

Audit Techniques & Practices for Regulators

RCA

QA

SMS

ISO

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INTRO

**Audit
Roadmap**

**On The
Road
Again**





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Audit Techniques & Practices for Regulators

RCA

QA

SMS

ISO

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**Audit
Roadmap**

**On The
Road
Again**





INTRO

**Audit
&
Human
Factors**

**Audit
Processes**

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THIS WEEKS SCHEDULE

20 Sept

Day 5

09:00 Pre-audit Activities

10:30 Break

11:00 Pre-audit Activities Cont'd

12:30 Question Period

Day 6

09:00 Performing an Audit

10:30 Break

11:00 Performing an Audit cont'd

12:30 Question Period

Day 7

09:00 Audit Findings & Reports

10:30 Break

11:00 Audit Findings & Reports Cont'd

12:30 Question Period

Day 8

09:00 Review of Root Cause Analysis

10:30 Break

11:00 Post-Audit & Corrective Actions

12:30 Question Period

21 Sept

22 Sept

23 Sept

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**TODAY'S
SCHEDULE**

1000

**Performing
an Audit**

1045

**Performing
an Audit**

1200

**Performing
an Audit**

1245

**Performing
an Audit**

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Physical Inspections



Aim

To describe the activities and procedures that are carried out during physical inspections.

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Outline

We will cover:

- Overview
- Checklists
- Interviewing
- Documenting evidence
- Audit forms
- Corrective action

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3

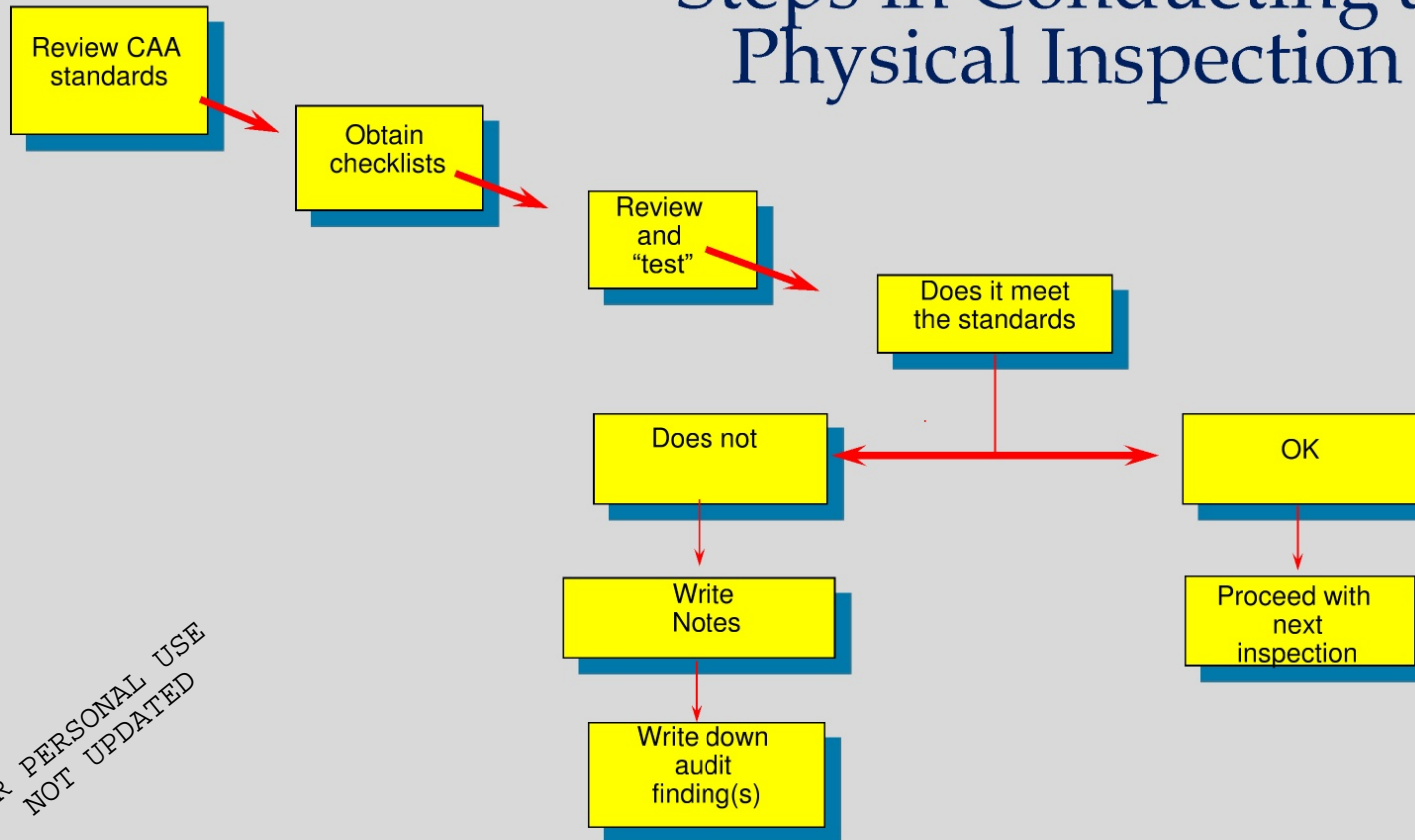
What is Auditing?

Examining the operator's system, in your assigned area, to determine if it meets the applicable Civil Aviation regulations and company procedures as published in their CAA approved documents and manuals.

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Steps in Conducting a Physical Inspection



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Checklists

- Use as directed
- Ensure that no area is overlooked
- Write down information
- Check company against applicable Civil Aviation regulation requirements



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Audit

Airworthiness

- Maintenance Control/Policy Manual
- Civil Aviation Regulation
- Aviation Act
- MPD/MRB
- Approved maintenance programs

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Interviewing People

Why?

- To determine if the system documented in the approved manuals is the system in use
- To assess the knowledge of the operator's personnel and to review their duties and responsibilities
- To determine if any other areas need be audited
- To tell people what is going on

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Basics of Interviewing

- Ensure no other Inspector has talked to the person about the same thing.
- Where necessary, determine which Team Member will talk to whom
- Be organized
- Be polite
- Do not interrupt auditee. If necessary make an appointment

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Basics of Interviewing

Cont'd

- Do not threatening
- Explain to Person what you are doing and why
- Check whether it is ok to take notes
- Ask questions carefully
- Listen carefully to the response

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After Interview

- Make extra notes as necessary
- Tell Team Leader if necessary

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Do Not

- Play 'I have you now'
- Intimidate
- Allow yourself to be intimidated
- Allow yourself to be drawn into fight

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What if?

- The person refuses to speak to you
- The person wants to say tell you a secret
- The person wants to fight
- The person wants to make a speech

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Basics of Interviewing

Cont'd

- Ask questions another way if necessary
- Ensure you understand the answers
- Ask extra questions as necessary
- Try to discuss
- Remain on track
- End the interview in a friendly manner

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INTERVIEWS & COLLECTION OF EVIDENCE

During this phase, the level of compliance with the regulations and organization approved manuals will be assessed.

The interactions between –

- functions,
- activities and
- processes

should also be assessed during the interviews and collection of evidence phase.

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INTERVIEWS & COLLECTION OF EVIDENCE

The assessment performed in this phase is based on the interviews, observations and documents and records reviews by sampling.

The evidence collected during the audit should be kept to justify to the auditees the non-compliance founds.

The audit team should share with the auditee the non-compliance as soon as it is found.

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Sampling

The sample size of a population and selection criteria have a direct impact on the validity and confidence level of the results. The following guidelines should be used:

- (a) each sample group must stand alone.
 - If there are 1 400 pilots, 2 800 flight attendants, 180 maintenance personnel, and 15 dispatchers, each of the four groups must be considered separately;
- (b) the RAP goal is to achieve a 95 per cent confidence level with the results of the sample tested. Often, this goal may not be appropriate; therefore, the audit team must carefully consider both the sample size and the time devoted to the task.

Random sampling may be considered an acceptable alternative;

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Sampling

For smaller populations, a larger sample must be examined and the following guide should be used:

Population	Sample
100:	50 per cent
199:	40 per cent
399:	35 per cent

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**Confidence Level of 95%
(Reliability of Sample Size \pm 5%)**

Population	Sample	Population	Sample
400	153	1 150	203
450	159	1 200	204
500	165	1 250	206
550	170	1 300	207
600	175	1 350	208
650	179	1 400	209
700	182	1 450	210
750	185	1 500	211
800	188	1 550	212
850	191	1 600	213
900	193	1 650	214
950	195	1 700	215
1 000	198	1 750	216
1 050	199	1 800	217
1 100	201	1 850	218

COMMUNICATION AND INTERMEDIATE MEETINGS

The internal communication within the audit team can be convened periodically, depending on the duration of the audit.

The internal communication is led by the audit team leader to share the progress of the audit and any concerns regarding the activities, the auditee and any other topic related to the audit.

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COMMUNICATION AND INTERMEDIATE MEETINGS

The internal communications shall be agreed on the preparation phase but can be amended by the team leader during the on-site activities.

The team leader should pay specific attention to team coordination if the audit is a multi-sites audit.

If a team member comes across a new and/or changed circumstances or risks, he/she should advise the team leader accordingly.

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COMMUNICATION AND INTERMEDIATE MEETINGS

The external communication with the auditee about the non-compliances found during the audit is necessary to be performed to the auditee as soon as possible.

During the communication is the opportunity to explain why they are non-complying with the regulations or manuals and is the right opportunity to explain to the auditee how to implement proper corrections and corrective actions to solve the non-compliance.

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COMMUNICATION AND INTERMEDIATE MEETINGS

The auditee should implement without delay a proper action to get back to a safe situation.

During the audit, the non-compliances template can be used to inform of a non-compliance finding and the deadlines to implement proper actions.

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Remember...Checklists

- Use as directed
- Ensure that no area is overlooked
- Write down information (all notes goes into the audit file)
- Check auditee against applicable regulatory requirements
- Examples of Checklists



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Remember...Checklists

- FOI, AIR, CSI, GOP, OCC, SMI)
- OPS Audit Checklist (Flight Operations)
- AIR Checklist (Airworthiness)
- Aerodrome Checklist
- ANS Checklist
- ONS Checklist



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Remember...Checklists

There are 20 (OP- 1 to 20) functional audit areas in which an air operator may be assessed:

- (a) PREVIOUS AUDITS..... (OP-1);
- (b) OPERATOR CERTIFICATES & OPERATIONS SPECIFICATIONS .. (OP-2);
- (c) COMPANY MANUALS (OP-3);
- (d) THE PUBLICATIONS LIBRARY (OP-4);
- (e) MANAGEMENT PERSONNEL & OPS CO-ORDINATION (OP-5);
- (f) THE COMPANY CHECK PILOT PROGRAM..... (OP-6);
- (g) THE FLIGHT CREW TRAINING PROGRAM (OP-7);
- (h) THE FLIGHT CREW TRAINING RECORDS (OP-8);
- (i) THE OPERATIONAL CONTROL SYSTEM..... (OP-9);
- (j) FLIGHT DOCUMENTATION (OP-10);
- (k) AIRCRAFT INSPECTION..... (OP-11);

Remember...Checklists

REF	ITEM	REFERENCE	OK	FINDING	NA
OP-2.1	Does the air operator possess the following requirements: <input type="checkbox"/> an adequate organization? - [YES/NO] <input type="checkbox"/> method of control & supervision, flight operations? - [YES/NO] <input type="checkbox"/> training programme? - [YES/NO] <input type="checkbox"/> ground handling and maintenance arrangements? - [YES/NO]	ICAO: A6-4.2.1.4 *NR: *OD:			
OP-2.2	Does the operator possess a current copy of AOC & OPS SPECs?	ICAO: A6-4.2.1.1 *NR: *OD:			
OP-2.3	Who is responsible for maintaining the AOC & OPS SPECs docs?	ICAO: N/A *NR: *OD:			
OP-2.4	What type of AOC does the company hold, i.e., commercial/ charter & domestic/international?	ICAO: N/A *NR: *OD:			

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Remember...Checklists

REF	ITEM	REFERENCE	OK	FINDING	NA
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OP-2.2	Does the operator possess a current copy of AOC & OPS SPECs?	ICAO: A6-4.2.1.1 *NR: *OD:			
OP-2.3	Who is responsible for maintaining the AOC & OPS SPECs docs?	ICAO: N/A *NR: *OD:			
OP-2.4	What type of AOC does the company hold, i.e., commercial/ charter & domestic/international?	ICAO: N/A *NR: *OD:			

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Remember...Checklists

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OP-2.2	Does the operator possess a current copy of AOC & OPS SPECs?	ICAO: A6-4.2.1.1 *NR: *OD:			
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Remember...Checklists

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OP-2.2	Does the operator possess a current copy of AOC & OPS SPECs?	ICAO: A6-4.2.1.1 *NR: National Requirements *OD:			
OP-2.3	Who is responsible for maintaining the AOC & OPS SPECs docs?	ICAO: N/A *NR: *OD:			
OP-2.4	What type of AOC does the company hold, i.e., commercial/ charter & domestic/international?	ICAO: N/A *NR: *OD:			

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DAILY TEAM MEETING

Team Leader Duties

- Exchange, discuss and validate the day's findings and confirmation requests
- Reach agreement on certain items
- Be informed and measure the progress of the audit
- Plan the strategies and take decisions necessary in terms of directing and redirecting personnel

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23

Evidence

What is it?

Anything which supports or shows the actual state of the area being examined

- non-conformance
- conformance

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Evidence

Why?

- Collect to support non-compliance
- Retain securely
- Record in notes
- Maintain evidence log

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Evidence

How? Remember Interviews...

- Key Post Holders/managers should be included in the interview schedule (Make an appointment)
- Prepare core questions in advance and use Audit checklist and OM (roles and responsibilities) as guide
- The interview schedule should be established with the operator in the planning stage of the audit

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Evidence

How? Remember Interviews...

- Normally interviews are conducted in twos.
- One conducts the interview, the other observes and takes notes.
- Explain who you are, what you doing, and why
- Verify that it is acceptable that your partner takes notes
(it should not be a problem)

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Evidence

Finally, remember...

- End the interview in a friendly manner
- Conclude the interview early if the atmosphere becomes highly negative, then discuss with Audit Manager
- Make extra notes as necessary
- Brief Team Leader as necessary

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Immediate Threat to Safety

Level I Findings

- As necessary, respond Immediately in accordance with delegated authority
- If time, before action, report through Audit management to Convening Authority with recommendation
- Convening Authority will determine implications, if any, for conduct of audit

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Not an Immediate Threat to safety

What do you do?

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Audit Findings & Confirmation requests

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Aim

To describe how to complete the Audit Finding and Confirmation request forms.

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Outline

- Overview
- Writing Audit Findings correctly
- Practice exercises
- Test on writing an Audit Finding
- The Confirmation request Form

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Audit Finding

Definition

“Audit Finding” means the determination of non-conformance of a product, process, practice or procedure or a characteristic thereof to a specified regulation or standard.

This will be documented in the Audit Finding Form.

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AUDIT NON-COMPLIANCE

The non-compliance should only reflect facts justified by evidence and not a judgment from the auditor due to the non-compliance.

It should be accurate, factual and referring to the article, applicable regulation or manual related.

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35

AUDIT NON-COMPLIANCE

If there is an absence of evidence or records of procedures with mandatory implementation, a non-compliance should be raised.

However, sometimes it is not easy to obtain the evidence that something does not exist;

- in that case, it should not be evaluated as “missing” but that as “it could not be provided during the audit.”

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36

AUDIT OBSERVATIONS

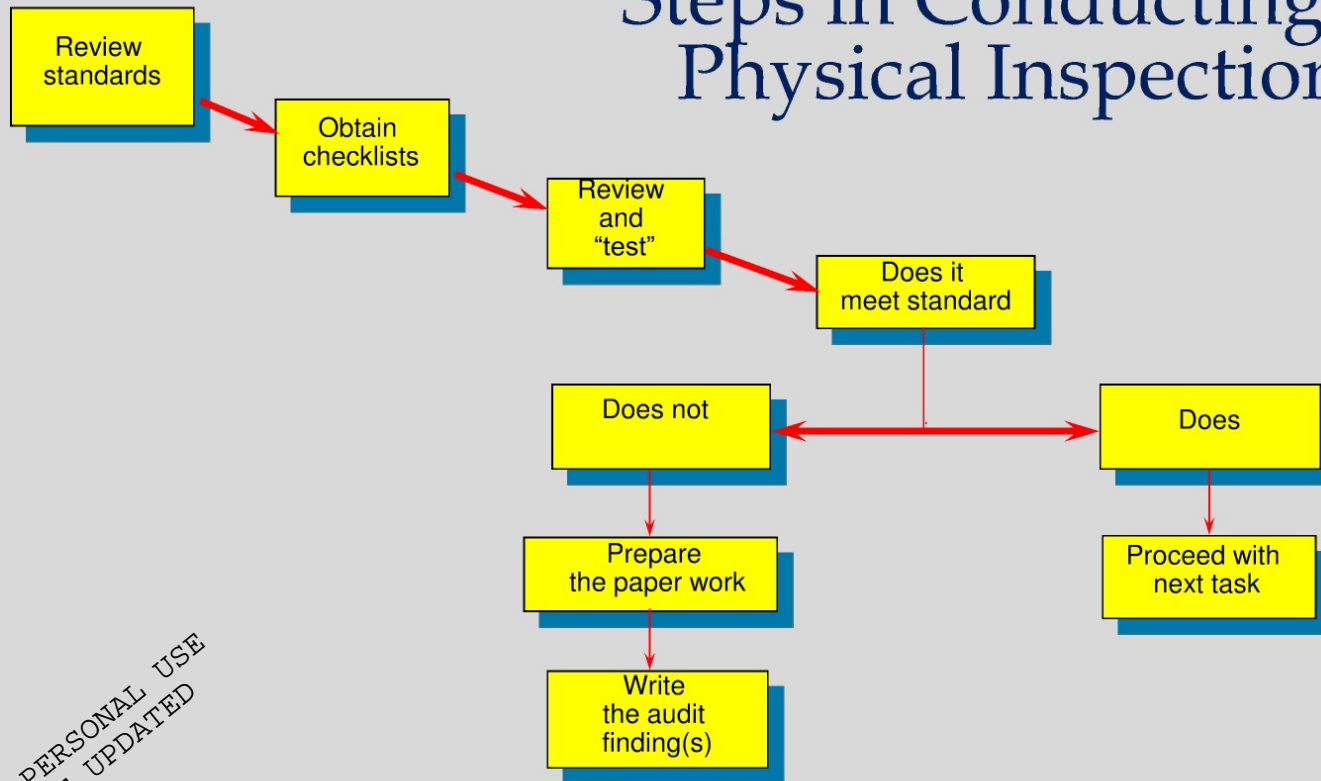
During the audit, the audit team members can highlight topics or areas of improvement that are not non-compliances by using the term 'observation.'

The observations do not impose the implementation of correction/corrective actions but are included and formalized within the audit report.

