Thomas Ashton Institute for Risk and Regulatory Research

Showcase 2023

Thomas Ashton Institute

The University of Manchester

HSE

UKRI Science and Technology Facilities Council

diamond

Thomas Ashton Institute

For Risk & Regulation

@ashtoninstitute

ashton@manchester.ac.uk

www.ashtoninstitute.ac.uk

Thomas Ashton Institute for Risk and Regulatory Research

About

Our aims

News and events

Contact us

The man behind the Thomas Ashton Institute for Risk and Regulatory Research

3 November 2022

The launch of the Thomas Ashton Institute in 2017 signified a major acknowledgement of the importance in ensuring the safety and health of a rapidly changing workforce. But who was Thomas Ashton?

When deciding on a name, it was important to not only choose someone who was synonymous with the ideals and values upheld by the Institute, but also someone who made a significant contribution to the development of Manchester as a major economic city as part of the industrial transformation that swept the country in the mid 19th century. Thomas Ashton was part of a family dynasty that valued the wellbeing and safety of their workforce. Thomas himself saw education as a medium for developing not only his workers, but also as a way of developing the nation's prosperity.

Thomas was a substantial supporter in the development of the Hyde Mechanics Institute, and further provided scholarships for talented employees to attend Owens College and the Manchester Mechanics Institute (and later the Manchester Technical School)

The Thomas Ashton Institute

Our purpose

- The Thomas Ashton Institute draws upon the combined strength of The University of Manchester (UoM) and the Health and Safety Executive (HSE) to deliver excellent research, education and regulatory insights to enable a safer working world.

Our capability

- TAI enables genuine co-production of research through a governance structure that is distinct and unique; we empower government officials and academics to co-operate in ways that are conducive to delivering transformative research into society. The institute creates a capability to co-create solutions to complex challenges that lie at the intersections of the engineering, physical, medical and social sciences.

Our measures of success

- Success is measured by reputation, both externally as a leading authority on regulatory science, and internally as an inclusive community of academics, civil servants and professional service staff who share a common goal. Also:-
    - 'R-Code' research income including UKRI and Contract Research
    - Citations of outputs in peer reviewed journals
    - Citations in government policy documents and commissions
    - Parliamentary impact
    - PhD recruitment and completions
    - Civil service awards/UKRI impact awards

Our vision for the institute

- The Institute will be an established, world-leading authority on regulatory science with a demonstratable track record of internationally excellent co-produced scholarship, policy impact and successful postgraduate research training leading to a new generation of scholars.

TRANSFORMING RISK , DELIVERING RESILIENCE

The Thomas Ashton Institute draws upon the knowledge and experience of the University of Manchester and the Health and Safety Executive (HSE) to deliver research, learning and regulatory insights to enable a better working world.

By combining research with regulatory insights, as well as through varied learning opportunities, the Institute will inform and improve industry practice and regulatory intervention.

Building upon the established reputation of its founding partner organisations, the Institute aims to deliver safer, happier and healthier workplaces around the world.

Grounded in social responsibility, the Institute will deliver change through:

- World class research
- Outstanding teaching and learning (PhD, postdoctoral, CPD)
- Robust data and data analytics

The complementary capabilities of 2 of the UK's most reputable science organisations makes the Institute a compelling choice for research funding bodies, combining academic prowess with real-world experience across all industrial sectors.

Our research is organised around six inter-disciplinary work-streams

How the digital revolution impacting society can be harnessed to continuously improve safety and health and be best employed to assure a resilient working world

How work and health outcomes are intimately interlinked, and what interventions can improve health outcomes.

How to improve the health, wellbeing and safety of the workforce

Understanding and considering the interdependency between various work activities that makes up our complex work environments so they are designed and managed to be safer and more resilient

How improvements in health & safety can support societal changes to the way work is undertaken

How to continuously improve the safety and increase the resilience of infrastructure of today and tomorrow

www.ashtoninstutute.ac.uk | ashton@manchester.ac.uk | @ashtoninstitute

TAI Thomas Ashton Institute

The Thomas Ashton Institute

Keeping the UK Building Safely

A two-phase project funded by HMT and overseen by Sir Patrick Vallance's Core National Studies Programme

https://www.gov.uk/guidance/national-core-studies-programme

ONR Office for Nuclear Regulation

Office for Nuclear Regulation

2 projects on the provision of an independent assessment of ONR's regulatory oversight culture (CONR), and the development and validation of a safety culture model and survey instrument for assessing safety culture within the UK nuclear industry (CiNIMA)

Safety Leading Indicators

The project aims to collect evidence on how occupational safety & health leading indicators have been used and linked with safety outcomes in high-risk industries around the globe

Health and Safety
Executive

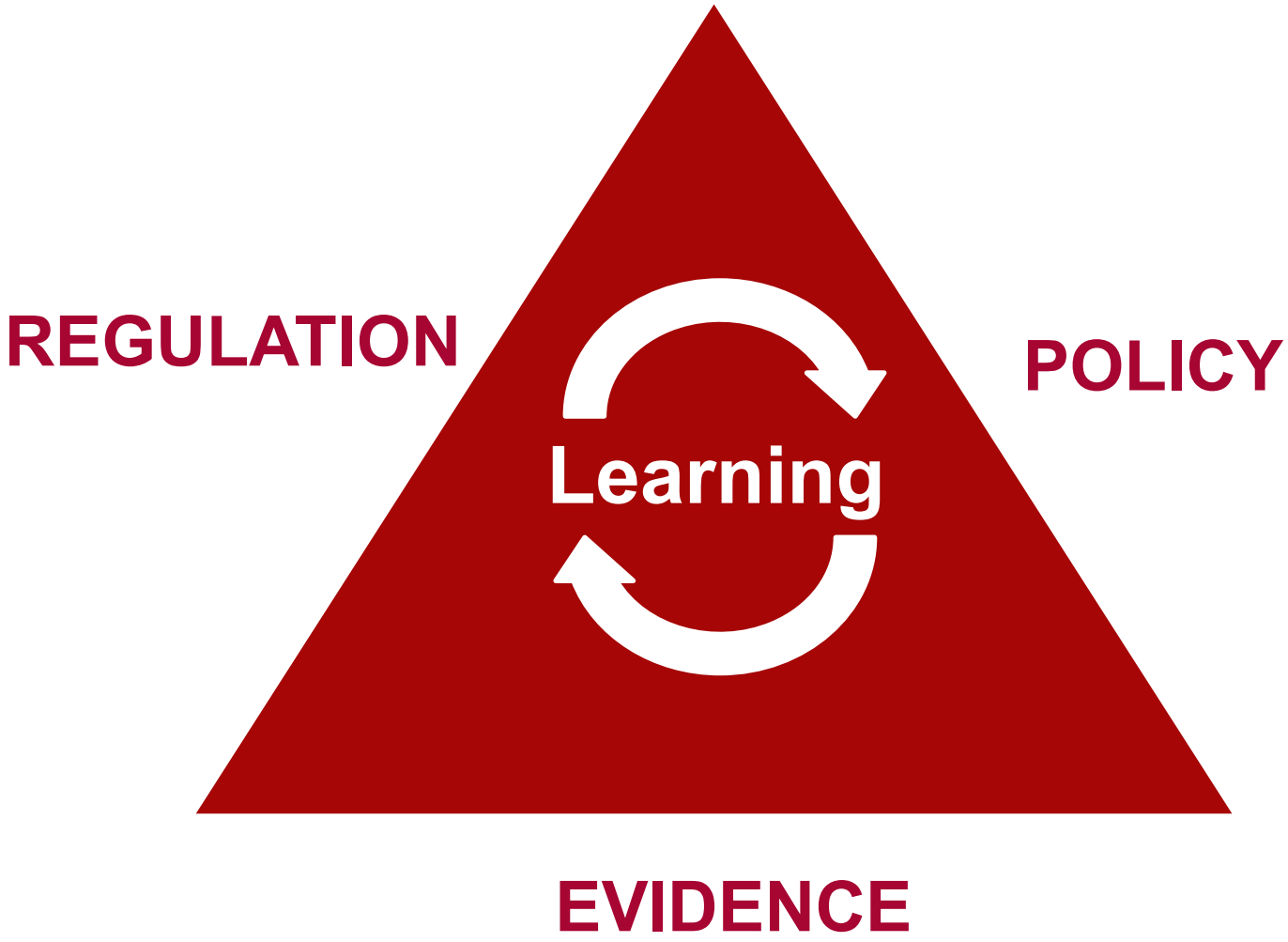
Science in HSE

Professor Andrew Curran
Director of Science and Chief
Scientific Adviser

What the Act says…

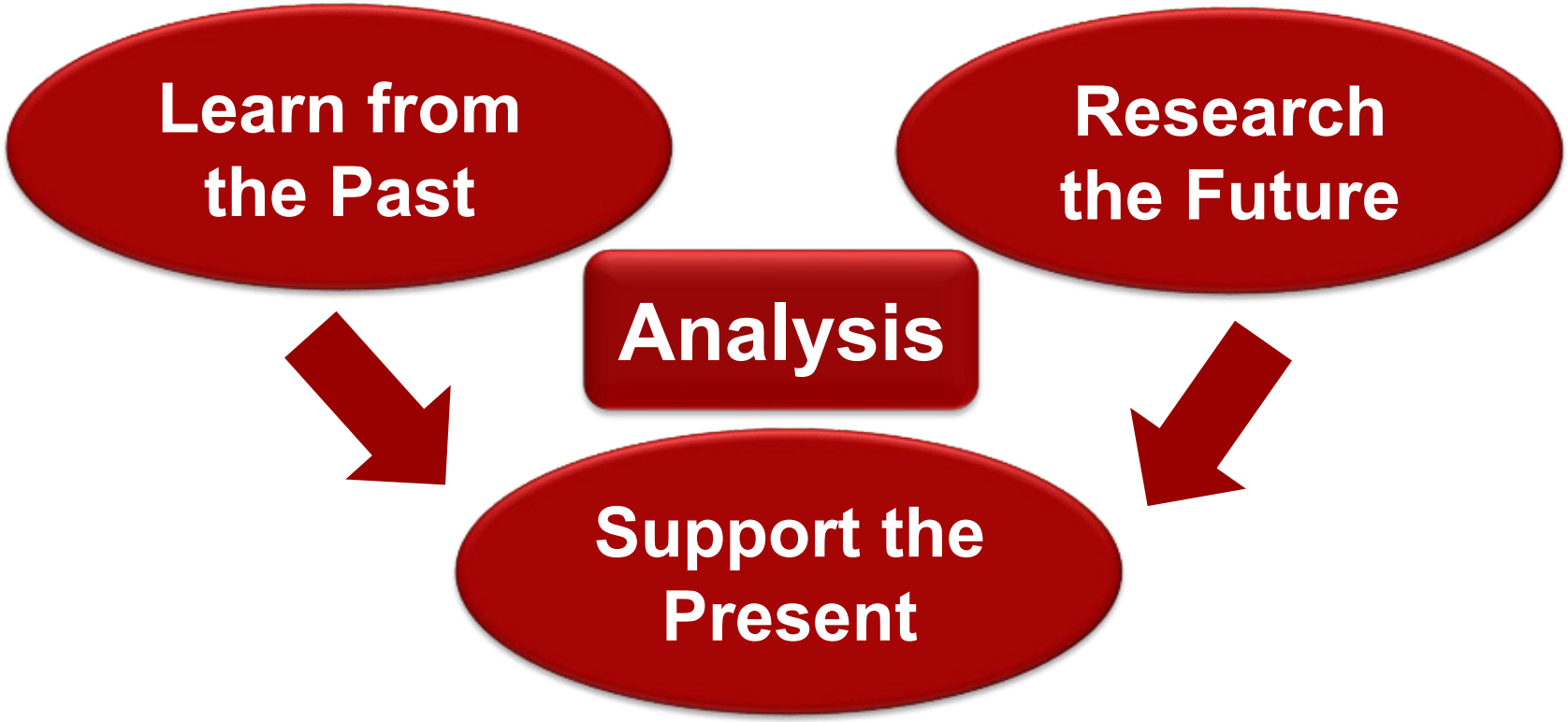
… shall make such arrangements as it considers appropriate for the carrying out of research and the publication of the results of research…

A System Underpinned by Evidence



How we use science in HSE

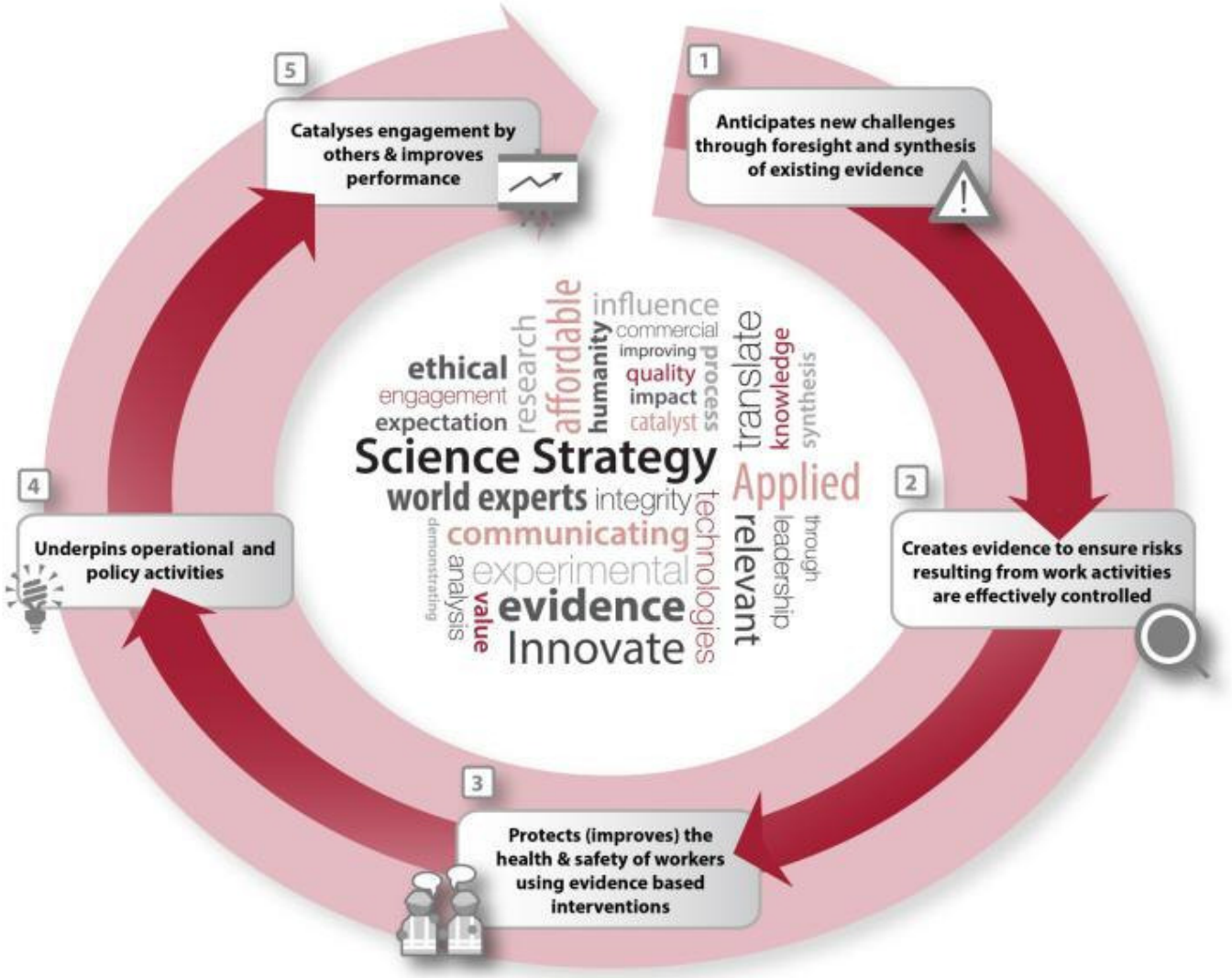
Knowledge Generation



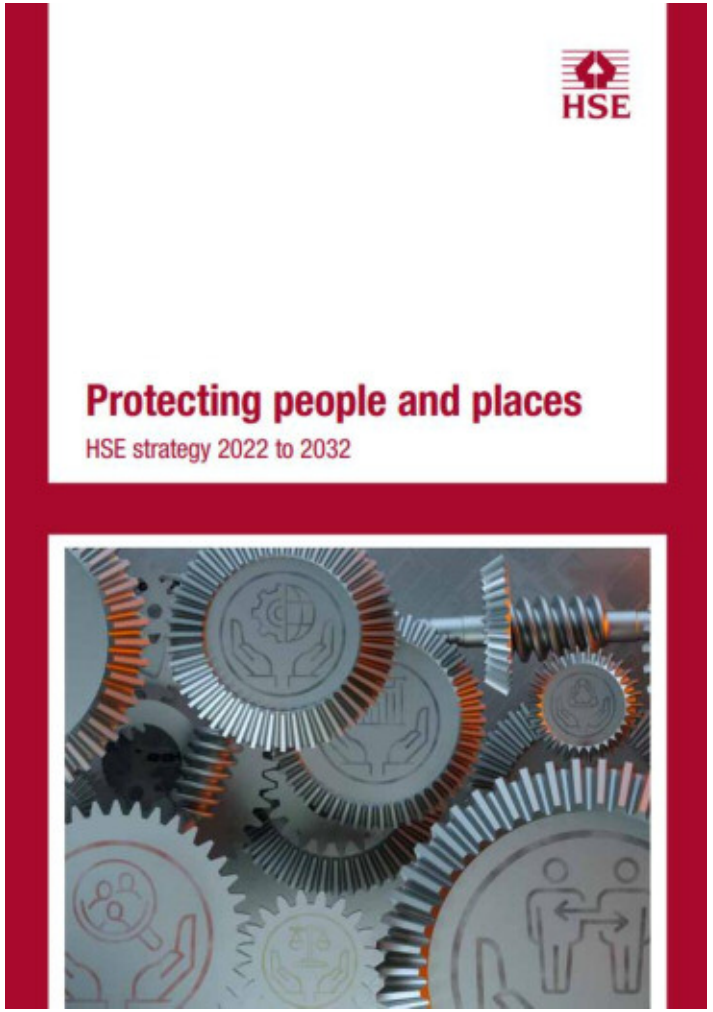
Knowledge Transfer via Practical Solutions

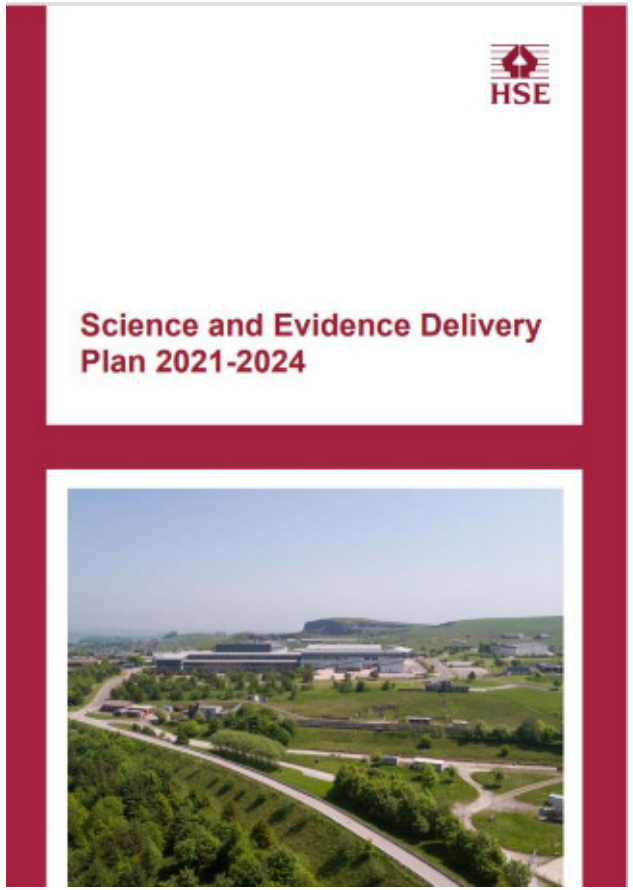
Relationship with Manchester

Science and Evidence Strategy



Our Strategy

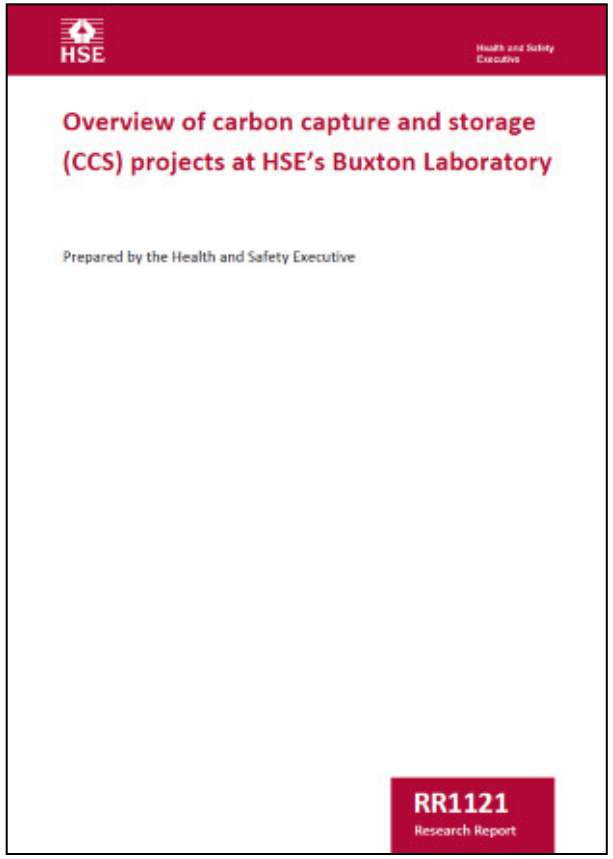


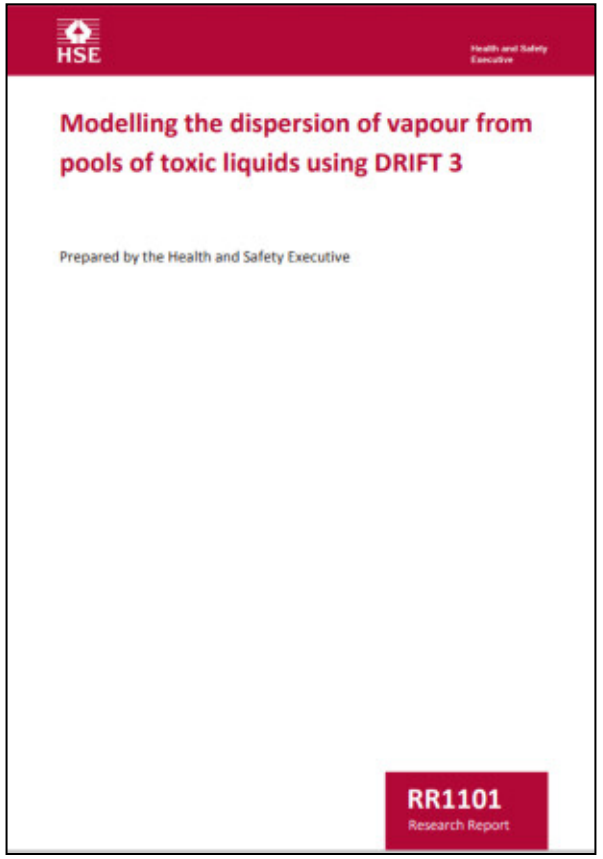


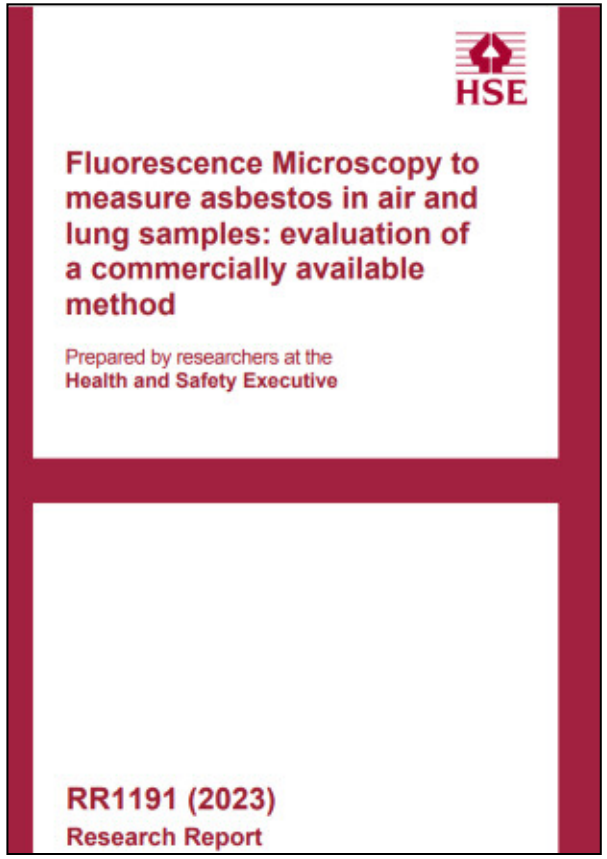
Science system

“Shop window” for Academia, OGDs, Industry

Outputs


HSE
Health and Safety Executive
Overview of carbon capture and storage (CCS) projects at HSE's Buxton Laboratory
Prepared by the Health and Safety Executive
RR1121
Research Report

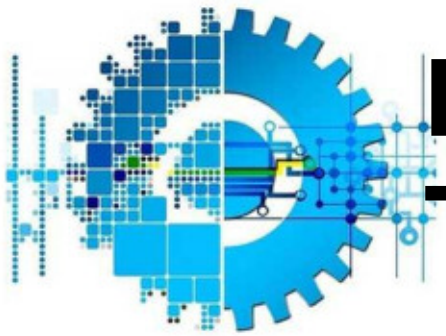

HSE
Health and Safety Executive
Modelling the dispersion of vapour from pools of toxic liquids using DRIFT 3
Prepared by the Health and Safety Executive
RR1101
Research Report


HSE
Fluorescence Microscopy to measure asbestos in air and lung samples: evaluation of a commercially available method
Prepared by researchers at the
Health and Safety Executive
RR1191 (2023)
Research Report

Outputs


PROTECTING PEOPLE
AND PLACES
HSE
Annual Science Review 2023

Thank you



Digitalisation and Complexity Theme introduction

Theme leaders and key members

Dr William Collinge

Academic theme lead

Lecturer in Project Management

Department of Engineering Management

School of Engineering

Dr Helen Balmforth

HSE theme lead

Head of Data and Analytics

Dr Clara Cheung

Former academic lead

Senior Lecturer in Project Management

Department of Engineering Management

School of Engineering

Digitalisation and Complexity Theme

Aims and objectives

- To understand what digitalisation means for occupational health and safety.
- To identify the opportunities for digitalisation to shape our working lives and improve workers' health and safety.
- To identify challenges and opportunities on how health and safety related digitalisation is managed and regulated.
- To identify key barriers to effective deployment of new technologies and potential practical solutions to increase industry uptake.

