



Human Factors in Renewables

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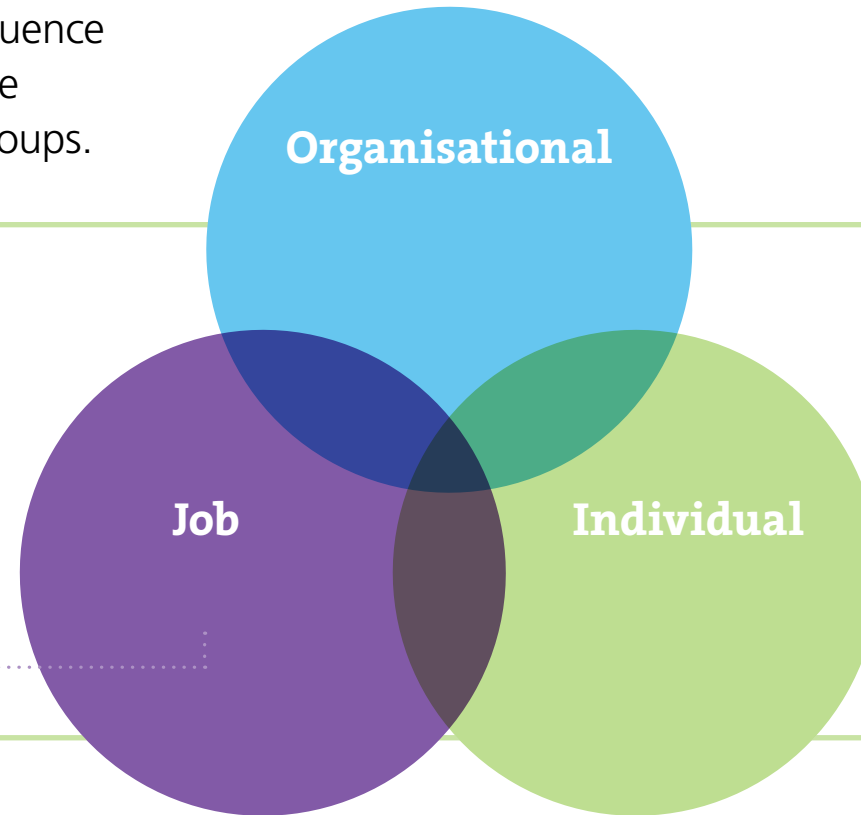
1. Introduction To Human Factors

We define Human Factors as the psychological, cultural, behavioural and other human attributes that influence decision-making, the flow of information and the interpretation of information by individuals or groups.



Job – Consider...

Nature of the task, the workload and the working environment. The design of displays and controls and the role of user friendly procedures and the ergonomic principles.



You are all critical in all parts of these three interrelated aspects. Think about these in four fundamental areas:

- Design
- Planning
- Setting To Work
- Work Activity

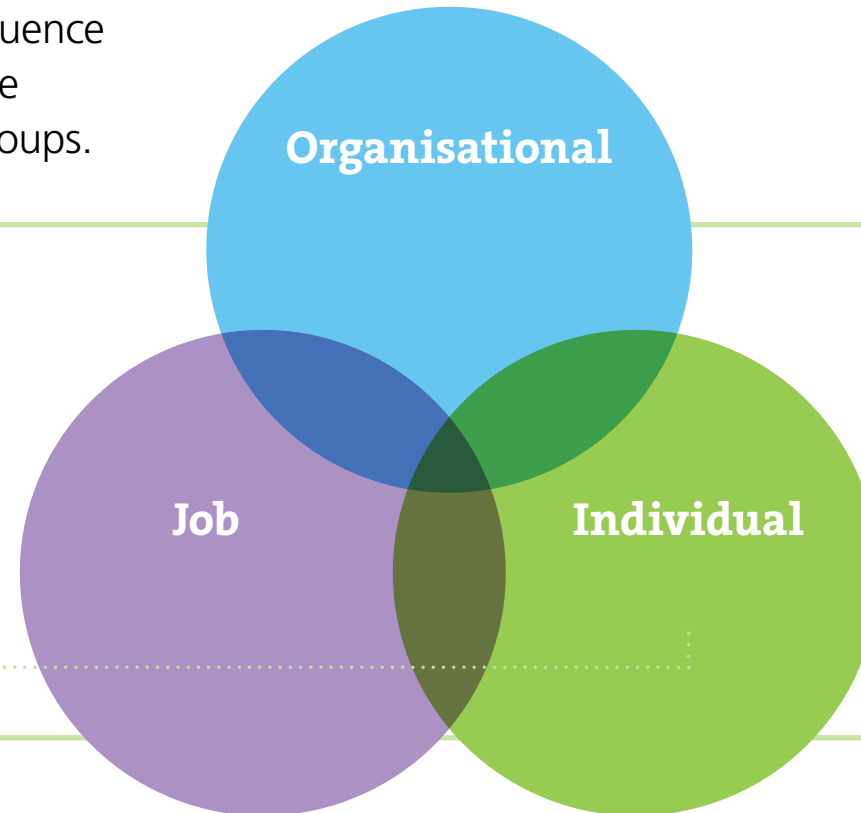
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Individual – consider...

