



Programme Area: Buildings

Project: Building Supply Chain for Mass Refurbishment of Houses

Title: Technology opportunity report

Abstract:

Please note this report was produced in 2011/2012 and its contents may be out of date. This deliverable define (within the context of the Optimising Thermal Efficiency of Existing Housing project) what an acceptable level of intervention will be for the 5 main housing types selected for scenario testing. The deliverable will undertake a Technology development review activity to identify technical opportunities that are capable of reducing identified risks of refurbishment to acceptable levels.

Context:

This project looked at designing a supply chain solution to improve the energy efficiency of the vast majority of the 26 million UK homes which will still be in use by 2050. It looked to identify ways in which the refurbishment and retrofitting of existing residential properties can be accelerated by industrialising the processes of design, supply and implementation, while stimulating demand from householders by exploiting additional opportunities that come with extensive building refurbishment. The project developed a top-to-bottom process, using a method of analysing the most cost-effective package of measures suitable for a particular property, through to how these will be installed with the minimum disruption to the householder. This includes identifying the skills required of the people on the ground as well as the optimum material distribution networks to supply them with exactly what is required and when.

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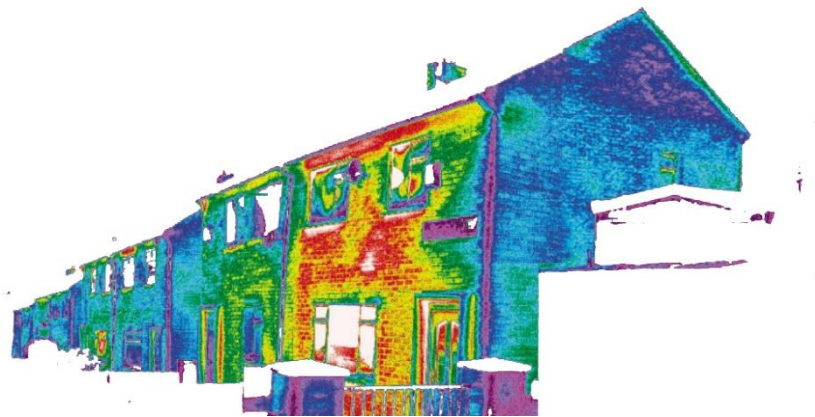
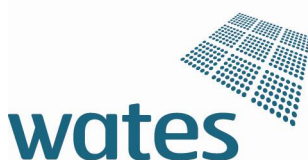


The **ENERGY ZONE**
CONSORTIUM:

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PEABODY



Optimising Thermal Efficiency of Existing Housing

BU1001_PM08_7.3_Technology Opportunity
Report

Version 2.0

December 2012

Responsible Persons:

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Warren Pope

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1. Executive Summary

MILESTONE SUMMARY REPORT

The purpose of this work package task has been to investigate three particular concepts;

- ***“To define within the context of the OTEoEH project what an acceptable level of intervention will be for the five main housing types selected for scenario testing.”***

The project consortium has proposed two levels of intervention: RetroFix and RetroPlus, both packages are designed to tackle the most significant thermal losses in the existing housing stock. These packages, typically include improvements to walls with external or internal insulation, loft, floor edges, improved airtightness, controls and heating system upgrades.

- ***“To undertake a Technology development activity to identify technical opportunities that are capable of reducing identified risks of refurbishment to acceptable levels as defined above.”***

Report 7.1 confirms that “any retrofit works that are likely to be carried out in line with the project findings make up 42% of fatal accidents”, (see figure 1 below and figure 2 on following page). When the fatalities are analysed by the kind of accident that caused them it demonstrates that *falls from height, struck by moving/falling object* and *struck by moving vehicle* are the biggest causes.

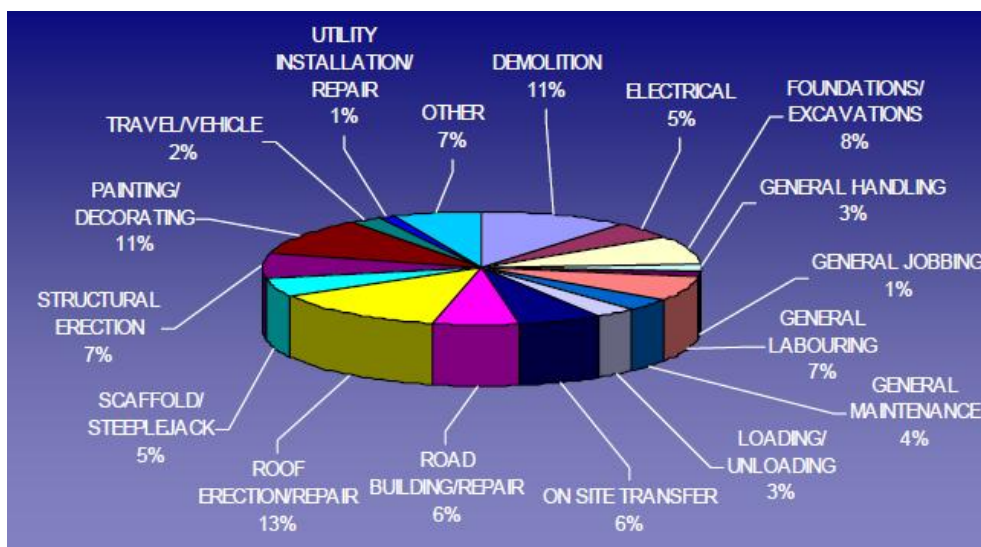


Figure 1: Fatal accidents by Work Activity: www.hse.gov.uk/construction/pdf/conintreport.pdf

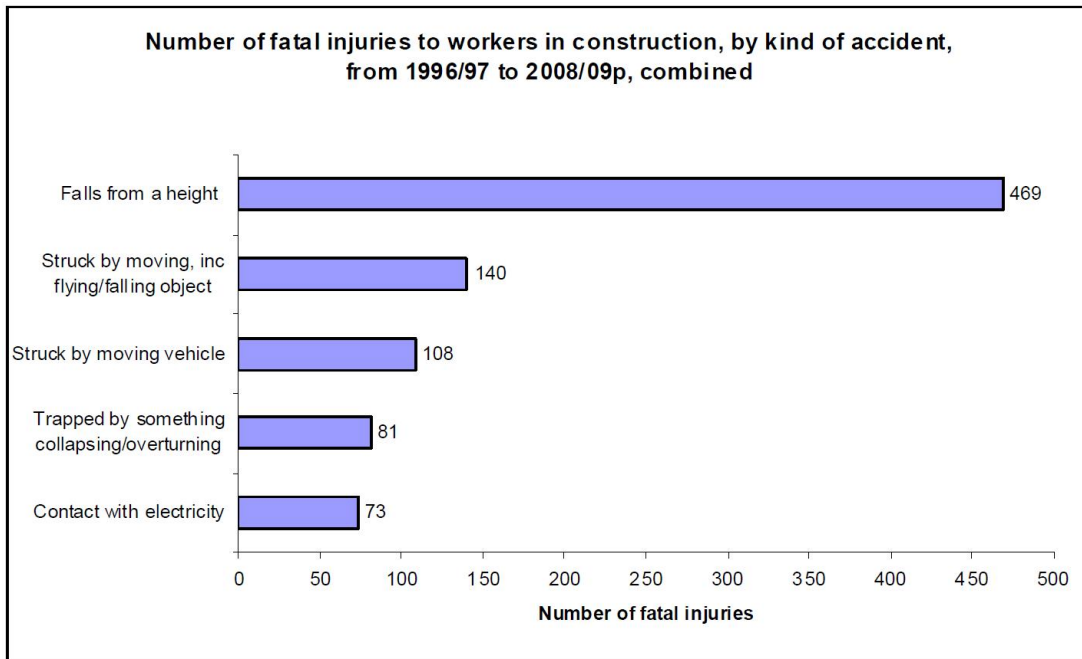


Figure 2: Fatal injuries by kind of accident. www.hse.gov.uk/construction/pdf/conintreport.pdf