Digitalisation and Complexity Theme

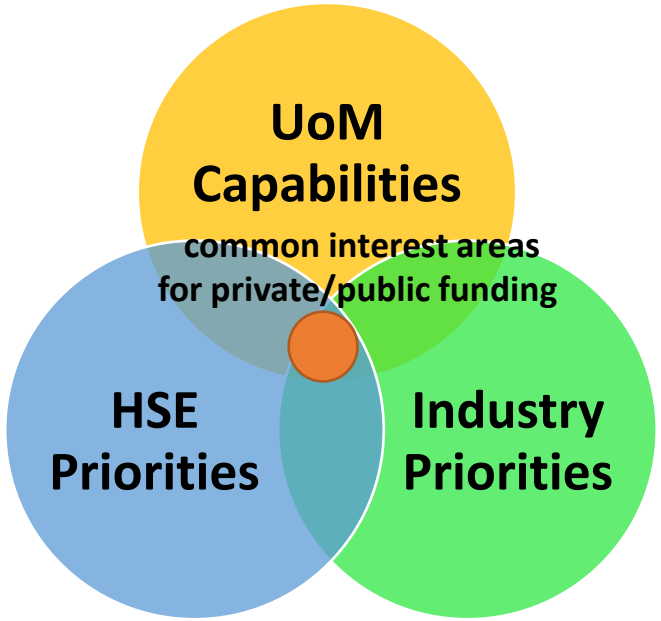
• Current/Recent completed projects

- **Design for Safety in Construction: Collaboration for knowledge transfer from the UK with implications for policy and practice in Malaysia** - The British Council
- **High-Performance Graphene Enhanced Cement: revolutionary Innovation in Low Carbon Manufacturing Process** - Innovate UK
- **The Evidence Base for occupational safety & health (OSH) Leading Indicators** - Lloyds Register Foundation and University of Manchester
- **Discovering Safety Programme - Using data and analytical techniques to improve global health and safety performance** - Lloyds Register Foundation

• Proposals in preparation

- **Digital Occupational Safety and Health Network (D-OSH)** – EPSRC Network Grant
  Submission deadline July 2023 Value ~ £500k
- **Manufacturing Safety Hub call for a sustainable future: outline stage** - UKRI
  Submission will be in 2 phases - 1st stage deadline 10 May 2023
  Value - £10-£11 million over 7 years
  Proposal Hub name: EPSRC Hub for Sustainable and Safe Manufacturing in a Rapidly Shifting Risk Landscape
- **Construction scaffolding safety & wind modelling project** - UoM IAA application

• Digital Health and Safety Satellite

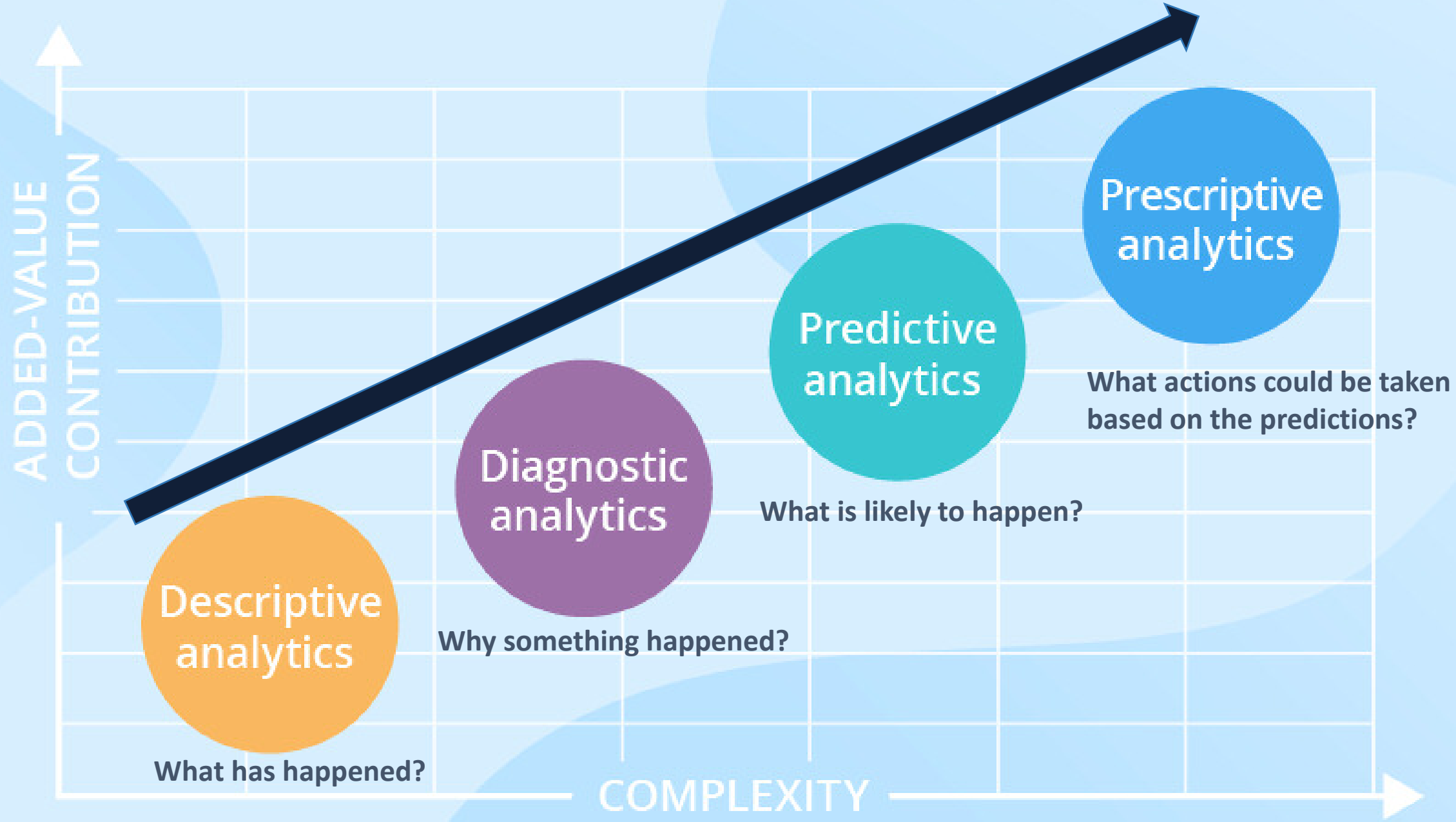


Introduction to Discovering Safety

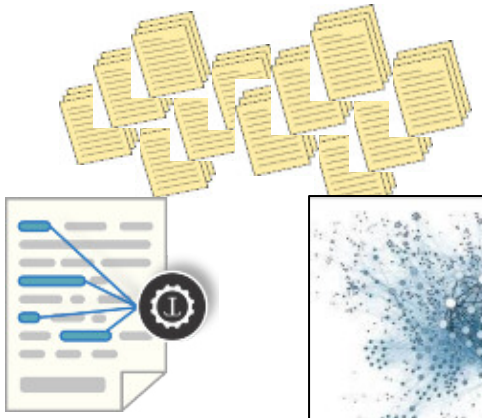
Discovering Safety aspires to be a leader in innovative, data driven health and safety with the aim of improving performance through the use of cutting edge data and analytical techniques.

Delivering health and safety benefits through a data driven global community

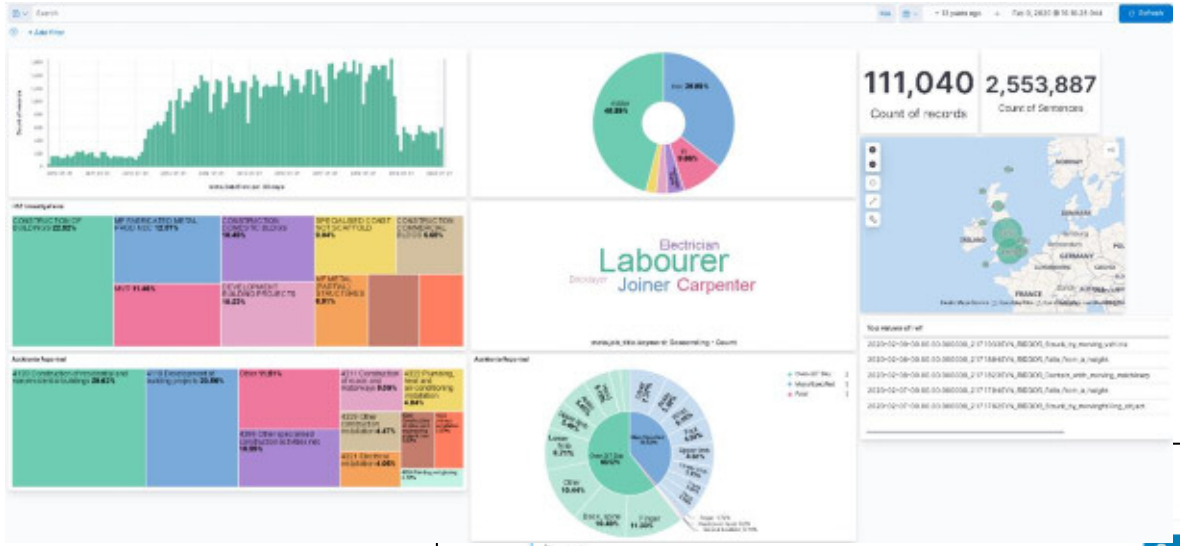
- £10 million, 5 year research programme (2018-2023)
- funded by Lloyd's Register Foundation
- jointly delivered by HSE, Atkins, Wood the University of Manchester and others


ADDED-VALUE CONTRIBUTION
COMPLEXITY
Descriptive analytics
What has happened?
Diagnostic analytics
Why something happened?
Predictive analytics
What is likely to happen?
Prescriptive analytics
What actions could be taken based on the predictions?

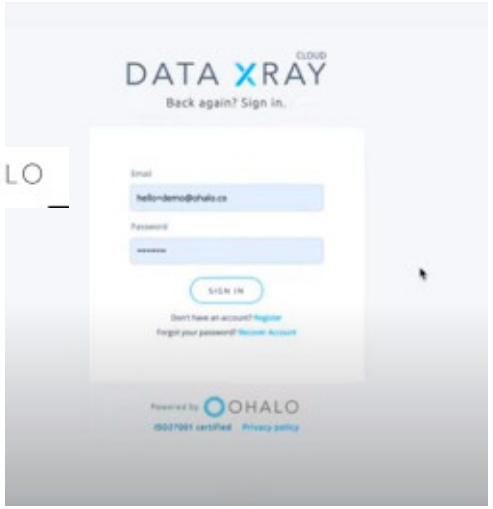
Outputs and Impacts
Data Fundamentals



Unlocking Data - Data Warehouse



Unlocking Data - Text Mining search and retrieve tool



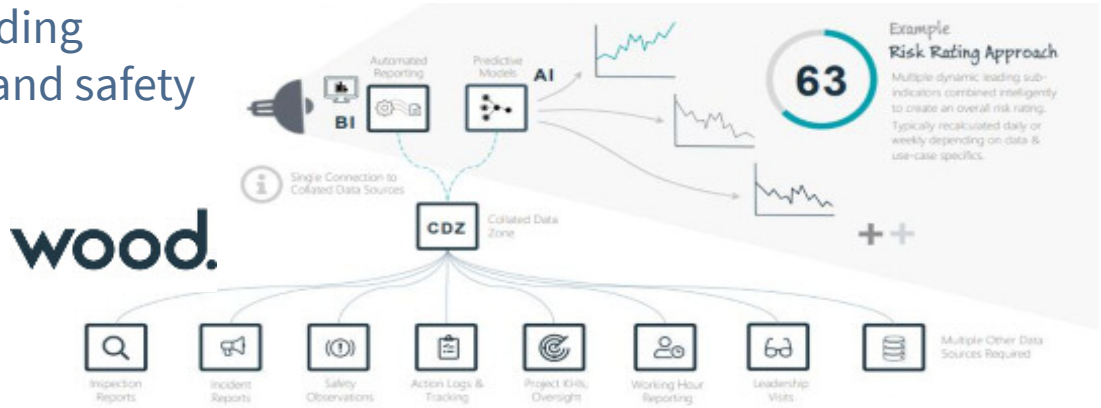
Unlocking Data - Data Anonymisation

DISCOVERING SAFETY

Outputs and Impacts
Industry Use Cases

Safety Critical Insights -
Designers risk suggestion tool

Safety Leading Indicators -
Framework of 17 leading indicators of health and safety performance



Safety Data - Severity Scanner

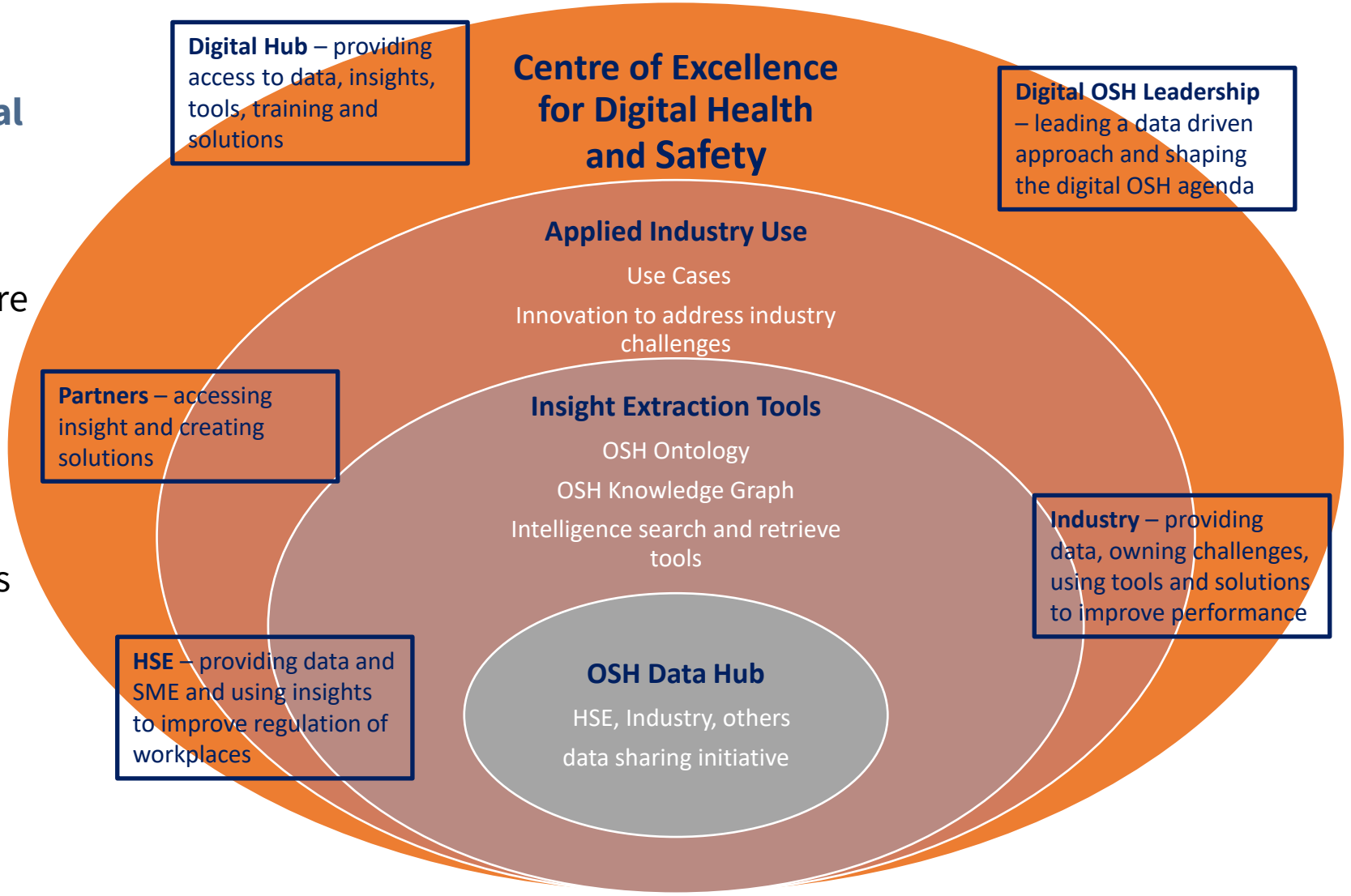
Safety Tech -
Accelerator challenges

DISCOVERING SAFETY

Digital Health and Safety

Discovering Safety will continue to build towards a **Centre of Excellence for Digital Health and Safety** through the establishment and development of -

- **OSH Data Sharing Hub -**facility to share HSE and others data
- **Insight Extraction Tools** –tools to exploit data and extract insights
- **Applied Industry Use** -facilitate access to learning by industry and partners through use cases and innovation challenges.



DISCOVERING SAFETY

Digital OSH Network

Leadership, Work and Wellbeing

Theme Introduction

Our team – A shared research approach

Dr Sara Willis

Academic Theme Lead

Ed Corbett

HSE Theme Lead

Prof Sharon Clarke

Project PI and Former Theme Lead

Theme Overview

The theme aims to contribute to…

Enhancement of wellbeing at work including reduction in work-related stress, positive contributions to mental health and physical safety

Better understanding of the role of leadership for risk management

Guide leadership development and governance, supporting pragmatic change for improvement

Example Projects

Wellbeing Indicator Tool – NHS England

Developed a health and safety indicator tool based on NHS England workforce data sets

The role of Corporate Governance in safety performance

Commissioned by ONR in the context of nuclear safety

Future Agenda

Bias and risk decision making

How do cognitive biases influence decision making about risk and safety? Project with the ORR, ONR and HSE

Safety culture development

What are effective strategies to develop a positive safety culture in the naval sector? Project with naval shipyard

Diversity, risk and safety

What role does diversity play for workplace safety and wellbeing?

Reliability and Resilience – Richard Kirkham

"How complex systems can be designed and managed to be safer and more resilient."

- **Reader in Civil Engineering, Department of Engineering Management, School of Engineering**
- **Deputy Director, Thomas Ashton Institute**

- **Principal Engineer, HSE Science Division**

MANCHESTER 1824
The University of Manchester

Thomas Ashton Institute

Thomas Ashton Institute for Risk and Regulatory Research

Reliability and Resilience – Richard Kirkham

"How complex systems can be designed and managed to be safer and more resilient."

Our action plan: **Risk**

On risk, we are already taking action by:

Refreshing the National Security Risk Assessment (NSRA) process, so it will look over a longer timescale, include multiple scenarios, look at chronic risks and interdependencies and use the widest possible range of relevant data and insight alongside external challenge.

Creating a new Head of Resilience, to guide best practice, encourage adherence to standards, and set guidance.

By 2025, we will:

Clarify roles and responsibilities in the UK Government for each NSRA risk, to drive activity across the risk lifecycle.

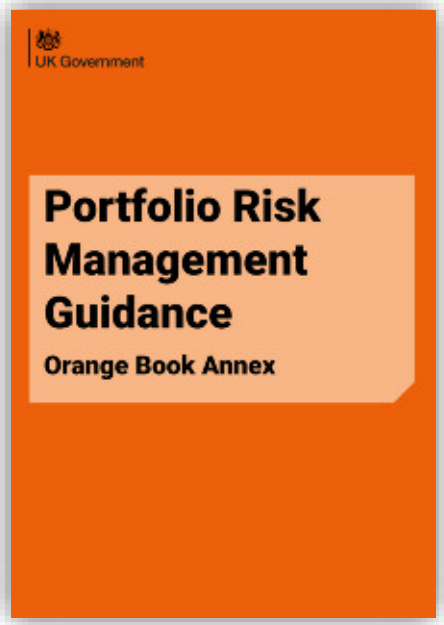
Conduct an annual survey of public perceptions of risk, resilience and preparedness.

Introduce an Annual Statement to Parliament on civil contingencies risk and the UK Government's performance on resilience.

Develop a measurement of socio-economic resilience, including how risks impact across communities and vulnerable groups – to guide and inform decision making on risk and resilience.

By 2030, we will:

Make the UK Government's communications on risk more relevant and easily accessible.



Orange Book - GOV.UK (www.gov.uk)

MANCHESTER 1824
The University of Manchester

Thomas Ashton Institute

Thomas Ashton Institute for Risk and Regulatory Research

Reliability and Resilience – Richard Kirkham

"How complex systems can be designed and managed to be safer and more resilient."

Project Leadership and Society 4 (2023) 100081

Contents lists available at ScienceDirect

Project Leadership and Society

journal homepage: www.sciencedirect.com/journal/project-leadership-and-society

Empirical Research Paper

Exploring the complexity of highways infrastructure programmes in the United Kingdom through systems thinking

Sagarika Bala Prakash [a], Richard Kirkham [b,*], Anupam Nanda [c], Sarah Coleman [c]

[a] WSP Ltd, 8 First St, Manchester, M15 4GU, UK
[b] Department of Mechanical, Aerospace and Civil Engineering, The University of Manchester, M139PL, UK
[c] School of Education, Environment and Development, The University of Manchester, M139PL, UK

ARTICLE INFO

Handling Editor: Martina Huemann

Keywords:
Benefits management
Infrastructure projects
Value capture
System thinking
Soft systems methodology
System-of-Systems
Causal loop diagrams

ABSTRACT

In this study, we seek to conceptualise multi-dimensional impacts of infrastructure investment through case studies of three nationally significant highways programmes in England. We use system thinking principles to characterise socioeconomic and policy impacts that may emerge from the interconnectedness of system variables. We consider three 'complex infrastructure programmes' in the National Highways portfolio; the A303 Stonehenge Tunnel, the A66 Trans-Pennine upgrade and the Lower Thames Crossing (LTC) and illustrate the interdependencies that may be present within and between these programmes using causal models. We identify a set of commonalities between the three programmes, with indications towards potential mechanisms for facilitating economic growth in disparate regions where timely implementation of efficient policies may be achieved. Moreover, we evidence that evaluating impacts through segmented areas of focus such as social, economic and policy may not adequately portray the real impacts of infrastructure investment in a comprehensive way. This research justifies the importance of understanding infrastructure projects as interconnected, complex systems that may deliver desired benefits in a non-linear and highly emergent way. We conclude with a proposition that understanding the characteristics of the larger infrastructure system-of-systems, is crucial to unlocking added value and realising long-term benefits of highways infrastructure investment.

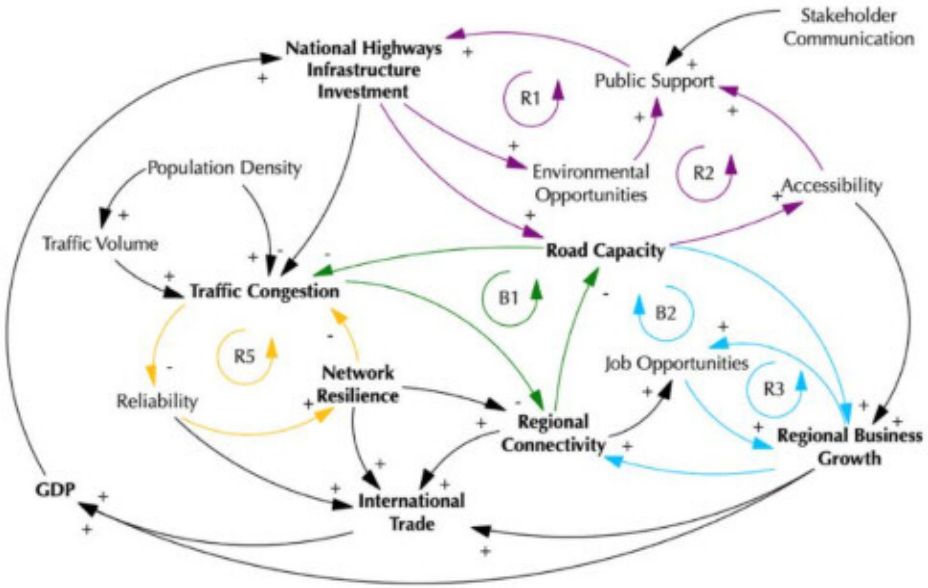


Fig. 8. LTC CLD: Combined model.

