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The hidden threat

Why industry needs to go above and beyond in the fight against HAVS

Report author: Paul Wilkinson, leading industry journalist

Executive summary

Use of vibrating hand tools is widespread across industry. An estimated two million people in the UK are at risk from hand arm vibration syndrome (HAVS), while 300,000 are suffering the advanced stages.

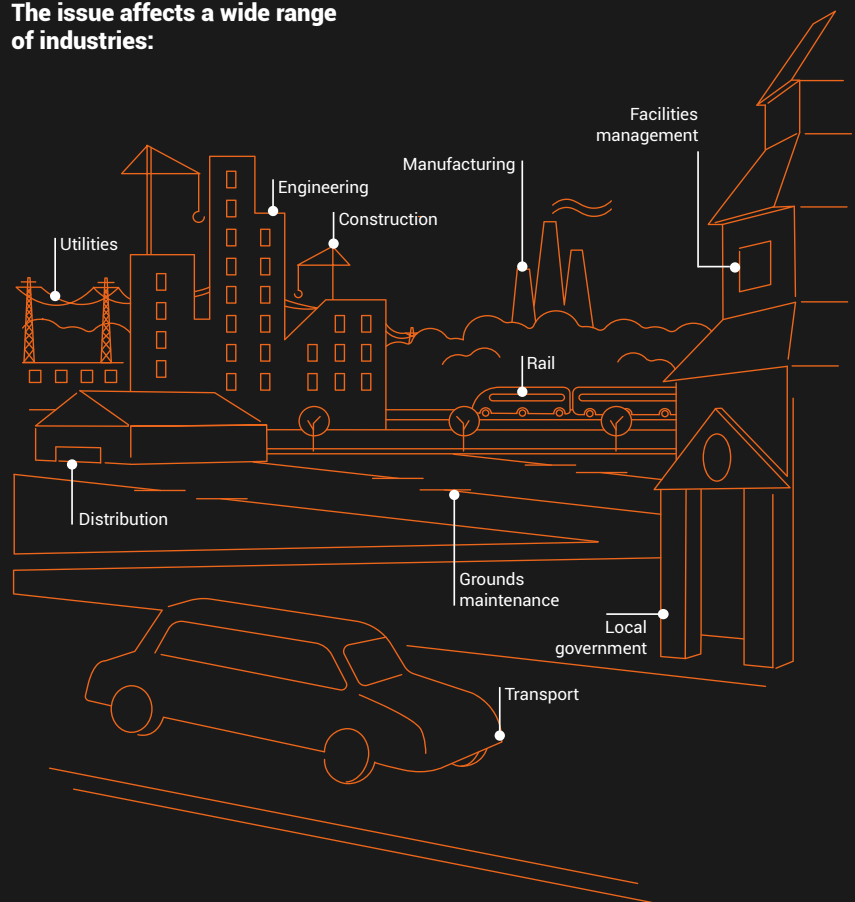
There is no cure for the life-changing condition, and those with the condition suffer financially and emotionally. Symptoms can take between 6 months and 20 years to appear, and HAVS is irreversible.

Employers can lose key workers at a time of skill shortages. Senior executives risk prosecution, with significant fines and even custodial sentences possible if found guilty, while businesses may also face expensive personal injury claims.

Despite vibration-related conditions being among the most widely reported illnesses, industry currently relies on outdated methodologies and standards to manage work-related vibration. A more concerted effort is needed to limit exposure to HAVS risks, and go beyond the current guidelines on legislation.

Wearable technology could transform the marketplace, helping employers safeguard their workers while ensuring regulatory compliance, through smart monitoring of vibration exposure.

The issue affects a wide range of industries:



HAVS: An introduction

Hand arm vibration syndrome (HAVS) is a debilitating disorder caused by exposure to vibration, commonly resulting from workers' use of handheld power tools. Once contracted, the condition is irreversible and potentially life-changing, but it is preventable if the right precautions and controls are in place.

HAVS affects the nerves, blood vessels, muscles and joints of the hands, wrists and arms used in operating power tools. Affected workers may suffer tingling, numbness and/or loss of feeling, while the impacts on blood vessels can lead to vibration white finger (VWF), a condition where fingers turn white in cold temperatures.

