February, 2019

U.S. Construction Industry Risk Outlook

In this Issue

Welcome

As we enter 2019, we see the construction insurance marketplace innovating as it continues to face threats from a changing world. Natural catastrophes continue to dominate the headlines from a macro insurance perspective. Indeed, 2017 and 2018 were the costliest back-to-back years on record, totaling $237 billion in private and public insured losses. Globally, 2018 insured natural catastrophe losses are estimated to exceed $90 billion, with 65% of these losses taking place in the United States. These include the tragic Camp and Woolsey wildfires ($17.5 billion), devastating hurricanes Michael and Florence ($15 billion), and numerous severely damaging convective storm losses ($15 billion) which caused loss of life and property damage from coast to coast.

Despite these record setting losses, the overall market remains stable and resilient, with $595 billion in global reinsurance capital available. With that said, this capacity is increasingly leveraging data and analytics to target loss drivers; and our market analytics are tracking moderate rate increases and a firming of the market in the most challenged lines. This report provides a detailed analysis of all major lines impacting construction; including notably challenging products and segments like catastrophe-exposed Property and Frame Property overall (fixed and under construction), Automobile, Lead Umbrella/Excess, and Architects & Engineers Professional Liability (A&E).The A&E dynamic is concerning for a host of reasons, notably in the context of complex projects.

The continued expansion of more closely aligned design and construction delivery methods, as well as the utilization of more data, analytics and technology platforms will drive better outcomes in price, schedule and quality. But the current state of the A&E professional marketplace has been described by many experts as dire. To exacerbate these developments, there are early warning signs that the multidimensional nature of construction risk is causing a knock-on effect into other lines of construction-specific insurance including Builders Risk, General and Excess Liability, Contractor's Professional and Subcontractor Default Insurance. More broadly, as the construction marketplace continues to grow, we see both contractors and owners working to achieve greater efficiency. Last year's report quoted a McKinsey study highlighting the industry's opportunity to improve productivity by 20%.

The global infrastructure technology, or Infratech, marketplace has exploded with more than $20 billion in venture investment received by the full universe of these firms. Simultaneously the risk and insurance industry is heeding calls for modernization as clients demand greater value for money invested in annual premium payments. Insurance technology, or Insurtech, is enjoying an international moment in the sun, with the space collecting nearly $10 billion in venture funding over the past three years. As the industry leader in construction risk advisory and brokerage, Aon sees these trends converging to make a tangible impact on the risk management and performance security marketplace for construction activity in the United States. As demonstrated in the A&E example above, carriers are increasingly able to stratify and price risks at an incredibly granular level, deploying capital where they believe outsize returns can be generated and pulling capital back from specific risks, and in some cases entire classes of business, where their objectives cannot be attained.

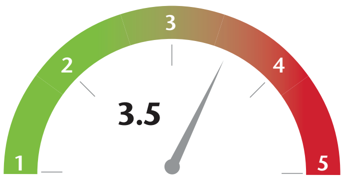
We are working with clients to develop new and innovative approaches in the face of these challenges, utilizing Infratech and Insurtech to tell a new story to the marketplace. As one example, these converging trends have created an opportunity for clients to meaningfully deploy capital to hedge against the universal peril of delay. We profile Aon's parametric weather risk solution as an example of an approach that clients are deploying to hedge against unfavorable conditions and avoid liquidated damages if contractual terms cannot be achieved.

Against the backdrop of additional industry change, we are excited to present our outlook for 2019, as our clients deploy new risk strategies that improve return on invested capital, promote jobsite and organizational safety, and ultimately achieve successful outcomes. We look forward to engaging with you this year to take advantage of this change for the benefit of your projects and overall business.

Respectfully,

Aon Construction Services Group Risk Advisory and Brokerage Team

Aon
Empower Results®



1 Highly Favorable
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State of the Market Update

CASUALTY

Primary Casualty

The Domestic market for primary construction risks has remained stable and competitive through 2018. However, several unfavorable trends in specific areas first seen in 2017 and earlier, have continued though 2018 foreshadowing a possible hardening of the market. Aon sees underwriters continuing to demonstrate their ability to compete aggressively for risks with favorable loss history and strong safety culture. This is especially true for larger risks that recognize the long-term value of retaining expected losses.

In 2018 the market saw several examples of multi-year rate commitments included in loss-sensitive programs on favorable risks. Conversely, clients with adverse loss history continue to see the broader insurance marketplace insisting on retention of high-frequency losses by imposing higher deductibles.