Economic and Social Research Council

The University of Manchester

Thomas Ashton Institute for Risk and Regulatory Research

Reliability and Resilience – Richard Kirkham

"How complex systems can be designed and managed to be safer and more resilient."

Cabinet Office

Search for news, events, guidance and more

About | How do I? | News & Blogs | Events & Training | People Finder | Hubs

Organogram | Our ministers

Home » About » Networks and groups » Cabinet Office Science and Engineering Network

Cabinet Office Science and Engineering Network

Welcome to the Cabinet Office Science and Engineering Network (S&E) Network! We are dedicated to promoting awareness and uptake of Science and Engineering across all of the Cabinet Office. We are an open and friendly network, open to all CO staff, regardless of whether you have a science background or not.

We would love to see you at our regular meetings every six weeks, where we will invite along guest speakers. See our website for information, events, opportunities and much more!

Purpose

Within the Cabinet Office, the network's purpose is to empower people to embed S&E across our business priorities to maximise impact. We aim to:

1. Build a vibrant community of individuals with an interest or passion for Science and Engineering across the broad range of Cabinet Office business areas.
2. Support and empower people to engage confidently with S&E as a core part of decision making, policy development and operational delivery.
3. Create a culture in the Cabinet Office where S&E is visible, valued, and diverse STEM talent is nurtured and celebrated.

...brilliant public services and policy, stronger security and resilience, boosting UK growth.....

Join us

We are a growing network of Cabinet Office members from a diverse background with all range of experience in S&E, united by our passion for integrating STEM into the day-to-day of policymaking! If you would like to work with us on:

- Improving S&E knowledge transfer across CO through events and new fora.
- Promote and foster a CO culture that embeds S&E.
- Build and promote the network to wider stakeholders

Please fill in this form to sign up to volunteer with one of our work streams for 2023! Visit our website to find out more about the work we are doing to achieve these aims!

Reliability

The Reliability and Maintainability (R&M) Hub has been created to highlight the benefits of a reliable and maintainable product in terms of operation and cost. It aims to develop mutually beneficial R&M practices, techniques, research programmes.

[dstl] | CGI | NPL | Wiltshire Council | ALFORD | QINETIQ

MBDA | TMD | HSE

Ofcom | AWE | Roxel | Ministry of Defence Dstl | MANCHESTER 1824 | EXETER

Chemring Countermeasures | Loughborough University | ATKINS

SUPPORTED BY OUR LEARNING PARTNERS

Institute of mathematics & its applications | Institute of Explosives Engineers | IOP Institute of Physics

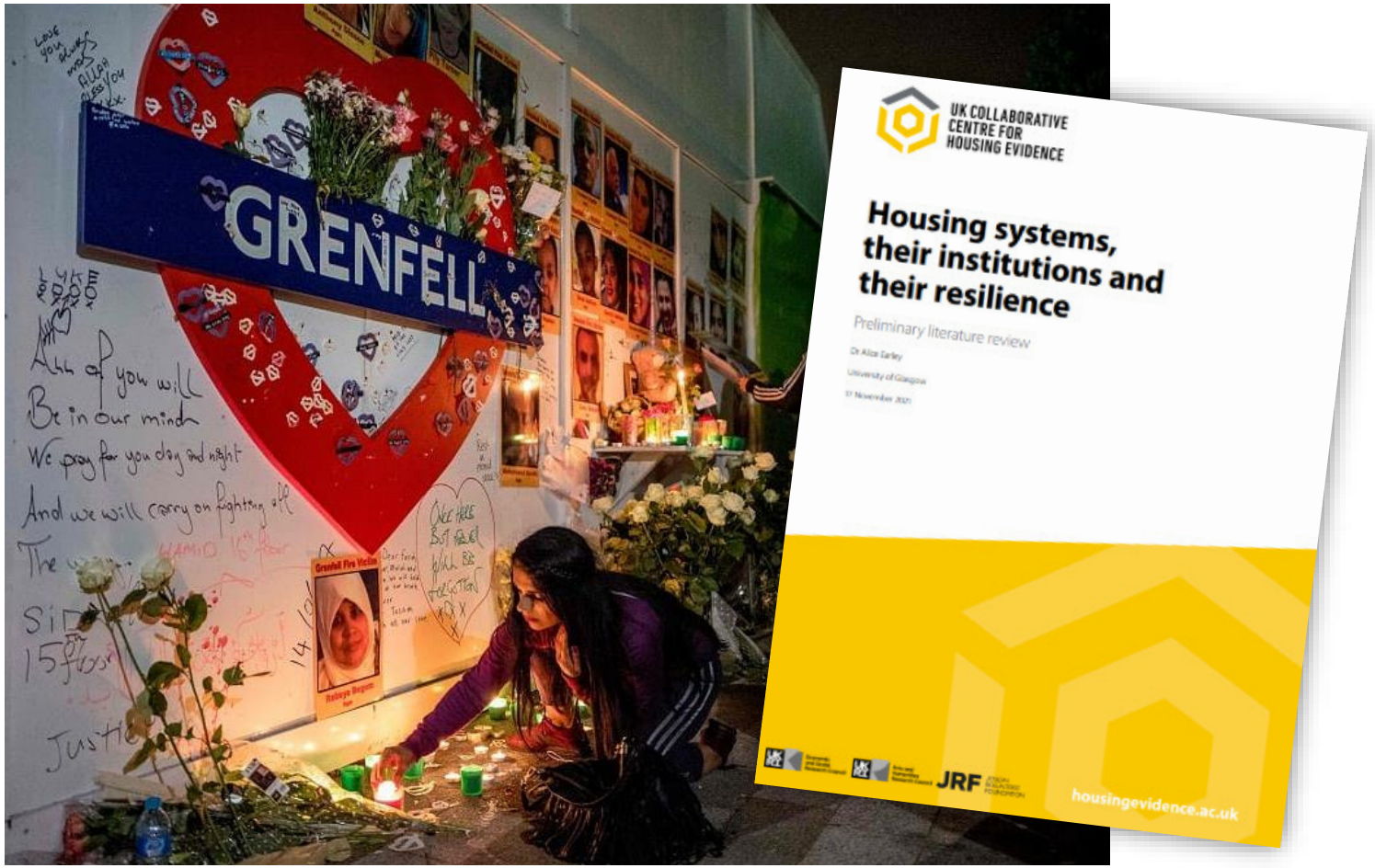
MANCHESTER 1824 The University of Manchester

TAI Thomas Ashton Institute

Thomas Ashton Institute for Risk and Regulatory Research

Reliability and Resilience – Richard Kirkham

"How complex systems can be designed and managed to be safer and more resilient."



MANCHESTER 1824
The University of Manchester

Thomas Ashton Institute

Thomas Ashton Institute for Risk and Regulatory Research

Thomas Ashton Institute

The University of Manchester

PROTECTING PEOPLE AND PLACES

HSE

Safer infrastructures

Meini Su (UoM) and David Glass (HSE)

- Applying cutting-edge discovery science and technical expertise to the engineering assessment of structural integrity and occupational safety, as well as mapping the way forward to safely use emerging technologies and industries.
- Concerning how materials, components, joints and structures may fail due to degradation and corresponding solutions; considering new and more extreme working environments; including design and fielding of advanced materials and new manufacturing techniques to assure resilience.
- Considering how infrastructure can be designed and constructed in a safer way: this may include organisational, cultural and management aspects as well as novel and emerging technological solutions.
- It builds on The University of Manchester's expertise in engineering and materials, and links with HSE's science programme on the UK's Asset Base and Future Evidence.

Safer Infrastructures

Goals for future direction

- **Low-carbon concrete (Net Zero 2050)**
  - Graphene modified concrete, Graphene Green Concrete (GGC), Graphene modified geopolymer concrete
  - Safe use of new materials – smart qualification
  - Safe use of recycled materials on building integrity (circular economy in construction)

- **Net Zero technologies (hydrogen architecture, standards, CO2 risk)**
  - NZ and safer infrastructure – unanswered questions
  - Impact on existing energy base (offshore, refining etc., & dwindling investment)

- **Safety and durability of existing infrastructures**
  - Smart intervention method (e.g. ICCP-SS)
  - Extension of service life

- **Building Safety**
  - What does regulatory structure look like – what teeth does it have
  - The structure of compliance and testing
  - Training and competency
  - Data management and the Golden Thread of Fire Safety Information

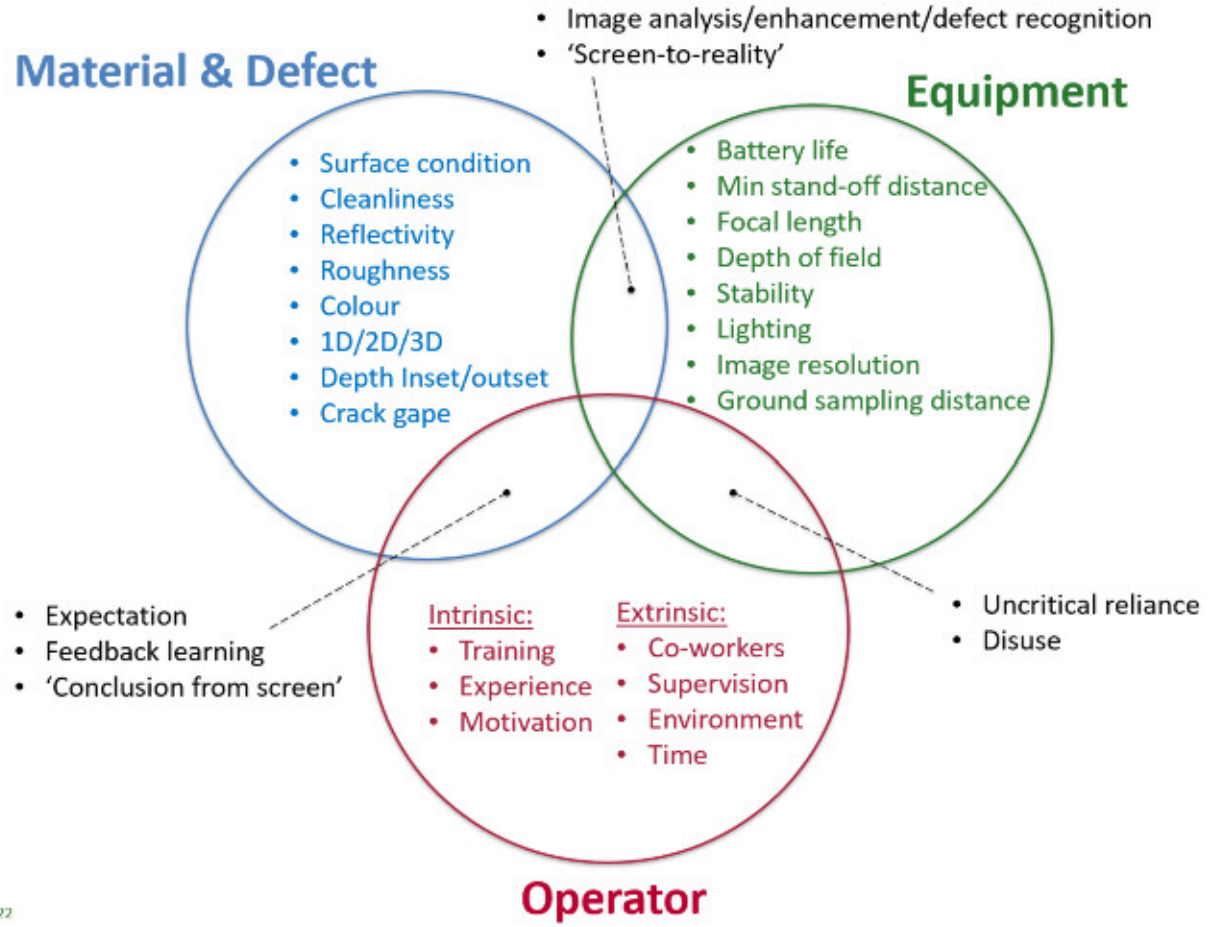
- **Safer by Design**
  - “Designing away Regulatory issues” © Tim Stallard
  - Integrating engineering and science with HF models – UoM + HSE SD

HSE Shared Research with Industry:

Remote Visual Inspection (2019 – 2023)

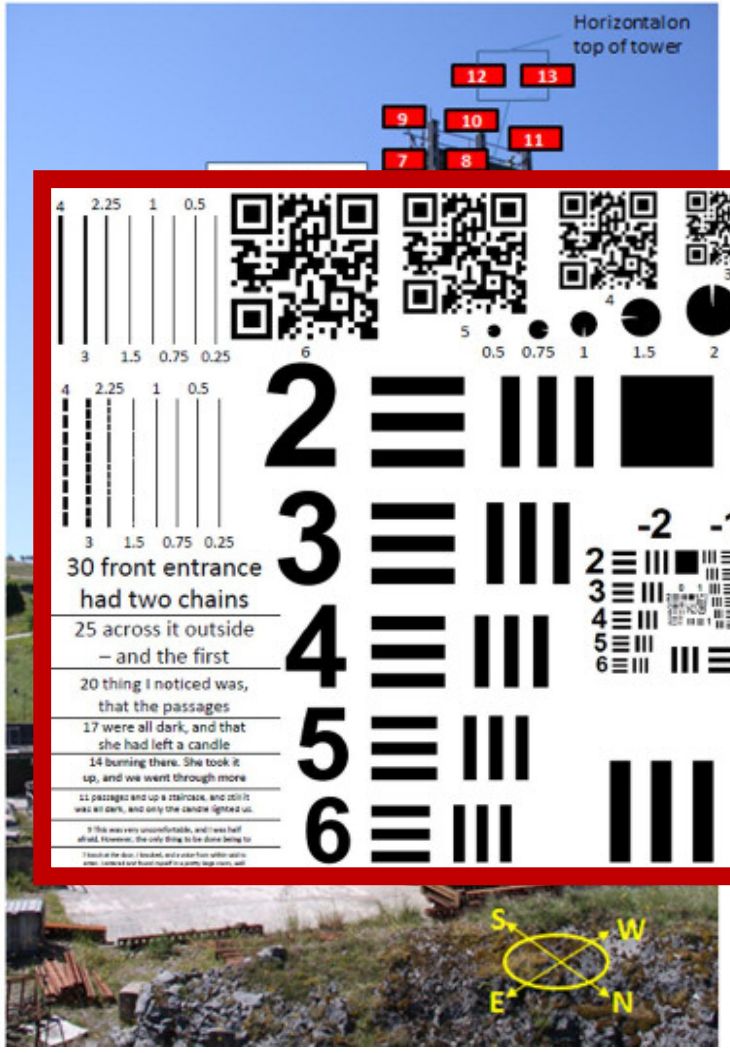
- Avoid manned entry/ confined space working
- Avoidance of work at height
- When manned entry is impossible due to space limitations
- Hazardous environment preventing human access (e.g. radioactivity)
- Interrupted visual path (e.g., behind bulkheads, etc)
- Potential reduced cost (not HSE's motivation)

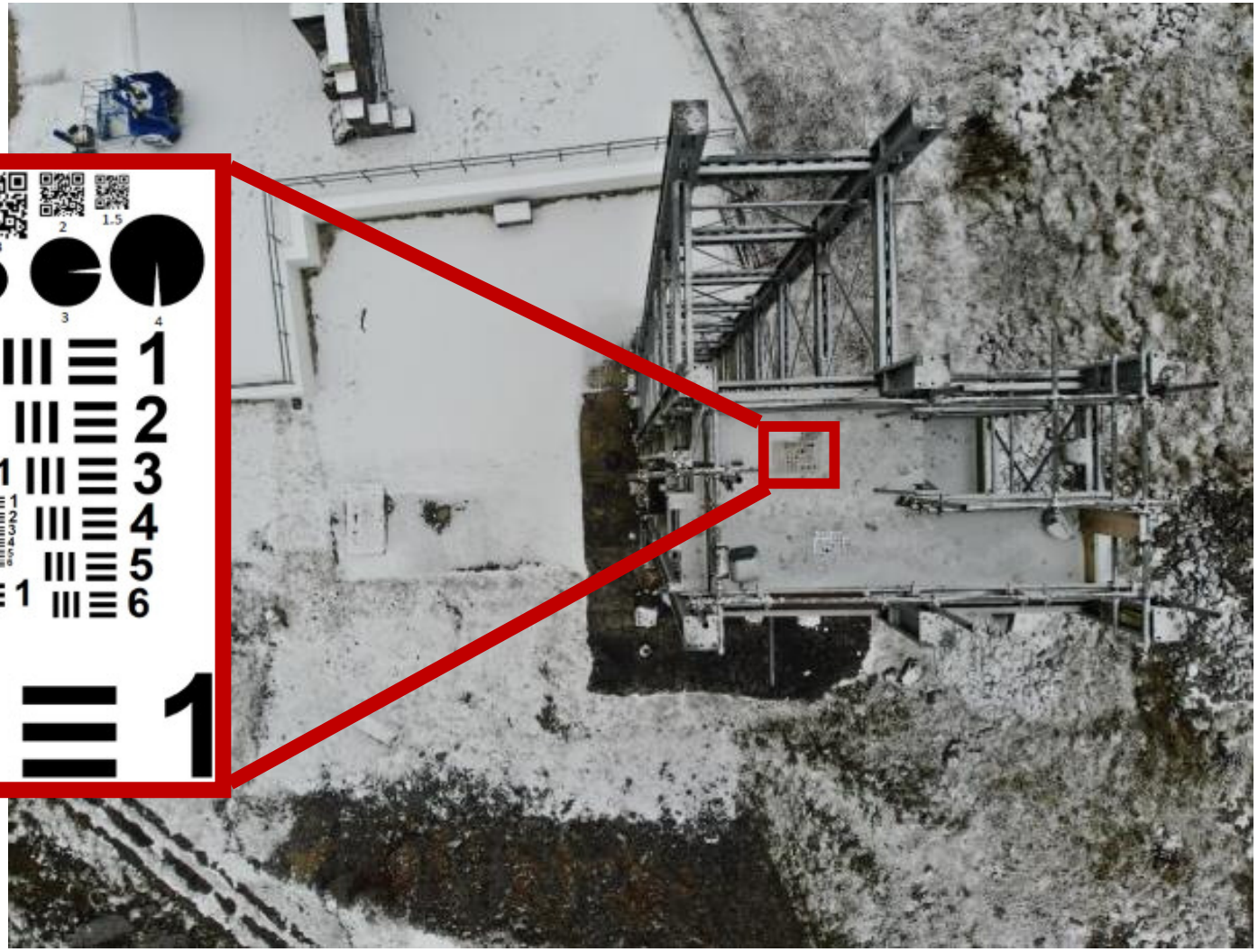
Remote Visual Inspection – some variables (drone trials):



- Method
  - Samples pre-characterised
  - Close Visual Inspection and RVI in trials
- Materials
  - Carbon steels
  - Stainless steels
  - Welded joints
  - Coated steels
  - GFRP
  - Concrete
- Features
- Variables
  - Indoor/outdoor
  - Height
  - Aspect/ Orientation

Remote Visual Inspection – Physical trials at Buxton, detection capability:



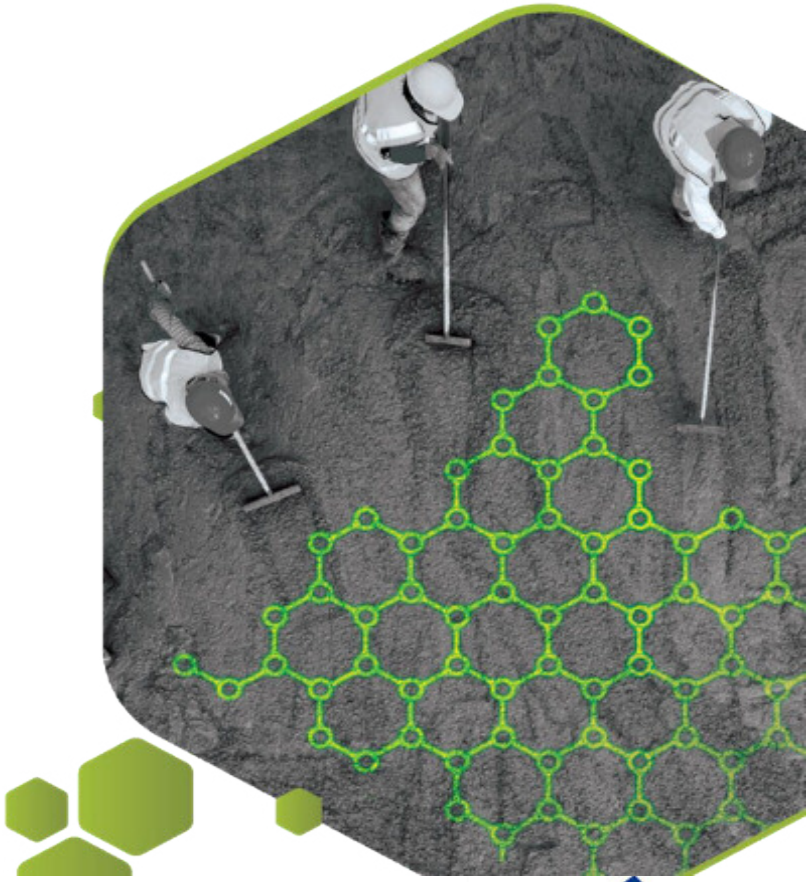


MANCHESTER 1824
The University of Manchester

TAI Thomas Ashton Institute

Thomas Ashton Institute for Risk and Regulatory Research

HSE



FIRSTGRAPHENE
World leading materials technology | ASX:FGR

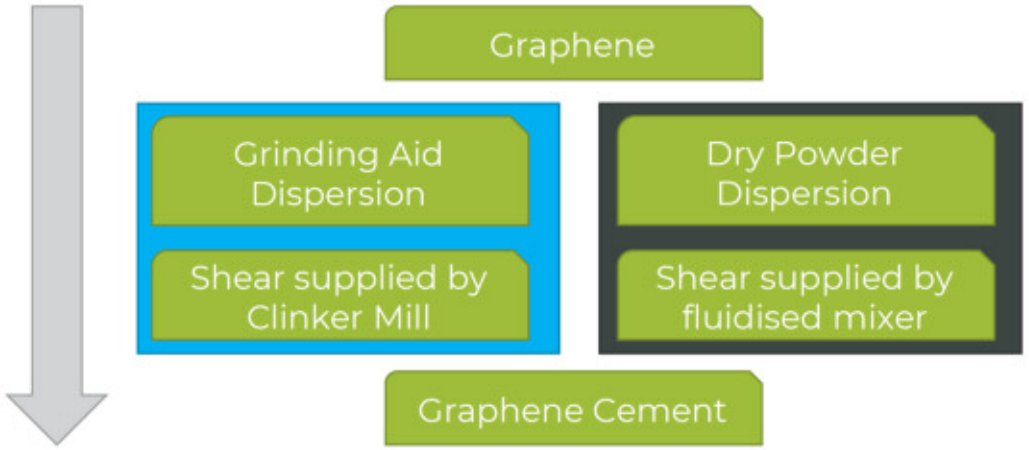
BREEDON

MANCHESTER 1824
The University of Manchester

MORGAN SINDALL

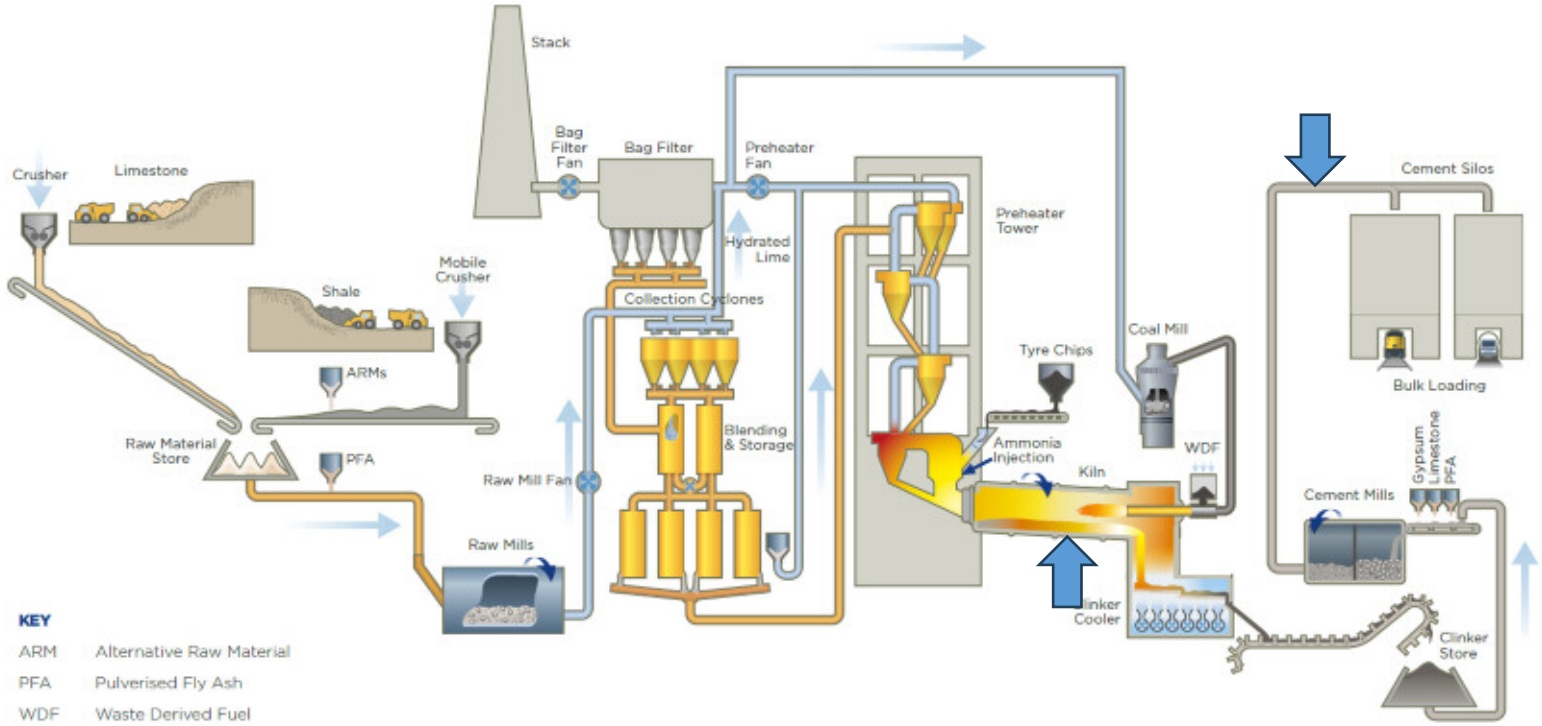
Innovate UK Transforming Foundation Industries: "High-Performance Graphene Enhanced Cement: revolutionary Innovation in Low Carbon Manufacturing Process" (2022-2023)