Sufferers may find it hard to carry out simple tasks such as holding a cup of tea, doing up buttons, or playing with their children. Many are forced to change career or have to stop work entirely, and suffer financially and emotionally as well as physically. Such repercussions affect sufferers' families, colleagues, supervisors and managers – and can be expensive for their employers.

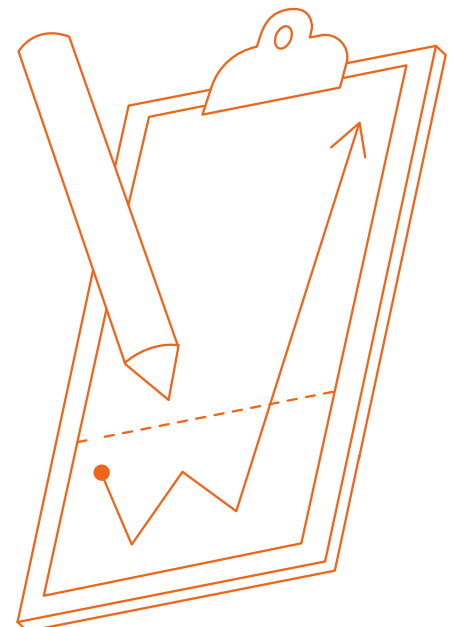
One in ten workers who operate at the Exposure Action Value will develop HAVS within 12 years... there is a strong case for employers to go above and beyond what regulations require to keep workers safe.

Traditional assessments and control measures can result in under-estimation of vibration exposure by up to 76%.

As symptoms may not become apparent for ten years or more, workers are often unaware of the danger, and those that are may ignore it for fear of losing their jobs. Regular assessments and generic control measures will help some workers, but can lead to under-estimation of vibration exposure by up to 76%, putting people at serious risk. Managers may think current procedures adequately protect their workers when often there is more they could do.

In one detailed study by a leading utilities company, results from a conventional risk assessment and real-time measured data were compared. The traditional assessment under-estimated a number of worker's exposure; with one worker's real-time measured exposure three times greater than the conventional assessment, reaching a level close to the regulatory limit requiring immediate 'tools down'.

To reduce HAVS risks, workers' daily vibration exposure levels are defined in the Control of Vibration at Work Regulations 2005. Yet, according to the HSE, one in ten workers who operate at what is known as the Exposure Action Value will develop HAVS within 12 years.



HAVS can be crippling for sufferers and businesses

"I would wake up in the middle of the night with cramps. It would be like as if you had been lying on your hands and they had gone numb. Even if I picked up a drill to do things around the house, I felt the tingling and would be in constant pain."

Alan Finley worked for years in various industries before being diagnosed with HAVS. "When I first started there were no such things as monitoring or anything like that. You would grab a tool and use it. You didn't know the consequences or what damage it was doing to you."

Finley is luckier than many: seven years ago, he became a manager at his present employer, Volker Rail. He no longer uses tools and is leading efforts to improve industry safety. Doctors say he needs an operation for carpal tunnel syndrome, a condition caused by compression of the median nerve through the wrist, another issue which can result from exposure to vibration.

"I've been lucky that I have never been out of work, but I know people who have, and it has had a big impact on them," Finley says. He has known cases where workers fail to disclose in job applications that they have the condition, for fear that they will have no chance of getting a job.

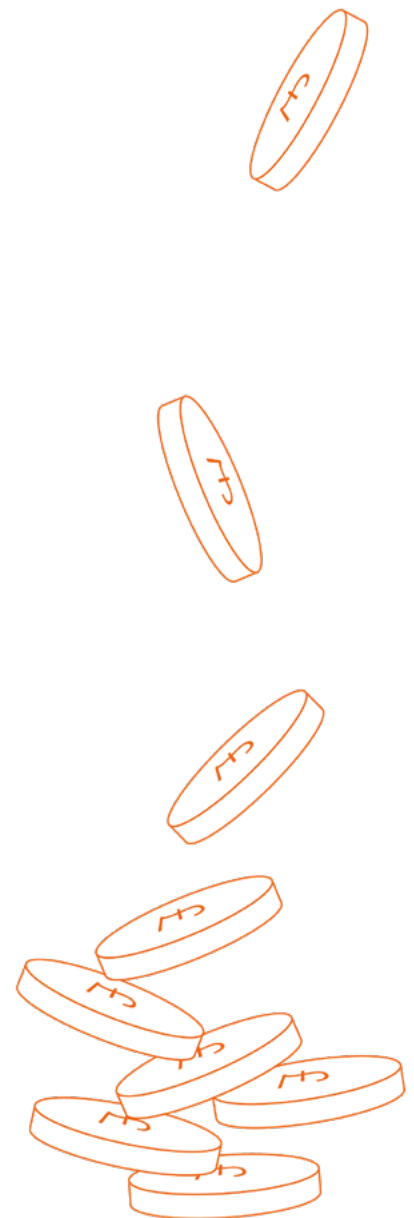
Prosecutions relating to the Control of Vibration at Work Regulations 2005, achieved a 100% conviction rate, with the average fine almost £37,000.

