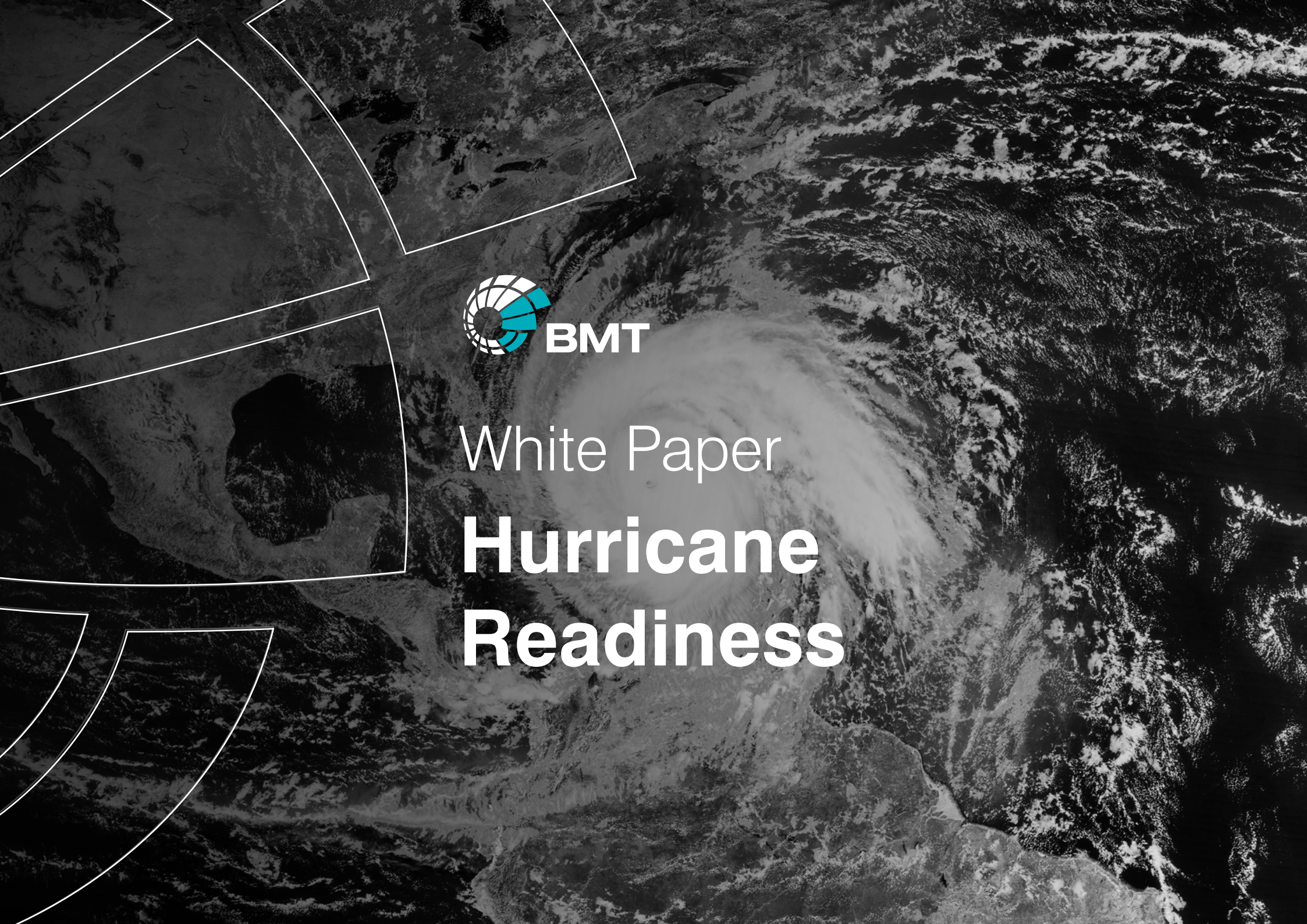


BMT

White Paper

Hurricane Readiness

Introduction

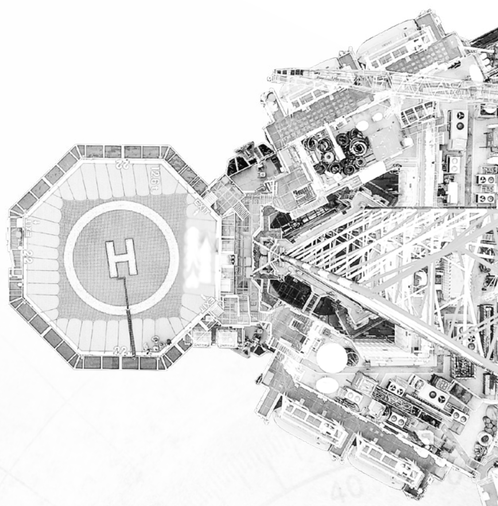
There is a growing threat of extreme weather conditions for offshore operators. We look at how resilient companies are preparing for disruption through using data to respond and adapt to immediate threats, helping them to restore their operations safely and quickly. In addition, this data is helping them make informed long-term decisions, giving them significant upside and a competitor advantage in a crowded market.