- Investigate a lowered CO2 cement product using graphene - Physical properties, H&S, LCA, Economics, and Scale-up
- Realisation of graphene based improvements: uniform distribution of graphene particles as the 2D platform to accelerate the hydration products
- Design of a dispersion device allowing large scale dispersion on site
- Production of Graphene enhanced cement on industrial scale



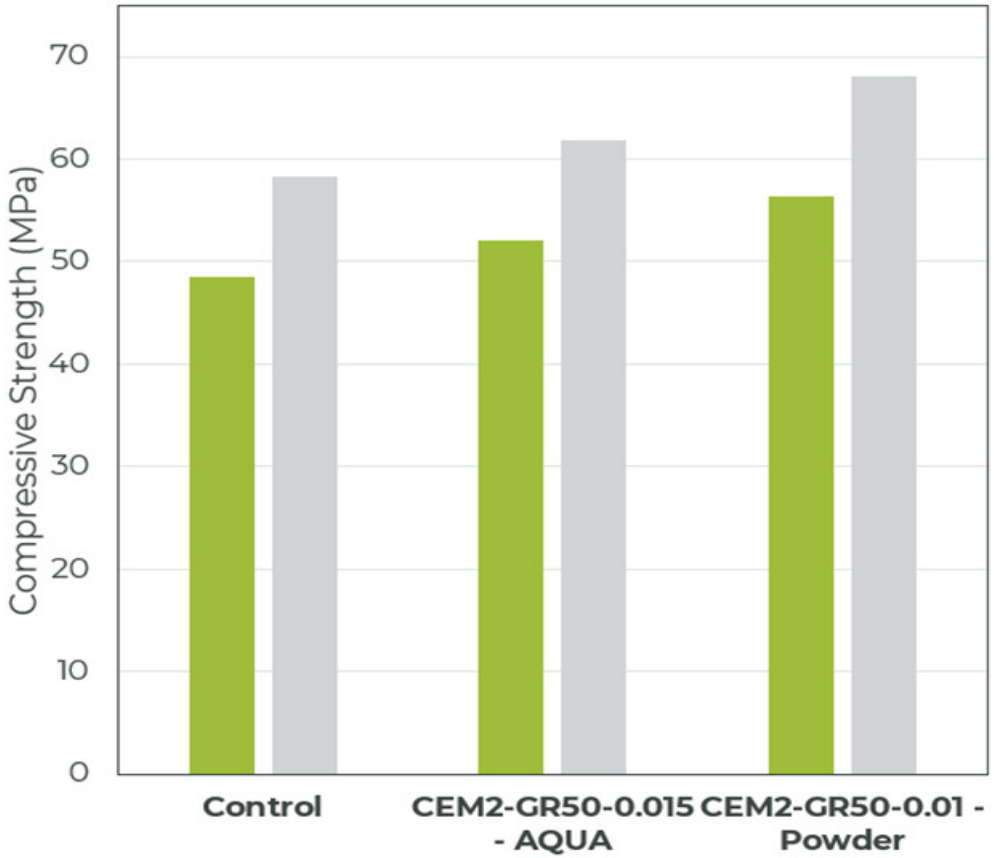
Trial and validation at laboratory scale:

- different dispersion techniques
- different surfactant
- mixture design
- machine design
- energy consumption and improvement of efficiency
- microstructural analysis



Large scale application:

- uniformity of dispersion
- economic viability
- life cycle assessment
- health and safety impact
- process hazard analysis



~20% improvement for the early day strength and standard strengths

Microscopic images: uniform distribution of graphene nanoplates in cement samples

Proposals:

Safer sustainable building materials networks (EPSRC Network Grant)

The importance of sustainable development in the construction sector is accepted. However, the H&S issues relating to the full life cycle of sustainable building materials, including manufacturing, transport, processing, handling, use, demolition and recycling, are unclear yet.

Aim: to ensure a safer built environment with the use of sustainable building materials.

Corrosion Under Insulation

Shared Research invitation to industry – the problem continues to pose a huge threat to people and the environment

Areas of potential interest:

- Additive Manufacture - ANSI guide has lots of challenges…
- Natech issues – a growing threat to infrastructure
- Digital Twins – Asset Integrity challenges
- Artificial Intelligence – Image and defect diagnosis?

Social Change and Inequalities theme

Theme leaders and key members

Dr Kara Ng

Academic theme lead

Presidential Fellow in Organisational Psychology,

Alliance Manchester Business School

Dr Helen Beers

HSE theme lead

Principal Scientist at HSE

Prof. Sheena Johnson

Former academic lead

Professor of Work Psychology and Wellbeing

Alliance Manchester Business School

About the theme

- Society is constantly changing, which can have profound consequences on our experiences at work
- We ask: “How does social change impact our health and safety at work?”
- Aims and objectives:
  - To provide evidence that contributes to the Government’s Industrial Strategy Ageing Society grand challenge
  - To provide evidence that helps to support people to participate in work for longer
  - To improve understanding of patterns for new and emerging risks arising from social change which may impact on working for longer
  - Understanding changes in risk attitudes and behaviours, and how to influence desired behaviours

Current projects

PROTECT

Cross-sector interdisciplinary project on COVID regulations and risk perceptions

Fatigue project

Collaboration evaluating how wearable tech measures light, sleep, cognitive outcomes

KUBS

"Keeping the UK Building Safely"

Creating COVID-secure workspaces in construction

VARN research

Collaboration with industry partners to reducing violence and aggression at work and sharing best practice

Future projects

- Research collaboration:
  - Working with Leadership & Well-being theme on project about team diversity, voice, and safety behaviours
  - Continuing fatigue and PROTECT work
  - Working German Federal Institute for Occupational Safety and Health on VARN
- Research dissemination:
  - Conferences, academic, practitioner publications
  - Blogs, social media
- Links with other institutes:
  - Work and Equalities Institute, MICRA

Work & Health

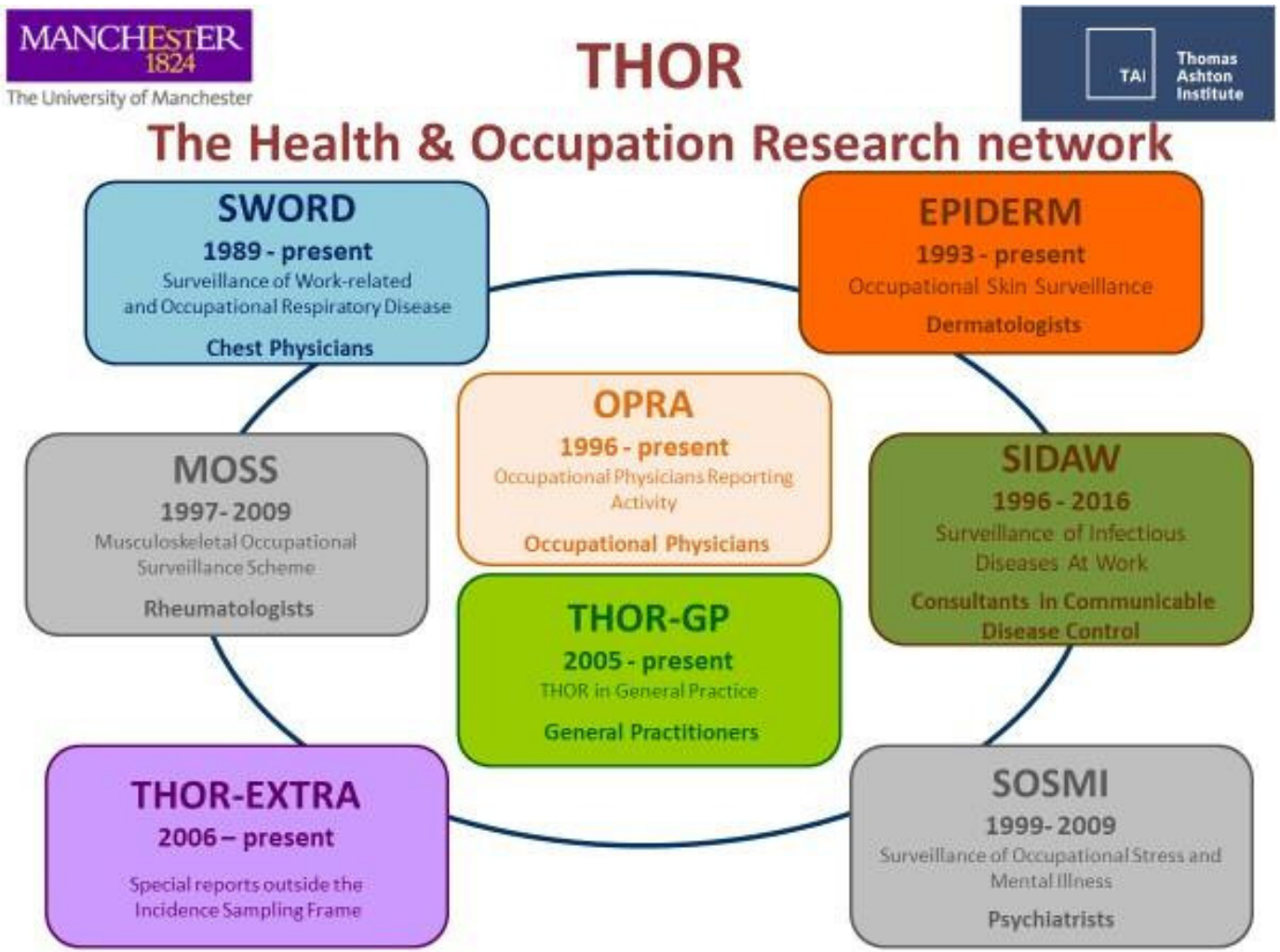
- Long history of Occupational Medicine and Health at UoM. Longest still existing academic occupational health group in UK
- Annual Lane Lecture
  - http://research.bmh.manchester.ac.uk/COEH/aboutus/lectures/
  - Professor Ira Madan in October 2023
- MSc in Occupational Medicine and Occupational Hygiene
- MPH in Occupational Health
- Strong PhD programme, attracting students from UK and overseas.
- Occupational health research carried out across schools and faculties

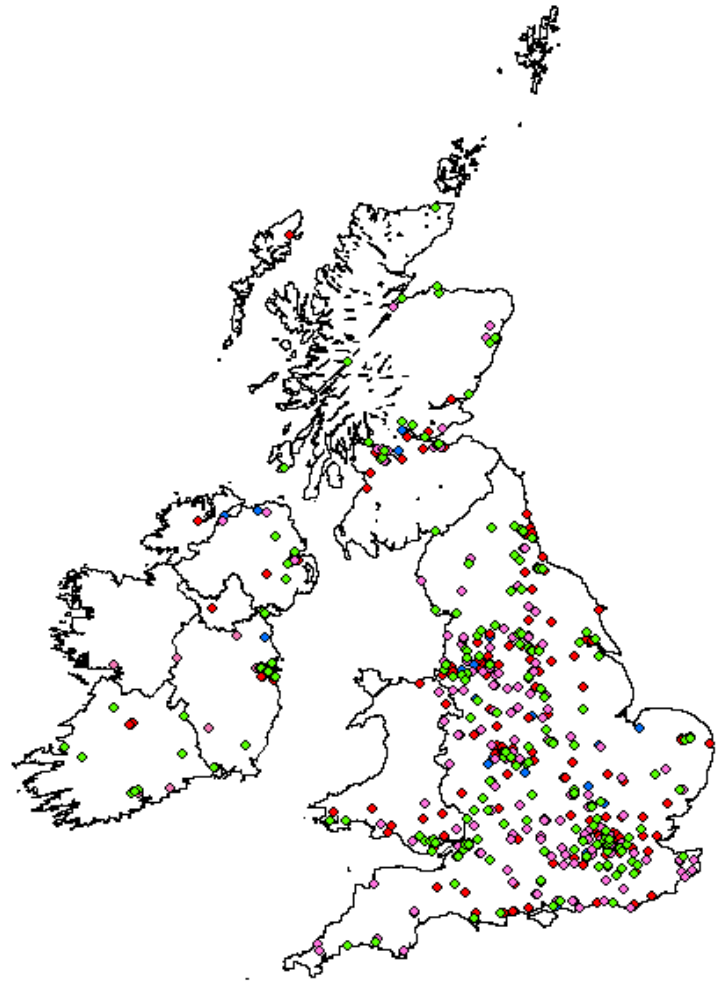
Work & Health

Vision:

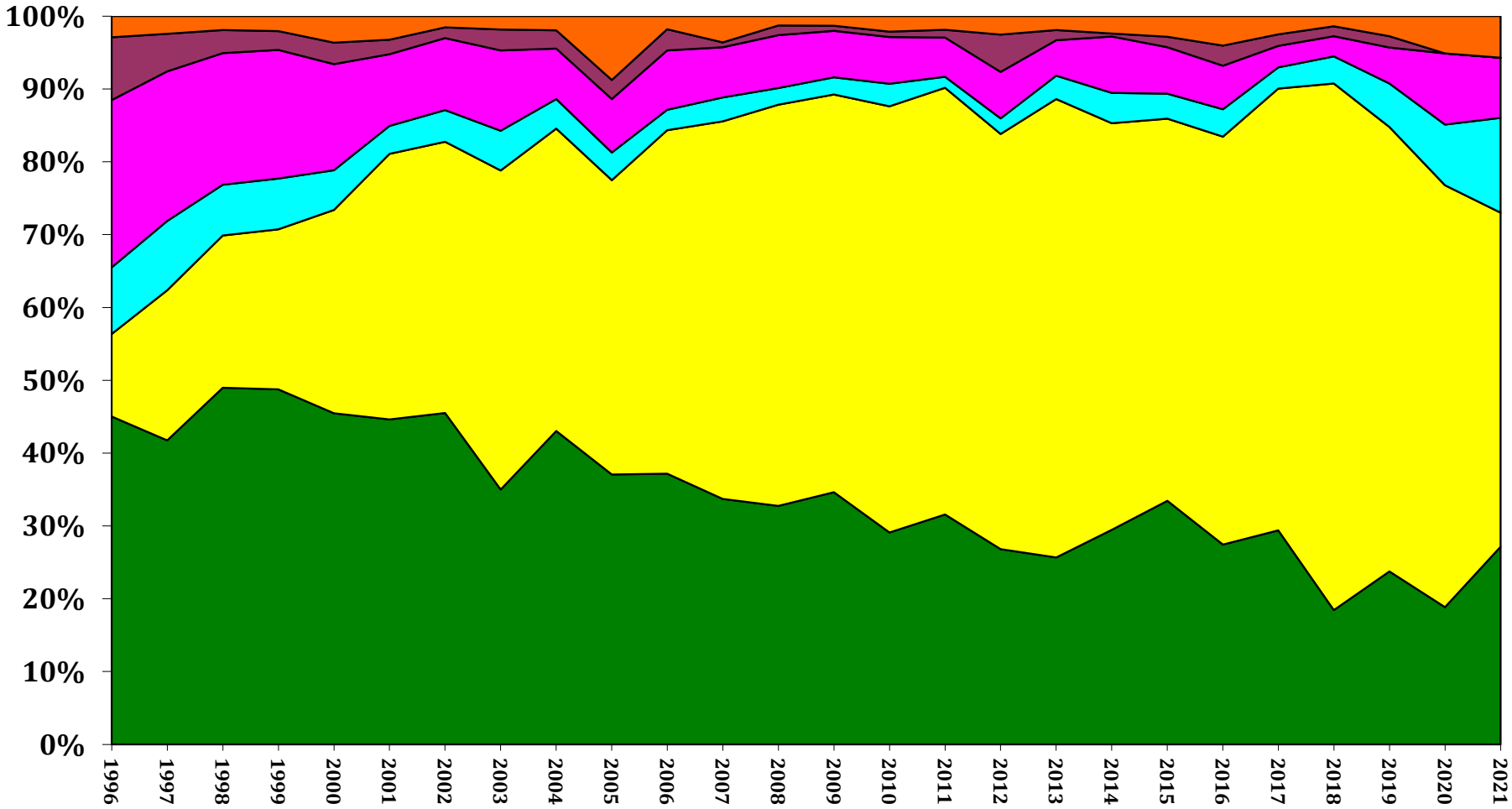
- to create an innovative research group and environment that is able to address both current and future workplace health priorities
  - Interdisciplinary, translational, applied and impactful
  - Focussing on worker (or patient)
- to address relevant research aspects of the broader interface between work and health; including those pertaining to all employed people and also return to work issues.
- Observational, mixed methods, interventions
- Innovative (exposome, data science, AI/text mining, health informatics)
- World class academic teaching and training (MSc and PhD)

THOR Reporting scheme





THOR Reporting Scheme
Diagnoses reported to OPRA (UK, 1996-2021)



	1996	2019	2021
Other	3%	3%	6%
Hearing	8%	2%	0%
Skin	22%	5%	8%
Chest	9%	6%	13%
Psych	13%	61%	46%
Musc	45%	24%	27%

PROTECT – Sector Studies

PROTECT
A COVID-19 National Core Study

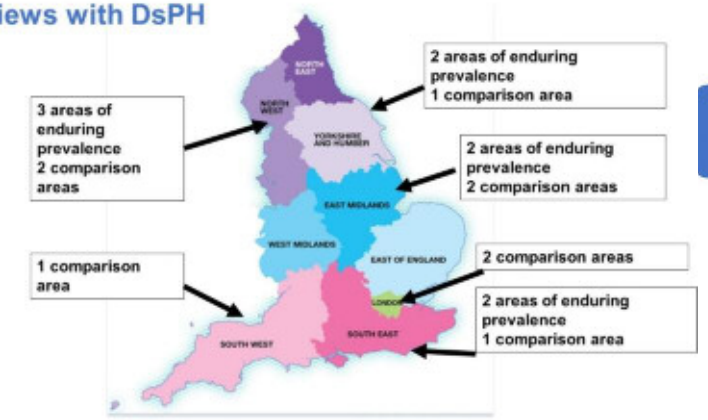
- Public transport
- Food processing
- Enduring prevalence
- Close contact retail
- Construction
- Logistics/delivery
- Care homes
- Higher education

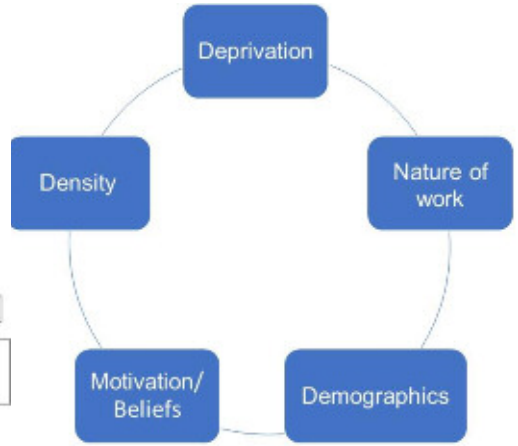
Qualitative studies into

- Risk factors
- Mitigations
- Barriers and facilitators
- Knowledge gaps.

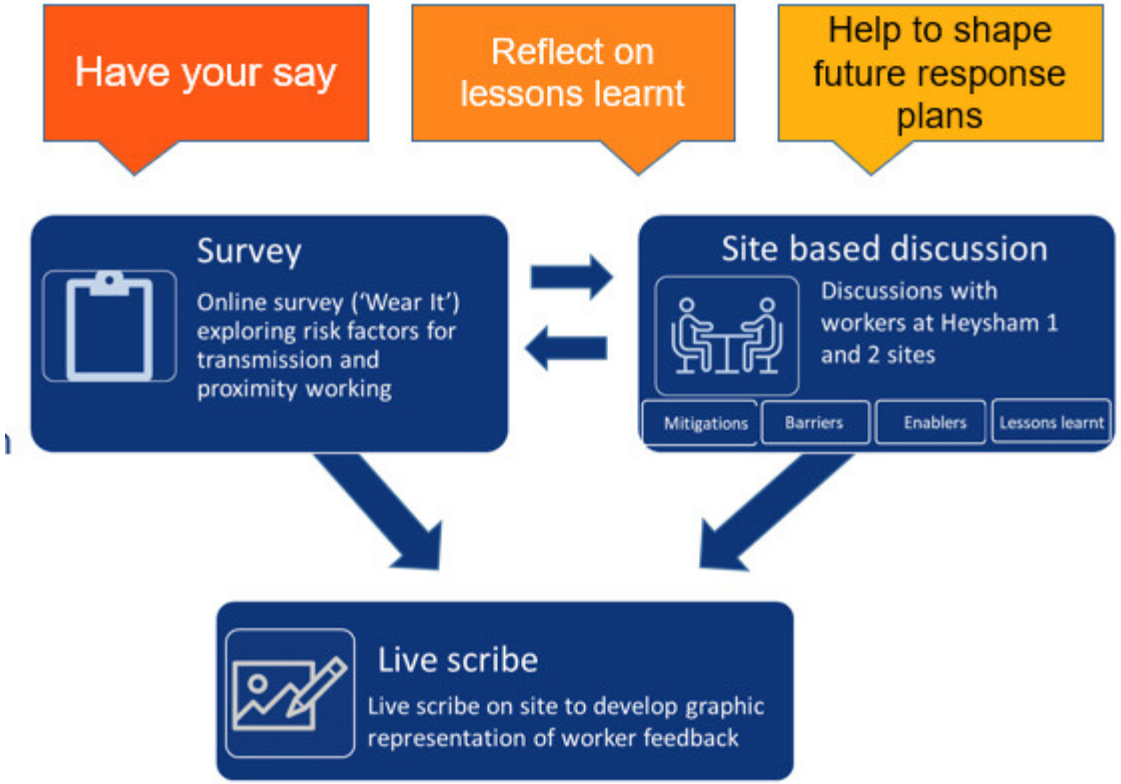
Areas of Enduring prevalence

Interviews with DsPH





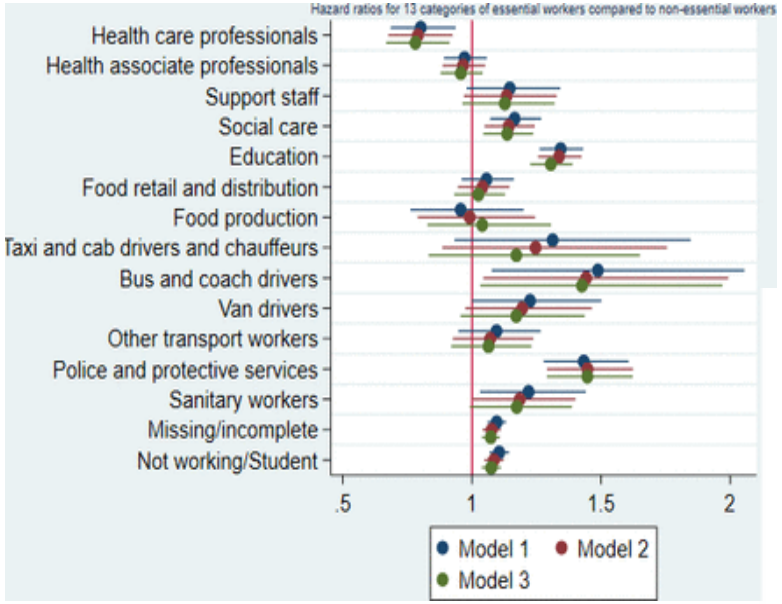
Collaboration with EDF



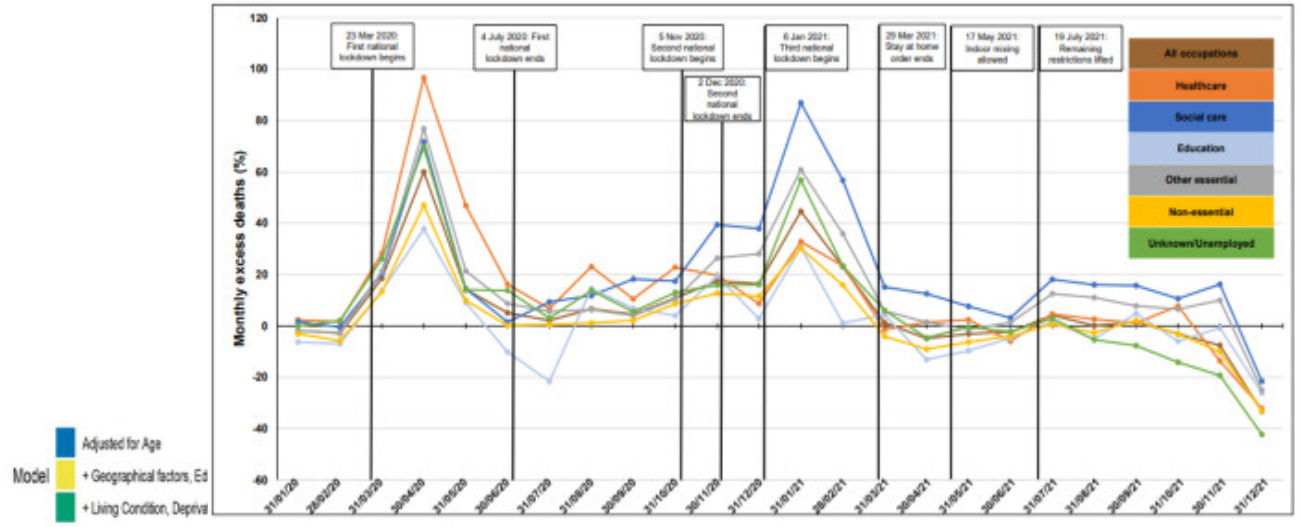
MANCHESTER 1824
The University of Manchester

