Facilitator Competence for Human Reliability Assessments

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It is widely recognised that Human Factors have a significant impact on managing process safety and UK regulators expect high hazard sites to manage the risks that they pose. Human Reliability Assessment (HRA) has become an established way of identifying and minimising the risks associated with human error in safety critical tasks. However, there is little guidance available for the competence requirements needed to facilitate the HRA process, other than to use a Chartered Human Factors Specialist.

This paper presents a framework for assessing competence in facilitating the HRA process as part of a process safety management system. It is intended as a structure to develop and assess internal site personnel in applying the HRA methodology and may also be useful as a development tool for other organisations working in the process safety field.

The competence framework describes the required competences for HRA facilitation, and covers the underpinning knowledge, the demonstrable skills and the required behaviours for effective application of the methodology. It defines the pre-requisite training, knowledge and experience required before the individual may be considered for assessment and suggests how each of these may be assessed by a competent assessor.

HRA is often equated to the HAZOP process. However, within a HRA workshop, the facilitator asks people to discuss the things that they could do which could lead to a Major Accident. Unlike a HAZOP, which concentrates on the potential for failures of the process, the conversations in a HRA can become quite personal and may include participants discussing their own errors and mistakes. For this reason, the paper also introduces the concept of psychological safety within the HRA workshop and what the facilitator can do to create a psychologically safe environment for all participants.

Introduction

It is widely recognised that Human Factors have a significant impact on process safety and UK regulators expect high hazard sites to manage the risks that they pose. Human Factors may be described as the elements within the system which can affect human performance and therefore the way in which people prevent, control, or mitigate hazardous events. Human Reliability Assessment (HRA) has become an established way of identifying and minimising the risks associated with human error in safety critical tasks and is now documented as part of the success criteria in the HSE Human Factors Operational Delivery Guide for COMAH sites (HSE, 2016). HRA can also be an effective methodology for improving other tasks and activities that have an impact on the business.

Although there is detailed guidance available, most notably from the Energy Institute in their ‘Guidance on Human Factors Safety Critical Task Analysis’ (Energy Institute, 2020) which describes the HRA methodology, also known as Safety Critical Task Analysis or SCTA, there is little definition about the competences needed to be able to effectively facilitate an HRA. One option has been to recommend a Chartered Ergonomist or Human Factors Practitioner registered with the Chartered Institute of Ergonomics and Human Factors (CIEHF) or other recognised Human Factors body lead these activities. However, as Human Factors is such a broad discipline, this is no guarantee that the individual actually has the required skills to conduct an effective HRA within a high hazard process industry environment.

For many sites it may not be practical to employ a Chartered Human Factors Practitioner, so they are likely to use external consultants to facilitate the process. Whilst this is an effective approach, some sites would prefer to have more internal control over the HRA process themselves. They may wish to lead and facilitate their own HRA workshops but will still need to ensure that this is done by competent personnel.

This paper presents a framework to provide a robust demonstration of competence in facilitating the HRA process as part of a process safety management program. It is intended as a structure which can be used to develop and assess internal site personnel to demonstrate competence in applying the HRA methodology and may also be useful as a development tool for other organisations working in the process safety field.

Human Reliability Assessment (HRA)

Human Reliability Assessment (HRA) refers to the process of analysing the tasks or activities which are conducted by a human, as compared to an automated or engineered system, identifying potential mechanisms and causes of human failure and recommending potential measures to reduce the risk of these failures occurring. There are many different methodologies for assessing human reliability, but for the purposes of this paper the qualitative HRA approach prescribed in the HSE Guidance has been considered (HSE, 2005). A similar approach is described by the Energy Institute (2020).

The HSE advocate the use of qualitative HRA for COMAH sites as an effective means of identifying issues and implementing solutions, without the difficulties associated with obtaining relevant data for quantitative methodologies. The expectation is to focus effort on managing risks associated with Major Accident Hazards (MAH) rather than personal safety, although the approach can also be utilised to manage personal safety, reliability, quality, or other business risks if required.

