EBOOK

Safe and reliable freight transportation

Best practice guide

Content

01 Summary

Efficient asset and work management practices are crucial in all industries, but they have never been more critical to freight transportation. The ongoing need to do more with less, coupled with the emerging challenges related to health and safety protocols, places unprecedented demands on companies globally.

While asset management has played a pivotal role in sustaining transportation and ensuring seamless service, it now falls short in the face of heightened public scrutiny concerning the safe and reliable movement of goods. Recognizing this evolving landscape, this best practice guide offers insights into reassessing applied enterprise asset management (EAM) methods and practices to meet elevated standards and expectations.

02 Seeing the unseen

Managing real-time equipment demands, ensuring reliable material availability, maintaining safe and clean operational environments and optimizing internal and external workforces present unrelenting challenges for transportation organizations.

At the same time, the focus on a continuously operational (and sometimes non-operational) service revolves around discussions of vital transportation assets, predominantly rail, truck, cars and other vehicles, along with linear assets. However, maintaining the efficiency of a system necessitates recognizing the equal importance of various components, including underground drains, pressurized gas lines and essential elements like signs, signals and switches.

Furthermore, simply running on time is not a satisfactory metric to show how assets are maintained. When a rail depot or station is rendered inaccessible or, even worse, deemed unsafe because of a hazardous materials spill or broken track, branding, reputation and revenue are immediately impacted.

03 Evaluating the right approach

Top priorities for any transportation company should involve understanding the required maintenance types and recognizing the assets used in daily operations.

That means making sure that the right type of maintenance is deployed:

- For the right asset
- At the right time
- By the right person
- At the right place/point
- For the right condition
- Aligned to asset lifecycle cost

This approach is essential to assessing all maintenance methodologies and understanding the reasons and methods for transitioning specific assets through the modes outlined in the Maintenance Maturity Model: reactive, preventative, condition-based, predictive and prescriptive practices.

Given the evolution of maintenance strategies such as asset investment planning (AIP), asset performance management (APM), and digital work empowered by technologies like artificial intelligence, machine learning and digital operational twins, transportation professionals can now develop the most cost-effective prescriptive maintenance asset management strategy.

04 Understanding the Maintenance Maturity Model

The Maintenance Maturity Model includes five levels:

- **Reactive**
  This entails repairing the asset after it breaks or malfunctions. Before technological innovation, it was (and still is) a common practice in transportation. This is the difference between fixing a blown-out tire versus predicting tire failure based on variables such as tire pressure, distance traveled, age, overall condition and tread depth.

- **Preventive**
  Proactive efforts to prevent failures by maintaining vehicles and equipment at predetermined intervals are the next step in maintenance maturity. This involves integrating an OEM's preventive schedule into the care routine for trucks, trailers, locomotives, rail cars or supporting infrastructure. This approach is vital for warranty claims, as they depend on accurately documented preventive maintenance. Although an enhancement compared to reactive methods, relying solely on preventive maintenance can be inefficient, costly and lead to unnecessary downtime.

- **Condition-based**
  During this stage, notifications are issued regarding a particular point of failure, utilizing data gathered from systems such as on-board telematics. However, this does not accurately depict the overall health of assets.

- **Predictive**
  Predicting the potential failure of assets has been simplified thanks to the advancement of algorithms and sensor technologies. These tools capture data from various sub-systems at any given location and time, sending the information to a cloud-based environment. In this environment, the data undergoes analysis and is swiftly presented to diverse stakeholders, enabling real-time decision-making.

- **Prescriptive**
  This goes beyond predictive maintenance, spotting potential issues before they arise, detailing the procedures and personnel required to prevent asset malfunction and providing suggestions for equipment remediation. It also provides insights into points of asset failure, highlighting why such failures might occur. For instance, the anticipation of an engine seizure linked to elevated temperatures, vibrations, emissions and unusual sounds may signal low oil levels, triggering the issuance of a work order for inspection, identification and necessary repairs.

Aside from mitigating risk, establishing a Maintenance Maturity Model and strategic plan provides a more precise set of data points for accurate budgeting, ensuring secure and reliable operations. Adopting maintenance maturity for crucial, mission-critical assets also yields lasting advantages such as cost reduction, improved customer service and optimized resource allocation.

05 Getting there

With an extensive array and number of assets at play, transportation agencies and organizations must identify the most crucial ones. Subsequently, freight transportation companies can focus on these essential assets and navigate them through the Maintenance Maturity Model, incorporating modeling, budgeting and reporting procedures.