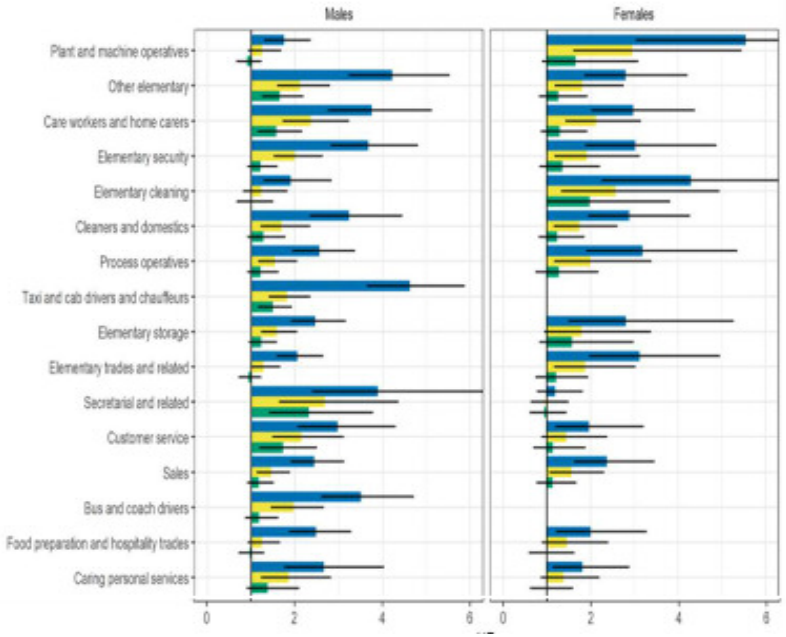
PROTECT

Differences in risk of Infection



Covid Mortality





Work & Health – Other projects

- Light exposure, sleep and sleepiness – collaboration with Centre Biological Timing, TAI, Electrical engineering
- Data linkage project – assessing feasibility of improving occupational health research through data linkages (UoM, Bristol, KCL)
- Pesticide exposure (UoM, IOM, HSE, IRAS)
- EPHOR – EU horizon project on using exposome in occupational health research
- HSE Framework projects (shellfish allergy, respiratory health surveillance, Occupational exposure database)
- Delivery drivers and Gig workers (China and UK)
- AIRWAVE (police cohort health and wellbeing, PI Paul Elliot ICL; MRC)

Other activities across UoM

- Research in musculoskeletal disease (Suzanne Verstappen)
- Effect of (recreational) noise (Chris Plack et al)

Work & Health – PhD projects

UK based

- Anli Zhou - Burnout in Junior Doctors
- Thomas O'Toole - Job quality, allostatic load, sleep, health and work turnover
- Sally Hutchings - Health impact assessment modelling
- Samantha Hall - Safety by Design for Advanced/Novel Materials

Overseas

- Tanawat Rakkamon - Solvent exposure in painters in Thailand
- Sewon Lee - Exposure to respiratory hazards in cleaners
- Zulkhairul Naim Sidek Ahmad - Pesticide exposure in Malaysia
- Tadpong Tantipanjaporn - Heath stress in sugar cane workers in Thailand
- Suraiya Mohammed - Respiratory protection in Nigerian Oil and Gas Industry
- Oladeji Oladipo - Safety climate and culture in Nigerian maritime sectors
- Fandita Tonyka Maharani – Respiratory and dermal symptoms amongst Batik workers in Indonesia

Work & Health - Going forward

- Occupational health evidence
  - The Occupational and Health Research network (THOR)
  - Increase use of routine health data through data linkage
  - Include focus on leading indicators (e.g. Occupational Exposure Intelligence System)
- PREPARE / Long Covid
  - Programme proposal developed by Ian Hall et al
  - Long covid research
    - Funding UMRI project on Long Covid and RTW
    - GM Long Covid consented cohort
- Return to work
  - Kidney transplant
  - Long covid
  - Social prescribing as an intervention for RTW
- Exposome
  - Use or sensors/wearables, ~omics, etc in workplace settings
  - Epidemiology
  - Utility in risk and impact assessment (EPHOR)
- Novel/advanced materials
  - lifecycle, exposure, and safety by design
- AI Management - Platform/gig working
  - ESRC proposal for longitudinal cohort in UK/China
  - NIHR Work and Health Development Award proposal
- Fatigue, shiftwork, light


Research
Showcase

PROTECT

A COVID-19 National Core Study

The PROTECT COVID-19 National Core Study on Transmission and Environment

@PROTECT_NCS

HSE

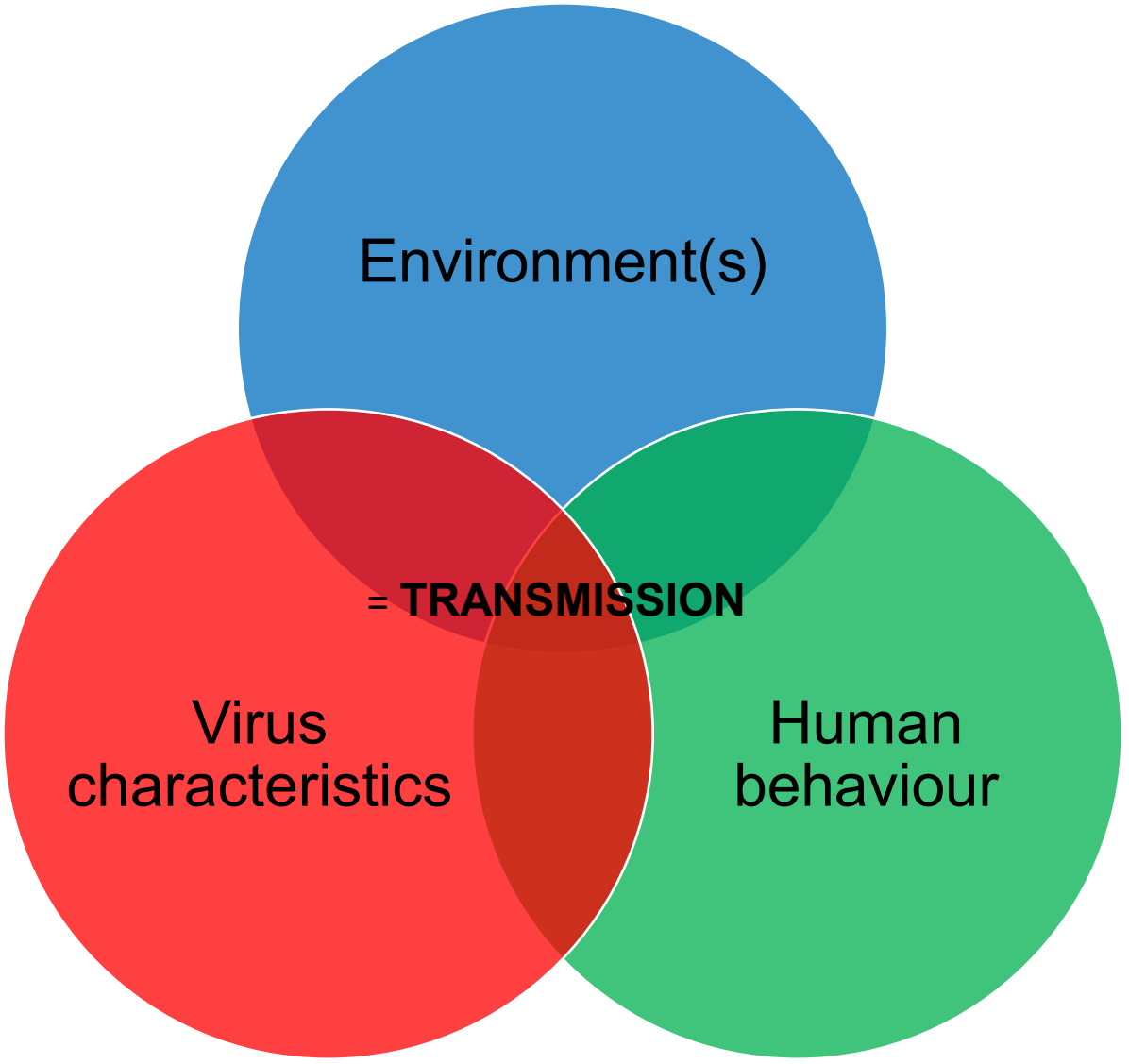
The PROTECT study

Context

- Part of COVID-19 National Core Studies programme led by Sir Patrick Vallance
- Three routes of COVID-19 virus transmission: surface, airborne, and person-to-person
- Start date: October 2020
- Duration: 29 Months

Purpose

- To provide an evidence generating capability for senior Government stakeholders to access new knowledge about transmission of the SARS-CoV-2 virus
- Understand ‘real world’ transmission
- Inform policy and practice
- Rapid and responsive (e.g. alpha to omicron)
- Deliver a legacy impact for future pandemics



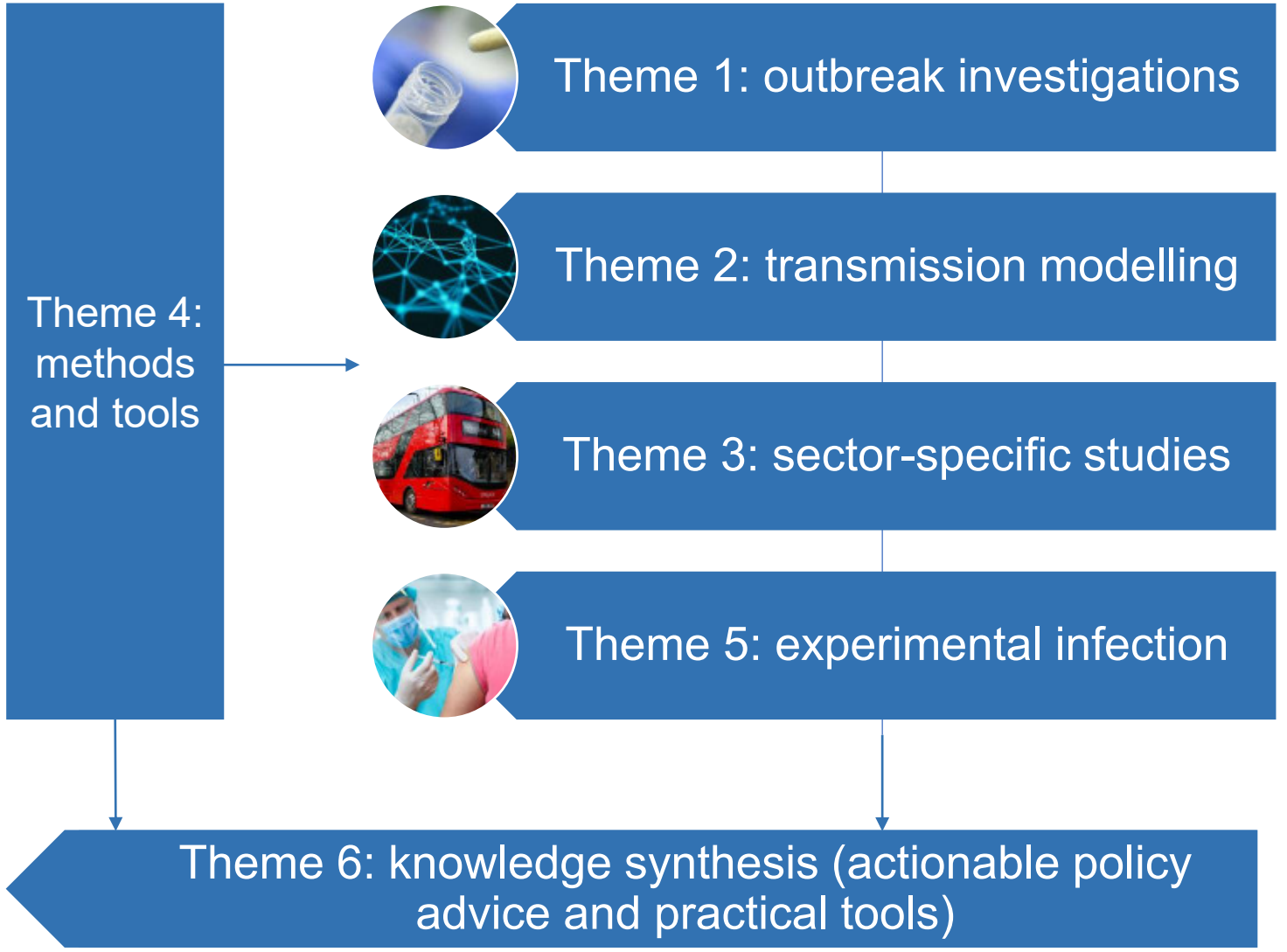
PROTECT Themes

Partners and funders

- Part of COVID-19 National Core Studies programme coordinated by GO-Science
- Funding renewed by HM Treasury until March 2023
- Led by HSE Chief Scientific Adviser Prof Andrew Curran
- Approx. 200 researchers from 20 academic and government institutions across the UK

Key Stakeholders

- Sir Patrick Vallance, Sir Chris Whitty and NCS Oversight Board
- HSE SoS, Cabinet Office, C-19 taskforce, Departmental Chief Scientific Advisers (particularly BEIS, DfT, DCMS, DHSC, Scotland Wales, Northern Ireland).
- HSE: CEO, FD, COVID Policy Team, SD



PROTECT in numbers

Year One (October 2020-March 2021) £1.7M spend

- Core team established and theme plans agreed
- Develop research network (e.g. NCS, ONS, UKHSA, JBC)

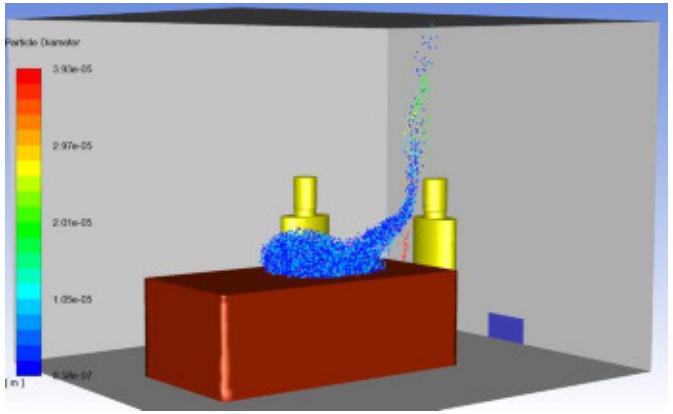
Year Two (April 2021-March 2022) £14M budget

- Delivery of underpinning research
- Open call to address new and emerging issues
- Understand ‘real world’ transmission

Year Three (April 2022-March 2023) £5M budget

- Conclusion of research activity (Dec 2022)
- Stakeholder engagement activity; translation of research outputs
- Legacy programme to deliver sustainable national capability.

National Core Study for SARS-CoV-2 transmission (PROTECT)



Theme 1

- Completed largest and most systematic study of outbreaks in the world
- Collected comprehensive data sets across a variety of workplaces to understand risk factors contributing to outbreaks
- Showed importance of considering work-ecosystem rather than using a narrow lens of work activity as the key risk determinant

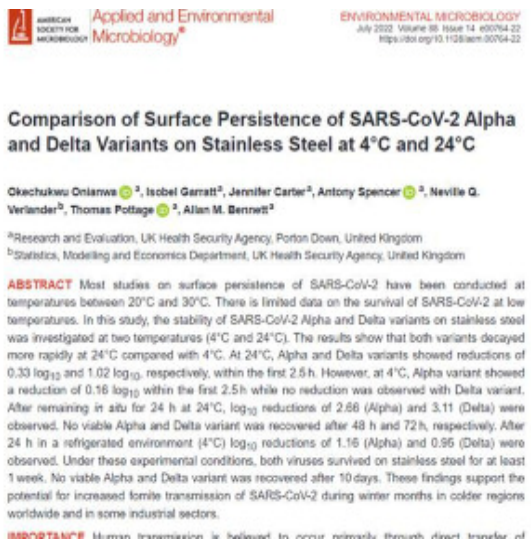
Theme 2

- Can't rule out any route of transmission
- Transmission is a consequence of the interaction between human behaviour, the characteristics of the environment and the features of the virus.
- Understand more about how different factors affect risk, which helps determine the most effective mitigations
- Individuals vary significantly in emission of the virus
- Dispersion of aerosols is complex
- Better understanding of CO2 monitoring, but general lack of understanding of ventilation

Theme 3

- Provided a deep understanding of specific sectors: their lived experiences, learning from appropriate data sets and qualitative findings
- Risk assessments and mitigation measures widely used and introduced quickly
- Organisational leadership was a critical success factor for effective control
- Tools developed to support understanding of role of occupation
- Work was an important determinant of risk

National Core Study for SARS-CoV-2 transmission (PROTECT)



Applied and Environmental Microbiology

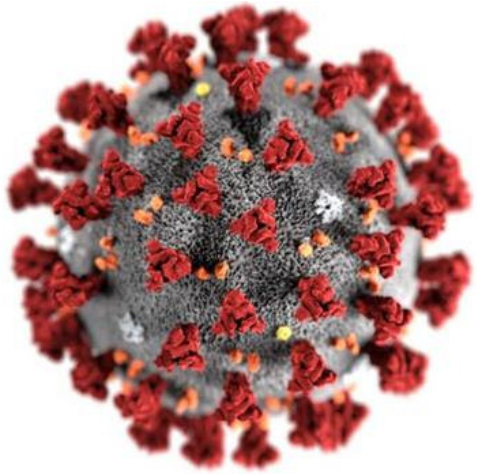
ENVIRONMENTAL MICROBIOLOGY

Comparison of Surface Persistence of SARS-CoV-2 Alpha and Delta Variants on Stainless Steel at 4°C and 24°C

Okechukwu Onianwa [a], Isobel Garratt [a], Jennifer Carter [a], Antony Spencer [a], Neville Q. Verlander [b], Thomas Pottage [a], Allan M. Bennett [a]

[a]Research and Evaluation, UK Health Security Agency, Porton Down, United Kingdom
[b]Statistics, Modelling and Economics Department, UK Health Security Agency, United Kingdom

ABSTRACT Most studies on surface persistence of SARS-CoV-2 have been conducted at temperatures between 20°C and 30°C. There is limited data on the survival of SARS-CoV-2 at low temperatures. In this study, the stability of SARS-CoV-2 Alpha and Delta variants on stainless steel was investigated at two temperatures (4°C and 24°C). The results show that both variants decayed more rapidly at 24°C compared with 4°C. At 24°C, Alpha and Delta variants showed reductions of 0.33 $\log_{10}$ and 1.02 $\log_{10}$, respectively, within the first 2.5 h. However, at 4°C, Alpha variant showed a reduction of 0.16 $\log_{10}$ within the first 2.5 h while no reduction was observed with Delta variant. After remaining in situ for 24 h at 24°C, $\log_{10}$ reductions of 2.66 (Alpha) and 3.11 (Delta) were observed. No viable Alpha and Delta variant was recovered after 48 h and 72 h, respectively. After 24 h in a refrigerated environment (4°C) $\log_{10}$ reductions of 1.16 (Alpha) and 0.96 (Delta) were observed. Under these experimental conditions, both viruses survived on stainless steel for at least 1 week. No viable Alpha and Delta variant was recovered after 10 days. These findings support the potential for increased fomite transmission of SARS-CoV-2 during winter months in colder regions worldwide and in some industrial sectors.



PROTECT
COVID-19 National Core Study

Theme 4

- Loss of viability within 1st hour of drying on surfaces
- Unlikely that changes in transmissibility due to differences in environmental stability in VoC
- Surface contamination is complex: no evidence of viable virus in any samples and frequency of detection reduced over time in workplaces
- Masks effective at reducing dissemination of aerosols, particularly in super-spreaders
- Face shields are ineffective compared to masks; reducing volume of speech reduces aerosol dissemination

Theme 5

- People don't emit infectious virus until they are lateral flow positive
- Some individuals emit much more virus than others
- Only 10 infectious units is enough to infect
- Superspreading people and events could have large impacts on outbreaks

Intangible Benefits

- Globally unique programme
- Value of Mission driven programmes driving interdisciplinary benefits
- Established links across the research ecosystem: PSREs, academic, independent
- Collected real world data
- Occupation isn't a thing; it is a system

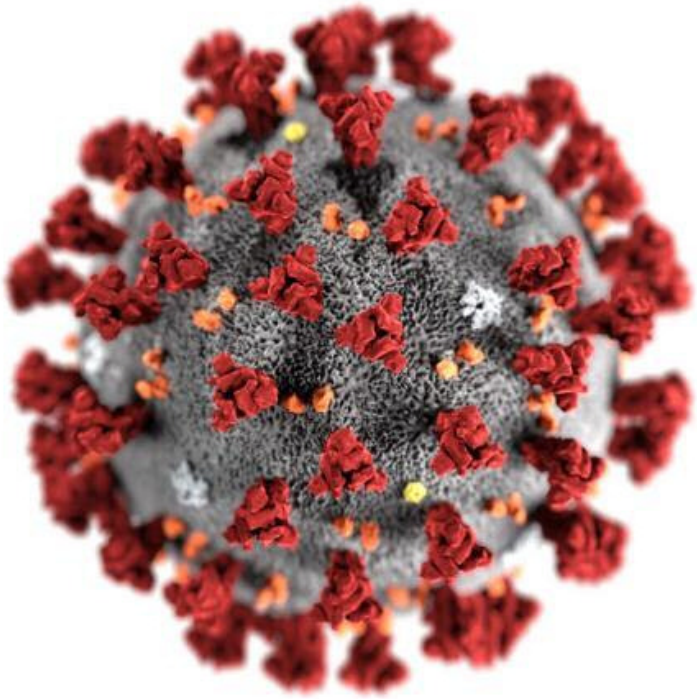
Route to Impact

- “This work has been essential for informing the Government’s position and response to the pandemic and has contributed directly to policy decisions”.

Sir Patrick Vallance, GCSA

- GCSA and GO-Science consider continuation of this work to be of extremely high importance in order to support the Government through this pandemic, and to prepare it for future pandemics

Government Office for Science



Acknowledgments

Theme Leaders

Yiqun Chen
HSE

Derek Morgan
HSE

Cath Noakes
University of Leeds

Martie Van Tongeren
University of Manchester

David Fishwick
HSE

Allan Bennett
PHE

Wendy Barclay
Imperial College

Organisations

… and our entire research and portfolio management community

PROTECT
A COVID-19 National Core Study

Keeping the UK Building Safely

Neil Bourne and Richard Kirkham

https://www.ashtoninstitute.ac.uk/about/news-and-events/headline-899571-en.htm

Keeping the UK Building Safely (KUBS)

As part of Theme 6 of the PROTECT NCS study, the Keeping the UK Building Safely (KUBS) project aimed to improve our understanding of the construction sector's efforts to build 'COVID-secure' workplaces.

