HUMAN FACTORS WEBINAR

JANUARY 12, 2022
LED BY HUMAN FACTORS SMIG

“SUBJECT MATTER INTEREST GROUP”
Introducing AS13100: AESQ Quality Management Requirements

The new standard creating a common language for quality throughout the aerospace engine supply chain.

This standard sets out to create a common set of aerospace requirements with common metrics and reference models to significantly simplify the business of suppliers with multiple customers. It encapsulates the core requirements to improve overall product quality by focusing on the key systems and processes that deliver consistent manufacturing process quality.

These common requirements aim to raise the bar for anticipated performance in these key areas, and ensure related guidance is provided to ensure clarity of expectations.

To ensure customer satisfaction, the aviation, space, and defense industry organizations have to produce and continually improve safe, reliable products that meet all customer and regulatory authority requirements. The globalization of the industry and the resulting demands of multinational requirements and expectations have complicated this objective.

End-product organizations face the challenge of ensuring the quality of the integration of product components from suppliers throughout the world and at all levels within the supply chain. End product companies need a common language, how to gain certification by allowing companies from around the world to work through each section of the standard and understand the new requirements.

For more information, please visit: discover.sae.org/AS13100

available from the AESQ website

AESQ – Aerospace Engine Supplier Quality Strategy Group

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HOW does it work?
AESQ Strategic Themes: HF SMIG part of deployment Strategy

G-22 Steering Group
- AS13001 DPRV
- AS13100
- AS13000
- AS13002
- AS13003
- AS13004
- AS13006
- AS13100 Reference Manuals

Communications Strategy Group
- AESQ Supplier Forums
- Quarterly AESQ/G-22 Meetings
- AESQ Website Updates
  - Newsletters
  - Best Practice Case Studies
  - Membership Promotion
  - Promoting AESQ Activities

Deployment Strategy Group
- AS13100 Deployment
  - Subject Matter Interest Groups
    - APQP & PPAP (RM13145)
    - Process Control (RM13006 & RM13002)
    - MSA (RM13003)
    - FMEA (RM13004)
    - Human Factors (RM13010)
    - Problem Solving (RM13000)
    - Quality Auditing (RM13005)
    - DPPV Training (AS13001)
    - Design Work (RM13008)
    - Sub-tier Management (RM13007)
    - First Article Inspection (RM13102)

Training Strategy Group
- AS13001 DPRV
- AS13100 Requirements
- AS13100 Foundations
- Training Provider Approval Process
The purpose of the Subject Matter Interest Group is to promote the effective deployment of the Quality Subject across the AESQ Supply Chain.

The Group is made up of Subject Matter Experts from the AESQ Member Companies.

The Group is accountable for the AS13100 related Requirements and associated Reference Manual content, ensuring that it is up to date and reflects current knowledge and best practice.

It shall promote the effective deployment of the Reference Manual using Communities of Practice (CoP). The CoP is open to any subject matter expert from the AESQ Member Companies and the wider AESQ supply chain.

Activities may include webinars, best practice sharing, development of shared training materials, conferences and published papers.
Human Factors Subject Matter of interest Groups: The Team

Groups:
- The Team
  - Yusufali Madarbukus: Safran Aircraft Engines
  - Brandon Richards: GE
  - Chris CRAIG: Rolls ROYCE
  - Ludovic CHEVET: AIRBUS
  - Beata TARCZON: MTU
  - Catherine CATARINA: SAFRAN
  - Loic SPECIA: Safran Aircraft Engines
  - Nick WATLING: P&W
  - Richard Bolingbrooke: PCC

Meets every Two or Three Weeks
What have we been doing?
Sharing experience within the group

- Communication Kits within our organizations.
- Awareness kit to empower leaders and teams
- Best practices company wide
- Best Practices and deployment at some suppliers

Objectiv : Share those best practices with you to help HF deployment at your plants
Why Human Factors in AS 13100

- Air traffic should doubles every 15 / 20 years
- Supply Chain risks are today one of the greatest concern for aviation stakeholders

The Market

Source: Airbus GMF 2018

- Air traffic growth
- Supply Chain risks

Human Errors are the origin of most supply chain issues (About 80%)

Source: Allianz Risk Barometer 2014
Note: Respondents could select more than one risk
FILM FLIGHT SAFETY
Minimizing human errors in the supply chain is **key** toward product safety, quality and delivery.
Human Factors Overview

- Human Factors are becoming a key theme in the Part 21 Aerospace Industry due to
  - Human Factors are a key element of the ICAO Annex 19 Safety Management System requirements (Due to be published in 2022)
  - Increase is non-conformance causal factors related to Human Factors
  - Airframers are now demanding it as a requirement for their suppliers
  - Human Factors has been required in Maintenance organizations for the past 20 years

