



THE KEIL CENTRE
CHARTERED PSYCHOLOGISTS

The Keil Centre Limited

Human Factors Capability Statement

Summary

The Keil Centre Limited is a private practice of Occupational, Counselling and Clinical Psychologists based in Edinburgh. All of our personnel are experienced in their field of specialism, having spent between 3 and 15 years practicing in a commercial environment. Our combined experience spans a number of industry sectors and includes several significant pieces of work for Train Operating Companies, Infrastructure Companies and the Rail Safety and Standards Board.

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1 Introduction

1.1 Background

This capability statement provides an introduction to The Keil Centre Limited and our work in the field of human factors, which includes some significant UK rail industry projects. Our capabilities in the field of human factors stem from our collective experience in a range of industry sectors, which is transferrable to any domain. Short CVs for our human factors specialists and associates are included at the end of this capability statement.

1.2 About The Keil Centre

The Keil Centre is a private practice of Chartered Occupational, Counselling and Clinical Psychologists, established in 1983. We are based in Edinburgh and provide applied psychology services to business and government, with an international client base. Current and recent clients include Rail Safety and Standards Board, Great North Eastern Railway, Balfour Beatty Rail, Balfour Beatty Rail Projects, Health and Safety Executive, National Air Traffic Services Limited, BP, DuPont, ExxonMobil and British Nuclear Fuels Limited.





2 The Keil Centre's Human Factors Capabilities

The Keil Centre's definition of human factors is closely aligned with the Health and Safety Executive's definition of human factors (see HSG48 – Reducing Error and Influencing Behaviour). We consider the job, the individual and the organisation to be integral parts of the human factors domain. We are therefore in a position to offer breadth and depth in applying human factors to business success.



Our human factors expertise can be divided into the following broad categories, all focussed on health and safety:

- Safety culture;
- Ergonomics;
- Human Error;
- Stress;
- Communications;
- Training;
- Teamworking.
- Behavioural Safety

The table in the following section summarises our capabilities under each of these headings. Later sections will provide further detail on each category.



2.1 Summary of Human Factors Capabilities

Safety Culture	Ergonomics	Human Error	Stress	Communications	Training	Teamworking	Behavioural Safety
Safety Culture Maturity® Model	Human-Computer Interface design and evaluation	Analysis of incidents	StressTools®	Shift Handover Assessment and Design	Delivery	Enhancing safety performance	Analysis of intentional unsafe acts
Best-practice guidance	Usability assessment	Predicting human error in future developments	Development of management standards	Effective communication	Design	Training	Behaviour modification
Evaluation of other assessment techniques	Equipment, workspace, job, task and procedural design	Hazard and Operability studies (HAZOPs)	Stress management	Communication Audit	Training the Trainers		Development of industry guidance
Development of improvement actions	Reducing work related injury	Error reduction strategies	Stress prevention	Training	Human Factors Awareness		Positive Safety Conversations
Training	Human factors in safety management		Assessment of sources of stress		Effective and safe Communications		
	Design for extreme conditions		Risk assessment		Safety Culture Maturity® Model		
	Vision and Lighting		Management training				
	Controls		Staff training				
	Displays						
	Auditory information						

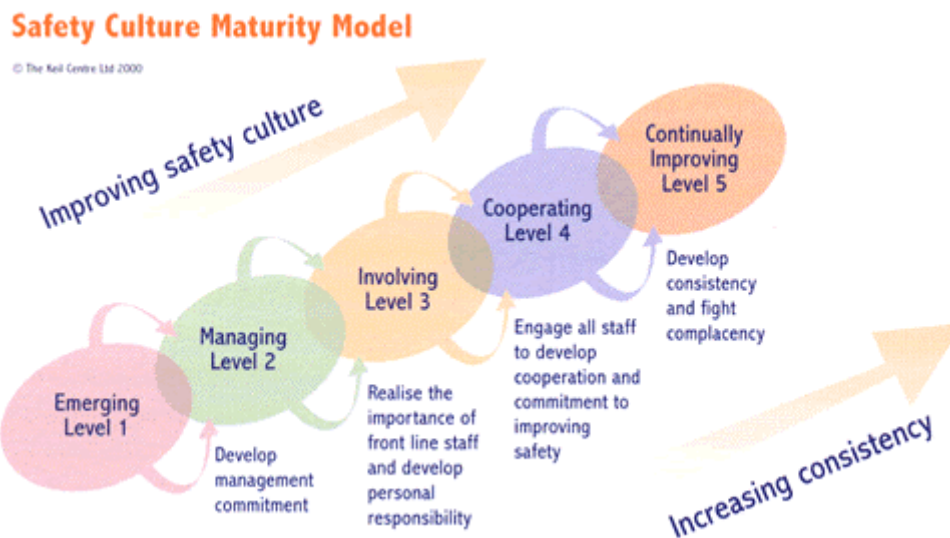


2.2 Safety Culture

Our experience in the field of safety culture is divided between conducting assessments of safety culture for organisations using the Safety Culture Maturity® Model (SCMM), and developing guidance material for regulatory bodies.

