

Moving Europe towards a sustainable and safe railway system without frontiers.

Guidance

Human and Organisational Factors integration in change management

Contents

Introduction.....	3
Definitions	4
Abbreviations	5
1. Part 1 - Methodology	6
1.1. Step 1: Initial HOF Assessment	7
1.1.1. Gather Documentation	7
1.1.2. Gather an interdisciplinary team for “HOF assessment”	7
1.1.3. Carry out your Document Review and Gather Information for an Initial HOF Assessment	8
1.1.4. Make a List of HOF topics	8
1.1.5. Validate the List of HOF Topics with Representatives of Stakeholders.....	8
1.1.6. Output of this step 1	8
1.2. Step 2: Identify HOF Goals	9
1.2.1. Analyse the list of HOF Topics.....	9
1.2.2. Review and Prioritise HOF Topics	10
1.2.3. Define and prioritise HOF Goals	10
1.2.4. Output of step 2.....	10
1.3. Step 3: Define HOF Assurance Activities to Support the Change	11
1.3.1. Identify the Specific HOF Assurance Activities	11
1.3.2. Identify the HOF Assurance Activities Monitoring	11
1.3.3. Output of step 3.....	12
1.4. Step 4: Define HOF Assurance Implementation	13
1.4.1. Implement the activities.....	13
1.4.2. Monitoring implementation and efficiency of the actions.....	13
1.4.3. Issue design recommendations including training and/or procedures.....	13
1.4.4. Output of step 4.....	13
1.5. Step 5: Verification and Improvement	14
1.5.1. Implement the recommendations.....	14
1.5.2. Monitoring the implementation.....	14
1.5.3. Output of step 5.....	14
1.6. HOF Assurance Process.....	15
2. Part 2 – Guidance on HOF Change Management Tool	16
Appendix 1: useful links to learn more	20

Introduction

To maintain and, when practicable, continuously improve a high level of safety in the Union rail system, Railway organisations also have to demonstrate a consistent approach to integrating and managing Human and Organisational Factors (HOF) within the Safety Management System (SMS). HOF shall be integrated in all change management processes, according to the 4th Railway package, and as such is an important part of the strategy needed following the CSM on SMS and Single Safety Certifications. HOF is a multidisciplinary field focusing on how to increase safety, enhance performance, and increase user satisfaction. In the case of Change Management, HOF integration is also recognised as a practice which reduces the cost due to a series of corrections necessary once the change is implemented.

According to the International Ergonomics Association, “ergonomics (or human factors) is the scientific discipline concerned with the understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles, data, and other methods to design in order to optimize human well-being and overall system performance”. HOF integrates knowledge from social sciences and engineering such as Management Science, Psychology, Sociology, Design Science, Political Science and Physiology to enlarge the scope of analysis and decision making while considering organisational, institutional, cultural or political contributors to safety as an organised socio-technical system. The term ‘organisational’ (in **HOF**) has been introduced to highlight the organisational level of analysis and not only the individual level although obviously organisations are composed of individuals.

Besides supporting the integration of safety at the design stage, the HOF approach provides concepts and methods to identify the gaps between the task (work as prescribed or expected), and the activity (work as actually performed or experienced and reported by workers). These gaps, whether concerning the task and/or the activity are problematic as they are a source of residual problems and need to be taken into account. This allows for a better management of workplace reality in complex organisations such as railway socio-technical systems, which is critical to lead to safety improvements.

Integrating HOF from the start of a change will help to achieve business, safety and operational goals more efficiently with better acceptance of the change by end-users. The aim of this guidance is to propose a systemic and systematic HOF approach throughout the change management process. When HOF are integrated too late in a change, modifications to the design can be a lot more costly, difficult to manage, and sometimes even abandoned.

Most systems rely on human and organisational performance. This guidance should be used to integrate human performance (strengths and weaknesses) and develop human input more consistently, develop better acceptance from end-users and stakeholders as well as be consistent with the current regulatory framework such as CSM on SMS, CSM on REA, CSM on monitoring, CSM ASLP...

This guidance can be used by the railway sector, including RUs and IMs, NSAs and manufacturers and concerning the internal audience, by the project manager in charge of the change, safety representatives, HOF specialist with tailored tasks according to the HOF topics and every stakeholder representative concerned by a change (including workers, contractors, partners and suppliers).

This guidance is not mandatory. In case the railway organisation is already applying a HOF integration methodology which ensures a consistent and systematic process for the support of human performance in change management, this can equally be used. Developed with the support of a taskforce including representatives of actors from the railway sector, this guidance is composed of two parts. A first part explains a methodology to integrate HOF more consistently and systematically in the change management process. The second part proposes a HOF assessment tool that can be used to identify and assess the impacts of the change on HOF. To ensure the correct implementation of this methodology, a specific training needs to be followed.

Definitions

Change management: in this guidance change management covers any technical, organisational or operational change made to a system, including the creation of a new system. The first step will enable the identification of the HOF topics and the need for further applying the whole methodology.