Evidence collected by the KUBS project is being used to support the sector to reduce transmission of the COVID-19 virus and support the productivity agenda in the sector

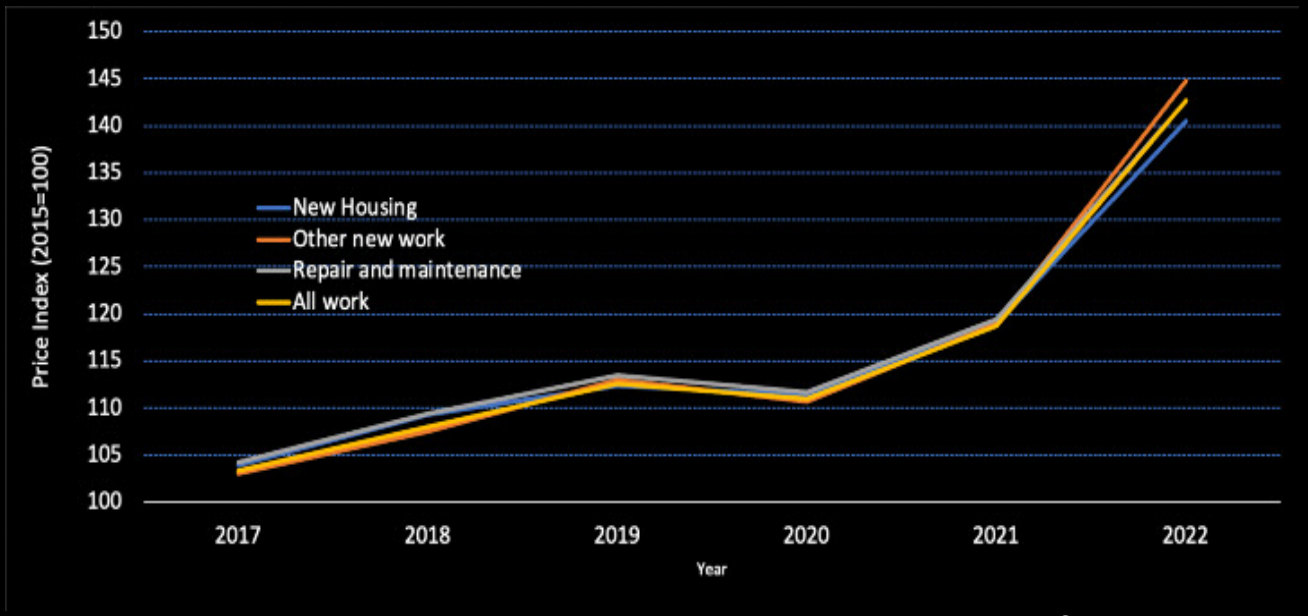
KUBS phase 1 report explored the context at the start of the pandemic with managers and suggested that construction was expected to manage well with safe working due to the existing cultures and structures. The KUBS project was structured around key workstreams, identified through engagement with the Health and Safety Executive (HSE) and construction industry stakeholders: transmission, technology, data and simulation, leadership, and construction project delivery.

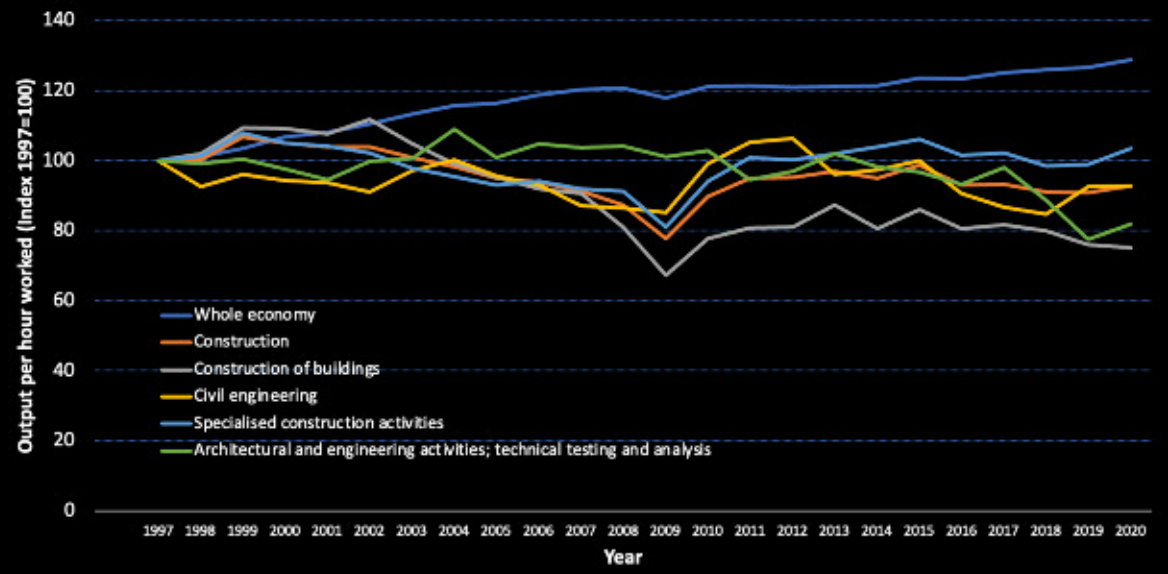
'KUBS 2', was conducted at a much later point in the pandemic, and with a wider range of staff from all levels within construction, allowing us to explore these expectations and the extent to which they were realised.

PROTECT
A COVID-19 National Core Study

Keeping the UK Building Safely (KUBS) – Neil
Neil Bourne & Richard Kirkham

PROTECT
A COVID-19 National Core Study





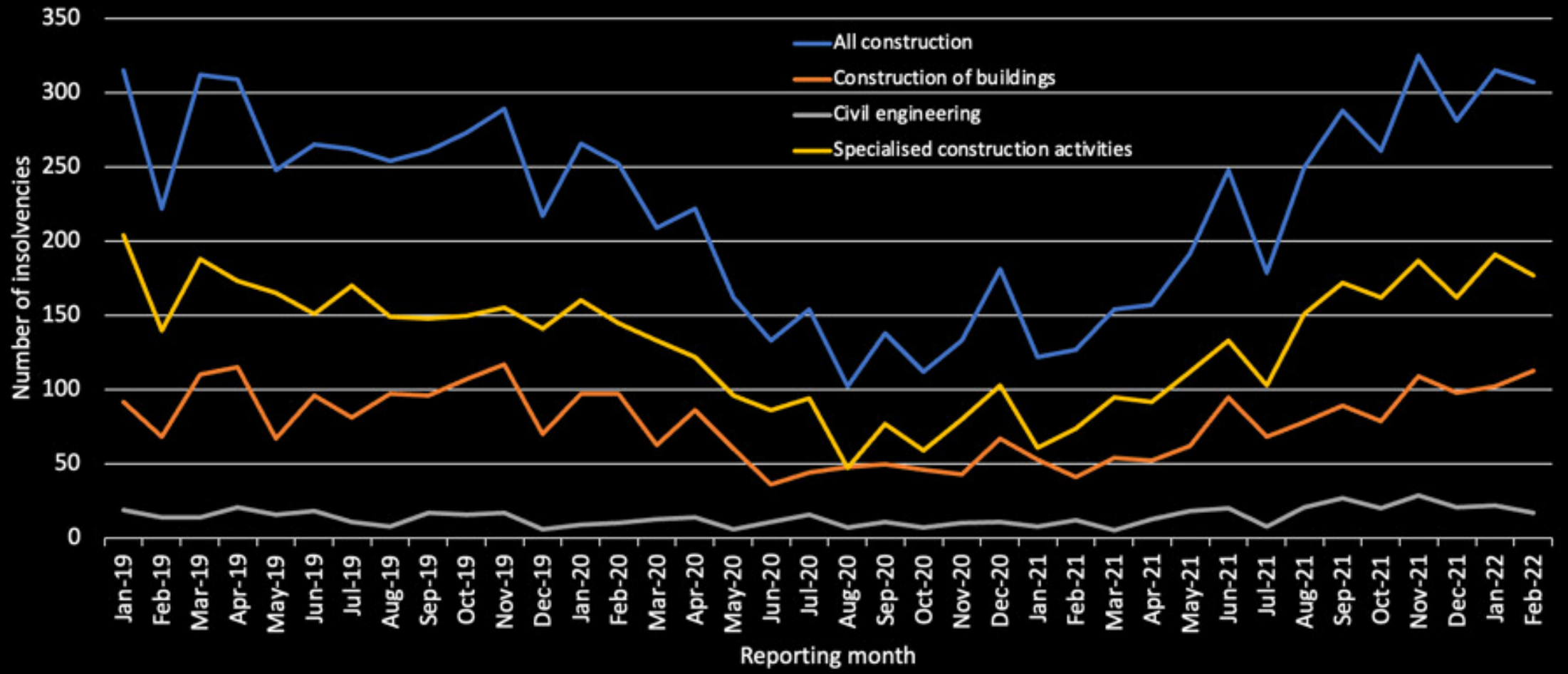
The three industries that experienced the highest number of insolvencies in the 12 months ending Q1 2022 were:

- Construction (3,213 insolvencies, 19% of cases with industry captured);
- Wholesale and retail trade and repair of vehicles (2,100 insolvencies, 13% of cases with industry captured);
- Accommodation and food services activities (1,977 insolvencies, 12% of cases with industry captured);

These were also the three sectors with the most insolvencies in the 12 months ending Q1 2021. The construction industry usually has the highest quarterly number of insolvencies of any industrial grouping (Source, ONS 2022)

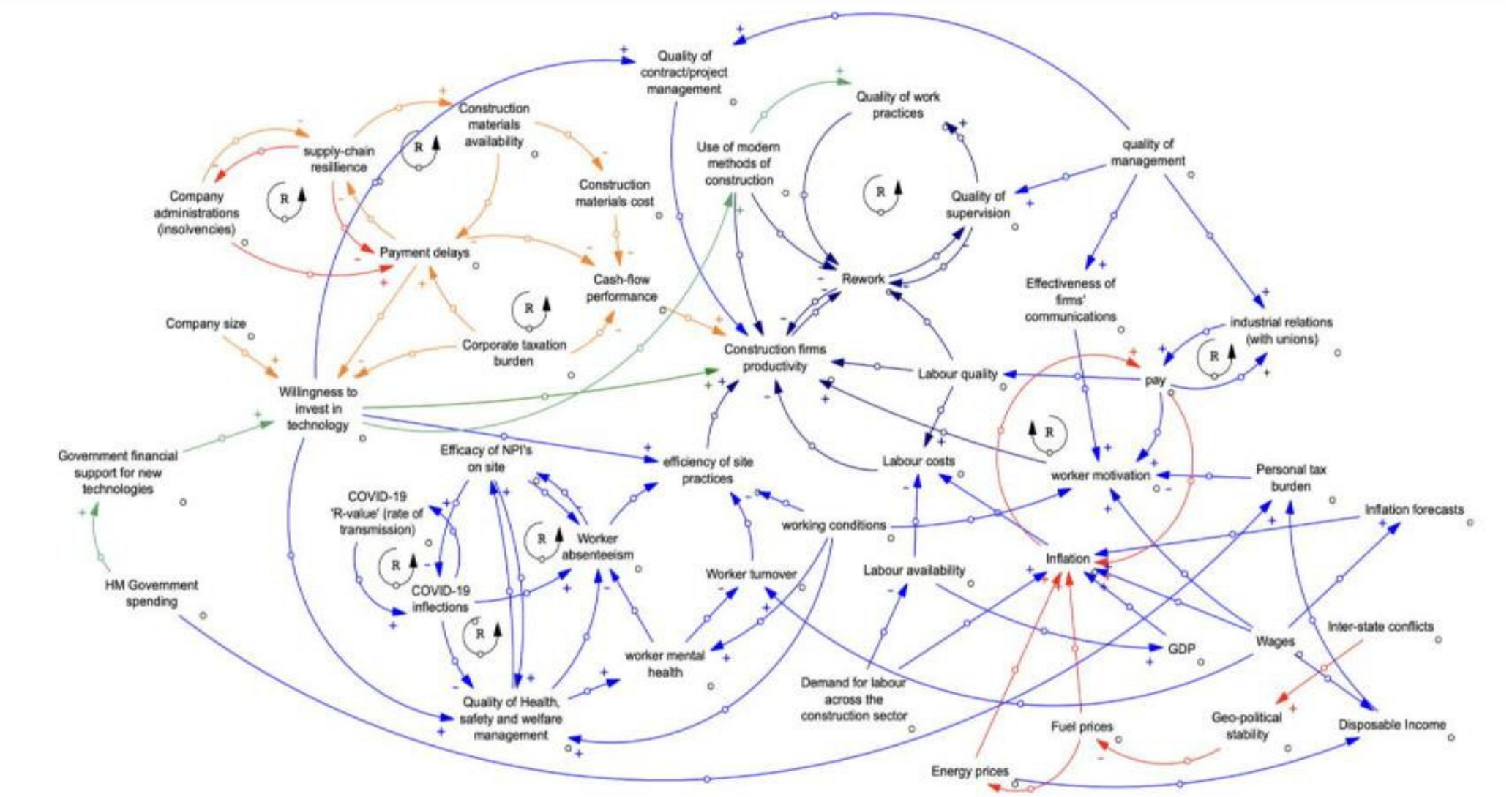
Keeping the UK Building Safely (KUBS)

PROTECT
A COVID-19 National Core Study



Keeping the UK Building Safely (KUBS)

PROTECT
A COVID-19 National Core Study



BIM RISK LIBRARY PROJECT

DISCOVERING SAFETY

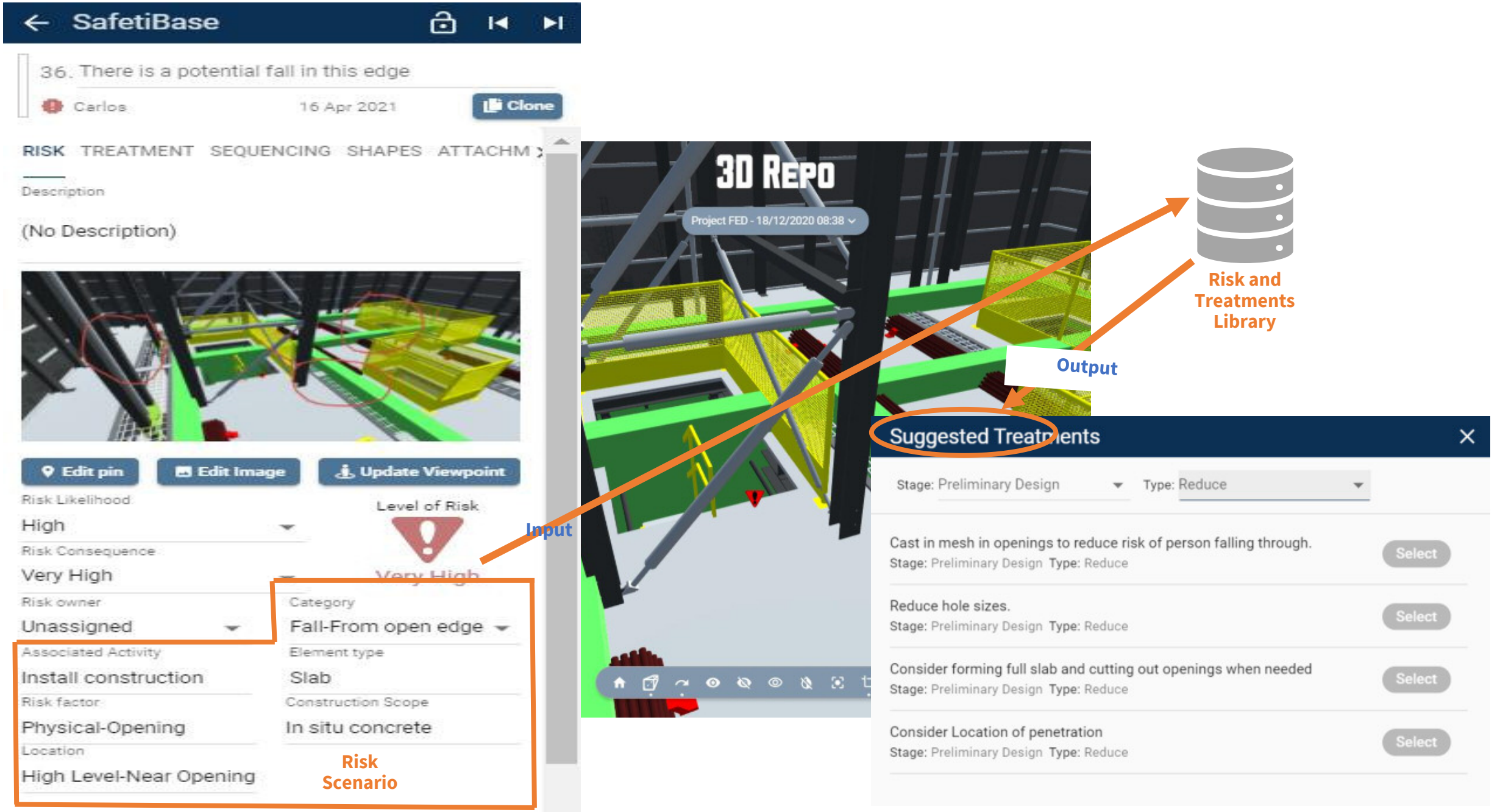
Delivering health and safety benefits through a data driven global community

TAI Thomas Ashton Institute

DEMONSTRATION

The Construction Risk Library

- Currently a simple csv file of risk scenarios and treatment prompts
- Risk Scenarios informed by incident history
- Catalogue is only just started
- Links data on risk to Models
- Enables Treatments to be tracked, managed and standardised
- Uses 3D Repo Model Viewer and Data Tracking


SafetiBase
36. There is a potential fall in this edge
Carlos
16 Apr 2021
Clone
RISK
TREATMENT
SEQUENCING
SHAPES
ATTACHM
Description
(No Description)
Edit pin
Edit Image
Update Viewpoint
Risk Likelihood
High
Level of Risk
Risk Consequence
Very High
Risk owner
Unassigned
Category
Fall-From open edge
Associated Activity
Install construction
Element type
Slab
Risk factor
Physical-Opening
Construction Scope
In situ concrete
Location
High Level-Near Opening
Risk Scenario
3D Repo
Project FED - 18/12/2020 08:38
Input
Output
Risk and Treatments Library
Suggested Treatments
Stage: Preliminary Design
Type: Reduce
Cast in mesh in openings to reduce risk of person falling through.
Stage: Preliminary Design Type: Reduce
Select
Reduce hole sizes.
Stage: Preliminary Design Type: Reduce
Select
Consider forming full slab and cutting out openings when needed
Stage: Preliminary Design Type: Reduce
Select
Consider Location of penetration
Stage: Preliminary Design Type: Reduce
Select

The Risk Scenario

Treatment

Initial
Risk Phase Filter
Safetibase label – “activity”

Material sourcing
Component manufacture
Storage, transport, logistics
Install construction
Commission, site tests
Asset management
Operation
Maintenance
Low probability /high impact events
Modification
Aging
Demolition, removal
Material disposal or re-use

Sources of risk

Construction Scope — Work activity

Element- — Tools/equipment; Plant/machinery; Building element/product; Structure/Temp structure

Location — On site-relative to risk; On or in vehicle; On access equipment; On or in structure

Risk Description

Risk Factor

Risk Category

Risk Treatment Prompt

	Eliminate	Reduce	Control by Subsequent Design	Provide Information
Preliminary Design	1	2	3	4
Detail Design	5	6	7	8
Pre construction	9	10	11	12
Site works, Temp works, change control	13	14	15	16

Welcome to the Press Release Dashboard - this is a list of 400 construction press releases from the HSE categorised in terms six data points which together describe a risk scenario.

Use the page navigation buttons to begin exploring.

The Risk Scenario

1. Activity - Describes phase of asset lifecycle in which risk will eventuate

Install Construction

2. Construction scope - describe/reference the construction context

B3-Trenches For Foundations And Services

3. Building element - describe/reference the construction context

Dumper Truck

4. Location - describe/reference the construction context

Site Logistics-Excavation Area

Risk Scenario 363 ..... A construction company has today been fined s after an employee operating a (3.) **2.5 tonne dumper** drove into a 5-foot-deep excavation. Magistrates court heard how, the employee was (1.) **installation of a** (2.) **French drain and soakaway in a** (4.) **church yard along with roofing work**. He was involved in **the excavation** of the sump, which on completion would be backfilled with aggregate. In the process of approaching the sump the **dumper failed to stop and** (5.) **drove into the excavation tipping him out of the** (6.) **dumper and trapping him**. Injuries sustained included a shattered ankle, sheared tibia and fibia and head .....

5. Risk Factor - Why is a person vulnerable?

Physical-Edge

6. Risk category - How does the risk eventuate?

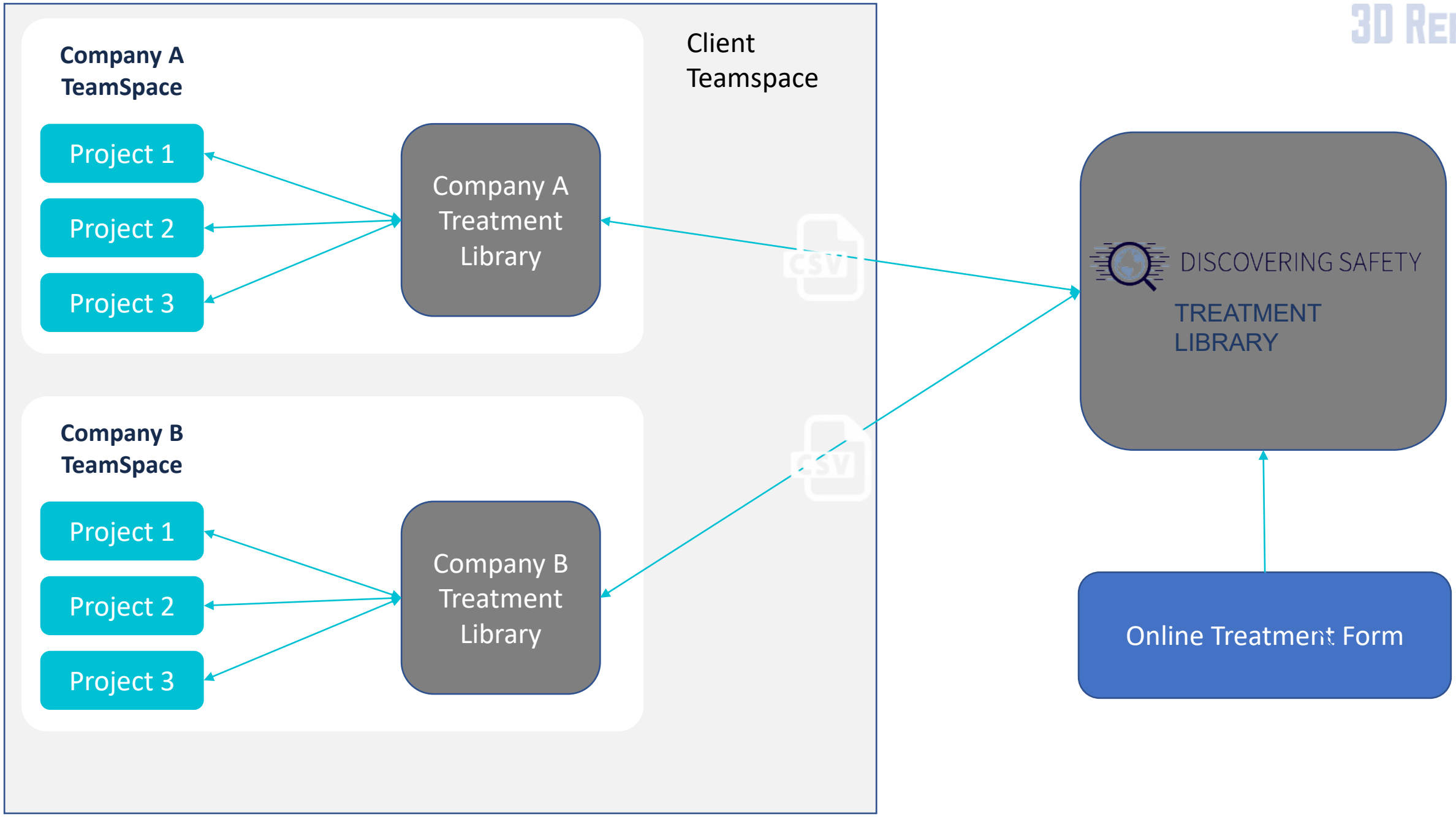
Struck-Overturning Plant Or Moving Machinery

A Discovering Safety proof of concept

DISCOVERING SAFETY

Page Navigation

- Introduction Page
- Most Common Identical Risk Scenarios
- Risk Category Breakdown
- Risk Scenario Breakdown Including Activity
- Detailed Risk Scenario
- Detailed Risk Details
- Scenario Matching Table