<table>
<thead>
<tr>
<th>AS13100 Supplemental Paragraph Reference</th>
<th>All processes in the QMS must be documented, HF as part of this QMS needs to be documented</th>
</tr>
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<tbody>
<tr>
<td>4.4.3</td>
<td>Leadership: <em>Top Management shall reflect a commitment to Human Factors</em></td>
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<tr>
<td>5.1.1.1</td>
<td>Leadership: Establishing the Quality Policy / HF Policy</td>
</tr>
<tr>
<td>5.2.1.1</td>
<td><em>Human Factors Awareness. The organization shall provide an appropriate program of training and awareness of Human Factors based on role</em></td>
</tr>
</tbody>
</table>

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*AS13100 Supplemental Paragraph Reference*
Human Factors should be an integrated part of:

- product and service design,
- manufacturing / assembly,
- and product servicing.
AS13100 Standard Section 4 Context of the Organization

Human Factors Training

- The organization shall train its employees in the understanding of Human factors and how they relate to the work that they do.
- The training will include a review of the ‘Dirty Dozen’ behaviors and typical mitigation actions.
- The training program will be repeated at scheduled intervals to act as a refresher (see also 7.3.1)
- Certain roles may need specific detailed training in addition to this e.g. Human Factor Investigations

incident reporting process

- The organization shall put in place an open reporting system for all mistakes and near misses (it is important that even minor occurrences are investigated).
- Learn from accidents and incidents to take appropriate action to prevent recurrence.
- After investigation communicate the lessons learned and the preventive action plan.

* Aéroplanes Henry Potez
In your work, an error, something forgotten or bad workmanship can cause the death of one or more people

********

A person who makes an error must report it
An error is a repairable and pardonnable mistake

But hiding it is a crime
An atmosphere of trust in which people are encouraged, for providing essential safety-related information.

Investigating responsibility helps managers to be fair.
Abstract:

- Errors are not made deliberately
- Several contributory factors lead to an error (accident/anomaly)
- Most of these contributory factors can be corrected.
- Several studies show that for each ERROR there is an average 4 contributory factors...

They need to be identified
Organizational failures must be identified because of their influence on human performances.

Indeed, they produce situations conductive to error: inefficient communication, distance from the field, lack of experience.

Organizational factors are involved in a large-scale of accidents / Incidents!
It is major to nominate a human factor focal point (project manager) who is:

- Leading action plans
- Following Kpis
- Assessing maturity

These reviews need to be performed on regular basis and approved by the steering committee

Follow the milestones of continuous improvement
HUMAN FACTORS LEADERSHIP AND POLICY

Top Management shall reflect a commitment to Human Factors

HF Policy
The organization shall have a policy that promotes Human Factors

Commitment
FOCUS ON HF POLICY AND LEADERSHIP

Nicholas Watling
Sr. Mgr Engine Centre Quality
Pratt & Whitney Canada
HUMAN FACTORS LEADERSHIP AND POLICY

Top Management shall reflect a commitment to Human Factors

Human Factors Leadership

Promote
Share Vision
Lead Change
HELP
INSPIRE
EMPOWER
Lead by example

HUMAN FACTORS - Human Factors is the way the People, Programs and Processes, the Work Environment, Organization and Equipment all work together as a system. The individual is at the middle of that system. Any flaws in the system impact the performance of the individual and any flaws in the individual impact the system.

The nature, volume and lifespan of our product means that there is a significant human element in the design, manufacturing and service processes.
HUMAN FACTORS LEADERSHIP AND POLICY

HF Policy

The organization shall have a policy that promotes Human Factors

Embedding Human Factors in your company culture and processes is, therefore, a key element of product safety and quality.

A clear policy explaining what and how the company will embed a Human Factors framework within their operating system is a must. This can be within an existing company policy and it is recommended that this be either the company’s Quality or Safety policy.

Successful execution requires leadership commitment to this policy.
HUMAN FACTORS LEADERSHIP AND POLICY

HF Policy

The organization shall have a policy that promotes Human Factors

Commitment

For a policy statement to be effective it needs to be well thought out, relevant and clear.

It should address:

• Living a just culture by ensuring the company defines what behaviour is tolerated by the organisation and what is not.
• Providing awareness of Human Factors & engaging the workforce in open discussions
• Embedding open reporting to capture hazards, mistakes and risks
• Considering Human Factors within investigations to get to the root causes that led to a human error and ensure appropriate action.
• Continually improving through reducing the risk of Human Factors influencing outcomes.
Human Factors initiatives will be more effective if they are integrated within existing processes. Much of Human Factors are common sense, professionalism, quality management, and safety management.

Human Factors best practices should be seamlessly and invisibly integrated within existing processes, such as training, open reporting, problem investigations and risk reduction practices.