Rate increases have been relatively modest even on adverse risks; largely resulting from continued abundant capacity.

However, our team sees unfavorable trends continuing in several areas:

- **Automobile Liability:** Poor underwriting results have continued in 2018, with adverse development in both frequency and severity. As a result, primary underwriters are seeking significant rate increases for clients with larger fleets, as well as risks with adverse losses. The need to increase excess attachment points on larger fleets is becoming more common. We are also seeing the most marketplace contraction for excess placements on risks with large losses in the past five years.
- **New York Labor Law:** The unprecedented marketplace dynamic associated with losses caused by New York Labor Law continues to confound insurance carriers that wish to remain in the market and avoid the associated increase in frequency and severity, particularly on vertical construction exposures. We are working with carriers and strategic partners to create unique programs focusing on loss prevention, increased retention levels, contractual risk transfer, and the incorporation of risk management technology to deliver differentiated outcomes for clients.
- **Wildfire:** In recent months catastrophic losses, some involving significant fatalities, have resulted in a disappearing traditional market and the need for unique strategies and capacity for clients in affected geographies. We dive into more detail later in this report.

Casualty	Commentary	Rating
Overall Market	While market competition and capacity remain abundant, the deterioration of underwriting results is evident in certain general liability and auto portfolios.	**Fair/Average**
Capacity and Pricing	Market competition and capacity remain abundant, however, the deterioration of the Auto Market and New York's vertical construction environment, continue to challenge underwriting results.	**Mildly Unfavorable**
Losses	Due to frequency and high severity in the automobile line, insurers are focusing on carefully underwriting large fleets and may put pressure on insureds to raise attachment points.	**Mildly Unfavorable**

Excess Casualty

Broadly, the competitive market for both lead and high excess layers has continued in 2018. However, as Aon and carriers continue to use data & analytics to stratify the market, we are identifying some noticeable and impactful trends.

Lead layer underwriters are insisting on higher attachment points to avoid frequency losses, while some markets are aggressively pricing renewals lower than expiring limits. Selective markets are increasingly interested in creating Integrated programs, characterized by multiple first and third-party coverage programs and significant fronting of primary and excess layers. Aon has significant experience in working with clients to structure and place these programs.

As we begin 2019, the development of large construction defect, auto, and wildfire losses is causing excess carriers to reevaluate risk appetites, available program limits, and pricing structures.

Current Events

Major events impacting the market in 2018 will continue to have ripple effects in 2019 and beyond.

- **AXA/XL:** Already a strong competitor in the construction market, XL developed an even stronger presence when it was acquired by AXA. The combined AXA/XL construction team is expected to continue aggressive pursuit of target risks across the construction industry.
- **AIG:** New leadership announced the company's withdrawal from the North American general liability market. Beginning in 2019, only fully-fronted general liability policies will be offered on large accounts. In addition, AIG Excess Construction has announced that it will be a non-admitted, wholesale market in 2019 focused on targeting middle market risks. These changes will have a major impact on competition in 2019.
- **Liberty Mutual/Ironshore:** With the acquisition of Ironshore completed, Liberty Mutual has consolidated its excess casualty resources and has created a one stop, direct access underwriting unit (excluding residential) that is expected to compete aggressively in 2019.
- **General Liability-Only Wraps:** The very aggressive non-admitted market has continued to compete on both rate and coverage, and there is no indication of any change in 2019. Several admitted markets have created GL Wrap programs in response to an increasing demand by both general contractors and project owners for programs that do not include the labor-intensive administration of Workers' Compensation Wraps.

Project Casualty Risk Update

The casualty market for controlled insurance programs remains competitive and has capacity; except the niche "for sale" residential marketplace, including condominium construction. In keeping with broader themes, underwriters are focusing more on details of project and case laws that could impact loss experience. Aon sees carrier questions as reflective of executive desire to better quantify potential exposures; more stringent underwriting approvals are also being implemented to mitigate project placements that could negatively impact carrier loss ratios.

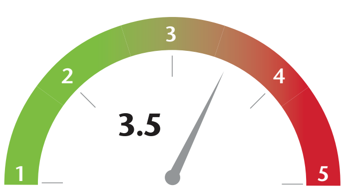
While project insurance rates remain competitive into 2019, there is a focus on carrier concerns and loss ratios in order to evaluate if there will be more changes throughout the year heading into 2020.

