In the sixth edition of our global construction magazine, Building Sight, we focus on the health and well-being of those closest to a construction project.

We explore the expectations attached to the design and development of smart cities and their critical infrastructure; focusing on the relationship between the built environment and the well-being of those constructing, living, and working within it.

Though not always recognized in the past, the impact of poor mental health on construction workers remains a critical concern, which is facing increased scrutiny.

As particular emphasis is placed on improving occupational health and safety, employers are increasingly adopting new technologies to manage risks both old and new. We consider the implications for construction workers’ health and safety in the context of new technologies and emerging industrial risks.

Alongside these developments, the construction workforce is becoming more diverse across a number of markets, with new employees with different backgrounds and life experiences bringing new ideas, needs, and perspectives to the industry.

While the full implications of these changes are still becoming apparent, it is clear that, ultimately, the health and well-being of a workforce, both on-site and off, is integral to the safe delivery of construction projects to schedule and on budget.

I hope you will find these articles interesting and informative, and would welcome your feedback.

RICHARD GURNEY
Global head of construction,
Marsh JLT Specialty

10th Construction Academy

Marsh JLT Specialty hosted its 10th annual Construction Academy in London from 10 to 12 July 2019. Aimed at delivering insight into the nuances of construction insurance, the event attracted 30 construction professionals who traveled from as far afield as Italy, Portugal, Brazil, and the US.

As well as developing their knowledge of construction insurances, from placement through to claims, the workshop-style course equipped delegates with practical skills they could use immediately. Networking events included a guided tour of Lloyd’s of London, one of the oldest insurance marketplaces in the world.

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BUSINESS UPDATE

You’re Changing, We Are Too

The creation of Marsh JLT Specialty on 1 April 2019 combines the teams and resources of both Marsh and JLT. The result is a global construction broker, which combines a vast pool of experience from both teams.

With a network of more than 1,000 people internationally and some 175 construction specialists in London, our global construction specialty already designs, places, and manages the insurance solutions for many of the world’s leading projects and construction companies.

With the deepest and most diverse pool of specialist expertise available globally, our greatest differentiation comes in our ability to offer the very best solutions to our clients. Together, our experienced professionals will be able to deliver a breadth and quality of service which brings together all that both legacy organizations have to offer.

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STANDARD CONTRACTS

Caribbean Adopts International Contracts

The Caribbean Development Bank (CDB) is the latest institution to adopt standard contracts from FIDIC, the International Federation of Consulting Engineers. In July, the CDB signed an agreement to use nine FIDIC contracts for the next five years, following on from similar deals with the World Bank and Inter-American Development Bank earlier this year.

FIDIC forms of contract will now be used on major projects financed by the banks, improving certainty and hence increasing the likelihood of overseas investment. As our article on smart cities suggests (see page 6), the involvement of international players can lead to the application of international health and safety standards, improving the lot of construction workers in the longer term.

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CONSTRUCTION SURVEY

Automating Health and Safety Approaches

The adoption of new technologies and practices can bring myriad benefits to a construction site including, perhaps most importantly, to worker health and safety. In our Reducing Risks Through Digital article (page 12), we explore how wearable tech and autonomous robotics are reducing the need for construction workers to engage in time-intensive and injury-prone work.

The GlobalData report, Trend Insight: New Technology in Construction (Figure 1), demonstrates that construction companies see the value in new technology. All those surveyed who had invested in the past are planning further investment within the next two years, across all technologies.

The principal drivers for investment in tech are increased productivity and greater market competitiveness, according to the report. However, although improved health and safety was rarely cited as the reason to adopt labor-reducing technologies, as explored later in the magazine, it could be a key beneficiary of them.

Figure 1. Investment Intentions — Respondents who have invested or will invest within the next two years (% of total), 2018

HAVE INVESTED WILL INVEST

15% Autonomous Vehicles 28%

29% Augmented Reality 56%

32% Drones 51%

32% The Internet-of-Things 61%

44% Virtual Engineering 60%

61% Building Information Modeling 65%

56% Mobile Applications 74%

69% Cloud Technology 76%

Source: The Construction Intelligence Center, GlobalData

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Smart City, Healthy City

Smart cities could mean better and healthier lives in emerging economies — both for inhabitants and the workers who build them.

Thinking Ahead

Poor mental health on construction sites, and how Australia takes a preventive approach to these problems.

Healthy Buildings

Progressive companies are looking for buildings that improve their employees’ health and well-being.

Reducing Risks Through Digital

Digital construction improves conditions for those working on site and reduces the risks of injury.

Diversity and Well-being

Three women from the construction industry discuss how diversity affects well-being and performance.