1. Start with situational awareness of the critical assets for the organization's key performance indicators (KPIs). These assets are identified using condition sensor technologies such as vibration sensors, heat sensing devices and metrics like hours in service and miles traveled.
2. Develop a comprehensive record of digital operational twin data elements that ensure safe and reliable transportation services. This includes details about labor, materials and tools involved in the process.
3. Establish Digital Driver Vehicle Inspection Reporting (DVIR) and procedures to ensure vehicles are in safe operating condition and meet US Federal regulatory requirements.
4. Allocate budget figures to each asset and its maintenance mode to comprehend the costs associated with any plan or action.
5. Automate data collection, where possible, to support quantified and qualified statements of condition.
6. Produce real-time status information for every component and its condition, specifying the data collector or source and details on when and how the data was gathered.

"The integrated platform in the Octave multi-tenant cloud has enabled us to digitally transform the way we manage our tanker fleet and represents a major shift for fleet management on board and ashore and will support and improve collaboration and work processes at Odfjell."

Robert Øksnes
Manager of Planned Maintenance Systems, Odfjell

06 The universal importance of safe and clean

The transportation industry is undergoing a transformation highlighted by a broader focus on rigorous health, safety and cleanliness procedures, fueled by both consumer and regulatory pressures. This essential shift, derived from insights presented on EHS Insight, extends past conventional equipment maintenance towards digitization and continuous surveillance of hygiene practices.

In this contemporary asset management blueprint, there is an emphasis on meticulous documentation of every operational aspect. This involves understanding the clean status, the most recent cleaning timestamp, the personnel accountable for cleaning and their training level on the latest cleanliness regulations.

To address growing concerns, transportation agencies are leveraging real-time data to trace and in-depth track potential contagions. This includes overseeing inspections and managing third-party suppliers.

As agencies evolve, leaders and their teams are empowered with accurate data representation of each asset. This clarity enables the construction of a comprehensive roadmap, outlining priorities and charting actionable steps, aiming for prescriptive maintenance of critical assets. It also demands a thorough maintenance data repository, covering:

- Regular maintenance schedules
- Robust checklists for cleaning
- Record of staff certifications and experience
- Effective digital tools for data collection

Understanding the impracticality of intensive data collection for every asset, the focus should be on prioritizing tasks, striking a crucial balance.

06

The scale of change within these organizations necessitates strong supportive systems. Key elements include maintaining transparent communication about evolving protocols, clearly defining roles via an accountability framework, forming a cross-functional team for progress tracking and adaptability and embedding training and certification requirements into plans.

Managing workplace risk is paramount and preventive measures outlined include:

- **Slips, trips and falls:** Ensuring well-lit areas, eliminating tripping hazards, maintaining clean and dry floors and advocating suitable footwear use.
- **Manual handling injuries:** Providing training on safe lifting techniques and implementing the use of mechanical lifting apparatus for heavy or cumbersome loads.
- **Vehicle accidents:** Regular vehicle inspection and maintenance, comprehensive driver training, strict licensing standards and adequate rest periods to fight fatigue.
- **Exposure to hazardous materials:** Offering specialized training on handling hazardous materials and supplying suitable PPE.
- **Extreme environment conditions:** Specific training on coping with extreme weather conditions and equipping workers with appropriate PPE.

Thankfully, logistics firms have the means to minimize these health and safety threats. Steps include:

- Arranging comprehensive health and safety training for workers
- Implementing safe work environments
- Providing suitable safety gear
- Conducting regular safety audits
- Cultivating an all-encompassing safety culture

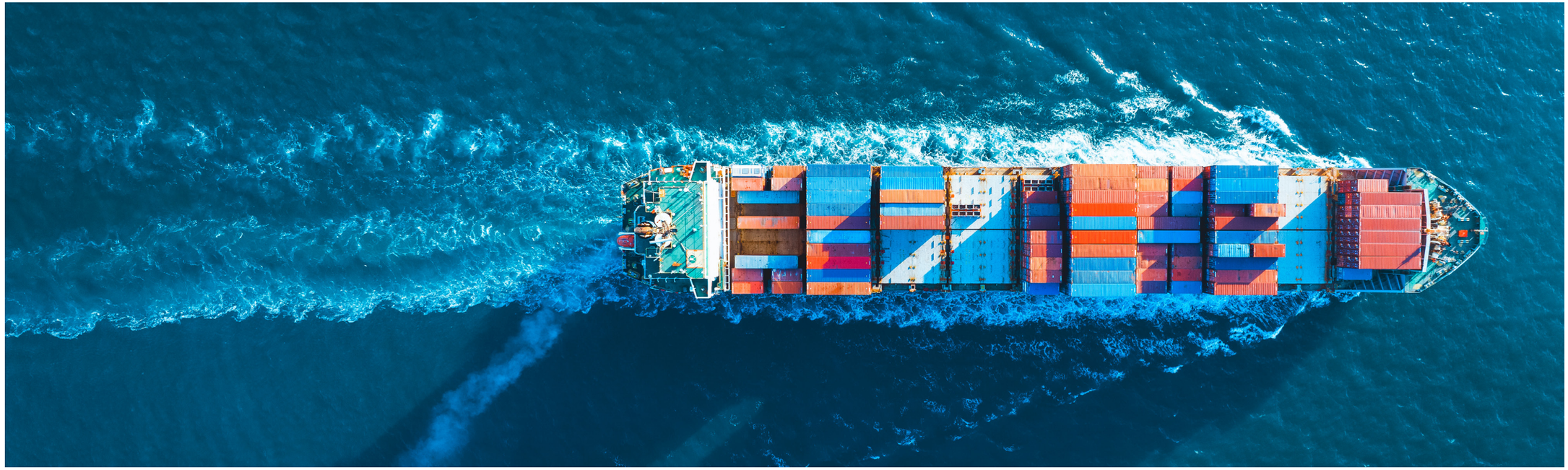
By integrating these steps, the transportation industry is better equipped to navigate future challenges related to safety and cleanliness.

