WHITEPAPER

The Impact of Fatigue Management on Your Enterprise

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Introduction

Worker fatigue rears its ugly head in a multitude of asset intensive industries, often with serious ramifications. Fatigue causes lowered alertness. This leads to slowed reaction times, reduced vigilance, poor decision making, and lack of communication. In extreme cases, this may contribute to catastrophic incidents. Unless individuals actually fall asleep, the incident is normally a combination of faulty decision making within a critical situation. Research by Professor David Dinges at the University of Pennsylvania showed that fatigue contributes between 30 and 90 percent of all serious incidents across industries.[1]

Decreased alertness during the duty period may come about because of extended work hours on a shift, continuous days of long shifts, deprived sleep, night shifts, and workers having to take on unscheduled labor time. For night workers, this is exacerbated by naturally decreasing performance that is driven by the circadian rhythm, and there is unlikely to be any improvement due to adaptation. The level of sleep shortage varies with the individual and becomes more pronounced with age. However, some adverse effects will be felt by individuals at any age.

Working hours are controlled by a variety of prescriptive schemes in most countries in the world. The European Union introduced their working time directive to guide all workers apart from military personnel and aircrew; the latter having had customized schedules in place for decades. In addition, some unions have negotiated terms to restrict duty times to cover specific industries and occupations.

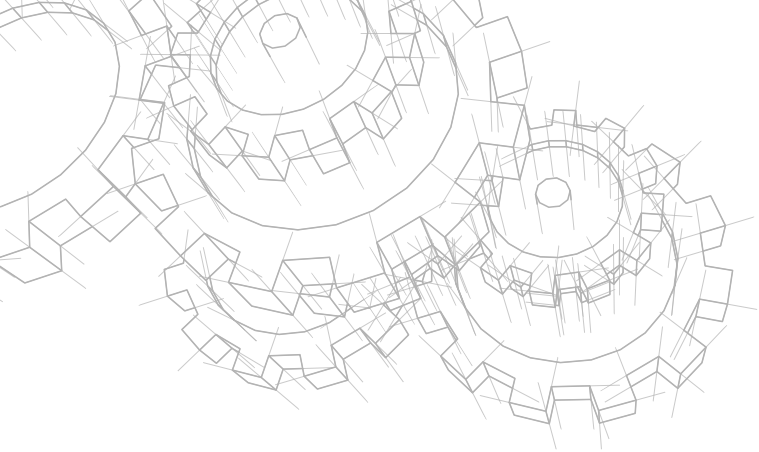
Keeping track of worker fatigue means understanding when someone worked in the past and when they are supposed to work in the future. The most important measurement is the rest period – the time between when a worker has stopped working and the time that he or she comes into work the next day. Managing those times is critical to managing worker fatigue.

Complementing Best Practices

In July 2008, the American Petroleum Institute (API) and the United Steel Workers worked together to develop Fatigue Prevention Guidelines that would – at a minimum – limit hours and days of work and address shift work. Also, the American National Standards Institute (ANSI) has developed Fatigue Prevention Guidelines for the refining and petrochemical industries that, at a minimum, limit hours and days of work and address shift work.

This resulted in standard ANSI RP 755 in April 2010. The standard provides guidance to all stakeholders (e.g. employees, managers, supervisors) on understanding, recognizing, and managing fatigue in the workplace. Owners and operators should establish policies and procedures to meet the purpose of the standard. This document was developed for refineries, petrochemical and chemical operations, natural gas liquefaction plants, and other facilities such as those covered by the OSHA Process Safety Management Standard, 29 CFR 1910.119.

[1] *Dinges, David. An Overview of Sleepiness and Accidents.*



The document is also intended to apply to a workforce that is commuting daily to a job location.

ANSI RP 755 applies to all employees working night shifts, rotating shifts, extended hours/days, or call outs involved in process safety sensitive actions. It should also be considered for others making process safety-sensitive decisions. On-site contractors involved in process safety sensitive actions shall have fatigue risk management systems (FRMS) equivalent to the criteria outlined in this document.

A further important element – in fact, a prerequisite – for successfully implementing a FRMS is the adoption of a culture that empowers employees to make safety-related decisions that impact operational performance sensibly, responsibly, and without fear of retribution. Successful implementation of an FRMS requires an open communication culture where everyone understands the importance and impact of risks related to fatigue.

