Fatigue Risk Management

A PROGRAM DEVELOPMENT GUIDE

SETTING THE STANDARD IN OIL AND GAS SAFETY

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About Energy Safety Canada

Energy Safety Canada is the oil and gas industry's advocate and leading resource for the continuous improvement of safety performance. Our mission is to help companies achieve their safety goals by providing practices, assessment, training, support, metrics and communication.

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DISCLAIMER

This document is intended to be flexible in application and provide guidance to users rather than act as a prescriptive solution. Recognizing that one solution is not appropriate for all users and situations, it presents generally accepted guidelines that apply to industry situations, as well as recommended practices that may suit a company's particular needs. While we believe that the information contained herein is reliable under the conditions and subject to the limitations set out, Energy Safety Canada does not guarantee its accuracy. The use of this document or any information contained will be at the user's sole risk, regardless of any fault or negligence of Energy Safety Canada and the participating industry associations.

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Preface

PURPOSE

The purpose of this guideline is to help organizations design and implement an effective Fatigue Risk Management Program. The goal of the program is to reduce incidents, injuries and damage where fatigue is recognized as a factor.

AUDIENCE

The intended audience of this guideline includes oil and gas industry supervisors, managers, health and safety personnel, senior management and executives, fatigue risk management committees, stakeholder groups and others responsible for designing and implementing a Fatigue Risk Management Program.

HOW TO USE THIS GUIDELINE

This guideline can be used by any organization within or supporting the oil and gas industry to identify and develop components necessary to manage risk related to fatigue. Organizations may use this guideline to implement a program of Fatigue Risk Management that addresses all or some of the elements. As some operations may not be able to meet the requirements of all components, the guideline allows organizations the flexibility to accommodate their specific needs.

PROJECT SCOPE AND LIMITATIONS

This guideline includes information about workplace fatigue, fatigue risk management issues and strategies and how to design and implement a Fatigue Risk Management Program. The guideline does not explore the science of fatigue, remedies for fatigue or effective personal approaches to prevention. These topics are introduced in a companion Energy Safety Canada info flip publication, *Guide to Safe Work: Fatigue*.

This guideline does not replace any in-depth training. It is intended as a framework to help identify components to consider in a Fatigue Management Program. Detailed information on scheduling strategies and application of hours of service are not included.

Several concepts and components are described in this guideline. Built on industry best practice, the intent of the guideline is to provide a non-prescriptive, flexible Fatigue Risk Management Program outline. While representatives from a range of companies have agreed that this advice seems appropriate for their organizations, the specific approach and its terminology might not be suitable for all.

REGULATIONS

Each provincial and federal Occupational Health and Safety jurisdictional authority has a well-established occupational health and safety regulatory framework. The Occupational Health and Safety legislation in each jurisdiction defines the responsibilities for employers, supervisors and workers to work safety and follow safe work practices. It is the employer's legal obligation to ensure compliance with current regulatory requirements and ensure the required qualifications and competencies of all supervisors and workers. Workers engaged in transportation activities may be further regulated by legislation regulating their hours of work.

REVISION PROCESS

Energy Safety Canada Guidelines are developed by industry for industry. Energy Safety Canada acts as an administrator and publisher.

Each guideline is reviewed on a three-year cycle. Technical issues or changes may prompt a re-evaluation and review of this guideline in whole or in

part. For details on the guideline creation and revision process, visit the Energy Safety Canada website at www.energysafetycanada.com.

This is the third edition and second revision to the original document entitled, Guide to Safe Work: Fatigue Management. The First revision was developed in conjunction with the Guide to Safe Work: Fatigue info flip publication for frontline staff. For details on the specific process for the creation and revision of guides to safe work, visit the Energy Safety Canada website at www.energysafetycanada.com.

Revision History

Edition	Release Date	Scheduled Review Date	Remarks and Changes
1	January 2003		
2	February 2007	February 2009	Document edited to be more consistent as a corporate guide and edited for flow and clarity.
3	December 2015		Document updated with consideration of risk management principles

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Introduction

When assessing the health and safety hazards of an organization, fatigue is an important subject for companies to include. The impacts of fatigue extend to both home and the workplace. Studies suggest that fatigue can have an impact similar to alcohol impairment. Employers therefore have safety and business reasons to deal with fatigue as part of an overall safety and risk management program.

Recognizing the factors that impact fatigue is important. These factors extend beyond traditional factors such as scheduling and work types. By identifying and managing fatigue risk factors, the employer enhances a culture of workplace safety.

The key steps, components and practices for development of a Fatigue Risk Management Program are depicted in the diagram below. An employer building a Fatigue Risk Management Program needs to involve management leadership and multiple employee levels in the development process. To do this, a steering committee is often useful to help develop the program.

Fatigue risk management components can be selected and combined to create an effective program. Smaller organizations may develop fatigue risk management principles based on those components and safe work practices. When a program has been developed and implemented, consideration should also be given to building employee competency in managing fatigue and ongoing program evaluation.

This guideline provides companies with information on the design and implementation of an effective Fatigue Risk Management Program to reduce fatigue-related incidents and injuries among their workers.

2.0 Workplace Fatigue

The six upstream oil and gas industry associations developed an industry consensus for fatigue risk management. Called the Fatigue Risk Management Guiding Principles, this document, seen below, demonstrates the associations' commitment to focusing on fatigue management. The Fatigue Risk Management Guiding Principles also provides a definition of fatigue.

Fatigue Risk Management Guiding Principles

We, the associations of the upstream oil and gas industry, recognize that fatigue is an industry issue and acknowledge that it has the potential to impact all aspects of our operations. Successfully managing the risks associated with fatigue is a shared responsibility among all industry stakeholders.

To meet our responsibility, we will operate under the following guiding principles:

- We support an integrated, risk-based approach to manage fatigue within the operational management system.

- We support the development of fatigue risk management initiatives, founded upon scientific knowledge and combined with operational experience, to develop flexible mitigations suitable for work activities, individuals, organizations, and industry.

- We will encourage our members to implement fatigue risk management initiatives, consistent with recognized practices, for the nature of the work activities and operations that they carry out.

- We will measure, review, and continually improve on our processes to mitigate the risks of fatigue.

- We will continue to advance, collaborate on, improve, and communicate methodologies, guidelines and recognized practices for mitigating risks associated with fatigue.

Definition of Fatigue

State of reduced mental and physical alertness or functioning caused by sleep related disruption or deprivation as a result of extended work hours, insufficient sleep, or the effects of sleep disorders, medical conditions or pharmaceuticals which reduce sleep or increase drowsiness.

Signed by the following parties on September 9th, 2013

Canadian Association of Geophysical Contactors

Canadian Association of Oilwell Drilling Contractors

Canadian Association of Petroleum Producers

Canadian Energy Pipeline Association

Explorers and Producers Association of Canada

Petroleum Services Association of Canada

ENFORM The Safety Association for Canada's Upstream Oil and Gas Industry

www.enform.ca

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2.1 HOW FATIGUE CAN AFFECT HEALTH AND SAFETY

Fatigue has a significant influence on health and safety both at work and at home. Fatigue causes slower reaction times and can result in poor decisions, more mistakes, decreased performance, and dangerous memory lapses. No one is immune to fatigue and its effects have an impact on the fatigued person's workplace, family and community.

