Willis Towers Watson

Construction risk insights

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A nuclear revival

The nuclear industry in the UK is undergoing a major revival. The first of some 19 GWe of new-generation plants being planned are expected to be on line by 2025. The government aims to have 16 GWe of new nuclear capacity operating by 2030, with possibly little or no restriction on foreign equity.

Following confirmation by the UK Government that Hinkley Point C will go ahead, this will be the first new build nuclear power station in the UK for a generation.

The energy company EDF expects the first reactor at Hinkley to be operational in early 2026, 115 months after the decision to proceed. The government has put the cost at £18 billion including normal contingencies, of which £2.4 billion has already been spent.

Hinkley Point C will lead the way for more new nuclear projects in the UK with the Horizon project at Wylfa in North Wales, EDF/CGN at Sizewell C in Suffolk, the troubled NuGen at Moorside in Cumbria and CGN at Bradwell in Essex all in the running to be the next new plant. At least two of the new major projects have a reactor vendor involved, which have substantial equity in the project, although the nature of these arrangements are under review following the much published problems at Toshiba and Westinghouse.

Investment and technology

The total investment for these nuclear projects will likely exceed £60 billion over the next 20 years. The projects will potentially create over 100,000 new jobs during the construction period, which could be up to 10 years for each project. This could lead to issues around accessing an already limited qualified talent pool especially if the UK goes ahead with a hard Brexit.

The Brexit issue also raises the UK's potential withdrawal from Euratom which could cause further delays to proposed new build programmes.

Major European players in the sector include EDF Energy and Engie (although they have now pulled out of the NuGen project in Cumbria). These are often in joint ventures with Chinese and Japanese partners, with the following technology being considered and undergoing Generic Design Assessment:

- UK EPR, submitted by Areva and EDF
- Westinghouse's AP1000 (recent developments could cast doubt on this)
- GE-Hitachi Nuclear Energy's ESBWR
- CGN Hualong One – UK version of Chinese PWR Design

The UK is also exploring new opportunities like small modular reactors (SMR's), which hold the promise of low cost, low carbon solutions that do not need to be located near major water supplies.

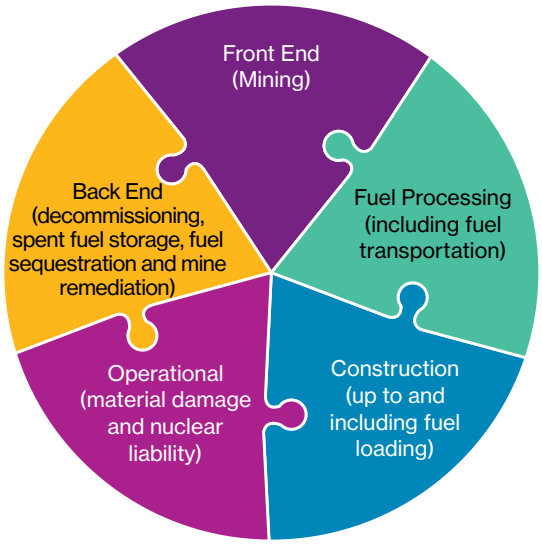
In March 2016 the Department of Energy & Climate Change (DECC) called for expressions of interest in a competition to identify the best value SMR for the UK. All proposals will need to go through the Generic Design Assessment process in the UK.

What does this mean from a risk and insurance perspective?

The construction of a new nuclear power station is a highly complex undertaking. From a risk and insurance perspective, there are a number of key considerations, but not limited to:

- High levels of regulatory control and long development periods
- Complex insurance laws dictated by International Conventions
- Pressure to provide higher capacity to comply with new laws
- Limited construction volumes and limited loss experience
- Highly engineered insurance underwriting
- Long construction periods and the heavy civil nature of works
- Testing, commissioning and maintenance exposures
- Transportation, storage and interfacing with other markets
- Security control and remote project sites
- Cost overruns (EDF have already announced for example that Hinkley Point C will likely be £1.5 billion overbudget and delayed by 15 months)
- Construction/Operation interface risks
- Human capital considerations across the project period, including operational phases

When insuring a nuclear project it is important to consider the whole project life cycle from mining, fuel processing, design, construction, operation, decommissioning and sequestration. There is little point in viewing each part of the cycle in isolation. Every part of the jigsaw is required for a full picture of risk exposure.