We see more and more that FRMS is – or will become – a part of an integrated solution around the Health, Safety & Environment (HSE) system. The FRMS process can be best described in the diagram below:

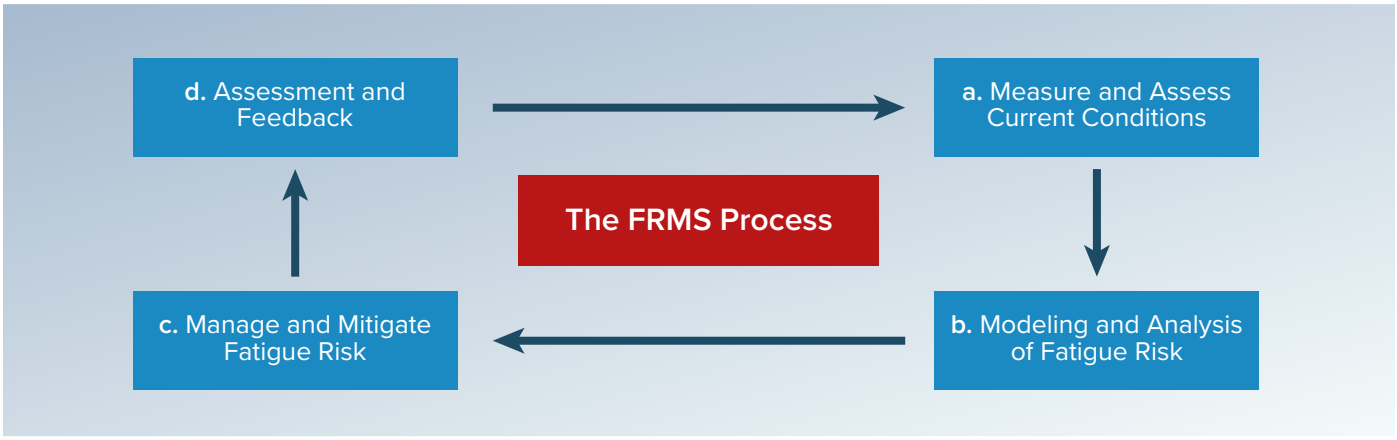
Some History on FRMS

In the 1970s there was an explosion of research into sleep performance and fatigue. In the early 1980s, the discussion moved into the political sphere, with congressional hearings on biological clocks and shift work scheduling. The first International Shift Work Symposium was held in 1979 in San Diego. The recognition of the effects of fatigue on safety can be seen from the number of federal investigations of fatigue related accidents in transportation and other industries since 1984.

In 2002, the New South Wales Rail Safety Act (Australia) adopted fatigue management processes as a regulation. This incorporates fatigue as a workplace hazard to be controlled, duty of care for managers and employees, and medical pre-placement requirements all within the Occupational Health & Safety (OH&S) legislation. Duty of care is within a shared responsibility model.

In May 2009, an initial meeting held at QinetiQ in the United Kingdom with about FRMS from European Aviation Safety Agency (EASA), EasyJet, QinetiQ, Civil Aviation Safety Authority (Australia), Air New Zealand, and Flight Global. During the meeting, it was agreed to continue with structured follow-up activities for all organizations interested in contributing to the development, implementation, and promotion of FRMS best practices.

These follow-up activities were structured in the FRMS Forum and were focused on organizing regular events open for airline, rail companies, health care, employee groups, independent FRMS consultants, software suppliers, and regulators. For more specific information on their activities, please see www.frmsforum.org. Safety-sensitive companies are tending towards more



risk-based views and adopting a holistic approach to leverage the optimal benefits from FRMS, including incident investigation, fatigue diagnostics, policy and strategy reviews, and internal training and education.

Focused Industries

Because of the potential impact of fatigue on health, safety, and productivity, any organization in which individuals work extended hours or hours during which people typically sleep can benefit from addressing workplace fatigue.

This is particularly important for safety-sensitive operations such as transportation, healthcare, oil and gas, chemicals, and energy industries, but it applies broadly to all process and discrete manufacturing industries.

Below are some examples where the importance of FRMS has been recognized within leading industry authorities:

Aviation

President Obama signed H.R. 5900 into law on Aug. 1, 2010, requiring every US airline to develop an FRMS plan by Oct. 31, 2010. FRMS is a recommended practice in the aviation sector.