Shift work and fatigue have been linked to health issues as well as disruption to social and domestic life. The highest rate of industrial incidents is usually found among shift workers, with catastrophic incidents more likely at times when workers are most prone to sleep, i.e., 12 am to 6 am; 1 pm to 3 pm. When examining work and fatigue, research demonstrates that the probability of a workplace incident rises with a decrease in alertness.

On the roads, more vehicle collisions occur in the early morning hours than at other times. This is a time when the fewest vehicles are on the road but is when people experience the greatest degree of sleepiness. An analysis of incidents involving commercial trucks found that drivers in fatigue-related incidents had an average of five and a half hours during their last sleep period compared to drivers with eight hours of sleep in non-fatigue related incidents. Also, evidence shows that the one hour lost in the switch to daylight savings time increases collision rates by seven percent. In the week following the change to daylight savings, fatal incidents, both on and off the job, increased by six and a half percent (NTSB, 1995).

In 1999, Lamond and Dawson measured the effects of fatigue and rated them against those of alcohol impairment. Findings suggest that after only 20 hours of sustained wakefulness, a person may be as impaired as someone with a blood alcohol concentration of 0.10 percent. The results of this study support the suggestion that even moderate levels of sustained wakefulness reduces performance to a greater extent than is currently acceptable for alcohol intoxication while driving.

These findings have important implications when considering that approximately half of shift workers typically spend at least 24 hours awake on the first night shift of their work period. The results are also important for anyone working extended hours over multiple days or weeks without adequate periods of rest. Similar performance impairments should be expected in workers fatigued by a sleep debt which can accumulate over multiple shifts.

2.2 WHY MANAGE WORKPLACE FATIGUE

Fatigue is an organizational concern as it impacts employee performance both directly and indirectly. Employee fatigue can result in decreased cognition, increased absences, increased incident risk and decreased productivity.

Fatigue is an issue that organizations can mitigate through the implementation of a Fatigue Risk Management Program. In the U.S. Refining and Petrochemical Industry, the American Petroleum Institute developed an American National Standards Institute fatigue risk standard (ANSI-API RP 755, 2010). The standard provides fatigue prevention guidelines that limit hours and days of work and addresses shift work.

While each organization's risk profile differs, the below graphic represents potential costs and controls associated with fatigue risk management.

A pyramid diagram with three levels. The left arrow reads "Incident Cost, Investigation Resources, Regulatory Intervention" pointing upward. The right arrow reads "Cost of controls, resources required to achieve compliance" pointing downward.

Top level:
Costs:
Major Incident
Controls:
Technology
Interventions,
medical screening

Middle level:
Costs: Process errors
Controls: Workplace design,
administrative / policy controls

Bottom level:
Costs: Absenteeism, illness, turnover
Controls: Training, awareness

By evaluating the business case, organizations may find substantial benefits, including the avoidance of incident costs and reduced worker absence and turnover. A Fatigue Risk Management Program demonstrates a company's due diligence and compliance with fatigue-related legal requirements. Employers are responsible to identify and control hazards. Employers and workers should consider fatigue as a potential hazard contributing to mental or physical impairment.

When evaluating the need for managing fatigue within an organization, consider the following:

- Is there a commute to the worksite that may contribute to an extended work day?
- Are workers required to work irregular hours, shift work or be "on-call"?
- Are the worker's tasks mentally engaging?
- Are workers active or sedentary for their tasks?
- What could the outcomes of a fatigue related incident really be for workers in each role, property damage, lost production, clerical error, catastrophic or something worse?
- Do the physical work conditions require heavy activity or work in extreme conditions?
- Have there been unexplained losses or incidents where no cause could be identified but fatigue could not be ruled out?

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- Is there a requirement for a critical response to an alarm or alert?
- Does the sequence of tasks or workflow induce fatigue related errors?

As part of their evaluation, organizations may find the evaluation process example located in Appendix 3 helpful to determine an appropriate level of controls. This example may not be applicable to all situations but working through the evaluation may help identify gaps in an existing program.

2.3 HOW A FATIGUE RISK MANAGEMENT PROGRAM CAN HELP

Similar to programs for substance use and dependency, a Fatigue Risk Management Program is part of an overall health and safety program. Often, it is part of a "fitness for duty" policy. A Fatigue Risk Management Program is intended to help companies increase employee awareness of fatigue and manage the associated risk factors to prevent or reduce fatigue related loss including injury, illness, productivity interruption, environmental or reputation.

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3.0 Understanding Fatigue Risk Management

This section provides background information on the effects of fatigue and identifies conditions which may increase the potential for fatigue. There is a wealth of information on fatigue available. Refer to Appendix 1 for resources to assist with the collection of fatigue information.

3.1 IMPACT OF FATIGUE ON PERFORMANCE

Most people need about eight hours of sleep a day — some a bit more and some a little bit less. However, those who do not get enough sleep each day can develop a sleep debt that adds up over time. The resultant fatigue can lead to the following hazardous conditions, effects or behaviours:

- more mistakes than usual
- poor logic and judgement including taking risks the worker would usually not take
- decreased alertness and watchfulness
- failure to respond to changes in surroundings or situations
- slower reflexes and reactions
- moodiness, e.g., giddy, depressed, irritable, impatient boredom, restlessness
- microsleeps (See Glossary for definition)
- automatic behaviour (See Glossary for definition)

An accumulated sleep debt may also result in the inability to:

- respond quickly or correctly to changes or alarms
- make good decisions or plans
- solve problems
- concentrate, including wandering thoughts
- communicate well
- handle stress
- see properly
- remember things just done, seen, or heard

Studies also show fatigued workers are more often absent from the workplace (i.e., sick) and cause more incidents than other workers. Fatigued workers tend to avoid complex tasks, work slower, check their work more and rely more on their co-workers.

3.2 FACTORS ASSOCIATED WITH FATIGUE

In addition to sleep debt conditions, fatigue can affect workplace health, safety and performance in a variety of ways. The following factors can impact fatigue levels:

- work scheduling
- work task type and length
- work and workplace conditions

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- worker health
- worker stress
- workplace health and safety culture

These factors are covered in more detail below.

3.2.1 WORK SCHEDULING

The time of day when people work has a significant impact on fatigue. For this reason, Fatigue Risk Management Programs should address work scheduling, which may include, but is not limited to:

- long hours of physical or mental activity
- breaks
- rest between workdays
- shift work
- extended or compressed workweeks and day-off patterns
- on call requirements
- travelling across time zones
- travelling between work site and accommodations, i.e., during the shift

Choosing an Optimum Schedule

When choosing work schedules, risks can be better managed when companies take into account employee needs in addition to operational efficiency and effectiveness. Optimum scheduling can be achieved by aligning shift schedules with natural body rhythms.

Optimum scheduling provides the following benefits:

- Efficient, in terms of the total costs to the company. Schedules which are poorly aligned to normal human sleep patterns and social compatibility have been linked to increases in both direct labour expenses and indirect cost factors such as rates of absenteeism, turnover, incidents and injuries.
- Effective, as optimal schedules facilitate employees' fast adjustment to the schedule.
- Appealing, as optimal shift schedules better match employees' needs and preferences. This can provide advantages in competitiveness for attracting candidates.

