

Guidance for Inspectors

Objectives, Principles and Evidence ORR looks for

Objectives of human factors integration

Human factors integration processes (e.g. a human factors integration strategy / plan or project integration plan) should define how human factors will be managed throughout the lifecycle of a project. They should:

1. Ensure the project takes full account of the human factors activities required during design, development, installation, commissioning, operating and maintenance;
2. Ensure the equipment / system provided is easy, efficient and safe to use by staff and, where intended, the public
3. Ensure the project identifies and eliminates, or mitigates, the impact of human error and rule violations upon the safety and reliability of the systems
4. Ensure the project provides all the required systems training, procedures and documentation at the right time and to a consistently high standard
5. Ensure that the operational design process considers normal, abnormal, degraded and emergency operating conditions
6. Provide a strategic framework within which all human factors issues will be addressed throughout the project, including those which affect the safety and/or performance of the railway
7. Enable clear identification of human factors acceptance criteria
8. Set out the responsibilities of all external contracts and internal workstreams with respect to human factors
9. Have a process to log, track down and close out identified issues

Principles

1. A system is fit for purpose (from a human factors point of view) if it enables trained operators to carry out their designated tasks safely and reliably under normal, abnormal and emergency conditions

2. The system should not place undue demands on error-free and/or rapid human actions in response to emergency situations
3. Operators should be able to perform their tasks in a sustained manner without excessive workload, exceptional time pressure, significantly reduced levels of alertness or the need to use novel actions or procedures
4. Any equipment (hardware and/or software) provided for operators should support their needs and be tolerant of human error. It should be designed to avoid any loss of confidence in, or frustration with, the equipment by users
5. Equipment should be designed to minimise the need for trained operators to have frequent recourse to user instructions or to other forms of help or written procedures
6. The terminology used on any equipment should match that in normal use by operators, to avoid confusion
7. Priority operator responses to ensure the safety of passengers and staff should be clearly distinguished by suitable design means. Such responses should be quick and easy to make
8. Different items of equipment (including equipment from different suppliers) used by an operator should present information in a consistent format with compatible means of navigation and control
9. Any long-term health effects which may arise from the ergonomics of the workplace should be identified and suitable controls implemented
10. Wherever possible there should be compliance with current human factors design standards and good practice guidelines

Evidence ORR look for

1. Resources and commitment, including:

- High-level project commitment to human factors integration
- A planned process for considering human factors issues throughout the design process
- Specific and relevant performance measures such as progress against written deliverables and stakeholder agreement to proposals

- Human factors effort proportionate to the size of the project, novelty of technology and the consequences of human failures
- Competent human factors resources, their role in the project team and level of project authority

2. A design process that includes user involvement, including for example:

- A description of users, their main tasks and goals, and the context of use in all scenarios including normal, abnormal, degraded and emergency scenarios
- A realistic operational concept, stating new user goals and tasks
- Demonstration that lessons have been learned from past experience and similar systems
- The active participation of end users throughout an iterative design & development process
- A list of relevant human factors standards and guidelines to be used in the design process
- A process for discussing and agreeing risk control measures between multiple stakeholders, designers and suppliers
- A process for tracking human factors issues to closure

3. Assurance and testing, such as:

- A statement of the necessary risk controls including personnel characteristics, staffing numbers, required training and procedural controls
- Evidence of the use of scenarios to demonstrate operational robustness, covering a range of workload, combinations of operational problems and equipment or system failure
- For safety systems, independent assessment of the human factors aspects
- Human factors risk mitigation evidence, for example human reliability assessment, to demonstrate that controls have reduced the risk to as low as reasonable practicable.