RM13010 – HUMAN FACTORS

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RM13010 Human Factors

Update for 2023

An AESQ Reference Manual
Supporting SAE AS13100™ Standard

Issued April 21, 2021

New content includes,

- Hazard reporting example
- Investigation example questions
- Avoidance of the "Blame Cycle"
- Error Zone Assessment example
- HF FMEA Example
- Wording clarifications
- Useful video, podcast & article links
- Investigation Interview guide example
- Error/ Violation decision tree example
- HF considerations for 8D Problem Solving
- Example Communications
- HF Deployment Framework example

RM13010 – HUMAN FACTORS

WHAT IS HUMAN FACTORS?

90% of significant events are caused by something other than just the individual.

PERFORMANCE MODES

SKILL-BASED: Using habit, not thinking, low or no conscious thought (TASK done successfully more than 50-100 times). Task has less than 7-15 discreet steps.

Error rate = 1:1,000

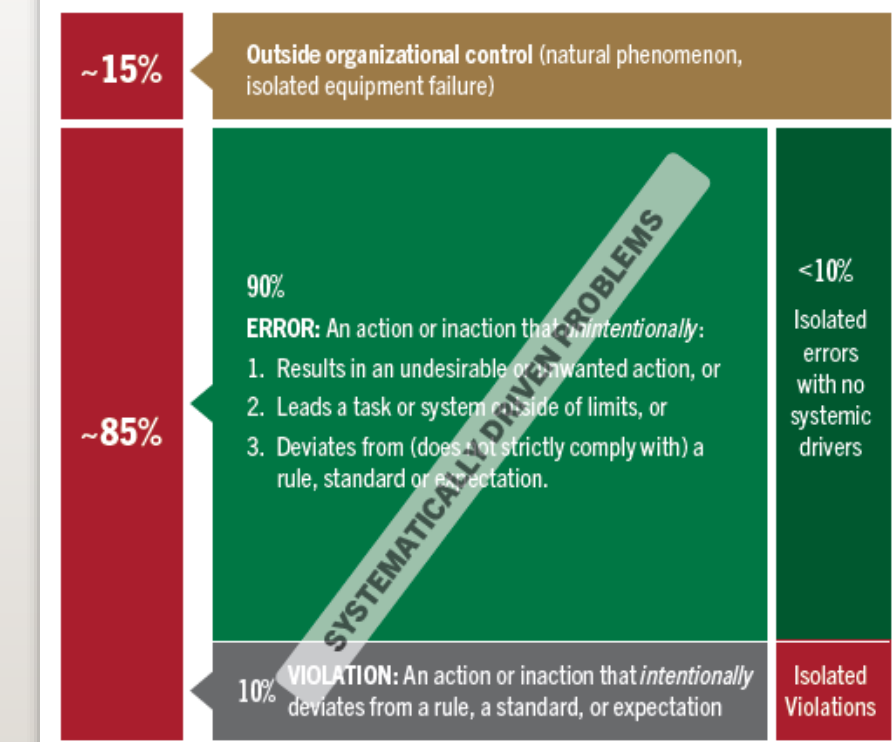**RULE-BASED:** There is a rule and you know the rule exists.

Error rate = 1:100 (from memory)

KNOWLEDGE-BASED: You don't know what you don't know.
Key Point: you cannot think your way out!

Error rate = 1:2 – 1:10

THE SWISS CHEESE MODEL
Cheese Model of Incident Causations

Failed barriers CANNOT be root causes

HOW BAD THINGS HAPPEN

~15% Outside organizational control (natural phenomenon, isolated equipment failure)

90% **ERROR:** An action or inaction that *unintentionally*:
1. Results in an undesirable or unwanted action, or
2. Leads a task or system out of limits, or
3. Deviates from (does not strictly comply with) a rule, standard or expectation.

