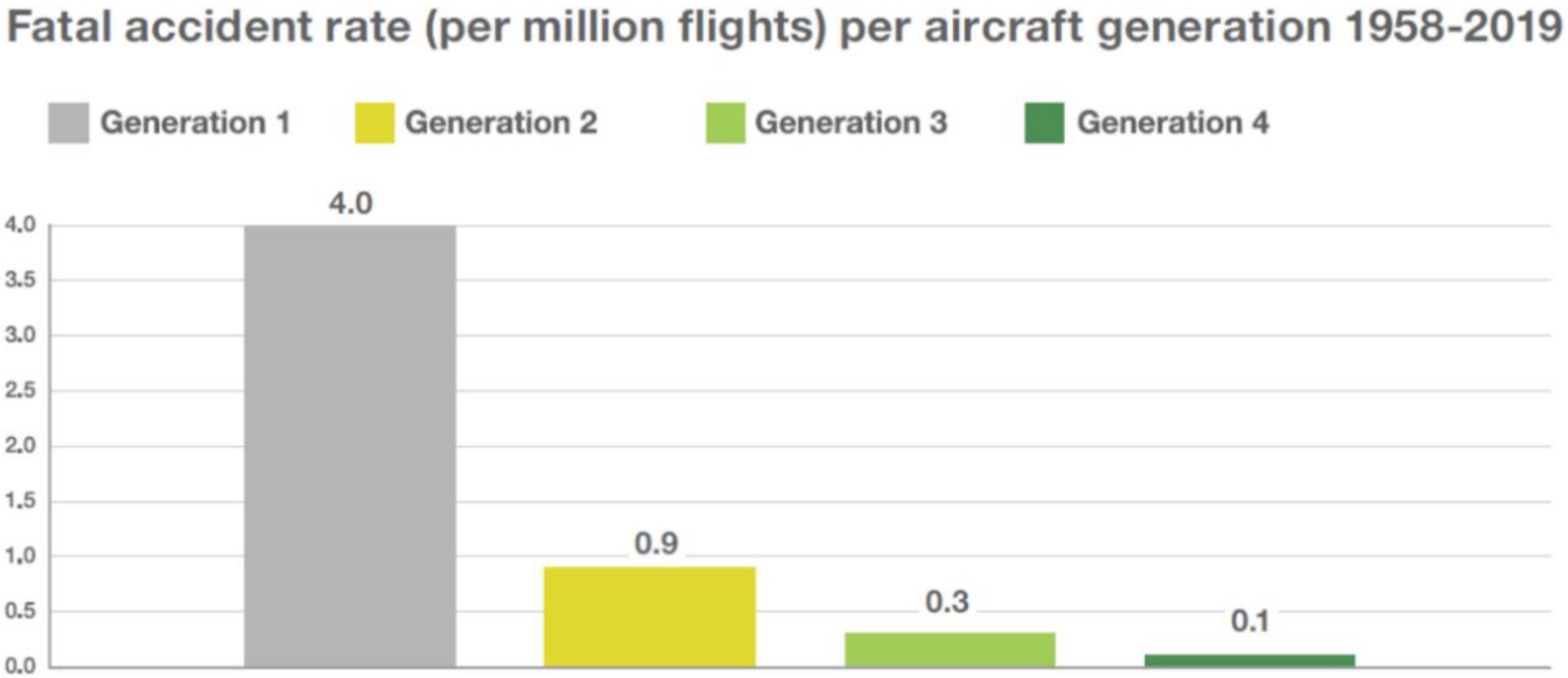
Why Human Factors?



Why Human Factors?



Why Human Factors?

1

Early commercial jets

From 1952

Dials and gauges in cockpit, early autoflight systems

Comet, Caravelle, BAC-111, Trident, VC-10, B707, B720, DC-8, Convair 880/990

2

More Integrated autoflight

From 1964

More elaborate autopilot and autothrottle systems

Concorde, A300, Mercure, F28, BAe146, VFW 614, B727, B737-100/-200, B747-100/-200/-300/SP, L-1011, DC-9, DC-10

3

Glass cockpit, FMS & TAWS

From 1980

Electronic displays, Flight Management System (FMS), and Terrain Awareness and Warning System (TAWS) reduced CFIT accidents

A300-600, A310, Avro RJ, F70, F100, B717, B737 Classic, B737 NG, B737 MAX, B757, B767, B747- 400/-8, Bombardier CRJ, Embraer ERJ, MD-11, MD-80, MD-90

4

Fly-By-Wire

From 1988

Flight envelope protection enabled by fly-by-wire technology reduced LOC-I accidents

A220, A318/A319/A320/A321, A330, A340, A350, A380, B777, B787, Embraer E-Jets, Sukhoi Superjet

Why Human Factors?

Implications

- Aircraft systems become more reliable.
- More protection systems and alerting systems are installed in modern aircrafts to prevent human errors.
- Human workload greatly reduced.
- **It is rather hard to transform human pilots.**
- **Human pilots are still vulnerable to the threats in the environment.**

Why Human Factors?

Federal Aviation Administration

*"Multi-disciplinary effort to **generate and compile information about human capabilities and limitations** and **apply** that information to equipment, systems, facilities, procedures, jobs, environments, training, staffing, and personnel management **for safe, comfortable, and effective human performance**."*

International Ergonomics Association

*"Ergonomics (or human factors) is the scientific discipline concerned with the understanding of **interactions among humans and other elements of a system**, and the profession that applies theory, principles, data and methods to **design** in order to **optimise human well-being and overall system performance**."*

Why Human Factors?

1. **Understand human capabilities**
2. **Design an user-friendly cockpit and operations**
3. **Increase safety**

Federal Aviation Administration

*“Multi-disciplinary effort to **generate and compile information about human capabilities and** [illegible] information to equipment, systems, facilities, [illegible] environments, training, staffing, and personnel management **for safe, comfortable, and effective human** perform[illegible]”*

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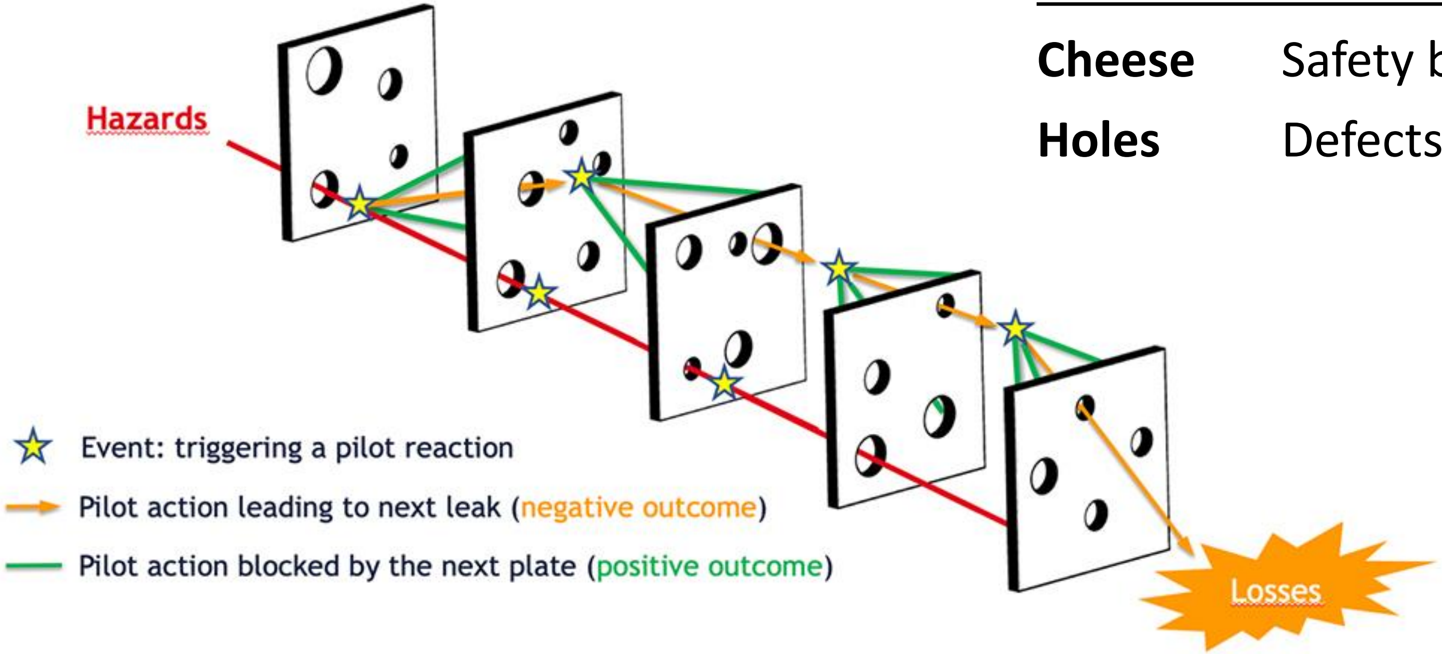
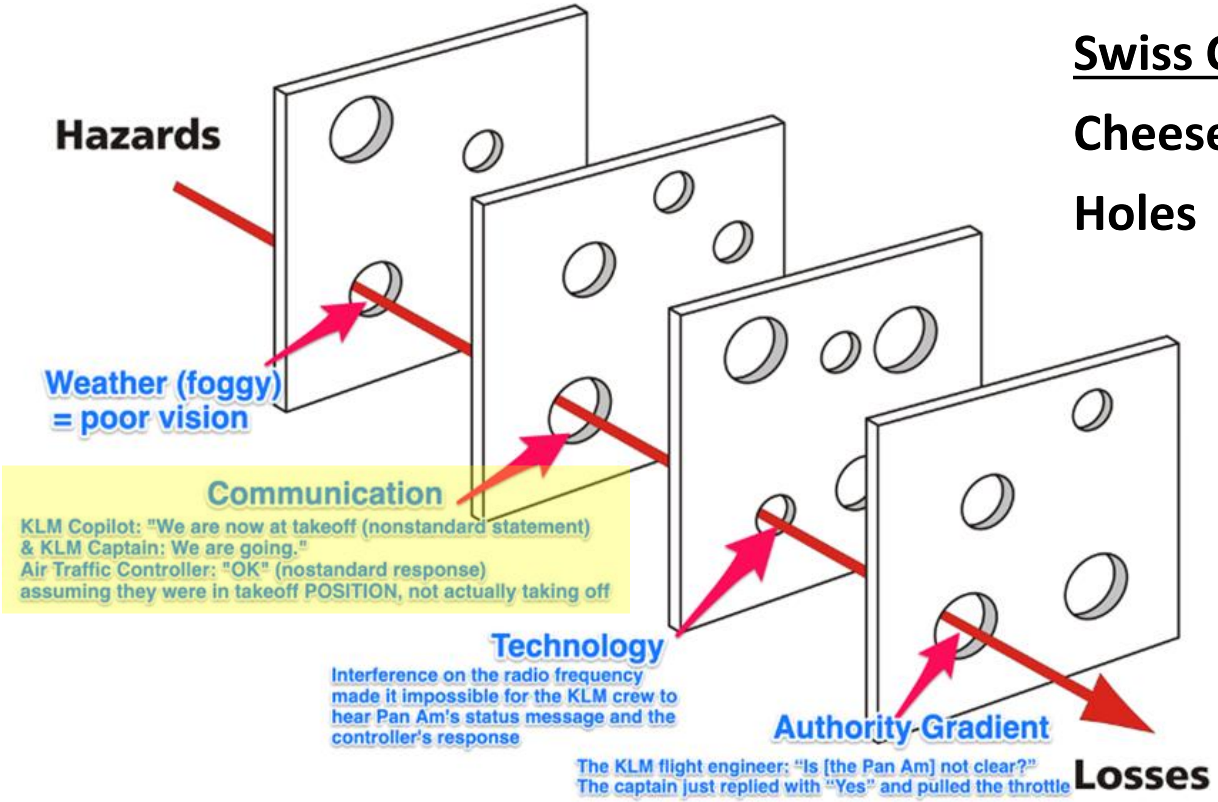
What went wrong in the communication in this air crash?



