

# WHITE PAPER



## **FACILITATING ISO 14224 WITH EAM SOFTWARE**



# CONTENT

<b>BENEFITS OF THE STANDARD .....</b>	<b>2</b>
<b>14224's scope and ties to EAM.....</b>	<b>3</b>
<b>WHAT PREPACKAGED ISO 14224 SUPPORT WITH DEFINED</b>	
<b>PROCESSES SCENARIOS SHOULD PROVIDE .....</b>	<b>4</b>
<b>A foundation for continuous improvement and cooperation.....</b>	<b>6</b>
<b>ABOUT IFS .....</b>	<b>8</b>



# FACILITATING ISO 14224 WITH EAM SOFTWARE

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There has always been a significant financial reward for high levels of equipment reliability in the oil and gas industry. The long-standing desire of the industry to improve on equipment reliability processes is reflected in the International Organization for Standardization standard for collection and exchange of reliability and maintenance data for equipment in the petroleum, petrochemical and natural gas industries, ISO 14224.

The standard explains that ISO 14224 constitutes a “reliability language” that can be used to improve communication between parties involved in rig or facility operations and maintenance. In this white paper, you will learn how enterprise asset management (EAM) software that is prepackaged to support ISO 14224 can speed up compliance with the standard and ensure successful generation of valuable key performance indicators (KPIs) which comply with the standard that in the long run will be used to enhance equipment reliability. In this way the system uses the standard as a consistent “reliability language” for RM data. You can use a prepacked EAM solution as an online accelerator for becoming adept at that language and all that entails—quicker compliance and being able to answer questions from regulators or auditors, independent of a certifications surveyor. Most importantly, being able to use consistent KPIs to improve reliability and maintenance across sites (rigs), both operational and financial .

We know there is a significant financial payoff to improved asset reliability. According to a 2010 industry survey on non-productive time (NPT) by Athens Group cited in Drilling Contractor magazine, more than half of respondents—53 percent—said that NPT on high specification rigs costs them between \$1 million and \$25 million per year. The same article notes that on deep-water rigs, which can have a spread rate (daily cost to drill) of \$1.2 million a day, mechanical downtime of 10 percent to 15 percent translates to costs exceeding \$100,000 per day.

A key aim of ISO 14224 is to provide standardization in the way that various players in the industry—oil exploration companies, drilling contractors, maintenance contractors—approach the definition of key types of RM data and related data collection processes. The idea is that by having consensus on factors such as equipment categories, as well as failure modes and priorities, it will be easier to build effective KPIs and improve RM performance. Companies are free to add further classes or sublevels to their RM approach, as long as the base 14224 data is present.

Setting up all the base data required by ISO 14224 and related KPIs within an EAM solution takes time and effort. While a company could custom-build support for the standard into an EAM application or some other application or database, this can be time-consuming and might lead to inconsistent set-up. So from a practical standpoint, there is the issue of how quickly and effectively an EAM system can be configured for ISO 14224 support. How this issue can be addressed through the use of EAM software with a migration tool and preconfigured ISO 14224 support will be explained later.

## **BENEFITS OF THE STANDARD**

Once ISO 14224 is supported within an EAM system and RM processes are being pursued consistent with the standard, several key benefits can be realized, including:

- Better visibility over reliability issues and performance, leading to improved asset integrity management.
- A standardized approach to taxonomies, data collection, and KPIs across sites.
- Streamlined compliance processes with auditors and/or regulators because the EAM system is able to provide answers to questions on the way the standard is implemented.
- Enhanced regulator trust due to the standard being in place, and supporting information available via the EAM system.
- Consistency with ISO 14224's base data, KPIs and priorities sets a stronger foundation for compliance with regulatory regimes in different regions, as well as for the reliability-centered maintenance (RCM) processes gaining favor among major companies.

One factor all these benefits have in common is that they arise from being able to instantly have ISO 14224-related information on hand within an enterprise-class software system. When an EAM solution is prepackaged with basic data on factors such as equipment classes and failure modes, the operators of a rig or facility can instantly answer questions, such as; “How do you classify your work orders for this type of equipment?” or, “Why do you give priority to this type of work order over others?”

When you can instantly provide partners or auditors/regulators with accurate answers to such questions, and demonstrate to them how the related procedures are executed in accordance with ISO 14224, audit and compliance processes tend to become easier. Moreover, because the KPIs and analytics for RM data are being

done in a consistent way, the company adopting the standard and incorporating it into its EAM solution is better positioned to improve reliability performance. As ISO's introduction to the standard states: "data standardization, when combined with enhanced data management systems that allow electronic collection and transfer of data, can result in improved quality of data for reliability and maintenance."

### **14224's scope and ties to EAM**

A better understanding of the scope of ISO 14224, and how that scope relates to EAM functions, helps us appreciate the benefits to be gained by having standard support preconfigured into an EAM solution.