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For a material known to cause fatal illness, international trade in asbestos is surprisingly brisk. The International Labour Organization estimates that 100,000 people die annually from a disease relating to workplace exposure to the naturally occurring fibrous mineral — yet, it is still a popular building material.

China is the world’s leading consumer of asbestos, using more than 570,000 tons in 2013, according to the United Nations University International Institute for Global Health. Even China’s smaller neighbor, Laos, with a population of around 7 million people, imported an estimated 8,000 tons of chrysotile (white) asbestos in the same year.

Asbestosis, along with other occupational health conditions such as hand-arm vibration syndrome (HAVS), represents a long-tail risk, resulting in claims and insurance payments long after the original exposure. Because of the latency period involved in the diseases that accompany exposure, potential claims, illness and deaths are likely to come decades from now in Asia, as experience in the West has demonstrated.

Generally, a country’s understanding of occupational health risks develops with its economy. In the case of HAVS, for example, Japan, Australia, and New Zealand have guidelines aimed at preventing exposure but there is little awareness in many parts of Southeast Asia. Some risks are new to both developed and developing regions alike, however, such as claims relating to UV exposure at work, and potential health issues relating to exposure to nanoparticles (see page 5).

Awareness of the risks of asbestos is growing in Asia. Hong Kong had 36 confirmed new cases of asbestosis and 96 confirmed new cases of mesothelioma, respectively, between 2006 and 2015, according to statistics from Hong Kong’s Pneumoconiosis Compensation Fund Board. Of the patients concerned, 87% had an employment record in construction. Similar data for mainland China, where asbestos use has increased dramatically since the 1970s, is hard to come by. Predicting when a peak in such cases may come is virtually impossible.

Encouragingly, Laos could soon count itself among the more than 60 countries around the world to have banned asbestos, including Australia, Hong Kong, Japan, Korea, New Zealand, and Singapore. Regulation by itself, however, is not necessarily enough — culture is also important, according to AIG Risk Consulting. “Unfortunately, even when bans exist, a lack of enforcement can result in regulations not being followed — and sometimes employees themselves will not even report problems because they fear the economic consequences of being unable to work.”

Because workers have had different employers during their career and can’t pinpoint when they were exposed to hazards that caused an occupational health condition, governments in Southeast Asia typically shoulder the financial burden. But contractors working abroad, in nations where regulations are less stringent than their home country, also need to be alive to the risk of future claims and reputational damage.

Both employers and employees in Southeast Asia are affected by a failure to adequately prescreen and monitor for occupational health conditions, such as pulmonary function tests for those wearing respiratory protective equipment. Without the adoption of screening for occupational health conditions, employers do not know if employees have a pre-existing condition or if their control measures are effective.

Rapid advances in wearable technology could soon change this, allowing governments and employers to quickly identify where workers are exposed to occupational health risks and introduce measures to protect them. “Small, internet-of-things-enabled sensors are now available that mean we can study what is happening to workers much more easily and make decisions more quickly,” says AIG Risk Consulting.

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OCCUPATIONAL EXPOSURE

Assessing the Risk of Nanoparticles

Nanoparticles will transform construction — but we need more research on their potential health risks.

Dave Cahill
Senior partner, Marsh JLT Specialty

The world of nanoparticles carries potential for huge advances in the strength and performance of construction materials. Meanwhile, 3D printing — also known as additive manufacturing — is expected to shift production away from standardized construction products to bespoke items that can be produced rapidly and far closer to site.

Materials that are expected to become more popular as the use of 3D printing increases include titanium dioxide (used in photocatalytic concrete to give it self-cleaning properties), silver powders (used in additive metal manufacturing and 3D printing), and silica (glass containing nanosilica gel that lends it good thermal and acoustic properties while cutting down on glare).

But such technological advances could also bring risks to occupational health that are, as yet, relatively poorly understood.

Nanotechnologies contain nanoparticles smaller than 100 nanometers and some, particularly where they are fiber- or wire-shaped, may be able to penetrate deep into workers’ lungs according to research by the University of Loughborough, funded by the Institution of Occupational Health and Safety in the UK.

In the UK, the Health and Safety Executive has issued a project proposal warning that additive metal manufacturing has prompted concerns about lung disease over the longer term, as well as the risk of ignition and combustion. It is set to update best practice on the safe use of metal powders.

To this end, contractors should consider developing a UV protection policy or written guidelines documenting risk control measures. They should also ensure workers are made aware of the dangers and given shade and personal protective equipment such as hats, sunglasses, and sunscreen when conditions call for it.

As for changing the attitudes of workers toward sun protection, education may be the best route.

