

Foreword

The problem we are looking to solve

The suggested approach to finding a solution

Need for the project

Not the project we started with

Partnership with CITB

Flexibility at all stages to align with emerging SLAM

Importance of PSG members and what they brought to the table

Project output

Winston Churchill quote - Now this is not the end. It is not even the beginning of the end. But it is, perhaps, the end of the beginning.

Next stage project (UK wide)

Communicate

Develop support materials

Test and pilot

Report

Thanks to all PSG members and consultees.

Vaughan Hart

Managing Director of Scottish Building Federation (SBF) and Chair of the Project Steering Group

Contents

1	Introduction	
2	Background	
3	Aim and Objectives	
4	Introduction to Human Factors	
5	Consultation Principles	
6	Methodology <ul style="list-style-type: none">• Work Package 1: Human Factors• Work Package 2: Workplace Behaviours• Work Package 3: Use Cases	
7	The Way Forward	
8	Appendices	

Introduction

Previous attempts to address issues around Human Factors in the UK Construction & Built Environment (UKCBE) have been, largely, based on local needs leading to local solutions. This ambitious and innovative project addresses an evidence-based national need and seeks to provide, through CITB leadership, a national solution.

The project was guided by a project Steering Group (PSG – see **Appendix XXX**) and 3 main factors:

- The Project Steering Group
- The need to align project direction/output with the CITB’s emerging Supervisory Leadership and management (SLAM) Framework
- Feedback from industry consultation

The starting point for this solution is found in the early identification and specification of what we mean by Human Factors. There are:

- | | |
|-----------------------|---------------------------------|
| • Situation Awareness | • Leadership |
| • Communication | • Decision Making |
| • Teamworking | • Managing Workplace Behaviours |

The context of, and for, the Human Factors was provided by the CITB SLAM which is based around a notional ‘target audience’ of occupational roles covering the operational, supervisory/mid-management and senior managerial functions:

- | | |
|----------------------------|-----------------------------------------------|
| • Operatives | • Engineers |
| • Occupational Supervisors | • Professionals |
| • On Site Technicians | • Construction Company Owner Operator <50 FTE |
| • Site Supervisors | • Construction Company Leader >50 FTE |
| • Site Managers | |
| • Off Site Technicians | |
| • Construction Managers | |

The Human Factors and the occupational roles gave the project a solid and reliable foundation on which to develop the project output:

- Full detailed specification of Human Factors for the UK CBE
- Human Factor profile by occupational role
- Specification of Workplace Behaviours for the UK CBE
- Workplace Behaviours profile by occupational role
- The Use Case – who will use the projects output and what will they use it for?

UK-wide consultation was a key factor in the development of the project output. The approach to consultation is outlined within this report.

The project output is seen as a starting point for all Human Factor work in the UKCBE and other factors may be added in time as industry demands mature and change. The CITB can now show genuine sectoral leadership on Human Factors by adopting and supporting the project output as part of the SLAM Framework.

Background

Companies in the UK Construction and Built Environment (UKCBE) in partnership with CITB are, broadly, good at identifying and providing technical training to employees. They are, arguably, not so good at recognising the importance and impact of Human Factors in this technical and safety-critical environment. This is not a new issue¹:

the concept of competence in the UK construction industry should be expanded to involve three main interrelated elements:

- **Skill:** occupational/functional skills, plus wider skills such as specific health & safety skills
- **Knowledge:** wide/deep knowledge related to the occupational role and health and safety
- **Human factors:** behaviours/attributes associated with self-, situational-, and risk-awareness

This suggestion was explored and developed further² where the explicit link between Human Factors and the Supervisory level of activity was made:

It is now widely acknowledged across the industry that human factorsare critical components. Supervisors and developing supervisory competence is key, and numerous programmes and initiatives across the industry have been set up to drive up supervisor standards and increase support for informed decision-making on-site.