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37

Steps in Conducting a Physical Inspection



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Writing Audit Findings

Problems

- The Regulatory requirement has been written incorrectly
- The standard and the example(s) do not match
- The example(s) would support more than one Audit Finding

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Writing Audit Findings

Exactly

- Write the regulatory requirement in terms of chapter, section, paragraph etc.
- Then incorporate the phrase "Which states"
- Then write enough of the regulation to clearly illustrate the meaning of it.
- Tie one part to another by using (dots)

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Writing Examples

- Ensure that the example matches the Regulatory requirement
- Include a lead-in statement such as "The following are examples of..." where possible
- Write a statement of how the situation was (past tense)
- Make reference to supporting evidence
- Generally use 3 most relevant examples to support a finding

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AUDIT FORMS:

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Audit Finding Form

ABC Airlines	XYZ	
Company Name	Base Location	File
Area of Audit:		No.
Non-Conformance With:		

Examples

Name and Signature of Auditor	Date

Company Corrective Action: Immediate, Short and/or Long Term

Signature/Title	Date

Department of Civil Aviation Response

Audit Follow up

Target Completion Date	Date Item Completed		Inspector

When completing these forms, auditors shall use the following checklist:

- (a) at the top of the audit finding form:
 - (i) correctly identify the company name as found on the aviation document;
 - (ii) enter the location of the base or sub-bases;
 - (iii) identify the company by Civil Aviation file number;
 - (iv) identify the area of audit in accordance with the checklist; and
 - (v) identify the audit finding number in accordance with the checklist or as directed by the audit manager.

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(b) in the “Non-Conformance With” section of the audit form:

(i) correctly identify the title of the regulatory requirement to be referenced, without using acronyms or abbreviations;

(ii) isolate the relevant portion of the regulatory requirement by reference to the chapter, section, sub-section, and paragraph as appropriate;

(iii) tie the non-conformance to the most applicable regulatory requirement;

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The audit form cont'd:

(iv) use the phrase “which states” when an entire quotation is to be used, then quote the regulatory requirement word for word, ensuring that the quotation is relevant; or

(v) use the phrase “which states in part” when a partial quotation must be used (segmenting), then quote the regulatory requirement word for word, separating segments as necessary with the notation “...” and ensuring that the quotation is relevant; and

(vi) when segmenting, quote a sufficient portion of the text to clearly identify the regulatory requirement while avoiding the use of unnecessary words.

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(c) in the “Examples” section:

(i) identify the auditors and date of the finding;

(ii) specify the three most applicable examples of the non-conformance, where practicable;

(iii) ensure that the examples illustrate non-conformance with the particular standard;

(iv) use an appropriate lead-in statement to introduce the examples;

(v) support the audit finding with secured evidence (i.e. photocopies, photographs or seized perishable evidence to be retained in an appropriate location).

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AUDIT FINDING FORM

Area of Audit:

Non-Conformance

With:

Company Corrective
Action

Immediate, Short
and/or Long Term

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Audit Finding Form		
Company Name	Base Location	File
Area of Audit:	FINDING No.	
Non-Conformance With:		
EXAMPLES		
Name and Signature of Auditor		Date
Company Corrective Action: Immediate, Short and/or Long Term		
Signature/Title		Date
Civil Aviation Division Response		
Audit Follow up		
Target Completion Date	Date Item Completed	Inspector

Finding No.

EXAMPLES

Civil Aviation
Response

Audit Follow up

AUDIT FINDING FORM

Area of Audit: O15 Flt & Duty Time Records **Finding No:**O15-1

Non Conformance with: **SAR 700.14** (1) which states in part - 'Every air operator shall establish a system that monitors the flight time, flight duty time and rest periods of each of its flight crew members.....

.....
Area of Audit: O2 OPS SPECIFICATIONS **Finding No:**O2-1

Non Conformance with: **SAR 705.26** (1) Which states in part - Subject to subsection (2), no air operator shall operate a twin-engined aeroplane on a route containing a point that is farther from an adequate aerodrome than the distance that can be flown in 60 minutes at the one-engine-inoperative cruise speed.

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AUDIT FINDING FORM

Area of Audit: *O16 Flight Inspections*

Finding No: *O16-1*

Non Conformance with: SAR705.29 (1) which states in part
.....flight crew members who are on flight deck duty shall
remain at their duty stations with their safety belts fastened..

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AUDIT FINDING FORM

Area of Audit: Storage facilities

Finding No:Xnn-1

Serviceable and unserviceable parts are not satisfactorily separated

Non Conformance with:

145.A.25 Facility requirements which states

The organization shall ensure that:

(d) Secure storage facilities are provided for components, equipment, tools and material.

Storage conditions ensure segregation of serviceable components and material from unserviceable aircraft components, material, equipment and tools.

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45

AUDIT FINDING FORM

Area of Audit: *A1 Maintenance Control Manual* **Finding No:***A1-1*

Non Conformance with: *SAR 121.137 (a) (1) which states in part - Each certificate holder shall furnish copies of the manualto - its appropriate.....maintenance personnel.*

.....

Area of Audit: *A14 Certification of Components* **Finding No:***A14-2*

Non Conformance with: *SAR 145.39 (d) which states in part - Each person who is directly in charge of the maintenance functions..... must have had at least 18 months of practical experience..... in the work for which the certificate holder is authorised.*

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AUDIT FINDING FORM

Area of Audit: *A21 Test & Measuring Equipment* **Finding No:** *A21-1*

Non Conformance with: *SAR 145.47(a) which states - A certificate holder must have equipment and materials necessary to efficiently perform the functions listed on their certificate*

.....
Area of Audit: *A21 Test & Measuring Equipment* **Finding No:** *A21-2*

Non Conformance with: *SAR 145.47(b) which states in part - The organization shall ensure that all inspection tools and test equipment are tested at regular intervals to ensure correct calibration*

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AUDIT FINDING FORM

Area of Audit: *A21 Test & Measuring Equipment* **Finding No:** *A21-3*

Non Conformance with: *SAR 145.47(b) which states in part -
The organization shall ensure that all test equipment are tested
..... to ensure correct calibration to a standard derived from
the National Standards or to a standard provided by the
equipment manufacturer.*

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AUDIT FINDING ~~ ISSUANCE DURING PHYSICAL AUDIT

- Findings generally *not* issued during the physical audit
- Audit Manager may decide to issue a finding during the physical audit if the nature of the finding requires a response prior to the completion of the formal audit report
- Response deadline must be specified on the written finding provided to the Auditee
- Audit Manager will be responsible for accepting corrective action plan
- Audit Manager may consult, as necessary, with technical experts

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Confirmation Request Form

Purpose

To Reduce Inspector workload during the Initiation and audit phases by requiring the Auditee to prove compliance when non conformance is indicated.

The CRF reduces time consuming document searching, and places the onus on the company to prove conformance.

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Confirmation Request Form

CRF Number

Auditors name

Company rep.

Company response required by:

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Confirmation Request Form	
CRF No.	Company Name
Name of Auditor	Area of Audit
Company Representative	Title
Subject Matter	
Subject matter	
Auditor's Signature	Date and Time
Company Response Required By:	
Company Response	
Company response	
Company Representative's Signature	Date and Time
For Inspector Use Only	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	

Company name

Area of audit

Company response

Confirmation Request Form

Advantages

The auditee is afforded the opportunity to prevent aircraft 'grounding', and it also ensures that the auditor is in possession of all the facts before proceeding with further action.

In addition the auditor receives a signed document from the auditee to use as part of the supportive evidence package.

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Confirmation Request Form

Advantages (cont.)

- Where initial evidence indicates a non-conformance, the burden is on the company to show otherwise;
- The auditor makes the final determination based on auditee produced facts as to which direction to proceed;

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Confirmation Request Form

Advantages (Cont.)

- Elimination of arbitrary findings based on subjective examples;
- The auditee is not faced with major surprises at the end of the audit because all contentious issues have been dealt with in an open manner; and
- The auditor has more time to devote to the business of auditing rather than chasing a paper trail.

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CONFIRMATION REQUEST FORM

Recap...

- Provides Auditee with the opportunity to locate and provide supporting documentation or other evidence
- May establish compliance and avoid a finding
- Alternately, the Auditee may concur that the information not available
- Permits open discussion of emerging issues during the audit
- The confirmation request form becomes part of the audit evidence package

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Daily Meetings



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Aim

To be able to conduct daily meetings
with the team and the company.

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Outline

We will cover:

1. Daily Team Meetings

- Team Leaders and Members
- Audit Manager and Team Leaders

2. Daily Company Meetings

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Daily Team Meetings

Team Members should brief TL on

- The area(s) they are examining
- A brief summary of what they are finding
- Identify any difficulties they are having
- Offer possible solutions

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Daily Team Meeting

So Team Leader can:

- Exchange, discuss and validate the day's findings and Confirmation Requests
- Reach agreement on certain items
- Be informed and measure the progress of the audit
- Plan the strategies and take decisions necessary in terms of directing and re-directing personnel

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Daily Team Meetings

Cont'd

A date/time for completion of any phase of their assignments,
(for example, The technical library review will be completed by
this afternoon)

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Daily Team Meeting

So Team Leader can:

- Be provided the information that will form the content of the comments he will make during the daily meeting with the operator
- Be provided the information to report the progress of the audit to the AM as necessary

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DAILY COMPANY BRIEFING

- Conducted by Audit Manager
- Audit manager may elect to have a team leader or team member brief the auditee's officials on specific items
- Hold at time agreed during entry meeting
- Scheduled to minimize any disruption
- Conducted to update the auditee's management on audit progress
- To discuss any audit findings that have been identified
- "Auditee may fix but finding stays"

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63

SYNTHESIS MEETING – AUDIT DRAFT

The synthesis meeting should be convened by the team leader, and it is mandatory for all the CAA audit team members assigned to the audit/inspection to attend.

The main objective of the synthesis meeting is to agree and prepare the audit conclusions.

During the meeting, it should be confirmed that the objectives of the audits have been reached and reviewed the non-compliances found.

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64

AUDIT REVIEW COMMITTEE - PURPOSE

Held after the completion of the *draft* Audit Report for the purpose of:

- confirming the technical accuracy of the report
- ensuring that the report is an objective account of the audit and that no subjective statements are included
- ensuring that statements made in the functional and specialty area summaries are supported by findings
- determining if any findings should be subject to investigation for punitive enforcement purposes

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65

AUDIT REVIEW COMMITTEE - MEMBERS

Chaired by Convening authority, includes:

- Audit Manager and Team Leaders
- CAA Directors / Managers
- CAA Superintendent(s)
- Aviation Enforcement Advisor
- Company principal inspector(s)

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66

AUDIT REVIEW COMMITTEE - FUNCTIONS

→ Members provide advice to the Convening Authority

- Convening Authority makes final determination on all matters related to the Audit
- Must be held promptly after the completion of the on-site portion of the audit
- Final Audit Report due to Auditee within 10-20* working days of the completion of the on-site audit

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67

Post Audit (Exit) Meeting



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Aim

To describe the activities involved in the exit meeting with the company and to better appreciate the climate it may be given in.

To describe how to create a positive environment for the
Exit Meeting

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Outline

We will cover:

Communication Rules

Topics covered at an Exit Meeting

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3

Exit Meeting

General

The closing meeting with at least the same participation that the opening meeting should provide an overview of the audit.

The meeting should summarize and include a review of the audit findings, stating areas of strength and weakness and present the conclusion of the audit and implied effect.

During the closing meeting, it should be confirmed that the objectives of the audits have been reached and reviewed the non-compliances found.

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Exit Meeting

General

This meeting must not come up with any surprises to the auditee, it will be a summary of the briefing sessions held throughout the course of the audit.

A controversial discussion with organization representatives regarding audit report content must be avoided.

If this meeting is a shock to the management it is evidence of procedures not being followed during the course of the audit.

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Exit Meeting

Content

The speakers must present their findings in a clear and concise manner.

The meeting should:

- be chaired by the audit Manager;
- be cordial, diplomatic, clear, and polite;
- take into account the personalities and background of the company representatives;

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Exit Meeting

Content (Cont.)

- thank the auditee for their co-operation;
- summarise audit findings;
- state the areas of strength as well as the areas that are deficient;

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Exit Meeting

Content (Cont.)

- outline the progression of the report following the meeting;
- explain the company's obligations regarding the corrective action plan;
- state how the response system works; and
- discuss follow-up action.

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Audit Report

The audit report shall be sent to the auditee focal point within 10 - 20 working days after the closing meeting.

The audit report shall be drafted using the audit report template in Appendix XX of the OPS Handbook and should only include objective statements.

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Audit Report

Format

Part I:

- Overview of the Auditee
- Names and Positions of Management
- Date Audit Completed and Auditee's Name and Address
- Purpose, Objective and Scope of the Audit

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FOR PERSONAL USE
NOT UPDATED

Part I General

Company Overview

ABC Airlines Limited is an aviation company which was formed in the year 2000. It offers both a scheduled and non-scheduled domestic air service from the main base at Kotoka International Airport, with sub-bases in Tamale Airport and Kumasi Airport.

ABC Airlines Limited operates one PA31 and two SAAB340 aircraft from its main base, one ATR42 from each sub-base, plus one DASH-8 from the sub-base in Tamale.

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Part I General

Company Overview

ABC Airlines Limited is an aviation company which was formed in the year 2000. It offers both a scheduled and non-scheduled domestic air service from the main base at Kotoka International Airport, with sub-bases in Tamale Airport and Suva.

ABC Airlines Limited operates one Dash 8 aircraft from each sub-base, plus one DASH 8 aircraft from the main base in Accra.

The two SAAB340 aircraft are used to support Call of the Wild Vacations, a subsidiary of ABC Airlines Limited which operates three fly-in fishing camps in Keta. The aircraft provide a scheduled service between Kumasi and Tamale, and between Tamale and Suva. The aircraft are also used on a charter basis and are available for med-evac under a standing offer to the Ministry of Health, Oil City, Sekondi-Takoradi. The operator is transporting certain dangerous goods.

Aircraft maintenance is performed in-house at all three bases. The main base in Accra has two Maintenance Engineers, five apprentices and two technicians. The sub-bases in Tamale and Suva have one Maintenance Engineer each. The aircraft are based at the main base in Accra.

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NOT UPDATED

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Aircraft maintenance is performed in-house at all three bases. There is a full-time staff of six Aircraft Maintenance Engineers, five apprentices and two technicians. The Aircraft Technical Records are kept at the main base in Accra.

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charter basis and are available for med-evac under a
Oil City, Sekondi-Takoradi. The operator is transport
Aircraft maintenance is performed in-house at all thr
Maintenance Engineers, five apprentices and two tec
at the main base in Accra.

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NOT UPDATED

Company Management

Name	
I. Sackey	Preside
M. Daniels	Directo
R. Thompson	Chief P
D. Amoah	Safety
M. Ibrahim	Chief, I
S. Lavallee	Directo

the Wild Vacations, a subsidiary of ABC
 camps in Keta. The ATR42s offer a scheduled
 male and Sunyani. The PA31s operate on a



Company Management

Name	Title	Telephone No.
I. Sackey	President, ABC Airlines Limited	(233) 974-2300
M. Daniels	Director, Flight Operations	(233) 974-2301
R. Thompson	Chief Pilot	(233) 974-2302
D. Amoah	Safety Officer	(233) 974-2303
M. Ibrahim	Chief, Dispatch	(233) 974-2304
S. Lavallee	Director, Inflight Services	(233) 974-2305
J. Anderson	Director, Maintenance	(233) 974-2306
T. Barnes	Quality Assurance Manager	(233) 974-2307
M. McCarthy	Manager, Dangerous Goods	(233) 974-2308

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 NOT UPDATED



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M. Ibrahim	Chief, Dispatch	(233) 974-2304
S. Lavallee	Director, Inflight Services	(233) 974-2305
J. Anderson	Director, Maintenance	(233) 974-2306
T. Barnes	Quality Assurance Manager	(233) 974-2307
M. McCarthy	Manager, Dangerous Goods	(233) 974-2308



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charter basis and are available for med-evac under a
Oil City, Sekondi-Takoradi. The operator is transport
Aircraft maintenance is performed in-house at all thr
Maintenance Engineers, five apprentices and two tec
at the main base in Accra.

Company |

Scope and Depth

The scope of the audit encompassed all activities that could affect the safe operation of the company, including, but not limited to:

- (a) Airworthiness and related programs,
- (b) flight operations and the operational control system,
- (c) cabin safety,
- (d) training, simulators and flight training devices, and
- (e) the transportation of dangerous goods.

The audit covered the period from October 10, 2010 to June 20, 2011.

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NOT UPDATED

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- (a) Airworthiness and related programs,
- (b) flight operations and the operation of aircraft,
- (c) cabin safety,
- (d) training, simulators and flight recorders,
- (e) the transportation of dangerous goods.

The audit covered the period from October 2017 to October 2018.

Approach

The audit of ABC Airlines Limited was a combined audit (of both operational and functional areas) and was conducted in accordance with the Audit Manual.

Aviation Enforcement

Audit Findings related to non-conformance with a regulatory requirement have been identified and an Aviation Enforcement action being taken.

Corrective Action Plan

The company is required to submit a corrective action plan to CAA within 30 days of receipt of this report. A nil or unsatisfactory response may result in further action.

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activities that could affect the safe operation of the company, programs,

W. Thompson
D. Amoah
M. Ibrahim
S. Levallee

Chief, I
Safety
Chief, I
Director

Approach

The audit of ABC Airlines Limited was a combined audit (of both airworthiness and operations functional areas) and was conducted in accordance with the Audit and Inspection Manual.

Aviation Enforcement

Audit Findings related to non-conformance with a regulatory requirement may result in Aviation Enforcement action being taken.

Corrective Action Plan

The company is required to submit a corrective action plan to CAA within 30 working days of the receipt of this report. A nil or unsatisfactory response may result in the suspension of the Company Operating Certificate.

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activities that could affect the safe operation of the company, programs,

A. Thompson	Chief Executive Officer
D. Amoah	Safety Officer
M. Ibrahim	Chief, Inspection
S. Leavelle	Director

Approach

The audit of ABC Airlines Limited was a combined audit (of both airworthiness and operations functional areas) and was conducted in accordance with the Audit and Inspection Manual.

Aviation Enforcement

Audit Findings related to non-conformance with a regulatory requirement. Enforcement action being taken.

Corrective Action Plan

The company is required to submit a corrective action plan and a receipt of this report. A nil or unsatisfactory response may result in the revocation of the Operating Certificate.

Audit Team

Name	Function/Specialty
R. Johnson	Covening Authority
J. Tannor	Audit Manager
D. Adjepong	Team Leader, Operations
Y. Jammeh	Team Leader, Airworthine
S. Kyeremeh	Ops Team Member PA31 a 340
V. Bruce	Ops Team Member, Cabin
M. Koranteng	Ops Team Member, ATR42
P. Gagnon	Ops Team Member, Dange

Audit Team

Name	Function/Specialty	Location	Telephone No.
R. Johnson	Covening Authority	Accra	(233) 952-0001
J. Tannor	Audit Manager	Accra	(233) 952-0002
D. Adjepong	Team Leader, Operations	Accra	(233) 952-0003
Y. Jammeh	Team Leader, Airworthiness	Accra	(233) 952-0004
S. Kyeremeh	Ops Team Member PA31 and SAAB 340	Accra	(233) 952-0005
V. Bruce	Ops Team Member, Cabin Safety	Accra	(233) 952-0006
M. Koranteng	Ops Team Member, ATR42	Accra	(233) 952-0007
P. Gagnon	Ops Team Member, Dangerous Goods	Accra	(233) 952-0008
R. Kombiri	Airworthiness Team Member	Accra	(233) 952-0009
S. Appenteng	Airworthiness Team Member	Accra	(233) 952-0010
T. Aidoo	Airworthiness Team Member	Accra	(233) 952-0011

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Audit Report

Format

Part I: cont'd

- Criteria Used
- Audit Team Composition
- Audit Synopsis
- Corrective Action Instructions
- Enforcement (if required)

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Audit Report (con't)

Part II:

- Executive Summary (which includes a statement of Overall Conformance)

Parts III and IV:

- Functional Summaries which contain the specialty area element (checklist) summaries for each functional area audited (A/W and OPs)

Appendices:

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NOT UPDATED

- OPs and AIR Audit Findings which contains the audit findings assigned during the audit

Audit Report (con't)

Approved Maintenance Organization

3.5 Scope of Approval

The company presently holds an approval for all non-specialized work of the Beech 100 series aircraft but does not have the Technical Library nor the tools required for this approval.