Therefore, this report has focused on the technologies that can assist with the reduction of working at height and assist with manual handling and material transfer.

In addition report 7.1 showed that although the gap was closing, that factories are safer than construction sites (see figure 3). This report therefore also looks at how to use offsite techniques to transfer work, and therefore risk, from the construction site to the factory.

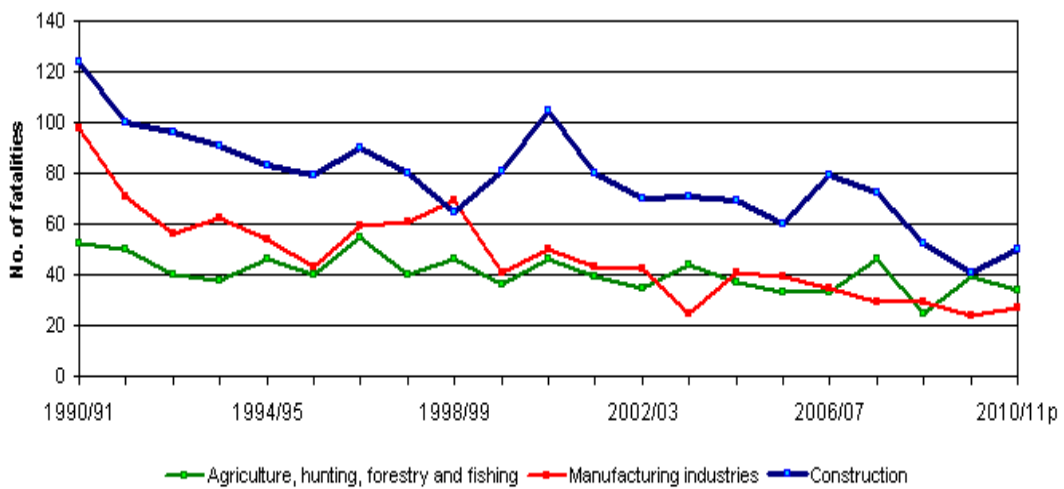


Figure 3: Twenty year trend in worker fatalities in three different sectors of work. www.hse.gov.uk/construction/pdf/conintreport.pdf

Key technologies include:

- § Laser scanning and CNC machining
- § The use of drones to take photos and video of inaccessible places as part of a survey
- § Offsite production of roof panels and units
- § Improved access systems
- § Assistance for manual handling

- ***“To include in the series of workshops, special attention to skills, culture and systems and processes issues within the construction industry.”***

As well as developing technical solutions the workshops also looked at complementing the work on skills and cultural issues addressed in workpackages 7.1 and 7.2. This helped to highlight some of reasons behind the statistics on fatalities in decoration, reflections on the industries culture and the use of safety equipment and looked at the barriers to innovation, especially the cost of testing and certification.

2. Introduction

The project consortium has proposed two levels of intervention: RetroFix and RetroPlus, both packages are designed to tackle the most significant thermal losses in the existing housing stock. These packages typically include improvements to walls with external or internal insulation, loft, floor edges, improved airtightness including controls and heating system upgrades.

Either of these two interventions could be applied to the Peabody stock selected for the scenario testing. Workpackage 7.2 has confirmed that from a safety perspective there is no novel or unusual innovations included within the technical solution package, the interventions have been risk assessed for use with traditional mechanical handling technologies.

Applying EWI (External Wall Insulation) normally requires working at height (above 2 meters,. This results in the work usually being undertaken with extensive scaffolding and the insulation being applied to the surface in multiple segments. These activities are all categorised as having the high fatality rate.

This report has investigated the use of offsite manufacture, where roof modules can have Mechanical Heating and Ventilation incorporated into them, removing some of the need for working at height, it also has looked at how the latest breakthroughs in pre-works measurement, and mechanical handling, can again reduce the risk of injury through material transfer and unloading activities.

Other activities while in themselves not particularly new or ground breaking, are new to construction. Attendees at the workshop were in the process of product development, in areas such as working at height platforms (quick set up and take down), IT software for record keeping, and using data to predict/identify injury prone activities, areas or staff.

The attendees were also asked to consider skills and cultural issues and their comments are in section 5.

3. Research Process

The second objective of this work package has been to undertake a technology development activity to identify opportunities that are capable of reducing identified risks.

The planned process for this activity was to undertake a series of workshops initially with the consortium and then to include external stakeholders, in particular from the non-construction industry, but targeting those wishing to move into the sector to diversify their product range with the assistance of the Manufacturing Advisory Service.

Because the consortium was effectively asking for product concepts, it was decided to offer an incentive by facilitating access to funding for innovators that agreed to attend, and also the opportunity for additional innovation support. The event flyer can be found in Appendix A.

The authors have known MAS for the past ten years, and the iNet for the past four years and have a good working relationship with both organisations. The event was promoted through emailing to 15,000 contacts and by directly contacting clients. Eight companies attended.

In addition to the planned workshop direct contact was made with companies known to BRE and further companies were sought out at trade events.

3.1 THE WORKSHOP

The workshop started with press articles being distributed around the room to indicate typical accidents within construction activities. Posters on court cases were applied to the wall detailing "Fatal Accidents by Work Activity", "Fatal Accidents by Accident Kind", and "Fatal accidents by Sector",

Each participant gave a brief introduction to identify which sector of work that was relevant to their company (full details can be found in Appendix D). Each participant was then asked to provide a synopsis of the opportunity they were seeking to pursue, or assistance they then required.

During this process, members of the consortium were able to ask questions on how the participants approached Health & Safety issues, and enter into a general discussion on spin-off applications. Other participants then also joined in the discussion offering experience and suggestions.


The session was facilitated by Warren Pope who matched the potential applications to the leading fatality statistics as detailed on the posters, and used the pre-distributed HSE court case accident reviews as examples to keep the conversations on track for a health & Safety innovation theme.


4. Concepts and Ideas for Improving Safety

4.1 REDUCING THE AMOUNT OF WORK ON SITE

As mentioned earlier by removing work from site we make them safer. Three concepts that have potential in this area are:

- Laser scanning with offsite CNC cutting,
- Laser scanning with the addition of a drone for photography and video.
- Offsite prefabrication of roofs.

