LCE LIFE CYCLE® ENGINEERING

Asset Leadership Network

Life Cycle Engineering and Asset Leadership Network

The Convergence of Asset Management and Resilience during Disruptions and Everyday Operations

The Convergence of Asset Management and Resilience during Disruptions and Everyday Operations

Executive Summary:

- Integrating resilience planning along with a structured asset management program will help better prepare your organization to achieve its strategic mission during everyday operations and during disruptive events.
- Lessons learned from preparing for and responding to disruptions can help organizations realize the benefits and value from applying similar efforts to everyday operations, and vice versa.
- When updating their resilience plan, smart enterprises will look beyond their immediate organizational boundaries and extend their planning to involve the communities in which they operate. Engaging public and private stakeholders is consistent with ISO55000 guidance and will strengthen organizational and community resilience while creating synergistic opportunities for improved performance.

Takeaway:

- Resilience planning is essential to asset management planning.
- A structured Enterprise Asset Management (EAM) program that includes resilience planning is a force multiplier that benefits all stakeholders.
- The ISO 55000 structure for asset management is a viable and holistic approach that can help organizations improve mission success during disruptions and in everyday operations.
- Asset management and resilience planning follow a natural maturity curve and are never complete. Organizations can improve their maturity regardless of where they currently reside on that curve. Experience tells us that greater maturity in these areas typically results in substantial organizational benefit.
- The time to update your asset management and resilience planning is NOW.

Introduction

Resilience across communities and public infrastructure involves much more than an individual organization's response to an emergency. It reflects the ability of disparate public and private sector organizations and stakeholders to collaborate as effectively as possible to anticipate, prepare for, respond, and recover when incremental or sudden disruptions occur.

Organizations tend to think of their mission and their assets as separate from the many stakeholders and diverse infrastructure assets that enable their success. But roads, electricity, gas, water, communication

services, and public infrastructure are essential to almost every organization – private or public. The responsibility to provide effective public infrastructure assets extends beyond the specific Department of Transportation, utility, or local agency that is charged with their safe and practical delivery. Private and public asset owners must see their operations as part of a larger system and incorporate collective resilience into their asset management policies, strategies, and objectives.

The ISO 55000 structure for asset management acknowledges that all relevant stakeholders should be involved in creating an organizational Strategic Asset Management Plan (SAMP). This requirement suggests that your SAMP must include tangential stakeholders. Even if your organization provides its own energy generation or maintains its own roads, some level of coordination with another energy provider, or with the local Department of Transportation, is essential during normal operations as well as times when emergency response is activated.

During emergencies and disruptions our need for interactive involvement across stakeholders and infrastructure is most apparent. A structured asset management program will greatly enhance resilience and stakeholder involvement, and ensure mission success during normal operations as well as emergency situations. With the inclusion of resilience planning, the structured asset management program can shift response to disruptive events from chaos to clarity. It can also help your organization mitigate very real problems that might impact your operations and your community's recovery.

As we have learned from the COVID-19 pandemic, governments, hospitals, first responders, citizens, and even industry all have critical roles to play in preparedness, response, and recovery. Each of these parties will benefit from greater collaboration across the resilience and asset management planning processes. But first, organizations must collectively acknowledge, understand, and be ready to work interactively with all key stakeholders to ensure mutual mission success.

The organizational mission for asset-intensive enterprises in either public or private sectors is directly linked to their physical assets and the alignment of the organization's people, processes, and technology to maximize the effectiveness of those physical assets. Maintaining mission readiness for these assets is difficult enough during normal operations. In the case of a local, statewide, national, or global disruption, the added challenges make readiness even more difficult and necessary.

When major disruptions occur, stress levels are high and the focus on asset management is often diluted; supply chains can be disrupted and workforce collaboration is often strained. Mid-crisis is not the time to deploy unfamiliar asset management systems and practices, develop a new supply chain, or ask your workforce to roll out unfamiliar protocols for infrequently used technologies.

Because resilience is part of an effective SAMP, preparing for emergencies and major disruptions is a significant asset management issue. Where possible, these events should be addressed with the same systems, processes, and people employed in your normal day-to-day operations.