2.2.1 Safety Culture Maturity® Model

Creating a positive safety culture is recognised as an essential aspect of effective safety management. As part of a recent project sponsored by the oil industry and HSE, The Keil Centre has developed a Safety Culture Maturity® Model (SCMM), which provides a structured safety culture improvement process. The SCMM® assists organisations in establishing their current level of safety culture maturity and identifying the actions required to improve their safety culture.



The SCMM is set out in a number of iterative stages. Organisations progress sequentially through the five levels, by building on their strengths and removing the weaknesses of the previous level. It is therefore not advisable for an organisation to attempt to jump or skip a level.



An organisation's safety culture maturity consists of ten elements, which include: perceived senior management commitment to safety, trust, communication and employee participation.

The Keil Centre has developed an SCMM workshop to facilitate objective discussion about safety culture and to identify specific actions to improve safety culture. Training in the use of SCMM for internal company staff is also available. The SCMM is available in a number of European languages. Notable projects include:

- Safety Culture Maturity® assessments for a major UK Train Operating Company (TOC) covering their on-train, maintenance and station staff.
- Safety Culture Maturity® assessments for blue-chip companies in the transport & communications, energy & water, construction and manufacturing industries covering a number of high-profile sites around the world.

2.2.2 Safety Culture Guidance

The Keil Centre have been asked to provide best-practice guidance to several regulatory bodies covering a range of industry sectors on the measurement of safety culture. Notable projects include:

- Development of an industry guide to safety culture measurement in the UK Rail industry for the Rail Safety and Standards Board (RSSB).
- Production of guidance on the measurement of safety culture in the European process industries for the European Process Safety Centre (EPSC).
- Development of guidance on the measurement of safety culture for the UK Health and Safety Executive (HSE) as part of the Step Change initiative for the UK petrochemical industry.
- Evaluation of the HSE's Climate Survey Tool for the measurement of safety climate.



2.3 Ergonomics

The Keil Centre can offer the services of an experienced Ergonomist in addition to our psychological services. We can therefore provide input to the design of systems, objects and working environments to ensure that they are safe, comfortable, and efficient to use. Previous experience of our Ergonomist includes:

- Provision of Human Factors expertise to Air Traffic Control (ATC) engineering staff, including Human Machine Interface (HMI) evaluation and definition of roles and responsibilities.
- Conduct of ATC usability assurance trials and HMI evaluations.
- Nimrod MRA4 Tactical Command and Sensor System HMI development.
- Nimrod Mark 2 datalink re-fit, conducting anthropometric assessment and HMI evaluation for the introduction of new equipment into the existing aircraft.
- Apache WAH64 HMI evaluations to inform the development of two software intensive systems.
- Virtual reality training development for Army anti-tank infantry.
- UK Ministry of Defence Human Factors Integration Programme (HFIP) training and education needs.
- Usability assessment of speech compression technology for use in ATC.



2.4 Human Error

Human error is frequently reported as one of the causal factors in incidents, accidents and near misses across a range of industrial sectors. Knowing how to tackle human error is therefore of key importance.



At The Keil Centre we draw upon many years of experience in identifying the human factors causes of error to help organisations to clearly specify actions that will have a powerful impact on safety performance. Recent work has included:

- Development of a human error analysis tool for use with an existing root cause analysis technique. This tool allows incident investigators to identify the psychological causes of error (i.e. why the error occurred).
- Development of a predictive error analysis tool for system designers to use during risk assessment of future equipment, procedures and organizational changes.
- Identification of the underlying causes of errors which led to train dispatch irregularities for a major UK TOC.
- Analysis of errors involved in an accident for a UK Rail infrastructure company.



2.5 Stress

The Keil Centre's Chartered Psychologists have a strong reputation for providing evidence-based services which cover all three levels of a comprehensive approach to work-related stress, namely:

- 1. Prevention** Identifying and tackling work-related stressors at source, via stress risk assessment

- 2. Management** For all employees, education and training in skills to recognise and cope with unavoidable stress

For managers, supervisors and HSE/HR professionals, training about their important role in identifying and tackling signs, symptoms and causes of stress

- 3. Treatment** For those requiring 1:1 help, access to professional psychological treatment and support can be arranged through our Clinical and Counselling service.