It should be clearly defined how Human Factors is considered and managed in all aspects of the organizations’ processes, cross functionally and throughout the product or service lifecycle.
Human Factors Leadership

**Top Management shall reflect a commitment to Human Factors**

- **Promote**
- **Share Vision**
- **Lead Change**
- **EMPOWER**
- **HELP**
- **LEADERSHIP**
- **INSPIRE**
- **Lead by example**

Considerations for leadership when embedding the policy in the company should include:

- Understanding and recognising the impact of company culture.
- Ensuring change and on-going communication.
- Providing both Human Factors awareness training sessions and training to support open reporting, problem investigations and risk reduction practises.
- Ensuring that the influence & risk of Human Factors is assessed regularly, in all aspects of the business, and that plans are put in place for continuous improvement.
- Promoting a culture that encourages open and honest reporting from everyone to ensure potential & known unsafe acts and risks are reported and appropriate actions taken.
HUMAN FACTORS LEADERSHIP AND POLICY

**Human Factors Leadership**

*Top Management shall reflect a commitment to Human Factors*

- **Promote**
- **Share Vision**
- **Lead Change**
- **HELP**
- **INSPIRE**
- **EMPOWER**
- **Lead by example**

Considerations for leadership when embedding the policy in the company should include:

- Setting up a defined network across the business of people to support the implementation and sustainment of the Human Factors policy.
- Identifying how the company’s risk management process considers Human Factors.
- Ensuring processes within the management system support the principles outlined in the policy and provide employees with the means of compliance.
Some examples
EXAMPLE OF HF POLICY

HUMAN FACTORS AND JUST CULTURE INCORPORATION INTO ROLLS-ROYCE GROUP SAFETY POLICY

Chris Craig
Senior Operations Quality Manager
Rolls-Royce
Our Safety Policy

• You can find our Code by googling “Rolls-Royce Code”
• This then links to our values, including “Operate Safely”
• And our Group Policies, including the Product Safety policy.

Product safety

Our product safety goal is to eliminate, as far as possible, the risk of product failure. This includes anything that could affect the safe operation of the Rolls-Royce product, the platform on which the product is installed, the people using or maintaining the product, or any long term negative impact to the environment in which it operates.

Principles

• Everyone who works in Rolls-Royce shares responsibility for product safety.
• We are aware of the safety impact of our actions and accept that we all have a duty to protect and improve product safety.
• We prioritise safety-related tasks so they get the right attention, time and resource.

We will

• Be curious and take action to anticipate and identify potential product safety risks,
• Not act in any way that could have a negative impact on the safety of our products; and
• Assume positive intent and stay open-minded if others express product safety concerns, even if they are about our own behaviours.

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Not Subject to Export Control
Our Safety Policy

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- And our Group Policies, including the Product Safety policy.

I believe that the way a new product is being built might, under certain rare circumstances, lead to safety issues. It’s a remote chance and the product is important to us and our customer so I don’t need to say anything, do I?

Yes! The safety of our products is vital to the lives and livelihoods of thousands of people, and our reputation and success depend on it. Always speak up about your concerns. All product safety concerns must be raised using Group Procedure Product Safety 3.1 to ensure the accountable person is made aware and can take appropriate action. Start by speaking to your manager. If you feel unable to speak to your manager, ask the next level of management or your local Head of Product Safety Assurance for advice. Or you can speak to your Local Ethics Adviser or raise the concern on the Rolls-Royce Ethics Line. Whichever route you take, it is important to speak up.

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Evaluating and controlling Human and Organisational factors sits within the policy

Highlights the importance by incorporating within the Product Safety policy

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Everyone is expected to report concerns

The expectation for the organisation to live a Just Culture to support speaking up and reporting safety concerns, including Human and Organisational factors

Everyone is responsible for minimising risk behaviours
Leadership

- The incorporation of Human factors and Just Culture is reinforced through the Product Safety Annual Refresh training.
- This training is mandatory for all employees to complete.
- The training is computer based and consists of leadership videos highlighting the important messages.

“So we always need to make sure we are thinking about human factors in our products. We’ve got to understand that people do have up times and down times. If a designer is working particularly long hours for instance, will they make a mistake? We need to worry about those things as leaders of the organisation and make sure we are taking those human factors in to account” - Chris Young, Group Chief Engineer

“So many of you may have heard the term just culture and just culture is an important part of our safety journey at Rolls-Royce. What just culture means is an acknowledgement that mistakes are generally the product of faulty organisational cultures or other system failings as opposed to being attributed to the one or two people may be directly involved in the incident itself. It’s the antithesis if you like of a blame culture, in which we try and attribute any mistakes to one individual and then believe that, that particular risk is mitigated by punishing that one person and part of a just culture is getting people to be bold enough and confident enough to speak up when they see something going wrong or about to go wrong, secure in the knowledge that their concerns will be taken seriously by their peers and by their line managers and we all actually have a duty to speak up when we see safety risk.” – Harry Holt, Chief People Officer

“Speaking up is vital. A just culture is about there being no fear within the organisation for raising issues with high consequence and we have to get to a position where everybody feels comfortable, they feel confident that they can raise any issue regardless of the consequence to cost, reputation or programme that has a safety impact and a just culture maintains that environment where that is possible” – Matt Blake, Chief Engineer - Small Modular Reactors
EXAMPLE OF LEADERSHIP EMPOWERMENT

BEATA TARCZON
QUALITY SYSTEM ENGINEER
MTU AERO ENGINES POLSKA.
Human Factor at MTU AE Polska
HF leadership - workshops
Human Factor leadership

AS13100
5.1.1.1 General - Supplemental Requirements
Top Management shall demonstrate a commitment to Human Factors in accordance with 4.4.3 and 7.3.1, see RM13010.