3.5.2 Technical Publications/Library

Numerous technical and regulatory publications were either not available or not up to date.

3.5.3 Personnel

The Quality Manager failed to carry out his duties as described in the Maintenance Control Manual and as a result a number of technical and regulatory publications were either not available or up to date and the training requirements have not been met.

3.5.4 Maintenance Training

The company's training program has not followed the initial training requirements as mentioned in the Maintenance Control Manual. Also, the recurrent training records for some of the employees were missing.

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NOT TO BE REPRODUCED

Audit Report (con't)

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Appendices:

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NOT UPDATED

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Audit Report (con't)

Part IV - Operational Functional Summaries

Operations Functional Areas

OP-2 Air Operator Certificate and Operations Specification

The Air Operator Certificate shows a sub-base at Keta. This base was closed in November 2010 without the required notification to Civil Aviation being made (reference AF OP-2)

OP-3 Company Manuals

Revisions to meet the new regulatory requirements for the Company Operations Manual are generally complete. There are two areas that will need work to bring the manual to an acceptable standard; however, these are the B200 pre-take-off passenger briefing procedure which is missing diagrams pertaining to emergency equipment, and the passenger briefing form for the PC-6, which is missing (reference AF OP-3).

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Appendices:

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NOT UPDATED

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Appendices:

- OPs and AIF assigned du

Appendix A : Airworthiness Audit Findings

t findings

Appendix B : Operations Audit Findings

AUDIT REPORT ~~ SUMMARIES

- Ensure the Functional Summaries are supported by Audit Findings
- Use the same format throughout the audit report
- Write the Summaries in the third person
- Follow the same order as the Audit Findings
- Consider identifying any non-conformances repeated from previous audits or inspections

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80

MAKING IT CLEAR

- Changing the structure and the way the Non-Compliance/Non-Conformance (NC) is written can assist in getting the auditee to address the “root cause” of why the problem/finding.
 - This helps you in the end and enhances safety.
- The NC must **highlight** the issue that there is **a system/process failure** vs a single incident failure.
- Therefore, the corrective action and root cause should be focused towards system/process failure, not the observed incident.

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81

THREE DISTINCT PARTS OF A FINDING

An audit/inspection finding (i.e., NC) should have three distinct parts:

1. The requirement, or specific reference to the requirement.
If you cannot identify a requirement, then you cannot raise a non-conformance.
2. A clear statement of the non-conformance.
3. Objective evidence that supports the statement of non-conformance; based on the requirement.

Includes Source of Finding

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82

STATEMENT OF THE NC

Record the requirement against which the NC was detected.
If possible, write out the exact text of the requirement.

The audit evidence must support the audit finding.
The evidence must be specific to the violated requirement.
Evidence must be traceable to the NC.

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83

STATEMENT OF THE NC

- Should be self-explanatory and related to the process.
- Be unambiguous and concise.
- Not be a restatement of the audit evidence.

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84

MET EXAMPLE

Non-Conformance Report (NCR)

NCR No: 1	Date: XX XXX 201X		
Auditor/Reporter: XXX	Target Date for Completion: Requirement		
Action Party: NMS, Quality Representative	NCR Risk-Ranking Category:	H	M
Department: National Meteorological Services (NMS)			
<p>Non-Conformance Statement:</p> <p>ICAO Annex 3 – Chapter 2, 2.2.1 states that "Close liaison shall be maintained between those concerned with the supply and those concerned with the use of meteorological information on matters which affect the provision of aviation meteorological service for international air navigation." Similarly, under Clause 5.2 of the ISO 9001: 2008 Standard maintains that top management shall ensure that customer requirements are determined and are met with the aim of enhancing customer satisfaction.</p> <p>Interviews with NMS senior management reveal that the NMS largely has an "Open Door" policy with regards to feedback and input from aviation users. Discussions with pilots from local operators (fixed-wing and helicopter) and ATS personnel reveal little interaction (if at all) with the NMS - aside from flight planning activities. All operational personnel indicated that if they wanted products they can go to the NMS, but there is no active NMS outreach programme to proactively gather input for the NMS on customer requirements, and on ways to enhance customer satisfaction.</p>			

Requirement Source

Nonconformance Source

Nonconformance

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WRITING NON-CONFORMANCE REPORTS (NCRS)

Good Practice

- Use the forms provided
- Present the facts concisely
- Supply sufficient detail so that anyone can go to the same areas and check the facts
- Refer to the reference standard, company documentation or legislation to state the deficiency

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86

AVOID

- Naming Names
- Jargon
- Generalities be specific
- Emotive terms. (Awful, worst etc.)
- Repetition. Try to group similar non conformities together as examples of the same problem

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87

NC STATEMENT “TIPS”

- The statement of NC should be as generic as possible to help direct the auditee to the system’s issue...instead of the specific incident.
- Keep the “specific details” in the objective evidence area, if at all possible.
- The NC statement should include enough details so that the auditee can respond to exactly what the auditor found...even years later.

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88

NC STATEMENT “TIPS”

Write complete sentences

- The problem description needs to be written clearly
- Stick to the facts. Don't make it a story.
- Be precise in defining the requirement and deficiency
- Avoid abbreviations, acronyms...

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89

NC STATEMENT “TIPS”

Noncompliance issues (Major, Minor) need to “violate” some requirement or they may document the absence of a process

- Program plan, procedure, standard, etc.
- Always include the violated requirement in the problem description

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90

PROBLEM DESCRIPTION REQUIREMENTS

Problem Description Sufficiency

- Identify What, Where, When, as appropriate
- Reference the Evidence
- The responsible assignee needs to have enough information from the problem statement to conduct root cause analysis and identify corrective action

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91

PROBLEM DESCRIPTION REQUIREMENTS

Self-check the problem description

- Is the statement complete and self-sufficient?
- Ask yourself ... So What?
- Where does it say that I have to?

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92

FLYRIGHT AUDIT EXECUTIVE SUMMARY (EXAMPLE)

Airworthiness

The Airworthiness section of this report indicates that, with the exception of 'Test & Measuring Equipment', all audited areas revealed non conformance findings demonstrating:

- Failure to fully comply with all applicable regulatory requirements.
- Ineffective management control of the 'Maintenance Organisation'.
- Ineffective system control through the company maintenance control manuals.
- A lack of effective quality control to ensure satisfactory standards.

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As a result, aircraft were operated with:

- a) inspections and components that had overrun maintenance specification requirements,
- b) non-approved parts installed,
- c) defect control and release certifications that did not meet regulatory requirements.

Flyright has therefore operated aircraft in commercial service with Certificates of Airworthiness not in force.

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(EXAMPLE)

Operations

The Operations section of this report indicates that audited areas revealed non-conformance findings demonstrating:

- Failure to fully comply with all applicable regulatory requirements.
- Ineffective management control of 'Training/Check Programs' to ensure satisfactory safety and regulatory standards.
- Failure to ensure that the company operations manuals provided effective system control.
- Failure to maintain adequate control of records.

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(EXAMPLE)
AIRWORTHINESS

Summaries

A1 *Maintenance Control Manuals*

The hierarchy of the maintenance control manuals approved under the Air Carrier Operating Certificate (AOC) and Approved Maintenance Organization (AMO), requires restructuring. The Certificate Holder utilizes the Aircraft Maintenance Specifications document as the CAA approved, controlling manual. Sub tier manuals include the Technical Procedures Manual, Technical Quality Manual, Quality Assurance Regulations, Reliability Control Program Manual and the Weight and Balance Manual.

In practical application the Technical Procedures Manual is the controlling manual, however, this manual has not been approved by CAA.

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The Inspection Procedures Manual, utilized by the Approved Maintenance Organization, as with the AOC Technical Procedures Manual, Reliability Control Program Manual, Technical Quality Manual, Quality Assurance Regulations and Weight and Balance Manual, do not meet regulatory requirements.

Numerous 'controlling' manuals were found in the system that were not reflected in the IPM or TPM, e.g. Maintenance and Engineering Technical Form Manual, Quality Assurance Regulations, and the Technical Quality Manual.

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A2 *Technical Publications*

Numerous Manuals in the Main Technical Library are not being maintained to a current status. A review of the document control, for the user departments revealed a serious lack of control. Numerous technical forms were found to be uncontrolled and in one case three different forms had been assigned the same control number.

A3 *Company Quality Audits*

Quality audits were not being consistently carried out of a number of areas, e.g. sub-contractors, out stations, and Engineering Quality Assurance. Staff were unable to provide details of the procedural control of the audit process. A review of the yearly audit plan for 2020 indicated that the schedule was not being met. It was noted that the Quality Audit department, encountered difficulty in getting responses to their audit findings.

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(EXAMPLE)

A4 *Engineering*

Numerous examples of components manufactured by outside agencies to non-approved data were found. Some of these parts may have been installed on Flyright, and other operator's aircraft.

Examples of non-approved engineering modification drawings and non-approved aircraft modification approvals were found.

The Technical Procedures Manual lacked procedures for the approval process of repair data by CAA. Numerous forms were being used in the field; however, these forms were not referenced in the Technical Forms Manual.

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A6 Aircraft Maintenance Records

Numerous examples of inadequate defect rectification data have been documented. Release certifications by unqualified persons, missing certifications, missing required inspection items (RII, s), lack of reference to standards, missing component information, missing ATA references and missing employee information was evident.

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OPERATIONS

(EXAMPLES)

O-13 *Minimum Equipment List (MEL)*

All of the MELs have been approved by CAA. Not all MELs reflect the latest revision of the manufacturing authority's approved MMEL. Evidence was seen of an item exceeding the MEL time category. Evidence was seen of an aircraft operating outside of the MEL performance limitations. One aircraft did not have an approved MEL on board.

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O-14 *Dangerous Goods*

Operations did not have a copy of the IATA Dangerous Goods Manual and one could not be produced when requested .

Notices to travellers, required by carry-on baggage dangerous goods regulations, were not in evidence at ticket counters, security clearance areas or holding rooms.

O-15 *Flight and Duty Time Limitations*

Flight Crew flight and duty time limitations and rest requirements were not in accordance with regulation 121.

Flight Attendant duty period limitations and rest requirements were not in accordance with regulation 121 requirements.

Flight Operations Officers duty time limitations were found not to exist.

Evidence existed of pilots exceeding regulatory flight time limitations.

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O-16 *Flight and Ground Inspection*

Numerous cases were found of AFMs on board aircraft not reflecting CAA approval.

Numerous cases were found of AOMs on board aircraft not reflecting CAA approval.

Several instances were noted of aircraft not having the current approach plate.

Several instances were noted of Flight Attendants not having the appropriate manuals in their possession.

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AUDIT/INSPECTION PROCESS - POST AUDIT ACTIVITIES

The post-audit activities are divided into two:

- The elaboration, distribution and acceptance of the audit report; and
- Non-compliance follow-up.



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104

Summaries – Remember....

Be Professional

- Ensure the Functional Summaries are supported with Audit Findings
- Use the same format throughout
- Write the Summaries in the third person
- Follow the same order as the Audit Findings
- You may consider identifying any repeat non-conformances

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Auditee Corrective Action



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Corrective Action

TYPES

- Auditee Corrective Action Proposals.
 - Before the Team can make a final recommendation as a conclusion of the audit the auditee's proposals for corrective actions must be received, reviewed and accepted.
 - Depending on the nature of the audit findings, the company's corrective action should involve:

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Corrective Action

Immediate Corrective Action

1. This is action taken immediately upon identification of the audit finding to remove the immediate threat to aviation safety;

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Corrective Action

Short-term Corrective Action

1. This action should correct a non-conformance that does not pose an immediate threat to aviation safety, which ensures that conformance is established quickly until long-term action is completed to prevent recurrence of the problem.
2. Short-term corrective action will normally take place within 30 days;
and

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Corrective Action

Long term Corrective Action

This longer-term action has two components:

1. Identifying the cause of the problem and indicating the measures the company will take to prevent a recurrence. These measures should focus on a system change.
2. A timetable for company implementation of the long-term corrective action. Long-term corrective action will normally take place within twelve months.

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NOT UPDATED

Corrective Action

Supporting Documents

Long and short term corrective action should be accompanied by supporting documents for review eg:

- logbook entries,
- purchase orders,
- memoranda or revised inspection procedure cards.

Note: It is important to verify as much supporting documentation as possible during subsequent surveillance.

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Audit Follow-up

Purpose

When the Team Leaders are satisfied that all corrective action proposals have been received, a full team meeting will be convened to formulate and agree to the final recommendations.

These recommendations will form a supplement to the Audit Report and should include:

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Audit Follow-up

Recommendations

- An overall recommendation based on the particular objectives of the audit;
- Acceptance or otherwise of the scheduled compliance time for corrective actions;
- Frequency of follow-up to the findings; and
- Period and extent of future surveillance.

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Audit Follow-up

Recommendations

The Audit Manager will present the final recommendations to the Director (for Approval).

Subject to approval by the Director the final result of the audit can then be forwarded to the company.

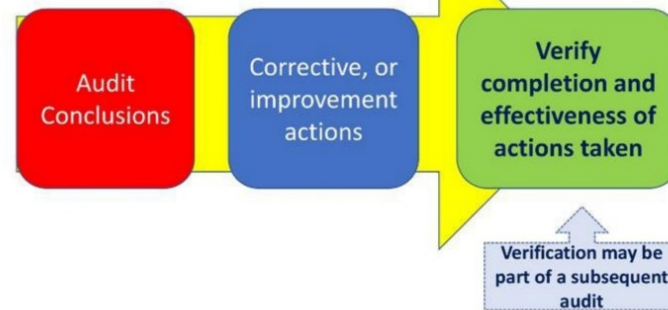
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Audit Follow-up

The Team Leader(s) will control and monitor the follow-up to all corrective actions, using the applicable team member for the corrective action to the Audit Finding that he/she raised.

When the necessary follow-up has been completed and is satisfactory the result will be notified to the Director.

Conducting audit follow-up



AUDIT CLOSURE

- Upon complete implementation of Corrective Actions
- Certificate Division recommends closure to Convening Authority
- Convening Authority sends formal correspondence to Auditee
- Normally within 12 months of Audit Report delivery
- Accepted Corrective Actions beyond 12 months managed outside audit programme as part of Auditee oversight.

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116

POST-AUDIT SURVEILLANCE

- Conducted as part of routine oversight by the AOC Division
- Post-audit surveillance is managed and conducted separately from the audit itself.
- Inspection related to implementation of corrective actions is integrated into surveillance programme
- Priorities established according the term of corrective action implementation and risk assessment conducted by the AOC Division

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117

Completing the Audit

The Parallel Report

An audit may identify observations and/or deficiencies in, or the misapplication of, Civil Aviation legislation, policies and procedures.

Where an observation or deficiency indicates a need for revised policies, standards, procedures or guidelines, a finding shall be made against Civil Aviation and not the auditee.

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Completing the Audit

Parallel Report Follow-Up

- (1) Parallel report items shall be forwarded to DGCA who will assign an appropriate office for co-ordination and follow-up of those deficiencies.
- (2) A sample parallel report can be found in the following slides..

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Completing the Audit

Part I - Observations, Comments, Recommendations

Audit Executive

Due to the heavy workload on Regional inspectors, the audit manager and team leaders were not given sufficient time to prepare for the audit. Much of the preparatory work had to be completed during the pre-audit phase and indeed during the physical audit itself. This resulted in the need to make numerous changes to the audit plan which detracted from the overall professional conduct of the audit.

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Completing the Audit

Part I - Observations, Comments, Recommendations

Audit Executive

Due to the heavy workload on Regional inspectors, the audit manager and team leaders were not given sufficient time to prepare for the audit. Much of the preparatory work had to be completed during the pre-audit phase and indeed during the physical audit itself. This resulted in the need to make numerous changes to the audit plan which detracted from the overall professional conduct of the audit.

Recommendation: The audit management team should be given sufficient time to plan for audits well in advance of the actual audit dates.

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Completing the Audit

Administrative Support

No administrative support was available to the audit team during this audit. Much overtime was required by audit team members simply to prepare audit report materials and correspondence with the auditee. These tasks could be handled much more efficiently by administrative support at a considerably lower cost.

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Completing the Audit

Administrative Support

No administrative support was available to the audit team during this audit. Much overtime was required by audit team members simply to prepare audit report materials and correspondence with the auditee. These tasks could be handled much more efficiently by administrative support at a considerably lower cost.

Recommendation: All audits should have access to administrative support. Audits of larger organizations and especially combined audits, should have a support person assigned to the audit team during the full audit period.

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Completing the Audit

Part II - Executive Summary of Parallel Findings

In addition to the points raised in Part I which detracted considerably from the professional conduct of this audit, the Region was found to be functioning contrary to established policy for the certification of an air operator in the areas of:

OP-2 Operating Certificate and Operations Specifications.

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OP-2 Operating Certificate and Operations Specifications

ABC Airlines Limited has been approved for the operation of ATR42 aircraft into a number of bases that cannot accommodate this type of aircraft.

This approval was granted when the operating certificate was renewed following implementation of the CARs.

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CAA Logo & Name

Safety and SecuritySécurité et sûreté

Parallel Finding Form

ABC Airlines Limited

June 9-20, 2011

Company Name

Date of Audit

Area of Audit: OP-2 Operating Certificate and Operations
Specifications**No.** OP-2-1**Description of Finding**

ABC Airlines Limited's Air Operator Certificate No. 23456, Part IV lists bases authorized for use by each aircraft type. These bases do not correctly represent the company operation as a number of bases are not suitable for all aircraft types.

Examples

1. Keta and Sunyani Airport are not suitable for use by ATR42 aeroplanes.
2. Keta is not suitable for use by PA31 aeroplanes.

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CAA Logo & Name

Safety and SecuritySécurité et sûreté

ABC Airlines Limited

Company Name

Parallel Finding Form

June 9-20, 2011

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Examples

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2. Keta is not suitable for use by PA31 aeroplanes.

OPI's Response or Corrective Action Plan

Name/Title/Signature

Date

Convening Authority's Response

Name/Title/Signature

Date

Target Completion Date

Date Item Completed

Responsible Manager

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Completing the Audit

Part II - Executive Summary of Parallel Findings

In addition to the points raised in Part I which detracted considerably from the professional conduct of this audit, the Region was found to be functioning contrary to established policy for the certification of an air operator in the areas of:

OP-3, which is followed by OP-7 (Flight Crew Training)

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OP-3 Company Manuals

The company's ATR42 Training Manual states that the six month recurrent circling approach requirement in the PPC need only be completed annually.

This is contrary to the regulatory requirement for operators who are approved for circling minima below 1000 foot ceiling and three mile ground visibility.

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CAA Logo & Name**Parallel Finding Form**

ABC Airlines Limited

June 9-20, 2011

Company Name

Date of Audit

Area of Audit: OP-3 Company Manuals**No.** OP-3-1**Description of Finding**

ABC Airlines Limited's ATR42 Training Manual, page 12, states that a circling approach will be conducted as part of the annual line check in lieu of the six-month PPC requirement.