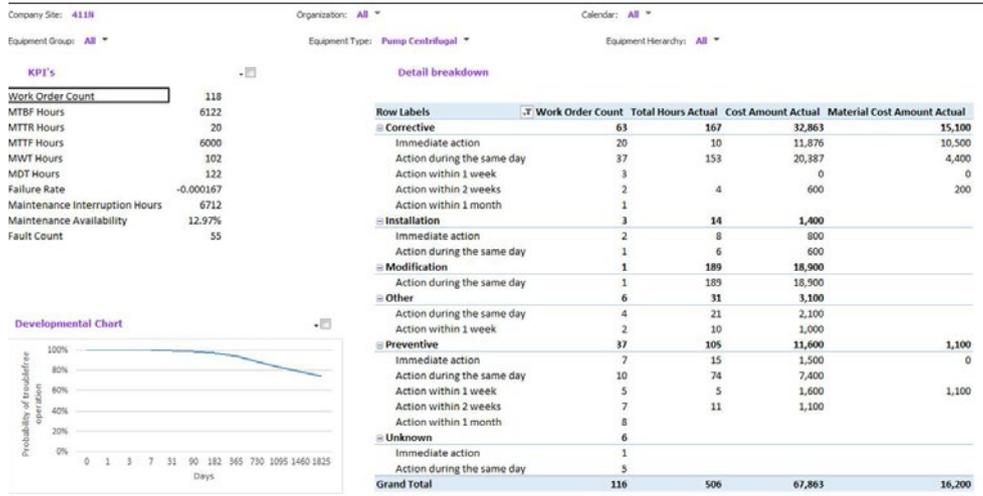
The standard itself defines equipment and failure information. It uses a hierarchical taxonomy for overall structure and logical categories or "classes" to define equipment, and sets forth multiple ways of tracking equipment failures and responses. For example, various types of pumps are grouped into an equipment class for "pumps," and all pumps are grouped as "mechanical" equipment. In the overall taxonomy, the standard starts at the broadest base level for "part," moving on up to larger maintainable components, to subunits, equipment units, larger systems, plants/units, major installations, business category (e.g. upstream versus midstream or downstream business), and at the highest level, by industry.

The ISO 14224 structure builds consistency in the way that RM data will be set up and collected. When combined with the various means of categorizing failures —such as by mechanism (e.g., mechanical problem versus material failure), detection method, maintenance activity, mode (e.g. failure to start) and priority (e.g. high, medium, low), a foundation is set for consistent tracking of failures.

All of this data set-up for ISO 14224 has a natural tie to EAM systems. EAM, as the name implies, is an enterprise-class solution for asset management. As such, it governs everything from maintenance management and scheduling to procurement of parts and equipment. It is very much like an enterprise resources planning (ERP) system for maintenance repair and operations (MRO) activities.

So if we map ISO 14224 definitions to the logical functions in EAM, multiple touch points arise. First of all, data within EAM for equipment and parts should follow the groupings set forth in the standard. While a company might choose to add levels, the standard classes need to be supported in the EAM system. Additionally, as the standard specifies various details on failure data such as failure cause, failure consequence, as well as related maintenance factors such as maintenance consequence, resources used, and downtime, the EAM system's work order and execution functions need to support these factors with the proper codes.

The ISO 14224 functionality within IFS Applications automates the capture of relevant KPIs, including mean time to failure, mean time to repair and others as required in the standard.



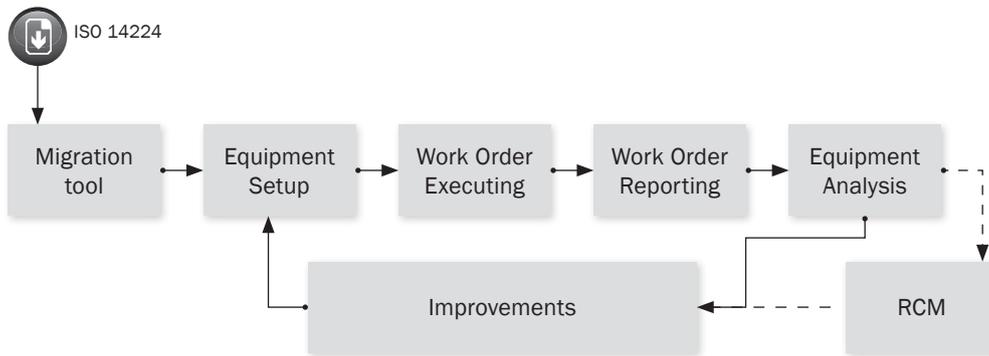
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Only when the EAM system is organized consistently with ISO 14224 classes and taxonomy, and the system’s handling of failure codes is also consistent with the standard, can the company hope to correctly generate, track and report on the KPIs envisioned in the standard. The standard’s “Annex E” section lists nearly 20 KPI examples, including:

- mean time between failures (MTBF),
- mean time to repair,
- worst actors (i.e. frequently failed equipment),
- operational availability,
- and preventive maintenance staff-hour ratio (i.e. preventive maintenance work order hours divided by total work hours, by equipment class or type).