A 2012 study of 120 construction workers by the University of Loughborough found that nine out of ten people showed a positive change in behavior, having viewed a video that explained the dangers of UV radiation and how to check skin for moles or unusual changes.

The level of exposure means that claims are gradually increasing. In Australia, a total of 1,970 workers’ compensation claims for sun-related injury or disease were made between 2000 and 2012, at a total cost of A$63 million in compensation.

To this end, contractors should consider developing a UV protection policy or written guidelines documenting risk control measures. They should also ensure workers are made aware of the dangers and given shade and personal protective equipment such as hats, sunglasses, and sunscreen when conditions call for it.

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GROWING RISK

Protecting Your Workers From the Sun

Exposure to ultra violet (UV) radiation at work is causing skin cancer. And claims are on the increase.

Dave Cahill
Senior partner, Marsh JLT Specialty

Skin cancer caused by UV radiation is the fastest-growing occupational malignancy, according to occupational skin disease specialist Professor Swen Malte John from the University of Osnabrück.

This fact is evidenced in the few countries that recognize such cancer as an occupational disease, says John, writing in The British Medical Journal (The BMJ).

For instance, after recognition in Germany in 2015, 8,000 cases of cutaneous squamous cell carcinoma or multiple actinic keratoses have been notified each year. More than 14.5 million workers across the EU are regularly working outdoors and need targeted protection, estimates the European Agency for Safety and Health at Work.

In Australia, one of the few countries to recognize occupational skin cancer, construction workers are estimated to receive up to 10 times more UV exposure than indoor workers; 200 melanomas and 34,000 basal cell and squamous cell carcinoma skin cancers are diagnosed each year in the country due to UV exposure in the workplace, according to Cancer Council Australia.

Even in the UK, a recent study by Heriot-Watt University and the Institute of Occupational Medicine put the annual number of skin cancer cases caused by outdoor construction work at 3,000.

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Healthy City

Smart City, Healthy City

Smart cities could mean better and healthier lives in emerging economies — both for inhabitants and the workers who build them.

Over the last decade, our understanding of what makes a “smart city” has shifted. It’s not so much about the technology in the city, as using technology and data to improve decision-making and delivering a better quality of life.

There are three layers to a smart city, according to the McKinsey Global Institute’s (MGI) 2018 report Smart Cities: Digital solutions for a more liveable future, which studied 50 cities around the world. The first layer is the physical infrastructure, the second is the technology — mobile phones, apps, sensors, and Wi-Fi — and the third is the data and how it is used.

The application of smart city ideas in emerging economies offers huge opportunities to improve the lives of people living and working in those cities. Beyond the basic needs of housing, social infrastructure, and utilities, smart cities could bring easier access to sanitation, transportation, public services, and information. They also lead to reduced crime levels, cleaner air, and the opportunity to live healthier lifestyles.

Cities with a smart agenda are also more likely to attract overseas investment. In turn, this could help raise safety and welfare standards for those constructing and maintaining them, as lenders and other project stakeholders may insist on project management standards that are above average for the territory.

While higher-income cities have progressed further toward smartness, the need to improve cities in developing economies is urgent. In Brazil, more than 87% of the population live in urban areas. In India, 33% of the population lives in cities, a figure set to rise to 50% by 2030.

With its established urban population, Brazil’s challenge is to improve its existing cities. Several Brazilian cities are working to advance the smart city agenda, among them São Paulo, Curitiba, Vitória, Belo Horizonte, and Rio de Janeiro, but they still lag behind the world’s leading smart cities such as Singapore, Seoul, and New York on almost every count.

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The Journey to Smart

“The Journey to Smart” says Andre Dabus, director of Marsh JLT Specialty’s infrastructure team in Brazil. Private investment will be vital to this journey, he adds, with a raft of public-private deals to cover everything from intelligent street lighting to sanitation and education.

São Paulo, cited by MGI and others as Brazil’s most advanced smart city, is still struggling with extreme budget constraints. One of its first smart city programs, Descomplica Digital, aimed to digitalize all interactions between citizens and the municipality. But, first, it had to upgrade the hardware used by the city’s civil servants, which could only be done with Cisco Systems and others donating computers.

One of the biggest challenges any city faces before it can become smart is to have functioning infrastructure in place. Though some developed cities suffer from creaking infrastructure.

“There’s a new infrastructure gap emerging, which is the fact that Latin American cities and their infrastructure are not ready for the digitization required to become smart cities,” says Joao Buzio, construction leader for Marsh JLT Specialty in Latin America and the Caribbean.

The Indian government has an ambitious smart city program, committing in 2015 to investing in 100 smart cities over five years. However, progress has been slow. In January 2019, the government admitted that just $510 million of $2.3 billion allocated had been spent on smart cities projects.