This research reflected what was going on in the housebuilding sector in Scotland which reported that a lack of sufficiently qualified and competent site managers was leading, directly or indirectly, to both Skills Gaps and Skills Shortages across the sector. Further, the opportunities for individuals to progress from Assistant Site Manager (ASM) or General Foreman (GF) to Site Manager (SM) were limited due to a number of competence/capability factors.

In 2014/15, CITB provided funding to Homes for Scotland (HFS), through the Technical Group on Skills & Training, to explore these factors further. CITB representatives sat on the Steering Group.

This project was successfully concluded in 2015 with the development of a specification for a Site Manager Development Programme (SMDP). The focus of the SMDP was entirely on the development and application of Human Factors in the specific context of the UKCBE. More recently, research findings³ tell us:

It is common within the construction industry for operatives to progress 'through the ranks' to supervisory and managerial levels. Such employees are therefore often technically proficient with strong company-specific skill sets but can lack the broader range of people skills that typify a strong leader.

In short, the problem of Human Factors as they apply specifically to the UKCBE has been clearly identified but never fully or satisfactorily addressed. This proposal seeks to change that situation through a series of innovative and collaborative approaches across the UK.

¹ Routes to Competence in Construction: Health & Safety Executive (2011)

² Competence in Construction: Final Report (CITB 2014)

³ Building Contractors Training Group (BCTG) - Supervisory Skills Gaps within the UK Construction industry (BCTG Construct: Feb 2018)

Aim and Objectives

Aim

To support those working in the UKCBE to optimise their workplace performance through a greater understanding and application of skills, knowledge and behaviours associated with Human Factors.

Objectives

1. Articulate the Human Factors for the UK CBE
2. Identify the suggested Human Factor profile by occupational role
3. Articulate the Workplace Behaviours for the UK CBE
4. Identify the suggested Workplace Behaviours profile by occupational role
5. Identify the Use Case for project output
6. Identify next steps for Human factors in the UKCBE

Project Principle: The project should inform, and be informed by, the work of CITB on the emerging Supervisory Leadership and Management (SLAM) Framework. This would ensure currency and relevance at the point of outcome delivery.

In addition, this project was designed with the longer term objectives to:

- Deliver more UKCBE professionals with the right skills, knowledge and behaviours to progress through the industry.
- Contribute to a reduction in reported skills gaps across UK by bridging those skills gaps between occupational roles (e.g. supervisor and manager) through use of the Human factor specifications
- Increase the awareness and application of Human Factors practice across the UK CBE.
- Increase the supply side of training by getting additional providers (colleges and private) to incorporate the Human Factors in their programmes
- Potentially raise the number of CITB registered companies accessing CITB grants through short duration training grants for programmes incorporating the Human Factors
- Stimulate demand for Human Factor training
- Improve the appeal of working in construction (through showing articulated progression routes) leading to a reduction in the reported skills shortages.
- Add value to the UKCBE through an increase in training spending and the development of fully competent existing employees capable of promotion from within or for recruitment of external candidates qualified with the Human Factors.
- Provide the evidence-based platform for the development of a pilot implementation programme

The Aim shown above was agreed by the PSG as a longer term aim that should be approached in stages. There was a clear need to build a significant evidence-based specification on which any future skills intervention could be based. Failure to do this would immediately put the project into the same category of those that had gone before and identified a problem with no real sense of a specific solution.

Introduction to Human Factors

If you ask 100 people what the Human Factors are (for working in the UKCBE) then you are likely to get 100 different answers. Other safety-critical sectors (aviation, medicine, nuclear, aerospace, , offshore engineering) have carried out extensive research⁴ in this area. Most of them came up with ad-hoc and partial solutions (similar to what has been happening in the UKCBE over the last few years) until the advent/acceptance of Crew Resource Management (CRM) in the aviation, nuclear and medical domains.