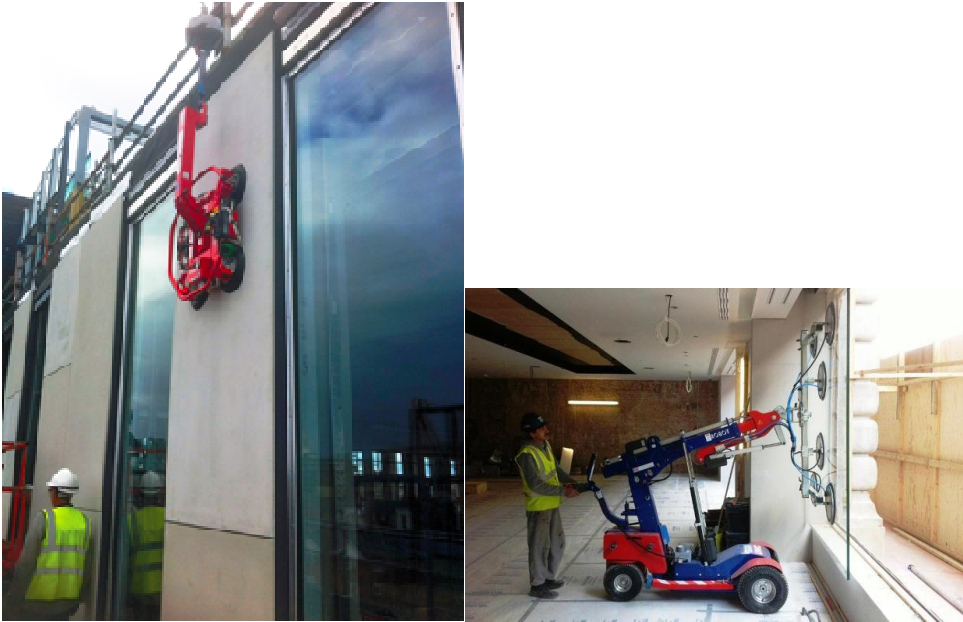
Idea	Concept	Potential for implementation
Laser Scanning & offsite CNC cutting	To provide a more efficient, reduced disruption method for IWI (Internal Wall Insulation) preparation.	Medium – available almost immediately
<ul style="list-style-type: none"> • A 3D laser scanner measures the internal dimensions of a room. The digital data is then downloaded to an off-site cutting machine. • The machine cuts the insulation boards with improved accuracy with software designed to optimise cuts to minimise wastage. • Boards delivered to site as a kit and are then fitted to the walls with to provide minimum of noise, mess and disruption and wastage. 		
		
More details can be found in Appendix C.		
Potential Safety Improvement	Technical Feasibility	Time Frame
Medium – removes work from site and reduces the risks of accidents through cutting insulation	Existing Product, some development may be required.	Available Now

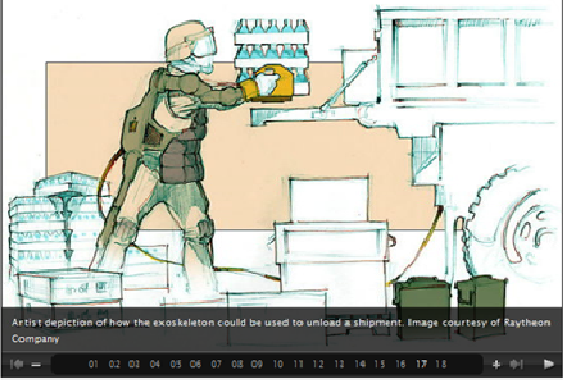

Idea	Concept	Potential
Video and photography drone with laser Scanning	Remote control drone (Similar to Parrot Control adult toy), linked to ground based scanning device, ground laser unit acts as datum while the drone can adapt to 3D imaging while traversing the building.	High – allows surveying without having to erect scaffolding
<ul style="list-style-type: none"> • Allows effective surveying without need for scaffolding, in a reduced amount of time • High level of accuracy, reduced margin of human error • Increased response time as data can be e-mailed/streamed to office from site • Data can be used for modelling with images overlaid to show final works <div data-bbox="220 568 1273 1155" style="text-align: center;">  <p>A drone videotaping and taking photos from above.</p> </div> <p>More details can be found in Appendix C.</p>		
Potential Safety improvement	Technical Feasibility	Time Frame
High – reduced risk of falls from height	Proven prototype, several developments completed successfully.	Prototype in use. 12 Months to simplify controls

Idea	Concept	Potential
Offsite production of roofing systems	To use pre refurbishment survey information (from Laser Scanning as detailed above) to fabricate modular roofing solutions, to include; SIPS Panel Roof or Stress Skinned panel roof (eg Smartroof) Roof with combined HVAC system Room extension	High – offsite capability easily transferable from new build
<ul style="list-style-type: none"> • Offsite production allows instillation of intricate equipment on level ground • High Quality should be achieved as no impact from weather conditions or access problems. • Maintenance access points can be installed in the interior space for future maintenance. • Roof and additional room space can be designed and receive planning approval in advance from select range of stock models. • Completed roof spaces can be craned into position either as modules or completed structures dependent on overall size. • Scaffold towers or mini cheery picker platforms can be used with safety harness in lieu of scaffold assemblies. • Market leader for offsite roofs in the UK is Smartroof www.smartroof.co.uk <div style="display: flex; justify-content: space-around;">   </div> <p data-bbox="217 1301 614 1330">More details can be found in Appendix C.</p>		
Potential Safety improvement	Technical Feasibility	Time Frame
High – removes risk from working at height	Proven prototype, several developments completed successfully in Austria and Switzerland.	3 to 9 months with adequate funding.

4.2 MATERIAL HANDLING AND MOVEMENT

Moving material to the workplace and handling it on arrival is a major cause of back injuries. Two ideas have been collected. One available now, but rarely used outside of commercial construction and one that looks more like science fiction, but is being developed.

Idea	Concept	Potential
Cherry Pickers, Mini Cranes and Lift Attachments	Reduction of working at height with difficult and heavy loads, greater opportunity	Medium – viable now, but space constraints in housing
<ul style="list-style-type: none"> The GGR Group currently produce a range of lifting solutions, from the mechanical handling unit to assorted lift attachments. The units are designed for lifting, moving and manipulating heavy glass and curtain walling for installation in-situ for various build situations. They also produce a product described as “Robot & Overhang Beam” a unit designed to be placed on a building roof for the installation of curtain walling, a similar requirement to EWI for medium height (3 to 4 storey) apartment buildings. Thomas Rae of GGR group has confirmed that they have just completed a development project with Kingfisher to develop product and process capable of cladding an end wall of a dwelling in just two panels, fitted with apertures for door and windows. The standard pneumatic suction pads will not function on porous or textured surfaces, so some form of interlock or knuckle grip would be required (similar to those used in robotic spot welding jigs and fixtures etc.) 		
		