Overview of HRA key steps:

- Step 1: consider main site hazards
- Step 2: identify manual activities that affect these hazards
- Step 3: outline the key steps in these activities
- Step 4: identify potential human failures in these steps
- Step 5: identify factors that make these failures more likely
- Step 6: manage the failures using hierarchy of control
- Step 7: manage error recovery

Steps 1 and 2 refer to the process of identifying and prioritising safety critical tasks (SCTs) for assessment. Steps 3 to 7 cover the requirements for analysing individual tasks. This paper covers the competence requirements for facilitating the workshops for HRAs on individual tasks, Steps 3-7. Identifying and prioritising SCTs does not need to be done frequently, although it is good practice to review the SCT list periodically. However, assessment of each individual SCT will need to be planned and HRAs should be expected to become a routine occurrence until the site's SCTs have been assessed. After the assessment, there will still be a requirement for the HRA to be reviewed by a competent person, either as part of routine process safety management audits or as part of management of change processes.

It is essential that the people who do the task are involved in the HRA workshop to ensure the analysis reflects real life experience. There are software packages available to support the HRA process and they can be very helpful in streamlining the work if used by a proficient operator.

Step 3 covers the process of describing the task (Kirwan, 1992). There are a variety of techniques, but Hierarchical Task Analysis (HTA) is the preferred method. This creates a graphical representation of the task, making it easier to identify any gaps in the defined task methodology and to understand how different elements of the task relate to each other. Development of the HTA can be an iterative process as more information becomes available during the workshop.

A site visit should be done as part of the HRA to provide all team members with the opportunity to observe the task if safe to do so, or to conduct a Walk Through/Talk Through (WTTT) of the task at the location, if not. The site visit enables the team to better understand potential performance influencing factors (PIFs) which can affect the human when conducting the task and may increase the risk of human error.

Steps 4 – 7 constitute the Human Error Analysis (HEA). In order to manage resources, e.g. availability of relevant personnel, it is acceptable to select key task steps for analysis in the HEA. For high hazard sites, any task steps which could affect a MAH scenario should be analysed. The HEA is very similar to the Hazard and Operability study (HAZOP) methodology and is sometimes called 'Human HAZOP'. The HRA team will identify potential human failures, using a set of guidewords to prompt discussion, and record the PIFs which increase the risk of the failure and existing safeguards which manage the risk. By linking the human failure to the potential consequences, the HRA team can then determine appropriate recommendations to manage the failure and/or recovery from the error or mitigation of the consequence.

When the HRA workshop is complete, the findings must be documented, and recommendations approved and completed. If the task cannot be eliminated, the HSE Human Factors Roadmap (HSE, 2010) suggests that the output from the HRA should be used to create or revise task procedures and information should be incorporated into the training and competence management processes for the site. The roadmap approach demonstrates visibility from process safety risk assessments through management of safety critical tasks to enabling front line workers to use these findings in their day-to-day activities.

Competence and Competence Assessment

Competence may be defined as 'the ability to undertake responsibilities and to perform activities to a recognised standard on a regular basis' (ORR, 2016). It incorporates the underpinning knowledge, application of skills, and suitable behaviours required to perform the particular role or activity. Competence criteria describe each aspect of the knowledge, skills and behaviours that are required to conduct the role or activity effectively; these elements are documented in a Competence Framework. The framework also defines the expected standard for each element and how it will be assessed.

Competence should be assessed by a competent assessor and can use a combination of assessment techniques, e.g. direct observation, written or verbal tests, indirectly obtained information, etc. The assessment methodology should be selected to provide a realistic indication of the person's competence within the context that they will perform the activity. The competence assessment indicates a minimum level of capability and an organisation may choose to assess at different levels. For example, having passed the competence assessment, it may be proscribed that the individual is more closely supervised for the first few times that they complete the activity and will only be authorised to complete the activity on their own if these initial attempts are acceptable.