Examples

M. Koranteng

June 27, 2011

Name/Signature of Auditor

Date

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CAA Logo & Name

ABC Airlines Limited

Company Name

Area of Audit: OP-3 Company Manuals**Description of Finding**

ABC Airlines Limited's ATR42 Training Manual, page 12, states that a circling approach will be conducted as part of the annual line check in lieu of the six-month PPC requirement.

Parallel Finding Form

June 9-20, 2011

Date of Audit

No. OP-3-1

Examples

M. Koranteng

Name/Signature of Auditor

June

OPI's Response or Corrective Action Plan

Name/Title/Signature

Date

Convening Authority's Response

Name/Title/Signature

Date

Target Completion Date

Date Item Completed

Responsible Manager

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OP-7 Flight Crew Training Program

Pilot interviews revealed a weakness in knowledge on the location and operation of emergency equipment even though the required Emergency Procedures Training (EPT) was certified as being complete.

It is recommended to the Regional Manager Commercial and Business Aviation that the next EPT training be monitored by the principal operations inspector to ensure that the standard of training is acceptable.

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Completing the Audit

Part II - Executive Summary of Parallel Findings

In addition to the points raised in Part I which detracted considerably from the professional conduct of this audit, the Region was found to be functioning contrary to established policy for the certification of an air operator in the areas of:

AW-35, Pre-audit Activities-Certificate of Approval.

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AW-3.5 Pre-audit Activities-Certificate of Approval

The company was issued the authority for non-specialized maintenance of Beech A-100 series aircraft during the initial stages of AMO approval.

The company has not and does not intend to maintain this type of aircraft. Further to this, the authority was granted while the necessary manuals and support equipment were not available as required for such certification.

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CAA Logo & Name**Parallel Finding Form**

ABC Airlines Limited

June 9-20, 2011

Company Name

Date of Audit

Area of Audit: Pre-Audit Activities - Certificate of Approval

No. AW-3.5-1

Description of Finding

The Air Operator was given authority for non-specialized maintenance of Beech A-100 series aircraft during the initial stages of the AMO approval.

Examples

The Air Operator does not operate or maintain BE-100 type aircraft. They do not have the equipment or manuals required to maintain this type of aircraft.

S. Appenteng

June 27, 2011

Name/Signature of Auditor

Date

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CAA Logo & Name**Parallel Finding Form**

ABC Airlines Limited

June 9-20, 2011

Company Name

Date of Audit

Area of Audit: Pre-Audit Activities - Certificate of Approval

No. AW-3.5-1

Description of Finding

The Air Operator was given authority for non-specialized maintenance of Beech A-100 series aircraft during the initial stages of the AMO approval.

Examples

The Air Operator does not operate or maintain BE-100 type aircraft. They equipment or manuals required to maintain this type of aircraft.

OPI's Response or Corrective Action Plan

Name/Title/Signature

Date

Convening Authority's Response

Name/Title/Signature

Date

S. Appenteng

June

Name/Signature of Auditor

Target Completion Date

Date Item Completed

Responsible Manager

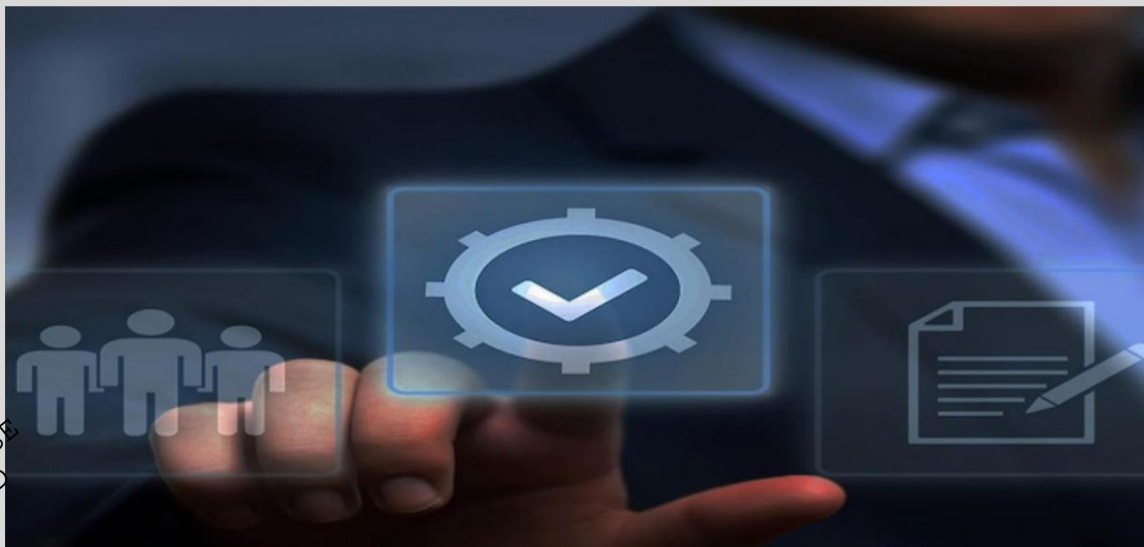
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Administration

- Submit expenses as applicable
- Ensure follow-up inspection is scheduled
- Schedule next audit
- Place all information on the audit file
- Return any borrowed equipment

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Audit Completed



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The Audit World and Auditors...YOU

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The Audit World and Auditors...YOU



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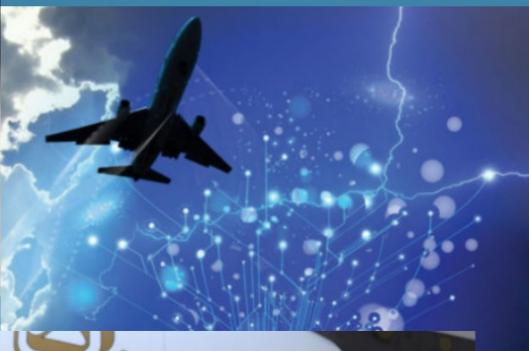
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The Audit World and Auditors...YOU



Guidance

This manual is issued in four separate parts as follows:

Part I — Organization and Planning;

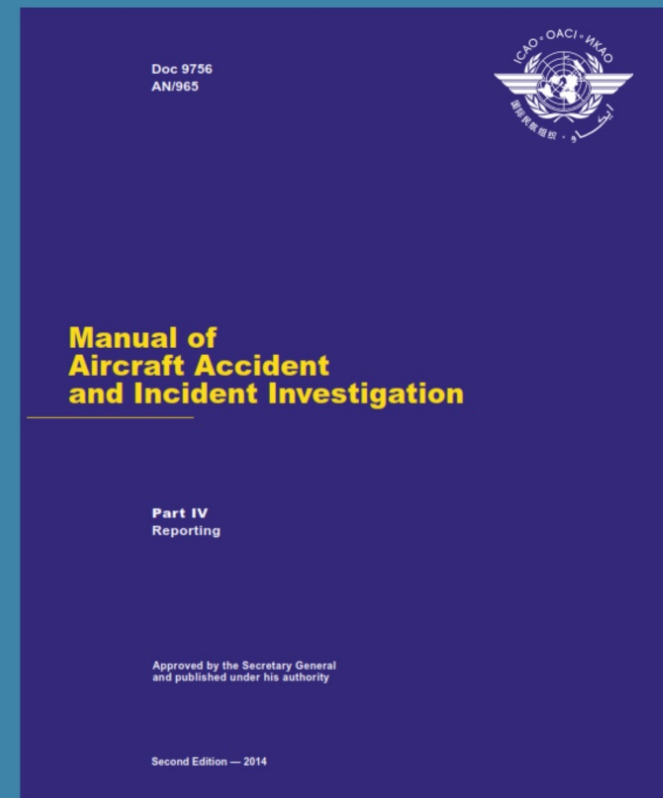
Part II — Procedures and Checklists;

Part III — Investigation; and

Part IV — Reporting.

Because this manual deals with accident, serious incident and incident investigations, for reasons of brevity the terms “accidents” and “accident investigation”, as used herein, apply equally to “incidents” and “incident investigation”.

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OR DISTRIBUTED



Guidance

The following ICAO documents provide additional information and guidance material on related subjects:

- Annex 13 — Aircraft Accident and Incident Investigation;
- Manual on Accident and Incident Investigation Policies and Procedures (Doc 9962);
- Manual on Regional Accident and Incident Investigation Organization (Doc 9946);

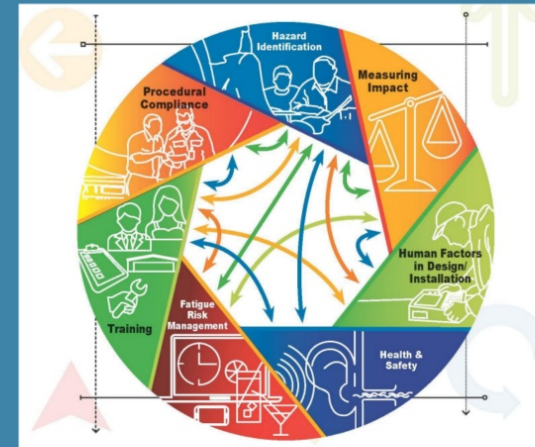
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Guidance

- Human Factors Training Manual (Doc 9683);
- Manual of Civil Aviation Medicine (Doc 8984);
- Hazards at Aircraft Accident Sites (Circular 315);
- Training Guidelines for Aircraft Accident Investigators (Circular 298); and
- Human Factors Digest No. 7 — Investigation of Human Factors in Accidents and Incidents (Circular 240).

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The Human Factors World



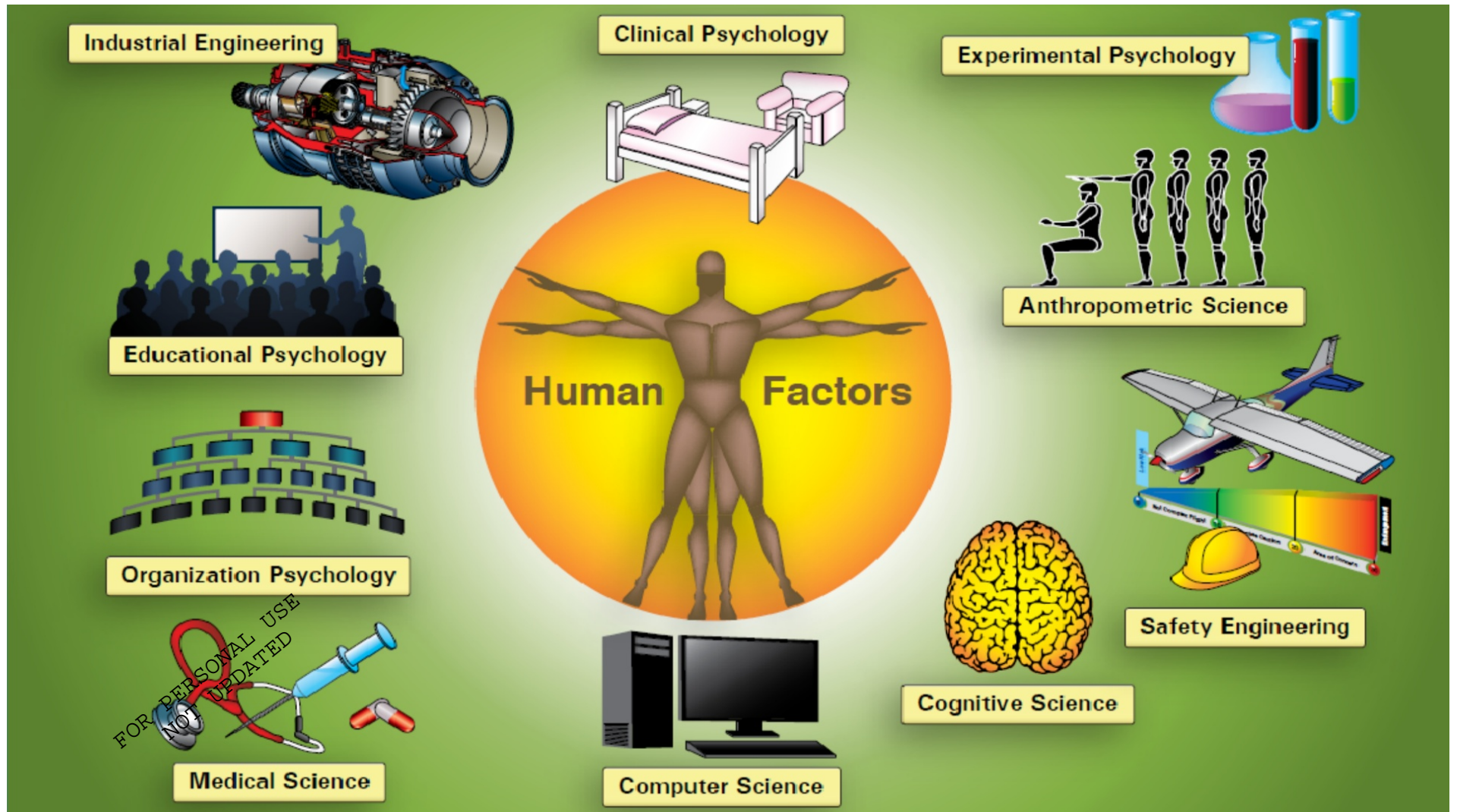
Human Factors

Human Factors is a science in its own right. (In the modern age is usually also associated with Non Technical Skills – HF/NTS.)

It has evolved from the early Cockpit Resource Management (CRM) in the 1980s, to Crew Resource Management in the 1990s – also CRM but now with a recognition that it was more than just pilots involved with the safe operation of an aircraft – to today's requirement to integrate HF/NTS into SMS.



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Perspective for thought...

Human performance.

No accident investigation can be complete without a thorough consideration of Human Factors issues involved.

The demands of the environment and the aircraft on the human often approach the physiological and psychological limits of the

- flight crew,
- maintenance and servicing crews,
- air traffic services personnel and other personnel required to support aircraft operations.

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Perspective for thought...

The study of human -

- limitations,
- communications,
- fatigue,
- decision-making processes,
- flight crew health; and

the information available from post-mortem examinations are vital components of this section of an investigation process.

An examination of the handling of the aircraft will encompass the areas of operations and training.

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Perspective for thought...

Organizational and management information is a section of the final report format and it concerns the organizations and the management involved in influencing the operation of the aircraft. The organizations include, for example,

- the operator,
- the air traffic services,
- airway,
- aerodrome,
- weather service agencies and the
- regulatory authority.

Conducting a review of the organizational structure and functions as well as the management policies and practices of the agencies, authorities and aircraft operator involved is a subject that should be covered.

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Committed to a Safe, Efficient and Sustainable Air Transport System



Committed to a Safe, Efficient and Sustainable Air Transport System



Committed to a Safe, Efficient and Sustainable Air Transport System



Committed to a Safe, Efficient and Sustainable Air Transport System

Perspective for thought...

For example, an investigator should have the competence to review an aircraft operator's;

- management functions,
- policies and practices
- in their entirety.

There are many aspects of the supervisory process which may have a direct bearing on the accident, such as acceptance of;

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Perspective for thought...

- inadequate flight crew qualifications,
- deficient guidance material,
- maintenance shortcuts,
- improper crew rostering,
- failure to provide proper training in aircraft type,
- shortcomings in crew resource management and
- unreasonable pressure to complete schedules on time.

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Perspective for thought...

The methods of investigating management and organizational aspects of an organization to determine the presence of any risk factors or other shortcomings is a requirement of a well-rounded accident investigation process.

An examination of the means of supervision is very important and will include a review of;

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Perspective for thought...

- orders,
- regulations,
- manuals,
- independent audits,

as well as the performance of;

- supervisors,
- instructors and
- company management.

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Perspective for thought...

Inadequate Supervision.

The role of any supervisor is to provide the opportunity to succeed. To do this, the supervisor, no matter at what level of operation, must provide guidance, training opportunities, leadership, and motivation, as well as the proper role model to be emulated. Examples of inadequate supervision are (not limited to):

- Failed to provide guidance
- Failed to provide operational doctrine
- Failed to provide Oversight
- Failed to provide Training
- Failed to provide Qualifications
- Failed to provide Track performance

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Perspective for thought...

Planned Inappropriate Operations.

Occasionally, the operational tempo and/or the scheduling of aircrew is such that individuals are put at unacceptable risk, crew rest is jeopardized, and ultimately performance is adversely affected.

Some examples of inappropriate planned operations are (not limited to):

- Failed to provide correct data
- Failed to provide adequate brief time
- Improper manning
- Mission not in accordance with rules/regulations
- Provided inadequate opportunity for crew rest

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Perspective for thought...

Supervisory Violations.

Supervisory violations, on the other hand, are reserved for those instances when existing rules and regulations are willfully disregarded by supervisors.

Some examples of supervisory violations are (not limited to):

- Authorized unnecessary hazard
- Failed to enforce rules and regulations
- Authorized unqualified crew for flight

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Perspective for thought...

2.4.9 What are, then, the traits of a safe organization? In general terms, safe organizations:

- pursue safety as one of the objectives of the organization and regard safety as a major contributor in achieving production goals;
- have developed appropriate risk management structures, which allow for an appropriate balance between production management and risk management;
- enjoy an open, good and healthy safety corporate culture;
- possess a structure which has been designed with a suitable degree of complexity, standardized procedures and centralized decision-making which is consistent with the objectives of the organization and the characteristics of the surrounding environment;
- rely on internal responsibility rather than regulatory compliance to achieve safety objectives; and
- respond to observed safety deficiencies with long-term measures in response to latent failures as well as short-term, localized actions in response to active failures.

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How to find the Human Factors...

Information relevant to an aviation occurrence can be acquired from a variety of sources.

Primary sources relating specifically to Human Factors include hardware evidence, paper documentation, audio and flight recorder tapes and interviews, direct observation of aviation personnel activities and simulations.

Secondary sources include aviation occurrence data bases, reference literature and Human Factors professionals and specialists.

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How to find the Human Factors...

Paper documentation spans the complete spectrum of SHELL interfaces. Specific sources include:

- personal records and logbooks;
- certificates and licenses;
- company personnel and training records;
- aircraft flight manuals;
- company manuals and standard operating procedures;
- training manuals and syllabi;
- company training and operational schedules;
- regulatory authority records;
- weather forecasts, records and briefing material;
- flight planning documents;
- medical records;

When necessary, medical and post-mortem examinations (see the ICAO Manual of Civil Aviation Medicine, Doc 8984).

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How to find the Human Factors...

Interviews conducted with individuals both directly and indirectly involved in the occurrence are also important. Examples of individuals from whom interviews may be required are:

- survivors (flight and cabin crew or passengers), next of kin, neighbours, friends, colleagues, air traffic controllers, eyewitnesses
- ground handlers, dispatchers, weather briefers, aircraft maintenance engineers, baggage handlers, de-icing personnel

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How to find the Human Factors...

More examples of individuals from whom interviews may be required are:

- company owner, chief of flight operations, chief pilot, chief instructor, check-pilot, supervisor, former employers, training captains
- chief of maintenance, maintenance engineers, technical specialists, regulatory authorities
- family or personal physician, psychologist, aeromedical examiner.

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How to find the Human Factors...

Direct observation of actions performed by aviation personnel in the real environment can reveal important information about Human Factors.

Observations can be made of;

- flight operations activities,
- flight training activities,
- maintenance activities and
- air traffic control activities.

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How to find the Human Factors...

Direct observation of actions performed by aviation personnel in the real environment can reveal important information about Human Factors.

Observations can be made of;

- flight operations activities,
- flight training activities,
- maintenance activities and
- air traffic control activities.



How to find the Human Factors...