HOF: any elements involving interaction with humans that can positively or negatively affect the expected performance of a system.

HOF topic: any HOF that could have an unexpected negative and/or positive impact on the system (or part of it).

HOF goals: objectives defined in order to manage HOF topics.

HOF assurance activities: activities that help the project manager and the team to develop the HOF assurance plan. The activities will depend on the requirements of the project and can be supported by HOF expertise, as required.

HOF assurance plan: document created by the project team which aims at ensuring the finished product meets all HOF assurance activities (including deadlines and persons in charge, where relevant).

HOF assurance report: report collecting evidence of implementation of the HOF assurance plan collected in the different steps of the methodology's implementation.

Intensity: here means the strength of the impact as evaluated by the team.

Interaction: HOF refers to the interactions among system components and humans, considering their behaviors, at all levels such as individual, situational, group, organisational or cultural.

Project manager in charge of the change: person responsible for carrying out the concerned change.

Facilitator: person in charge of guiding the methodology process.

Person responsible for monitoring activities: person in charge of managing the monitoring activities referred in steps 4 and 5.

HOF specialist: person in charge of managing HOF topics with the necessary level of competence.

Safety-related tasks: tasks that can affect safety identified by the company.

Abbreviations

Table 1: Table of Abbreviations

<i>Abbreviation</i>	<i>Meaning</i>
CSM	Common Safety Method
CSM ASLP	Common Safety Method for assessing the safety level and the safety performance of railway operators at national and Union level
CSM REA	Common Safety Method for risk evaluation and assessment (Regulation EU 402/2013)
HOF	Human and Organisational Factors
IM	Infrastructure Manager
MS	Member State
NSA	National Safety Authority
RU	Railway Undertaking
SC	Safety Culture
SMS	Safety Management System
TNA	Training Needs Assessment

1. Part 1 - Methodology

The methodology presented below draws inspiration from the HF case from Eurocontrol, already well implemented in the aviation sector. This methodology has been customised to better meet the needs of the railway sector and be consistent with the railway regulatory framework when a need for change is identified. This methodology should be applied from the start of a change i.e. when the need for change is identified. End-users should be involved from the very beginning, with the aim of identifying the specific HOF topics that will be included in the risk management process (and independent assessment, when needed, following requirements of Regulation EU 402/2013). To increase efficiency, this methodology can be carried out in parallel or using the same resources (e.g. existing documentation, meetings/workshops...).

The methodology should be guided or used by a HOF specialist¹, and if not available by someone with HOF expertise. People using this methodology should be specifically trained to use it. Several roles mentioned can be fulfilled by the same individual, especially for smaller companies and/or smaller changes.

In conformity with chapter 1.6, this methodology should ensure that HOF is integrated in change management in a balanced manner to avoid pressure or influence, as far as possible. The first question in determining whether to apply this methodology is: could this change have any impact (direct/indirect) on staff carrying out safety-related tasks?

A change management tool is proposed to help put into practice the methodology, which will be completed in an iterative manner. This methodology can be used for any change: from a small change to a more complex change involving many subsystem changes (ie organisational change, IT change...). A thorough description of the desired change is needed, as it may be necessary to break it down and study the interactions in several separate parts, that may not have been identified at first, this includes different systems, subsystems, teams, activities...

This methodology is composed of five steps, as can be shown in figure 1.