The condition can have a devastating impact on people's ability to work and live a normal life. Health, safety and environment consultant Harry Gardner believes employers should go above and beyond what regulations demand:

"There is no such thing as a safe level of vibration," he says. *"If you are working to minimum standards, you are just dicing with people's health. We should always be striving to achieve the lowest possible level."*

Businesses can suffer personal injury claims or convictions

HAVS is one of 6 reportable diseases linked with occupational exposure to specified hazards under the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR). It is the most frequently reported issue, accounting for 46% of all RIDDOR notifications.



In 2017-18, the HSE prosecuted seven cases relating to the Control of Vibration at Work Regulations 2005, achieving a 100% conviction rate, with the average fine almost £37,000. In June 2018, one construction business was fined £500,000, and ordered to pay costs of £195,000, for repeated HAVS failures between 2002 and 2011. There has been a 300% rise in financial penalties relating to HAVS since new sentencing guidelines were introduced in 2016.

As well as criminal proceedings, managers and their firms may also be subject to expensive civil compensation claims. HAVS claims are a "significant

and expensive feature of the claims environment", says Ian Macalister, partner at law firm DWF. He has seen awards ranging from a few thousand pounds up to tens of thousands, even six-figure amounts, citing a recent case affecting a relatively young man who was otherwise unskilled and unable to pursue a career that involved handheld vibrating devices.

For every £1 recovered through insurance, HAVS claims cost a company £10 in uninsured costs such as legal fees, sick pay and employee time, according to the HSE.

Firms that fail to manage HAVS risks could also find their insurance premiums increase. A leading insurer says a much better prospect is an employer who actively monitors vibration, has management and control systems in place and detailed records relating to individual exposures, and is clearly using that information to manage individual employees' exposure.

In addition to the legal and financial implications, businesses may also lose key workers, as HAVS sufferers must often change jobs or quit work entirely. With many industry sectors facing skills shortages, this adds to the impacts on businesses. In summary, with HAVS, there is a strong case for employers to go above and beyond regulatory guidance to keep workers safe.

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When symptoms appear, it may already be too late

Workers and managers underestimate the risk of hand arm vibration syndrome

As symptoms can take anywhere from 6 months to 10 or 20 years to appear, incremental damage can go unnoticed. By the time symptoms begin, it may be too late because the condition is irreversible.

"It's a huge problem and people don't appreciate and understand it," says health, safety and environment consultant Harry Gardner. "I don't think they see the risk from working with everyday tools."

A challenge in managing HAVS is correctly identifying when someone's symptoms started. Keith Prince, health, safety and environment leader for infrastructure at Laing O'Rourke, points out that a problem might have started with a previous employer or even with a leisure activity such as riding a motorbike.

That latency can also make it difficult for employers to defend personal injury claims. Employers often face allegations of vibration exposure that happened some years ago. In those circumstances, lawyer Ian Macalister says it is difficult forensically to make a meaningful investigation into the merits of a claim.

There are serious shortcomings with assessment

The Control of Vibration at Work Regulations 2005 require an employer to carry out suitable and sufficient risk

assessments, to reduce and control the risk to as low as reasonably practicable and to carry out health screening. However, there are serious shortcomings with conventional HAVS risk assessments. They can be infrequent, provide false assurance and may not protect individual workers adequately from dangerous vibrations, even when complying with regulations. They also apply a 'one size fits all' approach.