Shift Work Characteristics

A significant amount of research has been done to understanding how shift work characteristics impact fatigue. Some key characteristics to consider include:

- shift length, i.e., hours and times
- fixed shift schedules
- rotation of shifts
- days off
- weekends off

Refer to Appendix 2 for additional guidance on shift work and fatigue risk management.

Breaks

In general, companies should schedule tasks to allow for sufficient rest breaks and recovery time. Companies should consider providing proper nutrition, suitable rest areas and opportunities for physical activity. The use of extended day and multiple day schedules should be avoided whenever possible. When it is not possible, then increasing the number of rest and nutrition breaks for workers is an option to consider.

Travel

For work in remote locations, companies should consider scheduling that will allow workers to get on-site or to dedicated accommodations prior to their shift. In the time prior to shift, the workers should be expected to prepare for their shift, including taking time to get adequate sleep. Employees should treat their work-related travel time as they would regular work time in terms of fatigue risk management, e.g., scheduled rest, nutrition and physical activity breaks. After working away from home for extended periods, workers should be advised to rest before driving home.

Refer to Energy Safety Canada's *Journey Management Guideline* for additional information to consider about fatigue or drowsiness that may occur with work-related travel.

3.2.2 WORK TASK TYPE AND LENGTH

Fatigue and its effects are made worse by two kinds of work:

- simple or monotonous tasks lasting half an hour or more
- complex, mentally challenging tasks

The simple or monotonous tasks are not stimulating enough to keep a tired mind on the task. The challenging tasks are too stimulating for a tired mind to cope with. When jobs and tasks are designed, the fatigue factor should be considered for effective fatigue management.

In general, jobs should be structured to minimize the duration of repetitive, monotonous tasks as well as tasks with a high cognitive workload. As an example, some typical upstream petroleum tasks that carry these risks are listed in Table 1.

Table 1: Typical Upstream Petroleum Tasks Carrying Fatigue Risks

SIMPLE/MONOTONOUS TASKS	MENTALLY CHALLENGING TASKS
Driving to and from a worksite (a complex task often treated as a simple one)	Driving to and from a worksite
Monitoring gauges	Flow rate calculations
Waiting on lease	Assessing load lift parameters
Repetitive tasks	Determining mud viscosity
Fire watch/safety watch	Determining G-force on centrifuges
Cleaning equipment	Equipment start up

3.2.3 WORK AND WORKPLACE CONDITIONS

Work and workplace conditions can also aggravate fatigue. Taxing environments can increase a worker's susceptibility to fatigue. Some examples include:

- working outdoors with exposure to extreme cold or heat
- areas with high noise levels
- poor ventilation
- personal protective equipment (PPE) such as respirators and heavy clothing

Simply being away from home for long periods can fatigue a worker.

In general, a company should take the following measures to mitigate work and workplace conditions that can contribute to fatigue:

- create a work environment that promotes alertness
- implement controls to mitigate the effect of or reduce exposure to fatigue
- ensure sufficient resources of personnel, equipment and support
- structure hours of work to avoid the hottest or coldest periods of the day
- provide additional fluid and/or nourishment
- adjust time factors to incorporate the additional physical requirements and challenging environmental and physical conditions
- select PPE appropriate to the situation to limit the duration of tasks requiring PPE
- design or select equipment that is engineered for ease of use with minimal opportunity for error or misuse

3.2.4 WORKER HEALTH AND STRESS

A worker's health and stress levels can also contribute to how they are affected by fatigue. If they have conditions such as depression, diabetes or hypertension or short-term illnesses like colds or allergies, they can be more easily fatigued. Over-the-counter or prescription medication could also affect sleep or cause drowsiness. For example, some medications for cold symptoms, back and muscle pain and nausea can cause drowsiness.

In addition, sleep disorders can make fatigue worse. Physical or neurological sleep problems such as insomnia, sleep apnea, Rapid Eye Movement (REM) behaviour disorder, sleepwalking, restless legs syndrome, or periodic limb movement syndrome may increase fatigue.

Stress is known to have a detrimental effect on physical, mental and emotional health. Whether it is due to issues at work or at home, stress can increase a worker's vulnerability to fatigue at the workplace.

Some examples of stress related symptoms are included in Table 2.

Table 2: Stress related symptoms, which may increase vulnerability to fatigue

Chest pain	Stomach/bowel problems	Forgetfullness
Decreased sex drive	Substance abuse	Irritability
Headaches	Weight changes	Resentment
Indigestion	Anxiety	Insomnia
Muscle aches	Depression	fatigue

Good fatigue risk management takes into account the role of health and stress in an effective workplace safety culture.

3.2.5 WORKPLACE HEALTH AND SAFETY CULTURE

A workplace that rewards productivity over health and safety is not likely to take fatigue seriously as a hazard. To be most successful, a Fatigue Risk Management Program should be built on the foundation of an effective and functioning workplace safety culture. If a positive health and safety culture does not exist, implementing a Fatigue Risk Management Program could be a key intervention to foster improvements to the culture.

A company culture that supports a Fatigue Risk Management Program would demonstrate the following:

- promote and communicate a corporate message stressing the importance of fatigue risk management
- recognize individuals who apply fatigue risk management strategies
- include fatigue risk management planning as a measure of job performance and post-job evaluations
- ensure that incentive programs do not promote worker fatigue
- manage people who are deemed unfit for work as a result of fatigue with fairness
- not penalize workers who refuse to work because of work-related fatigue, e.g., rest period would not be deducted from sick days, holidays or banked-time days

The following sections guide the development of a Fatigue Risk Management Plan.

4.0 Initiating a Program

This section outlines some options for initiating a program for Fatigue Risk Management.

4.1 PROGRAM DEVELOPMENT

Groups or individuals may lead the effort to develop a company Fatigue Risk Management Program. Initial research should include a risk evaluation and needs assessment. To make the business case they may be asked to provide evidence of the issues associated with fatigue and the solutions available including the associated costs and benefits to the company. Senior management and leadership need to support the program financially and through policy direction. Program success will be greatest if senior management and leadership involvement, commitment and accountability are secured at the beginning.

4.2 COLLECTING INFORMATION

Before assembling a stakeholder group to design a Fatigue Risk Management Program, a file of applicable, credible and useful information should be collected on the topic of fatigue relevant to the business. The information can then be shared with stakeholders to inform them of relevant fatigue hazards. This ensures that all stakeholders have the same knowledge base from which to draw conclusions and contribute to program development.

Recognizing the need to help reduce the number of incidents and injuries related to fatigue, other industries in Canada have started to develop Fatigue Risk Management Systems. The following are a few examples:

- In 2007, Transport Canada commissioned a set of tools and guidelines to help the Canadian aviation industry set up fatigue risk management systems.
- The North American Rail Industry also developed on-line educational resources to provide education on fatigue to members of their industry, e.g., North American Rail Alertness Partnership, Railroaders' Guide to Healthy Sleep.
- In 2012, The American College of Occupational and Environmental Medicine (ACOEM) developed a guidance statement on fatigue risk management in the workplace. The guidance statement assists with the development, implementation and sustainability of fatigue risk management systems.
- In 2014, a consortium of government and industry agencies developed the North American Fatigue Management Program (NAFMP) for the commercial trucking industry. The NAFMP is a comprehensive approach to address the issue of driver fatigue including extensive information and on-line education.

Additional information and references are provided in Appendix 1.