Personnel in aviation are highly trained in Technical skills – flying or maintaining aircraft – but it is the cognitive ability of successful HF/NTS that allows them to be highly proficient in the employment of these skills. HF/NTS includes understanding and awareness of;

- Communication
- Leadership (and 'followership')
- Teamwork
- Stress
- Fatigue
- Alcohol and Other Drugs
- Situational Awareness
- Decision making
- Airmanship
- Threat and Error Management

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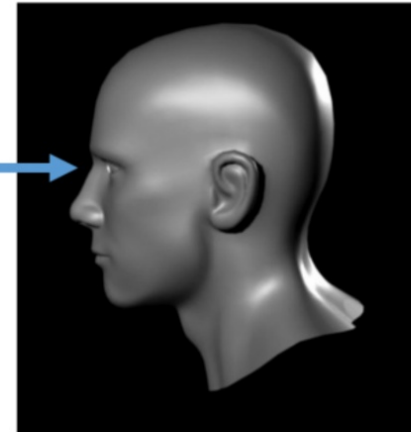
...(others – this is not an exhaustive list)

How to find the Human Factors...



Reality

Human Factors



Perception

Leadership Stress Fatigue
Situational Awareness
Communication
AoD Airmanship TEM
Teamwork Decision making
Assertiveness...etc

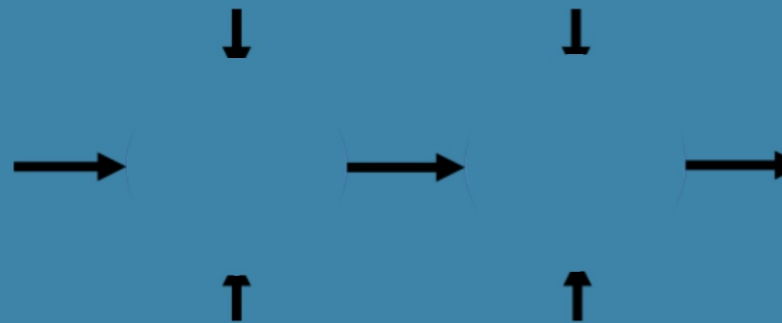
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How to find the Human Factors...

Human Factors is about human performance, behaviour, error, and an understanding of how humans interact with procedures, technology, environment and other humans.

Ultimately it is unsafe behaviours and actions that lead to accidents.

Behaviours are influenced by multiple inputs, commencing in the formative years when our personalities are being formed.



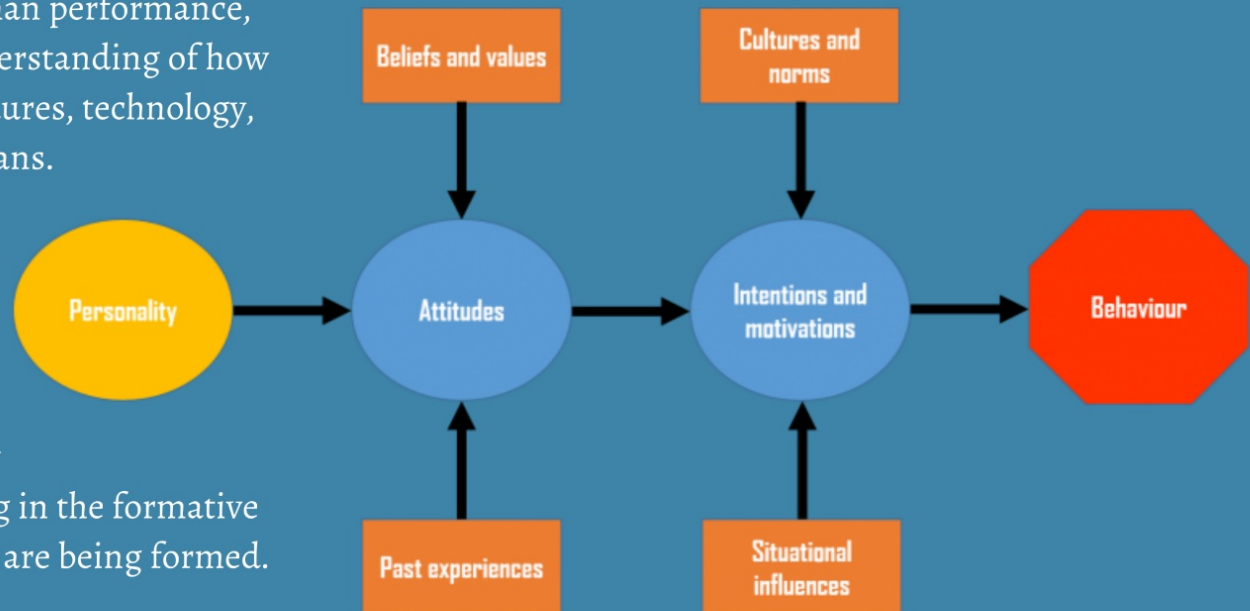
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How to find the Human Factors...

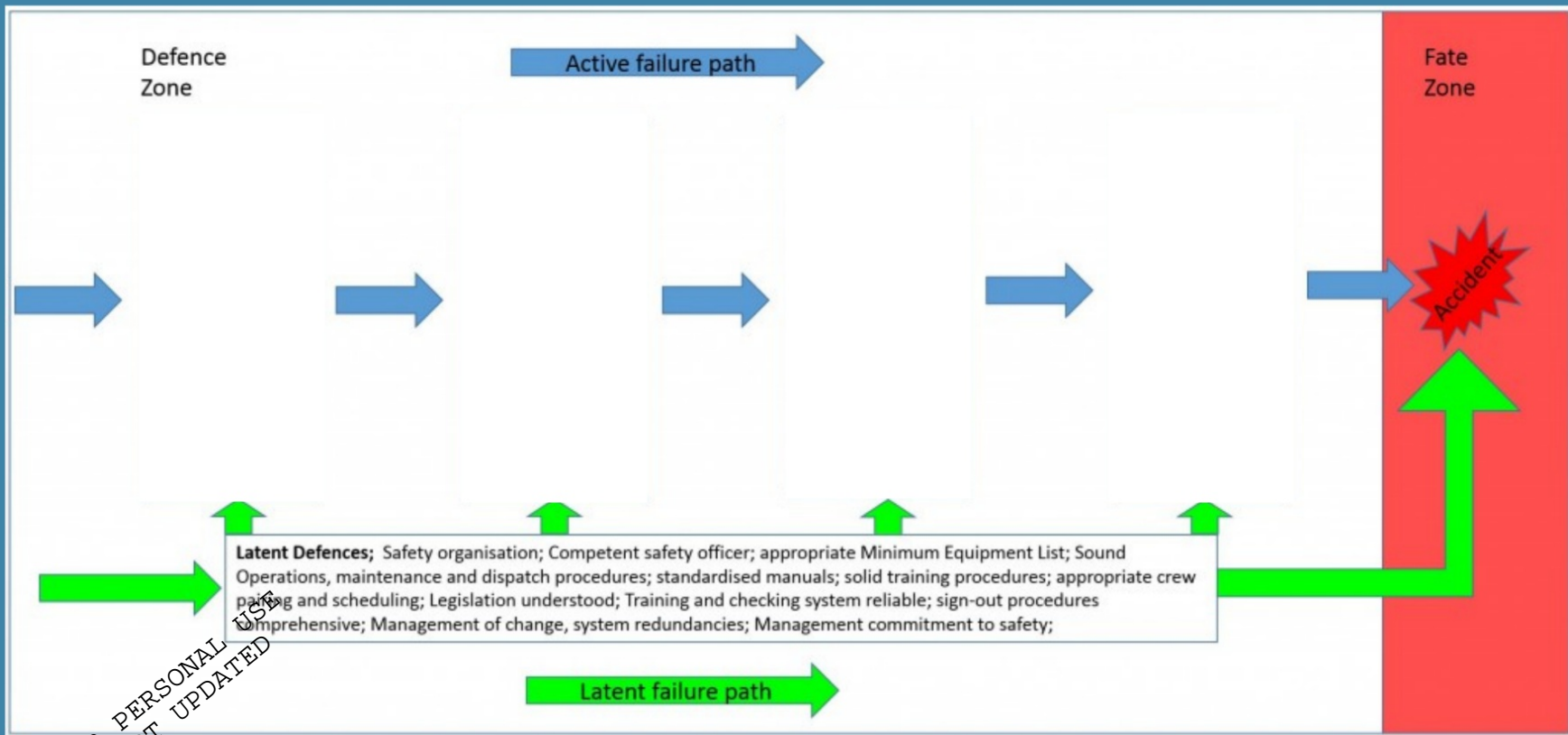
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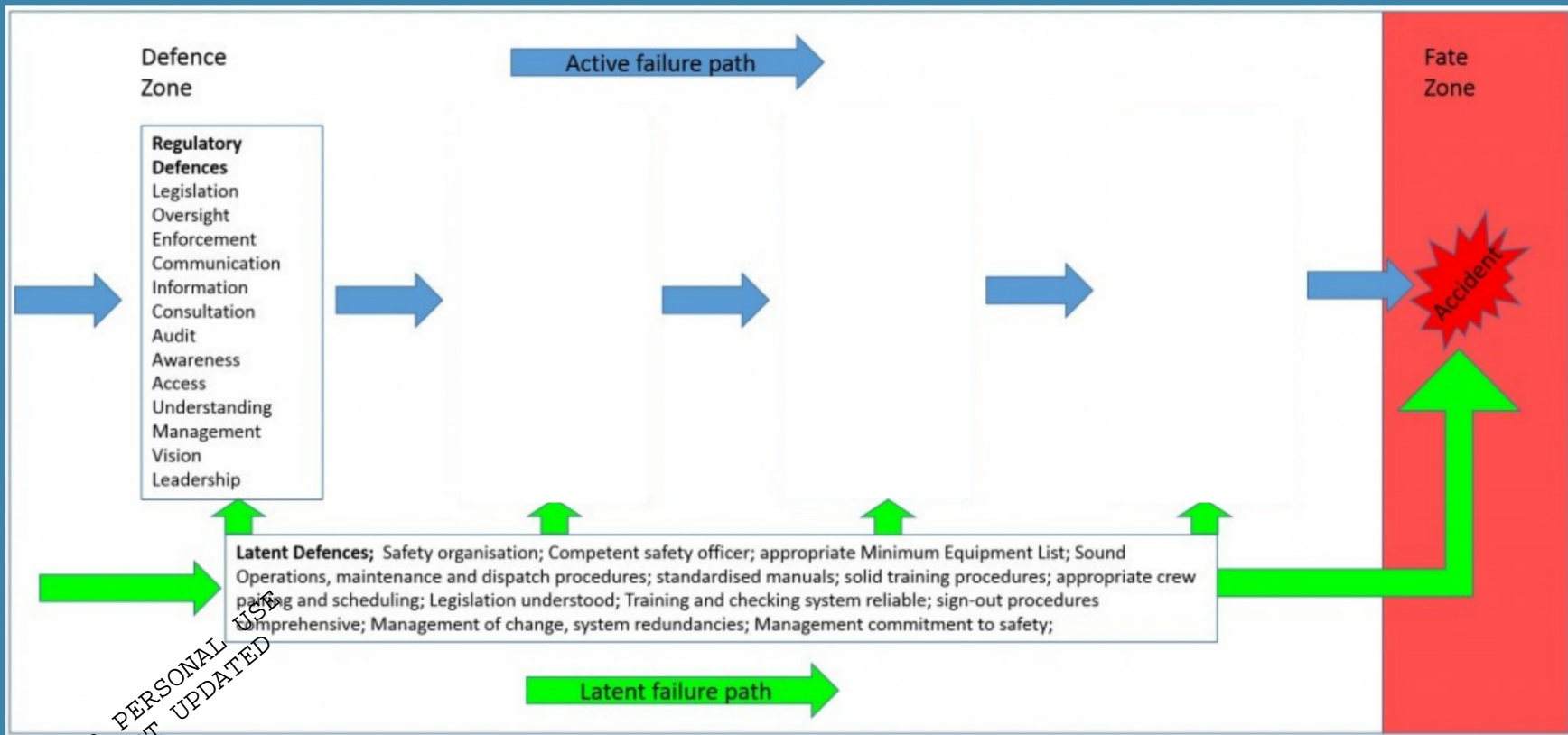
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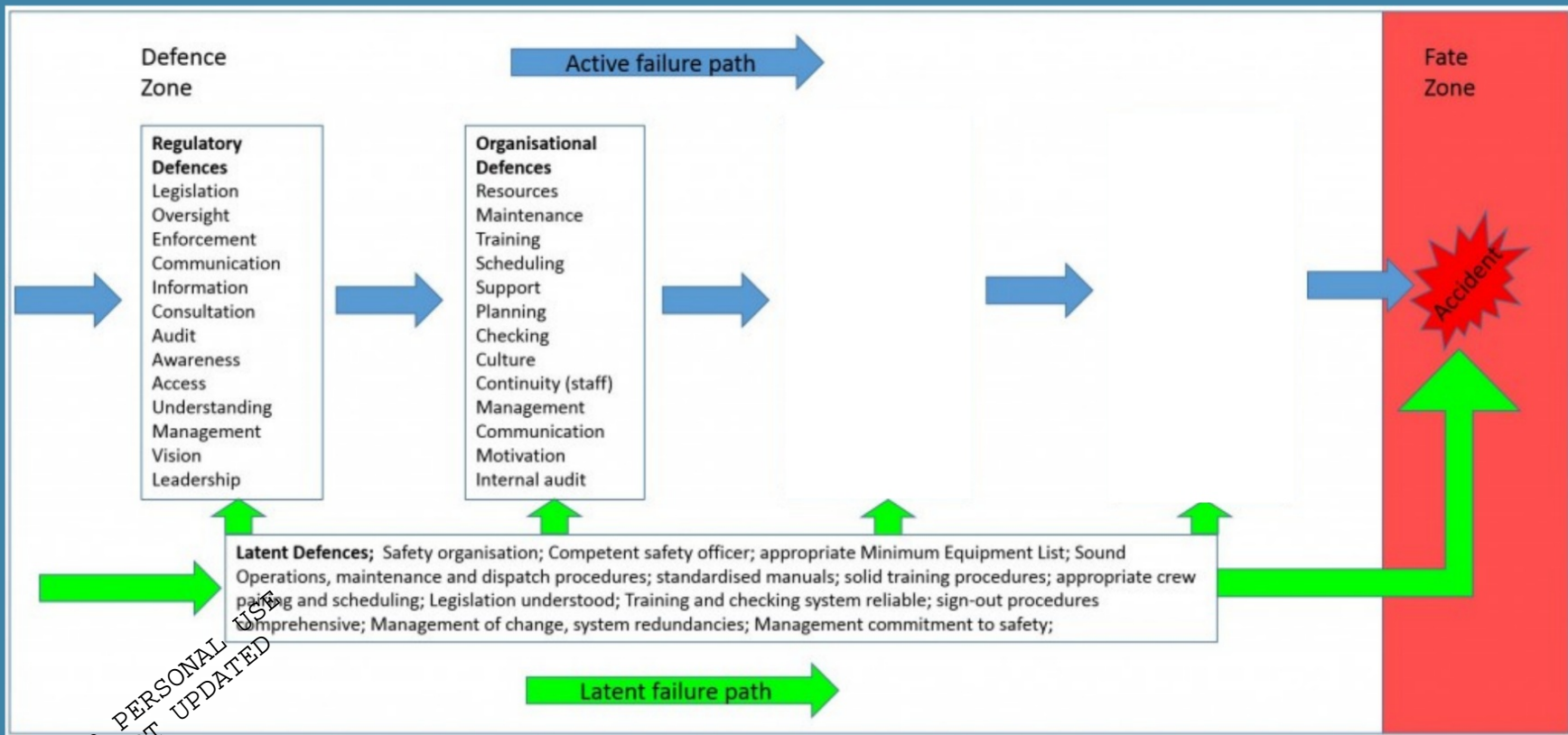
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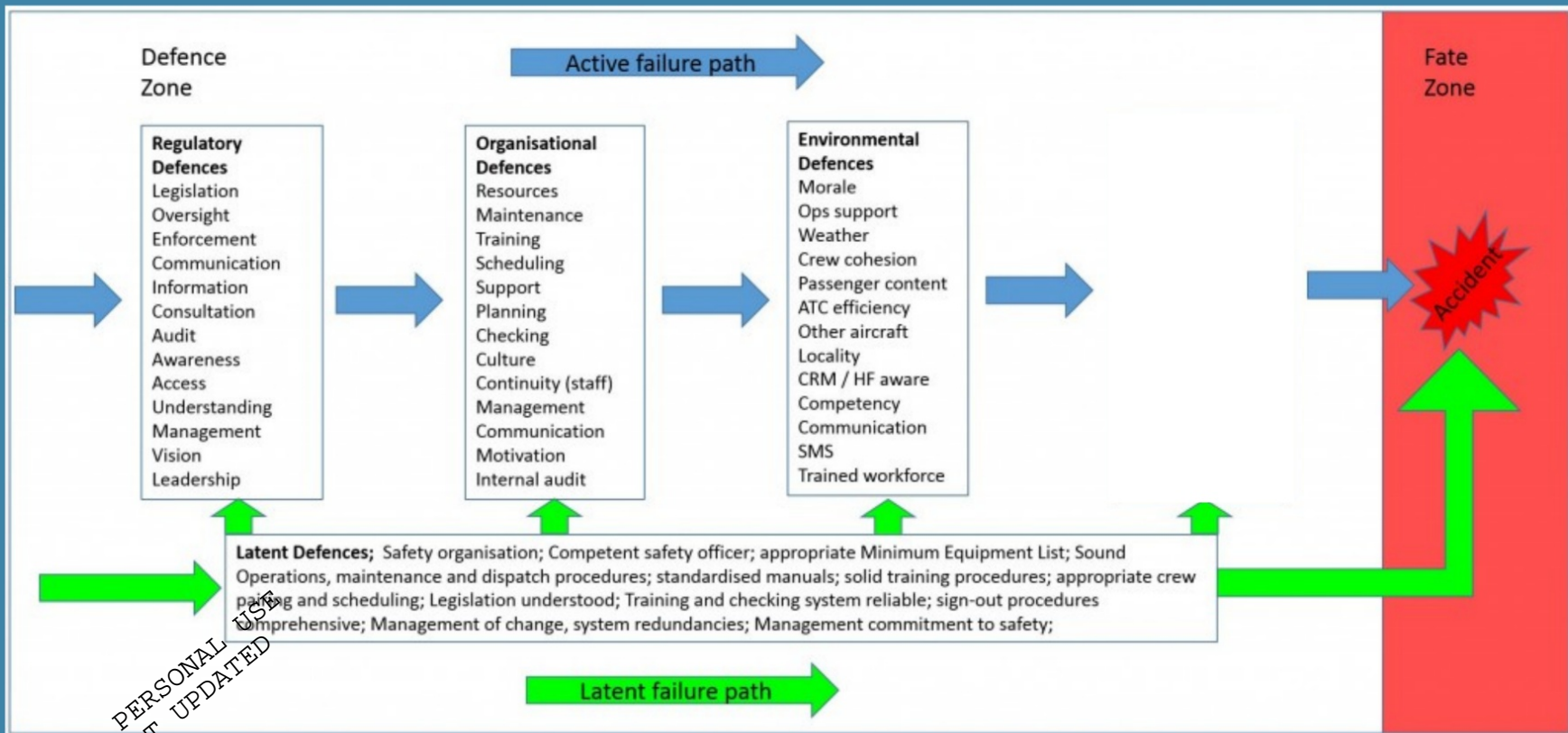
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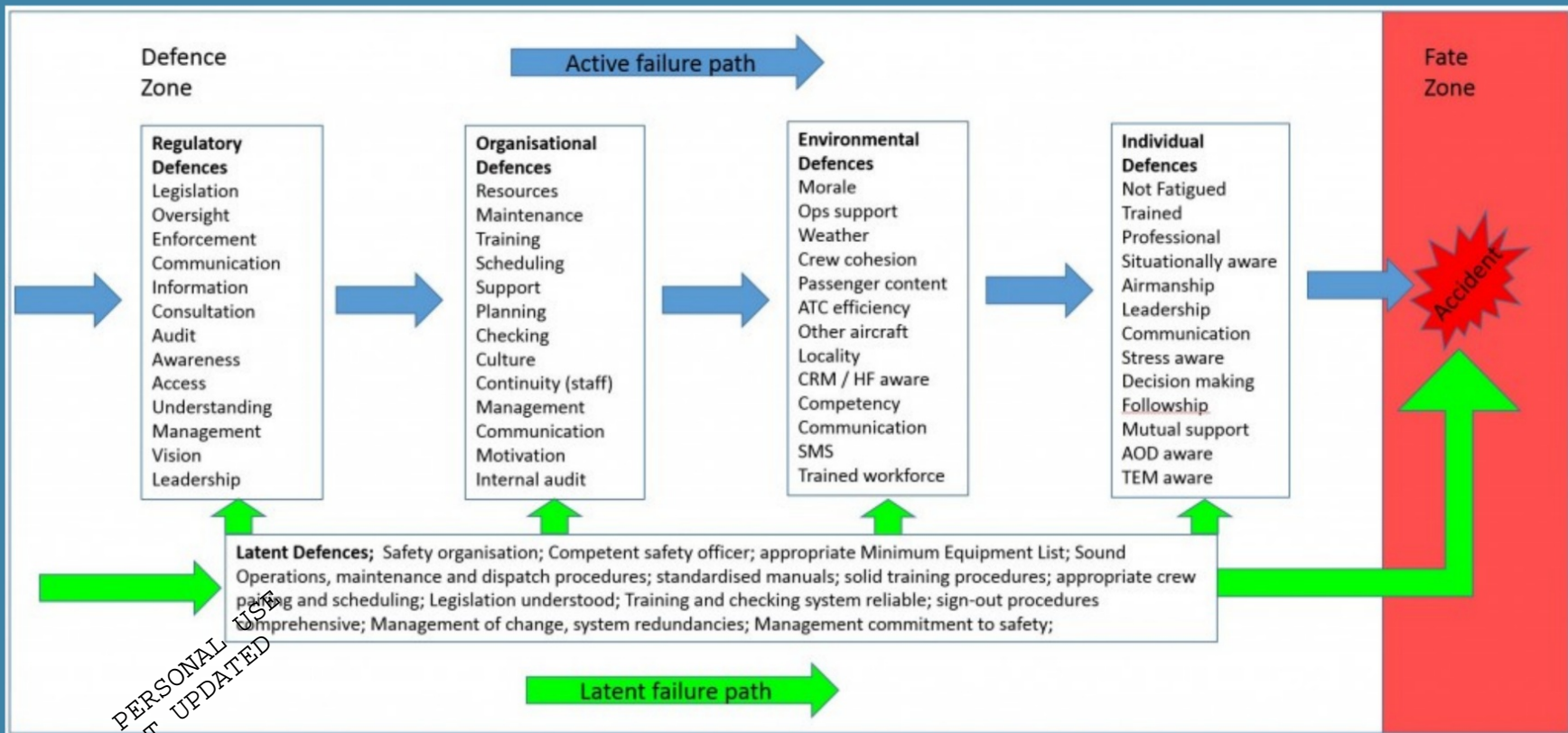