HAVS risk assessments are based on an assumed vibration magnitude for the exposure which are based on manufacturers' declarations, or from a measurement at a single point in time requiring a skilled technician to be on hand. When risks are identified, controls may be introduced such as limiting the

time a worker uses a tool, with health screening to validate the controls' effectiveness. While this approach may help most workers, it will inevitably not protect everybody. For example, where health screening identifies HAVS sufferers, stronger controls may only benefit future workforce health; it will be too late for existing sufferers.

Assessment data also will not account for individual differences. How people use tools, the intensity of use, and the condition of the equipment are all variables that can produce significantly higher levels of vibration than that assumed using static data.

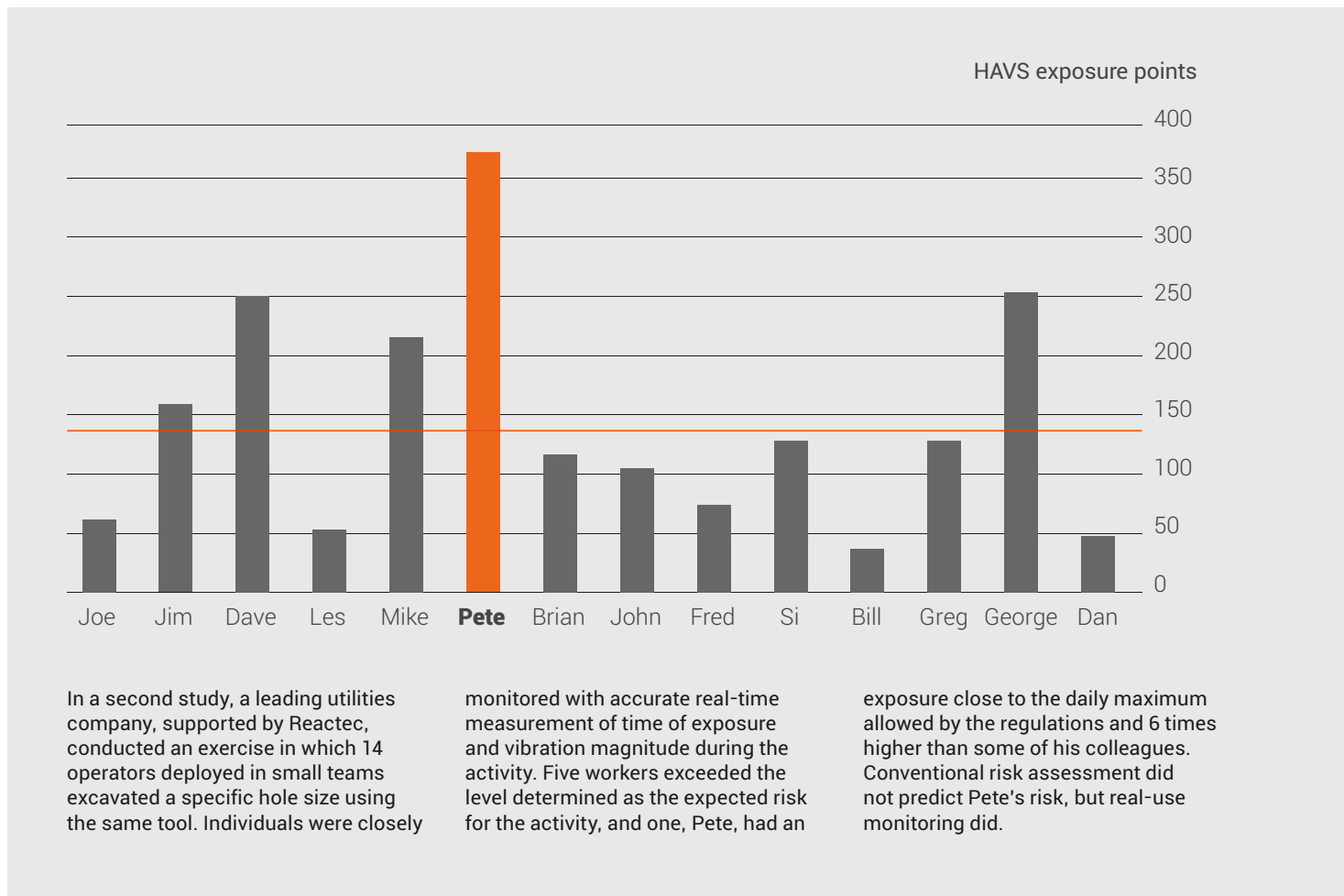


Revealing the hidden threat of HAVS?