Swiss Cheese Model

Cheese	Safety barriers
Holes	Defects

What went wrong in the communication in this air crash?



<u>Swiss Cheese Model</u>

Cheese	Safety barriers
Holes	Defects

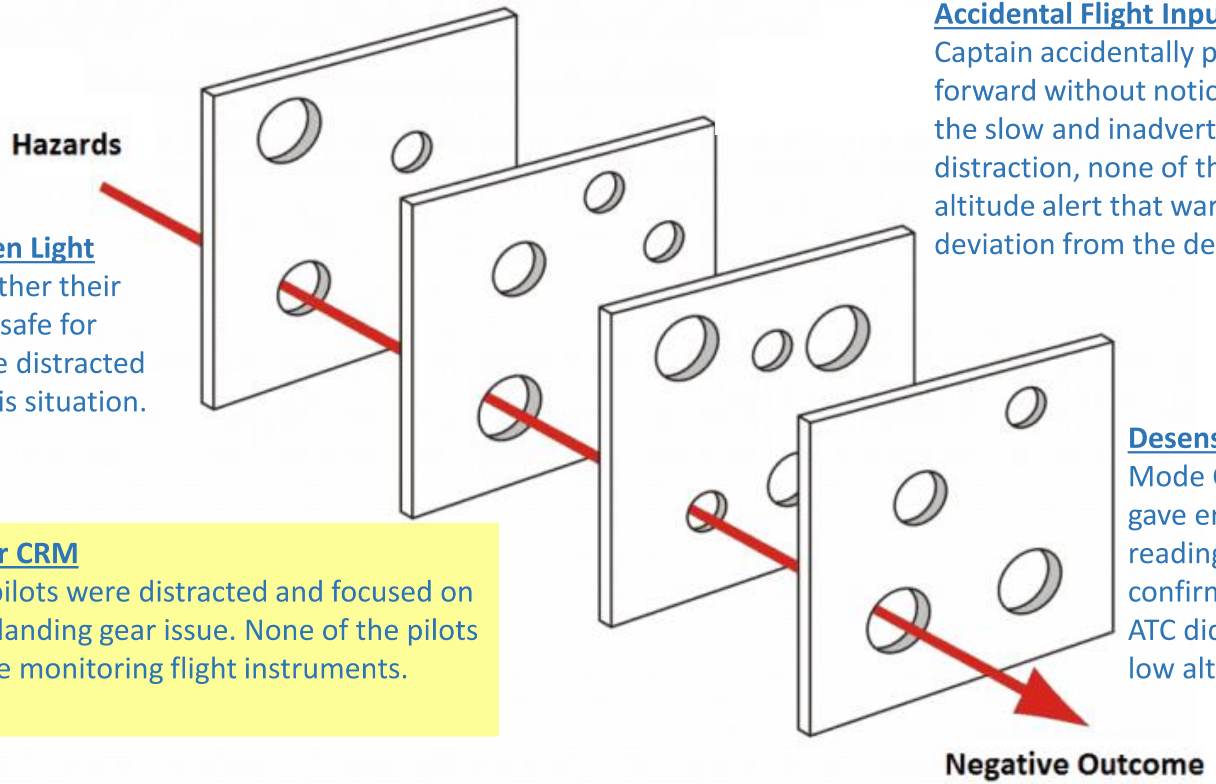
What went wrong in the communication in this air crash?

- **Confirmation Bias**
  - The tendency to look for what confirms our beliefs and to ignore what contradicts our beliefs while disregarding the truth.
  - <u>KLM 4805</u> Strong desire to take off due to series of delays
  - <u>Truth</u> No take-off clearance was ever given

What caused the confirmation bias??

Poor Teamwork & Distraction

What went wrong in this air crash?



Accidental Flight Input
Captain accidentally pushed the control yolk forward without noticing. This gave rise to the slow and inadvertent descent. Due to distraction, none of the pilots noticed the altitude alert that warned them about the deviation from the desired altitude.

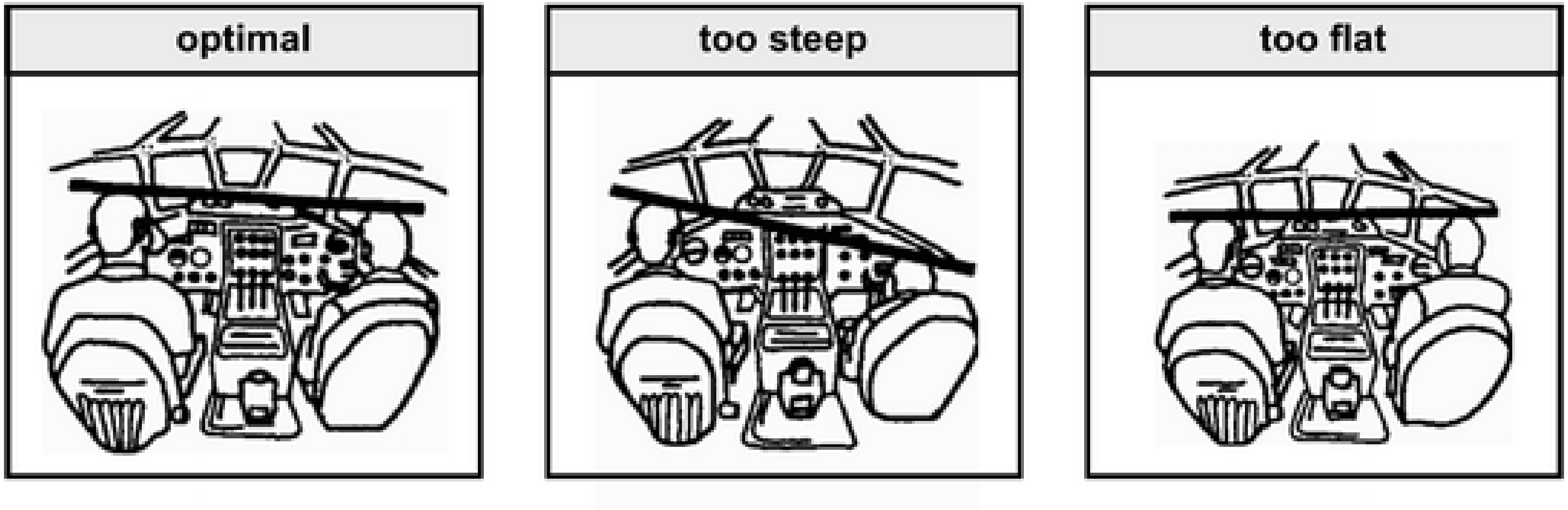
Broken Landing Gear Green Light
Pilots cannot confirm whether their landing gear is locked and safe for landing. They then became distracted and started focusing on this situation.

Poor CRM
All pilots were distracted and focused on the landing gear issue. None of the pilots were monitoring flight instruments.

Desensitised ATC
Mode C transponders often gave erroneous altitude readings. Despite ATC's confirmation with flight crew, ATC did not worry about the low altitude reported.

Cockpit Authority Gradient

- Affects how pilots of different levels of experience communicate in problem-solving
- Assertiveness of pilots determines the gradient



Implications

- Captain becomes too faithful to his experience and skills, and cannot take criticisms from colleagues
- First Officer becomes too timid to voice his opinions
- Advice when most needed is least heeded

Cockpit Authority Gradient

Implications

- Most dangerous
- Nobody is actually making decisions
- OR both pilots making decision
- Either cannot compromise OR both laid back

Cockpit Authority Gradient

Implications

- Ideal situation
- Determination from Captain + assertiveness by First Officer
- Respects opinions by each other
- First Officer can grow by learning from Captain
- Captain can get the best solution by inputs from First Officer
- Captain can avoid mistakes given assertiveness and corrections by First Officer

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Safety

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What is Safety?