4.3 STAKEHOLDER ENGAGEMENT

Using a steering committee, task group or working group to develop the program helps promote increased input and wider support. In all phases of program development and implementation, include staff from different levels and types of work such as:

- frontline workers
- supervisors
- managers

- occupational health and safety personnel
- executives
- external stakeholders, e.g., prime contractors, sub-contractors, regulators, etc.

It is also important to include individuals responsible for work scheduling. Consider whether staff selected, either by management or by their co-workers, will provide quality input or lend credibility to the program.

Committee members' roles and responsibilities should be clear at the outset. The tasks could be divided equitably based on skills and available time. As so many people with individual commitments and priorities are involved, committee work can often go off course or become delayed. To counteract this, the committee should set clear, achievable work goals and timelines at the beginning to track and refocus committee progress.

5.0 Developing the Components

There are many components that can be part of a Fatigue Risk Management Program. Some components are essential, such as a statement of the objectives of the program. Other components, such as practices and procedures for shift work, should be included only if applicable.

The typical components of a Fatigue Risk Management Program may include, but are not limited to:

- objectives
- roles and responsibilities
- safe work practices and procedures
- supportive process plans
- program implementation
- program sustainability and continuous improvement

Components are selected based on application to the company's business and can be customized for large and small organizations. The components can be integrated with existing health and safety management systems. For smaller organizations, a fatigue risk management program may be developed based on the components and safe work practices.

5.1 OBJECTIVES

A well-received and implemented program has a clear objective statement that typically uses inclusive language and covers:

- a brief introduction for context
- objective, purpose or over-arching goal of the program
- a policy statement
- to whom the program applies, e.g., safety critical positions
- what situations the program components apply and do not apply, i.e., scope and limitations
- how it will be monitored, enforced, upgraded and sustained
- the costs required to implement and maintain the program

> Example Fatigue Risk Management Policy
> **"Company Name"** is committed to providing a safe work system and a safe and productive workplace by eliminating conditions and work practices that could lead to personal injury, productivity losses and damage to equipment, property or the environment.
> Fatigue can impair fitness to work and may have negative impacts in the areas of health, safety, security and the environment. "Company names" objective is that all employees recognize this threat to manage and minimize the associated risks.

Consider using the industry sanctioned Fatigue Risk Management Guiding Principles to help demonstrate broad, high level support for the concept.

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5.2 ROLES AND RESPONSIBILITIES

The employer has responsibilities in a Fatigue Risk Management Program. These responsibilities may include, but are not limited to:

- ensuring safe work practices
- ensuring adequate resources are available to develop, implement and sustain a Fatigue Risk Management program
- ensuring an appropriate work shift design that allows for adequate recovery periods
- ensuring adequate assessment, control and monitoring of fatigue related hazards and risks
- developing policies and procedures that support fatigue risk management, e.g., overtime, napping, commuting, etc.
- building competency and disseminating information regarding fatigue risk management
- stopping work when the activities are unsafe due to fatigue

Supervisor and planning scheduler responsibilities in a Fatigue Risk Management Program may include, but are not limited to:

- providing adequate time for workers to perform their assignments without unduly increasing fatigue risk
- monitoring workers
- being informed on the symptoms of fatigue, and intervening where the symptoms of fatigue are discovered

Employees have responsibilities in a Fatigue Risk Management Program. These responsibilities include, but are not limited to:

- arriving at work fit for duty by obtaining adequate sleep
- managing lifestyle to minimize fatigue
- reporting all fatigue-related near misses and incidents
- maintaining an awareness of fatigue
- supporting and participating in risk mitigation strategies
- stopping work when the activities are unsafe due to fatigue

5.3 SAFE WORK PRACTICES AND PROCEDURES

Safe work practices are the rules that apply. Procedures are the exact steps to be taken in particular situations to safety execute tasks. Both tend to discuss rationale, roles and responsibilities. Safe work practices and procedures should be developed to address the following four areas:

1. recognizing the effects, signs and symptoms of fatigue and assessing the level of fatigue risk
2. assessing the causes and contributing factors for fatigue
3. investigating incidents and near misses which may be fatigue-related
4. developing appropriate preventative action to eliminate fatigue or reduce the impact of fatigue

Each of the four safe work practices is described in greater detail below. Refer to Section 3.0: Understanding Fatigue Risk Management for information on fatigue risk management issues and strategies that may relate to your company. Other fatigue information sources are listed in Appendix 1.

5.3.1 RECOGNIZE SYMPTOMS OF FATIGUE IN WORKERS

Workers and employers should be able to identify when they or others are fatigued. A number of methods to identify fatigue are outlined in Table 3.

Table 3: Methods to Identify Fatigue

Recognizing Fatigue as a Hazard	Workers too fatigued to work safely may present a hazard to themselves and others. Effective Fatigue Risk Management Programs discuss this hazard and detail how a worker, co-workers or supervisors can recognize the symptoms of fatigue.
	Surveys and/or technologies e.g., actigraphy may be used to gather information about the prevalence and impact of fatigue. Refer to Appendix 3 for additional details on recognizing fatigue proactively as a hazard.
Self-Assessments	Workers may use self-assessments to manage fatigue. Fatigue assessment tools assist workers in making a determination of their potential fatigue-related risk level.
	Enform has developed a wallet card for Individual Fatigue Likelihood Assessment (enform.ca).
Alertness Monitoring Devices	Monitoring devices may be utilized in real-time to identify symptoms of drowsiness. These include devices that alert the worker if symptoms of low alertness are detected.

5.3.2 ACCESS FATIGUE CONTRIBUTING FACTORS

Characteristics of the people and processes, i.e., schedules, tasks or environment may contribute to the risk level of fatigue. These can be assessed and managed within the Fatigue Risk Management Program. These include:

- Sleep Disorders

   Some people may not achieve an appropriate quantity and quality of rest due to sleep disorders. Sleep disorders such as sleep apnea, insomnia or restless leg syndrome can interrupt normal sleep patterns and compromise health. Self-assessment tools or medical consultation with sleep specialists may be used to identify if a worker may have a sleep disorder.

- Shift Schedules

  Some shift schedules may not provide sufficient sleep opportunity for workers resulting in increased risk of fatigue. Scheduling strategies should be used that ensure adequate opportunity for employees to sleep and recover. At a minimum, rosters should comply with any applicable hours of service regulations.

  Bio mathematical models have been developed to quantify the effects of circadian and sleep/wake processes as it relates to fatigue and performance. These models use algorithms based on the time of day, i.e., circadian or natural body rhythms. The length of time asleep and awake throughout the overall pattern of work and non-work periods is used to predict an average level of work-related fatigue. Models may be used to assess the fatigue-related risk associated with certain schedules. Modelling may be used to prioritize remedial action for workers or work schedules that are at highest fatigue related risk.

- Task Risk Assessments

  Some tasks may be more likely to cause fatigue or induce fatigue related errors. Activities with a high physically demanding workload (e.g., manual material handling) and/or mentally demanding processes may result in higher levels of fatigue. Tasks that are of long duration which are repetitive or monotonous also result in higher levels of fatigue. Workshops or surveys might be considered to provide an opportunity for workers to identify the tasks perceived to be related to fatigue. There should also be consideration given to prioritize controls for fatigue-related tasks that are safety critical.