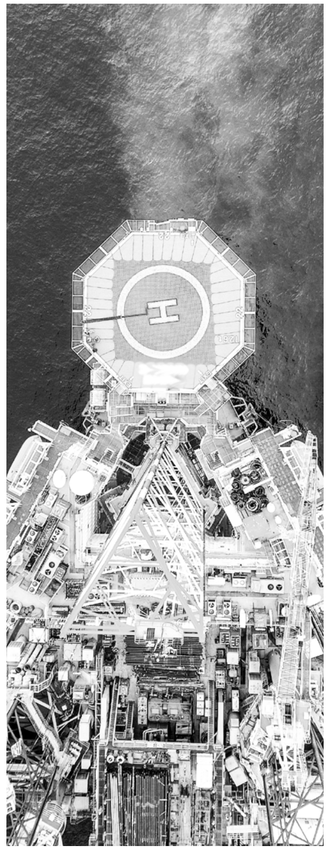
About BMT

BMT is a leading international design, engineering, science, and risk management consultancy with a reputation for excellence. We're driven by a belief that things can always be better, safer, greener and more efficient.

We provide our customers with the capability, capacity, and confidence to enable them to make the right decisions at the right time by drawing upon the expertise of over 1,500 professionals located in Europe, Asia Pacific, Australasia and the Americas.

Contents





1.2

Contributors

Experts from across BMT have contributed their industry knowledge and personal experience from working with customers to this white paper. Their combined insight is helping offshore operators address current challenges whilst also preparing them for the future direction of the industry.

Phil Dana

Business Development Director

Phil Dana joined BMT in 2019 as VP Business Development for BMT Canada. Phil has extensive experience in business development, professional services and marketing of IT services and product solutions. He is currently a Regional Business Development Director and is responsible for growth of BMT services across the Americas region.

Soma Maroju

Head of Data Services

Soma is Head of Data Services at BMT. He is an experienced data scientist with a demonstrated history of working in the maritime and energy industry. Soma leads the development team behind BMT DEEP and is responsible for product development.

Andy Brown

Business Development Manager

Andy is a Business Development Manager at BMT and has been working with offshore operators for over thirty years. His background in Marine Science and experience leading commercial operations in maritime organisations gives him insight into the challenges of our customers and the solutions they need to succeed.

Jeffrey Lewis

Technical Consultant

Jeffrey Lewis is a Technical Sales Advisor at BMT, and has been helping maritime companies with offshore assets improve their resilience to hurricanes for almost 20 years. His extensive background in the energy industry as well as his deep technical knowledge in software and data enables him to help customers prepare for uncertainty.

Jason Davis

Regional Marketing Manager, Americas

Jason is an experienced technical marketing professional who has over two decades of working in engineering and technology. He has consolidated the views of our technical and industry experts from our Podcast series on Hurricane Readiness into this white paper.

Greg Fisk

Global Lead – Climate Risk and Resilience

Greg is an environmental scientist with over 25 years of professional experience across both public and private sector roles related to coastal management. Greg leads BMT's global campaign around assisting our clients and customers to understand and effectively respond to the challenges of climate change, with a specific focus on resilience and adaptation strategies.

Gerardo Uribe

Client Support Manager

Gerardo is an Electronics Engineer with over 20 years of professional experience in several disciplines in the electronics/production field. Gerardo leads BMT's US Field Service Team assisting our clients and customers to understand the importance of aftermarket pro-active preventative maintenance repairs and upgrades, with a specific focus on efficiency and ensuring data quality and availability to our instrumentation products all around the world.

Christian Morgan

Lead Graphic Designer

Christian is the Lead Graphic Designer within BMT, supporting all regions and markets globally including The Americas, UK & Europe and Australia & Asia regions. Providing design support in the form of Motion Graphics, 2D Animation, Social Media Design, Digital Design, Print Design and Government Bids whilst Art Directing creative company-wide projects.

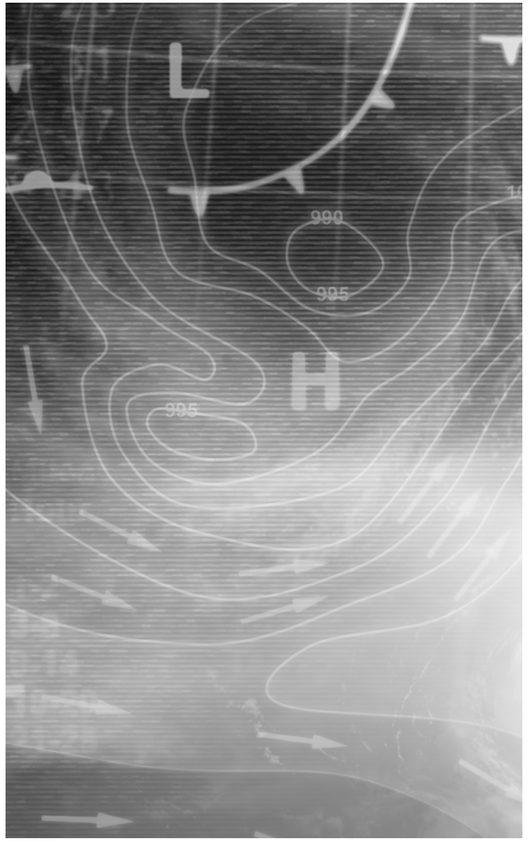
2.

The Growing Threat

Over recent years the number of tropical storms and hurricanes has steadily increased, posing real challenges to companies whose assets sit in their path. Over $1.4 trillion of company and personal assets are located within an eighth of a mile of the coast in the Gulf of Mexico, as well as offshore. The devastation unleashed by hurricanes can severely disrupt operations and be costly in both lost revenues and remediation and repair of Offshore Structures.

In the US, ‘tropical storms’, a collective term that categorises the extreme weather events of Hurricanes, Cyclones and Typhoons, have been increasing in frequency and intensity. Over the course of the last 40 years, tropical storms have caused $997 billion dollars in losses to the US economy, the equivalent of 5% of the country’s GDP.