07 Embracing a modern asset and work management solution

IoT technologies are crucial in fostering a modern asset and work management approach. To establish a forward-thinking and environmentally sustainable maintenance maturity management plan, transportation providers can initiate the process by gathering and digitizing critical data around the policies, personnel and practices associated with the maintenance and optimization of assets.

Transportation organizations are discovering that enabling staff mobility allows for real-time input and collection of work checklists and monitoring data. Additionally, these mobile capabilities house essential data on workflow, staff qualifications and certifications.

This allows for short-term transactional reporting, continuous business intelligence and long-term asset performance management. Additionally, companies stay prepared for audits, especially in an era emphasizing enhanced safety and cleanliness protocols and practices.



08 Finding the right partner

When implementing solutions to improve your maintenance maturity, look for a technology partner that understands the reality of transportation asset management challenges. Traditional on-premise and legacy solutions often fail to provide the essential sensor, predictive analytics and autonomous operation technologies today's transportation companies require. Opting for cloud deployment ensures the following:

- Scalable and extendable subscription-based delivery system
- Relieving agencies of the responsibilities associated with system upgrades and maintenance
- Establishing seamless connectivity across all systems to create an audit-ready, unified source of truth for EAM data
- Facilitating the adoption of emerging technologies like AI, machine learning and drones
- Providing a scalable platform to accommodate the expansion of digital work deployment across functions

Schwartz underscored that key tenets of any strategic approach must include "transparency, accountability and commitment for partners in business compliance." When approached with finesse, the limitations may be turned into "opportunities for growth, sustainability and responsibility to our community," he suggested.

09 Dig into the data

When reviewing standard transportation assets, here are some questions to consider when developing a maintenance maturity model that offers crucial insights for a modernized asset and work management plan.

Step 1: Define assets
Is it a point asset, componentized asset, linear asset or an asset with direction?

Step 2: Categorize assets in the model
Where do specific assets belong on the maintenance maturity model? What are the key performance indicators (KPIs) that help make that decision, such as cargo loss and damage, risk and safety?

Step 3: Derive condition-based KPIs
What condition-based data, such as asset history, age and performance, should be specified and incorporated into the plan using metadata and KPIs? How can we ensure that these data points are consistently updated?

Step 4: Gather data in real time
How can we guarantee the accuracy of work documentation? Utilizing digital work orders and checklists and integrating them with meters and monitors is essential to this process. The most reliable method for tracking activities is by digitally recording routine tasks, such as conducting oil viscosity checks in the field.

Step 5: Be audit ready
Unexpected events may happen. How can we verify the accuracy of our asset conditions? An audit-grade platform integrates software, workflow, labor qualifications/certifications, budgets and considerations for market shifts, such as upticks in freight transportation demand and significant business events.

Step 6: Create a dashboard
How do we extract transactional reporting and strategic business intelligence from the system? What are the key indicators that improve decision-making?

Step 7: Comprehensive asset performance management
How does the plan build toward a reliable, sustainable, efficient and cost-effective asset management culture?

Creating an asset maturity model requires agility and flexibility that on-site legacy systems may not support. Consider leveraging cloud deployment and industry-specific functionalities to enable:

- Automation, integration and connectivity across both internal and external systems
- Adoption of existing and emerging tools such as AI, machine learning and drone technologies
- Swift integration of user-friendly digital work applications

About Octave

Octave is a leader in enterprise software, turning data into decisive action and intelligence into your edge. Our software solves for and simplifies complexity, from the design and build to operations and protection of people, property and assets – for any scope, at any scale. For decades, we've partnered with customers to sharpen performance, elevate efficiency and amplify results. From factory floors to entire cities, our solutions are tuned to scale up what's possible from day one onward.

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