- Safety is **<u>being free from injury, danger or risk of harm</u>** at home, at work and in the community.
- Safety can also refer to the **<u>control of recognised hazards</u>** in order to achieve an acceptable level of risk.

Why is Safety so important?

Why is Safety so important?

- Morally right
- Reduce stress and fear
- Longer, healthier life
- Workers are more productive
- Save capital
- More and more…

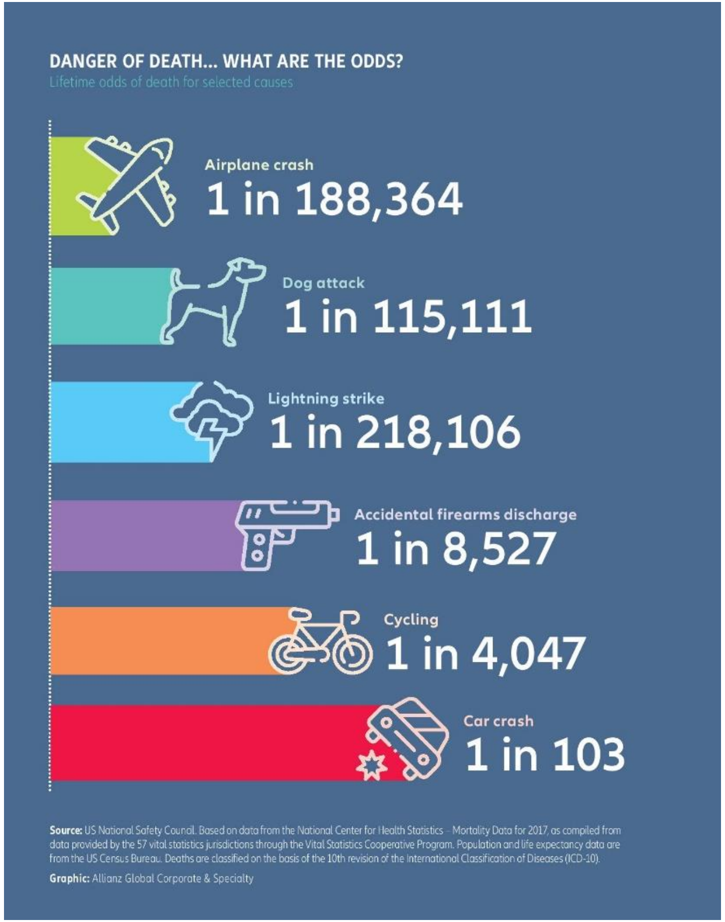
Concept of Safety

- The elimination of accidents (and serious incidents) is unachievable.
- Failures will occur, in spite of the most accomplished prevention efforts.
- No human endeavour or human-made system can be free from risk and error.
- Controlled risk and error is acceptable in an inherently safe system.

What is Safety in Aviation?

- Aviation safety is the **study and practice of managing risks** in aviation.
- This includes preventing aviation accidents and incidents through research, educating air travel personnel, passengers and the general public, as well as the design of aircraft and aviation infrastructure.
- The aviation industry is subject to significant regulation and oversight.

Aviation Safety



Question

Why can aircraft have the lowest death rate when comparing to the others?

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Safety Culture

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Safety Culture

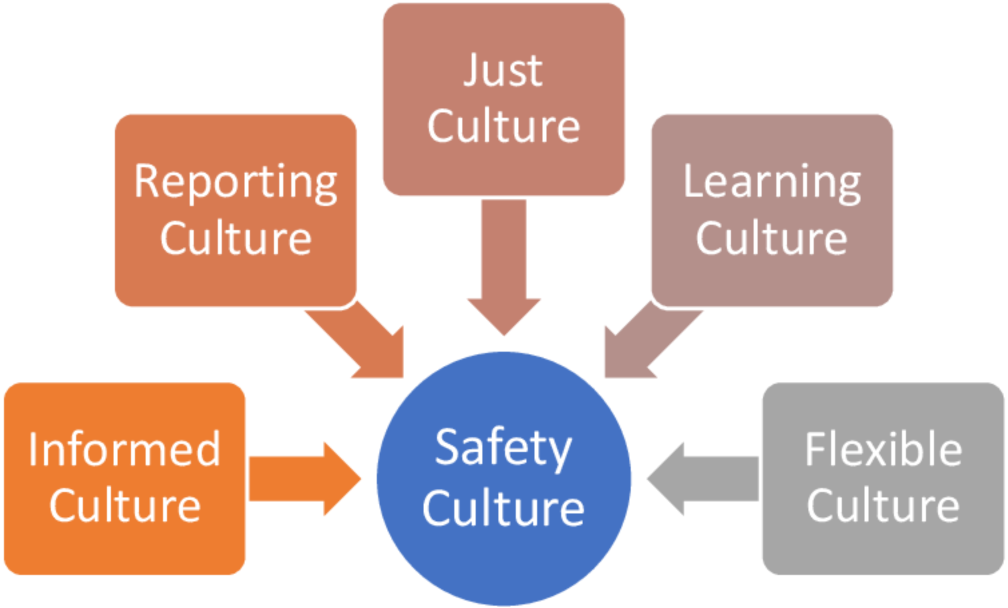
Safety Culture

- A "Safety Culture" represents attitudes of employees about an organization's approach to
  - Safety
  - Perceptions of risk
  - Beliefs on responding to and controlling risk
  - Engagement in activities that represent (and reinforce) a safety culture
- The introduction of safety management concepts lays the foundation upon which to build a safety culture
- Safety culture cannot be "mandated" or "designed", it evolves

Subcultures in the Safety Culture

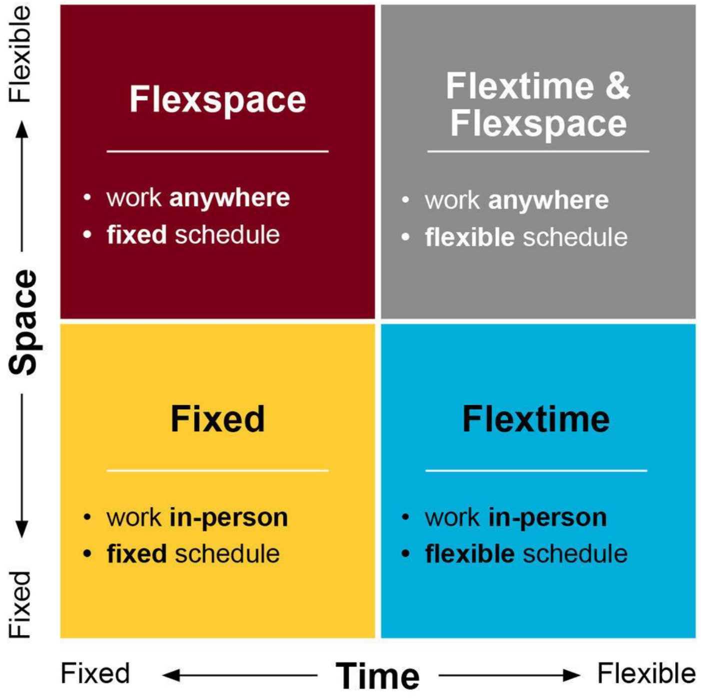
There are five subcultures in the safety culture:

- Flexible culture
- Reporting culture
- Informed culture
- Learning culture
- Just culture



Flexible Culture

- People working flexibly are given equal access to advancement, status, integration into the business, and quality of assignments.



Reporting culture

- A reporting culture means cultivating an atmosphere where people have confidence to report safety concerns without fear of blame.

Informed culture

- Those who manage and operate the system have current knowledge about the human, technical, organisational and environmental factors that determine the safety of the system as a whole.

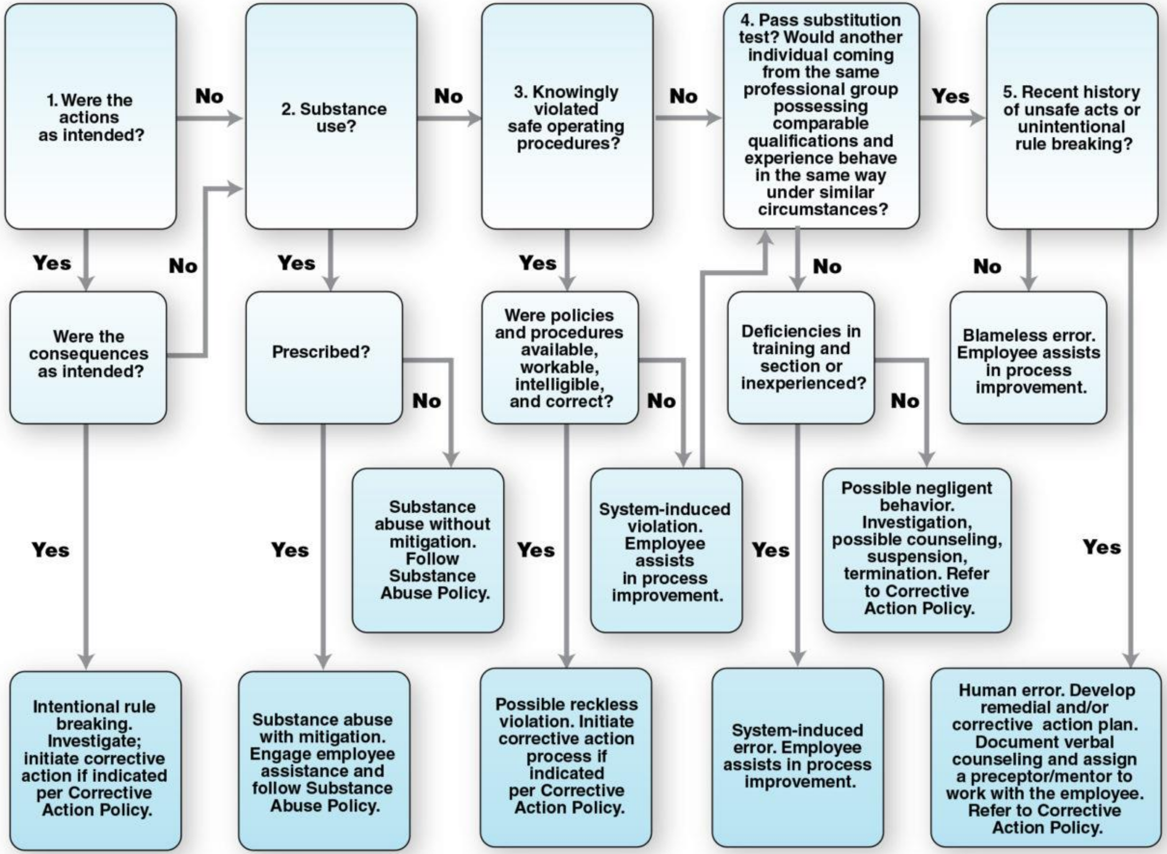
Learning culture

- A learning culture is an environment that demonstrates and encourages individual and organizational learning, and where both gaining and sharing knowledge is prioritized, valued, and rewarded.