The purpose of the competence assessment is to collect evidence to demonstrate that the individual can perform or behave to the specified standards for the role or activity (Fletcher, 2000). The assessment methodology should ensure the following:

- The assessment focusses on outcomes, i.e. the way in which the task or role is performed.
- The assessment is individualised, i.e. each individual may present a unique set of evidence to demonstrate performance based on their own experiences and opportunities.
- There is no comparison with other people, only against the competence standard.
- All competence elements should be met.
- There is no percentage rating, either the individual meets the standard for that competence element or is 'not yet competent'.
- The assessment can be an on-going process so it can be done in parts and does not all need to be done at the same time.
- If the individual is deemed 'not yet competent' for any element, they may undertake further development and be re-assessed.

Observation of the activity in the workplace is regarded as the most realistic form of assessment, supported by further questioning and discussion to determine how the individual would respond to any scenarios which cannot readily be observed.

It should also be remembered that competence can decay if the person is not given the opportunity to practice the activity on a regular basis. In order to ensure sustained competence, the person should be required to undertake some form of competence reassessment periodically.

A Competence Management System (CMS) provides a structure to develop personnel in specified tasks and roles, ensure that the competence assessments and reassessments are conducted and recorded in a timely manner, and have a procedure for managing people who do not meet the competence standard (ORR, 2016). It should also include systems for ensuring that people only conduct work for which they are deemed competent. The elements of the CMS should be audited and reviewed periodically to ensure that it delivers the required outcomes. It would therefore be expected that any competence framework would be part of this review process.

The Role of the HRA Facilitator

The role of the HRA Facilitator is to lead the HRA workshops in accordance with company procedures aligned to recognised good practice. As described above, they must be able to explain the rationale for analysing the task and ensure that the MAH risks are fully addressed. They are expected to provide the Human Factors knowledge and application to the analysis and ensure that they follow the HRA methodology correctly. They need to ensure a consistent and proportionate approach, including linking the analysis to the original prioritisation criteria and the source material. They must also ensure the output from the analysis is recorded correctly and issue the HRA report. In addition to managing the application of the HRA methodology within a process safety context, they also need to have the ability to run an effective workshop which encourages participation from all team members. Human reliability is often perceived as ensuring that the person does not make any mistakes, which is an unrealistic expectation. The challenge for the facilitator is to ensure the HRA team understand the principles of how the system in which the person works, both social and technical, can have a significant and often unexpected impact on human performance and therefore the wider system reliability.

It can be seen that the facilitator must be able to draw on a solid knowledge of Human Factors principles combined with an understanding of the process safety risks and apply them to deliver a credible analysis, whilst effectively leading an interactive workshop.

Dependent on the organisation, the HRA Facilitator may also be required to manage workflow after the workshop has been completed. This may include action management, procedure updates and development of competence frameworks.

Proposed Competence Framework for the HRA Facilitator

The Competence Framework proposed below is intended to provide a means of demonstrating competence for the facilitation of HRAs within the COMAH or high hazard process environment without the need for the facilitator to have achieved chartered status with the CIEHF or similar organisation. However, it must be emphasised that the facilitator is required to have a solid understanding of Human Factors principles in order to be deemed competent and must be able to demonstrate their application within the HRA process. Therefore, this is not a 'quick fix' to enable someone to conduct HRAs without sufficient Human Factors knowledge and experience. It is strongly recommended that a Chartered Human Factors Specialist is involved in the assessment process and potentially provides a level of oversight to subsequent assessments completed by the facilitator to ensure standards are maintained. It is envisaged that the individual being assessed may be on a development path to becoming a Chartered Human Factors Specialist in due course.

The competence framework is built around the knowledge, skills and behavioural elements required to facilitate the HRA process effectively. It defines the initial training and experience which must have been completed before any competence assessment can take place; these are listed as 'pre-requisites'. The individual elements are then listed against the criteria which needs to be met for the individual to be deemed competent. This should be read in accordance with the guidance on accepted practices for HRA and aligned to the site's own procedures to define the standard to be able to lead HRA workshops without direct supervision. It is dependent on a competent assessor conducting the assessment.