In the years 1999-2000 there were 13 hurricanes and tropical storms that passed through the Gulf of Mexico. By 2019-2020, this number had increased by 30% to 17 . What is more alarming is the heightened strength and impact of these storms. In 1999-2000 only one storm registered as a Category 2 or higher hurricane, 20 years later, this figure had increased to 7. It is important to note that these are longer term trends and not anomalies.



2.1 A changing climate

As scientists are able to collect and analyze more data, it is becoming clear that the increase in intensity and frequency of storms is linked to the changes of our climate, specifically an increase in the sea surface temperature.

Warmer sea surface temperatures are intensifying tropical storm wind speeds as well as increasing rainfall, potentially delivering more damage when they make landfall. It is estimated, wind speeds will on average increase by up to 10% and precipitation by 10-15% by 2050. Based on complex modeling, NOAA has suggested that an increase in Category 4 and 5 hurricanes will be a likely occurrence in the future with the frequency linked to projected temperature rises.

Over time, the effects of climate change will further exacerbate the existing threats to assets. BMT’s Global Lead for Climate Risk and Resilience, Greg Fisk notes:

“What we will see in places like the Gulf of Mexico as well as other hurricane and cyclone hot spots around the world, is the rapid intensification of tropical storms into larger hurricanes (owing to the warmer waters present) as well as greater effects from hurricane-related hazards like storm surges as a result of higher sea levels.

2.2 Managing Assets

Managing an asset, or a portfolio of assets, in a time of increasing environmental threats is a real challenge.

This is compounded further by economic shocks and society's drive to transition to a more sustainable future.

The threat to critical assets is real and for offshore operators being able to monitor and respond to natural disasters with agility is key to resilience as well as driving cost reductions across operations. In the long term, asset managers are considering forecast data to understand the risk profile their assets face against varying ocean temperature scenarios and the corresponding levels of threat. This is impacting both investment and decommissioning decisions and upending business models that were once seen as dependable.

In the short term, businesses still must manage their assets and recoup value from the investments that have already been made. To minimize disruption and to quickly recover from extreme weather events, businesses are implementing post-storm steps and long-term disaster recovery plans to become safer and more resilient to the growing threat.

Links

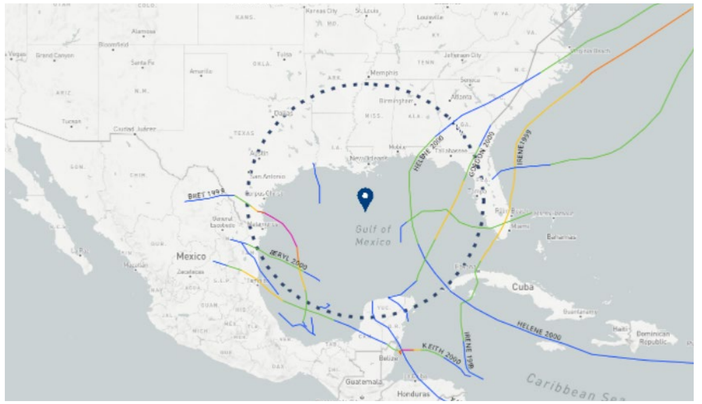
1.www.nature.com/articles/s41467-019-08471-z

2. www.nca2018.globalchange.gov/chapter/8/

3. https://coast.noaa.gov/states/fast-facts/hurricane-costs.html

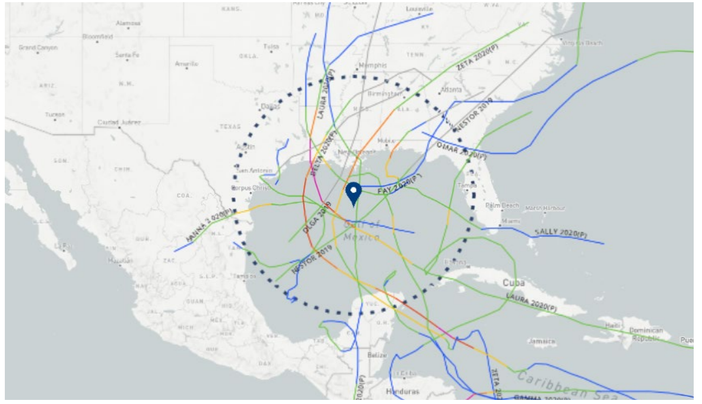
4. www.coast.noaa.gov/hurricanes

5. www.gfdl.noaa.gov/global-warming-and-hurricanes/



13 Storms **1999-2000**

13 Hurricane and Tropical storms passed through the Gulf of Mexico between 1999-2000, only 3 were above category 2



17 Storms **2019-2020**

17 Hurricane and Tropical storms passed through the gulf of Mexico between 2019-2020, 7 were category 2 or above

Source

www.coast.noaa.gov/hurricanes

3. Resilient Companies

There is increasing evidence that indicates companies that plan for disruption, and have the tools in place to respond quickly and adapt to events, are ultimately more successful and profitable. Preparedness can also create a competitive advantage over other companies while also improving employee safety and safeguarding the environment.

Resilient companies have 4Sight

Cranfield University, in the United Kingdom, has developed a four-stage resilience model called 4Sight, which can be used to support an organization's resilience strategy. It is a reimagining of the Plan Do Act Check tool for a future of uncertainty and change, specifically adapted to foster organizational resilience.