Six Key Asset Management Concepts that Enhance Resilience

There are six key asset management concepts that enhance resilience when facing a real-time disruption or disaster. These principles apply not only to disruptions and emergencies, such as the COVID-19 Pandemic response or the failure of Texas energy utilities during the 2021 cold weather anomaly. They also apply to everyday operations.

1. **Asset Registry**
2. **Mutual Aid**
3. **Commissioning/Decommissioning**
4. **Maintaining Idle Assets and Upcycling Assets**
5. **Configuration Management**
6. **Establishing Best Practices for Operations, Maintenance, and Reliability**

1. Asset Registry

It is critical during disruptions or during normal operations to have an accurate and current register of your organization's assets. In a disaster or disruptive event, an organization must know in advance what critical assets might be needed to maintain mission readiness and effectiveness and where those assets might be obtained regardless of whether they are owned by your organization or other stakeholders. Different types of disruptions require different types of assets and responses. Sometimes all assets needed for a response can be obtained within the organization. However as we have all seen, those assets may need to be procured, borrowed, or otherwise obtained from outside sources. In the case of COVID-19, many hospitals had to seek ventilators and personal protective equipment (PPE) from the Federal government, other health care organizations, and even from industry.

> ***"A structured Asset Management Program will align an organization's people, processes and technology with their physical assets."***

Asset registry issues to consider in an emergency or disruption include:

1. Can the responding organization anticipate where they might obtain critical assets when under an emergency protocol and can they automate the requests?

2. What alternative sources might be tapped for critical assets if the normal channels are disrupt ed? Using COVID 19 as an example:

a. Would local hospitals consider reaching out to airlines or airplane manufactures to obtain oxygen masks, hoses, and tanks from the idle aircraft assets that were grounded due to de creased travel patterns?

b. Would a hospital reach out to the local school system to obtain generators, trailers, and buses while students are out of school?

3. How do we connect these disparate resources to the collective need?

a. A key enabler would be to anticipate and catalog the required assets ahead of a disaster, identify potential sources, and capture that information into a shared asset registry that can contain the following information:

1. Asset tag information
2. Asset location (last known, real-time location services or RFID)
3. Asset condition
4. Asset maintenance history/reliability
5. Asset custodian
6. Mutual aid accounting information

An asset registry should be continuously developed and improved. Organizations and communities can start classifying emergency response assets within their asset registry for specific events such as pandemic, hurricane, earthquake, fire, flood, or other weather anomalies. For specific use cases such as these, certain classifications of assets can be linked (or made aware) to a common/community asset registry which might be maintained by a government entity or NGO. A community asset registry should continue to mature regardless of whether assets are owned by multiple entities and/or if certain resilience events require only subsets of that registry. **This link** provides an example of a community asset register. Community asset registers occur around the world.

2. Mutual Aid

When one organization obtains an asset from another, they may have to account for the wear and tear on that asset and compensate the loaning organization. The accounting for these types of transactions is part of what is known as mutual aid.

Accounting for mutual aid is often a laborious task that drags on for months or years after other aspects of the disruption have returned to normalcy. This accounting could be greatly simplified if the asset owner and asset borrower establish, or adopt existing template agreements prior to a disruption. Operating and maintenance activities and cost information can be captured and made shareable through standardized data collaboration tools or Application Programming Interface (API). More information on how private sector, government, and nongovernmental organizations can leverage mutual mid to plan, respond, and recover from a major disruptive event can be found on FEMA's website: **National Incident Management System**.

With some advance planning, mutual aid can help ease financial risk and concerns during an actual disruption and help focus collaboration on response and recovery.

3. Commissioning/Decommissioning

During the response phase of an emergency event or major disruption, organizations often have to rapidly commission temporary assets or facilities. Examples include emergency shelters, staging yards, or field hospitals. These temporary assets may need to be quickly designed, engineered, and commissioned. When the response phase of the event is over, the facility or asset often will be de-commissioned and borrowed assets will be returned to proper owners. These assets may also need to be subsequently re-commissioned/re-decommissioned if a secondary event occurs. Each instance can require the deployment, start-up, and shut-down of borrowed/acquired assets. Commissioning and decommissioning of complex assets is not easy. Capturing the process and standardizing it will streamline the activities and improve repeatability.