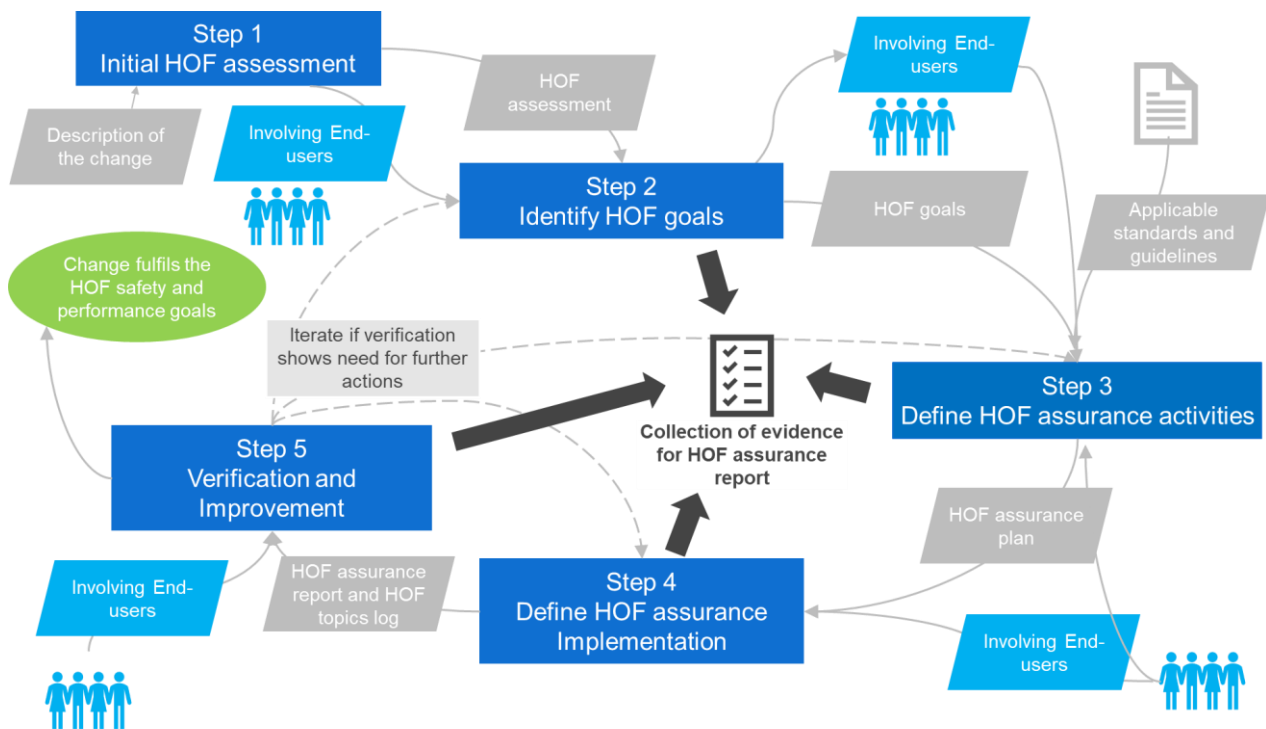


Figure 1: visual representation of the methodology

¹ When specific expertise is needed, e.g. on: the mutual influences between parts of the system and human, the differences between tasks and activities, the better known countermeasures to HOF negative impacts.

1.1. Step 1: Initial HOF Assessment



As already underlined, there are many aspects to look at when considering HOF, which can be complex and difficult to identify. To capture this in a structured way, the methodology proposes the use of a dedicated HOF change management tool, compliant with the current regulatory framework, throughout the different steps of the methodology.

The aim of this step is to identify HOF topics as it is important to have a good understanding of the system, organisation, and the tasks and how the change will have an impact on these. A facilitator to help the team work together through the different stages to achieve their objectives should be nominated.

This first step begins with gathering information on the change in order to identify what will change, which actors will be impacted and how they will be impacted. Even a small organisational or technical change can have impacts on HOF, the aim is to have as detailed a definition of the system as possible and to identify all interactions between the human and the technical system to detect HOF influences.

1.1.1. Gather Documentation

The aim is to make a list of all the relevant documentation for the change, all the current documentation concerning the system as it is today (including hazard log, issues registers, if available), and the documentation on the change, which will enable all the impacts of the change on end-users to be considered. To extensively describe the change will facilitate an eventual breakdown of it, each part to be further considered as a start to discuss the interactions.

1.1.2. Gather an interdisciplinary team for “HOF assessment”

The documentation will help to identify all stakeholders affected by the change, and more specifically end-users (e.g: train drivers, train preparers, traffic controllers, planners, maintainers...), that can be impacted by the change and integrate them in the team for “HOF assessment”, to get a better view of their activities and their needs. Stakeholders can be staff from other units of the company or from other companies (e.g. IMs, RUs, contractors, partners and suppliers).

Depending on the results of the HOF assessment using the HOF change management tool and/or to answer some particular questions, some specific HOF expertise may be required.

Depending on the significance of the change, the team should be reinforced by HOF specialists, systems designers, manufacturers, training specialists, HR representatives, end-users and stakeholders representatives, when needed.

Table 1: List of members of HOF assessment team

Role/Job	Name of representative(s) nominated in the team	Contact details

Once the team has been composed, a first meeting can be organised by the facilitator to present the methodology and the HOF change management tool as well as the contributions expected from every team member.

1.1.3. Carry out your Document Review and Gather Information for an Initial HOF Assessment

The aim is for the facilitator to analyse and prepare all relevant information on the change from the documentation available: definition of the system before the change, system definition of the change environment in order to better understand what will change and how the system (its different parts) will be impacted in terms of HOF. Specific attention should be paid to the different tasks impacted and the definition of future roles and tasks, with an iterative review of them, throughout the process.

1.1.4. Make a List of HOF topics

From the previous action, a list can be drawn up with the main topics of the change on HOF. The direction of causality is two-way, not only will the change affect HOF but HOF will affect the change and this is why the methodology is iterative, with reassessment of HOF topics several times, where necessary.

1.1.5. Validate the List of HOF Topics with Representatives of Stakeholders

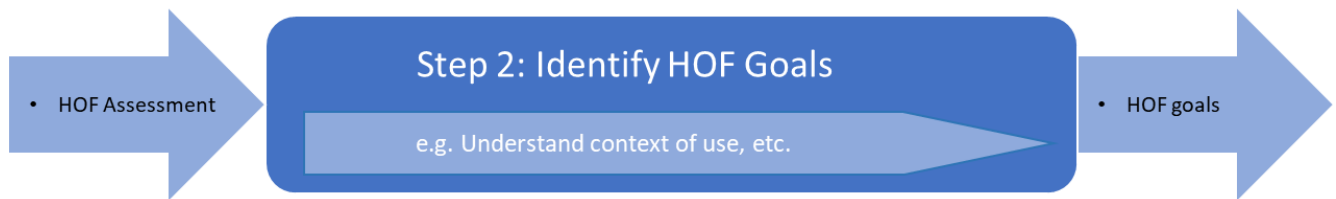
If representatives of identified stakeholders have not been involved in actions 1.1.3 and 1.1.4, a “validation” meeting can be organised to gather their feedback and review the HOF change management tool and the list. This meeting should also allow a more in-depth explanation of the next steps and every team member’s contribution.