The first stage of the model is to anticipate disruption through surveying external threats, whether these are competitors in the marketplace or extreme weather events that disrupt your business' operations. Companies need to observe and interpret the environment in which their operations and the assets that they use exist in. The next stage in the 4Sight model is discovering insight through "taking a step back and looking at the big picture". During this stage, companies are looking for patterns and analyzing what has been observed previously to come up with situational awareness. Uncovering deeper meaning as part of cause and effect of underlying challenges.

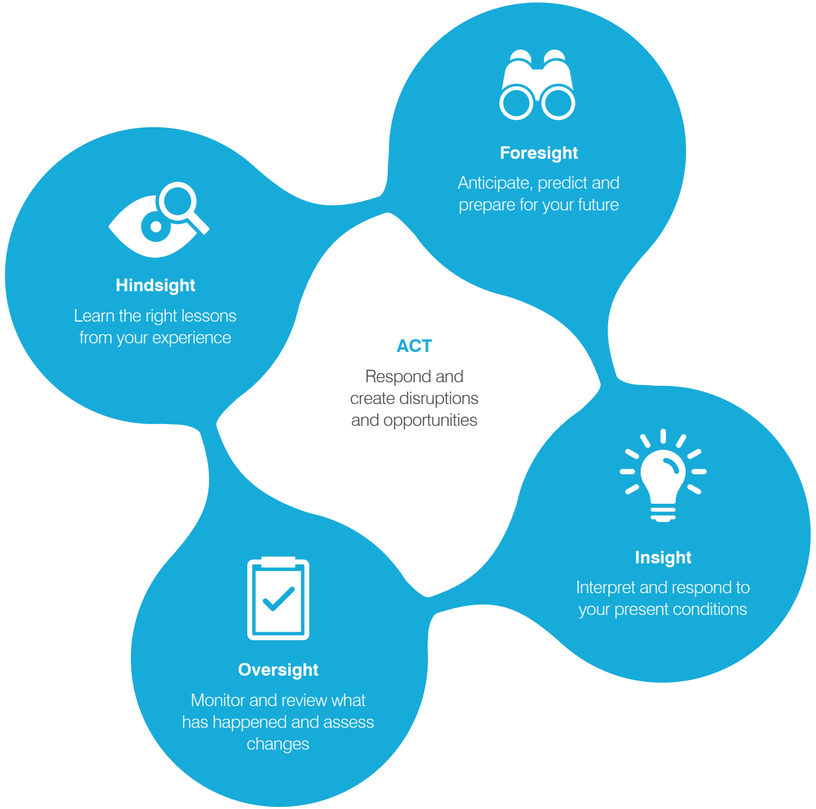
The third step of the model is to implement robust processes for managing and monitoring the organization's risks and ensure that process is continually improved as the business environment changes. The final stage of the 4Sight model is investing in time to develop hindsight, learning from the experience of past events, and enabling companies to respond to converging and emerging security threats as well as opportunities.

At the heart of implementing the 4Sight model, or indeed any model that promotes organizational resilience, is data collection. Data collection is key for responding to an immediate event, such as a hurricane, and putting in place a longer-term strategy to deal with long term trends. Without collecting a 'baseline' norm, a back catalogue of historical data or live data during an event, it is impossible for an organization to have foresight, insight, oversight and or gain hindsight from extreme weather events.

Links

6. www.raconteur.net/resilient-companies-succeed/

7. www.cranfield.ac.uk/som/case-studies/organizational-resilience-a-summary-of-academic-evidence-business-insights-and-new-thinking



3.2 Resilient Offshore Operators

For companies operating offshore in the Gulf of Mexico, and who face the increasing threat of hurricane season, they need to put in place a resilience strategy. This involves implementing plans, procedures, and technology to ready their operations and offshore assets for the disruption caused by tropical storms and hurricanes. Jeffrey Lewis, Technical Advisor at BMT, has been helping companies with offshore assets improve their resilience to hurricanes for almost 20 years. He said:

“Operators of assets will have a Hurricane Plan to follow when a tropical storm or hurricane is nearing their offshore platform. This will involve scaling back operations and evacuating all personnel to safety. However, being ‘Hurricane Ready’, begins months before the start of the season. It involves readying and preparing critical systems used by remote engineers and asset managers to monitor the ‘health’ and structural integrity of the offshore assets during a hurricane.

With all personnel evacuated, it is important to have a monitoring system that is working, and this requires regular maintenance. Otherwise, with no eyes on the platform, operators are effectively ‘blind’, and you really don’t know what’s happening as the storm passes overhead. Having a remote view of what’s happening with the platform is critical to being able to respond to events quickly and resume operations safely. Importantly, the data collected helps with long term resilience strategies as well as short term operational challenges.”

Resilient companies plan for disruption, mitigate impact, quickly recover and adapt their business to future threats. This is seen as the gold standard in management that is widely promoted by business journals and media outlets from The Harvard Business Review through to The Economist. However, how do you put theory into practice? Specifically, how do operators of offshore assets become resilient against increasingly damaging extreme weather events?