<p>Photos courtesy of GGR Group</p>		
<p>Contact: Thomas Rae, Thomas.rae@ggrgroup.com Mobile: 07500 020 296.</p>		
Potential Safety Improvement	Technical Feasibility	Time Frame
Medium	Existing Product, Proven Technology some development required to suit textured EWI.	Available Now

Idea	Concept	Potential
Exoskeleton & Manual Handling	A mechanical device to allow an individual to lift and move substantial loads without the need for a forklift truck or pallet trucks.	Prototype developed for military, excellent potential for civilian use. Maybe cost prohibitive
 <p>Artist depiction of how the exoskeleton could be used to unload a shipment. Image courtesy of Raytheon Company</p>		<p>Raytheon have developed an exoskeleton device to aid with the lifting and transfer of heavy objects without causing muscular or orthopaedic injury to operatives. Designed to assist missile and ordnance loading for military equipment. A prototype was first produced in 2010 and a second generation released in September 2012. The unit is hydraulic powered by a tether from a static unit. The device has potential for loading and unloading substantial loads on the roadside and in confined areas even lifting loads that would normally require a fork lift truck or when the insertion of an I Beam is required inside an existing structure (potential for use when removing internal supporting walls etc.). http://www.raytheon.com/newsroom/technology/rtn08_exoskeleton/</p>
 <p>XOS 2 test engineer Rex Jameson places a missile on a rack during a demonstration at the Raytheon Sarcos research facility in Salt Lake City, Utah. Photo courtesy of Raytheon Company.</p>		
Potential for Safety improvement	Technical Feasibility	Time Frame
Medium	Proven prototype working, however a lot of development is still required	2-5 Years

4.3 SAFER ACCESS AND CONTROLLING ACCESS

This area has highlighted two types of concept:

- The first is the development/adaptation of ladders, towers and scaffolding.
- The other is about the adoption of new technology to control access to equipment and areas.

Idea	Concept	Potential
Scaffold & Towers, Ladder safety	Better and more efficient set up and take down of scaffold and ladders. The adaption of ladders to become safe working platforms for certain tasks.	High – easy to take up solutions

Industry has moved towards more flexible use of scaffold towers, these are access solutions which include telescoping towers, non-conductive telescoping towers and scaffold solutions with sprung loaded fasteners to reduce the risk of falling objects. Solutions also include adaptations for ladders to make them safe working platforms and anchors for ladders (see photographs).

The ability to have fast access set up is a requirement from Wates to maximise the amount of working time in the day, with the telescoping ability to enable to easily manoeuvre the access equipment from front to the rear of limited access properties. Providers include:

- Scaffolding Solutions Limited
- Euro Towers Ltd
- Lobo Systems Ltd
- Worksafe Innovation Ltd



More details can be found in Appendix C.

Potential Safety Improvement	Technical Feasibility	Time Frame
High – sensible proven adaptations to prevent falls	Existing Product, Proven Technology	Available Now

Idea	Concept	Potential
RFID Tagging to control access	Control of access to equipment, theft reduction, staff management.	Medium – difficult to apply on smaller sites
<ul style="list-style-type: none"> Operator competencies are recorded on a smart card, with the smart card being the key to site vehicles, access points (such as concrete saws, pallet transfer kit) etc. The asset will not operate without the correct competency recorded on the smart card. Can be incorporated with standard CSCS Cards in use at present. Same CSCS cards can be used for storage container access and equip with data logging and CCTV for theft prevention. 		
<p>http://infobric.co.uk/products</p>		
<p>STAFF MONITORING</p> <ul style="list-style-type: none"> Real time staff monitoring regarding time and attendance Detailed site records <p>MACHINE CONTROL</p> <ul style="list-style-type: none"> Total control of all machines on site Uses the coming IPAF PAL Smart Card as key <p>ENERGY MONITORING</p> <ul style="list-style-type: none"> Control lighting and climate Reduce the energy spent Monitor and control via internet <p>LOCKING SYSTEM</p> <ul style="list-style-type: none"> Electronic locks for site accommodation Doors are monitored No more keys, uses the CSCS Smart Card <p>REGISTRATION</p> <ul style="list-style-type: none"> Perfect presence monitoring for smaller sites Uses the CSCS Smart Card or finger biometrics <p>CONTAINER SYSTEM</p> <ul style="list-style-type: none"> Secure storage and internal locking system Uses the CSCS Smart Card or finger biometrics <p>CENTRALENHET</p> <ul style="list-style-type: none"> The conductor on site, controls all other units Install GPRS modem <p>SLIDING GATES</p> <ul style="list-style-type: none"> Fully controlled sliding gates Uses the CSCS Smart Card or finger biometrics <p>BARRIERS</p> <ul style="list-style-type: none"> Fully controlled barriers Uses the CSCS Smart Card or finger biometrics <p>FOLDING GATES</p> <ul style="list-style-type: none"> Fully controlled folding gates Uses the CSCS Smart Card or finger biometrics <p>CSCS SMARTCARD</p> <ul style="list-style-type: none"> The key to access construction sites, locks, gates, portacabins, secure tool areas etc. <p>INFOBRIC EASE</p> <ul style="list-style-type: none"> Web based total site management system Monitor site staff and control machines <p>TURNSTILE</p> <ul style="list-style-type: none"> Entrance control Easy to move Uses the CSCS Smart Card or finger biometrics <p>SMART ZONE</p> <p>John Robertson Phone: 07793 079729 jrobertson@jri-uplift.co.uk www.jri-uplift.co.uk</p> <p>Mike Dibley Phone: 07549 479094 info@infobric.co.uk www.infobric.co.uk</p> <p>infobric www.infobric.co.uk</p>		
Larger image in Appendix C		
Potential Safety improvement	Technical Feasibility	Time Frame
Medium – the same end could be gained through appropriate training and enforcement	Existing Product, Proven Technology	Available Now

4.4 IMPROVED RISK MANAGEMENT SYSTEMS

This final concept is different from the others, in that it is about risk management systems and how they could be improved to aid data analysis.