1.1.6. Output of this step 1

The collection of evidence for the assurance process defined in 1.6, should contain:

- list of documentation used, description of the change, incl. component parts if any;
- list of the members of the HOF assessment team;
- minutes of meetings and/or Content of the HOF change management tool filled in (or any other HOF initial assessment).

1.2. Step 2: Identify HOF Goals



The objectives of this step are to:

- analyse the HOF topics;
- analyse and prioritise HOF goals.

Depending on the significance of the change, step 2 and 3 can be managed in parallel (e.g during the same workshop). Most systems rely on human and organisational performance. As a reminder, the terms “HOF topics” here are used to cover the risks and opportunities linked to human and organisational performance (strengths and weaknesses):

- The risks arising from human and organisational factors need to be identified, analysed and controlled;
- The opportunities from improved human performance can be maximised by actions integrating HOF at the design stage.

This step may also take into consideration user needs.

1.2.1. Analyse the list of HOF Topics

The aim is to analyse as many HOF topics as possible with the involvement of at least the project manager, safety manager (with HOF knowledge), and concerned stakeholders (managers, frontline workers, contractors, manufacturers, maintainers...). Different methods can be used such as observations of activities, interviews, focus groups or workshops.

The HOF change management tool described in part 2, and already filled in with a first list of HOF topics from step 1, should serve as basis for:

- defining the objectives of each focus group/workshop (with a view to having brainstorming sessions on the HOF topics and their potential consequences with active participation from end users and stakeholders);
- designing the checklist(s) for observations (with a view to better understanding the activities carried out within the system and the stakeholders’ needs);
- draw up the interview sheets (with a view to having a particular focus on specific HOF interactions with experts’ opinions).

The results of this analysis will enable the HOF topics list to be confirmed (e.g using the change management tool in part 2) or amended with new HOF topics identified. This list will serve as a basis to rank the HOF topics according to their priority, and this ranking will help thereafter to set priorities for the analysis and prioritisation of HOF goals.

1.2.2. *Review and Prioritise HOF Topics*

The objective is to review the HOF topics in order to validate their priority, where necessary.

For this review, it is important to involve at least the relevant stakeholders concerned by the change. People with HOF competence can also be invited, where necessary. This review can be made through different means, such as workshops, interviews or meetings. Based on the results of the previous step and the (amended) HOF change management tool, the facilitator will ask the participants to propose a ranking of the HOF topics.

A report (e.g. a summary table, a series of explanatory points) should be compiled based on the (amended) HOF change management tool, which integrates the results of the prioritisation of HOF topics.

1.2.3. *Define and prioritise HOF Goals*

The objective is to define, describe and prioritise the HOF goals. These HOF goals should consider the stakeholders needs' analysis, prioritised according to their potential influence within the system.

Based on the report mentioned in 1.2.2, the next action is to link the HOF topics to the needs for goals. The key question will be how to manage the prioritised HOF topics. This management will be formulated in terms of HOF goals to be achieved.

The comments will be made by the facilitator while reviewing the document, s/he can use HOF expertise if needed. The aim is to ensure consistency with the HOF topics, the HOF goals proposed and their priority.

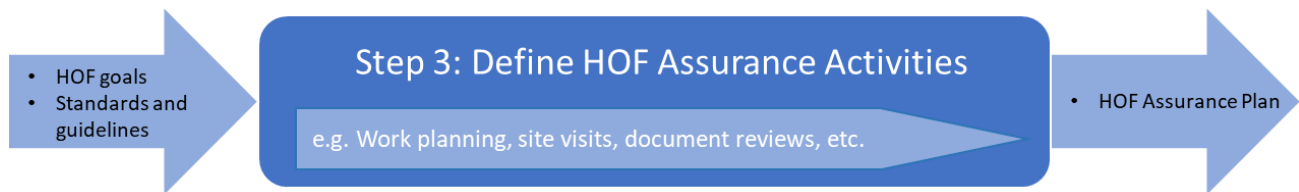
This list needs to be validated by accountable managers and reviewed regularly, to ensure its efficiency. In the case of stakeholders identified from other companies (as identified in 1.1.2), the company will have to agree with the proposed HOF goals.

1.2.4. *Output of step 2*

The collection of evidence for the assurance process can be:

- minutes of meetings, interview sheets, observation checklists,
- amended HOF change management tool, when used,
- reports and/or list of the HOF goals, prioritised in line with the HOF topics.