~85% / <10% Isolated errors with no systemic drivers

10% **VIOLATION:** An action or inaction that *intentionally* deviates from a rule, a standard, or expectation. / Isolated Violations

TRAPS, TRIGGERS, AND TOOLS

TRAP	TRIGGERS	TOOLS
Knowledge-Based Operation		Use STOP When Unsure and SEEK OUT Help
Time Pressure		Self-Check using Verbalize, Point, Touch
Distraction		Verbalize, Point, Touch
		Record the As-left Condition
Vague or Incorrect Guidance		Use STEP by STEP When Unsure and SEEK OUT Help

TRAP	TRIGGERS	TOOLS
Mental Difficulty		Use STEP by STEP When Unsure and SEEK OUT Help
Over-confidence		Use STOP When Unsure and SEEK OUT Help
First Time/ Infrequent Task		Use STEP by STEP STOP When Unsure and SEEK OUT Help
Poor Communications		Use 3-Part, Verify, Clarify, Alphanumeric

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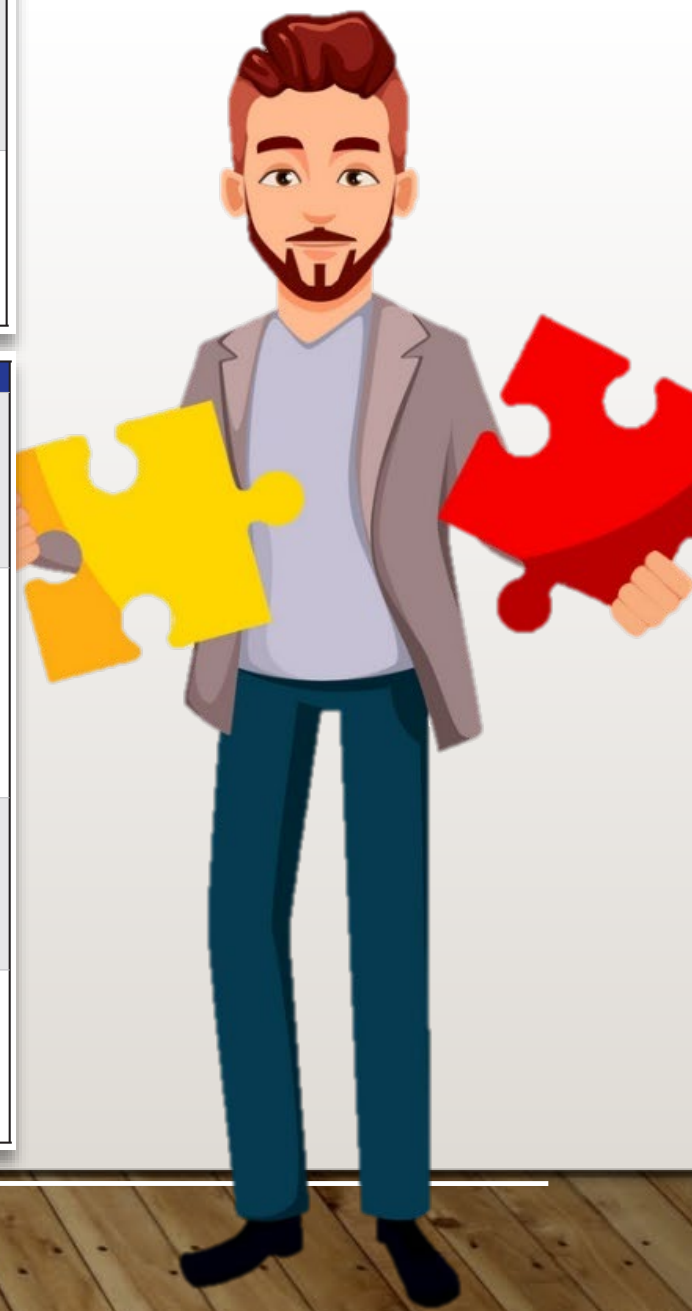
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Essential elements of a Human Factors Programme

Figure 9 - Essential Elements of a Human Factors Program

Example Deployment Framework

Human Factors Deployment Quick Reference

Human Factors Considerations for 8D Problem Solving

8D STEPS		HF contributions
D0	Make a preliminary analysis of the problem	Ensure that the emphasis is placed on the situation, time, location and impacts and not on the person(s) at the origin of the event.
D1	Form the team	Work directly in the 8D by bringing the specific features of HF into the context of the 8D team formed. Ensure that the HF skills are present.
D2	Define the problem to be processed	Challenge the characterization of the event and of the error from a human and organizational viewpoint. Ensure that the description the event does not contain value judgments, interpretations or opinions.
D3	Contain the risks	
D4	Find the root cause(s)	Ensure that the root causes linked with the persons and the organization have been studied. Characterize the facts from a human and organizational viewpoint (dirty dozen, Swiss cheese Model)
D5	Define and select the corrective actions	Challenge the chosen solutions. Propose solutions already applied in similar activities.
D6	Implement the chosen actions and check their effectiveness	Take part in the on-site observation in order to check the effectiveness of the corrective actions and collect the feedback
D7	Capitalize, perpetuate, generalize	Ensure that the feedback is shared within the HF network. Update the catalog of HF solutions / best practices.
D8	Conclude the group and congratulate the team	–

Example Error/ Violation decision tree

Join the AESQ human Factors Community of Practice on LinkedIn.