Just Culture

- Just Culture refers to a system of shared accountability in which organizations are accountable for the systems they have designed and for responding to the behaviors of their employees in a fair and just manner.
- Employees are accountable for the quality of their choices and for reporting errors and system vulnerabilities.

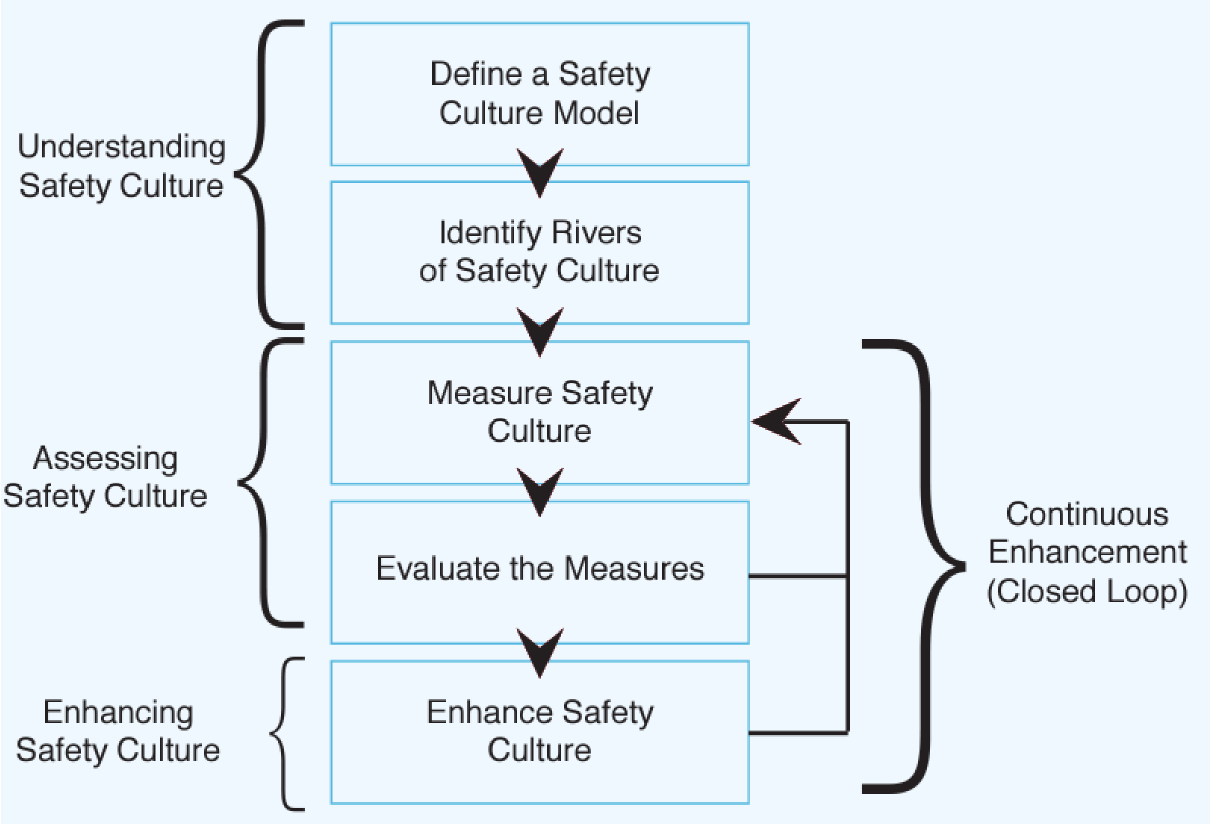
Example of Just Culture



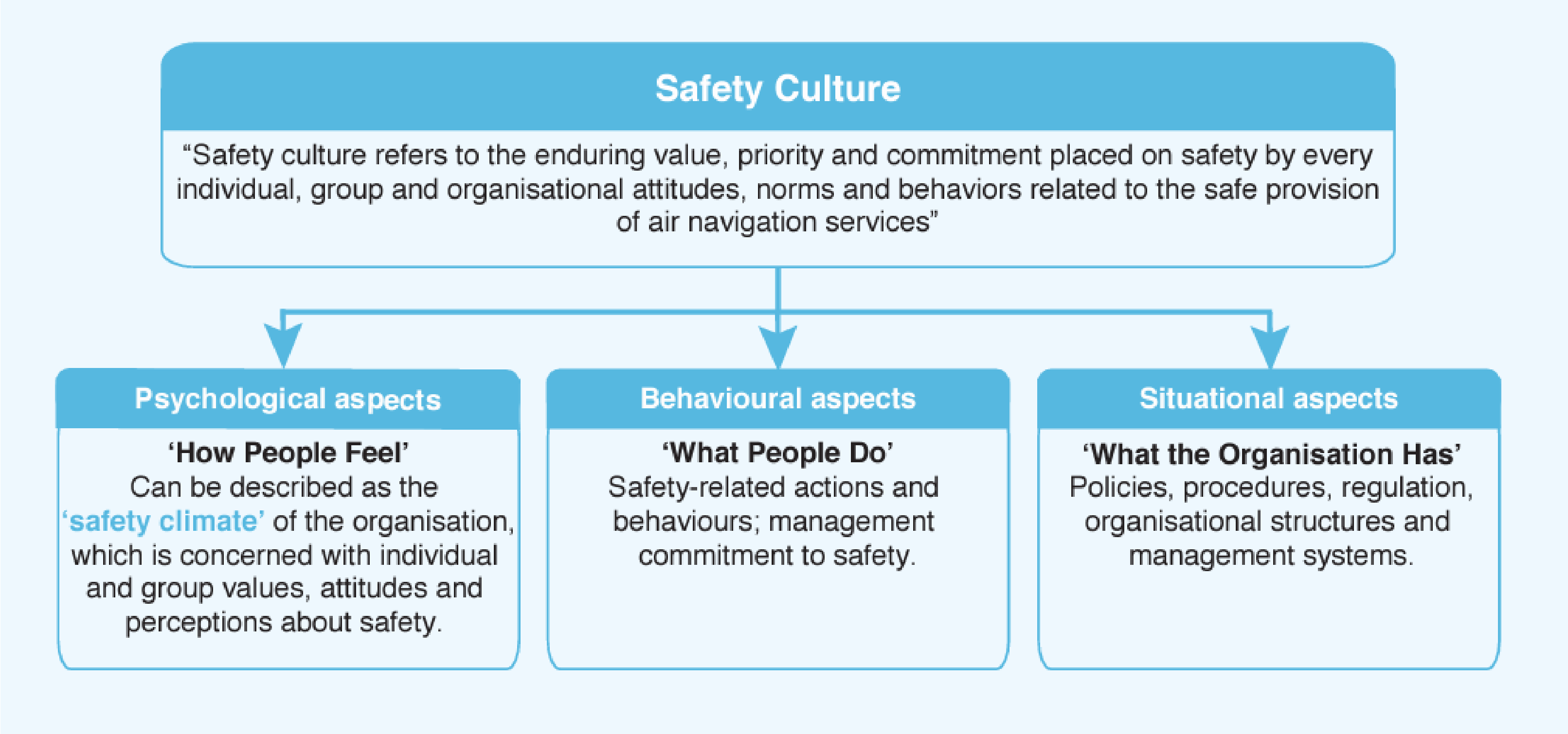
Safety Culture in Aviation

- From CANSO, safety culture refers to the enduring value, priority and commitment placed on safety by every individual and every group at every level of the organisation. Safety culture reflects the individual, group and organisational attitudes, norms and behaviours related to the safe provision of air navigation services."
- In the ICAO doc 9859, safety culture can be defined as "employees actions regarding safety when nobody is watching".