This gave a standardised and clear articulation of the Human Factors associated with working in a safety-critical environment. The key to the success of CRM is that it could be applied flexibly in different industries. The CRM approach identified the following 6 Human Factor areas:

- Situation Awareness
- Communication
- Teamworking
- Leadership
- Decision Making
- Managing Workplace Behaviours⁵

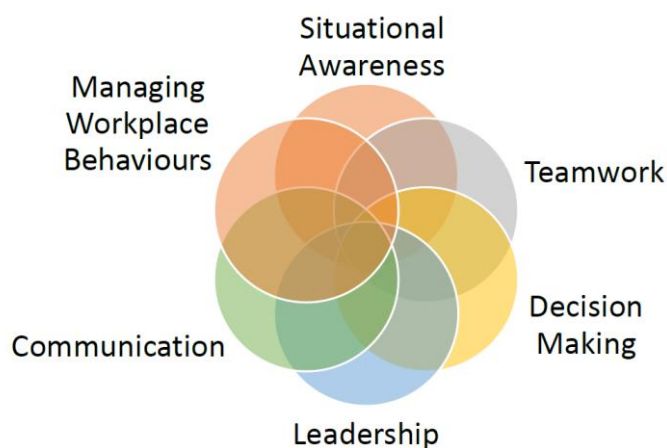
Human Factors links the skills and knowledge required for the technical, safety-critical environment to the behavioural aspects of job competence. It is suggested that the UKCBE uses these Human Factor areas as the starting point on a journey towards standardisation.

Relationship Between Human Factors

The extent to which the Human Factors overlap (see **Fig XXX**) and complement each other depends entirely on the workplace in which they are applied. This tells us two important things:

- Each industry, organisation, division, department, worksite will have its own bespoke combination of Human Factors.
- There is a need for a generic, neutral articulation of the Human Factors for the UKCBE that allows both standardisation (of the articulation) and flexibility (of the solution and its application) i.e.. we should develop a **Human Factors Framework** which is non-prescriptive.

Fig XXX: Model of Relationship Between Human Factors



⁴ A good example is: Safety at the Sharp End by Flin, O'Connor and Crichton (Ashgate:2008)

⁵ Originally Managing Stress: changed (through consultation) to managing Workplace Behaviours for UKCBE

Consultation Principles

The project included significant UK-wide consultation with the following principles:

- The consultation should be as inclusive and broad as possible.
- There was a greater chance of employer/stakeholder engagement if the initial communication was centrally-devised and then distributed by PSG members using all available routes to members and non-members (where appropriate) and using a variety of means to engage.
- Each PSG partner should provide a clear overview of their own specific approach. As an example, the HBF approach is summarised in **Fig XXX**.
- The consultation should seek to use all relevant methods includes:
 - ‘piggy backing’ the HF topic onto existing meeting/seminar agendas and ensuring a singular and consistent message in the form a brief presentation
 - e-consultation (survey monkey) through websites and newsletters to ensure optimum penetration of the project work across the UKCBE.
 - Other as identified as useful by individual members

Fig XXX: Example of Consultation Approach

To assist with feedback and support, HBF can ask members to get involved in a consultation process. To do this an email can be drafted and sent out to various member group outlined below.

Member Group	Recipient details
All members	Email sent out as a briefing as well as promotion in the members weekly news summary.
Majors	All major home builders are sent the email at CEO/ MD level
Mid-caps	Mid to high turnover company members at CEO/MD level
Metropole	Mid-level turnover company members at CEO/MD level
Small developer	Small developer members at CEO/MD level
Careers committee	HR and career representatives from Home builders
National technical committee	Technical directors and managers
HBSP Attract group	HR level representatives from home builders and partners
HBSP Skills & Development group	Skills, HR and L&D representatives from home builders and partners
Qualifying the workforce	Health & Safety directors and managers
Regional groups	Directors and MDs of regional home builders broken down by North West, North East, Yorkshire, East Midlands, West Midlands, Wales, South East, South West and London

Once a member group is chosen or segmented, an email will be sent requesting the level of support required and the deadline. The deadline can vary and follow ups are done a week and a couple of days before the deadline.