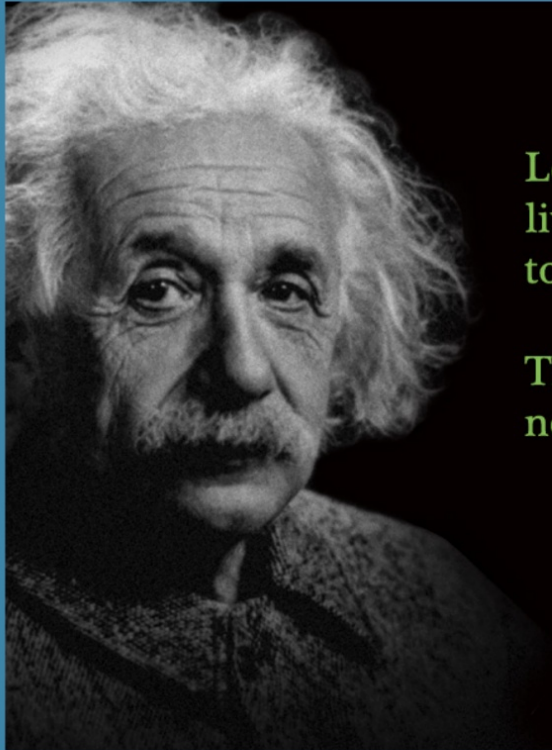
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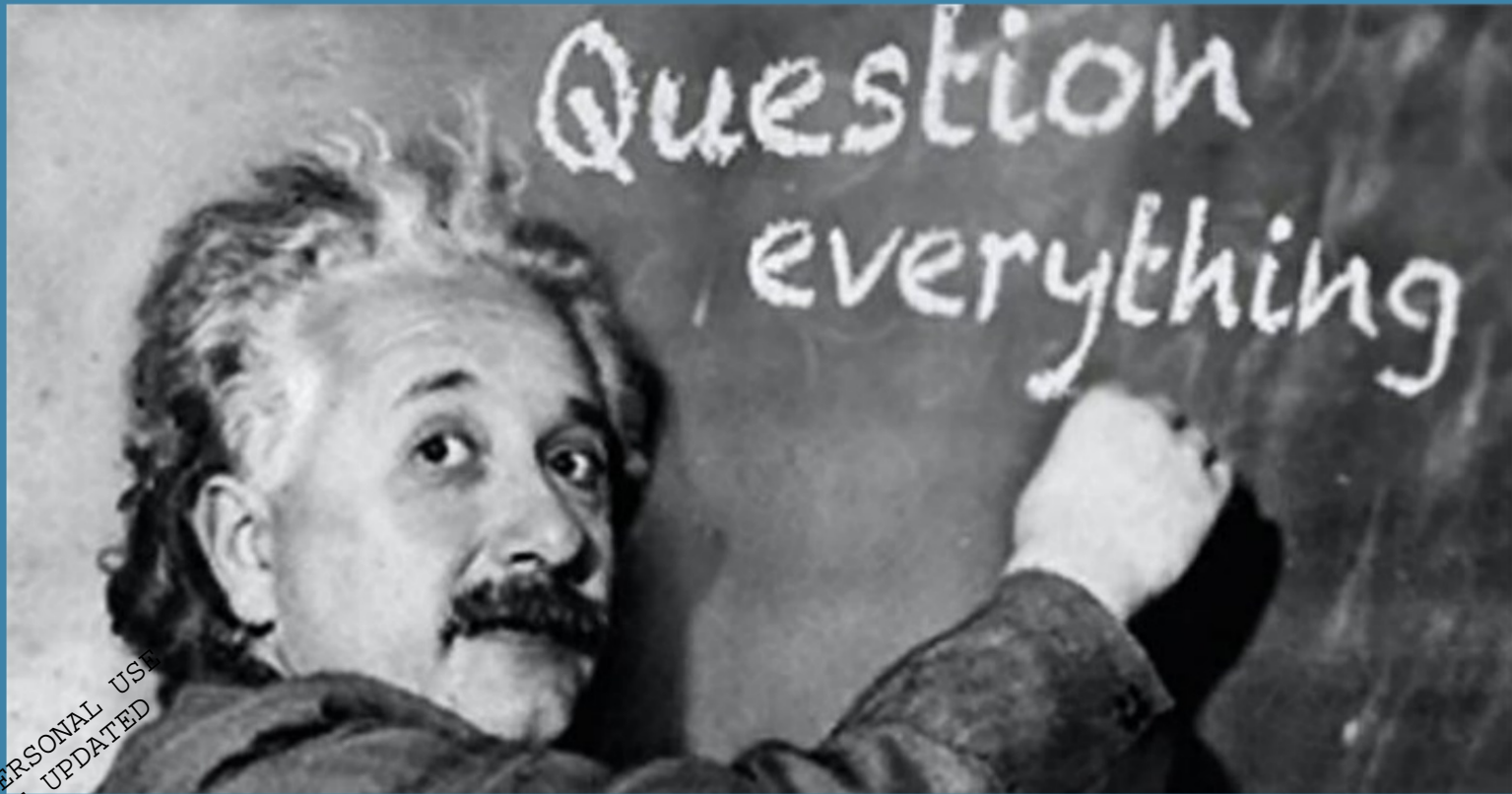
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Learn from yesterday,
live for today, hope for
tomorrow.

The important thing is
not to stop questioning.

– Albert Einstein



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INTRODUCTION TO HUMAN FACTORS



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WHAT ARE HUMAN FACTORS?

“A multidisciplinary field devoted to optimizing human performance and reducing human error. It incorporates the methods and principles of the behavioral and social sciences, engineering, and physiology. Human factors is the applied science that studies people working together in concert with machines.”

[Source: FAA Advisory Circular 120-51E]

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WHAT ARE HUMAN FACTORS?

“Human factors refer to environmental, organizational and job factors, and human and individual characteristics which influence behavior at work in a way which can affect health and safety.

...contd.

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WHAT ARE HUMAN FACTORS?

*A simple way to view human factors is to think about three aspects: the job, the individual and the organization and how they impact on people's health and safety-related behavior.”
[Source: Health and Safety Executive, United Kingdom]*

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WHAT ARE HUMAN FACTORS?

“The study of the way in which humans handle, and react to, things in their environment. It is used in aviation to develop safer systems and procedures.”
[AviationDictionary.com]

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WHAT ARE HUMAN FACTORS?

“Human Factors is concerned to optimize the relationship between people and their activities, by the systematic application of human sciences, integrated within the framework of systems engineering”.

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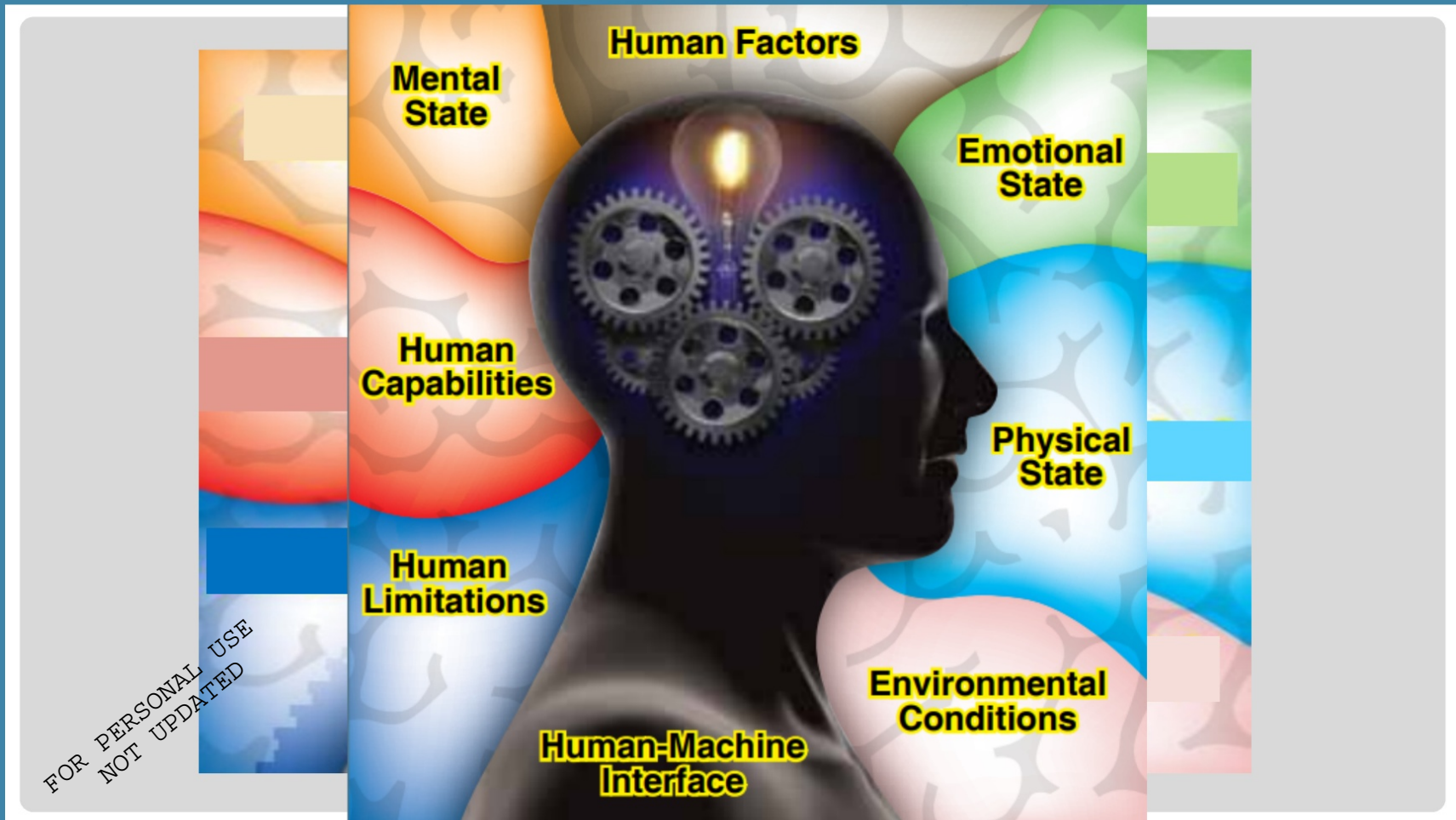
WHAT ARE HUMAN FACTORS?

Its objectives can be seen as effectiveness of the system, which includes safety and efficiency, and the well-being of the individual. - Professor Edwards

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1.1 INTRODUCTION

1.1.1 Human performance is cited as a causal factor in the majority of aircraft accidents. If the accident rate is to be decreased, Human Factors issues in aviation must be better understood and Human Factors knowledge more broadly and proactively applied.

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1.1 INTRODUCTION

By pro-action it is meant that Human Factors knowledge should be applied and integrated during the systems design and certification stages, as well as during the operational personnel certification process, before the systems and the people become operational.

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CHAPTER 1

FUNDAMENTAL HUMAN FACTORS CONCEPTS

The expansion of Human Factors awareness presents the international aviation community with the single most significant opportunity to make aviation both safer and more efficient. The purpose of this chapter is to present an overview of the various components which constitute Human Factors and to clarify its meaning.

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CHAPTER 1

FUNDAMENTAL HUMAN FACTORS CONCEPTS

1.1.2 Ever since humans began to make tools, thousands of years ago, the application of elementary ergonomics has improved work efficiency. But it is only during the last hundred years that the modern evolution of ergonomics towards Human Factors has begun.

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THE MEANING OF HUMAN FACTORS

1.2.1 Human Factors as a term has to be clearly defined because when these words are used in the vernacular they are often applied to any factor related to humans. The human element is the most flexible, adaptable and valuable part of the aviation system, but it is also the most vulnerable to influences which can adversely affect its performance.

Throughout the years, some three out of four accidents have resulted from less than optimum human performance.

This has commonly been classified as human error.

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THE MEANING OF HUMAN FACTORS

1.2.2 The term “human error” is of no help in accident prevention because although it may indicate WHERE in the system a breakdown occurs, it provides no guidance as to WHY it occurs. An error attributed to humans in the system may have been design-induced or stimulated by inadequate training, badly designed procedures or the poor concept or layout of checklists or manuals.

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THE MEANING OF HUMAN FACTORS

Further, the term “human error” allows concealment of the underlying factors which must be brought to the fore if accidents are to be prevented. In fact, contemporary safety-thinking argues that human error should be the starting point rather than the stop-rule in accident investigation and prevention.

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WHAT IS HUMAN FACTORS?

This section shall:

- Define human factors as it relates to our everyday life
- Show specific examples of human factors
- Show why the topic is important to you

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What is Human Factors?

- Designing workplaces, tools, procedures, and policies so people can use them easily and safely
- Primary concern is for people in the organization
- Combines elements from many disciplines
- Critical to the overall flight safety and personal safety

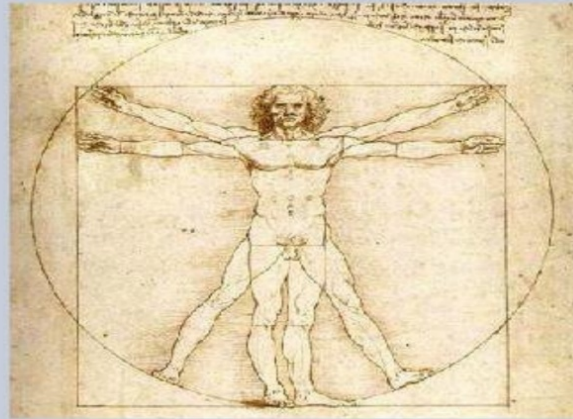
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Human Factors Goal — A Summary

Ensure continuing safety and efficiency by paying attention to issues that affect human performance.