“Around five years ago, the plan was to do everything in smart cities with private money,” explains Nisheeth Srivastava, construction leader for Marsh JLT Specialty.

“Eventually, people realized that it was going to be tough to persuade the private sector to build the basic infrastructure. Now the plan is to improve basic infrastructure to a level where it is attractive to foreign investment,” he adds.

India’s smart city agenda is now more attractive, integrated into a plan for five huge industrial corridors linking the country’s biggest cities. These include the Delhi-Mumbai Industrial Corridor, the Chennai-Bangalore Industrial
Corridor, and the Bangalore-Mumbai Economic Corridor. This approach is attracting overseas interest, with Japan a keen participant.

**Smart City, Smart Contractor?**

While tomorrow’s vision of a smart city delivers healthier and happier inhabitants, it cannot be presumed that the lives of those building and updating the city’s infrastructure will also be better. In emerging economies, construction workers are often uneducated or poorly educated, whose welfare and rights are often overlooked.

In emerging economies, construction workers are often uneducated or poorly educated, whose welfare and rights are often overlooked.

However, the involvement of overseas banks and other funders can positively affect safety standards and worker health. In Brazil, major infrastructure projects already adhere to international standards, says Dabus. Brazil is enjoying its third wave of public-private deals, with the latest one seeing the involvement of overseas players.

“In the infrastructure sector we already have international funders and agencies involved. International companies are very strict about safety, but I don’t see that it is a huge problem for Brazilian companies to meet those standards,” says Dabus, although he adds, “It may be a different story for small construction sites.”

For Planet Smart City, which is developing the smart cities of Laguna (see box) and Natal in Brazil, and hoping to create smart districts within some of India’s large cities, it is important that construction workers are competent.

“We want the highest levels of quality and safety,” says Daniele Russolillo, deputy chief executive officer of Planet Smart City, an English company headquartered in London. “If we want to build a sustainable place, we want to start with the people working in it.”

In Brazil, Planet Smart City is carrying out the construction work itself, employing local people. “We have 300 workers, all trained by us to high levels of safety,” says Russolillo.

In India, Planet Smart City partners only with local developers who share the same values and the same standards for safety and quality to be given to local contractors, says Russolillo.

Alongside the basic obligation of a company to protect and care for its workforce, there are various reasons why safe, skilled workers are important for Planet Smart City developments. First, construction sites often serve as a shop window for would-be inhabitants, with 24-7 camera footage shown online and visits to sites from potential house buyers meaning that the reputational exposures of a company are an ever-increasing concern. Second, the company promises to develop quickly to provide a better internal rate of return for its investors, and poor health, safety, and well-being policies may cause unnecessary delays to project delivery.

In India, Srivastava doesn’t see overseas investors or developers as a catalyst for welfare improvements among the country’s construction workers. Instead there is pressure from the government, he says.

“Over the last few years there have been a lot of labor reforms, with the introduction of minimum wages and certain health and safety standards for the laboring class,” adds Srivastava.

**“As smart cities develop, those providing construction and maintenance services must develop, too.”**

The Modi government is currently working to introduce more laws concerning wages, industrial relations, social security, welfare, occupational safety, health, and working conditions. These basic standards need to be in place before contractors consider using technology to improve efficiency or safety. Where workers are cheap and expendable, the motivation to invest in new solutions isn’t there.

But, as smart cities develop, those providing construction and maintenance services must develop, too, to be able to communicate and work with smart systems. In the future, automation and the use of remotely-controlled vehicles, such as drones, should reduce the potential safety risks to humans further. Though Brazil’s urban population is well-established and India’s is rapidly growing, both face similar challenges: How best to set up smart cities to attract private funding for future waves of development.

There is already an appetite from overseas investors, developers, and technology firms to get involved. And over the next few years we should see an increasing number of public-private deals that will allow them to do that. In turn, it is expected that the safety and welfare of construction workers will start to improve in line with the standards and technical skills of the companies involved.

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**An Affordable Smart City?**

In Northeast Brazil, Planet Smart City is building a brand-new city called Smart City Laguna. Located in São Gonçalo do Amarante, in the state of Ceará and 55 km from Fortaleza, its creators claim this will be the world’s first affordable smart city. “We are not interested in building smart cities for rich people,” says Planet Smart City’s Deputy CEO Daniele Russolillo. “We want to deliver homes for low-income families, using social innovation.”

Laguna will provide homes for 25,000 people on its 330 hectares. Mostly residential, it will also have small amounts of retail and industrial property, as well as schools and health care. The house prices at Laguna are aimed at low- and middle-income families, with a 56m² property costing from R$96,000 (£20,000).