Idea	Concept	Potential
Competency Software & CCTV	Modification of compliance software from the chemical and refinery industry for use on site to provide a competency based system, and combine with HSE and/or CDM review requirements.	Medium – works with existing software, but more difficult on smaller sites
<ul style="list-style-type: none"> • Identification of accident clusters by type, activity and by person, that can lead to early interventions. An excellent example is the “Olympic village porridge solution” (see Appendix B), where it was found that accidents peaked in the hour before lunchtime. Porridge was supplied for £1 and accidents in the morning fell. The health and safety record at the Olympics was 125 reportable injuries for 80 million hour worked¹. • To use in conjunction with standard accident and RIDDOR reporting. • Identification of fraudulent insurance claims (via monitoring of accident history). <p>For more information see Appendix C</p> <p>Further information is also at http://www.i2d2.com/</p>		
Potential Safety Improvement	Technical Feasibility	Time Frame
Low to Medium	Full feasible, needs development time	6 to 12 months

¹ <http://www.telegraph.co.uk/sport/olympics/9140247/Free-porridge-cut-accidents-in-obese-workers-at-Olympics.html>

5. Skills and Culture Themes

5.1 CULTURE AND THE USE OF SAFETY EQUIPMENT

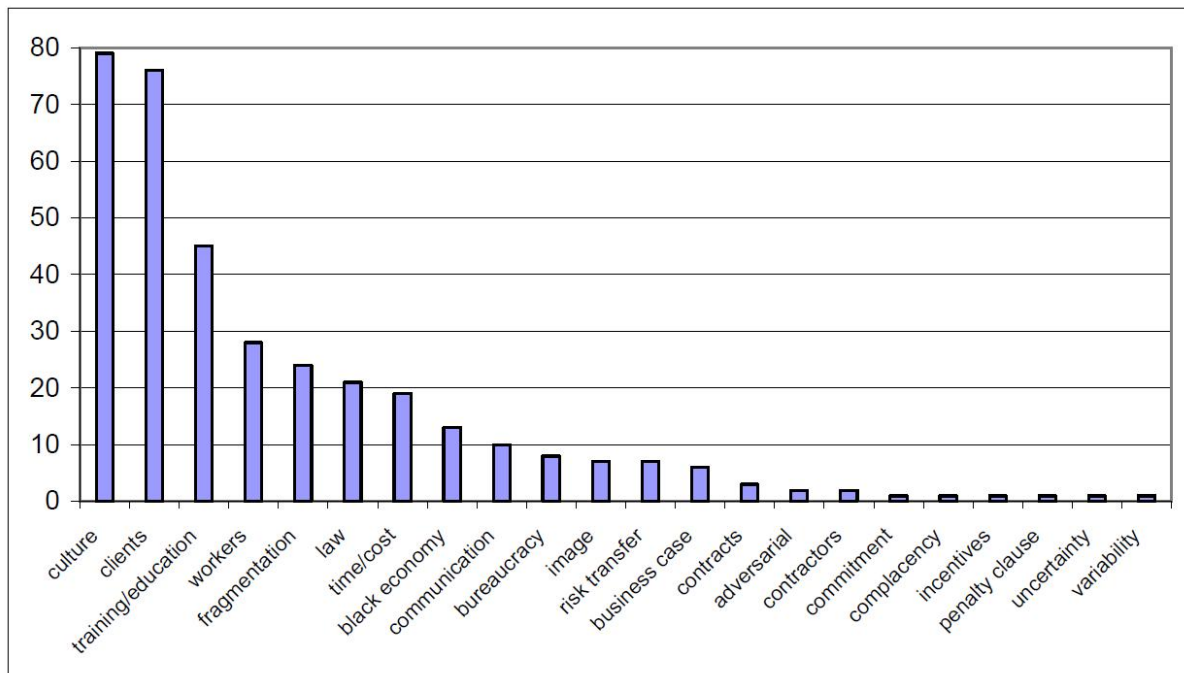


Figure 4: Answer to Question: "What were the greatest barriers to change within the industry?"
<http://www.hse.gov.uk/consult/2002.html>

Figure 4 is taken from Workpackage 7.1 and shows that culture is the key barrier to change. In highlighting just one aspect of culture a supplier of safety equipment commented on the problem of the "macho" approach, with employers purchasing cheaper equipment, which was not as easy to use or more uncomfortable than more expensive alternatives. This results in the tendency to remove the item, which then might lead to an avoidable injury.

5.2 RISKS FROM DECORATION

Figure 1 (page 2), which was taken originally from Workpackage 7.1 shows that decoration has a very high fatality rate (11% of total). On the face of it decoration does not appear to be that risky, but when this came up at the workshop Worksafe Innovation, who work in the area of safe access, were able to provide some photographs to illustrate why this is happening and the need for a new attitude in some parts of the industry. These pictures do not in themselves merely tell a story of recklessness. These sorts of situations can arise as a result of what would otherwise be regarded as a very

positive “can-do” attitude. However it is clear that these men do not really believe that accidents will happen to them, they clearly do not fully grasp the risks that they are taking. These pictures reinforce the need for training in understanding risk and its consequences.



5.3 OVERSEAS PERSPECTIVE

Workpackage 7.1 identified that Sweden has a good construction safety performance, similar to that in the UK. When discussing the concept of skills and culture with Infabric of Sweden, they put this down to a very active and powerful union base, capable of closing building sites within days if safety was poor. This clearly could be a factor in good Swedish performance, but even if it were to make an impact in the UK it would not be likely to bring much benefit to the poly-competent team who are likely to be self-employed or employees of a small business run by the team leader.

5.4 GENERAL SKILLS SHORTAGES

The workshop felt that there was a need to see more professional and vocational qualifications in the industry to demonstrate competence, including general business skills and customer service as well as health and as safety training. The use of qualifications needed to be considered normal good practice. This was deemed to be particularly appropriate for the concept of the poly-competent team.

5.5 BARRIERS TO HEALTH AND SAFETY INNOVATION

The current economic climate is undoubtedly causing problems for companies to invest in research and development. This was compounded by a feeling from the participants that testing and certification is very expensive.

This is certainly reflected in conversations with providers of construction systems, such as those used in offsite prefabricated solutions.

One common theme through the workshops and through general industry contact over past year is that there are two predominant barriers to product development:

1. Testing and certification, which typically can take 18 months and cost £16,000², and,
2. The inflexibility of Health and Safety approaches that for example insist on hard hats when more comfortable “bump caps” would be more appropriate. This shows the need for a more imaginative approach to risk assessment and management.

² Industry source

6. Conclusions and Recommendations

The conclusions and recommendations fall into two parts:

6.1 NEW CONCEPTS AND IDEAS

With regard to new concepts that could be incorporated into the RetroFix or RetroPlus packages there are a number of promising ideas available to reduce the work on site and improve safety. The leading ones that are available or nearly available, in order of immediate impact are:

- Adaptations to ladders, scaffolding and towers to produce tailored safe efficient working platform solutions, for example for the fixing of insulation, cladding or drylining.
- The use of attachments for cherry pickers etc. to aid handling of windows (especially triple glazed), cladding, drylining and insulation.
- The use of laser scanning and CNC cutting to prepare materials offsite, particularly internal wall insulation
- The prefabrication of roof units for loft conversions to minimise time on site
- The use of drones to photograph/video as part of the survey of the property – particularly for difficult to see areas that would require a surveyor to work at height eg roofs

These will be explored further in 7.4.

6.2 SKILLS AND CULTURE

The workshops along with other interactions that formed part of this work reinforced the need to continue to work at issues around the culture, training and practice highlighted in Workpackage 7.2 especially that:

- The poly-competent team will need to be competent contractor. They will have to have embedded a safety culture and have received training in generic good safety practices and risk identification. This will be the primary means by which risk will be managed and will include reducing risks from slips, trips, falls and handling.

Appendix A – Workshop Flyer

Growth Accelerator



Are accidents costing you time and money?