- Environmental Conditions

  Elements of the work environment can promote or reduce alertness. Conditions to consider that may contribute to drowsiness include:

    o low lighting

    o high noise levels

    o hot or cold temperatures

    o poor ergonomic design of workspace

- Sleeping Environments

  Accommodations, both at work and at home, and rooms used for napping should be evaluated to ensure they are conducive to undisturbed sleep.

  Variables to consider include:

    o noise, i.e., quiet

    o temperature, i.e., slightly cool

    o lighting, i.e., dark

    o bedding/mattress, i.e., comfortable

  To optimize the sleeping environment, distractions should be removed, i.e., work, television, electronics.

5.3.3 INVESTIGATE INCIDENTS

Managing fatigue requires recognizing and assessing fatigue as a possible factor in workplace incidents and near misses. Normal incident investigation questions should provide the investigator with an indication of

whether fatigue could have contributed to the incident. A review of incident and near miss reports may also be conducted to identify any trends of fatigue related occurrences.

Bio mathematical modelling may be used to assess the fatigue-related risk associated with the schedule used during incidents. The information may be used to determine the extent to which fatigue may have been a contributing factor.

Refer to Appendix 3 for additional details, i.e., investigation questions used to recognize fatigue as a contributing factor to incidents.

5.3.4 DEVELOP THE APPROPRIATE RISK MITIGATION STRATEGIES

To eliminate or reduce the impact of causes and contributing factors of fatigue, appropriate preventative/corrective actions should be taken. Consider the following:

- Fatigue Mitigation Strategies

  Workers are expected to use the time off work to obtain adequate sleep. If fatigue is experienced during work, workers can take actions to counter fatigue using various techniques. Actions to consider include:

  - eat low-fat, high-protein foods and avoid sugars and carbohydrates as they may cause a decrease in performance over the longer term, i.e., sugar crashing
  - drink water to avoid dehydration
  - use caffeine in moderation and avoid caffeine a few hours before sleeping, as the stimulant effect may make it more difficult to fall asleep
  - naps of about ten minutes in duration can have positive effects on alertness and performance. Time should be provided after the nap to recover from grogginess or sleep inertia that may occur.

- Commuting

  Workers that commute when tired present serious risk to their safety and the safety of others. Strategies should be developed for workers that may leave their shift tired. Support options should be implemented, i.e., use buses, taxis or share transportation with a non-fatigued driver.

5.4 SUPPORTIVE PROCESS PLANS

Supportive process plans are developed to implement the components of the Fatigue Risk Management Program. For example, some of the ways a company can eliminate or reduce the impact of fatigue is to:

- have facilities for naps; consider the quality of rest accommodations, hotels, camps, etc.
- consider how close the accommodations are to other necessities (food, laundry, etc.)
- make referrals to the EFAP (Employee & Family Assistance Program)
- use proper scheduling to ensure adequate rest
- minimize travel time between camps and workplaces, i.e., rigs and construction sites

In addition, some components of the plan may require more work or new procedures for other staff or departments. For example, hiring practices may change; managers and the human resources department may need to adapt existing policies.

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A benefit of planning supportive process in the program ensures these processes are not overlooked or rushed during implementation.

5.5 PROGRAM IMPLEMENTATION

When the research is complete, program wording can be finalized.

During the program launch, relevant documents, e.g.., policy, guideline, etc., should be distributed to those who need them. A method to keep documentation current should be discussed by the stakeholder group. Refer to Appendix 4 for documentation suggestions.

The Fatigue Risk Management Program should clearly indicate what kind of training will be needed initially. Further training will be needed to continue to support the program and to reach staff not covered initially. The program should identify the on-going training needs and implementation requirements.

5.5.1 TRAINING

To maximize the value of the program, staff should be trained in fatigue management.

The program should detail training specifics as outlined in Table 4.

Table 4: Details for program training

Training plan	When, where, and to whom training is given, e.g., initial training versus ongoing training, training during orientation, during a special session, during regular safety meetings, one time or regularly, etc.
Trainers	Who gives the training, e.g. supervisors, management, safety personnel, consultants, etc.
Training methods	How the training is given, e.g., self-directed, one-on-one, or in groups; paper, video, or electronic; lecture style or participatory; evaluation or no evaluation; setting pass/fail mark; etc.
Training resource material	What is needed for the training, e.g., slides and equipment for trainer, handouts or information booklets or wallet cards for trainees, etc.

Training Content

To ensure the success of the Fatigue Risk Management Program, employees should receive training in the following areas:

- their roles related to fatigue
- how the program is customized to your company
- where to find the fatigue risk management program within your health and safety program

Refer to the Enform info flip publication, Guide to Safe Work: Fatigue to address the following topics of this training:

- how to recognize the effects, signs and symptoms of fatigue
- the causes and contributing factors for fatigue
- appropriate and inappropriate corrective actions for fatigue
- effective fatigue prevention techniques

Supervisors and senior management should have the following additional training:

- assessing and documenting a worker's level of fatigue
- monitoring and enforcing Fatigue Risk Management Program policy, practices and procedures
- reporting fatigue assessment for incidents
- considering fatigue in investigations
- promoting effective fatigue prevention techniques
- supporting the Fatigue Risk Management Program
- reporting program feedback

5.5.2 ENSURE COMPETENCY

The program should state how competency will be verified. Performance standards should be determined along with mechanisms for verifying competency.

6.0 Program Evaluation

Any effective program requires regular, formal evaluation (e.g., quarterly, annually, etc.) to determine the effectiveness of the program. Program evaluations measure the success of the program's goals and objectives. Regular evaluation ensures the program is working and allows for continuous improvement to the program.

During program development, an evaluation plan should be created, which could include, but is not limited to the following:

- pre-determined review dates
- commitment from senior management and executive to carry out and act on reviews as scheduled
- a feedback method involving all affected personnel and incorporating management accountability and participation
- development of key measurements
- a reliable data collection method, i.e., empirical and anecdotal
- a meaningful analysis process with evaluation criteria based on overall program goals and specific performance objectives
- an efficient program document revision process

Reviews can help ensure that processes and work practices align with the program.

7.0 Summary

Both employers and employees have a responsibility to manage risk related to fatigue. This guideline provides a framework of key components, safe work practices and considerations to help members of the Canadian oil and gas industry establish a Fatigue Risk Management Program for their organization. The information contained in this document, along with other information sources referenced are intended to help build an effective risk-based program scalable to suit a variety of operational capabilities.

Appendix 1: References and Resources

The list of documents and information sources provided below includes any documents or websites consulted in the research for this guideline or referred to within this guideline. Several additional sources are provided that are useful for reference for basic information on fatigue science, health and safety and programs. This list is not exhaustive. Web addresses listed are current at the time of publication but are subject to change.