As for what makes Laguna “smart,” the city will boast more than 40 smart solutions, says the developer, including pavements that reduce heat, solar energy, and a “Planet App”, which allows residents to do a host of things from monitoring their monthly energy bills, to booking free public spaces for parties and community events, to organizing ride shares with neighbors.

An “innovation hub” that opened early in the development phase offers a library, free English and entrepreneurship courses, movies, and crafts. “A city is a place for people. We are very human-centric,” says Russolillo.

People are already living in Laguna. Planet Smart City completed the first phase of Laguna in January 2018, with the final phase to be delivered by 2021.
Poor Mental Health on Site

Construction companies must act now to protect employees.

The prevalence and impact of poor mental health in construction has fortunately seen greater industry discourse in recent years. However, a lot more can still be done to address the problem and avoid the tragic consequences of high stress levels, which can include loss of life. According to RMIT University’s 2017 conference paper, “Suicide in the Construction Industry: It’s time to talk”, 1,419 construction employees committed suicide between 2011 and 2015 in the UK alone.

Employers can no longer claim to be unaware of the problem, or the procedures they can adopt to protect their employees from the possible effects of poor mental health. It is well-established with other disease claims types that, in determining liability, a court will ask whether an employer took reasonable steps to protect its employees, with reference to the accepted level of knowledge at that particular point in time.

Occupational illnesses such as mesothelioma, noise-induced hearing loss, and hand-arm vibration have shown how increased awareness usually means there will, at some point, be a sharp rise in claims. Hard statistics are not yet available but, anecdotally, an increase in the number of stress-related employers’ liability claims in the construction sector is already being seen.

Fortunately, there are more resources to assist employers in managing this risk and identifying what “reasonable steps” they should take — such as conducting risk assessments, staff surveys, providing training, and offering confidential assistance. Construction employers who don’t address this now run a high risk of causing psychological injury to employees in the future, and then dealing with the claims that will inevitably follow.

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A New Approach to Mental Health

Leading players in Australia are taking a preventative approach to mental health problems.

The last decade has seen a significant shift in attitudes toward mental health in Australia’s construction industry. One of the catalysts for change has been the charity MATES in Construction. Set up in 2008 in response to the disproportionately large number of suicides among construction workers, MATES has since trained nearly 170,000 people and managed more than 8,200 cases.

At the heart of a preventative approach is the provision of information and training for employees — most importantly, managers and supervisors. Helplines and counseling for employees and their families are also now commonplace in construction, and one of Recovre’s most popular training courses is in mental health first aid.

Studies demonstrate that there is a strong business case for mental health training. Providing four hours of mental health training to managers resulted in a potential return on investment of 9.98 times the cost of that training, according to a medical study on the Australian Fire and Rescue Service, published in 2017 by the international peer review journal The Lancet Psychiatry.

Some construction companies are going even further. For instance, Recovre is working with a major contractor as it implements a complete health, safety, and well-being program on a huge government project that will run over several years. The program will include mandatory physical and mental health training as part of the induction process, and a psychologist on site once a month.

Ten years ago, construction companies used rehabilitation services sparingly, after a physical injury had occurred and generally only when employees were struggling to return to work. Today, they are creating programs to prevent injuries and improve the overall wellness of employees, both physical and mental.

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Healthy Buildings

Progressive companies are looking for buildings that improve their employees’ health and well-being. Progressive contractors are looking to build them.

Words by Kristina Smith

The buildings we work in have a profound effect on our health, mood, and, ultimately, our productivity.

A 2018 report by the World Green Building Council looked at 11 office buildings around the world to assess whether green features aimed at delivering health and well-being benefits actually worked. The report found that occupants had fewer days off and felt happier and more productive.

There were financial benefits, too. For instance, an office refurbishment for Sherwin Williams in San Salvador that added natural light and acoustic insulation, improved air quality, and used low-volatile organic compound (VOC) materials, led to a 44% reduction in absenteeism equating to $85,000 savings each year. Cundall’s WELL-certified building at One Carter Lane in London led to a 58% reduction in absenteeism and a 27% drop in staff turnover, saving £200,000 ($158,000) a year.

The WELL Building Standard is one of a handful of certification schemes for healthy...
“WELL fits with our values. We say that we build for a better society, we commit to customers, and we care for life. It felt right.”

Sofia Ekerlund, leasing manager with Skanska Sweden

buildings. Set up in 2014 by US organization Delos Living, it looks at hundreds of building attributes, grouped into seven concepts: air, water, nourishment, light, fitness, comfort, and the mind. As of June 2019, it had certified 179 projects, with nearly 2,000 registered in 51 countries.