Links

8. www.hbr.org/2020/07/a-guide-to-building-a-more-resilient-business#

3.3 Back to business

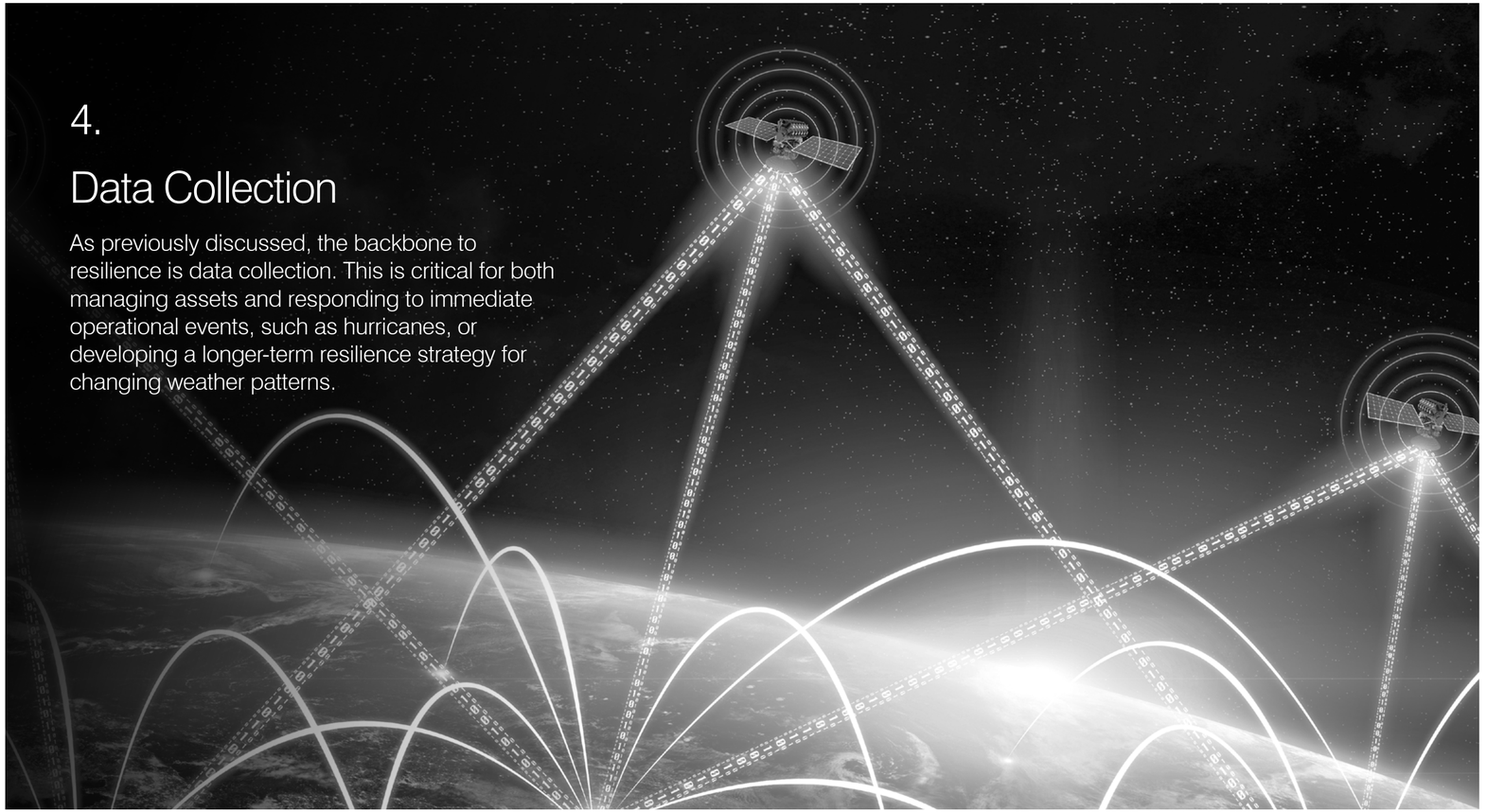
Being prepared for hurricane season and the extreme events requires a tremendous amount of effort to create systems and procedures, train personnel and ready offshore assets. As part of getting back to business after the event, offshore operators that are “resilient” are quick to recover and resume their business operations with minimal disruption. Their secret to a fast recovery is the data that they receive during the Hurricane that enables them to begin preparations around disaster preparedness planning and to get back to business before operators who lack this critical insight. Jeffrey Lewis explains the process that operators go through immediately after a weather event.

“If hurricane level winds hit a platform at any point, it triggers certain inspection requirements. The operators need to enter the platform with a certain crew. They need to do some physical inspections of the platform before they can bring the platform back online and get back to business.

In the rare occasion that an event occurs on the platform, often we are able to detect what those problems are and determine whether some kind of damage occurred or something that happened to the platform using the sensors on the independent remote operating system. Then the operator’s engineers can begin to plan repairs and prepare before the weather has cleared. Depending on the type of repairs they may be able to do the repairs in parallel as they bring the platform online. Trying to get that environmental consulting and planning done as early as possible is important so they can bring the platform back online and ensure any efforts to help improve recovery will reduce project losses. Another event that luckily, we have never seen with one of our systems that we monitor is that if mooring lines break completely, the structure can start floating around. This is a little bit more common maybe with the MODUs as opposed to production platforms. However, sometimes platform will break its mooring and start drifting around and having eyes on the platform is critical to detect this.

Our systems have cameras directed at critical areas of the platform, such as the helideck. So instead of flying an airplane to see that the helideck is clear for a crew to land, you can use the cameras. Cameras also play a critical role for identifying the type of damage or where the damage is located on the platform. The instrumentation might say that there is something broken; however, the cameras can be used to help identify the specific damage.”