It can be seen that the framework does not describe the details of the training or development path to be taken; the competence statements describe the performance outcomes of the role. The individual can be trained and developed in a way which works for their organisation and use this framework at the point at which they are ready for assessment. It is good practice to ensure that the learner is made aware of the competence framework that they will be assessed against at the beginning of their development path; this enables them to understand what is expected and work towards meeting the desired standard.

The assessment methodology can be adapted to suit the needs of the site and the preferences of the assessor. However, it should be consistent for all individuals at that site to ensure that competence standards are maintained.

The individual elements are described below. The whole framework is summarised in the table in Appendix 1 and includes the anticipated assessment method and any relevant references which would be used to support the assessment criteria.

Pre-Requisites

Before any competence assessment, the trainee facilitator must have completed training in Human Factors principles and understand how human performance can be influenced by the system in which the work is done. The training is expected to include the topics relevant to an operating site. The facilitator must also have had training in the HRA methodology and had experience of participating in and observing a competent facilitator in a number of HRA workshops.

In accordance with good assessment practices, the trainee will have had the opportunity to practise the skills being assessed and, with the agreement of their manager, feel comfortable that they are ready for the assessment. It is suggested that the development of their Human Factors and HRA skills and experience is supported through mentoring with an experienced competent HRA facilitator. This is likely to be a Chartered Ergonomist or Human Factors Specialist with the CIEHF or similar.

Knowledge Elements

The elements below describe the underpinning knowledge which the individual requires to be able to execute the HRA process effectively in a process industry environment. It considers process safety knowledge as well as Human Factors principles and the HRA methodology.

1. Describes the Connection between Safety Critical Tasks and MAHs

The individual must be able to demonstrate an understanding of process safety principles and how human performance can affect the site's MAH scenarios. They must be able to explain how the Safety Critical Task (SCT) which is being analysed has been identified and prioritised for assessment and be able to link the SCT to the risks associated with the MAH scenario.

2. Explains the Different Types of Human Failure

The individual must be able to define and give examples of slips, lapses, mistakes, and violations and be able to show where they would find the Human HAZOP guidewords and how they are used. They should be able to describe how the guidewords act as prompts for the HRA to team to develop error scenarios.

3. Identifies Performance Influencing Factors (PIFs) and Explains their Impact on Human Reliability

The individual must be able to describe the principle of PIFs and how different PIFs will affect performance. It would be useful to include a discussion of examples of incidents on site or elsewhere and discuss the PIFs which may have contributed to the incident.

4. Explains Appropriate Types of Corrective Actions for Each Human Failure Type

The individual must be able to explain why some solutions may or not be suitable for different types of human failure. For example, the individual should recognise that training will not be a suitable solution to a slip or a lapse. They should be able to suggest suitable recommendations to address each type of failure and give examples for different PIFs.

5. Describes the Site Process for Conducting an HRA

The individual must be able to describe the principles involved in the site process, e.g. how to describe the task, how to conduct a task observation and the elements that need to be included in a HEA. The process is likely to include the site requirements for failure analysis, PIF analysis and the approach to risk reduction, including management of actions from the HRA.

6. Describes how to Construct an HTA

The individual must be able to describe the principles of building an HTA chart and its constituent parts. They should also be able to describe what would be an appropriate level of detail in relation to the purpose of the HRA. They must be able to link the development of the HTA to the MAH risks to ensure that the human error risks can be considered within the HEA.

7. Describes how to Perform an HEA

The individual must be able to describe how to select individual steps within the task for detailed analysis, e.g. those steps with a potential MAH risk must be selected as a minimum. They must be able to explain how to identify potential human errors and how they are made more likely by the PIFs in the systems or less likely due to other control measures. They must also be able to assess the consequences and where they could potentially increase the risk of a MAH. They must also be able to use a Hierarchy of Control approach to developing recommendations which are appropriate for the errors identified.

Skill Elements

The elements below describe the demonstrable skills in facilitating the HRA process. It concentrates on being able to apply the HRA methodology correctly within the context of an operating site.