For consultations, feedback can be given in email format or through a survey link which proves more successful at engagement. Once the deadline has passed feedback will be exported to excel and members thanked for your support with any further actions or results outlined in a follow up email.

To support and attract as much feedback as possible, HBF would include on other media streams appropriate for the timescale e.g. Newsletter, Weekly Update, Social Media and webpage.

The combined approach of the PSG members ensured that all of the key target groups were included:

- individuals e.g. Site Foremen seeking to progress to Site Manager
- employer organisations e.g. federated and non-federated
- employer representative bodies
- strategic sectoral bodies
- relevant others (by sub-sector)

Each PSG member then distributed consultation documentation and information across their own networks using their own communication tools (e.g. standing committees, newsletters etc) and platforms (online).

This approach was successfully implemented on 3 occasions throughout the project term.

Taking the project as a whole, feedback was received from over 100 individuals from almost 80 separate organisations across the UK CBE. See **Appendix XXX**.

Methodology

Work Package 1 (WP1): Human Factors

WP1	Human Factors
1.1	Articulate the challenge
1.2	Articulate the suggested solution
1.3	Develop Consultation Framework
1.4	Implement consultation
1.5	Develop Human Factors specification
1.6	Human Factor profile by occupational role

Summary of WP1

The challenge was clearly established (see Background) and the project aim and objectives reviewed and developed accordingly. This established ‘the problem we are looking to solve’ and a road map to realising that solution in conjunction with the UKCBE.

Background research was carried out and the PSG agreed that the basis for the Human factors Framework (HFF) should be the Crew Resource Management (CRM) approach, This had been developed in the late 1970s primarily in the aeronautical/aerospace industry but subsequently applied to many safety-critical working environments including nuclear, medicine and offshore engineering/construction.

Detailed discussions took place on the content, nature and applicability of the Human Factors to the UKCBE. It was agreed to adopt and adapt the CRM model. This would be the benchmark for non-technical skills and help to avoid a costly proliferation of parallel projects in the future. The Human Factors relevant to the UKCBE were agreed as:

- Situation Awareness
- Communication
- Teamworking
- Leadership
- Decision Making
- Managing Stress - this was subsequently changed to Managing Workplace Behaviours in order to capture both positive and negative aspects.

A consultation exercise was devised and implemented (see **Appendix XXX**) to identify the full skills and knowledge specification for each of the Human factors as they apply to the UKCBE. In particular the consultation sought feedback on:

- The Human factors themselves (as shown above)
- The definition of each Human Factor. See Fig XXX
- A set of Outline Indicators which was provided as a starting point for the detailed specific required to progress the work. See Fig XXX

Feedback from this exercise was collated, analysed, synthesised and incorporated into the first full specification of Human Factors for the UKCBE. See **Appendix XXX**.

Fig XXX:

Human Factor	Definition	Outline Indicators
Situational Awareness	The ability to recognize, understand and project the events that take (and may take) place within the working environment.	<ul style="list-style-type: none"> • Establishes and communicates current situation/goals • Monitors situation • Identifies change, potential change and implications • Communicates with team (report up and down)
Decision Making	The ability to recognize and understand the range of options and to decide and communicate the chosen option within the working environment.	<ul style="list-style-type: none"> • Identifies the need and timescale for a decision • Involves relevant stakeholders • Identifies information required • Makes and communicates decision
Communication	The ability to consistently and effectively provide/receive appropriate information in a range of formats within the working environment	<ul style="list-style-type: none"> • Identifies the need and timescale for communication • Seeks/receives relevant information • Communicates clearly in a range of formats as appropriate • Responds positively to questions
Team Working	The ability to work effectively and consistently within a team that may experience changes in membership and work scope over time.	<ul style="list-style-type: none"> • Constructively acknowledges the views of colleagues • Provides clear, accurate and sufficient information to enable other team members to effectively carry out their work and makes suggestions of realistic improvements to team performance • Highlights issues within the team and seeks to resolve • Builds positive relationships based on trust and respect
Leadership	The ability to lead safe work through taking responsibility and influencing others in a working environment.	<ul style="list-style-type: none"> • Establishes the team vision. • Positively communicates the purpose and objectives of the team. • Ensures each team member has personal work objectives and encourages them to achieve these • Encourages team members to take the lead when they have the knowledge and expertise
Managing Workplace Behaviours	The ability to recognize, understand and manage workplace behaviours (positive and negative) in self and others.	<ul style="list-style-type: none"> • Recognises the range of workplace behaviours • Recognises the causes of workplace behaviours <ul style="list-style-type: none"> ○ Positive (could include expertise, professionalism, potential, ambition etc) ○ Negative (could include stress, pressure, personal reason, lack of training/expertise, etc) • Develop/implements a strategy to deal with the stress • Monitors the effectiveness of the strategy • Identifies potential changes to work methods and/or processes in order to address specific workplace behaviours