4. Maintaining Idle Assets and Upcycling Assets

Complex assets required for a disaster response may remain idle, or at reduced duty, during long periods of time between disruptive events. Think of the USNS Comfort, the U.S. Navy's hospital ship. This complex asset must be ready to rapidly deploy and increase operational activity with little advance notice. Engines, generators, pumps, HVAC systems, and electrical systems must be maintained during idle times with a minimal crew. The full response crew must be trained, certified, and ready to deploy as the emergency protocol requires. The physical assets and resources must eventually work together in harmony before, during, and after a response event.

An emergency often requires upcycling an asset with or without staff in place. Upcycling, also known as creative reuse, is repurposing an asset to perform a new, higher value or use. As an example, the U.S. Army Corp of Engineers might upcycle a previously decommissioned DoD medical facility to be used as a temporary hospital. Effective response planning must include an onboarding process for the resources needed to ensure readiness familiarity with the assets. Digitization of processes, facility maps, training, and onboarding processes could substantially improve efficiency.

The concept of idle assets is also relevant to non-emergency situations. For example, oil exploration assets may need to be temporarily placed in idle status if the price per barrel falls below a defined threshold. When the market justifies, the assets may need to be rapidly re-deployed or upcycled. Use cases such as these help to illustrate that organizational adaptability relies equally on resilience and asset management principles.

5. Configuration Management

Configuration management is a systems engineering process for establishing and maintaining consistency with a complex asset's configuration, expected performance, and operational information throughout its life. Configuration management can be leveraged to reduce the number of permutations of operational and maintenance processes when assets vary slightly in their configuration.

To help visualize how Configuration Management fits into resilience and asset management, imagine the complexity of rapidly deploying dozens of temporary housing units after a natural disaster. A strong configuration management program will:

a. Define a standardized model of those units
b. Associate resource planning, maintenance activities, and operational workflows to possible configurations to create efficiency and confidence in asset readiness.
c. Enable manufacturers to normalize construction and distribution as close to the standard as possible
d. Allow changes/improvements to the standard model to be captured, recorded, and disseminated

6. Establishing Best Practices for Operations, Maintenance, and Reliability

Optimizing the total life cycle of an organization's assets is not an easy job. Deploying the organization's proprietary assets into emergency operations which might have ambiguous organization boundaries is certainly an unsettling task for the people responsible for those assets. Each owning organization and each team member have unique processes and technologies in which they are accustomed

to operating. Those asset owners may not have confidence that borrowing organizations will match their standard level of care.

The application of well-defined job plans and consistent best practices is a safe and efficient way to standardize operations and normalize reliability activities so that assets can be managed, accounted for, and properly maintained throughout their lifecycle. Clear processes, roles, responsibilities, and maintenance activities can be defined with relative consistency for many asset classes and asset management activities. Management of change must be governed properly to ensure that approved changes are efficiently cascaded throughout the organization and that best practices are only adapted or updated when absolutely necessary. The need to establish and adopt best practices for operations, maintenance and reliability is fundamental regardless of whether the assets always remain under the care and custodianship of a specific business unit, loaned across your organization, or deployed outside the normal confines of the business. A comprehensive asset management program that includes resilience planning and the adoption of best practices will help optimize the assets' total cost of ownership and the value that it brings to your organization.

Resilience and asset management go hand in hand. Organizations that prioritize these disciplines will greatly benefit in times of disruption and in normal operations. Expanding your organizational maturity in these areas will improve adaptability, mission success, and enhance satisfaction for all stakeholders. Resilience and asset management can improve outcomes and save lives during a crisis, and can help optimize your organizational performance during normal business operations.

About the Authors

As Managing Principal, Jesse Rothkopf leads Life Cycle Engineering's Transportation and Non-Manufacturing consulting practice. Jesse and his team work with public and private sector clients to align the people, processes, and technologies with the physical assets that make up today's complex enterprises. You can reach Jesse at jrothkopf@LCE.com.

Michael Bordenaro is Director, Communications for the Asset Leadership Network (ALN). The ALN focuses on impacting asset management across all industries, markets and sectors that depend on physical assets to achieve strategic organizational objectives. You can reach Michael at mbordenaro@assetleadership.net.