RM13010
6.3 Employee engagement & monitoring

A core part of leadership commitment to Human Factors is to ensure the “leadership shadow” is visible and the intent of the Human Factors policy is delivered through both the actions and behaviours of people within the company.

Employees need to have confidence in the just culture and the supporting processes (e.g. reporting system) so they know that confidentiality will be maintained and that information they submit will be acted upon, otherwise they could decide there is no benefit in their reporting

What we want do to achieve it?

Understanding each other!
Assumptions of HF campaign in MTU Polska:

Just Culture is the base!

We are the one team!

Understanding of Human Factors by leader is crucial for success!

Do not improve others, work on your team!

Supported by professional HF trainer
Human Factor campaign – workshops by leaders

HF workshops performed by leaders with own teams

Introduction – some HF theory

Let's talk about our TEAM!

Just Culture!

Supported by professional HF trainer

Which factors are mostly present in our job?

Current status within team

Where we are?
Human Factor campaign – workshops by leaders

HF actions defined by team with leaders focusing of own area

Current status within team

Can it be better?

What can help to reduce impact of Human Factor in my team?

Supported by professional HF trainer

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<th>PART II</th>
<th>PART III</th>
<th>PART IV</th>
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<td>Q1</td>
<td>Q2</td>
<td>Q3</td>
<td>Q4</td>
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<td>Lack of Teamwork</td>
<td>Stress</td>
<td>Compacency</td>
<td>Lack of Knowledge</td>
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<tr>
<td>Lack of Communication</td>
<td>Fatigue</td>
<td>Norms</td>
<td>Lack of Awareness</td>
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<tr>
<td>Lack of Assertiveness</td>
<td>Pressure</td>
<td>Lack of Resources</td>
<td>Distraction</td>
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</tbody>
</table>
Human Factor campaign – workshops

Supporting actions
– to keep people more involved in campaign

Magnetic board with Dirty Dozen big size puzzles

Flyer + Crossword

Team competition (with award lottery for the team)

For every employee specially designed by MTU
Desk planner
Desk calendar – 1 Dirty Dozen/month
COMMUNICATION WITHIN THE COMPANY: PRACTICAL APPLICATION OF HUMAN FACTORS

Richard Bolingbroke
Quality Assurance VP – TIMET
Practical application of Human Factors

- Recognizing link to organizational culture, impact of people and likelihood of events occurring.
- Appreciating the synergy with Health and Safety.
- Distinguishing between an unintentional event and a violation.
Practical application of Human Factors

- Realizing people operate in different performance modes – people do what they do, at the time they do it, for reasons that make sense at that time.

- Employing preventative tools, as well as reactive ones, that help all employees consider the impact of HF and shape the culture.
Practical application of Human Factors

AWARENESS
- Introduction to HF
- Error Models
- Hazard Recognition
- Organization Culture
- Organizational Factors
- Individual Performance
- Environment
- Working Practices
- Communication
- Open Reporting

REACTIVE MEASURES
- 8D Problem Solving
- PFMEA
- Auditing

PROACTIVE MEASURES
- Stop for Quality
- STOP & Seek
- Pre-job Checks
- High Risk Task of the Day
- 3 Way Communication
COMMUNICATION AND MANAGEMENT OF INTERVIEWS / 8D

Yusufali MADARBUKUS  
HF referent  
Safran aircraft engines

Catherine Catarina-Graca  
Supplier Management System Coordinator

AESQ – Aerospace Engine Supplier Quality Strategy Group  
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CONTENTS

1. INTRODUCTION

2. DETAILS OF THE MILESTONES
INTRODUCTION

For each milestone, we have identified the subprocesses in which HOF elements (questions, tools, media) should be taken into account:

Finally, for the subprocesses concerned, we have specified the required actions from an HOF viewpoint.

The purpose of this document is to:
- take the human and organizational aspects into account in the 8D causal analyses
- give you the elements to be taken into account for each step of an 8D

This document is dedicated to the HOF section; it intentionally does not cover the detailed content of the 8D causal analysis method.