Early consultation

It is vital that insurance and risk experts are brought in to the equation at the earliest opportunity so that proper consideration can be given to a risk profile that will meet underwriting requirements.

This should include risk engineering, looking at contractual issues and insurance indemnities, engaging with the nuclear pools and giving serious thought as to the human elements of the project.

For example, the skills shortage and subsequent fight for talent to attract and retain the right people for the whole project duration is a key factor and one that is often overlooked.

Recent experience in Europe, and indeed elsewhere in the world, has shown that the building of mega nuclear projects can also lead to difficulties in terms of time and cost overrun and associated problems with quality assurance, quality control and supply chain issues to name but a few.

There are also issues to consider in terms of technology, especially where the chosen solution may be prototypical, untried or unproven in design.

The potential advent of commercial SMR's will also give rise to new and unique risk factors, particularly if these are being built in urban locations where liability issues may be far higher than projects in remote areas.

Nuclear projects may also be considered as high profile targets for terrorists so "terror-proofing" these projects will be another key consideration.

Add to all of this the increased use of new technology such as additive manufacturing, robotics, drones, BIM and cyber risk and it is clear that risk identification and avoidance, coupled to a suitable risk transfer solution will be key to a project success.

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Source:
http://www.world-nuclear.org/information-library/country-profiles/countries-t-z/united-kingdom.aspx

Using surety as an effective form of capital

Q&A with Scott Hull, Global Head of Surety and Goly Jafari, Global Head of Surety Operations, Willis Towers Watson

Suretyship plays a vital part in the functioning of government and commerce and has a long history going back thousands of years.

Surety bonds can be used to guarantee the performance of many obligations from construction or service contracts to licensing and commercial undertakings. The bonds are normally required under the terms of a contract, or in accordance with mandatory legal requirements. They are designed to protect the beneficiary from the default or insolvency of the principal up to the limit of the bond.

An increasing proportion of public and private contracts today require surety bonds and guarantees. The consistent need for these products can reduce the availability of bank credit lines and impact the financial flexibility required for working capital purposes and to finance investments. We talk to Scott Hull and Goly Jafari, Willis Towers Watson's global head of surety and global head of surety operations on using surety as an effective form of capital.

Q In its simplest form, what is suretyship?

SH: It's a specialised line of insurance created whenever one party guarantees the performance of an obligation by another party. There are normally three parties to the agreement: the principal (the party that undertakes the obligation), the surety (who guarantees the obligation will be performed) and the obligee (the party who receives the benefit of the bond.

Q What is a surety bond? Why are bonds required?

GJ: A surety bond is essentially an agreement that provides monetary compensation or completion of contract if the principal fails to perform the acts as promised. It is for this reason that they provide the most benefits.

Conditional bonds and guarantees are subject to the law of suretyship, which is itself derived from English case law and general corporate and commercial law principles. For example, road and sewer bonds are required by local authorities under section 38 of the Highways Act 1980 in England and Wales, and section 21 of the Highways Act in Scotland. Private owners and project lenders may also request bonds as it offers them the assurance that a project will be completed.

Q What advantages does a fully bonded contractor offer to public and private owners?

SH: A bonded contract helps safeguard an owner's investment in a project by providing a guarantee that the contractor's obligations will be met. The bond acts as a pre-qualification of the contractor's ability to the owner and surety's due diligence determines competency of the contractor.

The bond ensures that all subcontractors, suppliers and vendors are paid for the services and materials provided on the project. Contractors are also more likely to complete bonded projects since their surety will require their corporate and personal indemnity.