1. Prepares for the HRA

The individual must demonstrate that they can prepare for the HRA workshop in an organised manner by ensuring that the relevant people are available and invited, that the facility for the workshop is suitable and that all reference material is collated or made available. They must also ensure that arrangements are made for a task observation or walk through/talk through at a suitable time.

2. Introduces the HRA Process to the Team Members

The individual must give a clear introduction to the HRA process which describes the reason for the assessment, the methodology, and the input required from the team members.

3. Operates the Relevant Software

The individual must demonstrate that they can operate any software used to a level which will allow the HRA workshop to run smoothly. This includes being able to set up the software for the assessment, construct an HTA (if supported by the software), and complete all sections of an HEA.

4. Constructs an Accurate HTA

The individual must demonstrate the ability to construct an HTA which fully describes the task to desired level of detail. This will include defining the scope of the task, the development of a goal and pre-conditions, and creating a suitable hierarchy. The HTA must have well-defined steps with logical plans which cover steps which are not always required as well as the more obvious steps. They must be able to show how they would adapt the HTA to ensure that potential areas of concern are discussed within the HEA.

5. Conducts an Effective Walk Through/Talk Through (WTTT)

The individual must ensure that a WTTT is conducted at a suitable time to support the team discussions. This may be before, during, or after the HTA has been drafted but should always be done before the HEA. It is acceptable to have more than one WTTT if it supports the analysis. They must demonstrate how they encourage team members to discuss the task at the task location and bring potential PIFs to their attention. They should also ensure that any queries that may have arisen during the development of the HTA are checked during the WTTT.

6. Conducts an Effective HEA

The individual must demonstrate how they develop the table ready for the HEA and lead the discussion to identify appropriate steps for analysis, understanding time constraints whilst ensuring the necessary steps are considered. They must ensure the analysis uses the Human-HAZOP guidewords appropriately, identifies realistic PIFs which reflect the actual work environment, defines the potential consequences, and develops suitable actions which are logically derived from the PIFs, and errors identified.

7. Creates an HRA Report to Site Standards

The individual must demonstrate how they create a report which accurately reflects the workshop discussions and meets the site requirements. The points made within the report should be clear and understandable to people who were not in the original workshop sessions.

8. Manages the Workflow After the HRA Workshop

The individual must demonstrate how they manage the workflow which is relevant to their company procedures and their job role. This is expected to include managing the process for action management, i.e. getting actions accepted, allocated and tracked to completion. It may also include ensuring procedures are updated to reflect the outcome from the HRA and creating or updating competence frameworks for the task.

Behavioural Elements

The elements below describe the desired behaviours which produce valuable results from the HRA workshop. Although the skills and knowledge elements will enable an HRA to be completed, it will not be obvious if there have been missed learning opportunities because of poor facilitation. These are the competence elements which can have the biggest impact, but which are more difficult to train and assess.

1. Demonstrates Analytical Thinking

The individual must be able to demonstrate analytical thinking throughout the HRA process. This will be shown in the way in which they develop the HTA to ensure all discussion points can be captured in the analysis. They will need to demonstrate that they challenge what is written in the procedure to ensure that they capture the task 'as done' and discuss different conditions which might affect the task methodology. They must also be prepared to investigate what is offered by the team members rather than just accept what is said. This is particularly relevant to the discussions about human failure; often people overestimate their own capability and find it difficult to accept that an error is possible especially if they have not seen it occur. The individual should also be able to understand the task being discussed and have the ability to confirm that it is meeting the task objective especially if it provides a layer of protection to a MAH.

2. Demonstrates Strong Meeting Facilitation Skills

The individual must demonstrate that they can run the HRA workshop effectively. They will ensure that all team members understand the HRA process and are clear on what is expected of them. They will also ensure that every person participates in the discussion and is encouraged to contribute their opinions or experiences. They will be expected to observe the team members' body language and ask questions if they believe the person has something to offer but is not confident to speak up. They will also be able to provide rest periods when appropriate to ensure the team remains engaged and minimise fatigue.