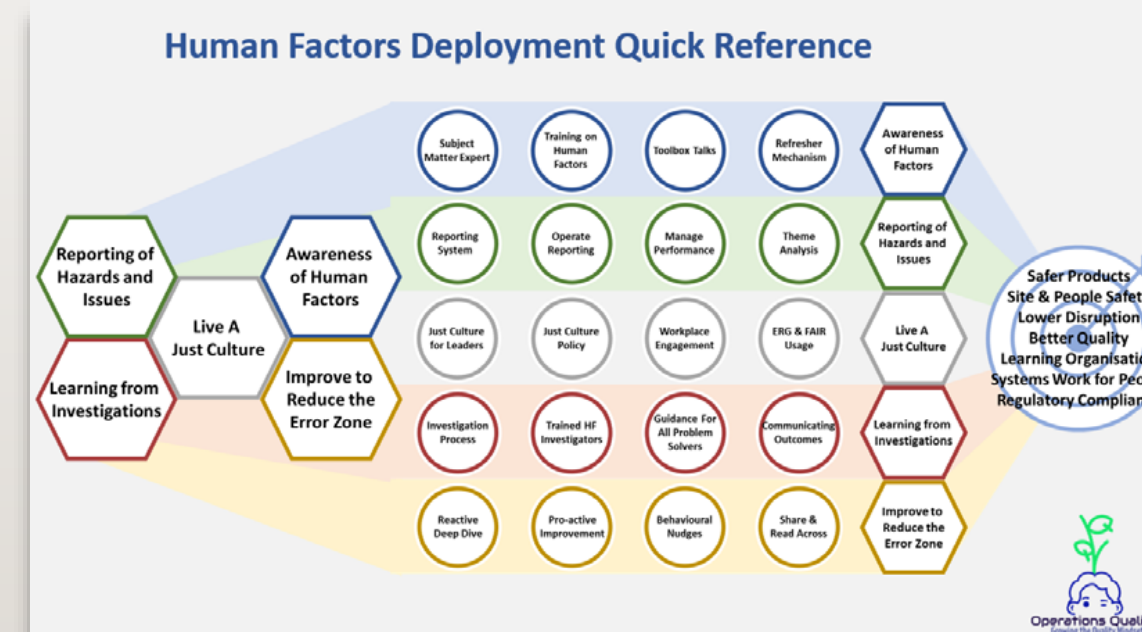**Example Interview Guide**

AIRCRAFT ENGINES

INTERVIEW GUIDE

The purpose of this guide is to provide assistance to any actor of the HOF approach who needs to interview a person as part of a causal analysis.
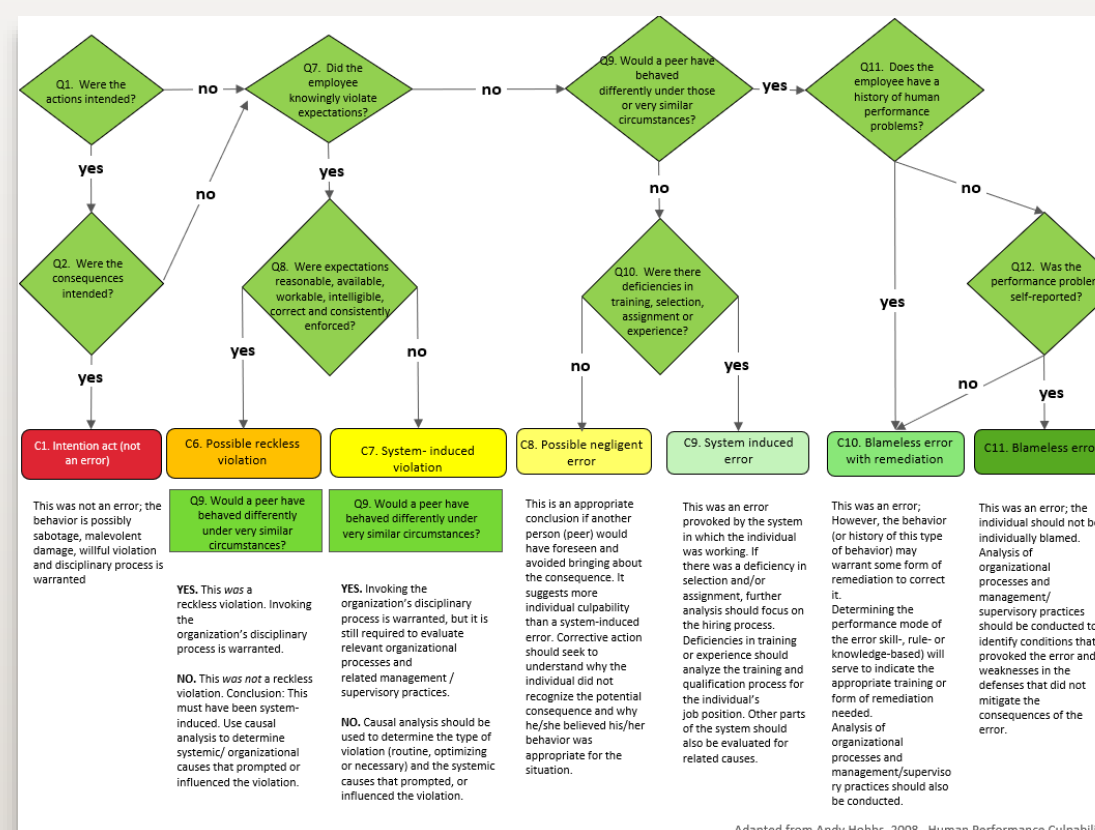
0- Interview preparation
- Find out about the sector where the event took place (history of events and history of the person to meet).
- Encourage the use of prepared materials to facilitate the discussion and have the list of the HOF contributing factors available.
- Be sure to implement the correct psychological conditions for the person to be interviewed (sufficient notice period and informed hierarchy).
- Provide for the interview, a space ensuring the confidentiality of discussions and initially out-of-flow, if possible.
- If several people are to be interviewed, it is essential to interview each one individually to begin with and then together if necessary.

1- Outline the context and structure of the interview
- Introduce yourself and present the HOF approach.
- State the reasons for our intervention.
- Explain that this is part of a process of sharing and continuous improvement based on trust and understanding.
- Clarify that we do not judge, we simply want to understand the event in order to identify the root causes and thus prevent recurrence.
- Reassure the interviewee that the purpose of our intervention is not intended to impose any sanctions at a later stage (on the contrary).

2- Presentation and description of the event
- Ask the interviewee to introduce themself (background, their role, length of service in the position, etc.).
- Use the list of factors contributing to the error as the common theme for the interview.
- Let the person express themself without any filter regarding the event (can you tell me what happened?).