In addition to GL-only placements as referenced above, we are also seeing increased client interest in project-specific placements. GL-only carriers continue to offer broader terms and conditions, which has led to a dynamic of clients evaluating Dual Line Wraps with split markets. Reduced deductibles and self-insured retentions on GL-only projects are also appealing due to the nil or reduced collateral requirements.

The "for sale" marketplace remains a challenge; especially in the Florida marketplace. The concerns around "for sale" include any projects with condo conversion exposures that are not able to accept a condo conversion exclusion.

While the excess market for projects continues to exhibit relatively abundant capacity, we are seeing instances of hardening in the first $10M excess layers of certain programs due to losses piercing this tower. We foresee continued focus on this layer from carriers in 2019 and 2020.

BUILDER'S RISK/PROPERTY



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As 2018 was a relatively mild year in terms of aggregate catastrophe losses, we have seen that the global market for Builder's Risk and related first party placements has reached "bottom". While the California wildfires and Hurricane Michael made national news, builder's risk losses incurred were not material, and carriers are holding the line on rates for new projects coming to the market.

Despite this market flattening, six carriers in the London market have ceased underwriting construction property risks. While adequate global capacity remains, some trends are clearly emerging:

1. **Requirement of detailed underwriting/exposure information in advance.** In the past several years, the detail and documentation could be provided post binding.
2. **Greater scrutiny and analysis for projects exposed to Flood, Named Windstorm and Earthquake.** Depending on the risk, the underlying design or project execution is driving sublimits, deductibles and rates/premium. The aggregation of risk in a specific geography also influences the capacity individual carriers are willing to offer.
3. **Challenges on some projects with enhanced terms and conditions.** Carriers are looking to better understand the underlying risk before agreeing to these enhancements.

4. **Frame projects are difficult with respect to fire losses.** Frame and commercial construction overall continue to have adverse loss experience arising from water damage claims and high-profile fires in major metropolitan areas. Markets are imposing material deductibles on water damage losses and risk engineering requirements for fire, theft and water damage claims.

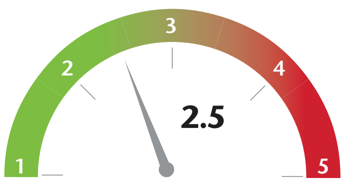
From a claims standpoint, we see carriers adjusting claims much more rigorously for construction risks. One area that is emerging is the resistance from contractors of overhead expenses. Areas such as general conditions are also becoming a challenge in major claims, and time element claims (Delay in Start-Up and Soft Cost) are becoming more difficult to adjust and settle.

Property / BR	Commentary	Rating
Overall Market	The market is showing signs of firming. This is based on eroding underwriting profits and some capacity that has left the market. Early engagement for the marketing of a risk with complete information will yield the best results.	**Mildly Unfavorable**
Capacity and Pricing	National contractors with non-"CAT" exposures will continue to see competitive options. The severe losses experienced in Frame Construction however, continues to impose higher than previously seen rates and deductibles.	**Mildly Unfavorable**
Losses	Frame construction continues to be the loss leader for the market. This includes fire and water damage claims. 2018 had few (number and severity) Natural Cat losses, however, markets are more closely underwriting exposed risks.	**Fair/Average**

We recommend the inclusion of more effort and detail commitment at the inception of the policy to assure that expectations will be met in the event of a loss.

Over the past several years, it was possible to secure binding quotations with minimal information and limited time. Carriers are now requiring more information and adequate time to underwrite, and where required, model the project for exposure to catastrophic perils. Aon recommends that clients engage as early as possible to secure the most competitive terms and conditions. We are also seeing clients deploying risk mitigation technologies on project sites with the end goal of minimizing severity of builder's risk losses. Aon foresees this trend gathering momentum as we move through 2019.

PROFESSIONAL LIABILITY



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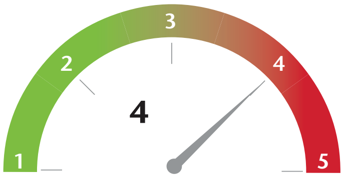
The professional liability market for contractors and construction risks remains generally stable for both annual practice and project-specific policies. However, there are early signs that the struggling architects and engineers (A&E) market is now affecting contractor and owner professional liability programs.

Despite insurance being established on the premise of a portfolio approach – where a single loss can be absorbed by the insurer's portfolio – the construction professional liability losses sustained are both large in frequency and severity, which has affected the profitability of some insurer portfolios.