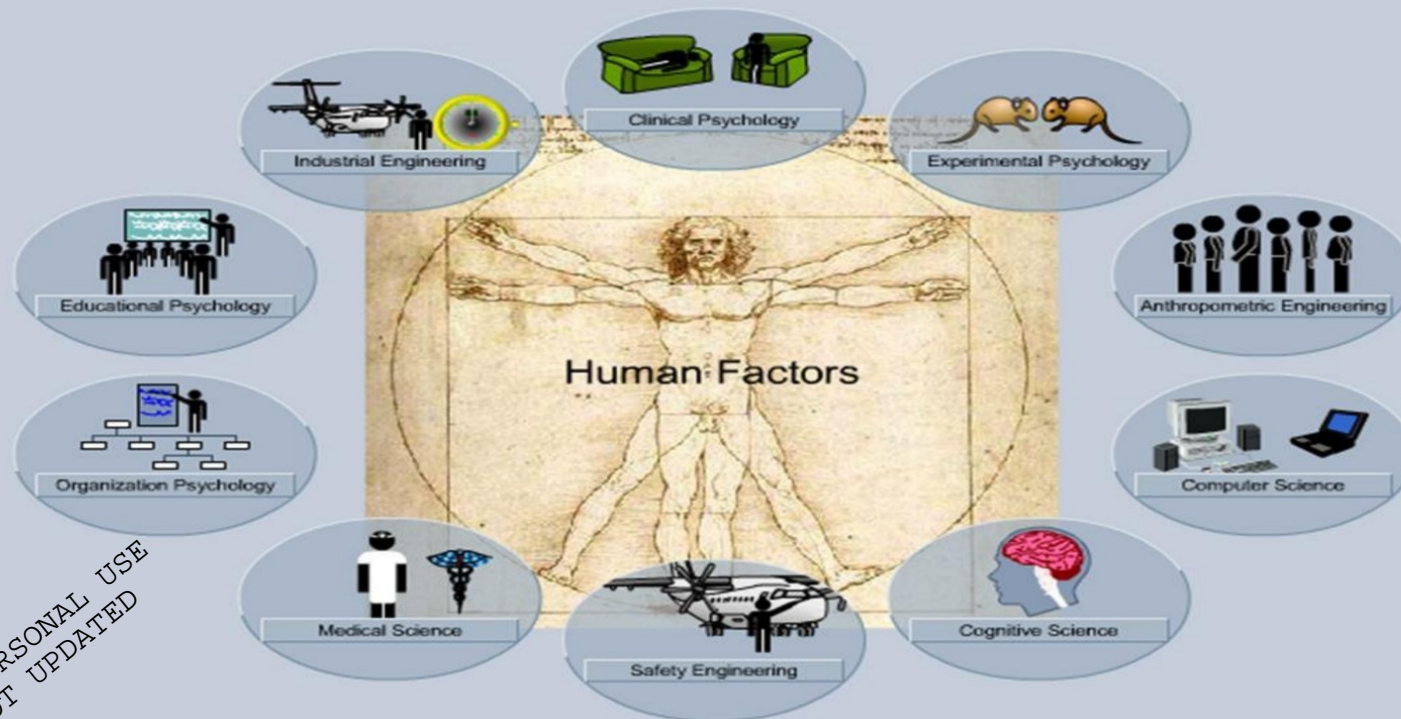
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INTRODUCTION TO HUMAN FACTORS

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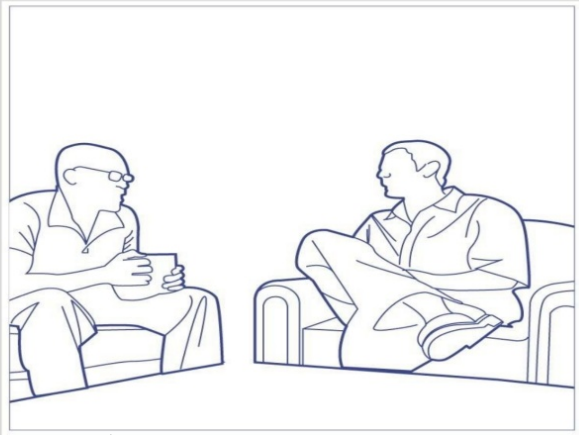
The Elements of Human Factors



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INTRODUCTION TO HUMAN FACTORS

Clinical Psychology



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- Personality types
- Relating to other people
- Dealing with stress
- Coping mechanisms
- Self image
- Accepting criticism

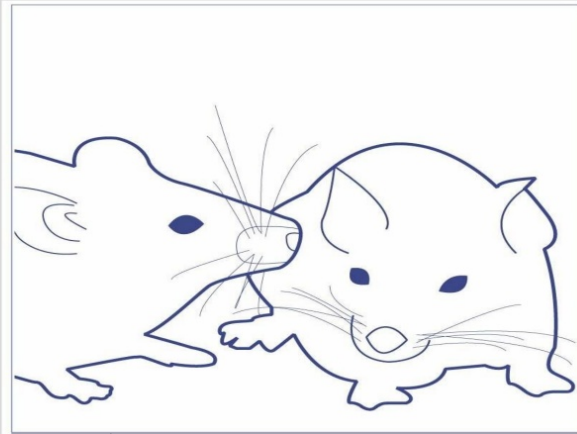
Anthropometrics



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- Study of human body part sizes
- Can the user reach controls?
- Ability to access aircraft parts and systems
- Designing for extremes, i.e., smallest female and largest male
- No such thing as the “average” person

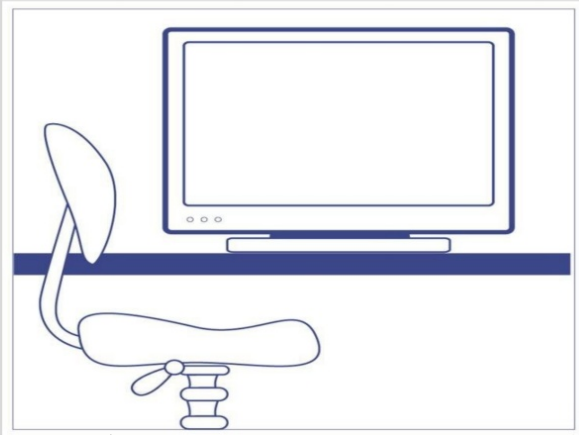
Experimental Psychology



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- Reinforcing desired behavior
- Observations in the workplace
- Statistical analysis
- Effects of stress on behavior
- Controlled studies of the effects of work policies and procedures

Computer Science



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- Human-computer interaction
- User interface design
- Requirements analysis for software-based tools and test equipment
- Accommodation for range of computer literacy

Cognitive Science



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- The “mental” parts of perception
- Problem solving ability
- Things that affect troubleshooting performance
- Effects of stress on mental processing

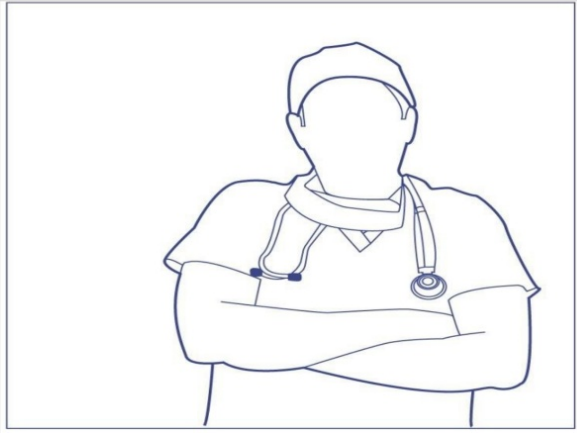
Safety Engineering



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- Industrial safety
- Slips, trips, and falls
- Materials handling, e.g., lifting
- Toxic materials storage and use
- Facility design and safety
- Warnings

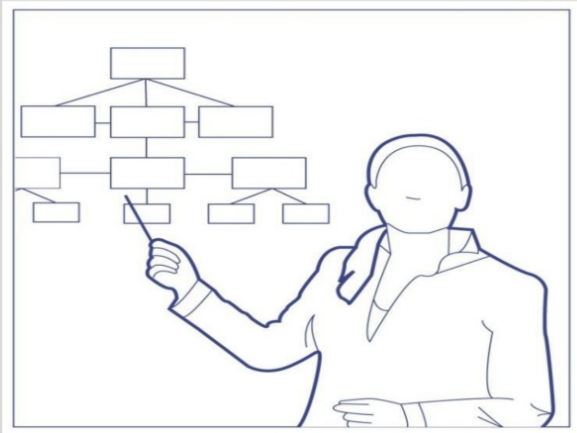
Medical Science



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- Skeletal and muscular structure
- Biomechanics
- Physical structure of perceptual elements, e.g., eyes
- Work physiology, e.g., heat generation and dissipation
- Fatigue effects

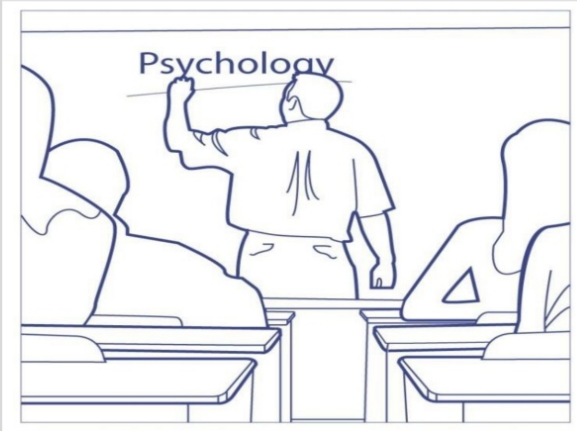
Organizational Psychology



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- Organizational structure
- Rewards and compensation
- Motivation
- Work teams and groups
- Union/management relations
- Equitable treatment

Educational Psychology



FOR PERSONAL USE
NOT UPDATED

- Principles of learning
- Ways to help people to remember
- Design of instruction

Industrial Engineering



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- Organized approach to the study of work
- Setting reasonable work standards
- Making work tasks efficient
- Statistical analysis of work performance
- Efficient facility layout

Human Factors Goal for Review

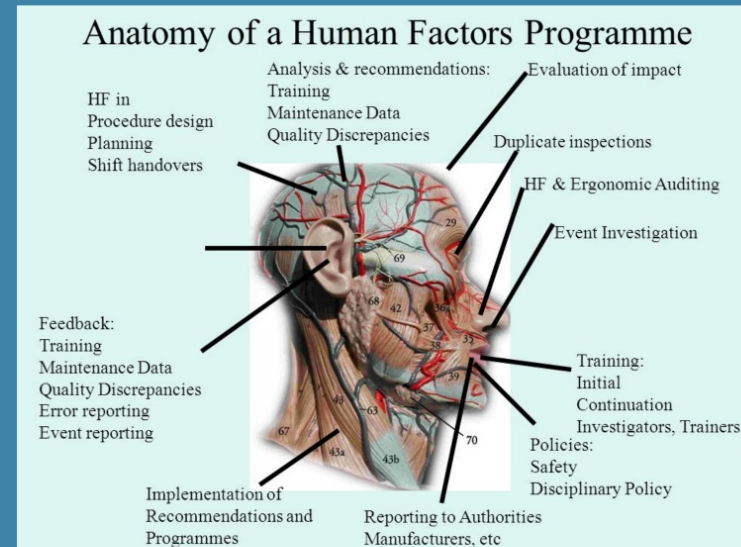
Ensure continuing safety and efficiency by paying attention to issues that affect human performance.

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The Auditor and HF

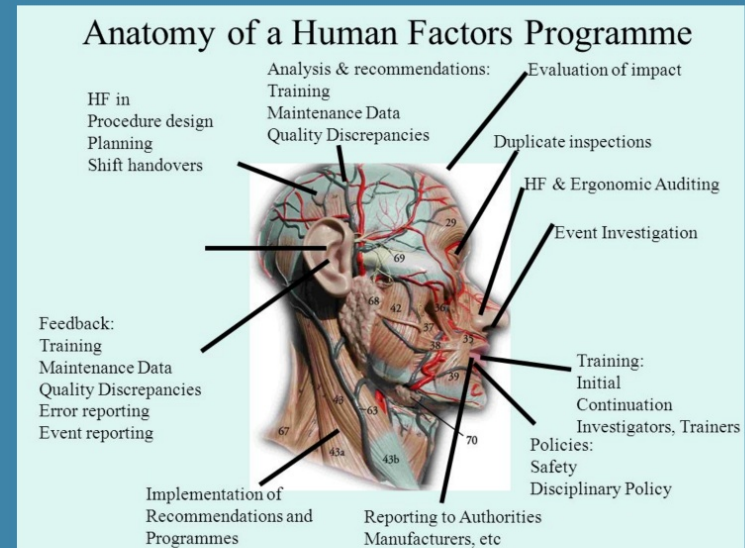
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The Auditor and HF



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The Auditor and HF

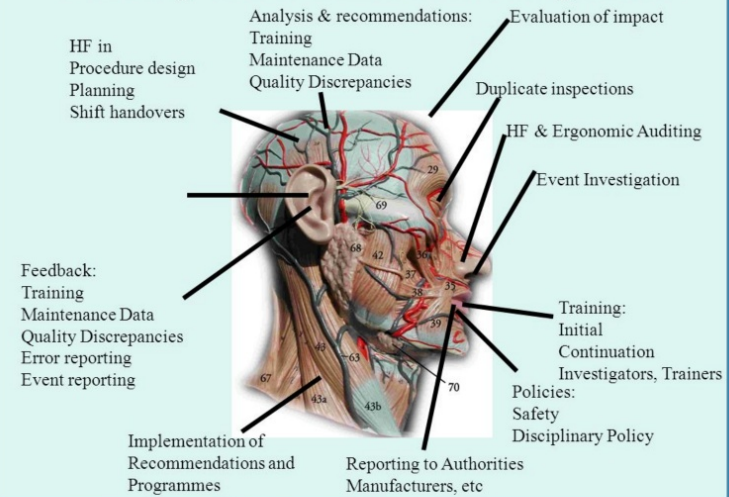


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The Auditor and HF



Anatomy of a Human Factors Programme



The Auditor & Human Factors 1.

We should acknowledge that virtually all the phenomena affecting the personal performance of operational personnel in aviation, whether they are individual factors, organizational and management factors or cultural factors, have a corresponding potential for affecting the performance of safety auditors in the fulfilment of their duties.

For example:

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The Auditor and HF

- fatigue and circadian disrhythmia;
- workload and stress;
- interpersonal communications (oral and written);
- failures in teamwork;
- insensitivity to cultural differences;
- motivation and morale problems.

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The Auditor and HF

5.1.2 These same phenomena create conditions which facilitate safety auditors making slips, lapses and mistakes in the execution of their daily tasks. For example:

- Intended to brief State representatives on a particular issue, but forgot.
- Overlooked major (embarrassing) transcription error in draft findings and recommendations.
- Presented incomplete, inappropriate or unsubstantiated recommendations to operator/audit team.

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The Challenge 2.

CHALLENGE: WHAT YOU SEE IS NOT ALWAYS WHAT YOU GET!

One of the principal challenges facing the ICAO safety auditor is maintaining a balanced safety focus, realizing that not everything is as it appears.

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The Auditor and HF

During a brief audit period, the auditor will encounter much sincerity with respect to aviation safety and will witness evidence indicative of compliance with SARPs.

However, there may be a significant difference between the superficial manifestations of meaningful safety measures and fully effective implementation of intent.

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The Auditor and HF

The following example drawn from an accident investigation report demonstrates the potential gap between perception and reality.

The court investigating the accident reported:

“The vital importance of [the] concept of absolute safety was acknowledged time and again in the evidence that the Court heard [from the company management].

The problem with such expressions of concern for safety was that the remainder of the evidence demonstrated beyond dispute two things:

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The Auditor and HF

The two facts are:

- i) there was total sincerity on the part of all who spoke of safety in this way but nevertheless
- ii) there was a failure to carry those beliefs through from thought to deed.

The appearance was not the reality. The concern for safety was permitted to co-exist with working practices which ... were positively dangerous.

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The Challenge 3.

CHALLENGE: DEALING WITH BIAS

Judgement is shaped by personal experience.

Notwithstanding the safety auditor's quest for objectivity, time does not always permit the collection and careful evaluation of sufficient data essential to such objectivity.

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The Auditor and HF

Based on a lifetime of personal experience, we all develop mental models that, in general, serve well for quickly evaluating everyday situations intuitively in the absence of a complete set of facts.

Unfortunately, many of these mental models reflect personal bias.

Bias is the tendency to apply a certain response regardless of the situation.

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The Challenge 4.

CHALLENGE: WORKING WITH CULTURAL PERCEPTIONS

Cultural perceptions make going beyond simple regulatory compliance and an objective systems approach to a safety oversight audit a challenge.

Several recent aviation disasters have highlighted exactly how controversial and emotionally provocative cultural perceptions can be.

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The Auditor and HF

If safety oversight auditors are to avoid accusations of bias, they must take into account the local context, which may vary markedly from the context in which the terms of reference and the guidance for the conduct of the audit were drafted.

Without a demonstration of real cultural sensitivity, the audit's findings may not be accepted as relevant.

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The Challenge 5.

CHALLENGE: LANGUAGE

Strongly linked to the question of culture is language, a fundamental source of problems in cross-cultural transactions.

The safety auditor faces the language issue on two fronts: in dealing with representatives of the Operators/State and in communicating with other members of a multinational audit team.

Even a small language barrier can present significant barriers to common understanding.

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The Challenge 6.

CHALLENGE: EMOTIONS

Effective communications can involve more than technical linguistic competence. Much of what we communicate concerns non-verbal communications, such as body language and facial expressions, which often have high emotional content.

Unfortunately, few of us are sensitive to the emotion-laden signals we are giving others by means of facial expressions, position of shoulders, arms and hands, gestures and eye contact.

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Some readily display their emotions without concern.

The Auditor and HF

On the other hand, others may be more guarded.

Indeed, the safety auditor may unwittingly betray his emotions through facial expressions or other body language.

In some cases, such displays may be considered disrespectful, compromising the auditor's credibility and undermining the effectiveness of the safety audit.

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The Challenge 7.

CHALLENGE: THE MULTICULTURAL AUDIT TEAM

Culturally diverse audit teams have a high potential for productivity.

They have the a breadth of resources, insights, perspectives and experiences to provide insight into new and better ways of achieving safety goals.

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The Auditor and HF

Regrettably, culturally diverse groups rarely achieve their full potential.

Mistrust, misunderstanding, miscommunication, stress and lack of cohesion often compromise the team's potential.

Careful management of team composition by the team leader is required to minimize these breakdowns and maximize the audit team's productivity.

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The Challenge 8.

CHALLENGE: EFFECTIVE FINDINGS AND RECOMMENDATIONS

Convincing the responsible parties of the need for action can be problematic for the safety auditor.

Safety oversight audits invariably identify areas of weakness indicative of safety deficiencies.

Understandably, operator's management/officials responsible for these areas may be quite defensive, denying the existence of any problems, or may wish to minimize the importance of problems to avoid embarrassment.

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The Auditor and HF

The effectiveness of the safety auditor when presenting findings and recommendations will ultimately determine the degree of success of the audit.

Without effective communication in this regard, much of the value of the safety audit will be lost.

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The Challenge 9.

CHALLENGE: PERSONAL STRESS

While everyone encounters stress in their normal lives to some extent, auditors are under enormous pressure to do a difficult job under what can best be described as difficult circumstances.

The resultant stress can manifest in several ways, for example:

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The Auditor and HF

- muscular tension or pain (usually in the back);
- headaches;
- loss of appetite;
- sleeplessness and irritability or anxiety;
- stomach pain;
- loss of concentration;
- errors in judgement.

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NOT UPDATED

The Auditor and HF

The effect of stress (and stressors) on human performance is applicable to the performance of safety auditors.

The following are typical stressors that may affect a safety auditor's performance:

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The Auditor and HF

- circadian dysrhythmia from travelling (jet lag);
- excessive workload due to the amount of material to be audited and its complexity;
- insufficient time for completing the audit necessitating evening and weekend work;
- insufficient time for audit preparation and report writing, compounded by scheduling of back-to-back audits;

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The Last Word.....

The safety oversight auditor will face many of the Human Factors discussed in this chapter.

Successful auditors will learn to appreciate how these factors affect their personal performance and that of the audit team.

The long-term success of the state safety oversight programme is dependent on the degree to which its safety oversight auditors can transcend these challenges.

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Next - The HF Models

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Next - The HF Models

The gap between the disciplines of human factors and systems engineering with new technology is widening because of rapid and steady technological development and progress.

We need to work together to close this gap in order to form a team from human and technology, where working methods are better coordinated and interconnected.

For this, it is necessary to deal with the technical development as well as with models of cognition.”

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Next - The HF Models



The gap between the disciplines of human factors and systems engineering with new technology is widening because of rapid and steady technological development and progress.