Is it free?	Yes
Where is it?	iCon Centre, Eastern Way, Daventry, Northamptonshire NN11 0QB
When?	Wednesday 18 th July 2012
Start Time	Start: 08:30hrs Close: 14:00hrs
How do I join?	Follow this link; http://www.bre.co.uk/eventdetails.jsp?id=6388

Where do I go for further information or speak to a real person?

E-mail Warren at popew@bre.co.uk with your preferred contact telephone number and you will get a call back.

The Energy Zone Consortium (EZC) is a group of nationally and internationally acknowledged experts in housing design, refurbishment, energy modelling, supply and construction.

The (EZC) is currently working with the Energy Technologies Institute (ETI) to identify ways in which the refurbishment of existing residential properties can be accelerated by industrialising the process of design, supply and implementation which includes BRE, University College London, PRP Architects, Peabody Housing Trust EDF and Total Flow.

Working with ETI, the EZC is looking to engage with the construction industry and Government and would like to invite a selection of stakeholders to attend a workshop to help define and develop innovative new ideas that can be introduced into the UK construction industry.

Why should I attend?

- If you want to design, manufacture, certify products for use in the construction sector
- If you already design and manufacture, but need a new idea for current market place
- If you supply or manufacture Health & Safety equipment, and have a gap in your product line
- If you keep thinking "if only I had a widget that did that" I could do the job in half the time

What's in it for me?

- One to One clinic with BRE, iNet, MAS and Growth Accelerator.
- Sustainable Construction iNet will be present and have match funding available for the right project.
- The Growth Accelerator team will be present to offer coaching & innovation support.
- The Manufacturing Advisory Service will be present to support the manufacturing companies
- BRE staff will be present to facilitate innovation, provide advice on product development and certification and testing for entry requirements.

The aims of the work shop are: (What the Energy Zone Consortium wants)

- To identify technology or new ideas that can reduce fatalities, serious injury in the construction sector.
- To enable SME designers and manufacturers to take the first steps in product innovation and development.
- To undertake a Technology Development Activity to identify technical opportunities that are capable of reducing identified risks of refurbishment to acceptable levels as defined above.
- Operator Training, Skills and culture within the construction industry "What needs to Change"



GrowthAccelerator



Workshop Agenda



- 08:30 Registration & opportunity to sign up for a one-to-one clinic session
- 09:00 Welcome and introduction from BRE, the EZC lead partner
- 09:30 Workshop (Idea Generation)
 - Separate into groups to include (designer, manufacturer, supplier, seller)
 - Generate ideas and concepts
- 11:30 Break
- 11:45 Workshop Review
 - Mix and match concepts (designer, manufacturer, supplier, seller)
- 13:30 Lunch & Networking
- 14:00 Networking & Innovation Clinic (pre-booked)



Appendix B – Analysis of Safety Data

Porridge reduced Olympic construction accidents

Page 1 of 2

The screenshot shows the website for FibreGrid Limited, with the tagline 'Creating a Safer Environment'. The navigation menu includes Home, Company Profile, Case Studies, Latest News, Clients, and Contact Us. On the left, there is a sidebar with various product categories such as Slipgrip Stair Tread Covers, SlipGrip Riser Plates, SlipGrip Flooring, EdgeGrip Stair Nosings, Matting, TactileGrip, DuraLine, DeckGrip, FibreRail Handrail System, RungGrip, Grating, Pultruded profiles, Spill Containment, Access Ramps, and Smoking Shelters. Below these are sections for Installations, Cutting Services, and a link to subscribe to the mailing list.

The main content area features an article titled 'Porridge reduced Olympic construction accidents'. The article includes social media sharing options for Twitter (0) and Google+ (Share). The text of the article is as follows:

Eating porridge is said to have cut on-site accidents during the construction of the Olympic venues, according to *This Is London*.

Speaking at a health and safety conference, Lawrence Waterman of the Olympics Delivery Authority (ODA) revealed that the builders' obesity was leading to "too many accidents".

Interestingly, 41 per cent of the 12,000 contractors working on the Olympic Stadium were found to be overweight, 29 per cent suffered from high blood pressure.

An analysis of accident records showed that occurrences peaked in the hour prior to lunchtime. Further investigation found that during this time, the builders' were concentrating on what they would be eating for lunch rather than the task in hand; having skipped breakfast following a late night fatty takeaway.

As soon as this became apparent to the ODA, it started to offer bowls of porridge in a bid to "ensure a healthy start to the day" and keep workers sufficiently full - which seemed to help reduce accidents.

Of course, there are plenty of other ways in order to reduce the incidence of accident or injury, including providing contractors with training on ladder safety, the installation of anti-slip matting or implementing spill control measures. Keeping the workforce healthy is also key though.

One construction worker told *telegraph.co.uk*: "Lots of us ended up eating porridge in the morning to see us through to lunchtime and I must admit it did work. Before that, we couldn't stop thinking about what we were having for lunch."

Mr Lawrence concurred: "They were coming into work for three hours suffering really low blood sugar. We had canteens offering porridge for £1 and accidents in the morning went down."

At the bottom of the page, there are three red circular icons: a telephone handset, an envelope, and a computer mouse. Next to them are the phone numbers 01440 712722, 01440 712733, and the text 'sales@'.

Appendix C - Further photographs and information on concepts

Laser Scanning and Offsite CNC Cutting

WHISCERS™ is a three part process:

- 1** Laser scanning
- 2** Offsite CNC cutting
- 3** Installation

You are here: [Home](#) > [Refurbishment](#) > [WHISCERS](#)

Refurbishment
WHISCERS

Sustainability
Reducing our environmental impact and improving quality of life in the community.
Find out more