Fitwel is an alternative standard, while researchers from the Healthy Buildings Program at the Harvard T.H. Chan School of Public Health have developed a simpler approach called 9 Foundations.

Growing Support
Several built environment giants have thrown their weight behind the healthy building movement. In 2015, Lendlease formed a global alliance with Delos, promising to pioneer the standard in Australia, Asia, the US, and the UK.

Lendlease, Arup, CBRE Group, and Sino-Ocean Group were all founding members of the research program, Well Living Lab, which promotes the study of the relationship between health and time spent indoors.

Multinational developer and contractor Skanska is also a devotee of the WELL Building Standard. “WELL fits with our values,” says Sofia Ekerlund, leasing manager with Skanska in Sweden. “We say that we build for a better society, we commit to customers, and we care for life. It felt right.”

In Sweden, Skanska trialed the WELL principles in its own office and is applying some of the lessons it learned in the construction of a new office building, Epic, in Malmö.

Features include a bicycle hotel with showers easily accessible on ground level and towels from reception, a central staircase to encourage people to walk to their floors, and a restaurant selling healthy food.

“They are small things, but I think they will make a big difference,” says Ekerlund.

Because Sweden is already well-advanced in terms of environmentally friendly and sustainable building design, some aspects of healthy building design were already “the norm” there, says Ekerlund.

“It’s important for us in Sweden to be leading the way in terms of the environment and how we do things,” says Magnus Friberg, a partner at Marsh JLT Specialty in Sweden.

Skanska’s Epic building — as well as its new HQ in Warsaw (see box) — will also benefit from biophilia (connecting with nature), an open square between buildings with green areas and small architecture, and an outdoor amphitheatre, create public space within the office complex.

Although biophillic design is covered in the WELL standard, Skanska has elected to give it extra prominence. “This is one of the categories that we believe will really make a big difference for our buildings in Sweden,” says Ekerlund.

2,000 projects (approximately) registered in 51 countries to WELL Building Standard, as of June 2019.

Building Healthy
For any contractor building toward WELL certification, there are some additional aspects they need to consider, compared to a standard build. Selection of materials is very important. For instance, there are limits for VOC levels in paints, sealants, and insulation materials.

Although working with materials that don’t release toxic chemicals brings health benefits for construction workers, they can introduce quality-related risks, warns Friberg.

“With new materials, it’s important to understand them and install them in the right way,” says Friberg. “We have had examples here in Sweden where natural materials in combination with insulation in facades have been installed incorrectly in housing developments and caused trouble down the line.”

The WELL standard also requires contractors to have a tight control on dust. The standard’s construction pollution management section tells contractors to limit dust, keep stored materials clean, and to clean or protect new heating, ventilation, and air conditioning (HVAC) ducting.

It’s also worth noting that the WELL standard requires collaborative working during the delivery phase to find the right materials and solutions, which could introduce difficulties for contractors who aren’t used to working in this way.

Demand for Healthy
WELL is an onerous badge to acquire. It requires that the building be tested once in use, so the occupants’ fit-outs must also meet certain requirements. For that reason, some developers are choosing to construct buildings that could be WELL certified, without going the whole way.

However, if Skanska’s experience is anything to go by, healthy buildings are definitely a pull for would-be tenants.

“Although it’s very hard to say that WELL is the only reason for the building’s popularity, I have worked for 12 years in this market and we have never had a building that we let out this early,” says Ekerlund of Skanska’s Epic development.

Skanska’s Warsaw HQ

Skanska is pioneering healthy buildings around the world. Its Warsaw HQ, located in its Spark C building, became Poland’s second WELL-certified office (BuroHappold just pipped it to the post with its Warsaw office).

Its features include human-centric lighting that harmonizes with natural circadian rhythm (or body clocks), a ventilation system that gives 30% more fresh air than standard systems, and 850 living plants. Skanska also describes it as “fully connected,” having invested €1.5 million ($1.7 million) in smart technologies.

German real estate fund KGAL Investment Management has purchased the first phase of Spark, building C — its first purchase in Poland. Building B has started to be used, and building A, a high-rise, has yet to be constructed.

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The drive toward digitalization and automation isn’t just about increasing productivity. It’s also about attracting the next, tech-savvy generation to the industry by making construction sites better places to work.

Already, new technologies are demonstrating the benefits that digital construction could bring to the workforce, whether through the use of robotics, wearable tech, virtual reality (VR), or 3D design.

In this article, we look at some examples and briefly consider what new risks these emerging technologies could introduce.

Digital construction improves conditions for those working on site and reduces the risk of injury.
Any technology that reduces the strain on the human body could make a huge impact. For example, removing humans from back-breaking work can reduce injury risk, with back problems cited as the most common injury in US construction by the Laborers’ Health & Safety Fund of North America.