1.3. Step 3: Define HOF Assurance Activities to Support the Change



This step should take into consideration users' needs, based on the analysis and definition of HOF goals and potential optimisation from the previous step. Specific HOF expertise may be needed.

The objectives of this step are to:

- identify the specific HOF assurance activities;
- identify the specific HOF assurance activities monitoring.

1.3.1. Identify the Specific HOF Assurance Activities

Based on the list of HOF goals and their priority, the aim is to define HOF assurance activities based on the description of the system including stakeholders, their tasks and objectives, their working environment and their needs. HOF assurance activities will be agreed within the team.

These activities should be valid under normal, degraded and emergency situations and based on standards, when available.

For each activity, the following should be mentioned:

- Its objective, as well as the risks/impacts it covers (with a link to the pertinent item in the HOF change management tool);
- The inputs;
- The expected outcome;
- The deadline;
- The stakeholder's involvement;
- The person responsible.

1.3.2. Identify the HOF Assurance Activities Monitoring

This action aims at defining how the project manager will monitor the implementation of HOF assurance activities, and how s/he will give sufficient feedback to the "HOF assessment team" and to the accountable manager.

Recurrent deadlines for monitoring and review in case of new risks or constraints identified should be indicated in the HOF assurance plan.

The following monitoring of activities are recommended: task analyses (including audits and observations), human reliability assessments, simulations and testing. They should involve all identified end-users and stakeholders.

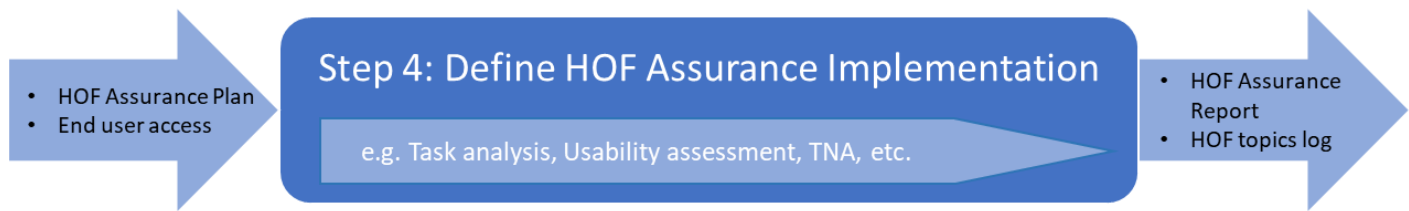
This plan needs to be accepted and reviewed regularly by people in charge of carrying out and validating the change, to ensure its efficiency. In the case of stakeholders identified from other units/companies (as identified in 1.1.2), decision-makers from the other units/companies should be involved in the process. If several persons are responsible for carrying out actions, a person responsible for the supervision of the whole plan should be designated.

The HOF assurance plan is a living document that will be reviewed on a continuous basis.

1.3.3. Output of step 3

The outcome of this step is a HOF assurance plan describing the change, the HOF assurance activities, the persons responsible for their achievement, their deadlines, how this will be monitored and how the HOF topics will be managed.

1.4. Step 4: Define HOF Assurance Implementation



The objective of this step is to follow-up the implementation of the HOF assurance plan.

It first starts with the implementation of the activities decided on in the HOF assurance plan and the monitoring (including effectiveness) of the activities. The results are then analysed which allows the activities to be reviewed when needed.

The output of this phase will be to produce, if necessary, residual design recommendations (equipment or tasks), including training and procedures and add them to the HOF assurance report and the HOF topics log.

1.4.1. *Implement the activities*

The person responsible for the supervision of the HOF assurance plan should supervise the carrying out of the activities defined in a timely manner. When the activities are not carried out, the activities and the HOF assurance plan are reviewed.

1.4.2. *Monitor the implementation and effectiveness of the actions*

Implementing the activities is not sufficient, this phase also includes a monitoring of their effectiveness to mitigate the HOF topics.

In this phase again, the stakeholders' role, and specifically end-users, is crucial.

The data will include any evidence, conclusions, lessons learned, feedback received from interviews or focus groups, changes to systems requirements...

In this step, a final review of the HOF change management tool can help identify new HOF topics (which require going back to steps 1 and 2) and new HOF goals needed. Therefore, the list of activities can also be reviewed (step 3) and implemented (step 4).

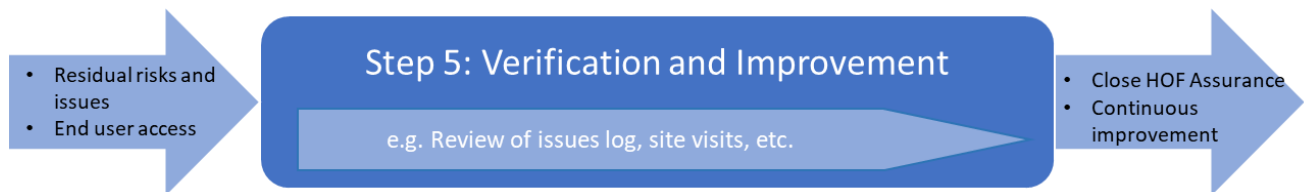
1.4.3. *Issue design recommendations including training and/or procedures*

Based on the results of the monitoring activities, the data will be analysed and, if necessary, recommendations for design and development, including training and/or procedures will be defined. Tests of the user's requirements will be carried out throughout the development process and reviewed where necessary. This includes different test scenarios to show operational and safety efficiency/effectiveness. The HOF change management tool should be reviewed and amended accordingly by the facilitator, when it is the tool used by the company.