## WHAT PREPACKAGED ISO 14224 SUPPORT WITH DEFINED PROCESSES SCENARIOS SHOULD PROVIDE

With enough consulting help and custom configuration, an EAM system can be set up during an implementation process or a systems integration project to support ISO 14224 definitions and reporting processes. However, an EAM system that is preconfigured to support the standard’s definitions and reporting takes away most



ISO 14224 in Maintenance Management.

of the burden, cost and risk inherent in this process because the end-user company can take the preconfigured base plate for ISO 14224 and adapt it as it sees fit.

A prepackaged approach to ISO 14224 support within EAM can be further simplified by using a migration tool utility that automatically loads the EAM system with the base data structures for compliance. The vendor should pretest this base data to ensure it can be used to correctly generate ISO 14224-related analytics. An under-appreciated facet of establishing ISO 14224 support within EAM is the amount of work that goes into getting the reports and KPIs to generate accurately.

The ISO 14224 functionality for IFS Applications effectively migrates the standard into the system. At this point, basic equipment setup, work order management, equipment analysis and optional RCM activities can be performed and tracked per the standard.

If an EAM vendor has done the necessary set-up of base ISO 14224 data for the EAM solution, and has preconfigured and tested related reporting, end users can leverage this work, and any associated migration tools to take time, cost, and risk out of configuring EAM to support the standard.

Once an EAM system is set up in accordance with the standard, operations and data collection can proceed in a manner that is consistent with the standard, spanning everything from the way equipment is classified under the EAM system, through the priority rules and failure codes associated with work orders to the use of reports and KPIs. Here are a few of the key capabilities that an EAM system with prepackaged support for ISO 14224 should encompass:

- All data structures pertaining to equipment in the EAM system should follow ISO 14224 definitions for category, class, and criticality. Users still have to populate these structures with the specific information for the actual equipment in use, but the packaged EAM solution should have the ISO 14224 base data structures predefined.

- Work order functionality in the EAM system should incorporate ISO 14224 terms and categories such as failure mechanisms, failure cause, failure mode, fault type, detection method, and priority. In this way, the actual execution of work and data collection will be done in a way that follows the standard.
- The EAM system should be able to generate reports and KPIs for RM processes addressed in the standard. Ideally, the packaged solution will have these reports preconfigured and tested.

### **A foundation for continuous improvement and cooperation**

The ultimate end goal for the standard comes back to improvement in equipment reliability and maintenance processes. By having in place better KPIs, these improvements become easier to achieve because the organization has a consistent way of looking at trends by the equipment classes and failure characteristics set forth in the standard. But there also are broader benefits to a standard approach to RM data, such as making it easier to comply with partner initiatives or fulfill aspects of other regulations. As the standard's introduction states, one of ISO 14224's aims is consistency among industry players: "Standardization of data collection practices facilitates the exchange of information between relevant parties (e.g., plants, owners, manufacturers and contractors) throughout the world."

For instance, major oil exploration companies are beginning to move toward reliability-centered maintenance (RCM) practices, an approach to ongoing improvement for maintenance that incorporates failure analysis. Through conformance with ISO 14224 and its use of failure classifications, a company has a better foundation for RCM initiatives it chooses to launch or must participate in.

Additionally, there are many country-specific regulations for the industry which govern safety concerns for various types of equipment, such as well control systems, blow-out preventers, and position monitoring equipment for floating rigs. With many of these regulations, there is a stipulation that the operator have an established equipment maintenance program.

While ISO 14224 cannot always be seen as fulfilling the maintenance requirements of country-specific regulations, having an established standard in place for RM data and procedures certainly provides a foundation that will tend to help with regulatory compliance. As a 2011 report from The Pembina Institute comparing offshore drilling regulations states, "legislation may refer to and in some cases incorporate ... best practice standards from industry, independent organizations, or other jurisdictions."

Ultimately, the value of adopting ISO 14224 and having an enterprise-class system to help execute it and perform analysis is actual improvement in equipment reliability. Here is where the rigor that goes into the base data on equipment classes and failure modes pays off by helping companies spot failure trends or make decisions on

which types of parts or equipment are most reliable. As the standard sums up, “data collection is an investment.” There are many possible payoffs such as improving time between equipment failures, or having better data on preventive maintenance.

When you combine these primary areas of benefit with secondary benefits such as aiding RCM efforts, or helping fulfill maintenance aspects of other regulations, the case for ISO 14224 is solid. It also is clear that a prepackaged EAM solution to support the standard will not only reduce the system configuration task involved, it will also tend to accelerate the effective use of the KPIs and analytics described in the standard to actually move performance in the right direction.

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## ABOUT IFS

IFS is a public company (OMX STO: IFS) founded in 1983 that develops, supplies, and implements IFS Applications™, a component-based extended ERP suite built on SOA technology. IFS focuses on agile businesses where any of four core processes are strategic: service & asset management, manufacturing, supply chain and projects. The company has more than 2,000 customers and is present in 50+ countries with 2,800 employees in total.

More details can be found at [www.IFSWORLD.com](http://www.IFSWORLD.com).  
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