Professional liability claims have been in the form of both damages as well as considerable legal costs in defending claims. In the U.S., there is a macro view wherein it is believed that for every $1 paid by insurers, some $0.65 - $0.75 relates to plaintiffs' and defendants' legal costs.

Professional Indemnity	Commentary	Rating
Overall Market	The professional liability market for contractors and construction risks remains generally stable for both annual practice and project-specific policies. However loss experience is starting to push markets to lift pricing and/or increase retentions in response to higher claim costs.	**Fair/Average**
Capacity and Pricing	Insurance capacity has seemingly leveled off over the last year, though there still remains a healthy amount of capacity in the North American market. Good competition on annual programs for accounts with favorable loss experience has resulted in the tempering of any attempts by incumbent carriers to significantly lift rates.	**Fair/Average**

2018 was marked by a leveling off of capacity with no real notable entrants to the construction professional liability market. Combined with consolidation following insurer mergers, this dynamic led to an overall reduction in the number of markets able to write large firm construction professional liability risk. Poor underwriting results are driving insurer decisions, resulting in withdrawals from this class of business as well as broader strategic decisions to reduce exposure to such risks.



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SUBCONTRACTOR DEFAULT INSURANCE (SDI)

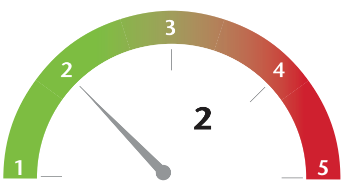
Although an unprecedented number of carriers now offer SDI in the United States market, carrier appetite reflected in the nuances of policy coverages and conditions can be limiting. Understanding these market distinctions is essential to longer term contractor strategy, which ideally incorporates overall SDI utilization strategy and a cohesive plan to mitigate the many integrated risks resulting from a subcontractor's non-performance under the terms of the subcontract.

While subcontractor prequalification remains a central and shared topic of importance, including the engagement of third party prequalification firms, there is a growing divergence among the carriers in where they place emphasis during the SDI underwriting process.

Obtaining the broadest available SDI terms requires allocating additional time for more thoughtful carrier alignment based on existing and expected future carrier appetite, contractor culture, controls, and project, geographic, and market segment pursuit.

As referenced above, Aon continues to see SDI as a multidimensional risk with the potential to impact multiple aspects of a contractor's risk management program. We are also seeing increased interest in large project owners securing their own SDI programs to protect against large defaults of meaningful contracts as they work to mitigate the overarching peril of delay.

SDI	Commentary	Rating
Overall Market	Insurance carrier variability in both coverage and policy conditions highly relevant. Challenges in covering long project and subcontractor duration, large subcontracts, for-sale residential, and specific subtrade scopes are common across all insurance carriers.	**Mildly Unfavorable**
Capacity and Pricing	New capacity continues to enter the marketplace, as existing capacity is seen to be limiting its scope. However, risk appetite continues to be a challenge. Additional capacity is not increasing rate competitiveness as premiums charged by new entrants are generally higher than market incumbents.	**Fair**
Losses	Claim notifications remain at elevated levels, driven in part by insurance carrier incentives for early reporting and a tight labor market. Claim severity continues to be a market specific trend with some insurance carriers continuing to incur noteworthy claims.	**Mildly Unfavorable**



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ENVIRONMENTAL

Aon clients continue to benefit from favorable conditions in the environmental marketplace with the availability of broad forms of coverage and competitive pricing. Total U.S. market capacity has increased to over $500 million. With the entry of more London markets insuring environmental risks, for certain environmental product lines, global capacity exceeds $600 million.

Rates and policy term lengths are tightening somewhat for site-specific environmental coverages, particularly for programs offered on development properties impacted by historical industrial operations. Aon continues to see increases in pricing and underwriter scrutiny from insurers underwriting both development sites and large portfolio programs that include properties and projects slated for development. Such scrutiny is resulting in coverage restrictions like Voluntary Site Investigation and Capital Improvement Exclusions, with some carriers declining to quote development projects altogether.

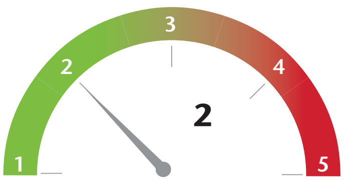
PFAS and PFOS (per- and polyfluoroalkyl substances) continue to be an emerging contamination issue, especially at military base closures. No formal federal or state maximum contaminant levels have been established, however substantial research efforts are underway for their development. PFAS/PFOS are a widely used class of chemical compounds which have been linked to adverse health effects for humans and the environment.