Projects
We're leading the way in

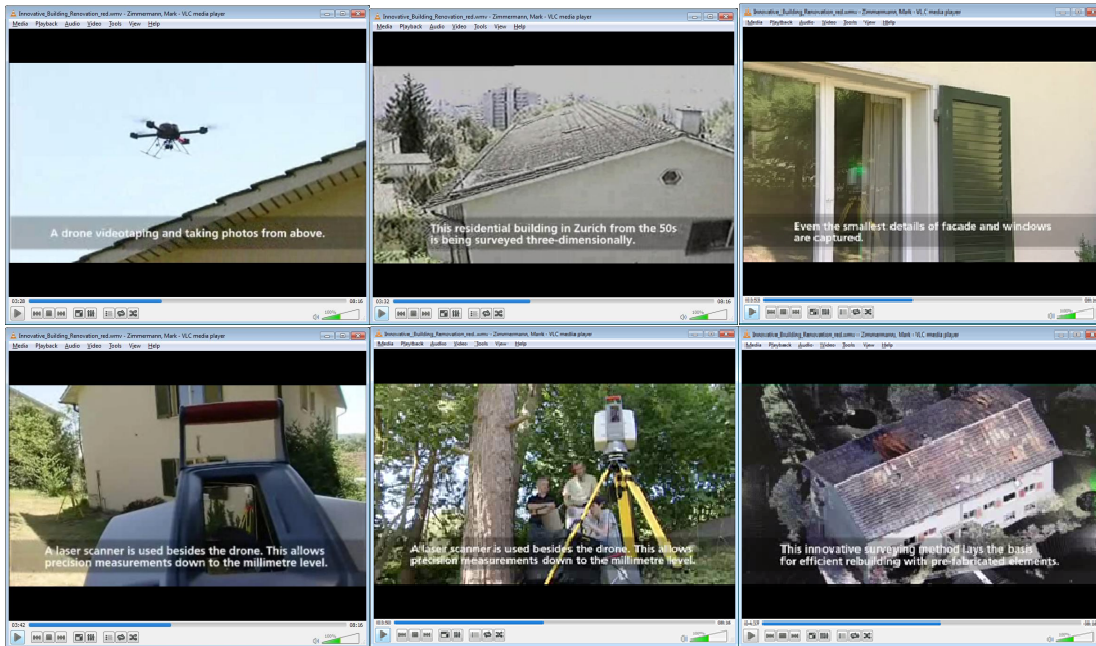
WHISCERS™

WHISCERS™ saves £££'s and CO2
See how WHISCERS™ has reduced fuel bills and CO2 emissions at a tower block retrofit in Dorking.
[Watch the video now](#)

Faster, better, cost-effective: low mess wall insulation for hard-to-treat properties

WHISCERS™ (Whole House In-Situ Carbon and Energy Reduction Solution) is a revolutionary process for Internal Wall Insulation (IWI) of hard-to-treat social housing that uses **laser technology** for the first time, enabling residents to continue to live in their homes throughout the refurbishment works.

Videoing and Photography Drone with Laser Scanning



Offsite production of roofing systems



Scaffold & Towers, Ladder safety

The WorkSafe Anchor Range



The WorkSafe Anchor Range are new and Innovative anchorage devices which provide a re-usable and secure temporary fixing. It comes in two models, the WorkSafe Professional Anchor which uses a turn wheel securing mechanism, and the WorkSafe Lever Anchor which uses a lever system to secure the anchor into position.



The WorkSafe Professional Anchor

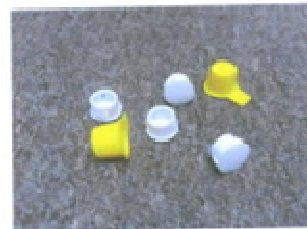


The WorkSafe Lever Anchor



WorkSafe Anchor Kit

Everything you need to start using the WorkSafe Professional Anchor



The WorkSafe Anchor Plug Pack

Both Models are made to the following specifications:

- High resilience nylon back plate -90mm diameter
 - ✓ Providing a very strong, compact and lightweight fixing device
- Curved metal handle – 8 mm bar
 - ✓ Providing ease of gripping and tying on restraint straps
- Rubber fixing components
 - ✓ Providing a very strong grip
- Anchor fixing is inserted into a 14mm drill hole on common surfaces (concrete, breeze block, house brick, wood etc)
 - ✓ Ideal for a wide range of fixing and anchoring requirements
- Simple plastic plugs available
 - ✓ Preventing the ingress of moisture
 - ✓ Enabling future access if and when required
 - ✓ Ensures that cosmetically the drill hole is concealed

Technical Pull testing has been carried out on each model with the following results meeting the published pull out strength (ISO/IEC 17020)

The WorkSafe Professional Anchor – Pull out tested up to 20kN's in appropriate surfaces. This level far exceeds recommended requirements

The WorkSafe Lever Anchor – Pull out tested to 3kN's

Visit our Website at www.worksafeinnovation.co.uk to order on line or call our sales line on: 01491 84 2913 or mobile 07710 389527

Controlling access to equipment through RFID Tagging



John Robertson
Phone: 07794 478229
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www.infobric.co.uk





For more information please [contact us](#).

Integrated Competence, Compliance Assurance and Training Solutions

A BLUEPRINT FOR COMPETENCY/COMPLIANCE ASSURANCE

i,CAT is an integrated software solution for planning, developing and monitoring enterprise capability, enabling you to meet your goals by maximising the effectiveness of your people.

VALUE FOR THE ORGANISATION

- Simple and inexpensive to deploy because there is no additional hardware or software to install
- Real time, objective information of enterprise capability enabling you to engage your resources where they will have maximum effect
- Minimises the risk of incidents and non-compliance that can result in injury to personnel, damage to the environment, prosecution and substantial financial loss
- Promotes a culture of competence and compliance
- Simplifies the auditing of competency and compliance and ensures there are no gaps in the audit trail

VALUE FOR MANAGEMENT

- Requires few human resources and no specialist IT skills to use
- Real time graphical reporting of workforce capability that enables managers to make timely and informed interventions
- Departmental/job position and individual competence, compliance and training gap analysis
- Automatic notice of re assessment, internal audit or re-training when certificates are due to expire
- Objective information to help short term and long term planning of training, assessments and audits
- Creates a positive, open attitude towards acquiring the skills and know-how to operate new technology and systems

VALUE FOR EMPLOYEES

- Recognition of incremental steps towards achieving competence and compliance encourages employees to become proactive in providing evidence and engaging with the process
- Employees can have instant access to their assessment records
- Competence, compliance and training gap analysis means employees can see exactly where they are on their journey to meeting their operational requirements
- Existing competence can be included in the assessment record - supports 'grandfathering'

Contact Us

© 2010 - I2D2 Ltd, registered office, NN11 3AT, England (reg no. 05383029)

Telephone: +44(0)333 577 5015

Appendix D - Attendees at Workshop

Name of Company: Tag Plus

Name of Person: Mervyn Brown

What they do:

Established in 2002 - working from warehouse and administrative premises in Ruddington Nottinghamshire - the original TAG Company established itself as a quality supplier of PPE, WORKWEAR & UNIFORMS. From its foundations in the Construction Industry TAG became lead suppliers with a reputation for quality and value – TAG supplies an ever expanding range of SAFETY, IMAGE and PROMOTION products to wide spectrum of Industry, clients - ranging from International concerns through to small local firms and specialist contractors.

Innovative Opportunity:

Incorporating ruggedized RFID tags into overalls and other clothing such as HI Vis wear to activate warning alarms or staff tracking on site.

Incorporating proximity sensors into clothing

To participate in Health & Safety event jointly with BRE for the Greater Manchester Chambers of Commerce.

Develop a marketing strategy post project, involve MAS if applicable

What looking for:

To expand on market share, improving on sales to the construction business as well as additional services

Keen to supply products developed through innovation, strong desire to assist with innovating, but need to concentrate on primary business in first instance.

Links + Further Contacts:

Introduce to GoldmineBD for North West links and added marketing services.

Introduce to Infobric, overalls with RFID technology

Continue link with Sure Technology for oxygen/dust sensors to be included in overalls, asphyxiation ranked medium in cause of fatality on site.

Contact Details:

Telephone: 0115 940 6700

Email: enquiries@tagplus.co.uk

Name of Company: WorkSafe Innovations Limited

Name of Person: Sean Roberts & Geoff Knight

What they do:

WorkSafe Innovations Limited is a UK based company focused on designing, developing and manufacturing unique working at height solutions across a wide range of industries, including, Construction, Painting and Decorating, Property Maintenance, Electrical, Environmental and logistics markets. They also design and manufacture bespoke solutions for a number of clients including the Construction and rail Industry.