Aviation Safety Culture Enhancement



Aviation Safety Culture Framework



Just Culture in Aviation

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Safety Management System

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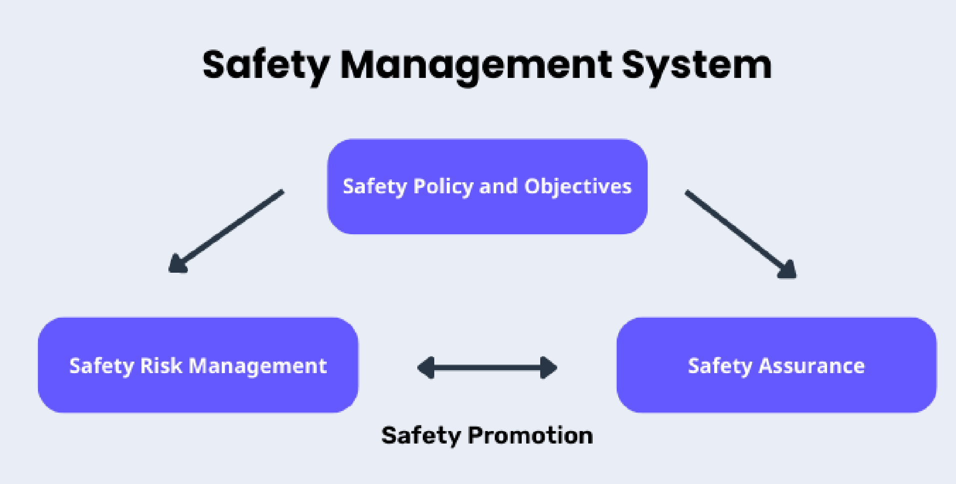
Safety Programme

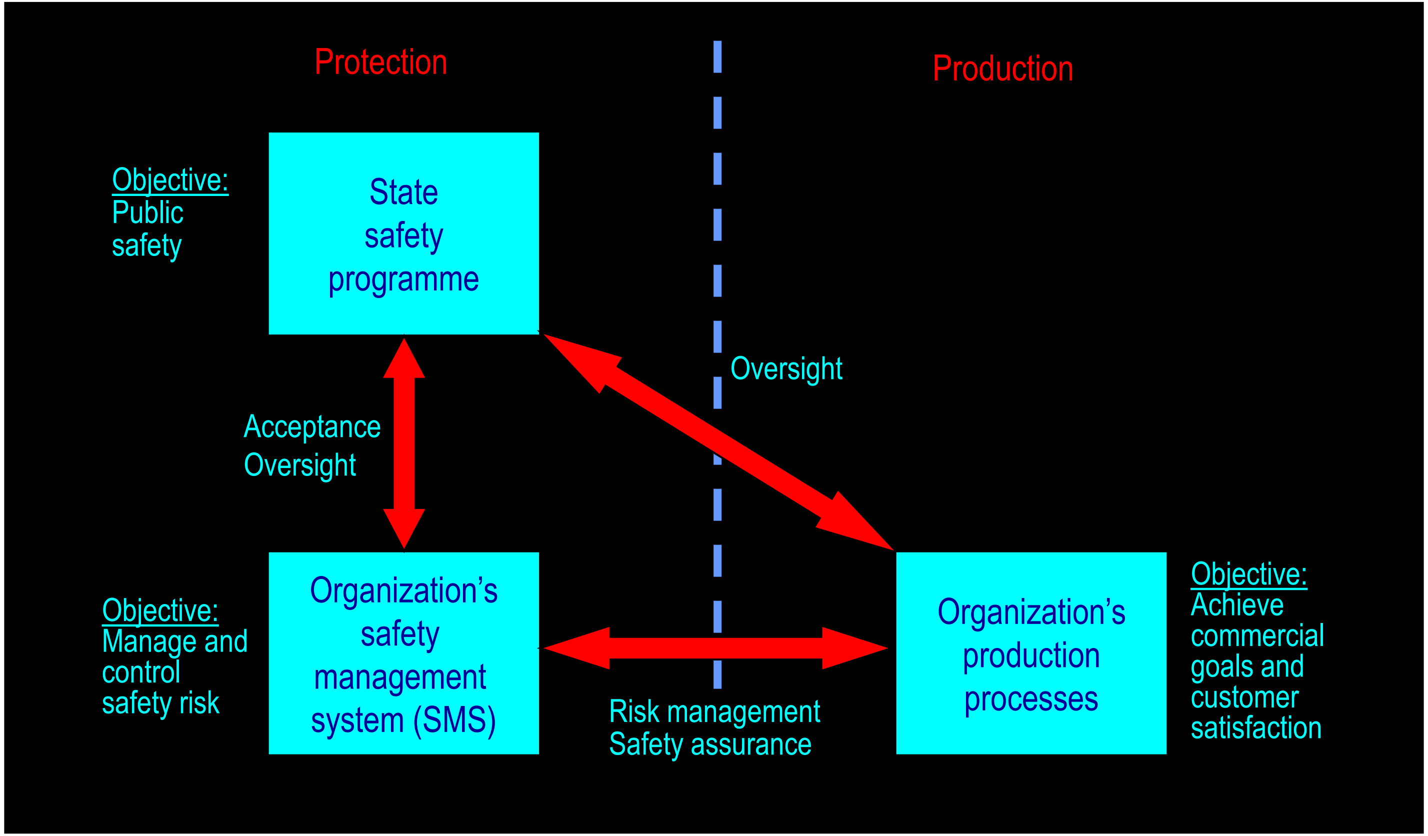
- An integrated set of regulations and activities aimed at improving safety.
- States are responsible for establishing a safety programme which includes
  - Safety regulation
  - Safety oversight
  - Accident/incident investigation
  - Mandatory/voluntary reporting systems
  - Safety data analysis and exchange
  - Safety assurance
  - Safety promotion
- One of the safety programme established is the Safety Management System (SMS)

Safety Management System

- Safety Management System (SMS) is a collection of structured, company-wide processes that provide effective risk-based decision-making for daily business functions.
- SMS help organizations offer products or services at the highest level of safety and maintain safe operations.



Safety programme – SMS relationships



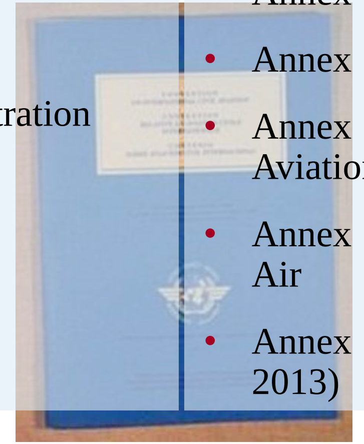
Safety Management System

- A safety management system encompasses service provider activities involved in safe aircraft operations, including organizational affairs such as legal, finance, and human resources.
- Clearly defined in the ICAO Doc 9859 or Safety Management Manual
- According to the ICAO, the key processes of a safety management system are
  - Hazard identification
  - Occurrence reporting
  - Risk management
  - Performance measurement
  - Quality assurance

Safety Management System

SARPs 19 Annexes

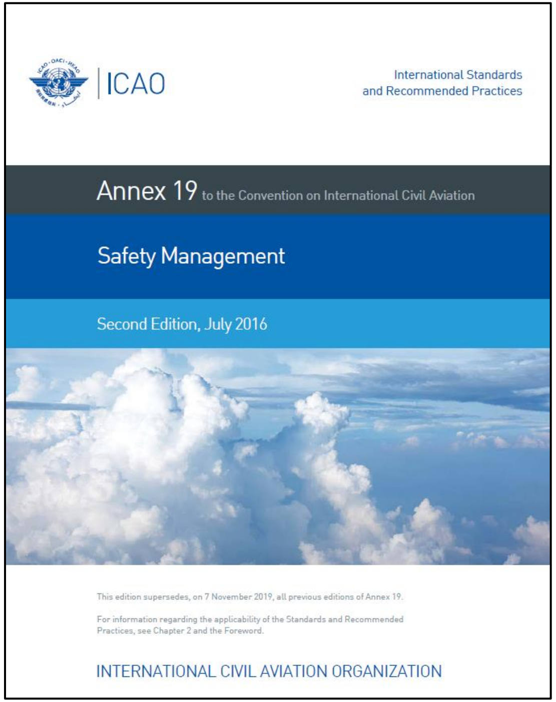
- Annex 1 – Personnel Licensing, Licensing of flight crews, air traffic controllers & aircraft maintenance personnel
- Annex 2 – Rules of the Air
- Annex 3 – Meteorological Service for International Air Navigation
- Annex 4 – Aeronautical Charts
- Annex 5 – Units of Measurement to be used in Air and Ground Operations
- Annex 6 – Operation of Aircraft
- Annex 7 – Aircraft Nationality and Registration Marks
- Annex 8 – Airworthiness of Aircraft
- Annex 9 – Facilitation
- Annex 10 – Aeronautical Telecommunications
- Annex 11 – Air Traffic Services – Air Traffic Control Service, Flight Information
- Service and Alerting Service
- Annex 12 – Search and Rescue
- Annex 13 – Aircraft Accident and Incident Investigation
- Annex 14 – Aerodromes
- Annex 15 – Aeronautical Information Services
- Annex 16 – Environmental Protection
- Annex 17 – Security: Safeguarding International Civil Aviation Against Acts of Unlawful Interference
- Annex 18 – The Safe Transport of Dangerous Goods by Air
- Annex 19 – Safety Management (Since 14 November 2013)



ICAO Annexes

Annex 19 - Safety Management System:

- This Annex is intended to assist States in managing aviation safety risks.
- The foundation of this proactive safety strategy is based on the implementation of a State safety program (SSP) that systematically addresses safety risks, including the necessary organisational structures, accountabilities, policies and procedures.



Annex 19 – One Part only

Benefits of Annex 19

- Highlights the importance of safety management at the State level
- Enhances safety by consolidating safety management provisions applicable to multiple aviation domains
- Facilitates the evolution of safety management provisions
- An opportunity to further promote the implementation of SMS and State Safety Programme (SSP) provisions
- A process established to analyse feedback received regarding Annex 19 and safety management implementation

ICAO SMS Framework

- The ICAO SMS framework in Annex 19 is made up of four component and 12 elements.