This approach is applicable for both near shore and deep-water facilities. However, as Soma Maroju BMT’s Head of Data Services points out, “the difference is in how you interpret the data”. Floating structures will have a different data signature to fixed structures, so the motion and indication of damage will be different. By identifying changes to the tilt and movement of the structure, this signals to engineers that the asset may require an underwater inspection. Again, this saves critical time in organizing and readying suppliers to recover operations and get back to business quickly.



4.

Data Collection

As previously discussed, the backbone to resilience is data collection. This is critical for both managing assets and responding to immediate operational events, such as hurricanes, or developing a longer-term resilience strategy for changing weather patterns.

4.1 Data collection for operations

During extreme weather events, such as hurricanes and tropical storms, it is common practice to shut down operations of offshore assets and evacuate personnel to safety. Platforms are then monitored remotely by engineers and asset managers. These monitoring systems enable them to quickly respond to any damage to the asset or know when it is safe to return the operations team. Having clear reliable data from different sensors is key to quickly resuming operations.

Remote monitoring systems collect and transmit data collected from several sensors that have been installed on offshore assets. These can be broadly split between two types of data: sensors that measure the integrity of the asset and those that monitor environmental conditions. Both types of data are used to understand the immediate condition of the asset, what the asset has experienced and how operators should best respond.

Wind speed is one of the most important environmental data sets to measure. It is what drives the requirements for inspection. Remote monitoring systems which can accurately measure wind speed enable operators to quickly prepare for the correct level of inspections.

Jeffrey Lewis, said,

“One of the most critical aspects of managing an asset during the tropical storm season is the need to understand what category of hurricanes has hit the platform. In the Gulf of Mexico, that is basically a wind speed measurement and depending on what category of hurricane hits the platform, operators need to respond with certain levels of inspection.”

“Another important environmental data set is wave height. Platforms in the Gulf of Mexico have a typical deck height. It’s important to monitor if waves are big enough that they are actually hitting the platform and doing damage to the deck.”

4.2 Data collection for asset integrity

To ensure that the integrity of the platform is maintained both during a hurricane and for the longer term, measuring both the mooring systems and GPS data can provide remote operators confidence that platform is upright and on location.

Jeffrey said,

“ The single most common point of concern for floating offshore platforms is mooring lines. A lot of our customers’ structures are going into ultra-deep water. They are using advanced mooring systems and they want to have the assurance that the mooring system is performing the way they expect it to. If you can tap into measurements of the mooring lines to detect breakage or tension levels, this can provide a level of assurance.

The integrity of the mooring system is critical to keeping the platform in its location, and contributing to the stability of the asset, so they are important to monitor. After that, there is always having the position of the platform as it can tell you quite a lot. It’s not a direct measurement of what’s happening with the platform, but if it’s on location and upright, you can get that single measurement that tells you it’s OK. ”

“If there is something that changes, you may need to have additional instrumentation to identify what the source of the of the issue is. So, again, at a high level, just measuring the position and the motions gives you that one stop shop of is of the integrity of the platform ”

In addition, having a general view of what is happening on the platform can also inform operators to the condition of the asset. This would include installation of camera systems that allow you to see images of the helicopter deck, the rig or the moon pool, or various places where you are concerned that damage can occur.

Having one monitoring system collecting the above data sets, or one asset monitoring platform that consolidates data from multiple sources can improve operator’s abilities to respond to extreme events, such as Hurricanes.

“

The single most common point of concern for floating offshore platforms is mooring lines.

5.

Pre-Hurricane Season

In the run up to hurricane season, resilient companies are preparing for the possibility of extreme weather events and disruption to their operations. They follow their resilient strategy by implementing plans to collect data and ensure that their data collection systems are in working order.

5.1 Inspecting your asset monitoring system

Hurricane season begins at the start of June and lasts through to the end of November. Offshore operators have a window of opportunity ahead of the season to proactively prepare their asset monitoring systems by updating their system or conducting maintenance. Routine maintenance involves calibrating sensors to ensure they are making accurate measurements as well as ensuring the system is in a good state of repair. This validation of sensor data involves both analyzing historic data readings but also visual inspection of the sensors.

Gerardo Uribe, Service Manager at BMT has been visiting and inspecting asset monitoring systems on offshore assets for over a decade. **“There are a number of key things to consider when inspecting monitoring systems to ensure they are ready for hurricane season”**, said Gerado. He continues, **“Some of the systems that we provide have a built-in power supply as well as communication systems. Either, because of the planned evacuation or the hurricane itself, power to the monitoring system can be disrupted. So, as part of the maintenance we ensure that all the power systems are working correctly and continue to operate and communicate with shoreside operations throughout the storm.”**

“We also look at the collected data and see that the sensors are making readings and they are giving rational responses , but once we go offshore, we can do physical inspections of the sensors’ locations. I have had wind sensors producing data that looked reasonable, however, when we went offshore, we discovered that the sensors were being shielded from the wind by the addition of new modules to the platform. Those types of things are very difficult to identify when we are only looking at the data, so being on the platform with independent sensors to verify the wind speeds and directions is important. This also applies to communication systems, antennas, or satellite receivers of the remote monitoring system. Equipment and devices installed after the initial installation of the monitoring system can interfere with the transmission system, downgrade the quality of measurements and can also interfere with GPS.”

Gerado concludes, **“A poorly maintained system, or one that fails to deliver information when it is needed, can often give false confidence by its presence, but delivers little when it’s needed in the critical moment.”**

Ensuring offshore assets are hurricane ready involves both a resilience strategy as well as pre-emptive plans and procedures. However, without a well-maintained monitoring system that gives you sight of your asset, an offshore operator won’t be able to respond effectively to disruptive events.