Carriers have begun to implement PFAS/PFOS exclusions for sites with high historic use – particularly at airports and military bases who used PFAS-containing firefighting foam. We anticipate further tightening of the markets on this topic, especially as PFAS/PFOS continue

Environmental	Commentary	Rating
Overall Market	Insureds continue to benefit from favorable conditions in the environmental marketplace, with broad coverage and competitive pricing available.	**Favorable**
Capacity and Pricing	Total U.S. market capacity has increased to over $500 million. With the entry of more London markets to environmental risk, global capacity for certain environmental product lines reaches higher than $600 million.	**Fair/Average**
Losses	Claims on contractor's pollution liability policies have not been as frequent or severe as the site specific environmental lines but do continue. Mold remains a particular concern on certain residential risks for third party bodily injury claims and, for commercial risks especially within the hospitality industry, cleanup and business interruption losses have been more frequent and costly.	**Average**

to capture the attention of mainstream media. We are working with both clients and carriers to best navigate this rapidly developing issue.

Rates for contractor's pollution liability coverage remain very competitive for activities ranging from general and trade contracting to participation in large infrastructure projects being delivered through public-private partnership and integrated delivery programs.



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CYBER

The cyber market in the construction industry is competitive and remains a buyer's market, despite the specter of risk that has dominated recent headlines.

Many construction-related entities are purchasing an initial cyber policy because:

1. They are implementing technology to stay competitive and drive revenue

2. They are contractually obligated to have coverage in place

3. The Board of Directors mandates the purchase of cyber insurance.

2018 saw 15 new entrants to the global cyber insurance underwriting community, building the population of cyber carriers to more than 75. Capacity continues to grow across geographies, with a growing number of insurers developing appetites for large, complex risks.

Pricing for initial placements is competitive and average premium rates reflect a year-over-year decline as well. A number of our clients are leveraging the competitive market by purchasing an initial policy as well as increasing overall capacity at renewal.

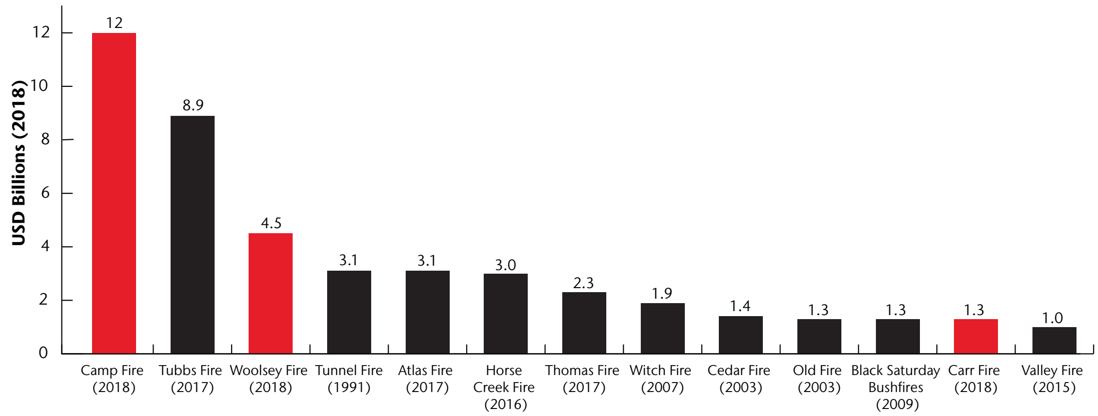
The construction industry has seen a continuous increase in ransomware activity, which has been leading to network business interruption concerns. While the complexity of breaches has driven an increase in incident response expenses incurred by clients, claims and loss data has expanded coverage offerings and improved actuarial data for loss modeling purposes. As with many lines of coverage, the stratification of risk enabled by improved data & analytics leads to better outcomes for the best specific risks.

Cyber	Commentary	Rating
Overall Market	The cyber marketplace for the construction industry is healthy, with carriers eager to grow by underwriting risks in infrastructure and development. We believe the competitive nature makes this a good time for clients who have not yet purchased cyber coverage to enter the market and lock in baseline competitive pricing before any hardening of pricing occurs.	**Favorable**
Capacity and Pricing	We continue to see carriers offering favorable pricing at common attachment points for contractors, as average premium rates decline on a year-over-year basis. Contractors purchasing cyber coverage can access significant capacity from established players and new entrants looking to grow their cyber books of business in construction and across all industries.	**Favorable**
Losses	While the market is healthy and pricing continues to decrease for most clients, we are seeing increased losses in this line of business, particularly due to employee / human error. More complex incidents have also driven an increase in breach response costs, which can be mitigated by locking in pricing on a retainer basis; a strategy we see more contractors adopting heading into 2019.	**Fair/Average**

Outlook for Natural Catastrophes—Wildfire Risk

Although not a new subject by any means, the availability and affordability of both property and casualty insurance coverage in areas prone to wildfire risk has become a "hot button" issue the last few years, especially as more than half of the most destructive California wildfires have occurred in the last decade.