Competence, skills, personality and attitude. Also risk perception as individual characteristics influence behaviour in differing levels of complexity.



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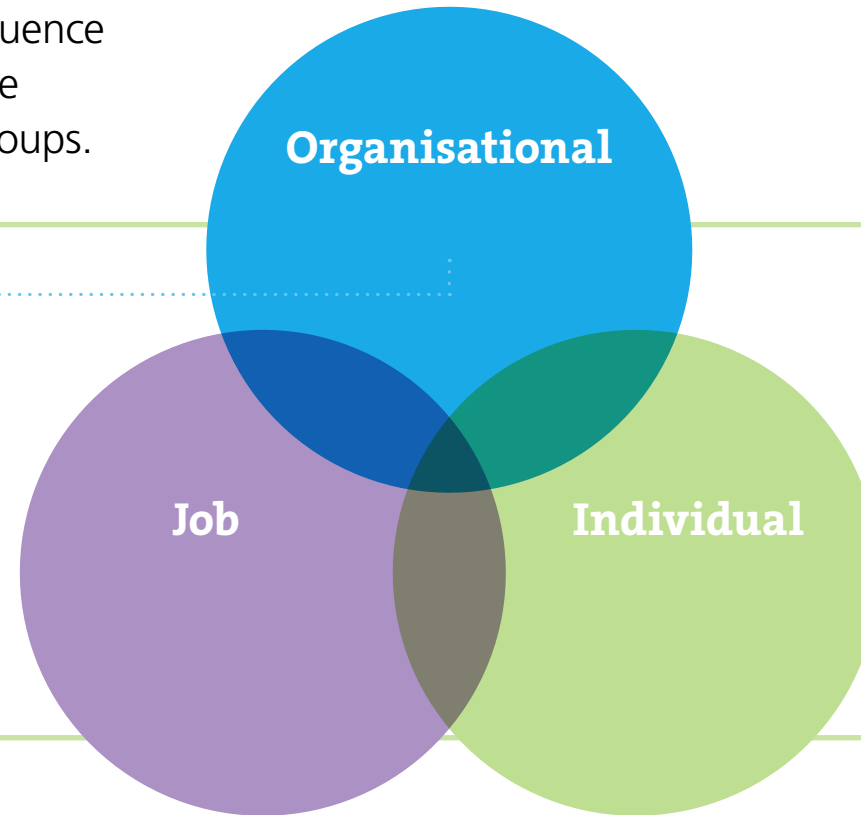
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Organisation – consider...

Work and shift patterns, the culture of the workplace, are there adequate resources, is there uncomplicated communications and lastly consider leadership levels.



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2. Meet Amy

Amy wants a safe and healthy environment just like us.

Consideration must be given to how we access structures and work on plant/apparatus or interact with systems. Amy also likes and needs to be set to work with simple instructions that can be easily understood and interpreted. So, why is it important to be like Amy and how do we get there? We can use our Health and Safety Essentials as a simple tool.