1.4.4. *Output of step 4*

The HOF Assurance report, incl. the HOF goals, activities, their implementation and monitoring and the HOF topics log should be considered for the collection of evidence for the assurance process.

1.5. Step 5: Verification and Improvement



The objective of this step is to verify the HOF recommendations throughout the implementation of the change process. Depending on the scale and the type of the change, this phase will need the intervention of different stakeholders such as designers and manufacturers. This phase will aim at checking that the efficiency of the recommendations meets end-user needs during installation, operation and maintenance.

1.5.1. Implement the recommendations

This step starts with the implementation of the recommendations decided on in the previous steps. In this phase the person responsible for the HOF assurance process will check that the recommendations are followed during the implementation of the change.

1.5.2. Monitor the implementation

The recommendations should include monitoring activities, which should:

- enable the identification of any HOF topic which is not sufficiently managed, or which emerges in the change process. In that case it could be necessary to partly apply steps 2 to 4 in order to again define new HOF goals activities and eventual recommendations;
- enable the gathering of data and findings on the results of the implementation, such as lessons learned, feedback, suggestions for local implementation, changes to system requirements...

1.5.3. Output of step 5

The output of this phase is the closure of the HOF Assurance process (see 1.6) and the integration of the change in the monitoring and continuous improvement activities of the company through its SMS. The results will be integrated into the collection of evidence for the HOF assurance process and, if needed, into the HOF change management tool (if step 2 to 4 are applied again).

The hazard record of the company should also be reviewed, to check if updates are necessary.

HOF should be part of the performance evaluation and continuous improvement integrated in the safety management system of RUs and IMs, therefore this step will be carried out throughout the lifecycle of the new implemented system.

1.6. HOF Assurance Process

The HOF assurance process aims at issuing the HOF assurance report, based on all the elements and collection of evidence gathered during the different steps of the process: HOF initial assessment, use of HOF methodologies and analyses, evidence of measures taken, evidence of monitoring activities...

The aim is to be able to show that the process was carried out independently, without any conflict of interest.

2. Part 2 – Guidance on HOF Change Management Tool

The second part is a proposed supportive tool whose use is not mandatory, companies can choose to use the expertise or tool that best suits their needs.

The aim of this tool is to support the process described in the first part of this guidance, with the involvement of end-users as early as possible.

This tool should be adapted by each company depending on its needs, it can be used for a change or for a part of it. Examples of questions are proposed in this tool, they are not exhaustive and need to be adapted by the company. Nevertheless, some HOF expertise could be needed to avoid any routine or other bias, while reviewing the questions or throughout the process.

This list of HOF questions is based on the fig.2 below which is designed to provide a taxonomy by which a common understanding of HOF terms and concepts can be achieved during any proactive or retroactive SMS activities.