- Ask the interviewee to be factual, reframe or refocus discussions on the event if necessary.
- Do not interrupt or pass judgment on what is reported.

3- Perspective and objectivity
- Encourage the interviewee to give their opinion, their perspective on the event.
- Ask if proposals for solutions are to be made to prevent recurrence or a similar case.
- Ask for their opinion regarding actions already established at the time of the interview (relevance, effectiveness, actions to be added).
- Give the interviewee the opportunity to address other subjects (sensitive or specific to their situation, their sector, etc.).
- Check whether the approach and the actors (HOF correspondent for the sector and/or the site advisor) were known before the event.

4- Contractualization of information and visibility
- Consolidate all discussions to avoid any possible errors of understanding, interpretation or misinterpretation.
- Confirm with the interviewee the information that they do not wish to see communicated or shared.
- Ask if other actors are to be interviewed for a better understanding of the event.
- Provide visibility regarding the rest of the interview (the interview being one of the stages of the causal analysis, outline the next steps).
- Indicate that we are likely to return to our interlocutor for further information.

5- Thanks and closing the interview
- Thank the interviewee for their availability, transparency and cooperation.
- Remind them of the golden rules and good HOF practices.
- Encourage the escalation of any weak signal or near-event so that their HOF correspondent and/or the site advisor.
- Encourage the interlocutor to address the HOF approach with their colleagues on the ground.
- Ask for feedback on the interview process (areas for improvement).