COMPONENT	ELEMENT
1. Safety policy and objectives	1.1 Management commitment
	1.2 Safety accountability and responsibilities
	1.3 Appointment of key safety personnel
	1.4 Coordination of emergency response planning
	1.5 SMS documentation
2. Safety risk management	2.1 Hazard identification
	2.2 Safety risk assessment and mitigation
3. Safety assurance	3.1 Safety performance monitoring and measurement
	3.2 The management of change
	3.3 Continuous improvement of the SMS
4. Safety promotion	4.1 Training and education
	4.2 Safety communication

ICAO SMS Framework

- Safety Policy and Objectives
  - This component focuses on how each service provider creates the right environment for an effective safety management.
- Safety Risk Management
  - Service providers should ensure that they are managing their safety risks. This process is known as safety risk management (SRM).
- Safety Assurance
  - Safety assurance consists of processes and activities to determine whether the SMS is operating
- Safety Promotion
  - Safety promotion encourages a positive safety culture and helps the service provider to achieve its safety objectives

Safety Risk Management

Risk Likelihood		Risk Severity				
		Catastrophic A	**Hazardous B**	**Major C**	**Minor D**	**Negligible E**
Frequent	5	5A	5B	5C	5D	5E
Occasional	4	4A	4B	4C	4D	4E
Remote	3	3A	3B	3C	3D	3E
Improbable	2	2A	2B	2C	2D	2E
Extremely Improbable	1	1A	1B	1C	1D	1E

Implementation of SMS

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Cockpit layout

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Cockpit Layout

Which one do you prefer?

Concorde (1976)

A350 (2015)

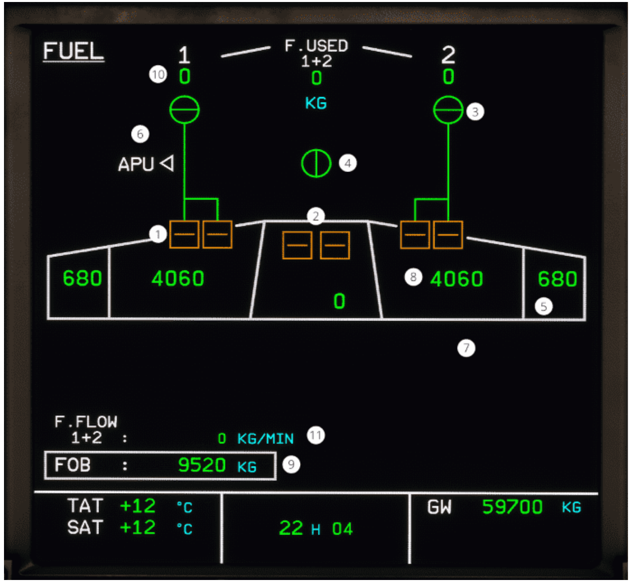
How Do You Define An User-Friendly Cockpit?

Instrument Design

Analogue Display

Good for showing information with changing nature

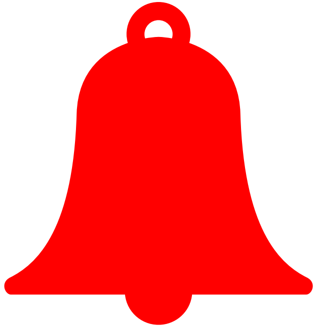
Digital Display



Good for showing exact numbers

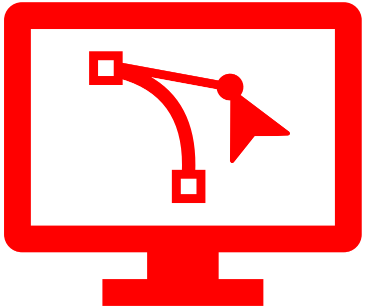
Warnings

What is the most effective way to give warnings to pilots in a cockpit?



Auditory Warning?

https://playback.fm/audio-reaction-time

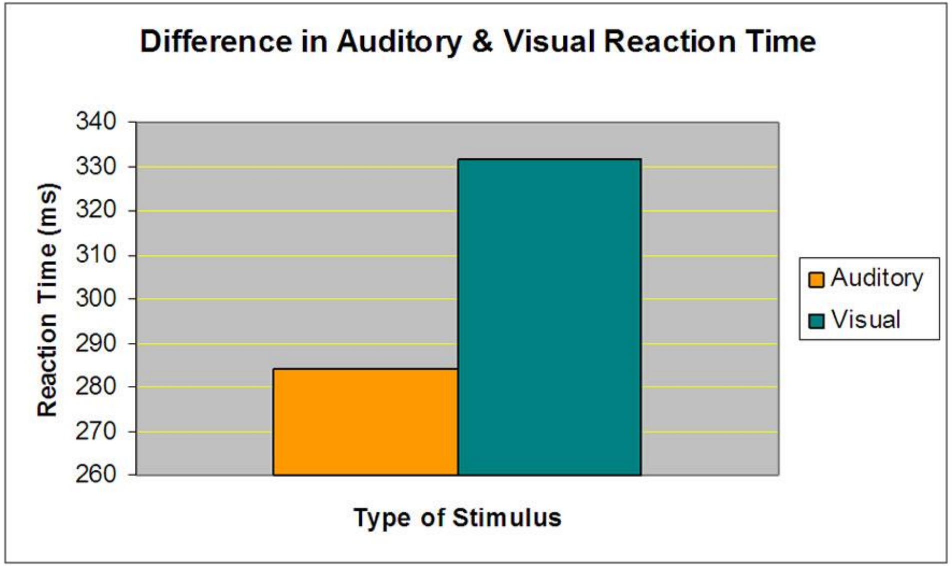


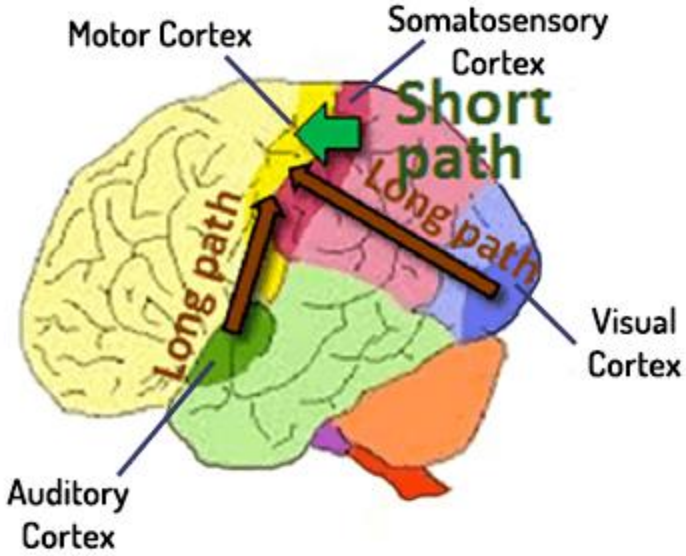
Visual Warning?

https://www.arealme.com/reaction-test/en/

Have a try!

What is the most effective way to give warnings to pilots in a cockpit?

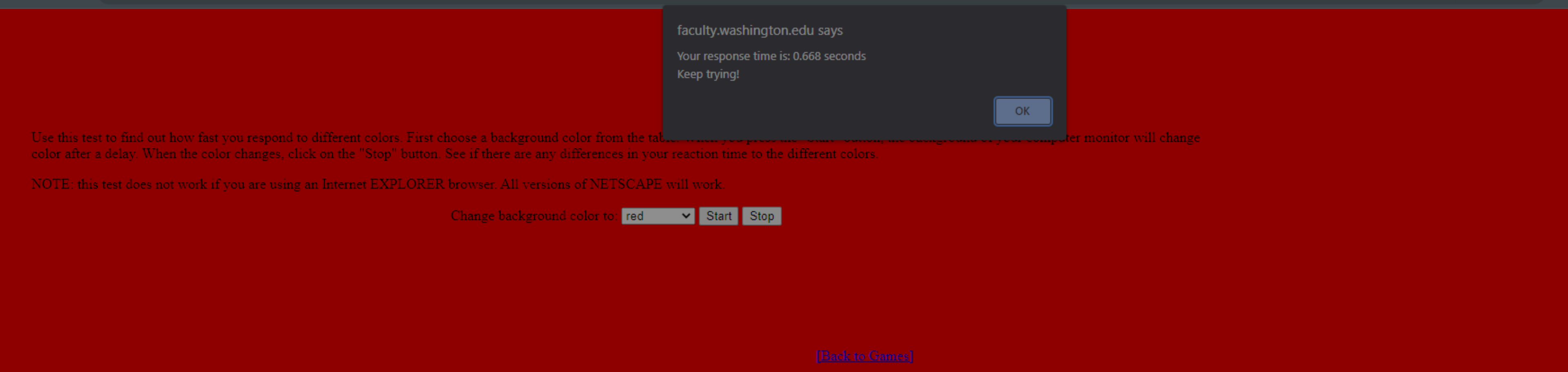




Colour Codes

Similar to what we usually see in daily lives!

Colour represents levels of seriousness.



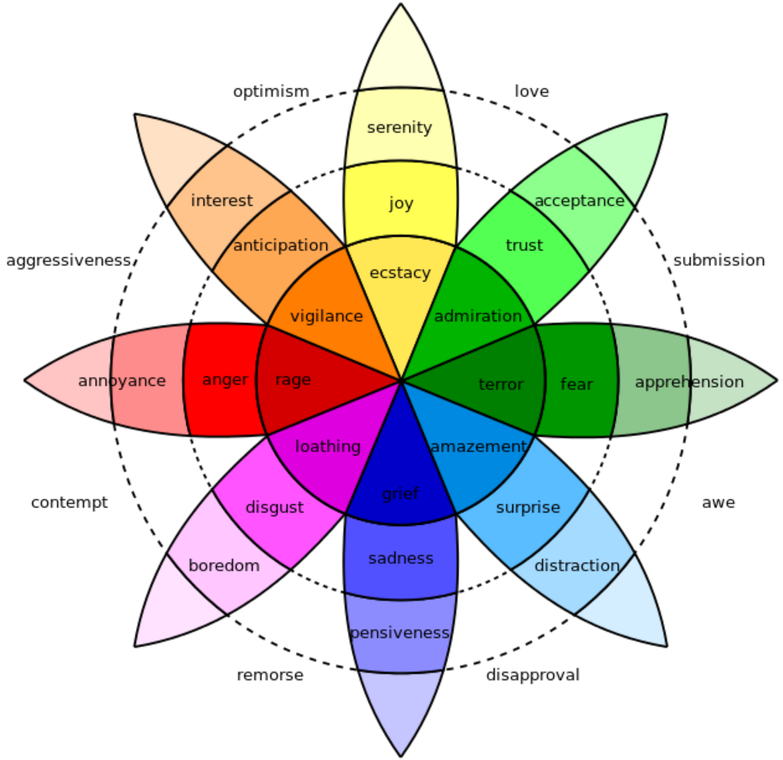
Why Colour Codes?