It's time for personalised real-time monitoring

Shortcomings with conventional assessment can be overcome by using methods which focus on the individual, not the tool. One study by Reactec analysed data from 4,000 UK tool operators, comparing traditional

static risk assessments with an innovative wearable technology that measured real-time tool use data over a nine-month period. It discovered that for a fifth of individuals, who were high risk individuals, static methods underestimated risk on average by 76 percent.





Wearable technologies that capture real-time data are increasingly widely used (Fitbit health and fitness devices, for example), and there is a growing body of independent research backing adoption of wearable technology for HAV monitoring. Reactec's HAVwear is a wrist worn device that measures vibration transmissions in real-time and enables the user to understand their own risk. The device can determine vibration exposure in two ways: a trigger time mode can be used for traditional risk assessments (and complies with HSE guidance), while a 'smart monitoring' mode measures real-use vibration magnitude (and goes beyond HSE guidance), giving new insights into a user's HAVS exposure.

Equally important, this smart technology has analytical tools providing managers with information to reduce future HAVS risks for employees. Armed with knowledge about each worker's exposure and the performance of each tool, managers can specify more training, redesign projects or choose different tools. Health, safety and environment consultant Harry Gardner says: "Digital monitoring is important and the analytical platform and the report that it produces are absolutely invaluable. HAVwear is the best that's out there." Laing O'Rourke's Keith Prince says Reactec's technology is:

"particularly beneficial if you have got high-risk tasks or workers exposed to multiple vibration sources in the same day. If employers need confidence that their risk management measures are working effectively, in those situations it becomes too complex to do it manually".

HAVwear in action

For Laing O'Rourke, HAVwear provides confidence in planning tasks. Prince says the technology is particularly useful when workers are performing multiple tasks and using several tools for different lengths of time.

"It's almost like a Fitbit, it's clocking his time irrespective of what he does today. I would challenge anybody to be able to work that out using a spreadsheet or a piece of paper. You could argue that HAVwear is an essential way to measure exposure where people are multitasking throughout the day."

At National Express, Paul Harley says HAVwear data enables him to keep tabs on vibration levels experienced by workers at the company's 14 sites.

The company has identified tools that are not functioning correctly, has rotated workers to avoid over-exposure, and, for those with HAVS symptoms from earlier

in their careers, has implemented controls so that their injuries are not worsened.

Francis Mullally, head of service support for National Express in the West Midlands, says the data enables managers to identify any potential problems affecting individuals early and act to prevent these becoming serious.

Digital monitoring is important and the analytical platform and the report that it produces are absolutely invaluable.

The risk management case for HAVwear

Jacqui McLaughlin, Reactec's chief executive says:

"Technology allows us to improve so many things by continuous improvement methodologies and data analytics, I don't see why this as a topic should be treated any differently. Regular smart monitoring is increasingly used in other contexts such as police body cameras, underwater diving, car telematics and average speed cameras, and has been shown to materially reduce risks and hazards."

Wearable technology like HAVwear enables employers to comply with the 2005 Regulations and to go further in protecting employees. HSE guidance advises that wearables are acceptable for risk assessments when used in trigger time mode, making HAVwear a viable option for those in charge of risk assessments. However, HAVwear also provides an assessment of real-tool use. Such data gives unique insights into an individual's vibration exposure.

If this shows an individual is at higher risk than the trigger time mode assessment suggests, it can be invaluable in investigating the reasons for the increased risk, and taking steps to reduce exposure. Employers are then meeting regulatory objectives to reduce HAVS risks to as low as reasonably practicable.

"The regulations are not prescriptive," says McLaughlin. "They do not say how you should keep people safe. They say you should risk-assess and our product gives you all the data you need for a risk assessment. They say you should put in controls. Our data, I think, informs intelligent controls rather than controls that are based on poor, gross estimates."

Additionally, while the HSE asserts that continual monitoring is "probably not a good use of your employees' time" (sometimes exemplified through onerous paper records), ultimately employers are in the best position to decide which methods are most effective in their objectives to keep their people safe. Smart monitoring can provide reassurance that people are using tools correctly and following safe working

plans, and can also provide additional intelligence unavailable from any other source about how to make work plans safer in the future. In short, real-time data enables managers to plan and deliver a safer environment for workers.