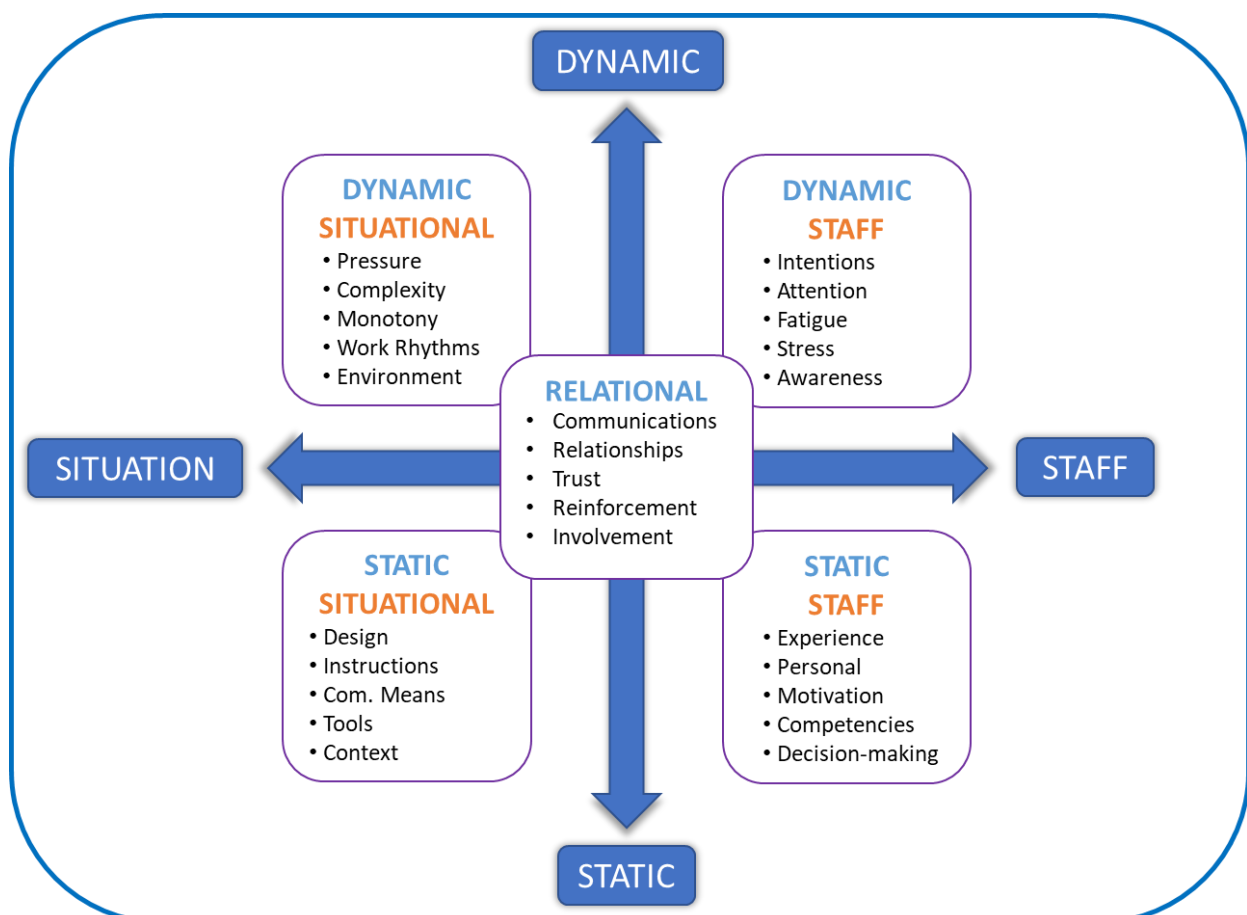


Figure 2: visual representation of the 5*5 HOF categories

Five categories of sources of performance variability attributed to HOF are identified. Four of these categories are organised in a 2x2 logic: static and dynamic features of the individuals (and teams), or, of the situation.

The last and fifth category focuses on the socio-psychological interactions, resulting in the following five groups: dynamic staff, dynamic situational, static staff, static situational and socio-interactional. The aim is to provide non-HOF experts with a quick but well-defined taxonomy and solid overview of the most critical HOF, even if this tool should not be used without a dedicated training, which can also help to identify the interfaces existing among these factors. Moreover, some questions may also need further HOF expertise.

This tool contains a sheet named “change description” which aims at describing the change and a “summary sheet” which summarises the main elements of each step of the methodology defined in part 1 of this guidance. This tool does not replace the HOF assurance report which is required to document the data collected at each step. The excel sheet “summary sheet” only aims at providing an overview of the process. The company which decides to use this tool can choose to also adapt these sheets, according to its needs.

STEP 1/ STEP 2 - Initial HOF assessment & Identified HOF goals				STEP 3 - Defined HOF assurance activities to support the change				STEP 4 - HOF assurance implementation			STEP 5 - Verified and ensured continuous improvement		
Description of the HOF topic	Ranking/ Priority (if necessary)	HOF goals	Comments	HOF Assurance activities	Monitoring Activities identified	Comments	HOF Assurance Plan	Assurance Implementation (ref. to HOF assurance plan)	Monitoring	Conclusion & Recommendations	Implementation of the recommendations	Results of monitoring of implementation	Conclusion

Figure 3: overview of the process in the “summary sheet”

In the “CAT” sheet, there is a first “screening question” for each category of factor, for which, if the answer is not clear or if there is an impact, there should be further analysis: more information, prioritisation and comments can be integrated in the following sheets (CAT 1 to CAT 5) and lines (more in-depth questions). The Screening question starts with “could there be any change to... (and reverse)”, the aim being to check if the proposed change can have any impact on the topic or if the topic can have an impact on the change.

The column “Comment or summarise the answer content” can be used to explain why it was assessed positively or negatively.

The other sheets with the descriptions of all the factors and relevant questions (CAT, CAT 1 to CAT 5) should be seen as subject to evolution as the methodology progresses and should be reviewed throughout the process when needed. For each source of performance variability, a generic definition exists, a screening question and some examples, as shown below in figure 4. When clicking on the name of the factor, the navigation will go directly to the more detailed questions concerned.

Sources of Performance Variability from / on:				
static situational factors: Example of questions are proposed in this tool, they are not exhaustive				
	Name	Generic definition	Screening question Could there be any change to... (and reverse)? Could the change have an impact on (and reverse)?	Example
Factor 3	Design	The factor “Design” refers to the end-user based approach when defining the tasks (e.g. allocation, workload, autonomy and significance/meaning), the procedures and instructions, the levels of automation and all the human-machine interfaces.	Could there be any change to the end-user based design approach?	Introduction of a new automated route setting system, but no end-users are resourced or late in the project steps. New instructions are to be designed, but no prior study is made of the current real situation.