Further details of the specific types of help The Keil Centre can offer are described below:

- **Formulation of stress/mental health at work policy**

- Expert input to support internal staff who wish to develop a policy

- **Stress risk assessment**

The Keil Centre has extensive experience of design and delivery of stress risk assessments in a variety of sectors and organisations

Three different projects delivered by The Keil Centre recently, which all focus on prevention, are listed as examples of best practice on the UK Health and Safety Executive's best practice database.



A stress prevention project delivered by The Keil Centre for BP won a prestigious 2002 European Health and Safety Award.

The Keil Centre has also developed a **flexible and innovative** online stress risk assessment package called StressTolls® that includes 3 stress risk assessments and a set of internal management standards.

The Keil Centre offers training for internal staff in the use of StressTools, which allows internal HSE, HR, Occupational Health and operational personnel to conduct their own stress risk assessments and act upon the results



The Keil Centre can also design and deliver StressTools projects when lack of time or internal expertise does not permit in-house delivery

A joint approach to the design and delivery of StressTools projects can also be adopted, involving coaching by our staff through all stages of a stress risk assessment project.

Development of internal capability and competence

The Keil Centre offer a bespoke Stress at Work MasterClass for internal HSE, HR, Occupational Health and operational personnel, who are responsible for the design and execution of policy

- For managers, supervisors, and HSE/HR professionals training to equip them for their important role in identifying and tackling signs, symptoms and causes of stress
- For all employees, education and training in skills to recognise and cope with unavoidable stress

Other bespoke projects, for example:

- Design of training and educational materials
- Management development workshops



- Design of a stress competency model
- Production of an educational video on stress at work
- Design of internet site on stress at work
- Formulation of recommendations on how to deal with work-related stressors
- Bespoke input to HSE conferences and seminars
- Assistance with the design, analysis or interpretation of stress questionnaires, surveys etc.

2.6 Communications

The accurate transmission of critical information is vital for the safety and profitability of high-reliability organisations. Shift handover is one of the critical points of information transfers for continuous process operations. A number of high profile disasters (e.g. Piper Alpha) have illustrated the consequences of failing to communicate information, especially between shifts



The Keil Centre has completed three applied research projects on safe communication at shift handover for the UK Health and Safety Executive, and numerous projects for commercial clients to assess and improve the effectiveness of communication in safety-critical operations. The Keil Centre has developed an audit methodology, training courses and a three-stage approach to improving safety critical communication. The first stage involves conducting a communication audit, the results of this audit are used in the second to improve communication by improving systems and training. The third stage involves ongoing monitoring against a specified standard. This improvement methodology can be licensed for use by in-company personnel.



2.7 Training

The Keil Centre has a strong reputation for its training courses, delivered to clients from a range of industries. All members of our human factors team are experienced in the following aspects of training:

- Training needs analysis
- Design, conduct and evaluation of training
- Open and distance learning
- Computer-based training
- Training of trainers

Examples of recent training courses include:

2.7.1 Human Factors Awareness

Of increasing importance in many such industries is the need for personnel to have a basic understanding of human factors. This helps to empower personnel to tackle some basic human factors issues in the workplace, and for managers to better understand and prioritise these issues.

- The Keil Centre has developed one-day and three-day human factors courses for managers and personnel offering training in all aspects of human factors relating to safety (as defined by the Health and Safety Executive).

2.7.2 Safety Culture Maturity® Model

The Keil Centre provides training to organisations to allow them to conduct their own internal assessments of safety culture maturity. This is offered as part of a licensing agreement for use of the Safety Culture Maturity® Model (see section 2.2.1).



2.7.3 Stress

The Keil Centre provides the following training courses relating to stress at work:



- Education and training for employees in skills to recognise and cope with unavoidable stress
- Training to equip managers, supervisors, and HSE/HR professionals for their important role in identifying and tackling signs, symptoms and causes of stress
- Training for internal staff in the use of StressTools®, which allows internal HSE, HR, Occupational Health and operational personnel to conduct their own stress risk assessments and act upon the results

2.7.4 Communications

The Keil Centre provides training to organizations wishing to address the effectiveness of their communications. Specific offerings include:

- Training in effective communications for managers and front-line staff.
- Training in auditing communication during shift handover and identifying practical improvement actions.