Amy follows our processes, rules and procedures



Amy promotes health and wellbeing in and outside of work



Amy only undertakes work she is competent to do



Amy and her colleagues will look out for each other and work as a team



Amy thinks before she acts – she assesses and controls the risks

3. What Affects Human Performance

The ten factors influencing human performance that we must consider in our design, planning, setting to work and work activity are set out below.

| | | | | |
|---|---|--|---|--|
|  <p>Competence</p> |  <p>Human Error</p> |  <p>Maintenance, Inspecting & Testing</p> |  <p>Change Management</p> |  <p>Inadequate Resources</p> |
|  <p>Poor Communication</p> |  <p>Fatigue</p> |  <p>Organisational Culture</p> |  <p>Complex Procedures</p> |  <p>Poor design</p> |

It is the decisions we make today that will affect our people and our assets tomorrow.

4. Human Factors in Design

Human performance is directly influenced by design, and poor design is a primary cause of human failure, whether it is the way information is presented, the layout of controls, the physical workspace or aspects of the environmental design.

Amy wants to be considered when we design, select or purchase our assets and equipment. To help, we need to consider access and egress, not just in construction but also in our maintenance activities.



Involve those who work on our assets, apparatus and use the tools



Involve specialists such as Occupational Hygiene



When completing hazard identification, ensure the right people are involved

Designing in health and safety at the early stage will avoid incidents such as manual handling, back strains, exposure to chemicals and safe application of Electrical and Mechanical Safety Rules.



5. Planning

Planning seems straight forward, but from a human factors point of view what does this actually mean?

Yes, it is about how we will undertake the work safely but what does that really involve and what does Amy want us to think about?



5. Planning

- ✓ Lead time, allow sufficient time for adequate resources
- ✓ Fatigue, consider work and shift patterns and social impacts
- ✓ Travel, ensure this is included in planning
- ✓ External impacts, what may affect decision making on the ground
- ✓ Weather, this may hold up work that may see an acceleration of programme
- ✓ Co-ordination, planning the right resources on site at the right time
- ✓ Hazard identification, have all the foreseeable hazards been identified
- ✓ Risk assessment, based on the identified hazards, as a suitable and sufficient risk assessment been completed
- ✓ Risk controls, have controls been developed and incorporated into the plan
- ✓ Emergency arrangements, have these been considered for the location and number of persons involved in the activity

If the above are not completed, or we fail to consult early, it may affect decisions in the setting to work and work activity phase.

6. Setting To Work

Any setting to work, whether it be for an individual, a team or even at the outset of a project and throughout the project life cycle, should aim to ensure that:

Person(s) know exactly what they have to do, how they have to do it and with what resources they have to achieve it.



It's at this point that Amy and her team want clear and concise instructions.



Not only do they want to know the contents of any risk assessments, but they also want uncomplicated method statements.

Whether communication is written or verbal, just because we know what it means does not always mean that others do.



6. Setting To Work

In some activities, it may be necessary to seek understanding of the requirements, particularly in high risk activities where safety critical information is necessary. Let's take a look at a few of the key points to assist Amy and her team:



Seek confirmation of understanding when issuing verbal instructions



Provide concise written instructions – stick to the safety critical points



Ensure people know relevant hazards and risks



Ensure the team know what to do in an emergency



Ensure the team are competent for the task



Ensure the team have no health issues that may impact on activity



7. Work Activity

Amy now has all the information. She and the team know the hazards, know the controls and understand the user-friendly instructions that they have been provided ...but wait...

- Amy has some personal issues that are distracting her; or
- additional work has been requested; or
- work is not going to plan; or
- a new hazard has been identified

At any given point, Amy and the team will be required to make decisions and these may be impacted by any of the above and more including mobile phones, peer pressure to name a few.

Amy remembers **SLAM**



Stop



Look



Assess



Manage

This needs to be considered along with situational awareness.



8. Situational Awareness

In reality, the decision and the choices we make influence everything else within the work flow; from decisions at design stage through to the completion of the work activity of task.

But our daily world and environment changes all the time, from when we travel to work until we go to bed at night. Situational awareness is:

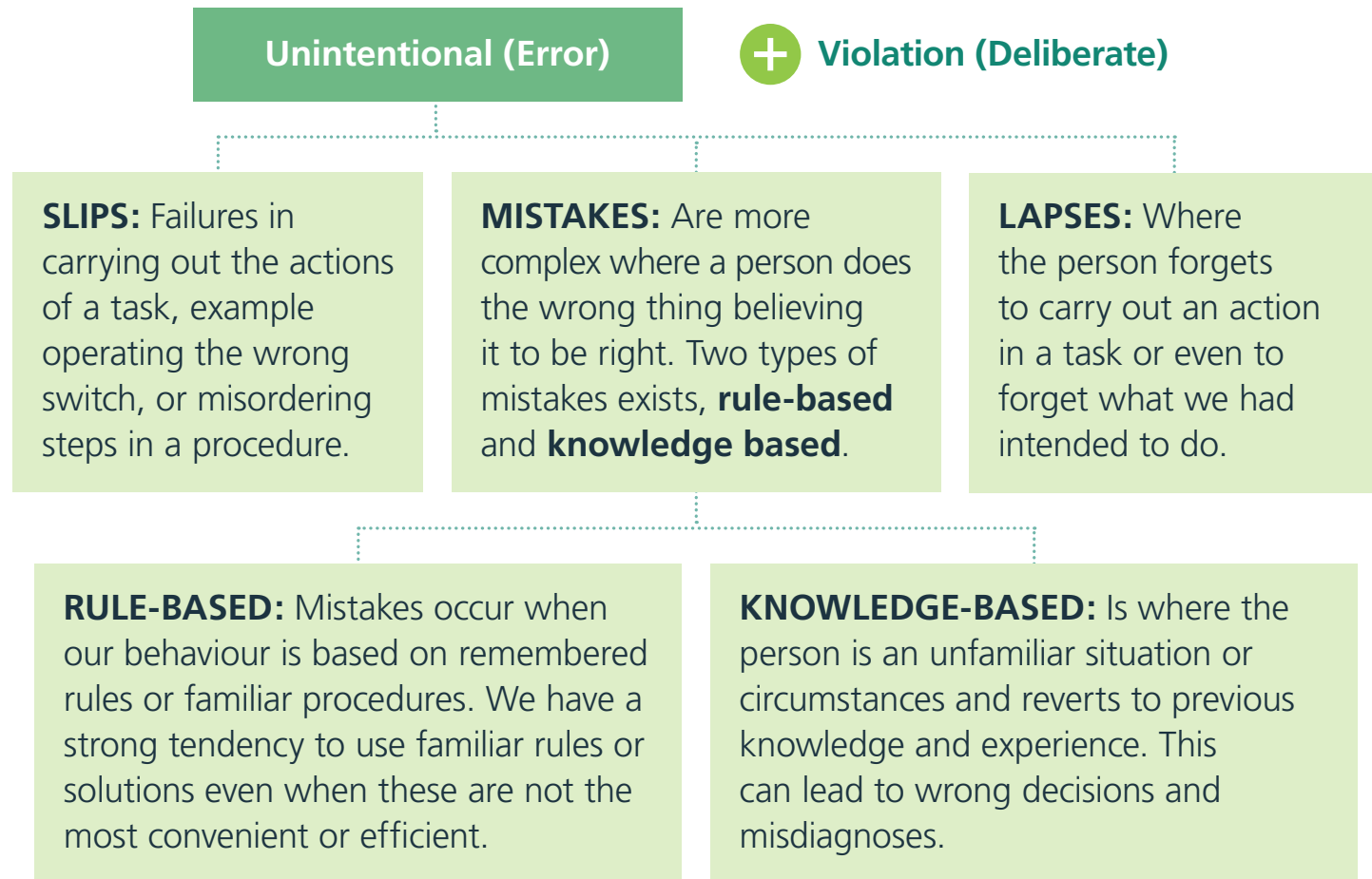


Ability to recognise the hazards and risks of our immediate surroundings, take cognisance of the changes of these hazards and risks and take the necessary actions to reduce the likelihood of harm.

9. Decision Making

Amy and her team, like us all make hundreds of decisions during our daily lives. Some are good and some are bad decisions, that's what makes us human. Have you ever stopped to consider how we get there?