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<thead>
<tr>
<th></th>
<th>Standard</th>
<th>HF action(s)</th>
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</thead>
<tbody>
<tr>
<td>D0 - 2</td>
<td>Make a preliminary analysis</td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td>Describe the anomaly, collect the available information, define the objective to be reached to return to a normal situation</td>
<td>Check the need to initiate the HF section</td>
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</table>
DETAILS OF THE MILESTONES
## STANDARD

<table>
<thead>
<tr>
<th>Step (D)</th>
<th>Description</th>
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<tr>
<td>D0</td>
<td>Make a preliminary analysis of the problem</td>
</tr>
<tr>
<td>D1</td>
<td>Form the team</td>
</tr>
<tr>
<td>D2</td>
<td>Define the problem to be processed</td>
</tr>
<tr>
<td>D3</td>
<td>Contain the risks</td>
</tr>
<tr>
<td>D4</td>
<td>Find the root cause(s)</td>
</tr>
<tr>
<td>D5</td>
<td>Define and select the corrective actions</td>
</tr>
<tr>
<td>D6</td>
<td>Implement the chosen actions and check their effectiveness</td>
</tr>
<tr>
<td>D7</td>
<td>Capitalize, perpetuate, generalize</td>
</tr>
<tr>
<td>D8</td>
<td>Conclude the group and congratulate the team</td>
</tr>
</tbody>
</table>

### HF contributions

1. **D0:** 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.
2. **D1:** Work directly in the 8D by bringing the specific features of HOF into the context of the 8D team formed. Ensure that the FH skills are present.
3. **D2:** Challenge the characterization of the event and of the error from a human and organizational viewpoint. Ensure that the description of the event does not contain value judgments, interpretations or opinions.
4. **D3:** Ensure that the root causes linked with the persons and the organization have been studied. Characterize the facts from a human and organizational viewpoint.
5. **D4:** Challenge the chosen solutions. Propose solutions already applied in other similar activities.
6. **D5:** Take part in the on-site observation in order to check the effectiveness of the corrective actions and collect the feedback (REX).
7. **D6:** Ensure that the feedback is shared within the HOF network. Update the catalog of HOF solutions / best practices.

...
DO: PRELIMINARY ANALYSIS

• Objectives: report a problem

• Recommendations: remain vigilant about the need to apply an 8D

• Process:

1. Enter the information in our quality systems
2. Make a preliminary analysis
3. Inform the decision-makers
4. Initiate immediate actions if necessary
5. Initiate FAST-8D based on the defined criteria

8D method initiated
### DO: PRELIMINARY ANALYSIS

<table>
<thead>
<tr>
<th></th>
<th>Standard</th>
<th>HOF action(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>D0 - 1</strong> Enter the information in our quality systems</td>
<td>Formulate all major events that have been reported <em>(Anomaly Report – Customer complaint – etc.)</em></td>
<td>Check if similar events have already happened</td>
</tr>
</tbody>
</table>
| **D0 - 2** Make a preliminary analysis | Describe the anomaly, collect the available information, define the objective to be reached to return to a normal situation  
Confirm whether or not the problem is significant  
Identify the sectors concerned | 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.  
• Check the need to initiate the HF section  
• Determine if the activity concerned is a mechanical or human activity  
• Determine if the nonquality event has already happened  
• Determine the risk of the event being repeated |
| **D0 - 3** Inform the decision-makers | Identify and inform the appropriate decision-maker(s) of the preliminary analysis that was performed | Inform the HF Advisor and the Focal Point of the sector concerned |
D1: FORM THE TEAM

• Objectives:
  • appoint a coordinator,
  • Form the team and the Decision Committee

• Process:

1. Designate a coordinator, the Decision Committee, determine its objectives
   - Decision-maker Requester

2. Determine the profiles and skills required to deal with the problem
   - Requester and Coordinator

3. Select the members and define the operating method for team
   - Requester and Coordinator

4. Put in place management and reporting tools
   - Coordinator

5. Launch the group (during the kick-off meeting, present the technical problem, stakes, objectives, and the management and reporting tools to the group)
   - Requester and Coordinator

Team and Steering Committee empowered
# D1: FORM THE TEAM

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<thead>
<tr>
<th></th>
<th>Standard</th>
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</thead>
<tbody>
<tr>
<td><strong>D1 - 1</strong></td>
<td>Appoint the coordinator from among the staff trained to use the 8D method, and according to the knowledge required to deal with it</td>
<td>Include the HF Advisor or the Focal Point in the team</td>
</tr>
<tr>
<td></td>
<td>Determine the composition of the Steering Committee</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Decision-maker Requester</strong></td>
<td></td>
</tr>
<tr>
<td><strong>D1 - 2</strong></td>
<td>Define each person’s roles and missions</td>
<td>Work directly in the 8D by giving the features specific to HF in the context of the 8D team formed</td>
</tr>
<tr>
<td></td>
<td><strong>Requester and Coordinator</strong></td>
<td></td>
</tr>
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</table>

**D1**: FORM THE TEAM
D2: DEFINE THE PROBLEM

• Objectives:
  • Describe the perceived problem(s)
  • Propose to deal with the problem identified as major