At the same time as the first draft of the HFF was developed, CITB outlined some of the emerging thinking and developments associated with the SLAM Framework. One of the key characteristics of SLAM was the importance of relating any output (or future training provision) to 11 key occupational roles in the UK CBE.

- Operatives
- Occupational Supervisors
- On Site Technicians
- Site Supervisors
- Site Managers
- Off Site Technicians
- Construction Managers
- Engineers
- Professionals
- Construction Company Owner Operator <50 FTE
- Construction Company Leader >50 FTE

It was agreed that the HFF would be more usefully presented, and optimise alignment with the SLAM Framework, if it were presented in the context of the above occupational roles. The outcome is shown in **Appendix XXX**.

It was agreed as being impractical to have a version of the HFF for each of the 11 roles. Instead, three variants were developed for each of the individual Human Factors with a view to identifying an **HFF profile** for each role. The three variants broadly aimed to address the operational, supervisory/mid-management and senior managerial functions of those occupational roles.

The purpose of establishing an HFF profile was to give some initial guidance to those using the HFF and SLAM to identify and construct bespoke training courses.

The outcome, as developed and verified by the PSG, is shown in **Appendix XXX**.

WP1 was complete.

Work Package 2 (WP2): Workplace Behaviours

WP2	Workplace Behaviours
2.1	Articulate the Workplace Behaviours for the UK CBE
2.2	Identify the suggested Workplace Behaviours profile by occupational role
2.3	Develop Consultation Framework
2.4	Implement consultation
2.5	Develop Human Factors specification
2.6	Human Factor profile by occupational role

Summary of WP2

With the HFF successfully developed and profiles against the occupational roles, CITB advised that the emerging SLAM Framework would incorporate 'behaviours'. Clearly, in order to align with SLAM a consultation was launched with UK CBE. It was agreed that this should mirror, and be a companion piece to, the HFF profile by occupational role.

Collation and analysis of all behaviours listed in the Construction and Built Environment Apprenticeship standards showed the behaviours fell into one or more of the following groupings:

- Team working
- Communication
- Health and safety
- Development of self and others
- Problem solving
- Taking responsibility
- Professionalism

It was noted that:

- There is no definitive listing of workplace behaviours and no widely accepted/recognised listing of workplace behaviours as there is for, say, active verbs in the learning domain (Blooms Taxonomy)
- There is no consistency in terms of structure of content of the listed behaviours. This includes the definitions and overviews of professionalism from the professional bodies.
- Many of the behaviours listed on the Apprenticeship standard were simply re-writes of the skills and/or knowledge components (the 'what' individuals do) contained within the standard.
- Team Working, Communication and Problem Solving are explicitly addressed by the HFF and so can be removed from the above list of behaviours. leaving:
 - Development of self and others
 - Taking responsibility
 - Professionalism

It is suggested that:

- Professionalism incorporates Taking Responsibility and the Development of Self.
- The Development of others is predominantly an ancillary function often undertaken by specific teams within organisations (e.g. HR and/or Training) or bought in from external sources/providers.
- The Behaviours applicable to the HFF all come under the single heading of Professionalism. This allows us to focus on ‘how’ individuals go about their work i.e. how they actually behave when they undertake their role.
- Professionalism has two components. That which is performance-based and that which is personal (or personality)-based.