3. Provides a Psychologically Safe Environment

The individual must be able to ensure that all participants feel included in the process and able to express their opinions or concerns without fear of adverse repercussions. This may include having to manage comments from other team members which might stifle an open discussion. They will be able to create a safe, non-judgemental atmosphere in the workshop to enable potential errors and experiences to be discussed openly. They will also enable the team to challenge existing work practices to look for potential improvements. They must ensure that examples of errors are anonymised within the written report and that comments are not attributed to any individual team member.

4. Demonstrates Active Listening and Questioning Skills

The individual must demonstrate that they listen actively to what is being said and provide space for people to think and talk through any points of the discussion. They should be able to summarise and reflect back what has been said to check understanding and to ensure the discussion is accurately recorded. They should also be able to use different questioning techniques to elicit information, clarify understanding and gain consensus within the team.

5. Challenges the Team's Thinking

The individual must ensure that the team considers a range of perspectives, especially when identifying possible errors. They should be able to challenge current practices where appropriate, whilst maintaining a psychologically safe environment. They should be able to use a range of techniques to do this, including questioning, using anecdotes from everyday life and have a number of relevant examples of real incidents to provide evidence of potential scenarios or human failures.

6. Demonstrates Curiosity in Human Factors Approaches

In order to be an effective facilitator for the HRA process, the individual needs to develop a good understanding of human factors principles and develop a broad knowledge base that they can draw on in the HRA process. Whilst there is a baseline level of knowledge described above, the individual should demonstrate that they are interested in widening their understanding. This might be through reading, attending conferences or webinars or listening to relevant podcasts. The individual should be able to demonstrate that they are building their knowledge base and are able to discuss a range of information which supports the HRA process.

Psychological Safety in the HRA Process

Psychological safety may be broadly defined as 'a climate in which people are comfortable expressing and being themselves' (Edmondson, 2019). This is manifested by people being able to share their concerns and mistakes without fear of embarrassment or retribution. They are confident that that can speak up and won't be humiliated, ignored, or blamed and are able to seek clarification when unsure. A psychologically safe environment is one where people trust and respect their colleagues. Clark (2020) describes four stages of psychological safety:

1. Inclusion Safety – team members feel accepted and valued by their group
2. Learner Safety – team members feel encouraged to learn and accept that mistakes are part of the discovery process
3. Contributor Safety – team members feel listened to and able to actively participate
4. Challenger Safety – team members feel confident to challenge the status quo without risk of reprisal

In this model, each stage builds on the preceding stage. Therefore, team members need to feel accepted as a valid member of the group to be able to learn about what is expected from them and to then contribute their own ideas and suggestions. Only when they are comfortable contributing to the team will they feel able to challenge the status quo.

HRA is often equated to the HAZOP process; as described above, the Human Error Analysis (HEA) element is sometimes referred to as a Human HAZOP. It may be asked why the behavioural competences to facilitate a HRA are different to those

required to facilitate a HAZOP. Other than the requirement for a technical understanding of Human Factors, they may be seen as very similar methodologies which demand the same facilitation skills. Psychological safety is relevant to all teamwork including HAZOP. However, within a HRA workshop, the facilitator asks people to discuss the things that they themselves could do which could lead to a Major Accident. Unlike a HAZOP, which concentrates on the potential for failures of the process, the conversations in a HRA can become quite personal and may include participants discussing their own errors and mistakes. For this reason, maintaining a psychologically safe environment within the HRA process for all participants is a key competence if team members are to contribute fully and challenge current ways of working.

Therefore, the HRA Facilitator must be able to include everyone in the process and ensure that they are able to learn how the HRA methodology will be applied. Questions on the process should be encouraged and any misunderstandings should be corrected in a non-judgemental manner. All experiences are valid and the facilitator should show curiosity in understanding the background to any comments. If there are differences of opinion, the facilitator needs to ensure that everyone is listened to and that the team can reach a consensus about how to proceed with the analysis. Challenger Safety is often the most difficult to achieve and is heavily influenced by the organisational culture. Many workers have had experience of offering suggestions to improve their work processes and had them ignored. The HRA facilitator may request a senior manager to reinforce the message that the site is ready to be challenged and to encourage participants to consider all options for improvement. As a minimum, the facilitator should ensure that a range of recommendations are discussed and that valid improvement opportunities are proposed for consideration.