DOCUMENT NAME OR INFORMATION SOURCE	AVAILABILITY
ACOEM (2102). Fatigue Risk Management in the Workplace. American College of Occupational and Environmental Medicine.	https://www.acoem.org/uploadedFiles/Public_Affairs/Policies_And_Position_Statements/Fatigue%20Risk%20Management%20in%20the%20Workplace.pdf
ANSI/API Recommended Practice 755: Fatigue Risk Management Systems for Personnel in the Refining and Petrochemical Industries.	http://www.api.org/environment-health-and-safety/process-safety/process-safety-standards/standard-rp-755
Canada Safety Council – Fatigue	https://canadasafetycouncil.org/workplace-safety/fatigue
Canadian Centre for Occupational Health and Safety – Shift work	http://www.ccohs.ca/healthyworkplaces/topics/shiftwork.html
Canadian Centre for Occupational Health and Safety – What is fatigue?	http://www.ccohs.ca/oshanswers/psychosocial/fatigue.html
Canadian Sleep Society	http://css-scs.ca
Energy Safety Canada: Journey Management Guideline	http://www.energysafetycanada.com
Enform: Wallet card for Individual Fatigue Likelihood Assessment.	http://enform.ca/cms-assets/documents/40400-315753.10-00065-fatiguesumposiumwalletcardcro.pdf
Enform: Info-flip - Guide to Safe Work: Fatigue Risk Management – A Worker's Guide to Preventing Incidents and Injuries Related to Fatigue.	http://www.enform.ca/safety_resources/Guides_to_Safe_Work.aspx
Enform: Fatigue Risk Management Guiding Principles.	http://www.enform.ca/cms-assets/documents/132000-696778.frmgp-signed.pdf

IPIECA – OGP (2014) Assessing Risk from Operator Fatigue.	http://www.ipieca.org/sites/default/files/publications/Assessing_risks_from_operator_fatigue_2014.pdf
Lamond, N and Dawson, D. (1999). Quantifying the performance impairment associated with fatigue. J. Sleep Res. 8, 255-262.	http://www.flugdienstzeiten.de/wp-content/uploads/2013/02/j.1365-2869.1999.00167.x.pdf
National Sleep Foundation	http://www.sleepfoundation.org http://drowsydriving.org/
NAFMP: North American Fatigue Management Program: A Comprehensive Approach for Managing Commercial Driver Fatigue.	http://www.nafmp.org/
NARAP: North American Rail Alertness Partnership	http://www.narap.org
NTSB. Factors that affect Fatigue in Heavy Truck Accidents Volume II: *Case Summaries*; National Transportation Safety Board	http://trid.trb.org/view.aspx?id=447928
Railroaders; Guide to Health Sleep: Steps to improve your sleep and make a real difference in your life.	http://www.railroadersleep.org/
Workers' Compensation Board of Alberta – Working Safely Behind the Wheel	http://www.wcb.ab.ca/pdfs/public/driving_safely.pdf
WorkSafe Alberta – Fatigue, Extended Work Hours, and Safety in the Workplace	http://work.alberta.ca/documents/WHS-PUB-erg015.pdf
WorkSafeBC: Fatigue Survey of BC Truck Drivers	https://www.worksafebc.com/en/resources/health-safety/information-sheets/fatigue-survey-of-bc-truck-drivers-summary?lang=en

Appendix 2: Work Scheduling

Choosing an optimum schedule requires an understanding of shift work characteristics and how alignment of schedules with natural circadian rhythms can help reduce effects of fatigue. The cumulative nature of fatigue requires a strategy to control fatigue risk.

SHIFT WORK CHARACTERISTICS

SHIFT LENGTH (HOURS) AND TIMES

People have a daily internal clock that sets circadian rhythms. These circadian rhythms are the times for sleep, alertness, eating, digestion and other body functions. These rhythms are repeated approximately every 24 hours and are designed for high activity during the day and low at night, when people usually sleep. For this reason, circadian principles are more easily applied to eight-hour shifts. This relates to the effectiveness of the schedule. However, many employees favour 12-hour shifts, as they get a third more days off. This relates to the appeal of the schedule. Worker age can be an important factor for appeal of shift length. Older workers are less able than younger workers to adjust to the frequent changes that shift work requires and so an eight-hour day shift suits an older worker better.

Strategies exist to try to help make shift work less intrusive into natural sleep habits and social activities. One strategy is to have the shift end at a time when the shift worker can still get some sleep during "normal" sleep time e.g., a shift of 10 am to 6 pm, 6 pm to 2 am, and 2 am to 10 am. Also, staggering the length of shift can be assistive. For example, a day shift is ten hours, afternoon eight hours and night only six hours.

Another consideration for selecting shift hours and times is the timing of the shift change. Research on incident rates, performance, employee health and the social well-being of shift workers all point to the value of having later start times: shifts requiring workers to wake up before 5 am causes more circadian de-synchronization than night shifts. Finishing a shift in the early morning e.g., between 2 am and 5 am is also considered undesirable, especially related to driving.

Whatever shift schedule a company uses; their employee input will be important. With employee input and using some of the above shift scheduling techniques in this section and sections below, a schedule can be set up that serves both employer and employee needs.

FIXED SHIFT SCHEDULES

Fixed shift schedules are ones where employees are placed on a particular shift with the intention that they will remain on the shift throughout their time with the company, or at least until they are reassigned to another fixed shift. Rotating shifts involve continual movement of employees across two or more shifts. Many researchers and shift workers alike have argued strongly for fixed shift systems as they enable employees to reset their internal clocks, thereby reducing the stress caused by changing work schedules.

However, being assigned to a permanent night shift has one area of major concern: fixed night schedules work best only if workers maintain the same sleep/wake pattern on their time off—not reverting to daytime schedules on their time off. This will likely not happen, as most of the world operates on day schedules. Similarly, fixed afternoon shifts can create social de-synchronization because the most desirable social time of the day is considered to be between 5 pm and 9 pm. So, although fixed work hours provide stability, they do have some drawbacks.
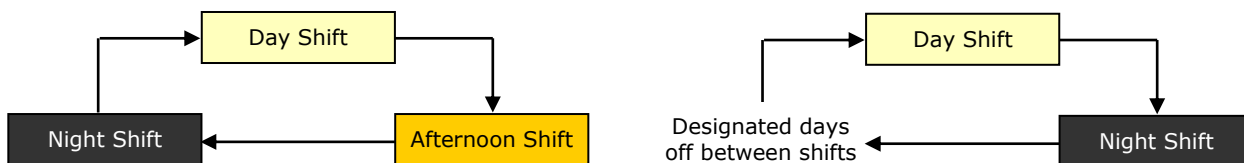
ROTATION OF SHIFTS

Whether using long or short rotations of shifts, companies need to keep in mind that it takes at least one week for the circadian rhythm to adapt to a schedule change. A long rotation consists of working a stretch of night shifts for four to six weeks. With this long stretch of time, a worker would probably need to work nights only twice a year with rotation of staff. With a period this long, a person's circadian rhythm has a better chance of changing to the night shift time period. But again, to make this work, workers must keep their sleep/wake times the same even on their days off. This poses a problem for many people, as they tend to return to a day-oriented lifestyle on their days off, leaving their circadian rhythm chronically disoriented.

A short rotation would involve no more than three-night shifts in a row. This quick changeover keeps the circadian rhythm from fully resetting and is considered to create less circadian de-synchronization than weekly or long rotations. An example of a short rotation is the 1/1/1 rotation: one day shift, one afternoon shift, and one-night shift followed by two days off.

Whether long or short rotation is used, a clockwise direction is the easiest on the circadian rhythm and a counterclockwise direction runs counter to the natural circadian rhythm (See Figures 1 and 2 below).