6.

During Hurricane Season

As extreme weather systems approach human settlements, governments issue orders to their citizens to prepare and evacuate to safety. The same is true for remote offshore facilities. As hurricanes approach, operators initiate their hurricane plans.

Weather events are tracked and when they pose a threat to assets, the operators evacuate their personnel to safety. With no one left on the facility, asset managers are completely reliant on remote monitoring systems to keep an eye on the asset as weather systems pass over.

Offshore facilities are complex, with many interdependent systems for power, communications, and sensors for data collection. Often, failure at any one point can lead to the shore-based teams being left blind to the events unfolding. Therefore, operators install remote monitoring systems that are independent of day-to-day operating systems.
Jeffrey Lewis said,

“Our independent remote monitoring systems get used in line with operator’s hurricane plan and its phases as the weather system approaches. There’s a phase where we become aware that the hurricanes are in the Gulf and as the hurricanes start to approach, non-essential personnel are evacuated off the platform and measurement systems enter standby mode. We start to see the data coming through the monitoring system and we start collecting that data as the hurricane is approaching.

At the point when all personnel are evacuated, we then switch into hurricane mode and now it becomes the eyes of the platform. It is capturing all the videos and images and the system is in full swing at that point, collecting data and bringing that data onshore for visualization on BMT DEEP, our online data management platform. As the hurricane hits the platform, we are monitoring what is happening with the extreme values. Once the event has passed and the platform is re-manned, we return the system to its normal state.”

The key to remotely monitoring unmanned assets is the quality of the data and the ability to validate and extract insight. Soma Maroju, Head of Data Services at BMT explains.

“Having frequent measurements of sensors is important to fully resolve the motions and forces that assets are experiencing. On our systems we typically sample the data at frequency high enough to capture the responses during an extreme weather event. This high resolution enables us to capture the impact of extreme waves and wind on the platform. Moreover, the data is transmitted frequently unlike during normal operations. We are also able to validate this data using machine learning and compare it against third party sources such as NOAA’s network of weather monitoring buoys.”

BMT DEEP also helps reduce the load of several users remoting into the offshore system. The data and information are consolidated from multiple sources into one place and all stakeholders can access this information in a secure way. BMT DEEP is an online platform that stores and processes data from remote monitoring systems and enables operator’s severe weather response teams to monitor multiple assets.

From the onboard systems collecting the data through to our online data platform, BMT is enabling teams of engineers and asset managers to keep a watchful eye on their offshore assets when extreme weather hits.

7.

Post-Hurricane Season

As noted in Cranfield university's 4Sight resilience model, analyzing data collected from operations, the business environment and indeed from asset performance is all part of developing a resilience strategy for the long term and a plan for dealing with next year's extreme weather event.

While operators are rightly concerned with the narrow field of data surrounding the days either side of an extreme weather event, taking a longer-term view of the entire season and looking at trends over several years is important to identify trends that pose a risk to the business.

7.1 Data Validation

As part of post hurricane season analysis, it is important to collect and validate data from instrumentation devices. Not all platforms transmit data during hurricanes. Certain platforms have data transmitting during the hurricanes via satellite, while others use fiber optic networks. Soma Maroju, Head of Data Services at BMT explains.

"What we typically do is look at all the data that has been transmitted to ensure that we have good data sets collected during these extreme events. While we advocate that systems are checked ahead of the season and that the sensors are calibrated occasionally this is not possible, or instrumentation may become damaged during the season that can produce invalid data. Thus, it is important that the data we are incorporating into long term and historical data sets are accurate."

As part of the data management process in BMT Deep, we have incorporated an automatic quality control process that can identify and query unusual data points which are then flagged for inspection by our customer support team.

BQC

Combine offshore System status with data to compute aggregates

Meta data Recorded with data.

- System Status
- SHM Files
- Event Logs

AQC

Combine offshore System status with data to compute aggregates

Meta data Recorded with data.

- System Status
- SHM Files
- Event Logs

MQC

Combine offshore System status with data to compute aggregates

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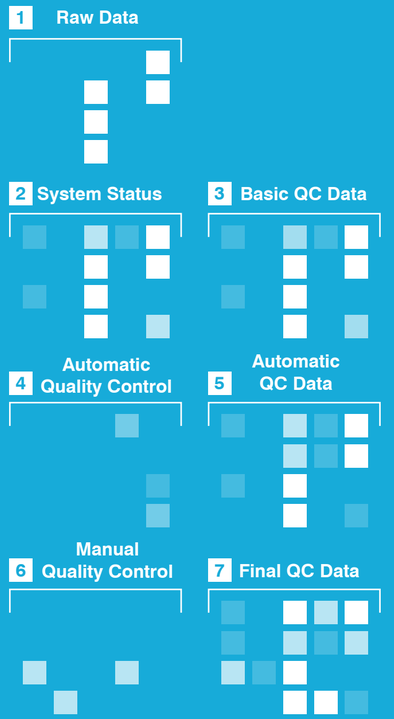

7.2 Identifying damage

One of the key benefits of remote operating systems is the ability to identify damage to offshore structures. This enables operators to make repairs and ensure safe operation. Damage can either be sudden, and identified immediately after a hurricane, or it can be longer term fatigue identified after a season, Soma explains.