Conclusion

Human Factors have a significant impact in the operation of any high hazard process facility. Conducting effective Human Reliability Assessments is a key part of any process safety management system and is dependent on having a competent facilitator to lead the HRA team through the process. Using a Chartered Human Factors Specialist is not a guarantee that the individual is competent in leading HRA workshops in a hazardous process environment.

The Competence Framework presented provides a robust approach to assessing the competence of a HRA Facilitator to a good standard that incorporates underpinning knowledge, application of required skills and suitable behaviours necessary to conduct the role effectively. This requires an assessor who is themselves competent in Human Factors and the HRA process in high hazard process environments. The framework can be used by personnel at operating sites or other companies involved in process safety to demonstrate the competence of their HRA facilitators.

As with all competence assessments, it is expected that competence will continue to develop with experience. Organisations may deem it appropriate to continue to have a level of oversight on the output of recently assessed HRA facilitators to ensure that HRA standards are maintained.

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List of Abbreviations

CIEHF	Chartered Institute of Ergonomics and Human Factors
CMS	Competence Management System
COMAH	Control of Major Accident Hazards Regulations
HAZOP	Hazard and Operability Study
HEA	Human Error Analysis
HRA	Human Reliability Assessment
HSE	Health and Safety Executive (UK)
HTA	Hierarchical Task Analysis
MAH	Major Accident Hazard
ORR	Office of Rail and Road (UK)
PIF	Performance Influencing Factor
SCT	Safety Critical Task
WTTT	Walk Through/Talk Through

Appendix 1: Competence Framework for HRA Facilitator

PRE-REQUISITES		
	Training Requirement	**Evidence**
1	Attended Human Factors Training Course	Certificate of Attendance
2	Completed training on conducting Human Reliability Assessments	Certificate of Attendance
3	Participated in a minimum of 3 Human Reliability Assessments	Discussion with Assessee Review HRA Reports if available

KNOWLEDGE				
	Learning Outcomes	**Assessment Criteria**	**Reference**	**Method of Evaluation**
1	Describes the connection between Safety Critical Tasks and MAHs.	• Can describe the HSE Roadmap. • Can describe how SCTs are linked to site MAHs.	HSE, 2010	Discussion
2	Explains the different types of human failure.	• Defines Slips, Lapses, Mistakes and Violations. • Describes Human HAZOP Guidewords and how they are used.	Reason, 2009 HSE, 2005 HSE, 2009a	Discussion
3	Identifies performance influencing factors (PIFs) and explains their impact on human reliability.	• Explains what is meant by a PIF. • Provides examples of PIFs on site and how they may have contributed to incidents or near misses.	HSE, 2009b	Discussion
4	Explains appropriate types of corrective actions for each human failure type.	• Can identify relevant recommendations for different failure types, e.g. training supports mistakes but not slips and lapses. • Gives specific examples for each failure type.	HSE, 2009a	Discussion

5	Describes the site process for conducting HRA.	• Task analysis
		• Walk through/talk through
		• Human Error Analysis, including
		  ○ Failure analysis
		  ○ PIF analysis
		  ○ Risk reduction
			Site procedures
			Energy Institute, 2020
			HSE, 2005
				Discussion/Drawing

6	Describes how to construct an HTA.	• Can describe how to formulate a goal and the pre-conditions. • Can describe the difference between a plan and an action. • Describes good practices for building the HTA, e.g.one step per action, max 8 steps per line, stopping guidance, describes human actions so start with a verb. • Can explain how the HTA needs to consider the requirements for the HEA.	Site procedures Energy Institute, 2020 HSE, 2005 Kirwan, 1992	Discussion/Drawing
7	Describes how to perform a HEA.	• Can describe how steps can be screened for efficiency, e.g. MAH risk only. • Links human error to process safety risks. • Can describe how to assess the consequence. • Refers to the Hierarchy of Control for developing actions.	Site procedures Energy Institute, 2020 HSE, 2005	Discussion