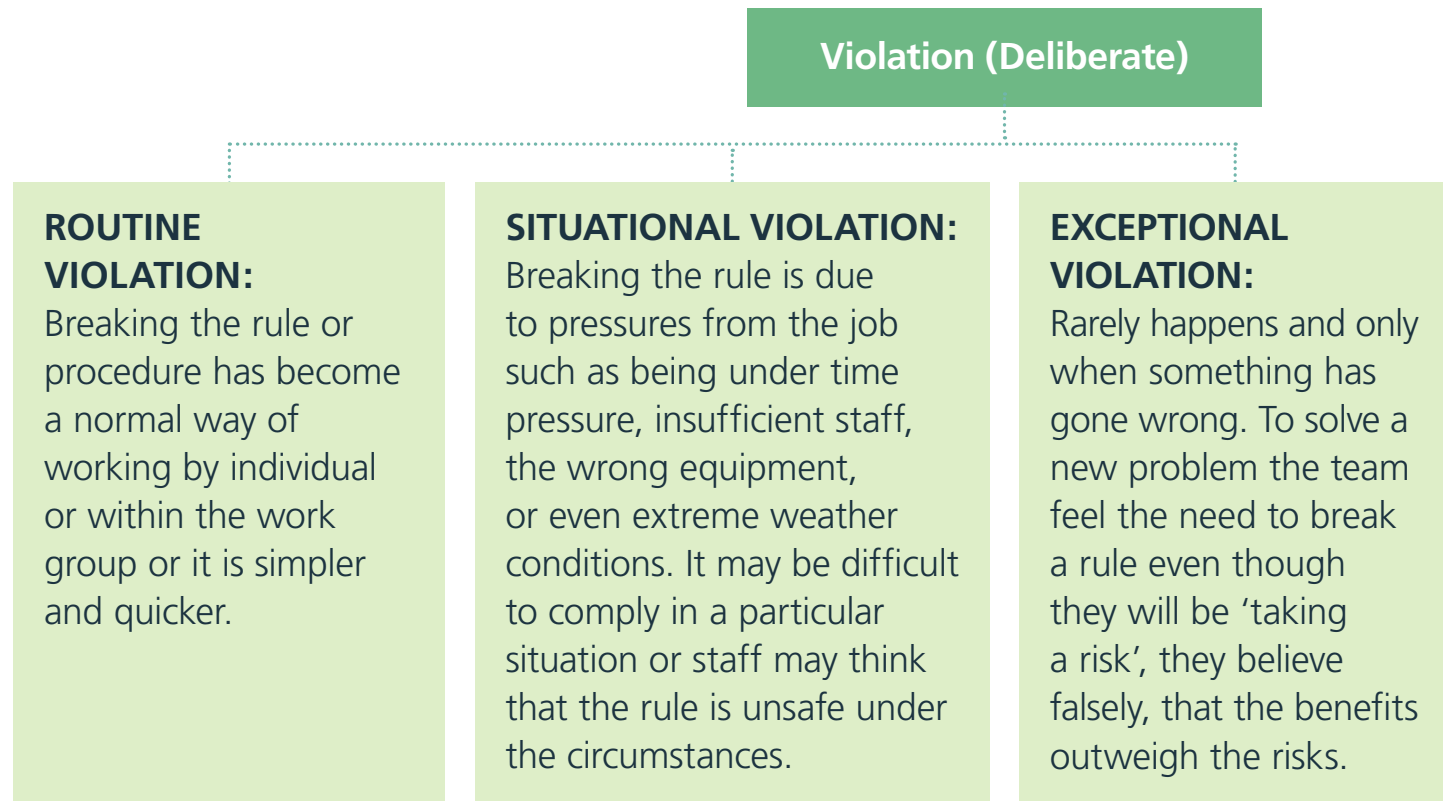
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10. Human Factors and Incident Investigation

Each incident or accident is a learning opportunity, but one that could be wasted unless the effort put into analysing it focuses on discovering the true underlying causes of the incident rather than focusing on the people directly involved and the immediate causes of their failure.

When an incident occurs, Amy and her team want to know why it happened so that we can all learn for the future.

Understanding the root causes is critical and it's important that the four work elements of; Design, Planning, Setting to Work and Work Activity are examined. Remember, Amy and her team never go to work to deliberately have an accident.

An Incident Review Checklist can be used to support incident investigations and when reviewing incident reports. This will assist in determining what human performance influencing factors contributed to the incident.



11. Human Factor Incident Review Checklist

An Incident Review Checklist table can be used to review incident reports to determine if Human Factors have been considered. Contractor reports in particular should be challenged to ensure that the right questions have been asked.

The investigation should aim to:

- Identify those Human Factors as contributing to the incident
- Identify those Human Factors that are root causes
- Identify Preventative actions
- Communicate to those who are or maybe affected