Q How is suretyship different from common lines of insurance?

GJ: With traditional insurance, risk is transferred to the insurance company. The insurer takes into consideration the fact that a certain amount of premium charges will be paid out in losses and the key underwriting goal is to spread the risk.

However with suretyship, the risk remains with the principal, who is required to enter into an indemnity agreement to reimburse the surety for all compensation paid by the surety. The premium charged is more of a 'service fee' for the use of the surety's financial backing and guarantee and the underwriting is based on rigorous financial credit qualifications.

Q Why is surety generally a better option than bank letters of credit?

SH: Unlike surety, letters of credit do not offer the owner a guarantee of completion on a construction project, nor do they offer a guarantee to subcontractors, suppliers and vendors that they will be paid in the event of default.

The letters require a contractor to pledge specific liquid assets and diminish the contractor's line of credit because they appear as a liability on the contractor's financial statement. Surety bonds, on the other hand, do not diminish a contractor's borrowing capacity.

Finally, while surety bonds remain in force for duration of contract, letters of credit can contain a date-specific expiration and may contain evergreen clauses for automatic renewal, with related fees.

Q What are the main surety products out there?

GJ: There are a number of products available including: bid bonds; performance bonds; advance payment bonds; environmental remediation bonds; customs bonds; retention bonds; maintenance bonds, supply bonds, financial guarantee bonds, tax bonds, and other miscellaneous bonds.

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Hardhats, high tech and the value of new technology

Paul Becker, construction global industry leader, talks about the challenges and opportunities presented by new technology.

The construction industry's history of slow adoption of new technologies may offer advantages in finding the right risk/reward balance. The cautious approach is being increasingly tested by a variety of new quickly advancing technologies.

I've been in construction a long time and admit that at times we may deserve our industry's reputation of not being early adopters of new technology. We're no strangers to high tech, of course. CAD, BIM, drones: we're doing fine, thanks, in the 21st century. But as long as people use buildings, roads and other infrastructure, construction will be mostly a physical job in the physical world. Bricks and mortar, hammers and nails, hardhats and lunchboxes. So forgive us if we tend to lean toward technology you can grab with both hands.

However, the industry now faces significant productivity challenges; a recent **McKinsey & Company study**[1] shows that the typical large project in mining, infrastructure and oil and gas construction takes 20% longer to complete than scheduled and runs 80% over budget. Construction productivity has not kept pace with overall economic productivity, which has led to volatile financial returns for contractors.

We need to seek new and better ways of doing things, and that includes the use of cutting edge technology, for the simple reason that the opportunities are so great. With opportunities come risks, of course. So here we review both – the risks and opportunities – presented by a handful of technologies, and we consider the case for caution. While each one of these technologies merits a much longer discussion, maybe this will start some useful conversations.

BIM

Building information modelling or management (BIM) is deeply embedded in many parts of the construction sector but still presents technological issues that are gradually coming into focus. The sharing of documents and scheduling tools that are part of BIM can help prevent bottlenecks and identify critical dependencies in work and material deliveries. The collaborative nature of BIM, however, can be challenging. Sharing visibility into a project may mean sharing liability. Joint planning tools imply joint responsibility to the point of allocating responsibility when problems arise can be problematic. Bidding on jobs is all about privately weighing estimates about time, effort and resources. It is traditionally a non-collaborative undertaking. And yet collaboration may be something of a requirement in the era of BIM.