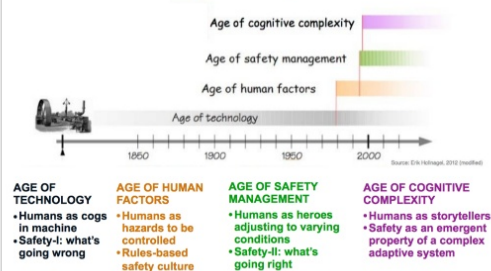
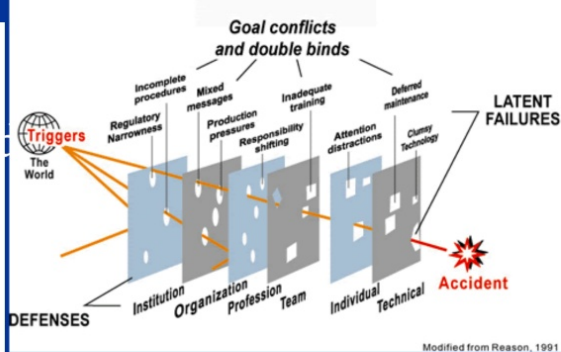
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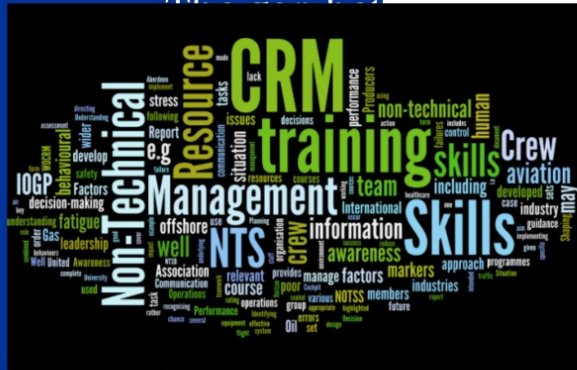
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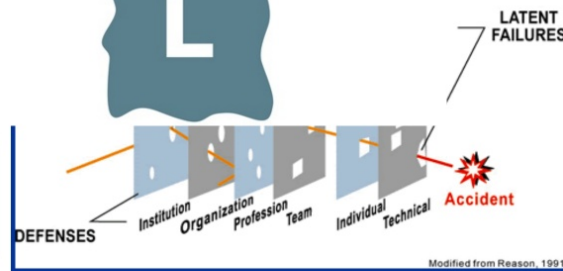
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Next - The HF Models

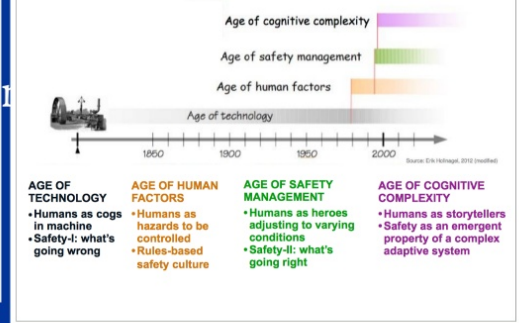


Factors influencing Employee Performance



er coordinated and

Evolution of Safety Thinking



Next - The

HF

IOGP
develop
wider
behavioural
safety
Factors
decision-making
fatigue
leadership
Awareness
used

SAF

FACTORS W
• Unsuccess
• Risks
• Errors

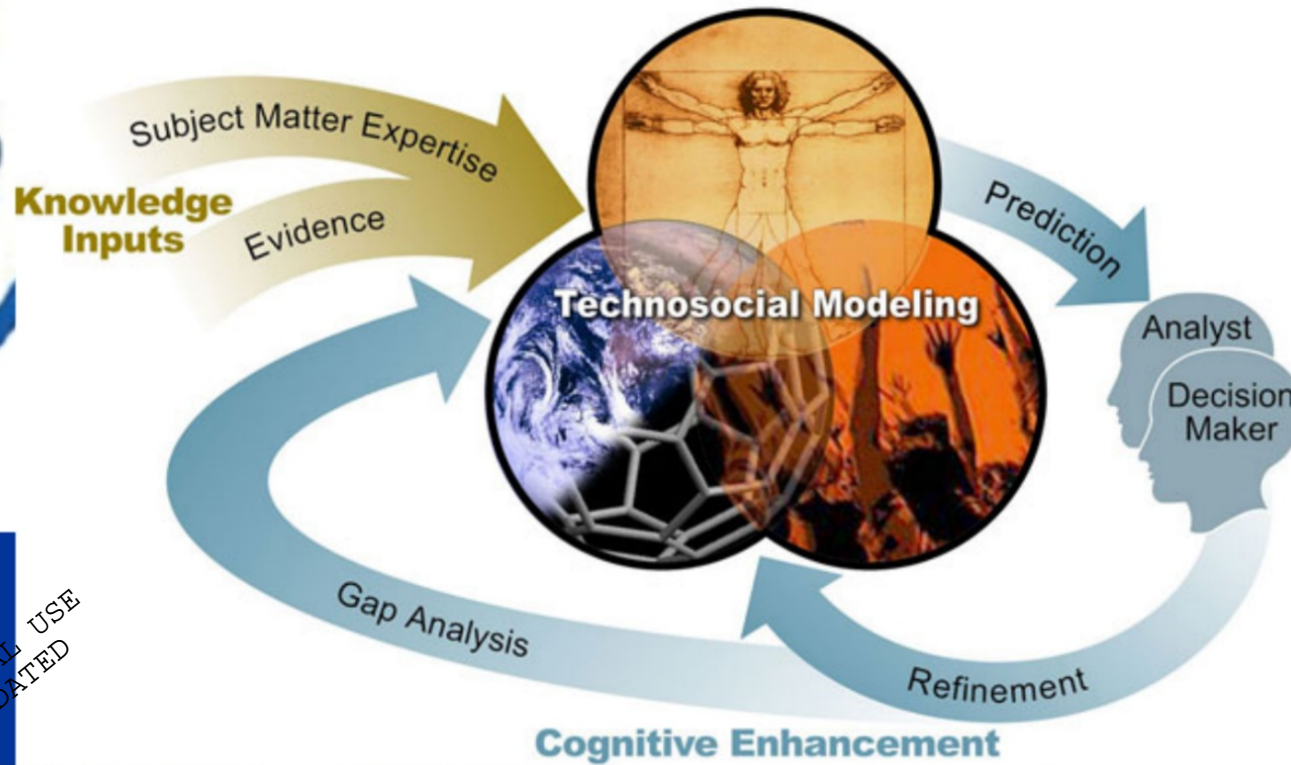
INDIVID
IN FOCU

• "Bad"
• "Findings"
• Latent system

= OLD THINKING

= NEW THINKING

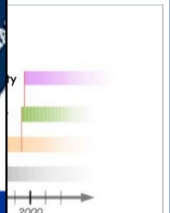
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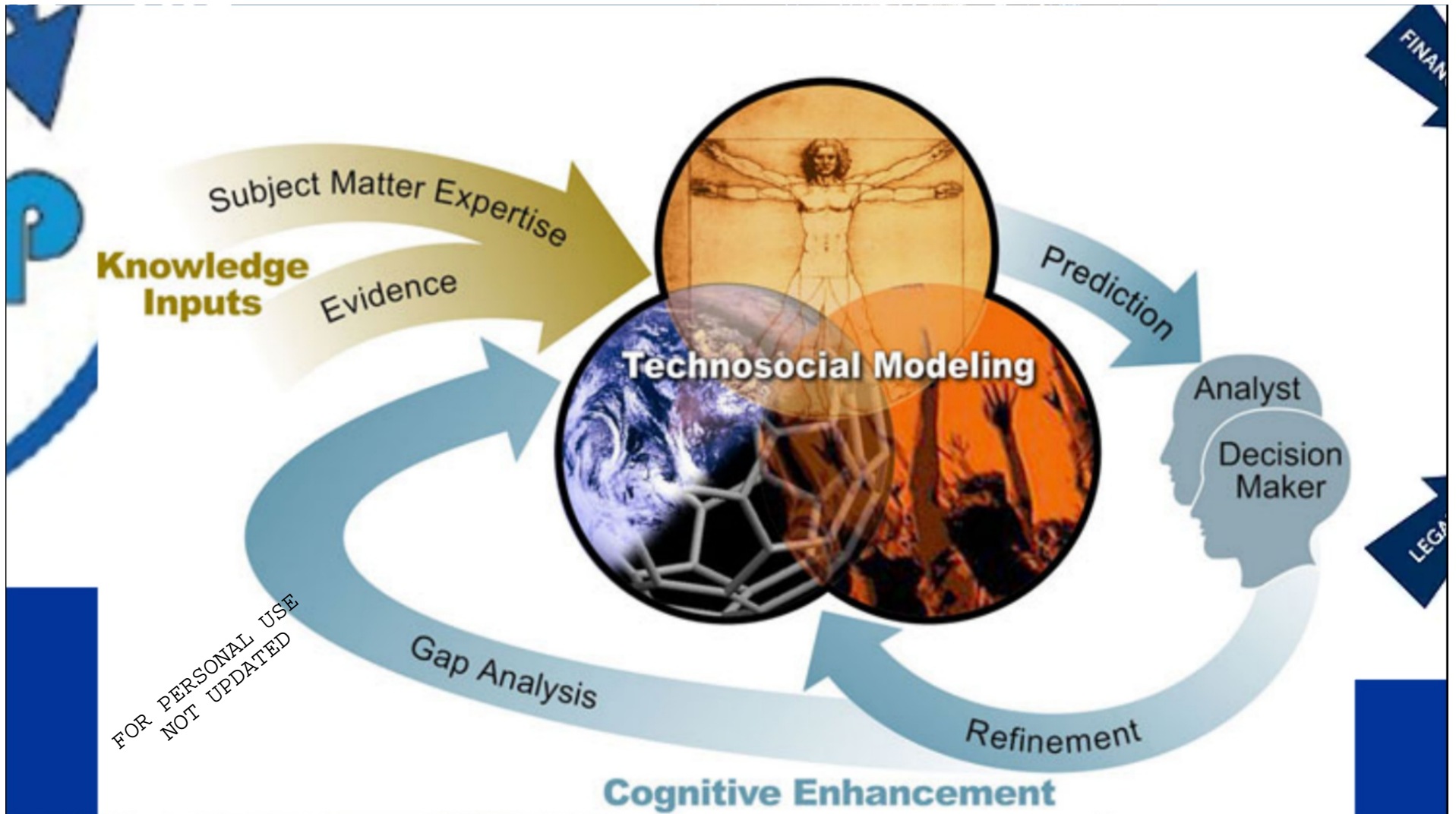


LEGAL



AGE OF COGNITIVE COMPLEXITY
• Humans as storytellers
• Safety as an emergent property of a complex adaptive system

Modified from Reason, 1991



S-H-E-L-L

The The SHELL Model is defined as “the relationship of human factors and the aviation environment”.

This concept has originated from the 'SHELL Model' by Edwards in 1972, which the name was derived from the initials of its components (Software, Hardware, Environment, and Liveware X 2).



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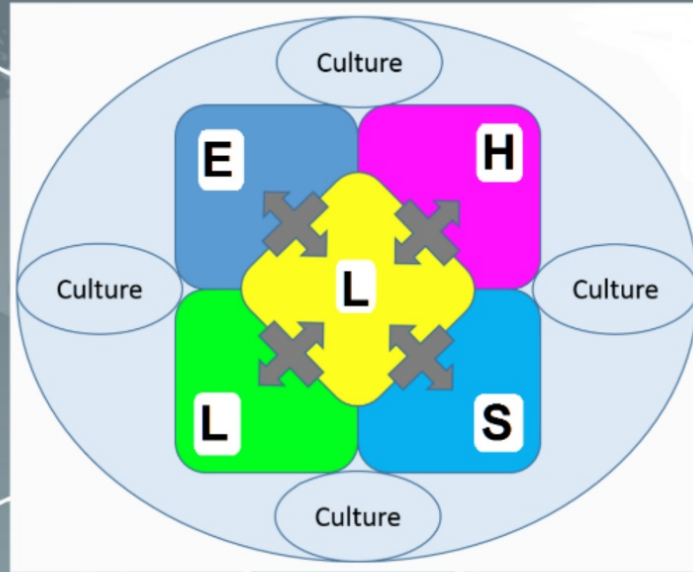
ENVIRONMENT

HARDWARE

LIVEWARE

**LIVEWARE -
YOU**

SOFTWARE



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ENVIRONMENT

HARDWARE



LIVEWARE

**LIVEWARE -
YOU**

SOFTWARE

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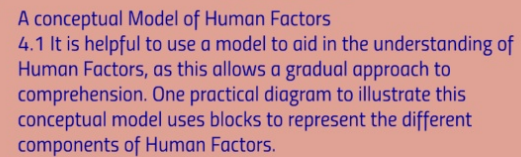
ENVIRONMENT



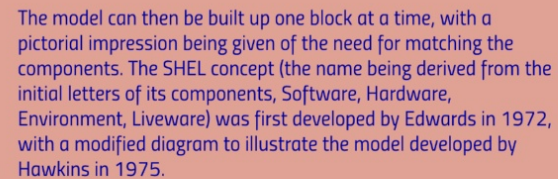
HARDWARE



S-H-E-L-L



A conceptual Model of Human Factors
4.1 It is helpful to use a model to aid in the understanding of Human Factors, as this allows a gradual approach to comprehension. One practical diagram to illustrate this conceptual model uses blocks to represent the different components of Human Factors.



The model can then be built up one block at a time, with a pictorial impression being given of the need for matching the components. The SHEL concept (the name being derived from the initial letters of its components, Software, Hardware, Environment, Liveware) was first developed by Edwards in 1972, with a modified diagram to illustrate the model developed by Hawkins in 1975.



LIVEWARE



SOFTWARE



LIVEWARE -
YOU

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S-H-E-L-L

A conceptual Model of Human Factors

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SOFTWARE

- Non-physical, intangible aspects of the aviation system that govern how the aviation system operates and how information within the system is organised (Hawkins & Orlady, 1993 4).
- Software may be likened to the software that controls the operations of computer hardware (Johnston, McDonald & Fuller, 2001 6).

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- Software includes rules, instructions, regulations, policies, norms, laws, orders, safety procedures, standard operating procedures, customs, practices, conventions, habits, symbology, supervisor commands and computer programmes.
- Software can be included in a collection of documents such as the contents of charts, maps, publications, emergency operating manuals and procedural checklists (Wiener & Nagel, 1988 10).

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The Nuts and Bolts



Hardware

Physical elements of the aviation system such as aircraft (including controls, surfaces, displays, functional systems and seating), operator equipment, tools, materials, buildings, vehicles, computers, conveyor belts etc (Johnston et al, 2001 6; Wiener & Nagel, 1988 10; Campbell & Bagshaw, 2002 2). does it all come together?

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Environment

- The context in which aircraft and aviation system resources (software, hardware, liveware) operate, made up of physical, organisational, economic, regulatory, political and social variables that may impact on the worker/operator (Wiener & Nagel, 1988 10; Johnston et al, 2001 6).

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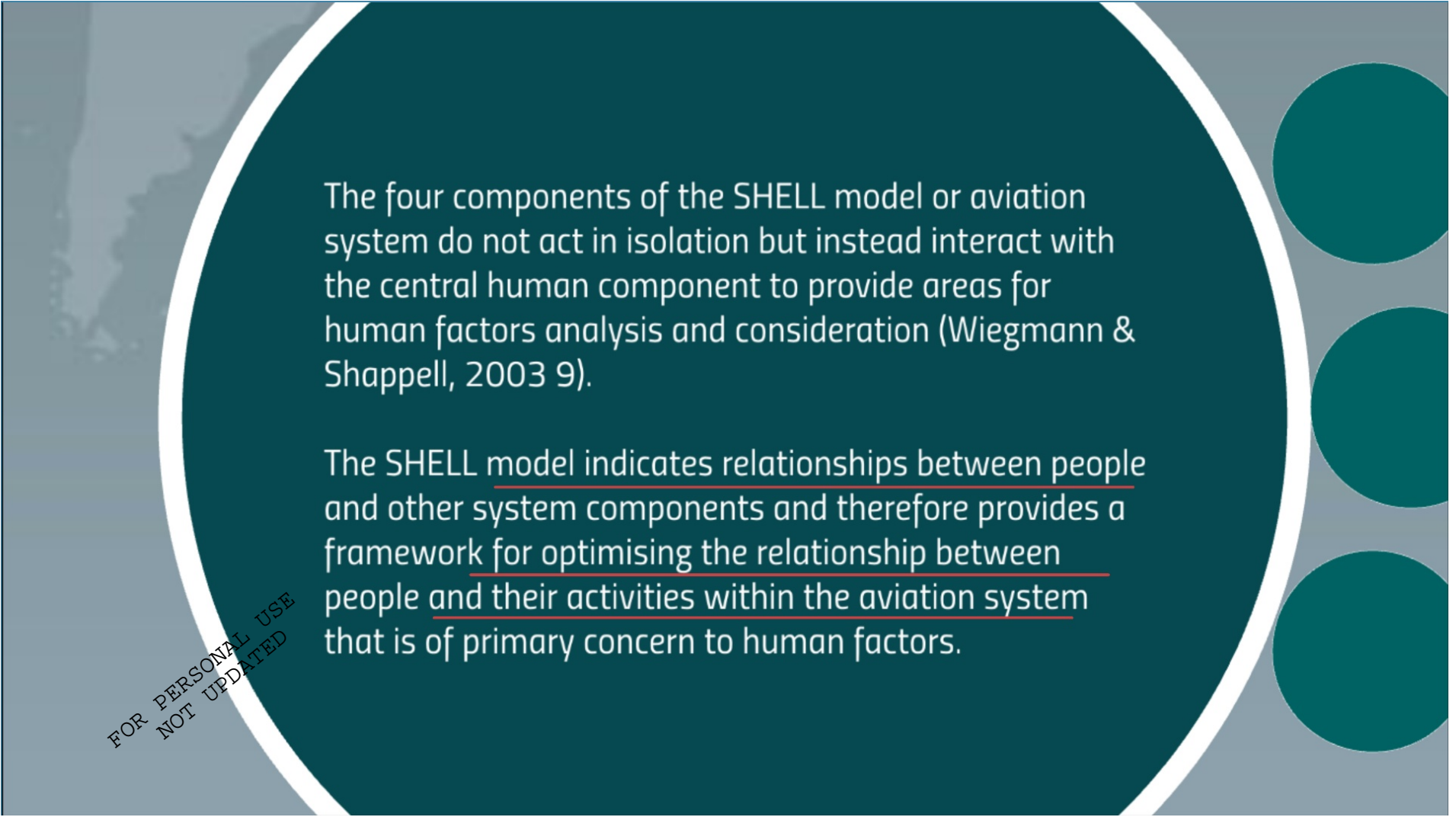
- Internal air transport environment relates to immediate work area and includes physical factors such as cabin/cockpit temperature, air pressure, humidity, noise, vibration and ambient light levels.
- External air transport environment includes the physical environment outside the immediate work area such as weather (visibility/turbulence), terrain, congested airspace and physical facilities and infrastructure including airports as well as broad organisational, economic, regulatory, political and social factors (International Civil Aviation Organisation, 1993 5).

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Liveware

- Human element or people in the aviation system. For example, flight crew personnel who operate aircraft, cabin crew, ground crew, management and administration personnel.
- The liveware component considers human performance, capabilities and limitations (International Civil Aviation Organisation, 1993 5).

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The four components of the SHELL model or aviation system do not act in isolation but instead interact with the central human component to provide areas for human factors analysis and consideration (Wiegmann & Shappell, 2003 9).

The SHELL model indicates relationships between people and other system components and therefore provides a framework for optimising the relationship between people and their activities within the aviation system that is of primary concern to human factors.

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In fact, the International Civil Aviation Organisation has described human factors as a concept of people in their living and working situations; their interactions with machines (hardware), procedures (software) and the environment about them; and also their relationships with other people (Keightley, 2004 7).

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According to the SHELL model, a mismatch at the interface of the blocks/ components where energy and information is interchanged can be a source of human error or system vulnerability that can lead to system failure in the form of an incident/accident (Johnston et al, 2001 6).

Aviation disasters tend to be characterised by mismatches at interfaces between system components, rather than catastrophic failures of individual components (Wiener & Nagel, 1988 10).

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FOR PERSONAL USE
NOT UPDATED



Audit Techniques & Practices for Regulators

RCA

QA

SMS

ISO

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INTRO

**Audit
Roadmap**

**On The
Road
Again**