Company A TeamSpace
Project 1
Project 2
Project 3
Company A Treatment Library
Client Teamspace
Company B TeamSpace
Project 1
Project 2
Project 3
Company B Treatment Library
CSV
CSV
DISCOVERING SAFETY
TREATMENT LIBRARY
Online Treatment Form

Phase 3 work – to Complete May 2024 Working with the BIM Academy as DS partner

- achieve adoption of the Construction Risk Library -recruit suitable industry partners - Working with partners to expand and reinforce the library of risk treatment prompts, and complete an “Alpha Version” of the CSV file. To include a representative range of design risk scenarios and risk treatment prompts to provide examples for the industry
- Data sharing – work with EA to promote SDSL and develop a supportive design risk data audit- anonymisation and generalisation
- Develop the software offering with Asite - 3D Repo, and other platforms. Carry out BIM – sensors- GIS innovation trial
- Create training and briefing material for HSE and external users of the Construction Risk Library

Violence & Aggression Research Network (VARN)

Sheena Johnson, Kara Ng (UoM)

Helen Beers, Eleanor Kinman (HSE)

Workplace violence and aggression (WVA)

- The HSE defines **work-related violence** as *"any incident in which a person is abused, threatened, or assaulted in circumstances related to their work*."
- The risk of WVA from the public (third parties) is a **growing concern**
- **Pre-COVID**, WVA incidents were broadly consistent
- **The impact of COVID:**
  - Marked increase in WVA
  - New 'types' of abuse, like spitting

Initial project aims and methods

We aim to understand…

1. The **extent** of work-related violence and aggression (WVA)
2. The current state of how WVA is **reported**
3. How organisations are trying to **prevent** WVA
4. WVA's **impact** on employees

Methods:

1. **Scoping review** to synthesise academic and grey literatures
2. **Three Workshops** (~44 participants) and 1-on-1 interviews (n=7) with organisational representatives
3. Workshop **survey** data

Variety of sectors: Border Force; Construction; Healthcare; Local authorities; Retail; Waste management

Findings from the literature reviews

- Most academic research initially focused on **healthcare** – but what about other public-facing work?
  - Elston & Gabe (2016): Study of UK GPs – 4/5 GPs reported experiencing verbal assault in past 2 years
  - Nurses, support workers, women, BAME staff report higher WVA rates (Lepping et al., 2013)

- WVA **negatively affects** health, engagement. Increases turnover intention (Cheng et al., 2020)

- Methods to **reduce** incidents:
  - In retail/hospitality: (Taylor et al., 2020)
    - E.g. limiting sales of alcohol drinks; training staff on service refusal

- Some **evidence** that methods work:
  - Ariel et al. (2019): Intervention study using body cams in rail transport
    - 26% reduction in assaults in experimental (body cam) vs. control group
    - Camera use can reduce up to 3000 days lost due to violence

Findings from interviews

- It is likely that many incidents (with the exception of those reportable under **RIDDOR**) are not reported
- WVA is **normalised**
- **Complex, time-consuming** reporting systems
- **Lack of faith** in management
- **WVA has both mental and physical effects on employees**
  - Mental: Anxiety, trauma, PTSD, low self-esteem
  - Impacts on physical health and future career prospects/development
  - Fear 'spills over' into home/non-work lives
- **Sustained WVA affects organisations**
  - High turnover, low group morale, negative effects on culture
- **The 'drip effect'**
  - Verbal abuse, sustained over time, can be particularly harmful

Methods to encourage reporting WVA

- Importance of **multisource reporting systems** that work with employees' environments and needs
  - E.g., providing IT equipment, allowing workers to report incidents during work time
- Increase **meaningful training** emphasising that WVA is unacceptable
- **Engage workers** themselves and ask what they want
- Develop **strong relationships** with local authorities and police
- **However, very little information collected and analysed**

Using the VARN for research

Progress:

- Established Violence and Aggression Research Network (VARN)
- Linking up, and sharing learning, with other networks
  - Partnership on Work-related Violence (POWV)
- CAPE funding application Apr22: unsuccessful
- Considering other funding opportunities – COLT funding

Dissemination:

- *Blog posts*
- *SHP article*
- *Conference presentations (EAWOP, CIPD, HW@W)*

Current research focus

- Received **AMBS Impact Support Funding** to carry out research with VARN partner
- Investigating the impact of body-worn cameras on **V&A incident rate among civil enforcement staff**
  - Aim to share findings among VARN partner's senior leadership and competitors to encourage body camera use

Current research focus: V&A in social care settings

- **Workshop** (22nd May 2023)
  - Managers and/or health and safety leads in social care
- **Purpose of the workshop**
  - To understand:
    - The true extent of violence and aggression in social care
    - The impact on workers
    - How incidents are being recorded
  - To identify:
    - Potential solutions
    - Instances of best practice

TAI Thomas Ashton Institute

Thank you!

Design for Safety (DfS) in Construction: Collaboration for Knowledge transfer from the UK with Implications for Policy and Practice in Malaysia

Patrick Manu, Clara Cheung and Akilu Yunusa-Kaltungo – The University of Manchester

Prof. Ts Dr. Che Khairil Izam Che Ibrahim, Assoc. Prof. Dr. Sheila Belayutham, Dr. Mazlina Zaira Mohammad – Universiti Teknologi MARA

Objectives

1. To solidify the opportunities for UK-Malaysia collaboration, notably in the field of occupational safety and health in construction, specifically in the subject of design for safety (DfS) practices, through collaborators' interactions.

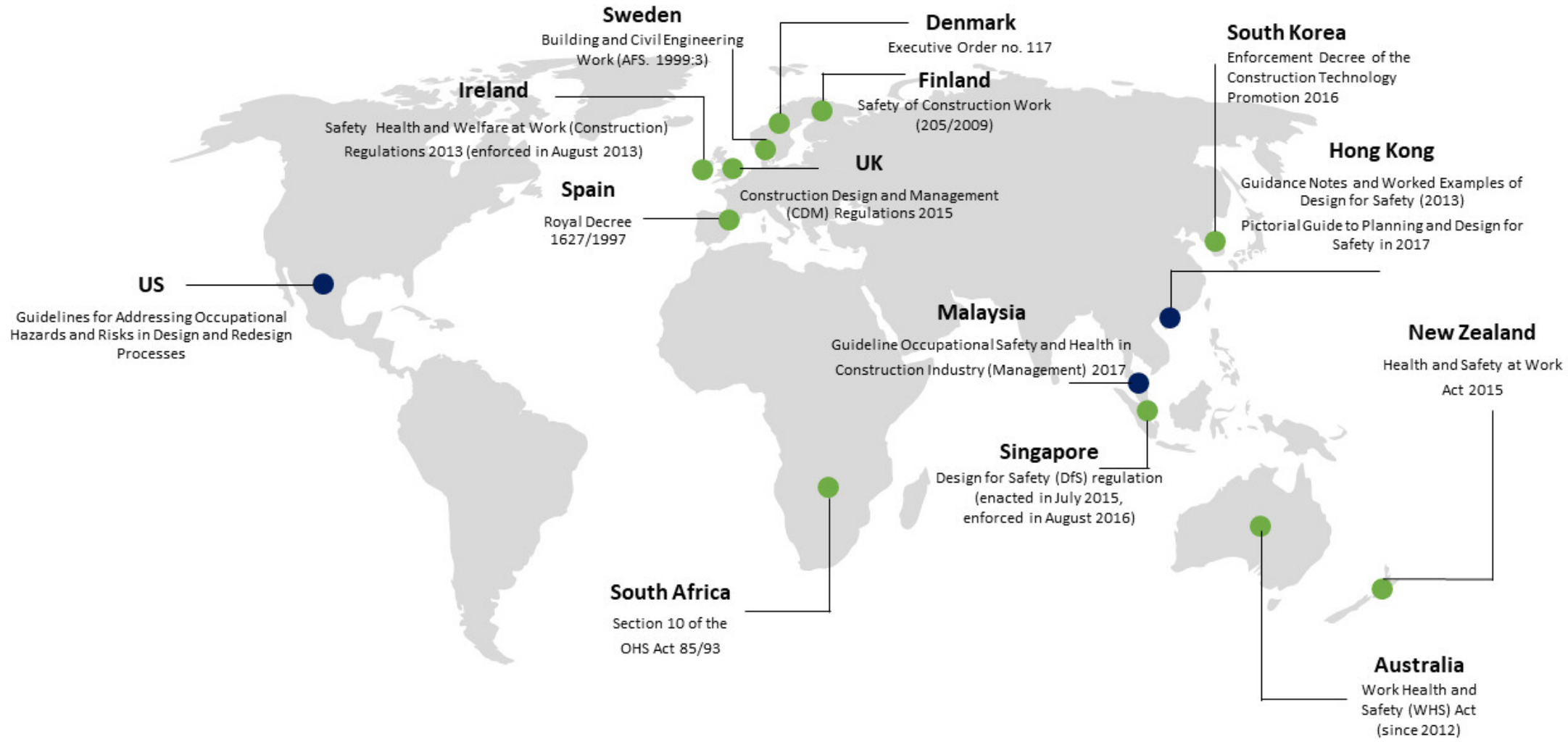
2. To raise awareness of DfS benefits in Malaysia construction industry via outreach, e.g., workshops and knowledge dissemination in outlets (printed, online, social media and industry periodicals).

3. To transfer knowledge on DfS practices from the UK to Malaysia by case study visit, sharing lessons-learned via scholarly activities and publications in peer-reviewed outlets to inform DfS educational material.

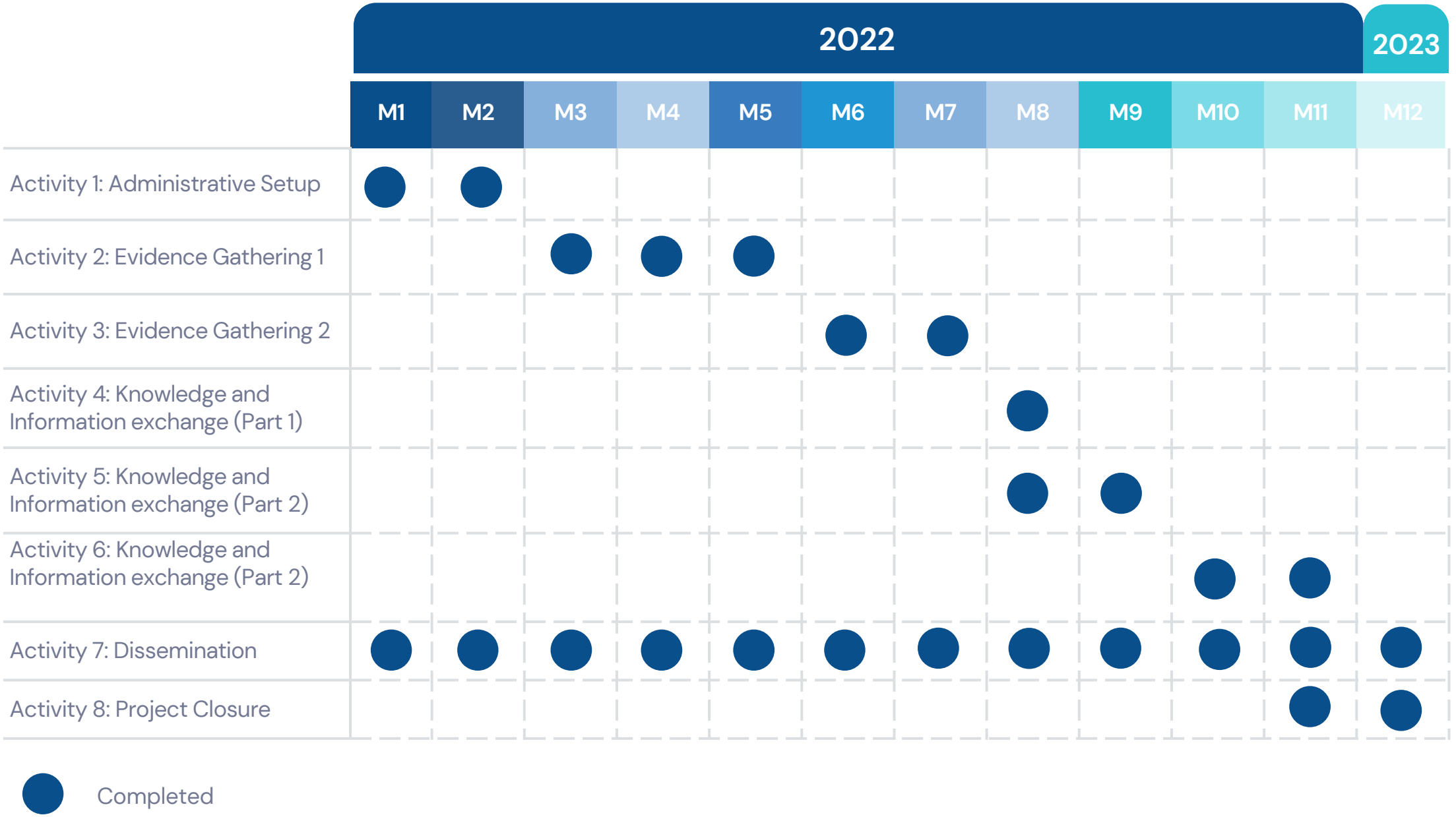
4. To strengthen the visibility of the academic portfolio for both academics and associated institutions as leaders in DfS practices.

DfS Regulatory / Guideline Framework

CONSTRUCTION SAFETY & HEALTH



Progress Timeline



Activity 1

Administrative Setup

Coordination Meeting

1st Meeting
14 February 2022

Every 3 weeks

Finalising MoA – UiTM & MIGHT – 22/2/2022

Finalising Collaborative Agreement – UiTM & UoM – 6/4/2022

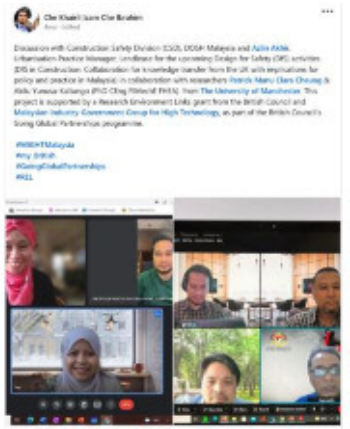
Ethics Application

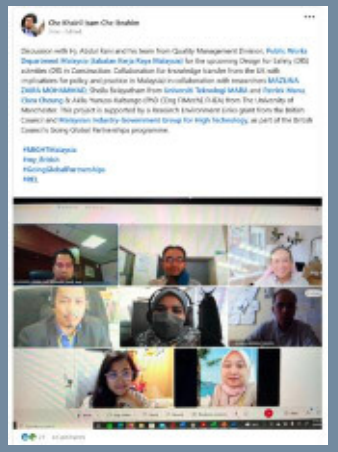
Approved by the UiTM Research Ethics Committee on 24 February 2022 (Reference no: REC/02/2022 (ST/MR/22))

Collaborator Meeting

Department of Occupational Safety and Health (DOSH), Ministry of Human Resources MALAYSIA – 22 Feb 2022

Lendlease Projects (M) Sdn Bhd – 4 March 2022





Public Works Department (PWD) MALAYSIA – 6 April 2022

17 PARTNERSHIPS FOR THE GOALS

Activity 2
Evidence Gathering 1

438

Webex

8

Webinar 1 – 18 May 2022

217

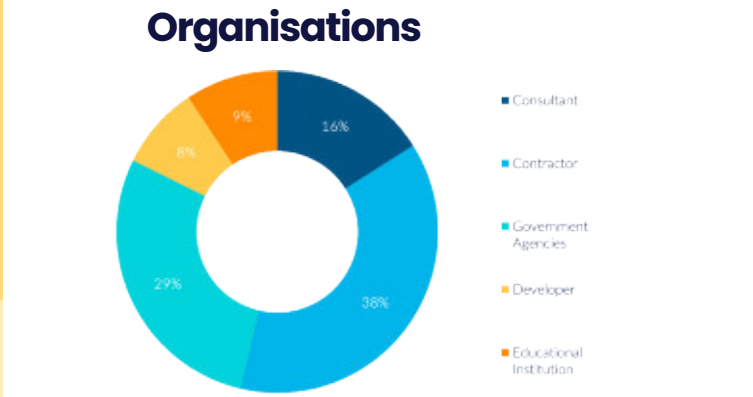
Webinar 2 – 15 June 2022

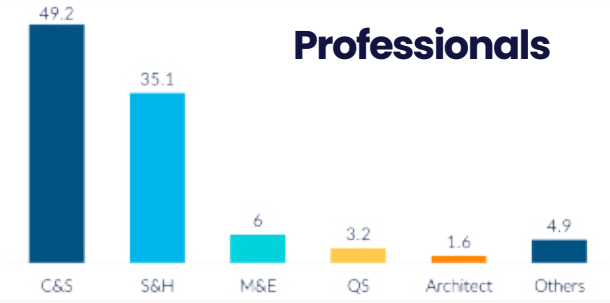
221

63%

37%

Collaborator & Supporting Organisations





JABATAN KESELAMATAN DAN KESIHATAN PEKERJAAN

JKR

lendlease

MRCB | Builders
Setia Utama LRT 3 Sdn Bhd

Minconsult

TAI Thomas Ashton Institute

MRT CORP

Overview of OSHCIM 2017 on Stakeholders Roles & Responsibilities

Introduction on Design for Safety (DfS) Concept

Design for Safety (DfS) on Organisational Capabilities

Design for Safety (DfS) Practice in Malaysia

UK Construction Design and Management (CDM) Regulations – built in, not bolt on!

Applying Prevention through Design concept to Improve Safety at Construction Site

Design for Safety (DfS) Practice in the United Kingdom (UK): "Using site information to inform early project decisions"

Activity 3
Evidence Gathering 2

Webinar 3
6 July 2022

Participants 222

Female **36.9%**

Male **63.1%**

Webinar 4
3 August 2022

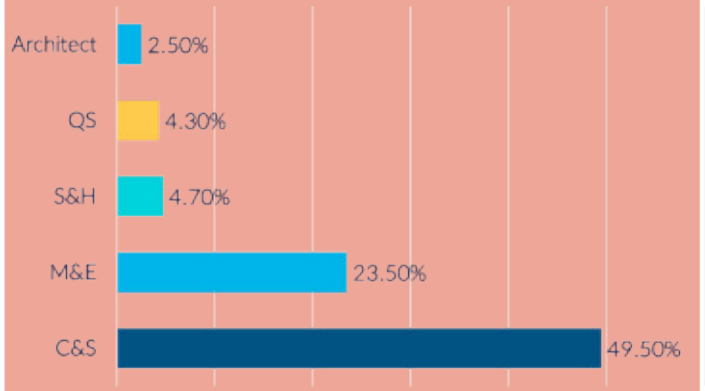
Participants

211

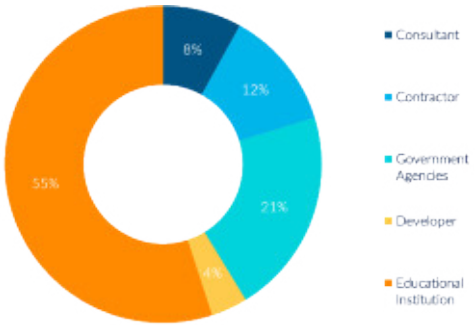
Female **22.7%**

Male **77.3%**

Professionals



Organisations



Overview of OSHCIM 2017 on Stakeholders Roles & Responsibilities

Introduction on Design for Safety (DfS) Concept

Design for Safety (DfS) in academic landscape

Construction Safety Cost Typology

Construction Safety Cost Calculator

Health & Safety and Environmental Aspects Based on Engineering Accreditation Council (EAC) and Engineering Accreditation Technology (ETAC), Board of Engineers Malaysia

Design for safety in relation with Malaysia Uniform Building By Law

Will Construction be Safe when it's Designed to Be Safe?

Design for Safety (DfS) – Actual implementation in existing buildings with Certificate of Compliance & Completion (CCC)

Design for Safety (DfS) Educational Landscape in the United Kingdom (UK) "BIM Risk Library"

Activity 4

Knowledge and Information exchange (Part 1)

Site Visit

ARCOM Conference

1 – 7 September 2022

Discussion with HSE July 2022

- Mr. Tim Plowright
Head of International Partnership
- Mr. Nic Rigby
HM Principal Investigator, International Unit

38th Association of Researchers in Construction Management (ARCOM) Conference

5-7 September 2022, Glasgow Caledonian University, Glasgow, UK

Site Visit

HSE Science & Research Centre

Lendlease Manchester Town Hall Project & Burntwood project

Manchester Engineering Campus Development (MECD)

MECD Building Health and Safety tour

MECD Engineering Lab

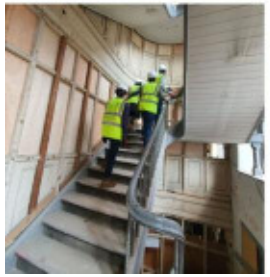
Paper

Design for Safety (DfS) Organisational Capability In Malaysia: A Multi-stakeholder Perspective

Acknowledgements

This work described in this paper has been co-funded by a Research Environment Links grant (Ref No. MIGHT/CEO/NUOF/1-2022(1)) from the British Council and Malaysian Industry-Government Group for High Technology, as part of the British Council's Going Global Partnerships programme.

Visit to The University of Manchester, HSE, Manchester Town Hall & Cubic Works site (September 2022)



Collaborative Teaching

ECM 744: Construction Site & Safety Management
MSc in Construction Engineering

Activity 5 & 6

Knowledge & Info. Exchange (Part2)

Activity 5

Mini seminar / workshop with doctoral students related to OSH and DfS research and practice.