Historical Billion-Dollar Insured Loss Wildfire Events



Source: Aon Re

California has seen more than 680,000 acres scorched by about 4,000 wildfires in 2018, far surpassing the acreage burned in all of last year.

To provide further recent statistics, California has seen more than 680,000 acres scorched by about 4,000 wildfires in 2018, far surpassing the acreage burned in all of last year. In 2017, 506,000 acres were burned by more than 7,000 blazes, according to Cal Fire. The state's five-year average is about 203,000 acres burned per year.

The market response in wildfire prone areas is severe; as carriers are either excluding the coverage or limiting capacity/raising costs. Losses do not just stem from the alleged ignition of wildfire, as carriers have paid claims for non-thermal damage, no access for recovery, business interruption and other causes. As one example, insurance markets paid more than $2 billion in claims for one client as a result of wildfire losses.

Climate changes, historical drought conditions, differing causes, increased volatility and destructive force of the fires are combining to cause uncertainty among insurance carriers. Add this to the strict liability imposed upon utilities in California, and you have a "perfect storm" of a hardening market for wildfire in the state.

Excess carriers have been hit hardest due to paying out full limit losses at high tower attachment points that yielded very small premium dollars. In response to this dynamic, excess carriers (including those on construction projects in California) have begun to increase the use of exclusionary wording endorsements on their policies.

While dependent on many factors, including the type of construction, urban development, proximity to dry vegetation and the current state of wildfire activity for projects with long terms, large footprints, work at grade (i.e. hotworks) and low urban development, wildfire exposure is expected to continue drawing even further adverse reactions from carriers.

Aon Review:
Underwriters are reviewing the following elements as they consider California wildfire expectations in 2019:

1. Location and proximity to wildfire exposed areas
2. Vegetation management systems in place
3. Definition of wildfire itself – a number of criteria have to be met to be able to grant the coverage
4. Contracts / Hold Harmless agreements in place
5. Frequency of power line inspections by transmission line operation managers
6. Amount of work directly associated to wildfire exposure
7. Limits offered: Excess carriers are offering $5M or $10M (instead of the usual $25M) to help control the potential CAT exposure.
8. Facultative Reinsurance: Carriers are more frequently seeking fac coverage if available (as many carriers have treaty restrictions on wildfire limits in place).

We see wildfire as a a critical emerging risk heading in 2019 and are working with clients on the best approach to covering this peril in light of the marketplace's reaction to 2018's unprecedented loss environment.

Construction Risk Management: Harnessing the Power of Technology, Data and Analytics to Create Risk Management Value

The construction and infrastructure industry is one of the largest and most critical pieces of the world economy, as virtually all economic value created by populations and businesses occurs within the built environment. It is estimated that $10 trillion is spent on infrastructure development each year globally; with that figure projected by McKinsey & Co. to rise to $15 trillion by 2025.

In spite of the importance of this segment and the broad investment in improving both civil and commercial facilities, we have seen technology impact construction perhaps less than any other industry in recent years. Construction is the second-least-digitized industry in the U.S. (after agriculture and hunting); and broadly the industry is an estimated 10 years beyond "state of the art", according to the same McKinsey study.

Construction is the second-least-digitized industry in the U.S. (after agriculture and hunting); and broadly the industry is an estimated 10 years beyond "state of the art", according to a recent McKinsey study.

However, enterprise is closing this gap, with a wave of more than $18 billion from venture capital, private equity and industry investing in startup Infrastructure Technology, or Infratech firms over the past three years. These firms create value throughout the construction process, from streamlining project management by creating a record of building activity that can be shared by all stakeholders, to installing sensors at the end of the construction process, effectively developing Smart Buildings that transmit failure data before challenges occur.