Have a little experiment here.

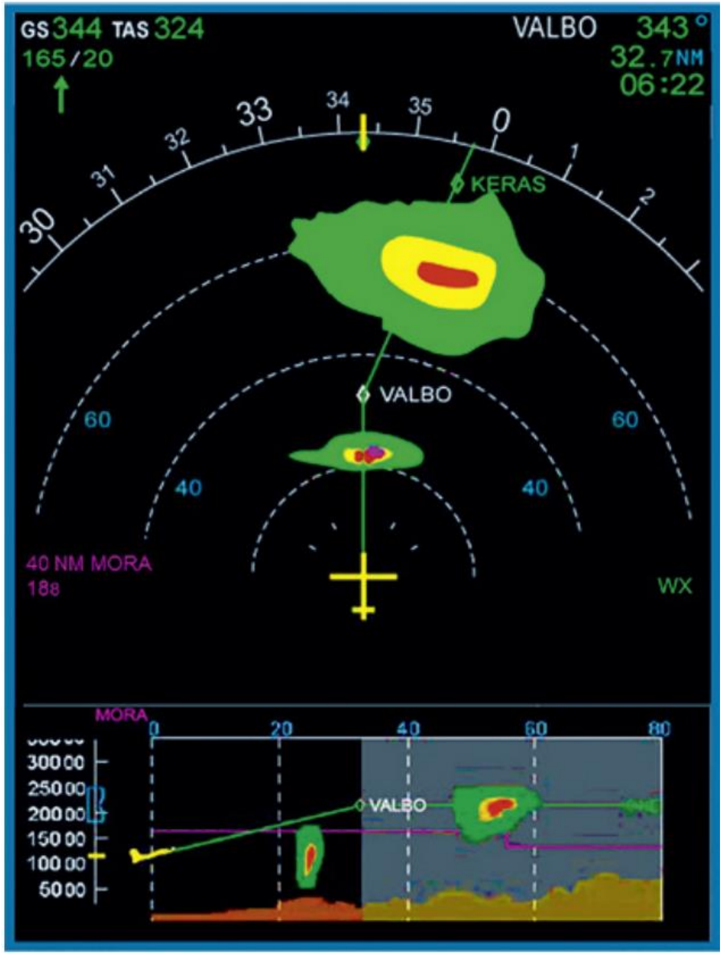
https://faculty.washington.edu/chudler/java/backtime.html

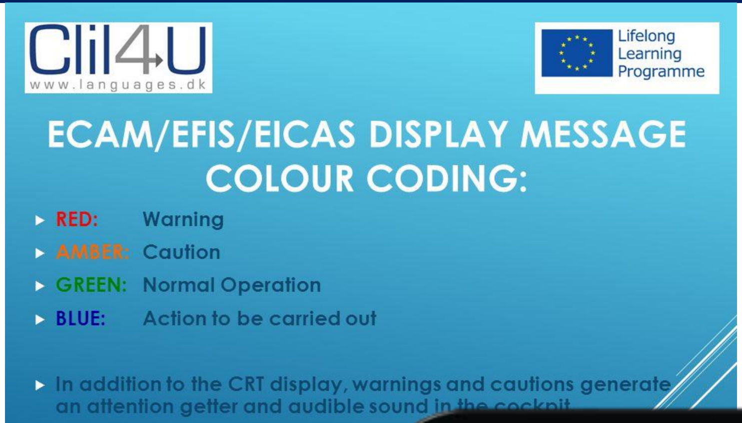
Why Colour Codes?

(I) Color	(J) Color	Mean Difference (I-J)	P-value
Yellow	Blue	−8.37	<0.001
	Green	−2.22	0.195
	Red	8.14	<0.001
Blue	Yellow	8.37	<0.001
	Green	6.15	<0.001
	Red	16.51	<0.001
Green	Yellow	2.22	0.195
	Blue	−6.15	<0.001
	Red	10.36	<0.001
Red	Yellow	−8.14	<0.001
	Blue	−16.51	<0.001
	Green	−10.36	<0.001



Colour Codes





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Case Study

Cathay Pacific Flight 780 (CX780)

Basic Information

- Date: 13 April 2010
- Time: 0543 UTC+0000 (i.e. 1343 HKT)
- Callsign: CPA780
- Aircraft Type: Airbus A330-342
- Departure Airport: Juanda International Airport, Surabaya, Indonesia
- Arrival Airport: Hong Kong International Airport, Hong Kong, China
- Responsible Organisation: Civil Aviation Department (CAD)

Accident Information

- Flight CPA780 declared “MAYDAY” when approaching Hong Kong International Airport (VHHH) with control problem on both engines. The aircraft landed at a groundspeed of 231 knots, with No. 1 engine stuck at about 70 % N1* and No. 2 stuck at about 17 % N1. Five main tyres were deflated after the aircraft came to a complete stop on Runway 07L of VHHH.
- A total of 57 passengers and six cabin crew were injured during the evacuation.
- Before departure for VHHH, the accident aircraft had uplifted 24,400 kg of fuel at Juanda International Airport, Surabaya, Indonesia (WARR).

*N1 refers to Rotation speed of the engine LP compressor and turbine rotor expressed as a percentage of its maximum rotation speed

Landing Stage

News Report

HONG KONG - Eight passengers were injured on a Cathay Pacific plane from Indonesia at the Hong Kong International Airport Tuesday afternoon, when tires deflated and caught a fire during an emergency landing, local authorities said.

A Cathay Pacific airbus lies on the tarmac after an emergency landing in Hong Kong April 13, 2010. [Agencies]

The Cathay Pacific A330 aircraft, flight CX 780, arriving from Surabaya, Indonesia, made an emergency landing at the Hong Kong International Airport at about 13:45 local time (0545 GMT) on Tuesday due to a suspected engine problem.

Related readings:

- Body found in airplane wheel well at Tokyo airport
- A man was pushed out of an airplane, without a parachute. How was he able to survive?
- Paper airplane virtuoso tests record aloft

An emergency evacuation of passengers was initiated after the aircraft landed on the north runway of the airport, with six aircraft tires blown out after the landing.

Out of altogether 309 passengers and 13 crew members on board, four male and four female passengers were injured during the evacuation and were sent to hospital for medical treatment. Two were sent to Yan Chai Hospital and have been discharged, while six remained in Princess Margaret Hospital.

The Civil Aviation Department has formed a team to investigate the emergency landing, and investigators are collecting data and will conduct interviews with passengers and crew, said Director of Civil Aviation Norman Lo at a joint press conference on Tuesday afternoon.

A preliminary report will be submitted in a month, he said.

All four tires on the left of the aircraft and two on the right deflated, and they were designed to deflate in emergency situations to prevent them from bursting, Cathay Pacific Airways' Chief Executive Tony Tyler said.

The incident closed the north runway for two and a half hours when a total of 125 flights operated from the south runway for landing and take-off and only 35 flights suffered minor delays.

Air Disasters: Deadly Descent

Accident Report

- The investigation had identified that contaminated fuel uplifted at WARR had caused stiction in the Fuel Metering Units of both engines and eventually the total seizure of these components, rendering the loss of both engine thrust control of the aircraft during approach to VHHH.

Causal Factors

- A series of causal factors had led to the uplift of contaminated fuel to the aircraft.

1. The re-commissioning of the hydrant refuelling system after the hydrant extension work in WARR had not completely removed all contaminants in the affected hydrant refuelling circuit. Salt water remained in the affected hydrant refuelling circuit.
2. The re-commissioning of the hydrant refuelling system after the hydrant extension work in WARR was not properly coordinated which led to the premature resumption of the hydrant refuelling operations while the hydrant system still contained contaminant.
3. The refuelling operation in WARR, in particular low flow-rate refuelling, DP recording and monitoring, did not fully comply with the international fuel industry latest guidance.
4. A number of unscheduled filter monitors replacements after the premature resumption of hydrant refuelling operation were not investigated by the fuel supplier and hydrant operator at WARR.
5. The unusual vibration observed during the refuelling of CPA780 was not stopped immediately and properly investigated by the fuel supplier personnel.

Contributing Factors

- The investigation also identified the following deficiencies and contributing factors that may cause possible fuel contamination:

1. There were no established international civil aviation requirements for oversight and quality control on aviation fuel supply at airports.
2. There were no established international civil aviation requirements for refuel operational procedures and associated training for aviation fuel supply personnel.
3. The manual monitoring of DP changes in a fuelling dispenser during refuelling was not effective.

Safety Actions

- Safety Actions have been taken by the following parties:

1. Pertamina
2. DGCA Indonesia
3. ICAO
4. Airbus
5. CPA
6. CAD
7. Facet

Safety Actions - Taken by Pertamina

1. To address the finding that the refuelling operation in W ARR did not comply with international fuel industry latest guidance, Pertamina arranged an audit in July 2010 to their aviation fuel facility and refuelling operation in WARR by an external aviation fuel expert. The audit findings raised during this audit were subsequently addressed by Pertamina to the satisfaction of the auditor.