Innovative Opportunity:

Have developed an Anchor Kit compliant with HSE recommended ladder safety best practice.

As the product is removable it is not subject to fixed anchor point legislation.

It has sufficient resistance to pull out strength it can be used in conjunction with a running line as a fall arrestor in some applications.

Tag Plus & easi-edge identified that in their experience operating in stair wells was a high cause of falls from ladders, and that the anchor product would be a good preventative device either as fall arrestor or ladder anchor.

To maintain contact with PRP and Wates for use of product on future projects.

BRE have offered to run second event for the iNet team if requested in 2013, WorkSafe Innovations Limited will attend a second event if held.

Access platforms are well suited to be used in any potential ETI project seeking to apply the Retrofit solutions as an alternative to scaffolding

What looking for:

Formal testing and certification of Anchor Product.

Links + Further Contacts:

To keep in touch with Wates and PRP

To maintain contact with Richard Smith of Total Flow

To maintain contact with Philip Carney of BRE for testing and certification of product

Contact Details:

Telephone: 0115 940 6700

Email: enquiries@tagplus.co.uk

Name of Company: easi-edge Ltd

Name of Person: David Ford

What they do:

Suppliers of perimeter edge protection, fall prevention systems and fall arrest systems

Innovative Opportunity:

Easi-edge are developing a self-supporting barrier that is capable of withstanding high winds up to the region of 120 mph without collapsing, and are investigating re-cycling waste concrete to act as counter weights to one of the barrier range to reduce onsite waste in the early stages of site preparation.

To sit on project board if possible for determining suitable targeted testing for regulation compliance.

Investigate concrete recycling and geo-polymers with Liverpool University

What looking for:

Testing costs are prohibitive; they would like to support a method that allows for;

- Reduction of testing costs
- Review of regulations to allow for;
 - Targeted testing to ensure that product is fit for specific purpose rather than generic or hypothetical uses.

Links + Further Contacts:

Connect David Ford to Matt Fulton of Liverpool University Concrete centre & Andrew Dunster of BRE Concrete centre.

Connect David Ford to Insurance companies, facilitate meeting to determine what aspects are of primary importance to target for injury reduction.

To discuss aspects of LABC requirements with Philip Carney

Introduce to Infobric

Contact Details:

Tel: +44 (0)1777 870901

Fax: +44 (0)1777 872047

E-mail: enquiries@easi-edge.co.uk

<http://www.easi-edge.co.uk/>

Name of Company: I2D2 Ltd

Name of Person: David Horne

What they do:

I2D2 team are a combination of software developers and e-learning team, with a suite of different products with a wealth of experience within the chemical and refinery industry.

Innovative Opportunity:

I2D2 have an existing software product/service to supply Integrated Competence, Compliance Assurance and training Solutions, the product is potentially very close to being able to provide a Health & Safety monitoring record keeping system on refurbishment sites.

Modification of the compliance software to suit a competency process for refurbishment skills.

Develop (with others) tablet based software for use as accident book recording for onsite usage.

Engagement with HSE for CDM regulation review?

Talk to Wates to consider software use within their build programme.

What looking for:

Diversification into the construction industry within the UK.

Links + Further Contacts:

Introduce to Infobric, Sweden, could be used for asset tracking within the Infobric system.

Could be used to simplify CDM/RIDDOR reporting process, possibilities for HSE to incorporate for other reporting requirements.

Incorporate I2D2 with National Skills Council, introduce to GoldmineBD/Google Deck

Consider Calibre/Smartwaste application

Additional work under Niagara Framework.

http://www.niagaraax.com/cs/products/niagara_framework

Contact Details:

Tel: +44(0)333 577 5015

Name of Company: Nanotech Solutions

Name of Person: George Konstantinidis

What they do:

NanoTech (UK) Solutions Ltd are the Exclusive Distributor for UK & Ireland of all the product lines of NanoPhos SA. Nanophos SA. They provide a number of products for surface protection which have a number of potential refurbishment applications, from water proofing to insulating

Innovative Opportunity:

Improvements to U value, instantly suitable for listed buildings or buildings within a conservation area.
Need to develop scientific testing process for customer engagement
Identify quantifiable benefits form product in specific circumstances

What looking for:

To get acceptance of products into the refurbishment market place.

Links + Further Contacts:

Connect to Loenergy, to use in conjunction with historic buildings, and there associated products.

Introduce to Penny Lord at UKCeed Peterborough.

Introduce to GoldmineBD regarding opportunities in Manchester for architectural distinct buildings.

To keep in contact with PRP and Wates.

Contact Details:

Tel: 0149 184 2913

Mobile: 07894473730

Email: info@nanotechsolutions.uk.com

Name of Company: SURE Technology Ltd

Name of Person: Graham Marshall

What they do:

The Directors of SURE Technology have been providing innovative solutions designing electronic products for the security industry and have over 25 year's experience in design and electronic development. The current development projects include:

- Remote communication of devices over wireless networks and the internet for: Home Automation, Building Automation, Temperature and Facility Management, Meter Reading, Security and Interactive Devices.
- Environmental energy saving products - Intelligent Light Switches, Building Management and Temperature Monitoring.
- Digital video recording and communication providing high technology storage and video transmission over GPRS networks and the Internet.
- Security products providing affordable high tech solutions that are currently only available at high cost.
- DNA marking of intruders and Forensic Analysis systems.
- Environmental energy saving products - Intelligent Light Switches, Building Management and Temperature

What looking for:

Market development and access to funding for product development

Innovative Opportunity:

Introduce WiFi cameras to waste skips, controlling hazzardous waste as well as pre identifying waste for re-cycling schemes. "Skipcam"

Introduce WiFi cameras to site accident blackspots "SlipCam"

Introduce WiFi cameras to site as required on refurb works "RetroCam"

Have button cell proximity sensors, explore use at entry points to refurb sites to assit with visitor safety.

Links + Further Contacts:

Introduce to Infobric, combine cameras to secure access process

Combine cameras to Calibre process

Connect SlipCam to I2D2 Compliance software package to aid with data capture to understand accident clusters.

RIDDOR Compliance?

Contact Details:

Tel: +44 (0) 1949 836 990

Fax: +44 (0) 1949 836 991

Email: graham@suretechnology.net

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David	Ford	Easi-edge Ltd	BDM	Ollerton Road, Tuxford, Newark Notts, NG22 0PQ	01777 870901	dford@easi-edge.co.uk
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Name	Organisation	Job title	Address	Phone	Email
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Barrie Billingham	SC iNet	Advisor	SC iNet iCon Innovation Centre Eastern Way, Daventry, Northamptonshire NN11 0QB	07595092023	Barrie.billinghay@northampton.ac.uk
Martyn Cowsill	GoldmineBD	Consultant	www.goldminebd.com	07827 017796	martyn@goldminebd.com