• Process:
## D2: DEFINE THE PROBLEM

<table>
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<tr>
<th></th>
<th>Standard</th>
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</tr>
</thead>
</table>
| **D2 - 1** Collect and check the available data | Encourage the search for and collection of the available data:  
  - at the incident location: this data is essential for making an accurate mapping of the situation in which the anomaly was found  
  - from the assessment: this data is acquired via the various assessment means available and that may be used depending on the nature of the anomaly  
  - on the equipment concerned: faulty equipment and equipment in production, delivered, and installed on engines in service (condition of all the equipment) | Carry out interviews and collect items of proof as soon as possible to prevent loss of perishable data caused by a failing memory or rationalization  
Collect the facts directly from the people concerned  
Group together the available data for later analysis |
| **Group** | | |

<table>
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<tr>
<th></th>
<th>Standard</th>
<th>HOF action(s)</th>
</tr>
</thead>
</table>
| **D2 - 2** Characterize the problem and define the anomalies | Establish the sequence of events  
Formalize the WWWWHW  
Use the available tools | Challenge the characterization of the event and of the error from a human and organizational viewpoint.  
Ensure that the description of the event does not contain value judgments, interpretations or opinions  
Ensure that the description of the facts is substantiated by the persons concerned |
D2: Interview guidance

**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.

1. **Interview preparation**
   - Find out about the sector where the event took place (history of events and history of the person to interview).
   - 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 note-keeping and informed hearing).
   - Explore the possibility of interviewing a space ensuring the confidentiality of discussions and inviting 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.

2. **Outline the context and structure of the interview**
   - Introduce yourself and present the HOF approach.
   - State the reasons for your 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.
   - Remind the interviewees that the purpose of our intervention is not to impose any sanctions at a later stage (on the contrary).

3. **Presentation and description of the event**
   - Ask the interviewees to introduce themselves (background, their role, length of service in the position, etc.).
   - Use the list of factors contributing to the event as the core theme for the interview.
   - Let the person express themselves without any filter regarding the event (can you tell me what happened?).
   - Ask the interviewees to be factual, reform or refrain from discussions on the event if necessary.
   - Do not interrupt or pass judgment on what is reported.

4. **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 of a similar event.
   - Ask for their opinion regarding actions already established at the time of the event (relevance, effectiveness, actions to be added).
   - Give the interviewees 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.

5. **Contractualization of information and visibility**
   - Summarize all discussions to avoid any possible errors of understanding, interpretation or retransmission.
   - Confirm with the interviewees 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.

6. **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 discussion of any weak signal or near-event via 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 (area for improvement).
D3: CONTAIN THE RISKS

• Objectives:
  • Propose provisional actions to contain the effects
  • Decide on the choice of actions and their application

• Process:
D4: FIND THE ROOT CAUSES

Objectives:
• determine the possible causes, probable causes, root cause(s)
• prove its(there) effect

Process:
### D4: FIND THE ROOT CAUSES

<table>
<thead>
<tr>
<th></th>
<th>Standard</th>
<th>HOF action(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>D4 - 1</strong>&lt;br&gt;Check and update the description of the problem</td>
<td>Construct a summary of the significant elements/information about the problem to be processed&lt;br&gt;&lt;br&gt;Don't hesitate to travel to locations in the field to gather information, to “touch” the parts and talk to the operational personnel.</td>
<td>Establish the sequence of events&lt;br&gt;Define the deviations between the stipulated work and the work actually carried out (analysis of the work situation)&lt;br&gt;&lt;br&gt;Identify the shortfalls / drifts in the data and organization in place</td>
</tr>
<tr>
<td><strong>D4 - 2</strong>&lt;br&gt;Find the probable causes (appearance &amp; nondetection)</td>
<td>Find the possible root causes, and the causes of nondetection</td>
<td>Construct the fault tree from a human and organizational viewpoint.&lt;br&gt;&lt;br&gt;For each element, ask the same three questions each time:&lt;br&gt;1. what caused this event to happen?&lt;br&gt;2. was this necessary?&lt;br&gt;3. was this sufficient?</td>
</tr>
</tbody>
</table>
## D4: FIND THE ROOT CAUSES

<table>
<thead>
<tr>
<th>D4 - 3</th>
<th>Find the root causes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standard</strong></td>
<td><strong>HOF action(s)</strong></td>
</tr>
<tr>
<td>Find the root causes</td>
<td>Ensure that the root causes linked with the persons and the organization have been studied*</td>
</tr>
<tr>
<td>Identify the intentions or objectives of the person(s) concerned at the time the actions were carried out</td>
<td></td>
</tr>
<tr>
<td>Characterize the origins of the inappropriate actions or the factors which enabled them to appear (use the contributing factor list)</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>D4 - 5</th>
<th>Prove the probable causes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standard</strong></td>
<td><strong>HOF action(s)</strong></td>
</tr>
<tr>
<td>Reproduce the circumstances specific to the probable causes</td>
<td></td>
</tr>
<tr>
<td>Check the result obtained (presence or not of the anomaly)</td>
<td></td>
</tr>
<tr>
<td>Carry out the observation at the workstation</td>
<td></td>
</tr>
<tr>
<td>Take part in the observation at the workstation</td>
<td></td>
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</tbody>
</table>