Aon Review:
At Aon, we recognized that tremendous value can be unlocked for clients by introducing technology to mitigate risk management challenges. In 2018, we established a Technology Assessment Panel (TAP) to assess technology firms on their ability to reduce risk for our clients in construction and asset management. This created a formal intake and review process to ultimately identify the Infratech firms that could make the biggest impact on the risk management and safety approaches of our clients. We have used the TAP approach to identify and vet more than 30 firms so far and are well underway with the process of introducing these firms to our clients.

(Representative Sample)

- Aditazz
- AspenTech
- Doxel
- MX3D
- Pillar Technologies
- Procore
- Rhumbix
- SmartVid.io
- Site 1001
- Tread
- Upbrella
- Uptake

Technology Assessment Panel (TAP)

- Assessment team consisting of brokers, actuaries, and risk engineers
- Vets various tech firms for their potential to reduce risk in construction and asset management
- Helps our clients navigate the large number of Infratech firms to assess implementation potential and no negotiate with insurers to lower their cost of insurable risk

Identify

Introduction
Webinar/Demo

Filter

TAP Assessment Filters:
1. Impact on Key Risk?
2. Insured/Insurable?
3. Degree of Impact?
4. Best in Class?
5. Widest Adoption?
6. Is this a data opportunity?
7. Is it globally available?
8. Funding?

Elevate

Introduce Tech to:
1. Contractor Clients
2. Design Clients
3. Owner Clients
4. Insurance Capital*
5. Project Finance Capital*
6. Venture Capital

*Primary Objectives

Aon has partnered with certain firms to help our clients benchmark their firm's adherence to key safety practices and to receive real-time notification of non-compliance of safety practices.

As an example, our panel identified the power of computer vision and AI technologies to better manage safety risk on the jobsite. We have partnered with certain firms to help our clients benchmark their firm's adherence to key safety practices and to receive real-time notification of non-compliance of safety practices. Some firms are currently piloting solutions that predict safety events based on frequency of violations; we are seeing positive initial results. We broadly believe that technology can ultimately reduce risks associated with worker injury and property damage.

This is just one example of the way we can deploy Infratech to positively impact our clients. As we move into 2019, we see the potential to deploy additional solutions from claims, safety, smart buildings, and data & analytics to benefit our clients and help promote improved digitization, modernized processes.

Finally but importantly, we are also seeing the infusion of data & analytics in the construction risk underwriting process, as outlined throughout our report. Underwriters have stopped painting with broad brush strokes and are starting to stratify clients by various criteria, deploying new technologies to recognize patterns and deeply analyze accounts at a line of risk level. We see the deployment of Infratech specifically and broadly as a key strategy clients can take to differentiate their risk and help tell their unique stories in the marketplace.

Aon Spotlight Solution—Parametric Insurance

In the last three years we have seen record-breaking extreme weather events, changing seasonality, increases in temperature and rainfall, and overall greater weather volatility globally. This has created challenges for U.S. construction and infrastructure assets through non-damage business interruptions and delays. Fortunately, the insurance and wider financial services sector are offering tailored solutions to both owners and operators. These offerings help them better manage the financial impact of adverse weather on increased costs, liquidated damages and lost revenue associated with weather related events.

Unlike the direct physical/material damage to construction projects from events, such as hurricanes and floods, weather insurance offers coverage against the impact of season-to-season variations. These variations can come in perils such as temperature, rainfall, snowfall and/or windspeed, and can be view independently or in combination.

Consider the impact of rainfall on the pouring of concrete, or frigid temperatures on workable manhours. These can cause a delay in the work due to the removal of water or additional personnel breaks, neither of which would be protected in a traditional policy. The weather insurance solution provides insureds the ability to protect itself from adverse weather events, but ultimately offers a solution to boost financial confidence around tendering for a weather inclusive construction or infrastructure contract.

The weather risk solution provides coverage to insureds by responding to pre-specified occurrences of weather events (i.e. a certain temperature, windspeed, or precipitation level is reached and recorded during the policy period). Under the weather insurance solution, no proof of physical loss or damage is required to trigger a policy, simply the occurrence of a covered event or accumulation above/below a certain level. The claim value is calculated according to a pre-agreed payment amount per each weather event occurrence or index level, and claims payments are made quickly once the policy has been triggered and the value of the index is confirmed.

Pre-policy data (temperature, rainfall, wind, snow, or etc. in combination or individually) is pulled and analyzed to provide clients an in-depth understanding of the weather risk on a project or asset. This information is then used to help set thresholds or levels where the insurance solution will begin to provide coverage and payouts. Each policy is tailored to the assets exposure of the risk, ensuring that it covers the weather scenarios that can negatively impact the insured's balance sheet.