2.8 Teamworking

Many organisations are placing increasing reliance on teamworking to support achievement of their business objectives. There is a trend towards increasing the autonomy and competence of team members, and reducing levels of supervision. The implications for health and safety of an increased reliance on teamworking are not readily apparent, especially in high-hazard industries.



The Keil Centre's Chartered Psychologists have conducted a number of applied research projects and teamworking interventions to ensure that the benefits of teamworking are realised, whilst known "safety tripwires" are successfully negotiated.



Recent projects include:

- Development of a best-practice guide to teamworking and safety for the European Process Safety Centre.
- Reviewing best practice in the implementation of self-managed teams, and producing guidance for industry
- Assisting an oil refinery to choose the most appropriate form of teamworking for its existing culture, and implementing enhanced teamworking in shift production teams
- Advising the nuclear industry on safety implications of self-directed teams
- Designing a guide on safety implications of self-managed teamworking for use by UK Health and Safety Executive offshore safety inspectors.

2.9 Behavioural Safety

It is now widely recognised within high-reliability organisations that employee behaviour is a significant contributory factor in a large proportion of accidents and incidents. With the increasing recognition of the importance of employee behaviour there has been a corresponding increase in the number of companies providing behaviour modification programmes, which aim to reduce unsafe behaviour and thus reduce accident rates. The effectiveness of these programmes appears to vary widely, with some organisations reporting dramatic reductions in accident rates, while others report no improvement. This presents managers with the challenge of trying to select an appropriate programme for their organisation. Their task is made more complex by the terminology used and the fact that all providers can provide examples of success.



The Keil Centre has recently completed a project for the UK Health and Safety Executive's Offshore Safety Division and the oil industry's STEP-Change committee investigating the efficacy of behaviour modification techniques and the characteristics of successful programmes. This project revealed the features of effective programmes and provided organisations with guidance about how to select and implement behaviour modification programmes effectively.



The Keil Centre's Chartered Psychologists use their expertise in this area to provide organisations with independent advice to assist them in the selection of an appropriate behaviour modification programme. We also provide assistance in 'trouble-shooting' programmes that have encountered difficulties and re-launching programmes that have fallen into disuse.



3 The Keil Centre's Human Factors Team

3.1 Staff

Ronny Lardner BSc, MSc, C.Psychol, AFBPsS



Ronny is a Chartered Occupational Psychologist and a Director of The Keil Centre.

He manages The Keil Centre's human factors programmes and also undertakes projects on a variety of applied psychology topics including assessing and enhancing safety culture, behavioural safety, effective team-working and communication in safety-critical industries.

Recent/current work includes:

- Acting as an expert advisor to a research project, founded by the UK Health and Safety Executive, which involved the development of management standards for work-related stress
- Advising and facilitating in client organisations tasked with implementing a comprehensive strategy to tackle work-related stress
- On behalf of the UK Health and Safety Executive, researching a variety of human and organisational factors which influence health and safety, including safety culture, behavioural safety, effective shift handovers, human factors in health and safety, work-related stress, etc.
- Acting as external human factors advisor to a company team investigating a series of unexplained lost production incidents
- Delivering a wide range of applied human factors projects for clients in the onshore and offshore petrochemicals and process industries
- Developing the internal human factors capability of a high-hazard site.



Richard Scaife, BSc(Tech), MSc, C.Psychol



Richard is a Chartered Occupational Psychologist with fourteen years experience gained primarily in defence and air traffic control, working as a Human Factors Specialist.

He specialises in all aspects of human factors, particularly human safety analysis (including human error) and the design and evaluation of equipment to meet user requirements.

Richard's undergraduate studies were completed at Cardiff University, and he then went on to complete a Master's degree at Cranfield University. Prior to joining The Keil Centre, Richard spent six years working for National Air Traffic Services, latterly as the head of human safety in their Human Factors Unit. He has also spent four years working on the design of military sensor systems, primarily for aircraft.

Recent/current work:

- Delivery of Safety Culture Maturity® workshops to a range of UK organisations across a number of industrial sectors to help them to develop action plans for the improvement of safety performance
- Advising the Rail Safety and Standards Board on the measurement of safety culture in the UK rail industry, including the development of a guide to measuring safety culture for all UK rail industry companies
- Conduct of human factors Hazard and Operability (HAZOP) study to assess the impact of proposed rule changes for a UK Train Operating Company
- Investigation into the cause of train despatch errors for a UK rail client to help in the development of effective actions to minimise impact
- Development of a computerised tool for the investigation of the likely impact of automation on the role of the operator for a UK aviation organisation
- Participation in the delivery of a Human Factors training course to managers and staff of a UK petrochemical company.
- Development of a bespoke safety culture assessment methodology for Air Traffic Control



Chiara Amati, MA, MSc



Chiara Amati, an Occupational Psychologist, joined us in January 2001.