Tying reinforcing bar (rebar) for steelwork is a case in point. It’s injury-prone and unpopular, and finding enough skilled people to do it is getting harder. In 2017, Stephen Muck, owner of Brayman Construction Corporation, which builds bridges, roads, and dams, devised his “TyBot”: an autonomous robotic arm rigged to a gantry, which uses artificial intelligence and machine vision to locate where lengths of rebar need to be tied together at laps.

Muck estimated that the TyBot could save up to 50% of the bridge-deck rebar labor function, so he paid experts to develop a prototype, which demonstrated the concept’s feasibility. TyBot has since been deployed on bridge projects. In April 2019, a second robot was unveiled (the “IronBot”) which lays rebar, another heavy manual task.

Such machines also bring commercial benefits, says Adrian Pellen, senior vice president and infrastructure segment leader in the US and Canada for Marsh JLT Specialty. “Workers’ compensation for injury and illness adds significant cost to construction projects, with huge variations among different regions.

“In Canada, construction insurance premiums will typically comprise around 1% of a project’s cost for a large project but, in New York, where workers’ compensation premiums account for a significant portion of all construction insurance, costs can be as much as 12%.”

Raising Awareness

Technologies that heighten worker awareness on site are another fast-developing area. For example, networked wearable devices can monitor a worker’s fatigue or warn that machinery is too close.

Three current examples include: the Spot-r system by Triax, which tracks where workers are, emits alarms, and logs falls; SmartCap, which uses electroencephalography to monitor drowsiness in machinery operators; and Cat Detect, Caterpillar’s proximity detection system for plant.

VR can be used to raise awareness of potential hazards before a worker even gets on site through immersive site-safety training. The Saskatchewan Construction Safety Association (SCSA) in Canada, an industry-funded training provider, launched “Hazard ID VR” training, which envelops students in a workplace scenario and challenges them to spot hazards in a game format.

“Telling people how to stay safe isn’t enough to overhaul a culture that has historically struggled with safety,” says SCSA president Collin Pullar. The tool is very popular among young trainees, adds Pullar, which is positive because 25% of injury claims to the Saskatchewan Workers’ Compensation Board involve workers under 25.

“Data and analytics have allowed us to minimize clients’ full cost of risk and helped to eliminate risk of causing financial loss to projects.”

Adrian Pellen, senior vice president and infrastructure segment leader, Marsh

Embracing Digitalization

Meanwhile, the use of Building Information Modeling (BIM) or advanced 3D modeling can improve how the construction of a building is planned. As well as helping to avoid scheduling clashes that can lead to rework and unplanned activities, it highlights potentially hazardous works or sequencing to designers and constructors.

For instance, some constructors are using BIM to communicate to teams of workers before they physically start work on site. This helps to identify where the order of work could be improved or interfaces with other trades could cause problems.

Digitalization can increase cyber insecurity, as more of a company’s data floats around in the cloud or is transmitted from device to device. The potential impact to on-site activities could be just as great as for those in the office.

The industry needs to enter a steep cyberlearning curve as it digitizes, Pellen adds. “Insurers look at data on a retroactive basis, but in the aggregate. The next level up is looking at a basket of different construction projects, particularly around worker injuries, and using prior loss experiences and predictive modeling to figure out where we’re having the losses, including from what geographies and which contractors. This will help our clients isolate project participants with poor safety performance records, which was more difficult before when just looking at aggregated data.”

For instance, the proprietary web tool Data Navigator, developed by Marsh, provides its clients with unprecedented insight into their construction projects (see box).

Fed by data recorded during an owner-controlled insurance program, Data Navigator provides analytical and predictive modeling based on information including enrolment, safety observations, claims, and past project characteristics. By allowing clients to drill down by project, location, and contractor, the tool has also made it easier to evaluate the performance of particular contractors, enabling targeted efforts to reduce the potential for risk.

“It has been quite successful, especially on large projects in the US where these costs are extraordinary,” says Pellen. “Data and analytics have allowed us to minimize clients’ full cost of risk and helped to eliminate too many bad apples that are at heightened risk of causing financial loss to projects.”

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Does the diversity of a team affect well-being and performance? Three women draw on their industry experiences.

Words by

Kristina Smith

Construction companies are waking up to the fact that more diverse teams lead to better results. In some cases, clients are demanding diversity. For instance, in the US, federal agencies are targeted to award 5% of their prime contracting dollars to women-owned small businesses.

For others, diversity is just good business sense. Research from McKinsey in 2017 found that companies in the top quartile for gender diversity were 21% more likely to experience above-average profitability.