From Regulators:

- The International Civil Aviation Organization (ICAO) formed a task force with representatives from airline operations, aviation medicine, and sleep science to create guidelines for airline operators and the regulatory community. The guidelines were announced in August 2011 and released for adoption by member states in December 2011.
- Federal Aviation Authority (FAA) announced their new rule in December 2011.
- The UK Civil Aviation Authority (CAA) is already at the forefront of FRMS implementation and was part of the ICAO task force. They have already aligned their processes with ICAO and EASA guidelines and are ready to receive FRMS applications from airlines.
- Chile is the most advanced regulator in South America with Argentina and Brazil not too far behind. In Southeast Asia, Malaysia and Singapore have made strong progress.

Chemical

The American Petroleum Institute (API) published ANSI Standard RP-755 in 2010 requiring all US refining and petrochemical operations covered by the OSHA Process Safety Management Standard to implement a comprehensive FRMS.

Rail/Transportation

The UK Rail Safety and Standards Board (RSSB) work closely with the Office of Rail Regulation in the UK to create guidelines on managing fatigue in the UK rail industry. The RSSB includes fatigue as one of the 12 key risk areas the UK rail industry is addressing in its strategy, leading health and safety on Britain's railways.

Healthcare

The most well-documented health care model of a comprehensive FRMS is that of Queensland Health in Australia. The implementation of the Queensland Health Medical Fatigue Risk Management Policy in 2011 was based on an awareness that fatigue is an occupational hazard that needs to be managed, just as hospitals would manage hazardous chemicals. This policy was developed with the intent of minimizing the

risk of patient harm caused by fatigue and keeping employees and the work environment healthy and safe. At each level, the staff and leadership can gather data and determine what controls, if any, need to be implemented to alleviate fatigue.

Mining

The Tasmanian Minerals Council in Australia published its Fatigue Risk Management Guide in 2004, and the New South Wales Mines Safety Advisor Council established a group in 2008 to develop a fatigue risk management standard for the New South Wales mining industry which was published in 2009.

Benefits of using FRMS

Organizations cannot eliminate fatigue, but they can effectively manage the associated risks. There are different tools and systems available that manage the different components to eliminate risk and increase safety and quality outcomes. There are many advantages for implementing an FRMS for all stakeholders. These may include:

Risk Reduction

An organization using FRMS will identify hazards and reduce risk to all stakeholders. Those at risk can be educated and take steps to mitigate the effects of fatigue while on duty. Those who engage with fatigued people will be educated in recognizing the signs of fatigue and have the opportunity to change their normal approach to accommodate fatigue driven behaviors and be more effective in their direction, communication, and management.

Increase Labor Productivity, Employee Satisfaction, and Customer Service Levels

FRMS can increase labor availability and promote more employee engagement leading to a happier workforce and higher output per employee. Mistakes cost money to correct and are disruptive. Fewer mistakes lead to a more productive workforce that have a higher sense of achievement and pride in their work, thus reducing QA engagement and discord with management. Even better, the direct and consequential costs for correction are avoided completely and customer service levels increase.

Managing Sick Leave

FRMS focuses on fatigue-related sick leave data, which should reveal issues with particular shifts and highlight sleep disorders. Management action can then be brought to bear to resolve such issues.

Increase Flexibility

FRMS can give the personnel or scheduling department the tools to adjust duty periods or if appropriate by choosing standby staff according to lowest level of fatigue. The availability of statistics and information will assist with managing the events on the day thereby increasing flexibility of an operation.

Summary

Fatigue management is a process, and an enterprise FRMS solution should be integrated into an existing technology footprint such as ERP, EAM, or CMMS. This allows companies to leverage existing investments, while ensuring compliance and minimizing risk. An FRMS allows companies to go beyond guesswork and ensure that all governmental and industry fatigue risk management standards are met.

For more information on how a FRMS can work for your organization, please visit our website and view the Fatigue Management section.

About Prometheus Group

Prometheus Group is a leading global provider of comprehensive and intuitive enterprise asset management software solutions that work within ERP systems and span the full work management life cycle for both maintenance and operations. Developed jointly with end users, Prometheus software enhances the customer experience for planning, scheduling, and executing work for both routine maintenance and shutdowns and turnarounds, all while protecting the workforce with safety solutions and electronic permit to work. Our straight-forward functionality, graphical visualization, and simple processes enable customers to increase productivity, reduce costs, and improve reporting. For more information, please visit www.prometheusgroup.com.