A native of Italy, Chiara studied psychology at the University of Edinburgh. Chiara then worked as a research associate at The Koestler Parapsychology Unit investigating human volition and willpower.

Chiara is currently completing a Masters degree in Occupational Psychology at Heriot Watt/Strathclyde Universities. She joined The Keil Centre's human factors team, and works with Ronny Lardner.

Recent/current work:

- Involvement in UK Health and Safety Executive joint-industry project focusing on the application of innovative solutions to tackling stress at work through the development of management standards
- Design and delivery of company-tailored stress risk assessments which emphasise effective identification of sources of stress linked to practical preventative solutions
- Provision of workshops aimed at helping managers and team leaders to recognise and prevent stress in their organisations.

3.2 Associates

Bill Gall, BSc (Tech), C.Psychol, MergS, MEI

Bill has 24 years experience as a human factors specialist in manufacturing industry, consultancy and the Health and Safety Executive.

Bill is the former Head of Profession (Human Factors) for Serco Assurance's team of Ergonomists and Psychologists and held the post of Human Factors Programme Manager/Project Director for Devonport Royal Dockyard Ltd.

Since 2002 Bill has been a Project Manager/Technical Advisor for four rail safety research projects (one international with a pan-European Steering Committee) concerned with safety culture, competence and compliance with safety-critical rules.



Bill's previous work includes:

- Study of 'dual role' operations (multi-skilling of operators and technicians) at a gas plant to determine the impact of team flexibility on safety.
- Applying the Safety Culture Maturity® Model to a food factory.
- Various studies of human performance in the operation of road tankers, nuclear power and reprocessing plants, oil and gas platforms, rail (freight, passenger and 'underground'), chemical manufacturing plant, water industry, electricity supply industry. Consultancy work has included participation in HAZOPs, usability studies, change management audit and human reliability analysis.
- Interview-based survey for HSE concerning how best to introduce human factors methods and approaches to safety and health in high hazard industry.
- Developed a series of 16 human factors 'Briefing Notes' – introductory text on key HF subject matter and techniques – for the petroleum industry as a member of the Institute of Petroleum (now 'Energy Institute') Working Group on human factors. Recently completed a similar set of guidance notes aimed at lower tier COMAH sites for HSE's Hazardous Industries Division and a number of illustrative case studies for the Energy Institute.



Annex A: The Keil Centre Terms of Business

PROJECTS AND COURSES

The following terms relate to assignments of a project nature undertaken by Keil Centre consultants on behalf of clients.

A consultant day is normally taken to be a maximum of 8 hours between 0830 and 1800 hrs, including lunch breaks. If evening, weekend or public holiday work is involved, and/or if the project involves work offshore or outside the British Isles, higher rates may apply.

Fees generally include training materials (unless these have to be purchased or hired externally). Test materials are included in the case of individual assessments, but will be charged extra for assessment centres and other projects involving any volume of test or questionnaire administration. Video, travel, hotel expenses and other subsistence expenses are charged extra. Travel and subsistence is charged at cost: where car travel is involved the mileage rate is 50p per mile.

For work charged at an hourly rate which involves travel, travelling time will also be charged at the hourly rate.

PAYMENT TERMS

All fees are liable for Value Added Tax.

Consultancy projects are invoiced on a monthly basis, for work completed. Invoices are payable within 30 days from the date of invoice.

Charges for cancellations before the commencement of booked consultancy work are as follows:

- within 2 weeks: the full fee
- within 3 weeks: 50% of the fee
- within 4 weeks: 25% of the fee.

Charges for cancellations of individual assessments (not changes of date) within three days of the arranged date will be £100.

For in-company training courses, the venue is organised and paid for directly by the client. The tuition fees are payable four weeks before the starting date of the course. Travel and subsistence for Keil Centre consultants are payable on completion of the course.

Outplacement fees are payable in full by the sponsoring organisation within 14 days of the individual attending their first session with their counsellor.

In the event of a confirmed project or in-company training course being cancelled, or the numbers of days required reduced, The Keil Centre will credit the client with any time which can be resold.

In the unlikely event of illness or other unusual circumstances, we will endeavour to replace the consultant with one of a similar level of experience.



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A party may disclose Confidential Information to the extent required by law or where the disclosure is required by order of a court or regulatory body.

Ronny Lardner, Director
August 2001