“Getting different perspectives helps to improve decision-making and integration with clients,” says Katie Cromie, a recent graduate in Marsh JLT Specialty’s construction team in New York. “If you all think the same way, you may not come up with the best solution.”
Well-being is a significant piece in the diversity-productivity puzzle. The way people feel and behave at work has a huge impact on both individual and team performance.

“Being in a team where there are other people like you gives you a sense of security; you aren’t looking around, wondering whether you should be there,” says Shannon Whalen, VP, construction casualty placement, for Marsh JLT Specialty in New York. “That security leads to a sense of happiness and feelings of self-worth and that makes you more productive.”

But it isn’t just gender balance that is important, as explained by three female construction professionals, all with experience of working in a variety of teams, who spoke out on what contributes to their well-being and productivity.

**Esin Pektas, architect and engineer, New York**

Esin Pektas is extremely well-placed to talk about the dynamics of different teams. A qualified architect and engineer, she started working in architectural offices in Turkey when she was 16. Since then, she has worked in major design practices in New York and China, has created women-only projects alongside Syrian refugees, and now runs her own design and construction management business, supported by her LGBTQ+ friendly design office in Istanbul.

“I am most productive when everything is balanced,” she says. “I love drafting and designing but I love building too. I like working inside and outside. A good team needs a balance of genders, age, experience, race, culture, and education levels.”

Pektas believes firmly that teams should be gender balanced, not only in offices but out on site, too. “When you have women workers, LGBTQ+ workers, and people with different life experiences, language and behavior changes,” she says. “Everybody’s awareness improves and the use of space changes.”

Even with her many years of experience — 15 in New York City alone — Pektas still finds that she has to prove herself in new work environments. “There’s no harassment, but people can be condescending,” says Pektas.

“In the office, everybody pretends to know everything, nobody dares to ask questions in case it shows a lack of knowledge. If you are young, a woman, if you have a foreign accent... it takes months sometimes. However, proving yourself on site takes much less time than in an office,” says Pektas. “You cannot fake it on site. Your knowledge and experience become obvious very quickly.”

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**Anna Olliver, tunnel engineer, Doha**

For Anna Olliver, design lead and tunnel engineer for the international consultancy firm, Jacobs, in Doha, it isn’t diversity of gender as much as diversity of culture that makes for good team dynamics.

A sixth-generation underground worker whose father was also a geotechnical engineer, Olliver is currently working with a group of engineers and other professionals from all over the world on the construction of a huge sewer in Doha. There are women working on the project in various roles, says Olliver, although the proportion is lower here than in Sweden where she studied.

Over her 15-year career, Olliver has encountered different attitudes toward female engineers in different regions. As a junior engineer, she admits that the macho culture in some European countries made visits to some sites daunting.

“However, the diversity overall, in terms of cultures and nationalities, works really well here because it has brought a lot of different viewpoints in,” she says. “We have lots of interesting discussions and some of the solutions we have come up with have been very positive, both from a management and technical perspective.”

**Zoe Hodgson, electrical engineer, Chelmsford (UK)**

When Zoe Hodgson started her apprenticeship as an electrical engineer, aged 16, she was the only girl on the course. “It was a bit of a culture shock, not to have any girls there,” she says. “Guys talk about things that you would not talk about with girls. There is a lot more banter. Having females definitely softens the atmosphere.”

Hodgson, now with seven years’ experience under her belt, is today in the unusual position of working on a site that is almost balanced in terms of gender: a vast new Jehovah’s Witness live-work community in Essex, UK, where around 40% of the workforce is female.

“I think you get more variety of skill sets when there are men and women on a team, and also people from many nationalities.”

**I think you get more variety of skill sets when there are men and women on a team, and also people from many nationalities.**

Zoe Hodgson, electrical engineer, Chelmsford (UK)

She contrasts that with her time as an apprentice where she was one of only a few women at the company. “A lot of guys had the idea that it was not a girl’s job,” she says. “I just ignored the comments and showed that I could do the job. Once I had showed them that I could do things as well as they could, sometimes better, they came to accept me.”

Hodgson would like to see more young women following her into the electrical trades. “I wish that more people knew that girls can do it, as well as guys. If there were more women in the industry, it would make sites nicer places, in my opinion.”

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Kristina Smith is a construction specialist freelance writer.
Delivering Specialty Through Partnership

Marsh JLT Specialty brings local knowledge to a global marketplace.

With a borderless and truly collaborative approach, our regional construction practitioners deliver optimum risk transfer solutions across the breadth of building, engineering and civil works projects. Working hand in hand with global experts, our local specialists deliver risk and insurance solutions tailored to each client’s unique challenges.