* Don’t forget the analysis of the decisions taken
D5: DEFINE AND SELECT THE CORRECTIVE ACTIONS

Objectives:

• propose corrective actions
• decide on the choice of actions to be implemented

Process:

1a Identify the preventive and corrective actions for the causes of appearance found

1b Identify the improvement actions for the control system relating to the identified causes of nondetection

2 Establish the substantiation plan for these actions

3 Perform a risk analysis relating to the application of the corrective and improvement actions for the control

4 Prepare an assessment of the actions chosen by the team (corrective, preventive and improvement for controls)

5 Decide on the choice and the application of the adopted corrective and preventive actions, as well as the improvement actions for the controls

6 Identify the persons responsible for the actions and the lead times for their application

Corrective, preventive, and improvement actions that have been identified for the control system, together with the persons responsible for them

Coordinator + Steering Committee

Group

Group

Group

Group

Coordinator + Steering Committee

Coordinator + Steering Committee
## D5: DEFINE AND SELECT THE CORRECTIVE ACTIONS

<table>
<thead>
<tr>
<th>Group</th>
<th>Standard</th>
<th>HOF action(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>D5 - 1a</td>
<td>Identify the preventive and corrective actions for the causes of appearance found</td>
<td></td>
</tr>
</tbody>
</table>
| D5 - 1b | Identify the improvement actions for the control system relating to the identified causes of nondetection | Make the anomaly visible  
Prohibit the anomaly  
Propose solutions already applied in other sectors |

The corrective and preventive actions are to be sought based on the results of phase D4, from the studies and from the tests.

If the proven cause is a combination of several basic causes, then corrective and preventive actions shall be sought for each of the chosen causes.

Identify the improvement actions for the control systems.
D6: IMPLEMENT THE CORRECTIVE ACTIONS AND CHECK THEIR EFFECTIVENESS

Objectives:

• implement the chosen actions, ensure that they are applied
• check their effectiveness with respect to the initial problem

Process:

1. Schedule the implementation of chosen actions
   - Person in responsible for the action

2. Implement the actions (and the substantiation plan)
   - Person in responsible for the action

3. Periodically check the progress of the actions
   - Coordinator
   - Check that the actions are completed and their effectiveness

4. Communicate with the customer
   - Project Dept. or Program Dept.

5. Apply these actions at the Customer’s
   - Project Dept. or Program Dept.

6. Eliminate the provisional action
   - Coordinator + Customer interface

7. Check the effectiveness of the actions
   - Sector + Quality

Corrective and preventive actions identified, together with the persons responsible for them
Corrective and preventive actions applied
**D6: IMPLEMENT THE CORRECTIVE ACTIONS AND CHECK THEIR EFFECTIVENESS**

<table>
<thead>
<tr>
<th>Standard</th>
<th>HOF action(s)</th>
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</thead>
<tbody>
<tr>
<td>Check the effectiveness of the actions</td>
<td>Observe the application and effectiveness of the corrective actions on site (observations, exchanges with the main persons concerned, photos, etc.)</td>
</tr>
<tr>
<td>Ensure that they do not generate new risks</td>
<td>Ensure that the actions implemented are robust with respect to the HF to correct the problem (no reoccurrence)</td>
</tr>
<tr>
<td></td>
<td>Ensure that the actions implemented do not risk generating new factors contributing to the error</td>
</tr>
</tbody>
</table>
D7: CAPITALIZE, PERPETUATE, GENERALIZE

Objectives:
• Ensure the feedback by updating existing databases and analyzing others

Process:
## D7: CAPITALIZE, PERPETUATE, GENERALIZE

<table>
<thead>
<tr>
<th>Standard</th>
<th>HOF action(s)</th>
</tr>
</thead>
</table>
| **D7 - 2**  
Capitalize on acquired experience  
(update the experience databases)  
Update the appropriate knowledge bases to prevent the reported quality event from reoccurring | Update the catalog of HF solutions and best practices. |
| **D7 - 3**  
Spread best practices to other equipment  
Present the main results of the investigation to all the sectors concerned | Present the feedback to the HF network  
Ensure that the feedback is presented to the operational teams which have identical and/or similar activities (attendance sheet mandatory)  
Send the feedback to the sector’s Focal Point and HF Manager |
D8: CLOSE THE PROCESS AND THANK THE TEAM

Objectives:

- Sort the documents and draft the summary file
- Assess what worked well and what did not work so well
- Thank the team for the results obtained

Process:

1. Sort and archive the important documents
2. Draw up a summary of the group's work and send it to the decision-makers and sectors concerned
3. Assess the group's work (functioning, objectives met, results, etc.)
4. Present the assessment to the Decision Committee
5. Thank the team for the results obtained

Preventive actions for similar problems capitalized on

IMPACT-8D process completed and team disbanded
COMMUNICATION WITHIN THE COMPANY: PRACTICAL APPLICATION OF HUMAN FACTORS

Brandon D. Richards
Senior Engineer – Human Factors Engineering
GE Aviation
Bring Them Home Safely

- Stay focused
- Every person, process, and part counts
- Raise safety concerns
- Hold a safety moment

It’s OUR Job... if you see something, say something!