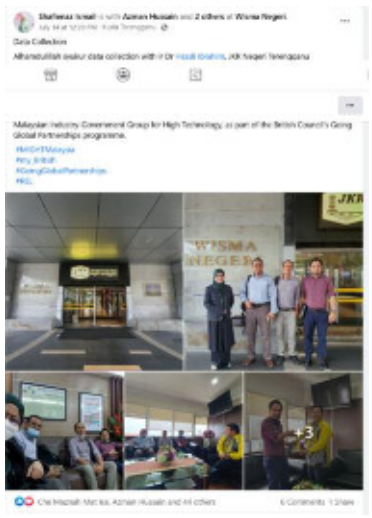
Guest Lecture by experienced academics and practitioners

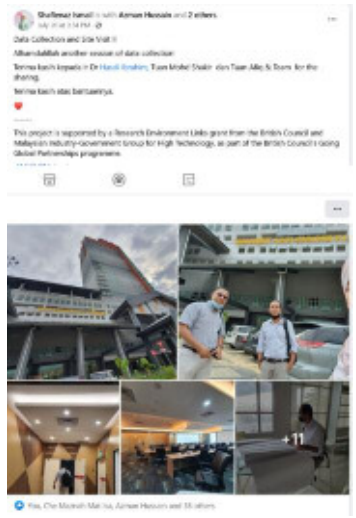
Activity 6

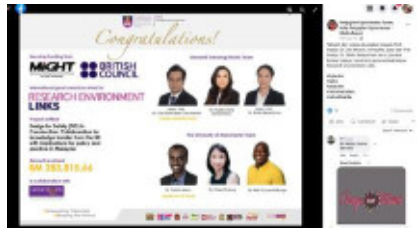
Workshop with stakeholders

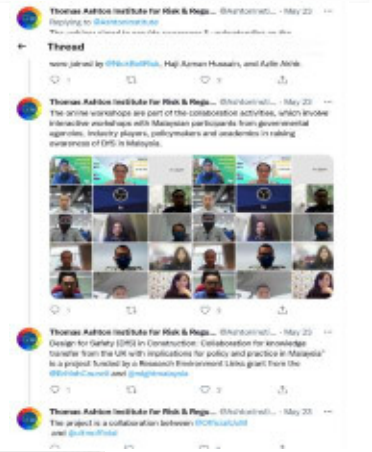
Activity 7

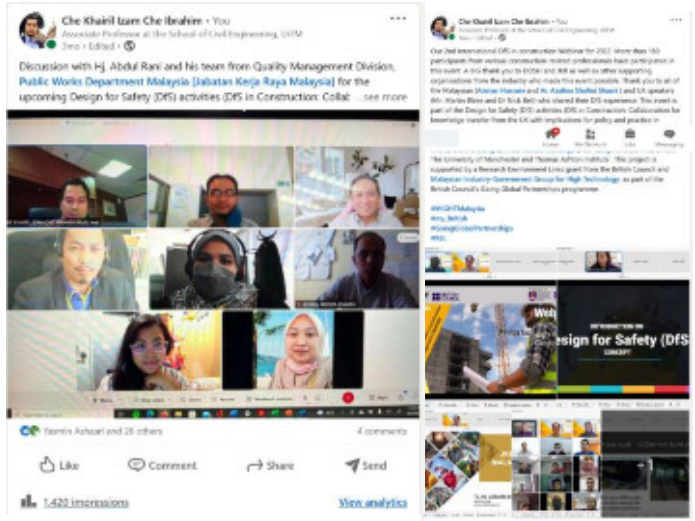
Dissemination









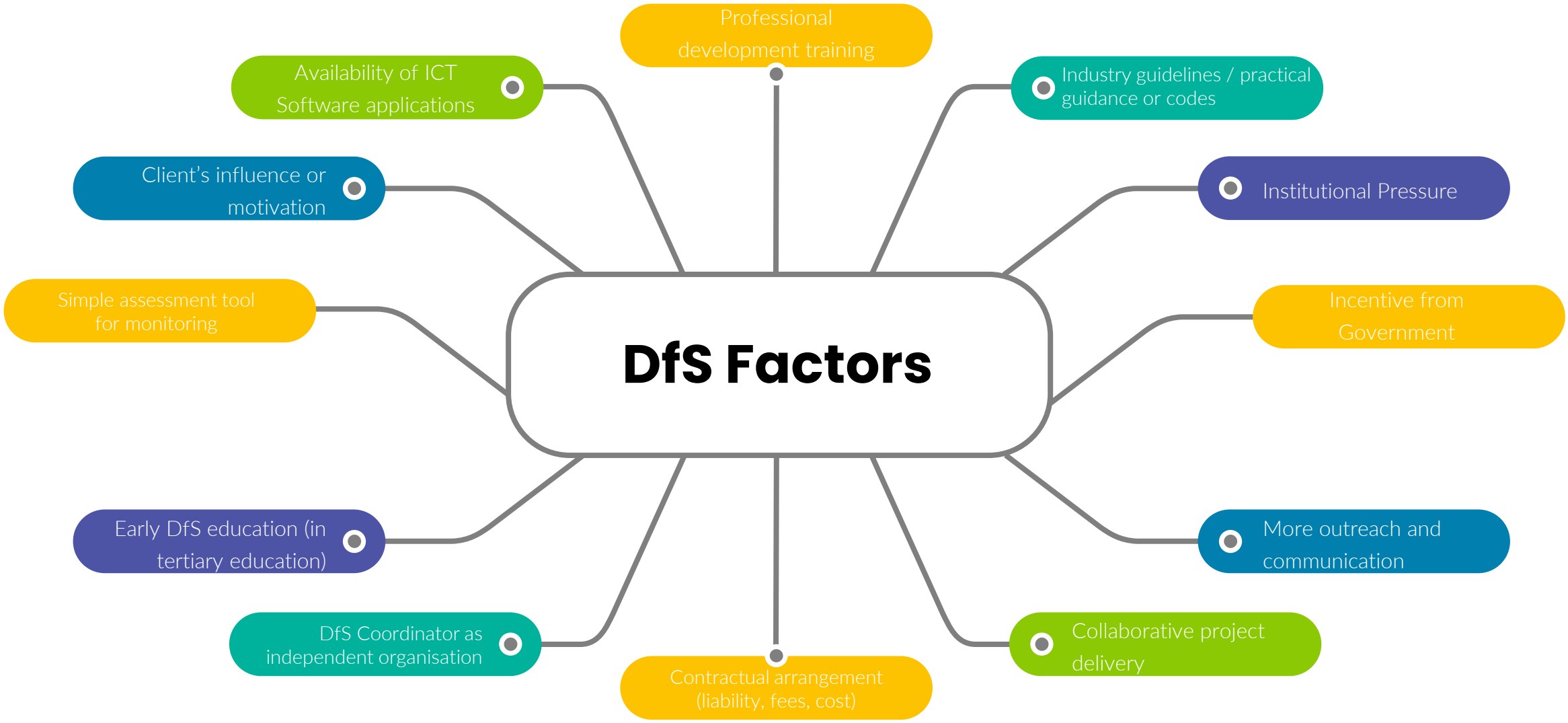


Activity 8

Project closure

Factors Influencing DfS Implementation

Operational Organisation Factors, External Forces & Industry Dynamics



Way Forward

Institutional pressure e.g.,

- Regulatory body to play important roles in strengthening the legislative and compliance framework for DfS implementation

Continuous engagement beyond compliance e.g.,

- Focus on wider stakeholder community engagement through seminars, workshops or focus group discussion. A growing dialogue is critical for nurturing and stimulating duty holders' own safety culture.

Industry responsiveness e.g.,

- Enhance the existing designer DfS competence framework

Building a culture of DfS e.g.,

- Early and continuing DfS learning, through enhancing the related engineering and built environment curricula in the tertiary education at all levels (e.g., certification, diploma, degree and master) to include more construction courses, including site safety and DfS concept.

Technological Advancement e.g.,

- Embrace the emerging technologies to enhance flow of information between project actors

Acknowledgements

- HSE colleagues - Helen Balmforth, Tim Plowright, Nic Rigby, Steve Naylor, Gordon Crick.
- TAI staff - Vicky Turner, Helen Kreissl, Darren Clement
- UK-based speakers & supporters – William Collinge, Carlos Osorio Sandoval, Nick Bell, Martin Blake, Lendlease UK, Cubic Works
- Malaysia-based speakers & supporters – Azman Hussain, Shafienaz Ismail, Che Maznah Mat Isa, Ar. Azalina Shafini Shaari, Azlin Akhir, Asmalia Che Ahmad, Izatul Farrita Mohd Kamar, Nurakmal Abdullah @ Goh Tuo Ho, Department of Occupational Safety and Health, JKR, Lendlease Malaysia, Malaysian Institute of Architects, RHR Hospitality, Public Works Department, etc.

MANCHESTER 1824
The University of Manchester

TAI Thomas Ashton Institute

Thank you!

A Feasibility Study for Developing an Occupational Exposure-Control Intelligence System in GB (OccECIS) using respirable crystalline silica as the working example

Ioannis Basinas PhD, Martie van Tongeren PhD,
Damien McElvenny PhD

TAI Showcase 10 May 2023

Primary Research Question

- Is it feasible to develop a methodology for a British OccECIS that will provide leading indicators so that HSE can:
  - identify and prioritise hazards and relevant sectors and occupations of concern; and
  - monitor the effectiveness of any national or sector-specific interventions over time

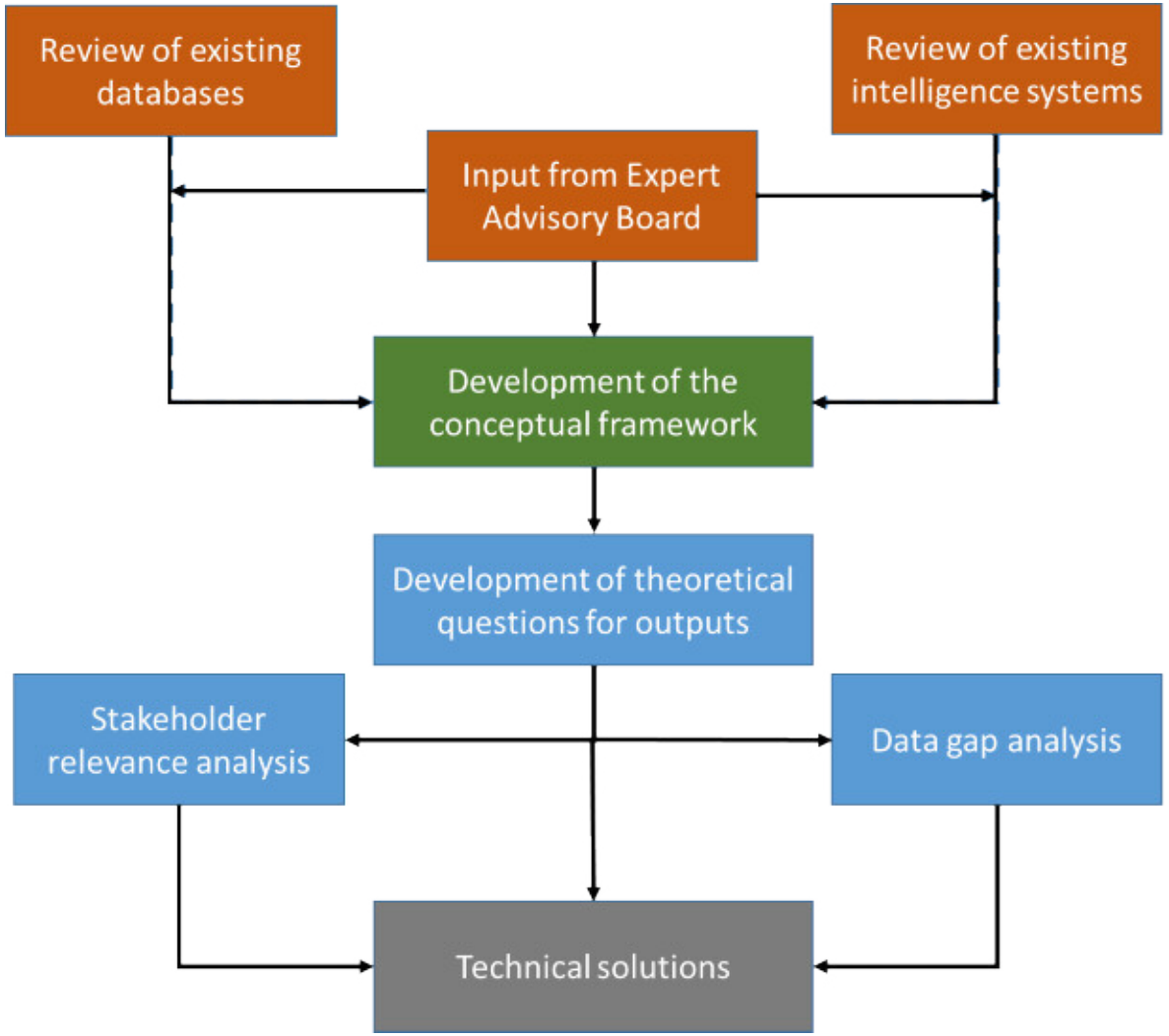
But what would it provide?

- Exposure intensity
- Exposure prevalence
- Exposure control/ Risk Management Measures (RMM)
- Background Information

Benefits of an OccECIS? Not just for HSE!

- A tool for **several** stakeholders, e.g.:
  - Policy makers
    - Agent prioritization, policy interventions, evaluation of effectiveness
  - Professionals (OH/H&S providers)
    - Agent prioritization, exposure control, prevention, intervention and evaluation, information
  - Individual businesses and the public
    - Exposure control, prevention, intervention and evaluation, other information (e.g. OELs)
  - Researchers
    - Epidemiological analysis, impact assessments

Methodology towards system design



Review of existing intelligence systems

System name	Country	Coverage			Substances
		Intensity	Prevalence	RMMs*	
CARcinogen EXposure (CAREX) EU	EU	Yes	Yes	No	Carcinogens
CARcinogen EXposure (CAREX) CANADA	Canada	Yes	Yes	No	Carcinogens
Italian register of occupational exposures to carcinogen agents (SIREP)	Italy	Yes	Yes	No	Carcinogens
Exposure control efficacy library (ECEL)	NR	No	No	Yes	Any
CPWR's Exposure Control Database	NR	No	No	Yes	Silica, welding fumes, noise, lead
Silica Control Tool™	NR	No	No	Yes	Silica
Control Measures Efficacy Database (COMED)	NR	No	No	Yes	Any

Exposure prevalence and intensity

Exposure control

Review of existing data sources

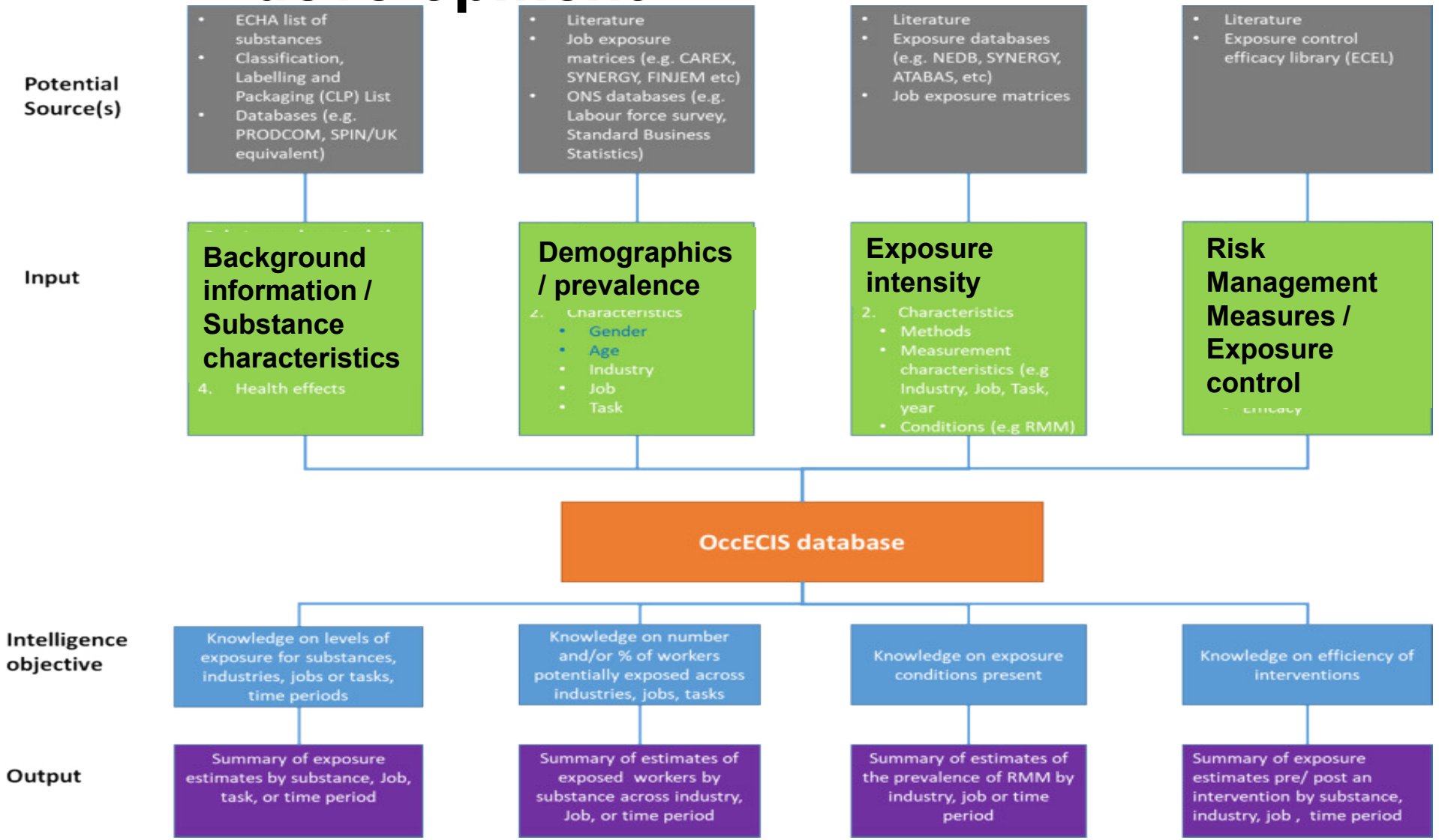
- Inventory of ~60 identified exposure databases (DBs)
  - Some with UK data; e.g. NEDB, SYNERGY, CODUST, WOODEX etc. with UK data
  - Most DBs not publically available
  - Logistics (i.e. time required, paperwork etc) a potential issue

- Several relevant databases for workforce population estimates available
  - Most important: Census and Annual Population Survey

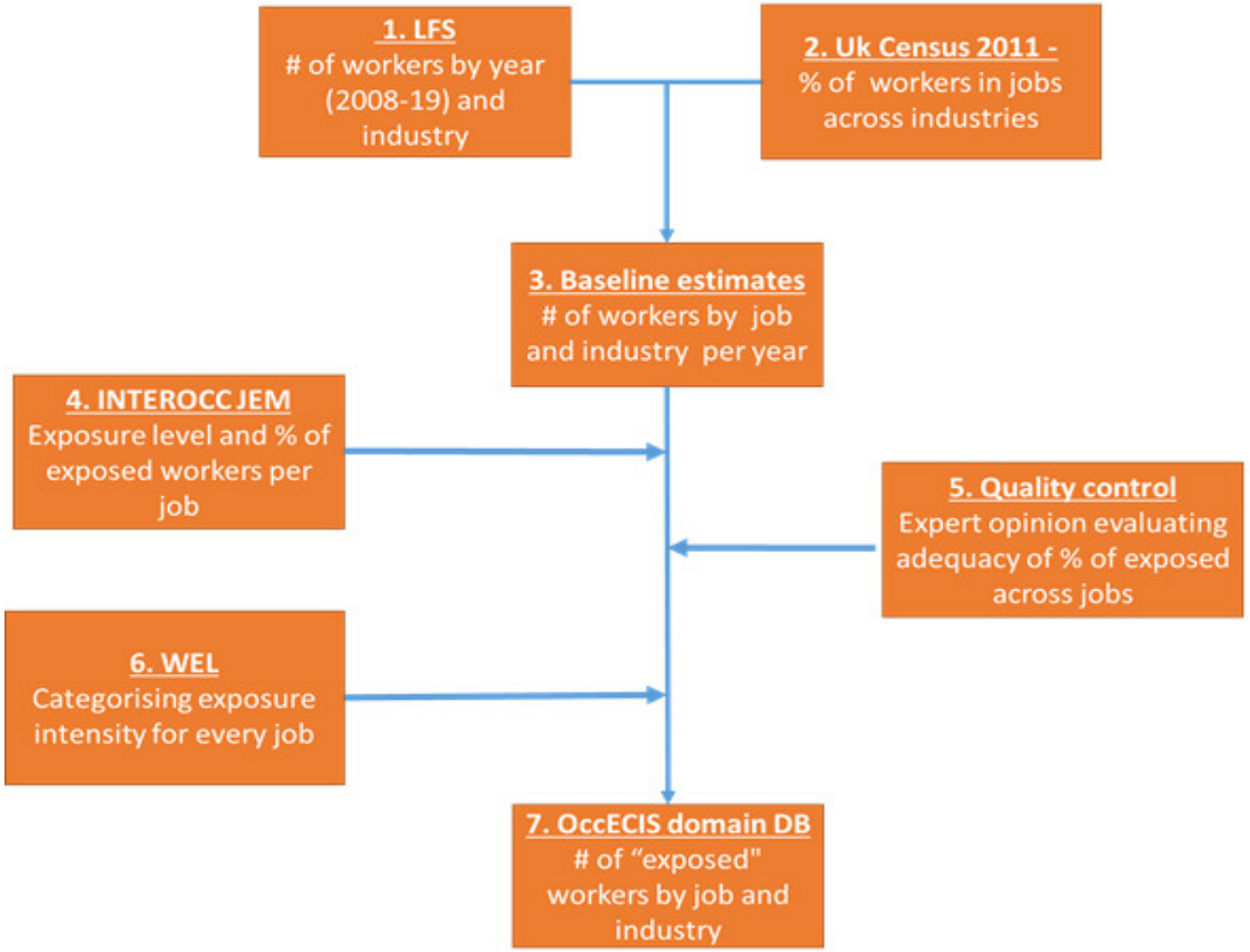
- JEMs not extensively mapped (except for silica)

- Literature

Conceptual framework for system development

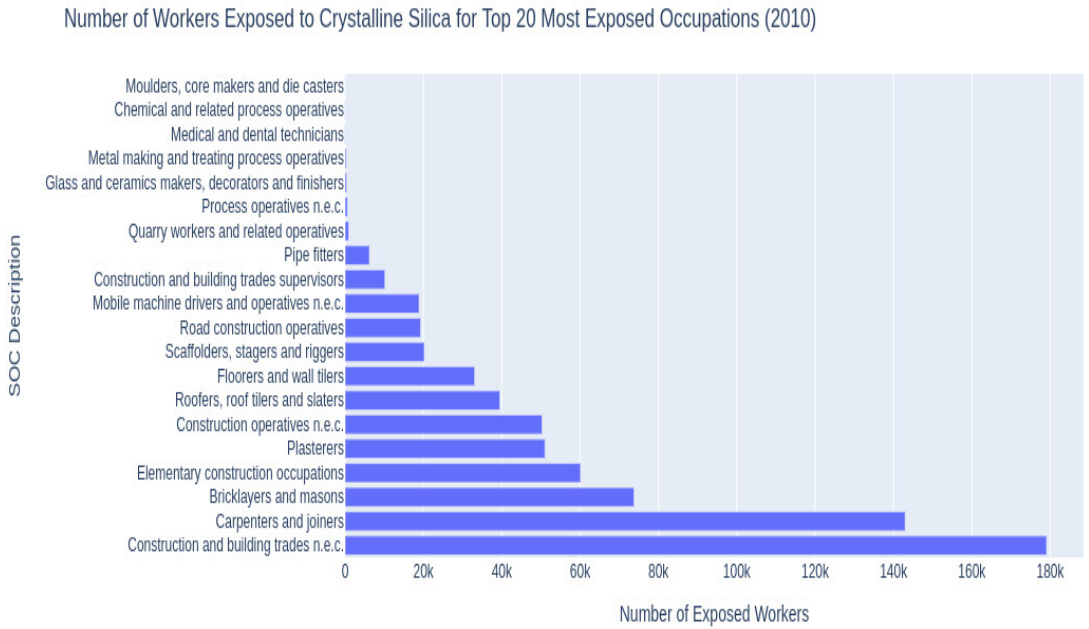


Testing the Feasibility of the System



NEDB data on brick manufacturing

Potential example outputs

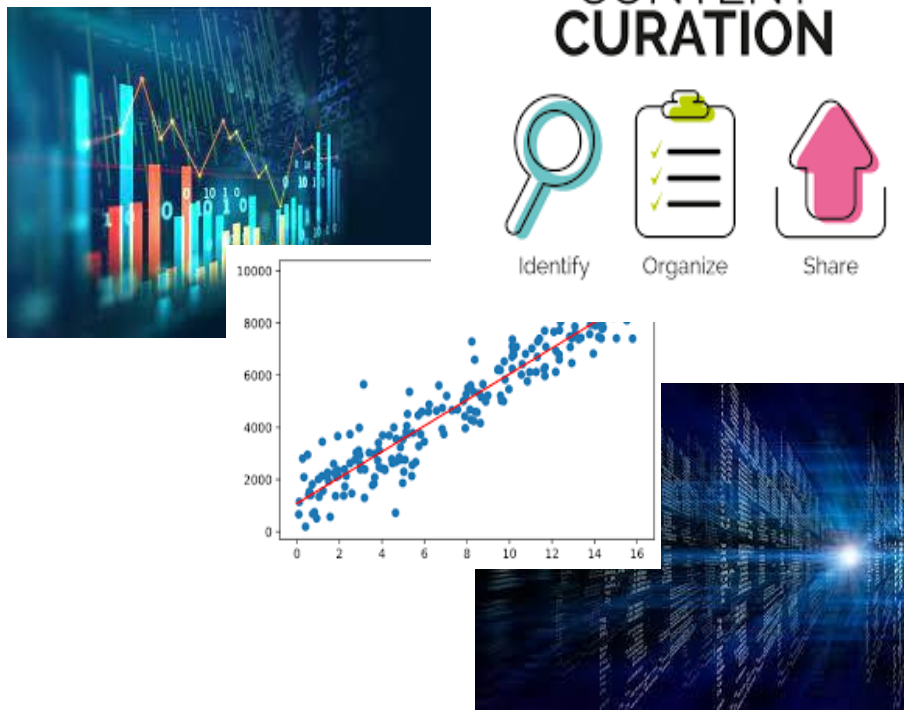


Feasibility outputs

- **Yes it is feasible** to develop a British OccECIS
  - Data are available
  - Linkage is possible
  - Systems to capture and process structured/unstructured data exist
  - Analytical methods are well developed
- However there are issues to be addressed

Main issues to address

- Data requirements
  - Limited data available on RMM scenarios and prevalence
  - Dynamic system = requires regular data updates
  - Data holders/contributors need be incentivised
- Strong data curator and modeller roles required
- Data gaps need be filled – principles need be developed (prioritisation; approach)
- Method requirements
  - Good modelling practices
  - (Solid) principles for assessing data quality



Post-feasibility stakeholder engagement

- Occupational Hygiene Community
  - Barriers and Facilitators
- Construction Industry and Related
  - Practicalities of data transfer (and barriers and facilitators)

Concluding Remarks/Next Steps

- Feasible to develop OccECIS
- Report of recent workshop circulated to attendees
- Scientific paper, probably AWEH
- Need to incentivise data providers
- Barriers have been identified and solutions discussed with stakeholders
- Small data collection exercise (silica from construction industry) – practical feasibility
- Small amount of funding to develop prototype system

Acknowledgements

- Project Advisory Committee
- EAC members
  - Kevin Bampton (BOHS), John Cherrie (IOM), Amanda Eng (Massey), Lin Fritschi (Curtin), Lothar Lieck (EU-OSHA), Cheryl Peters (Calgary), Susan Peters (Utrecht), Tapani Tuomi (FIOH), Kelvin Williams (BOHS)
- André Freitas, Julia Rozanova (TAI/UoM)
- HSE project team, Chris Keen, Yiqun Chen, Peter Baldwin, Kerry Poole
- Workshop participants (BOHS, Construction Industry, Consultants working in the industry)
- TAI staff (Darren Clement, Vicky Turner, Helen Kreissl)
- Funding (HSE, UoM IAA)

Connect with us

ashton@manchester.ac.uk

@AshtonInstitute

ashtoninstitute

thomas-ashton-institute