SKILLS				
	Learning Outcomes	**Assessment Criteria**	**Reference**	**Method of Evaluation**
1	Prepares for the HRA.	• Gathers relevant information for	Site procedures	Observation /

		conducting the HRA, e.g. procedures, P&IDs, process descriptions, MAH descriptions, HAZOP report. • Ensures the relevant personnel are invited to the HRA. • Ensures suitable facility to conduct workshop. • Ensures site visit is organised.		Discussion
2	Introduces the HRA process to the team members.	• Provides an overview of the process and team expectations. • Describes how to construct an HTA. • Describes principles of human error types.	Site procedures	Observation (Possible slide pack if used for introduction)
3	Operates the relevant software (if used)	• Sets up the software ready for use. • Can build an HTA in the software. • Can complete an HEA in the software.	Site procedures Software User Manual	Observation
4	Constructs an accurate HTA.	• Creates a clear goal. • Defines the relevant pre-conditions. • Creates a high-level hierarchy without too much detail for the first level. • Creates clear plans. • Creates well defined steps. • Includes potential steps which may not always be required. • Ensures HTA covers the steps required to discuss potential errors of concern.	Site procedures Energy Institute, 2020 HSE, 2005 Kirwan, 1992	Observation / Discussion
5	Conducts an effective walk through/talk through	• Encourages team members to discuss the task in the field. • Investigates the key questions discussed in the HTA. • Notices potential PIFs and brings them to the attention of the team.	Site procedures	Observation / Discussion
6	Conducts an effective HEA.	• Identifies appropriate steps for analysis. • Identifies suitable error types. • Uses the guide words appropriately. • Identifies realistic PIFs which reflect site experience. • Defines the potential consequences. • Develops effective corrective actions linked to the PIFs and the error types.	Site procedures Energy Institute, 2020 HSE, 2005	Observation / Discussion
7	Creates a HRA Report to Site Standards	• Develops a report in line with site procedure.	Site procedures	Report
8	Manages workflow after HRA workshop	• Conducts action management workshop to agree action responsibilities and delivery dates. • Ensures procedures are updated. • Ensures competence assessment documentation is updated or created.	Site procedures	Observation

BEHAVIOUR				
	Learning Outcomes	**Assessment Criteria**	**Reference**	**Method of Evaluation**
1	Demonstrates analytical thinking	• Can construct an effective HTA which covers the elements that need to be covered. • Does not just copy the steps in the procedure. • Demonstrates critical thinking in the HEA.		Observation
2	Demonstrates strong meeting facilitation skills	• Ensures all team members understand the process and their roles. • Ensures that all team members contribute to the discussion and allows opportunity		Observation

		for everyone to speak. • Observes body language and elicits comments. • Provides breaks and downtime when team energy is low.		
3	Provides a psychologically safe environment	• Ensures all participants are included and encouraged to contribute. • Encourages a safe, non-judgemental atmosphere to discuss potential errors and experiences. • Uses questioning techniques which dissociate errors from specific individuals, e.g. 'how could someone do this step incorrectly?' • Ensures everyone's opinions are considered. • Provides the opportunity to challenge the status quo.	Clark, 2020 Edmondson, 2019	Observation
4	Demonstrates active listening and questioning skills	• Allows space for people to think/talk. • Reflects back what has been said. • Uses open questions to elicit information. • Uses closed questions to confirm understanding.		Observation
5	Challenges the team's thinking	• Asks questions to ensure the team consider a range of perspectives. • Provides relevant examples for potential errors, scenarios, or solutions.		Observation
6	Demonstrates curiosity in human factors approaches	• Shows an interest in widening their understanding of human factors principles. • Discusses relevant information that supports the HRA process.		Observation / Mentoring