Figure 1: Clockwise Rotation of Shifts (Recommended)

Figure 2: Counterclockwise Rotation of Shifts (Not Recommended)

DAYS OFF

One factor related to the quality of off-time is the number of consecutive off-duty days available in the work schedule. Employee preference and scientific research both support the use of schedules which have at least two consecutive days off after each set of shifts. Where this is not possible, due to efforts to create longer periods of off time elsewhere in the shift cycle, it is recommended that a minimum of 48 hours follow every on-duty period, with some shift sets being followed by three or more days off.

A second factor to consider in designing quality off time is the timing of those off-duty periods. Many eight-hour schedules assign an extended off-duty period to follow the day-shift sequence, leaving only minimum off-time after the evening shifts, night shifts, or both. Yet, it is the latter shift that places the most stress on employee health and welfare and therefore requires the most restoration effort. Employees not granted sufficient leisure times often are drawn to activities that tax their bodies to maximize their free time. Younger workers frequently shorten their sleep periods, returning to work fatigued. Older workers tend to need to use their off time to recover and return to work resentful that they slept their time away.

Work schedules involving night shifts must design recovery time into the off-duty pattern so there is sufficient opportunity for rest and recuperation following the night shift.

WEEKENDS OFF

North American culture traditionally follows a five-day work week and places great value on weekend time. Shift workers, like the rest of the work force, generally want to maximize their time off. It is important to consider the days of the week on which each new shift starts and stops. For example, a schedule that maximizes weekend time and also allows for recovery time would make Thursday the last shift of the night shift assignment. This would let employees use Friday as a recovery day and still have the benefits of a free weekend, so they can remain connected to their family and community.

Workers in certain segments of the upstream petroleum industry face schedules out of sync with a five-day work week. This is usually due to operational requirements such as 24-hour operations in remote and temporary locations. This poses a greater challenge in managing fatigue. Workers need to be able to plan ahead. Schedules should be set well in advance to provide predictability.

ON-CALL SCHEDULING

The oil and gas industry, like others, requires some groups of individuals to remain on standby for immediate deployment. These schedules are often dictated by the need for a specific sequence of services at the worksite (cementing, transportation services) or to provide emergency support (technical, medical, and firefighting). Although challenging, on-call scheduling should consider work/rest cycles and circadian rhythms to minimize risk to the worker and operation.

Appendix 3: Recognition and Assessment of Fatigue as a Hazard

HAZARD ASSESSMENT

When a supervisor suspects that a worker is too fatigued to be fit for work, having a standard procedure to follow ensures consistency. The following questions may be helpful for developing of a worker fatigue assessment tool for supervisors:

- How many hours did the employee work in the past week?
- What is the pattern of hours worked in the past week?
- Is the employee suffering from acute sleep loss?
- Does the employee have a sleep debt?
- Is the employee required to work at a time out of sync with the waking cycle of the employee's circadian rhythm?
- Do environmental factors pose an additional fatigue load?
- Does the employee's condition match the mental, physical, and emotional demands of the work?
- What is the physical intensity of work?
- Does the employee's physical fitness match the work demands?
- What events are currently going on away from work? Is the employee experiencing life stressors?
- How well has this employee coped in the past?
- Does the employee get support at work and at home?

INCIDENT ANALYSIS

Managing fatigue requires the recognition and assessment that fatigue is a possible factor in workplace incidents. Incident investigation questions should provide the investigator with an indication of whether fatigue could have been a contributing cause of an incident. If fatigue is considered a potential cause, the investigator can examine additional fatigue-related questions such as the following:

- When did the worker last sleep?
- Where did the worker last sleep?
- How long did the worker sleep the last time?
- Did the worker have a restful sleep?
- What was the time of shift?
- How many consecutive hours had the worker worked?
- What and when was the worker's last break between shifts?
- How many days had the worker worked in a row?
- How many hours did the worker work on those days?

If an investigator knows or strongly suspects fatigue as a contributing cause of an incident, the investigator could also assess the following:
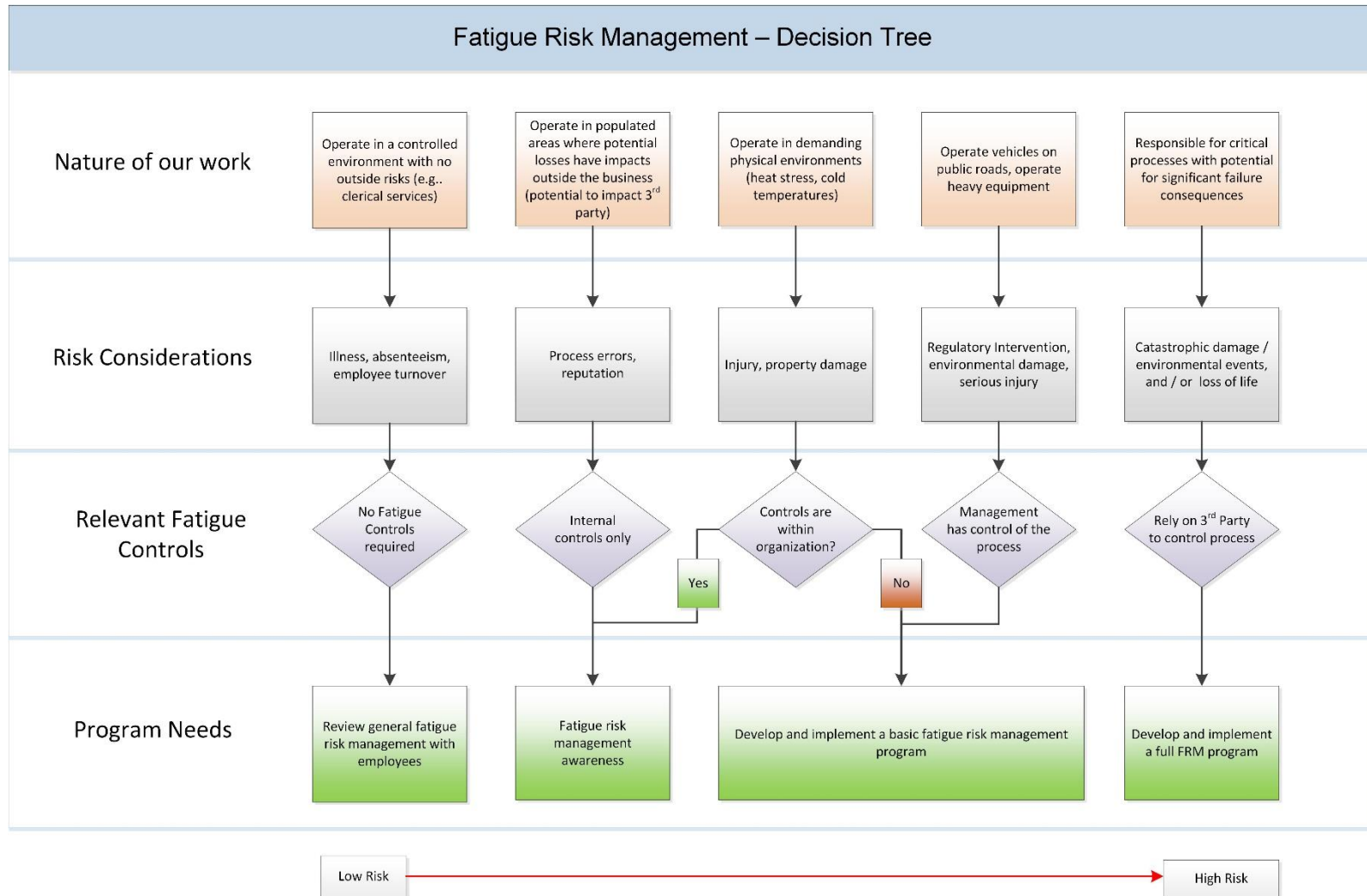
- Work schedule

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- Work task type and length
- Work and workplace conditions
- Worker health and stress
- Workplace health and safety culture

An in-depth examination should reveal if, or to what extent, fatigue is a cause or contributing factor in a workplace incident.