2. To address the concern of the insufficient awareness of refuelling personnel on unusual refuelling events, Pertamina had arranged refresher training for their refuelling personnel by qualified aviation fuel expert with a view to improving their awareness during refuelling operation. The training was completed i n S eptember 2010.

Safety Actions - Taken by Pertamina (cont'd)

3. To address the finding that the fuelling dispenser at WARR has excessive refuelling flow-rate capacity for WARR operation, Pertamina has down-rated one of the fuelling dispensers by replacing 20 filter monitors in the filter vessel with blanking elements. Pertamina also acquired two additional fuelling dispenser with small flow-rate capacity. These fuelling dispensers with lower flow-rate capacity were in operation since October 2011.

4. To enhance the effectiveness of DP monitoring during refuelling, Pertamina has been working on a trial installation program since January 2012 to install automatic DP monitoring devices on its fuelling dispensers. Such device has the ability to show corrected DP, register peak DP value, and provide visual and audio alert of DP changes to the dispenser operator and stop the refuelling. At the time of writing this report, Pertamina is evaluating the results of the trial.

Safety Actions - Taken by Pertamina (cont'd)

	Actions Taken		When
1	Revise Pertamina Aviation Procedures	• Incorporate the monitoring and convertion of Filter DP • Devided into 4 books: HSSE & Admin, Quality Control, Refueling Procedures & Maintenance	• January 2011
2	Intensive Training for Quality Control & Refueling procedure with new Training modules by international expert	• Training for trainers • Use the modules as their training modules • In the process of aligning all the modules	• September 2010
3	Conduct Maintenance Training with new Training modules by international expert	• Training for all maintenance personnel • Use the modules as their training modules	• July 2011
4	TSA with Air Total International	• Yearly audit SUB, CGK & DPS • Sharing the Procedures & bulletins • Training	• April 2011
5	Become Associate Member of JIG	• Joint the JIG Managers Meeting & Training • Receive & internalize JIG bulletin, Lesson Learned & procedures	• May 2011
6	Reducing monitor Vessel flow-rate	• Using dummy monitor elements on 1 vehicle • Use 2 new low flow-rate vehicles	• October 2011 • September 2011
7	Improve filter DP (Delta Pressure) monitoring system	• In the trial process of using Filter DP Electronic System • Using new Filter DP monitoring method with daily converted record • Before delivered to hydrant system, install flow-rate indicator for each fixed fliter water separator	• January 2012 • June 2010 • April 2011
8	Improve Audit System	• With INACA (Indonesian National Air Carrier Assotiation) established audit procedure and conduct on major airoports • Using new IFQP Quality & Safety Check List for audit refference	• September 2011 • April 2012

Safety Actions - Taken by DGCA Indonesia

- To address the shortfalls and improper coordination in the re-commissioning of the hydrant refuelling system, the Taskforce of DGCA Indonesia had coordinated a review to the re-commissioning procedure of the affected hydrant refuelling circuit. A revised re-commissioning procedure was formulated. Cleaning and draining of the affected hydrant refuelling circuit were completed. Internal inspection of hydrant piping was done in September 2011 and the result was being evaluated by the Taskforce. At the time of writing this report, the affected hydrant circuit remained isolated. Refuelling at Stands No. 1 to No. 10 is still being done by refuellers / bowsers.

Safety Actions - Taken by ICAO

- To address the lack of established international civil aviation requirements for oversight and quality control on civil aviation fuel supply in airport, ICAO, with the assistance of IATA Technical Fuel Group, has issued DOC 9977 "Manual on Civil Aviation Jet Fuel Supply" in June 2012. DOC 9977 is a signpost document to relevant industry practices that cover all matter related to aviation fuel quality control, operations, and training across the entire supply and distribution system. The aim of DOC 9977 is to provide guidance to the aviation globally about the existence of internationally accepted practices and to reinforce the need for their compliance. ICAO also indicated the consideration of adding new SARPs in Annex 14 and/or other Annexes, as necessary, on the oversight and quality control on civil aviation fuel supply in airport.

Safety Actions - Taken by Airbus

1. To inform Airbus aircraft operators of the industry-wide recognised guidelines and practices to prevent uplift of contaminated fuel onto aircraft, Airbus has issued Service Information Letter 28-094 dated Nov. 26 2010. This Service Information Letter “highlighted the roles and responsibility of key players with regard to the fuel standards and specifications, up to the point of into-plane refueling”.
2. To provide more guidance to flight crew to handle situation of suspected fuel contamination, Airbus has revised the QRH to include a new section 70.07 dated 20 September 2011 “SUSPECTED ENG FUEL SYS CONTAMINATION” for A330 with RR engines to assist the crew in determining and handling of fuel contamination incident. Moreover, Airbus has also published similar procedure for A330 with Pratt and Whitney engines and in the process of publishing similar procedure for A330 with General Electric engines.

Safety Actions - Taken by CPA

1. CPA has incorporated the new Airbus QRH 70.07 dated 20 September 2011 "SUSPECTED ENG FUEL SYS CONTAMINATION" to provide guidance to its flight crew to handle situation of suspected fuel contamination
2. Following the occurrence, CPA conducted a series of additional line station fuel farm audits in WARR with assistance from external aviation fuel experts. To further enhance its aviation fuel quality oversight function, CPA has since joined IATA-IFQP and now uses the IFQP audit checklist which reflects the latest specification, guidance, and procedures used in aviation fuel storage and refuelling operation.

Safety Actions - Taken by CAD

1. ATMD of CAD has reviewed its procedures and confirmed that declaration of "Full Emergency" and "Local Standby" will be based on the prevailing information presented by the pilots to ATC controllers.
2. The Flight Standards and Airworthiness Division (FSAD) of CAD had revised the CAD 360 “Air Operator's Certificates Requirements Document” in August 2011 to provide the AOC holders with further technical guidelines by making reference to the requirements on specifications and standards of Jet A-1 that have been established by the fuel industry and airlines associations.

Safety Actions - Taken by Facet

- To address the collapsing of filter monitors, Facet released their new FG230-4 filter monitors in September 2011 which have improved strength by using steel centre tube and also met the EI 1583 6th Edition specification.

Safety Recommendations issued previously

a. Safety Recommendations issued previously in Accident Bulletin 3/2010 published on 11 August 2010:

Recommendation 2010-1

Satuan Kerja Pengembangan Bandar Udara Juanda Surabaya (i.e. The Juanda Surabaya Airport Development Taskforce)* should, with suitably qualified personnel of aviation fuel hydrant operation and re-commissioning experience, conduct an extensive review of the re-commissioning procedures of hydrant refuel system in accordance with the best practice in aviation fuel industry. (Reference 2.10 b)

(The Juanda Surabaya Airport Development Taskforce is the project owner for the hydrant refuel system extension work at Stands No. 1 to 4 at WARR.)*

Recommendation 2010-2

The Juanda Surabaya Airport Development Taskforce should ensure the re-commissioning procedures are completed before resuming the hydrant refuelling operation for Stands No. 1 to 10 at WARR. (Reference 2.10 e)

Safety Recommendations issued previously

b. Safety Recommendation issued previously in Accident Bulletin 1/2011 published on 20 January 2011:

Recommendation 2011-1

International Civil Aviation Organization to establish requirements for oversight and quality control on aviation fuel supply at airports. Such requirements should also cover the refuel operational procedures and associated training for relevant personnel. (Reference 2.14 f)

Safety Recommendations issued in this accident

Recommendation 2013-2

International Civil Aviation Organization to specify the requirements of installing a device in equipment used in refuelling civil aircraft. This device should be able to automatically alert the equipment operator and stop the refuelling process when the differential pressure across the equipment filtration system is outside the equipment designed value or range. (Reference 2.14 h)

If you want to know more…

AIRCRAFT ACCIDENT REPORT 2/2013

ACCIDENT INVESTIGATION DIVISION

Civil Aviation Department
The Government of
Hong Kong Special Administrative Region

Report on the accident to Airbus A330-342
B-HLL operated by Cathay Pacific Airways Limited
at Hong Kong International Airport, Hong Kong
on 13 April 2010

Hong Kong
July 2013

THE HONG KONG POLYTECHNIC UNIVERSITY
香港理工大學

Case Study

Cathay Pacific Flight 880 (CX880)

Opening Minds • Shaping the Future
啟迪思維 • 成就未來

Basic Information

- Date: 23 June 2023
- Time: 1622 UTC+0000 (i.e. 24 June 2023, 0022 HKT)
- Callsign: CPA880
- Aircraft Type: Boeing 777-300ER
- Departure Airport: Hong Kong International Airport, Hong Kong, China
- Arrival Airport: Los Angeles International Airport, Los Angeles, US
- Responsible Organisation: Air Accident Investigation Authority (AAIA)
- **Detailed Investigation is In Progress***

Accident Information

- Preliminary investigation has revealed that the flight rejected takeoff due to a discrepancy with the airspeed indication in the flight deck.
- As the aircraft taxied back to its parking stand, the crew observed an increasing temperature in the left and right main landing gear brakes, accompanied by progressive deflation of the tires. While waiting for the airbridge to connect to the aircraft, an explosive sound was heard and severe vibration were felt by the occupants on board.
- Concurrently, the crew observed a fire at the left main landing gear (aft position) via the Ground Maneuver Camera System (GMCS).
- Passenger evacuation was initiated via five aircraft emergency slides and the airbridge subsequently connected to the L1 door.
- Immediately after the fire was observed by the crew, they alerted the Air Traffic Control (ATC) and requested assistance. The ATC activated the crash alarm and notified the Airport Fire Contingent, who responded to the emergency.

News Report

News Report


Online Photo
AY PACIFIC
In a statement, Cathay said the crew
had followed standard procedures due to a

Thank You!