The agreed consultation methodology was implemented and views were sought across the UKCBE. The outcome is shown in **Fig XXX**.

Fig XXX

Performance-based behaviours The individual in the workplace will at all times:	Personal-based behaviours The individual, in the day to day execution of their role, will be:
<ol style="list-style-type: none"> 1. Apply professional judgement and support 2. Challenge unsafe behaviours/activities 3. Demonstrate innovation through the identification of areas for improvement and suggestion and/or development of innovative solutions 4. Identify and manage risks to self and others 5. Keep work area clean and tidy 6. Manage own time effectively 7. Think logically and accordance with the demands of the situation using clear and valid reasoning when making decisions to undertake the work instructions 8. Work effectively individually and in a team 9. Work in accordance with quality requirements 10. Work productively 11. Work safely and ensure the safety of others 12. Work within own level of competence and know when to seek advice from others 	<ol style="list-style-type: none"> 1. Assertive 2. Confident 3. Dressed appropriately 4. Empathetic 5. Fair 6. Honest 7. Proactive 8. Productive 9. Punctual 10. Reliable 11. Respectful (in terms of equality, diversity and inclusion)

It was agreed as being impractical to have a version of the HFF for each of the 11 roles. Instead, three variants were developed for each of the Workplace behaviours with a view to identifying a Workplace Behaviour Profile for each role. The three variants broadly aimed to address the operational, supervisory/mid-management and senior managerial functions of those occupational roles.

The outcome, as developed and verified by the PSG, is shown in **Appendix XXX**. WP2 was complete.

Work Package 3 (WP3): Use Case

WP3	Use Cases
3.1	Develop Consultation Framework
3.2	Implement consultation
3.3	Develop Use Cases

Summary of WP3

So far the project has developed:

- Full detailed specification of Human Factors for the UK CBE
- Human Factor profile by occupational role
- Specification of Workplace Behaviours for the UK CBE
- Workplace Behaviours profile by occupational role

The main questions that the PSG sought to address at this stage was:

- Who will use this?
- What will they use it for?

This simple and effective approach is becoming more common and is referred to as ‘the Use Case.’

The plan was to implement the same consultation approach and seek employer input at certain sectoral events but this was not possible due to the restrictions associated with Covid 19. Instead this was a consultation with the PSG members which identified that they key users would include:

- Individuals
- Employers
- CITB
- FE
- HE
- Private Training Providers
- Trade Associations
- Professional bodies
- Funding agencies
- Clients
- Recruitment Agencies

The detailed outcome of this work is shown in **Appendix XXX**. Work Package 3 was complete.

The Way Forward

There appears to be 3 main options:

1. Pass all project output over to CITB and let them integrate it into the SLAM Framework and 'roll it out' in due course
2. Initiate a follow on project to take the work forward
3. A combination of 1 and 2

Option 1

This option would see CITB dropping the project output into the SLAM Framework and then promoting the use of the Human Factors as an explicit and unique part of the Framework.

Option 2

This option would see the development and implementation of a stand-alone project to build on the identified Use Cases and promote/test the project output and which, as a minimum, would:

- Communicate the existence and benefits of Human Factors specifications and how they can be used
- Develop training/support materials for each of the Human Factors and behaviours
- Test/pilot the suitability of the materials and messages
- Report on the outcome

Option 3

This option would see a specific piece of project work set up to bring the Human factor project output and the aims/ambitions/practicalities of the SLAM Framework even closer together. The work would follow a similar pattern to that in Option 2 but would be even more strongly guided by SLAM as it matures and starts to gain in profile across the UKCBE.