Opportunities

- Instant communication and access to information
- Avoid bottlenecks and scheduling mishaps
- Role clarity
- Efficient project management

Risks

- Difficulty in allocating responsibility and determining liability
- Complicating the bidding process by revealing work details
- Cyber security issues

Cyber security is an issue for any online system and **BIM is no exception**[2]. As anyone following the headlines will note, cyber-crime rises along with cyber dependency. The more we go online, the more we are exposed to cyber vulnerabilities. A jewel thief would be quite happy to hack into the blueprints for a museum, store or other facility where valuables are stored. Like it or not, the construction industry is joining other industries, from retail to banking, where cyber security experts fight ongoing battles with cyber criminals, and owners of data being sought face liability questions in the cyber era: who is responsible when data is stolen? Those who created it? Those who store it? Those who access it? These questions can be as difficult to avoid as they can be to answer.

Drones

The drones are coming and the construction industry is one of the leaders of the charge. According to **recent reports**[3], the industry accounts for a commanding proportion of the waivers the Federal Aviation Administration (FAA) has granted for commercial drone use. The FAA is **now rolling out**[4] new rules that will likely broaden the use of drones for many commercial and industrial applications. The value of using drones to make inspections in hard-to-reach places is obvious. Next, drones will be arms in the sky, delivering materials to the workers in those same places. At some point, those responsible for the drones will have to look into aviation insurance coverage – something they may have never considered. The risks associated with drones will have to be addressed, whether companies develop their own drone fleets and operators or simply hire a drone service provider.

Opportunities

- Inspections of work and work areas
- Material delivery
- Documenting project progress

Risks

- Air safety issues
  - Air traffic control on the job site (including unauthorized drones)
  - Protection from crashes – property and liability issues
- Privacy issues
  - Supervisors looking in on works (possibly subject to union negotiation)
  - Inadvertent recording of off-site activity

The appeal of drones is that no human passengers or pilots are required – but humans end up having access to everything drones see and record. The privacy implications raise serious liability concerns. The privacy of workers on a jobsite may be an issue. So is the privacy of anyone working, living or traveling through the vicinity of a jobsite where drones may be in use. If a company drone sees some suspicious activity are they obligated to report it? If some embarrassing moment is captured on a drone's video and then a clip of it goes viral, where might responsibility rest should the result include reputational damage? These are just a couple of the questions companies should look into before they fly ahead with their drone plans.

Wearable technology

There's a lot to keep track of on a job site, including people. On some job sites today, workers wear transmitters on their hardhats so the job supervisors can keep track of them electronically. And on a hot day, everything becomes harder – including making sure that everyone on the jobsite is hydrated and no health issues arise. At least **one insurance carrier is supporting efforts**[5] by getting workers to wear health monitoring devices that can transmit an alarm if a biometric trigger (related to body temperature or heart rate, for example) goes off – or if a worker is motionless for a certain amount of time.

The potential advantages of 'wearables' in the workplace in terms of efficiency and safety are clear. Those employing these technologies, however, may also want to reserve some risk management resources to monitor and track the potential liabilities that could develop from privacy and liability issues.

Opportunities

- More efficient deployment and management of workers
- Immediate biofeedback to prevent health problems from going undetected, allowing first aid to be delivered immediately
- More data available to research accidents and workplace injury claims

Risks

- Privacy issues for workers on and off break
- Health monitoring and HIPAA issues – laws protecting the privacy of health data
- Health monitoring responsibility and liability issues

Health care providers aren't the only companies that have to consider the laws regarding the privacy of personal health information. Companies that provide wellness programs (with the intention of improving employee lives and productivity) face these issues today. They must be aware of laws preventing discrimination according to physical appearance and condition. They must be extremely careful with any personal information – of any kind – they keep about individuals. Health monitoring on the job raises these and other issues immediately: who sees the biometric data? How is it stored? Who is responsible for its security? Can health monitoring be made mandatory? If for reasons of privacy a worker does not wish to be monitored, can an employer change their assignment to one with lower risk? These are potentially questions, for risk managers, lawyers and unions.

The question of medical responsibility arises at the same time. If the intention of a health monitoring program is to protect the safety of employees, how far does that protection go? If health monitoring reveals a chronic health condition that the worker and the employer were previously unaware of, who is responsible for any change in work status that may result?