Prince says Laing O'Rourke uses HAVwear to "give us confidence" that it is planning tasks properly.

"We may well put HAVwear on a worker, certainly if it's high-risk or complex, and at the end of the day it should tell us what we already knew. It gives us confidence that we are planning our work safely and predictably and not overexposing people to risk."

Lawyers defending civil liability claims against employers find monitoring data invaluable. In the past, employers were often unable to defend liability claims because of inadequate records of exposure sustained years earlier. "Anything that generates reliable exposure records has got to be in a better position than historically," says an insurer. Prince agrees:

"If an inspector came to one of my sites and said 'there's a guy here who's doing 6 different vibratory tasks during the day, how are you managing his exposure and how can you evidence that'? I think the only way you're going to show that you are monitoring his exposure is by using HAVwear, because it would be too complex to do it manually."

Use of smart technologies to monitor exposure to vibration benefits employers, keeps employees safer and healthier, and helps to avoid a debilitating and life-changing illness. As a HAVS sufferer, Volker Rail's Alan Finley says:

The more safely they work, the longer they work.



In summary

An incurable condition, HAVS has wrecked careers and damaged families for decades, but now 21st century wearable technologies may help reduce workers' and employers' risks. Previously hidden problems can be surfaced, helping ensure individual workers' exposure is contained within safer limits. In the process, employers can minimise risks of prosecution and significant fines plus expensive compensation claims for failing

to protect their employees.

HAVwear meets regulations and complies with HSE guidance. While there is no legal requirement for regular monitoring, it helps managers to understand levels of exposure, particularly where workers are performing multiple or repetitive tasks. More effectively than traditional risk assessment methods using static vibration magnitude data, HAVwear helps managers take account of

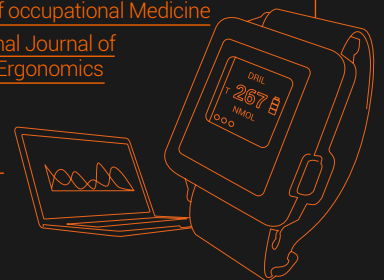
individual differences in how people use tools. Equipped with detailed information about each worker's exposure and the performance of each tool, managers can be proactive in improving training or replacing tools to prevent problems. Employers using HAVwear will not only be complying with the regulations, but going further than guidance to keep their workers safe.

To find out how Reactec can help you go further in protecting and safely deploying your workforce, contact info@reactec.com and 0131 221 0930.

HAVS: Further reading and viewing:

- HSE (2018), Health and safety at work: Summary statistics for Great Britain 2018
- HSE (2018), Hand arm vibration in Great Britain
- HSE (2018), Enforcement statistics in Great Britain

- Kennedy's (2018), Hand-arm vibration syndrome – more costly prosecutions
- [Institute of occupational Medicine](#)
- [International Journal of Industrial Ergonomics](#)
- [Telegraph](#)



Paul Wilkinson - Leading industry journalist

Paul Wilkinson has been working in the UK construction industry since 1987, starting in professional services before moving on to information technology. He headed communications at a software start-up for 10 years, and since 2009 has been an independent technology analyst, PR consultant, freelance journalist, blogger and public speaker.

He is an authority on the use of construction collaboration technology platforms, SaaS and

related developments in fields such as BIM, mobile technologies and social media. Applying this knowledge, he is deputy chair of the information systems panel at the Institution of Civil Engineers, an executive director and chair of the technology group at the UK BIM Alliance, and on the management teams at COMIT (Construction, Operation and Maintenance through Innovative Technology) and the Leeds-based ThinkBIM.

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Reactec is the leader in the development of smart wearable technology to inform employers about the potential impacts of Hand Arm Vibration and enable them to protect their workforce from this debilitating condition. The company invests in significant research and development to pioneer innovative technology to safeguard employees' and employers from exposure to everyday risks in the workplace. Reactec's work has involved leading academics in the field of the human response to vibration and involved The Institute of Occupational Medicine (IOM), the leading provider of health and safety solutions to industry, commerce, public sector and professional bodies within the UK to bring independence and authenticity to validation work. Reactec are also very active in raising the awareness of HAVS risk to help industry better understand the human impact of HAVS and importantly the legal requirements of The Control of Vibration at Work Regulations 2005 and related HSE guidance.