Example fatigue risk management evaluation process:

Fatigue Risk Management – Decision Tree

Nature of our work	Operate in a controlled environment with no outside risks (e.g.. clerical services)	Operate in populated areas where potential losses have impacts outside the business (potential to impact 3rd party)	Operate in demanding physical environments (heat stress, cold temperatures)	Operate vehicles on public roads, operate heavy equipment	Responsible for critical processes with potential for significant failure consequences
Risk Considerations	Illness, absenteeism, employee turnover	Process errors, reputation	Injury, property damage	Regulatory Intervention, environmental damage, serious injury	Catastrophic damage / environmental events, and / or loss of life
Relevant Fatigue Controls	No Fatigue Controls required	Internal controls only	Controls are within organization? (Yes / No)	Management has control of the process	Rely on 3rd Party to control process
Program Needs	Review general fatigue risk management with employees	Fatigue risk management awareness	Develop and implement a basic fatigue risk management program		Develop and implement a full FRM program

Low Risk →→→→→→→ High Risk

Appendix 4: Documentation

WRITING UP THE PROGRAM

Once research is complete and the stakeholder group has agreed on what to include in the program, the wording can be finalized. As usual for safety documentation, the needs and limitations of the readers should be considered during the writing. Also, the style of the document should be consistent with other health and safety-related policies, practices and procedures of the company.

Other documents may also need to be modified or created as a result of the new program, such as the following:

- a training component may need to be added to orientation checklist forms for new staff
- checkboxes and spaces may need to be added to hazard report forms or incident report forms
- questions may need to be added to incident investigation forms
- topics may need to be added to safety meeting forms
- criteria may need to be added to annual performance review forms
- elements may need to be added to safety recognition programs

During program design, company forms and health and safety documentation should be reviewed to check for and revise any cross-over points or address any gaps by adding new documents.

GETTING FEEDBACK AND APPROVAL

A document approval process may require the Fatigue Risk Management plan to be circulated for feedback and approval. Feedback and approval of the document validates the fatigue-related concerns and treatments expected. Management must have a leadership role in acknowledging and implement the Fatigue Risk Management Plan.

PLANNING FOR IMPLEMENTATION

Program implementation should be considered during program design. The guideline can be printed or provided on-line to employee as well as corresponding policy information. A communications program to increase employee awareness of the program should be considered. For example, use safety meetings or build interest by providing facts about fatigue up until the release of the program.

Before implementation, ensure that all the supportive processes required for the program are in place.

Glossary

TERM	DESCRIPTION
Accumulated sleep debt	Shortened or disrupted sleep that adds up over time.
Actigraphy	Watch-like or clip-on devices that can detect motion to help assess the sleep/wake patters of users.
Automatic behavior	A situation where the worker is completing routine tasks but is not having any conscious thoughts.
Bio mathematical models	These models use algorithms based on the time of day, i.e., circadian or natural bod rhythms. The length of time asleep and awake throughout the overall pattern of work and non-work periods is used to predict an average level of work-related fatigue.
Circadian rhythms	People have a daily internal clock that sets circadian rhythms. These circadian rhythms are the times for sleep, alertness, eating, digestion and other body functions. These rhythms are repeated approximately every 24 hours and are designed for high activity during the day and low at night, when people usually sleep.
Competency	The ability of a worker to carry out a job with a certain, accepted level of expertise.
Fatigue	A state of reduced mental and physical alertness or functioning caused by sleep-related disruption or deprivation. Fatigue is a feeling of tiredness or exhaustion that comes from physical or mental exertion. It is a message to the body to rest. Fatigue can be aggravated by acute lack of sleep or an accumulated sleep debt.
Fitness for duty	Fitness for duty means that an individual is in a physical, mental, and emotional state which enables the employee to perform the essential tasks of his or her work assignment in a manner which does not threaten the safety or health of his or herself, co-workers, property, or the public at large.
High cognitive workload	A heavy amount of mental effort being used in working memory.
Long rotation	A long rotation consists of working a stretch of night shifts for four to six weeks.

Microsleeps	A state of up to 60 seconds where the brain goes to sleep and the worker blacks out no matter what they are doing.
Optimum scheduling	Schedules that align to normal human sleep patterns and social compatibility, in addition to operational efficiency and effectiveness.
Short rotation	A short rotation would involve no more than three-night shifts in a row.
Simple or monotonous tasks	Routine tasks lasting half an hour or more.
Sleep disorder	Physical or neurological sleep problems such as insomnia, sleep apnea, REM behavior disorder, sleepwalking, restless legs syndrome, or periodic limb movement syndrome may increase fatigue.
Social compatibility	The degree to which there is a match with a group or person's lifestyle preferences, fundamental rights and principles.

Contributors

The following individuals helped to develop this guideline through the Fatigue Management Steering Committee (2015) and the Fatigue Management Guideline Development Sub-Committee (2015).

Energy Safety Canada is grateful for each participant's efforts and acknowledge the support of their employers.

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ENERGY SAFETY CANADA

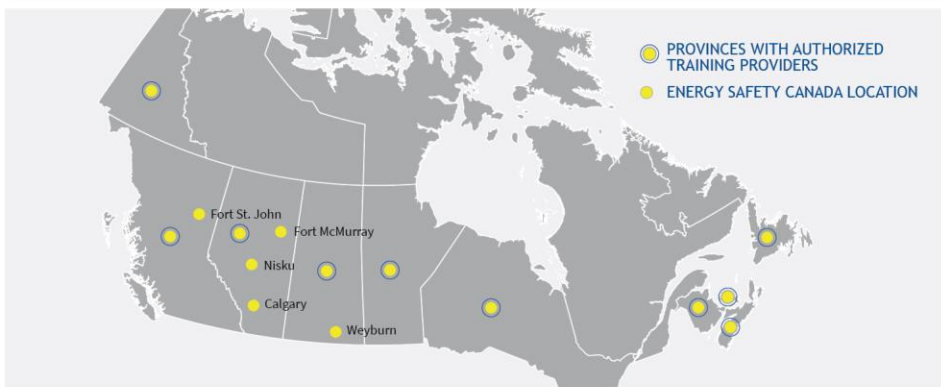|		
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SAFETY DOESN'T CLOCK IN AND IT DOESN'T PUNCH OUT. IT'S 24/7.

ENERGY SAFETY SERVICES:

- Virtual training
- Safety services
- Company consultations
- Data reports
- Certificate of Recognition

LOCATED WHERE YOU ARE:

○ PROVINCES WITH AUTHORIZED TRAINING PROVIDERS
● ENERGY SAFETY CANADA LOCATION

Fort St. John
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