“It’s interesting to notice as the storm passes by how structures move in their position, whether floating in deep water or fixed in shallow. They sway with the wind, waves and current. Data collected before, during and after a hurricane, when adjusted for weather conditions, can reveal damage to the structure. Several years ago, we noticed on a particular platform that a temporary structure fell off during the storm. There was a big change in the vessels list and trim, and there were huge increases in the acceleration of the platform. This was then validated using imagery from the remote monitoring systems cameras. By bringing information together from multiple sources, the team of engineers was able to identify what happened.”

7.3 Long term trends

The data collected during the season, both during and in between extreme weather events becomes very useful for long term trends and for evaluating how the structures have performed. Asset managers can assess the performance of the platform against the design guidelines and identify any fatigue.

Soma said, **“By building a platform which solves the problems of collecting, managing, and storing vast amounts of data, trillions of data points, and enabling collaboration, we’re unlocking long term trends. The data transmission has improved. The way we organize the data has improved, processing capabilities have improved. All of this allows us to go and look at massive amounts of historical data as well as the current and try to synthesize and derive trends of the data and try to advise our clients on what patterns we are observing from the data.”**

Data collected during these extreme events is very useful to assess the platform’s condition. These are a few ways how BMT can help our clients post hurricane analysis around structural integrity to extend the life-span of some structures, risers or topside equipment.

8.

The Future

Anticipating change is a core part of resilience. Companies who understand the direction of their markets, as well as technology are better positioned to face threats and benefit from opportunities.

In the last 10 years BMT has made improvements to the underlying hardware, as we integrate more advanced components in our data collection products, and we have introduced digital solutions. The introduction in 2015 of our cloud-based data analytics platform, BMT Deep, capitalizes on the culmination of advances in global connectivity and cloud computing which has brought benefits to many industries.

It is enabling asset managers to have confidence in the data, as the powerful cloud computing can run sophisticated algorithms to validate raw data, and it is enabling them to identify real insights from the trillions of data points that are collected. It is fair to say, asset monitoring has made many advances over the last few years, but what is next?

8.1 Affordable monitoring for all

Andy Brown, Business Development Manager at BMT, has been working with offshore operators for over thirty years and has seen the tremendous change in the industry, the challenges clients face, and the opportunities technology has in meeting those challenges. He explains how component level improvement are opening access to more companies.

“When we first launched our monitoring systems, they delivered incredible value to operators who had highly valuable assets operating in deep water. However, they were not always an affordable option for smaller nearshore facilities. We have continued to innovate, looking at the data we have collected from various assets, we have been able to reconfigure our monitoring systems to hit a lower price point for those nearshore operators.

At the same time, the offshore energy production industry has faced increased competition with a fall in energy prices. Oil prices in real terms are 60% less than 10 years ago and that is with the recovery in demand to pre-covid levels. Also, the cost of wind production has decreased by 30% in the same period. It has become more important than ever before to maximize the value from assets, extending the lifespan of facilities, and the only way to do that safely is through collecting data. This pressure is only set to continue over the next 10 years as the cost of ownership increases and margins are eroded through innovation.

With more affordable solutions and a greater need to collect data, I see remote monitoring and analysis become imbedded and the real norm over the next 10 years. Not just in the energy sector, but across all sorts of industries that have critical assets or facilities that customers want to protect and sustain.”

8.2 The bigger picture

Soma Maroju, Head of Data Services at BMT explains how technological advances are joining the dots and closing the loop in helping asset managers better manage their assets.

“We’re very much moving to that space of creating a digital twin, where the data we are collecting will create a virtual representation of an offshore asset. However, with so much hype around the term ‘digital twin’, it is important to note, no one solution can create an end-to-end digital twin of an asset. The concept of a digital twin should be thought of as an ecosystem. Where different solutions come together to collect real-time data, update a digital version of the asset, and continually model how it will perform with the new data set in the real world.

Historically, there has been a disconnect between the design, manufacture and use of an asset. There has not been a clear feedback mechanism between lessons learned and implementing changes to improve asset performance, at least not at that whole system level. These historical challenges are the result of not enough data being collected or data that is being collected being unorganized which restricts the ability to uncover insight through analysis.

Data collection will become the norm for all industries because of greater demand from customers to ensure asset integrity and safety of their personnel. This is important , as we will have the data to match the advances in cloud computing and models which extract the insight to help inform better asset management and improvements during and post disaster event?”

Links

9. https://energypost.eu/5-charts-show-the-rapid-fall-in-costs-of-renewable-energy/

8.3 Informing the response to climate change

In line with recommendations of the Financial Stability Board, more and more companies are beginning to assess and disclose future climate risks to their business to shareholders and investors. While a key focus of this agenda has been on decarbonization and managing transition risks to a low carbon economy, a 1.5 C change in global temperatures will lead to increased vulnerability of existing facilities to climate risks as well as a need to ensure new development accounts for future conditions.

At a more strategic level, BMT can use our proven metocean data sets as well as published predictive data sets from agencies like NOAA and National Weather Service to undertake scenario planning of how different CO2 emissions scenarios may affect natural hazard frequency or severity such as hurricanes.

Combined with real time data collected from offshore platforms over time using BMT DEEP, we can generate realistic and practical risk assessments for our clients to inform their climate risk exposure and response.

BMT’s Lead for Climate Risk and Resilience, Greg Fisk explains –

“Creating practical linkages between climate data and predictions and the actual effects of real time hazard events on asset integrity and performance is the level of detail that is critically missing from most climate risk assessments.”

“Using data collected and analyzed using quantitative mitigation tools like BMT Deep creates a level of knowledge around climate risk that will drive sound decision-making and future investment.”

Links

10. www.fsb-tcfd.org/recommendations/

www.bmt.org/deep