Safety Management System

- Policy
- Promotion
- Risk Management
- Assurance
DEPLOYMENT AT SUPPLIERS
SAFRAN AIRCRAFT ENGINES

HUMAN FACTORS

CATHERINE CATARINA-GRACA
SUPPLIER MANAGEMENT SYSTEM COORDINATOR
SAFRAN AIRCRAFT ENGINES
Methodology and Tools

Methodology
• HF Initiatives at suppliers is a main action plan for SAFRAN Aircraft Engines
• Deployment kits are available for trained SQE to deploy
• A Presentation in different languages is ready: Workshops DONE WITH top MANAGEMENT AND MANAGERS at suppliers

Tools
• PowerPoint presentation in different languages films, quizzes and games
• HF guidance (leaflets – in different languages)
• Puzzle (team game)
• Goodies
• Flashdrive with all documents.
Methodology and Tools

1. After that first day (presentation/ animation with Top Managers / Managers;
2. A Workshop to propose first action plan is organized;
3. Action plan is followed on regular basis
4. Workshops to analyse some quality events can be organized at suppliers plant
5. Maturity in the deployment can be evaluate:

   1. HF audit (in test)
   2. FOD audit
DEPLOYMENT AT SUPPLIERS
AIRBUS

EXAMPLE : SAFRAN NACELLES

Ludovic Chevet
Lead Supply Chain and Quality Manager
Propulsion Systems - POPL
Airbus SAS
WHAT kind of Human Factor project to launch?

To train everyone

Human Factor project

- Manque de communication
- Excès de confiance
- Excès de distraction
- Manque de travail en équipe
- Excès de fatigue
- Excès de pression
- Manque d'affirmation soi
- Excès de Stress
- Manque d'attention
- Excès de normes

To consulte workshop through « Stop & Think »

Define and deploy 10 concrete initiatives
SNA Colomiers – Concrete initiatives examples

For instance:
- **Anti-Interruption white jacket to wear**
- “*Thank you for not interrupting me, sensitive operations in progress*”
- To be weared when specific operations requires specific focus
- Avoid the necessary refocusing phase after interruption and therefore the potential errors associated with resuming activity
- Already deployed at SNA – Colomiers

**Act on:**

- Excès de pression
- Excès de distraction
- Manque d’attention
- Excès de Stress
SNA Colomiers – Concrete initiatives examples

For instance:

- **Electrical powered Trolley instead of thermical powered**
- Avoid some external factors related to LEAP engine manutention with thermical powered trolley, as:
  - high noise / emanations / lack of communication due to disturbance, etc. and therefore potential errors

- **Act on**:
  
  - Manque de communication
  - Excès de distraction
  - Manque d’attention
  - Excès de Stress
SNA Colomiers – Concrete initiatives examples

For instance:
- **Clip with Flag**
  - To be settled on hardware to physically identify the localisation of interruption, whatever the reason
  - High visibility to avoid any FOD risk
  - Flag can be written on to give information on the reason of interruption, or outstanding work to complete
  - Help mechanics to recover activity after interruption

- **Act on:**
  - Manque de communication
  - Manque de travail en équipe
  - Manque d’attention
  - Excès de confiance
For instance:

- **« Stop & Think »**
  - Dedicated monthly production shutdown in all sectors to lead discussion around the chosen theme of one of the Dirty Dozen.
  - Prior to these sessions, a specific communication (Flash Project) is built and shared with all to introduce the chosen theme.
  - To share the situation around the chosen Dirty Dozen, and propose concrete solutions (quick wins or long term).

  **Concrete initiative by itself, as a way of training people and communicate around what the HF are.**

- **Act on:**

  - Manque de communication
  - Excès de confiance
  - Manque de connaissance
  - Excès de distraction
  - Manque de travail en équipe
  - Excès de fatigue
  - Manque de ressources
  - Excès de pression
  - Manque d'affirmation de soi
  - Excès de Stress
  - Manque d'attention
  - Excès de normes
Q & A SESSION

USE THE “CHAT” FUNCTION TO ASK A QUESTION...
What are you expecting from us?
Wrap Up

These Resources will be provided to all participants in a follow-up email.
THANK YOU FOR PARTICIPATING