A final set of questions loom in regard to investigating claims. When a construction company launches an incident investigation, workers on site are often reluctant to get involved in the interest of potentially protecting a co-worker or themselves. With workplace tracking, the employer may know for a fact that a given worker was close to the scene when an incident occurred. That may put pressure on them to divulge information they might have wanted to keep quiet, whatever the moral implications. It's important to remember that technology often has an impact in areas it was never intended to affect at all.

Laser scanning and its applications: autonomous vehicles

Measure twice, cut once – the rule in carpentry is a reminder of how crucial accurate measurement is in construction work. Laser scanning, the technology behind self-driving vehicles, can raise measurement accuracy to new heights. Laser scanners can measure every aspect of a space at any stage of construction. The potential value is enormous. Lines that start out straight don't always stay straight in the real world and in complex projects, laying conduit, plumbing and anything that requires precise placement can be problematic. Laser scanners promise precision at any stage of construction. The ability to accurately register a 360-degree view of the world, as the technological basis for self-driving cars, heralds the development of autonomous construction vehicles.

Opportunities

- Laser accuracy
- Measurement of complex spaces
- Use of self-driving construction vehicles

Risks

- New technologies to learn, new expertise required, dependence on specialized equipment
- Liability and reliability issues facing self-driving, autonomous vehicles

It's probably safe to say that, costs aside, the opportunities represented by laser scanning in taking measurements during construction outweigh the risks. Taking the next step and using autonomous vehicles, which employ laser scanning to act as the eyes of the self-driving machinery, may be another matter. The appeal of autonomous backhoes and cranes is clear – the work can be dangerous and extremely precarious. But **news reports**[6] of the first death of a driver of a semi-autonomous vehicle – while possibly pointing to human error more than machine error – serve as a reminder of the dangers and liabilities courted by early adopters.

VR training

One of the largest construction equipment rental companies we know offers virtual reality (VR) training for users of hydraulic lifts, scissor lifts and other heavy equipment that can pose a danger to operators and people nearby if not operated correctly. Virtual reality offers an immersive experience akin to the 3D reality of the job site without the physical dangers. It potentially offers access to different scenarios and situations that a trainee can expect to find in the real world. And it is one of the most engaging training technologies ever devised. Your attention remains focused when you're wearing 3D goggles and begin interacting with the virtual world.

Opportunities

- Engaging and immersive training experience
- Hands-on practice with no risk – and no wear and tear on equipment
- Monitoring training results and progress

Risks

- Over confidence, complacency and desensitization
- Liability for assuring sufficient training before workers use dangerous equipment

Yes, VR is more like real life than pictures in a training manual. But it is not the same as real life, and VR shouldn't be taken as an actual real-life experience. VR offers what programmers have imagined. Real life offers everything we can imagine and more. Which brings me back to where we started. Construction is physical reality. The virtual, digital, cyber and wireless world is no doubt part of our reality and when it comes to adopting new technology, we'll move ahead. But we'll keep our yellow and black caution signs in mind.

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[2] Building Information Modelling (BIM): Addressing the cyber security issues, **http://www.theiet.org/sectors/built-environment/topics/building-information-modelling/articles/bim-cyber-security.cfm**

[3] Construction drone use taking off as industry scores 40% of all FAA exemptions, Construction Dive, **http://www.constructiondive.com/news/construction-drone-use-taking-off-as-industry-scores-40-of-all-faa-exempti/417421/**

[4] Here's why the drone industry just had a milestone moment, Fortune, **http://fortune.com/2016/06/21/drone-faa-rules-commercial-business/**

[5] AIG Sees Profits in Tracking Workers' Moves, **https://www.wsj.com/articles/aig-sees-profits-in-tracking-workers-moves-1452084000**

[6] NHTSA probes Tesla self-driving cars after fatal crash, The Detroit News, **http://www.detroitnews.com/story/business/autos/2016/06/30/tesla-model-crash/86570186/**

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