Figure 4: screenshot of the presentation of the sources of performance variability in HOF change management tool

Other adaptations may be done by the companies. For example, if specific tasks are concerned, depending on the context and the change, some companies may group them, whereas others may prefer to have one sheet per task. Another example concerns the estimated intensity, which can be adapted to take into account the context and needs of each company (e.g: scale 1-5, low-medium-high, ...). The estimated intensity should help in prioritising the HOF assurance activities to be performed to manage the identified risks, e.g.: combined ratings from different HOF topics or different tasks may increase the score.

Is this factor affecting and/or affected by the proposed change (or part of)?									
no	yes	positive or negative	Not relevant	Description of the change (or part of)	Activity/Task concerned	Estimated intensity:	Comment or summarise the answer content	Mark for further analysis	HOF goal
	X								
	X								

Figure 6: screenshot of the presentation of the assessment of the sources of performance variability

The column “Mark for further analysis” aims at identifying if it is too early in the process to answer the question or if further analysis is needed (e.g. in an early stage, procedures are not written yet, it can be difficult to assess their clarity, but it helps keep track that further analysis may be needed).

Because of the nature of the impact (positive or negative), and of the intensity which may vary depending on the step, the “comment” part is useful to keep track of the consecutive explanations and the eventual decisions made.

A positive rating means that the HOF-topic is already covered and assessed positively, and should remain when change is implemented, this should also be checked during the implementation phase.

As the methodology is an iterative process, the questions may also be adapted considering the phase of the change. Depending on the phase of the change, its maturity or the information available, in some cases, it will not be possible to answer some of the questions in the first steps. The most important thing is to use the tool in an iterative way and use the dedicated columns “comment review following step xxx” to check the factor when needed.

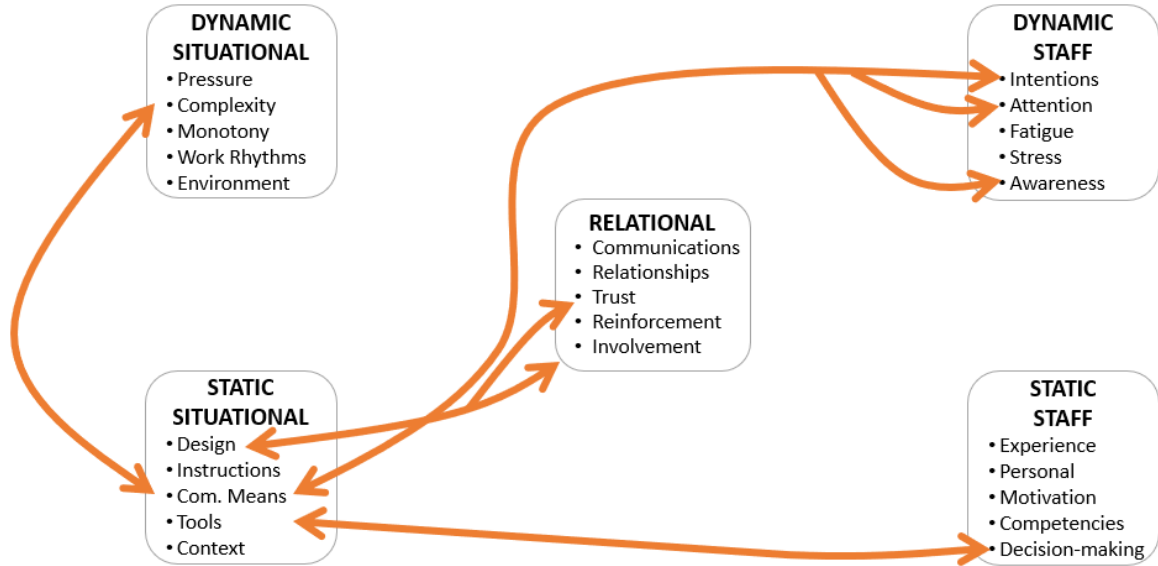
Specific columns exist to add comments after reviews following steps 3, 4 and 5.

Activity/Task concerned	Estimated intensity:	Comment or summarise the answer content	Mark for further analysis	HOF goal	Comment review following step 3	Comment review following step 4	Comment review following step 5

Figure 5: screenshot of the presentation of the columns for review during iterative process

Another excel sheet named “overview of factors” aims at quickly identifying the main questions linked to each factor. Each company can adapt this sheet depending on their identified needs. This sheet can also be used for changes with less important impacts to check if every HOF was identified in the risk assessment process.

The iterative process also aims at identifying the influences of the factors. For example, for the creation of a new procedure the following influences can be identified:



Appendix 1: useful links to learn more

[Safety Culture | ERA \(europa.eu\)](#)

[Human and Organisational Factors \(HOF\) | ERA \(europa.eu\)](#)

[Common Safety Methods | ERA \(europa.eu\)](#)

[Home - RailHOF](#)

Annex 1 title