Exposure will vary according to the location and period of concern. For example, a contractor worried about excessive rain during a construction project could purchase a policy that triggers if rainfall exceeds a pre-agreed number of millimeters during the project. There could be a single, one-off payment if the index threshold is exceeded, or alternatively the payout could increase per additional measurement (millimeter, degree, etc.) once the initial index threshold is breached.

Ultimately, weather cannot be directly controlled by owners or contractors on projects and these parties traditionally must estimate contingencies around weather related project or asset impacts. The weather risk solution provides another tool for all parties to estimate weather uncertainty and transfer this estimated risk to third parties.

How the product works:

1. **Weather Consulting:** Historical weather data is applied to details of a construction project including schedule, budget and means and methods to understand how critical path may be impacted by adverse weather.
2. **Program Structure and Brokerage:** Aon creates a bespoke program based on project exposures and schedule to mitigate weather risk on a project.
3. **Weather Risk Transferred to Third Party:** Outside capital provides Weather Insurance coverage on a parametric basis, meaning clients do not have to prove the loss, as the claim is paid on an agreed value when a pre-agreed weather trigger is reached and captured by the weather data.

Performance Security—Market Update

Financial results for the surety industry remain profitable, and in general, the market is competitive and healthy, with sufficient capacity. There has been further evolution of the performance security array of products for privately financed, and public-private-partnership (PPP) procurements. These include traditional performance and payment bonds, but with added liquidity features. While the number of transactions involving these products are few, they have been used on some very sizeable procurements, such as I-66 in VA, the Brightline/All Aboard Florida project, the recent I-75 DBFOM (design build finance operate and maintain) in Michigan, and others.

Economically we see 2019 as having a slower pace of growth. Gridlock in Washington will worsen. However, the need for infrastructure investment continues to grow.

We see some loss activity related to the high-end capacity users, and in particular non-US, global construction firms. Underwriters are increasingly pushing for more transparency from global companies on their non-bonded, non-US projects. Heretofore US surety underwriters have tended to focus on bonded US work and performance. However, problems have emerged with the non-US work which have had a material impact on the parent balance sheets, leading to financial challenges that impact US bonded work. We expect to see a stronger push for more disclosure on major projects outside of the bonded backlog.

Project size continues to increase. The larger surety companies, which write about 60% of all surety business, are regularly seeing projects in excess of $500 million. Even single projects in excess of $1 billion are more frequent. One of the primary risk mitigation tools of contractors and sureties on these large projects are joint ventures (JV). These provide a check estimate and cash flow sharing, spreading surety risk across joint and several partners, and the all-important resource sharing for qualified and specialized people to complete work.

However, there have been a number of disappointments amongst partners as these major projects are not producing the margins originally expected. In general, major projects have had a tendency for profit fade, rather than improvement. When things do not go well, it brings strains on the JV partnership. The need for JVs is not going away—in fact given the trend towards larger projects it is expected to continue. Contractors need to continue carefully selecting JV partners and have better alignment on estimating costs, adding contingency, and establishing a margin strategy consistent with their longer-term objectives of profit (as opposed to revenue).

Economically we see 2019 as having a slower pace of growth. Gridlock in Washington will worsen. However, the need for infrastructure investment continues to grow. While short term uncertainty will slow activity, the long term market trends are positive and will continue to attract global players into the US market.

Aon Review:

Aon has developed data and analytics to support client analysis of risk in major projects. We have considerable experience in the North American market, with innovative surety products designed to meet lender and rating agency requirements for liquidity, while maximizing surety credit resources. Each project has tended to result in tailored made surety products, best suited to meet unique requirements, rather than an off the shelf product.

Our team has worked effectively with global clients to design solutions for capital allocation, indemnity structures, and financial disclosure that result in optimizing access to surety credit. Aon's senior surety executive relationships and data base of deal flow, provides the benchmarking points to deliver results that work for clients and the surety companies.

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Aon’s Construction Services Group

Aon's Construction Services Group is Aon's largest industry practice and the leading provider of risk management and insurance solutions to global contractors, specialty contractors, project owners and developers. We leverage the placement volume, broking experience, and service infrastructure of Aon to provide industry-leading terms and conditions, pricing, and claims support to the infrastructure space.

Our construction insurance professionals deliver customized service, informed by our deep knowledge of local construction marketplaces and regulations across all geographies. For more information about our products and services, please visit us at www.aon.com/construction.

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