IPIECA

International Association of Oil & Gas Producers

Managing fatigue in the workplace

Appendix 10.2 – Fatigue Evaluation Matrix

Health

THE GLOBAL OIL AND GAS INDUSTRY ASSOCIATION FOR ENVIRONMENTAL AND SOCIAL ISSUES

www.ipieca.org

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STEP 1.

Identify potential fatigue risk factors. Consider each factor in the context of each specific FIFO operation and associated safety culture.

STEP 2.

Assess the level of risk for the fatigue risk factors identified and set priorities. The green, amber, red and purple colour code used below serves to provide a general **indication** of the level of risk exposure for each fatigue risk factor.

STEP 3.

Implement control measures where a fatigue risk exposure factor is identified as red or purple risk. Adopt the 'hierarchy of control'. Review the effectiveness of the control measures that have been adopted.

Fatigue risk factors	Risk assessment				Control measures
Work scheduling and planning	Lower			Higher	
Shift length (Daily work hours)	8 hrs	10 hrs	12 hrs	>12 hrs	Long shift duration is an important cause of fatigue. • Scheduled shifts should not exceed 12 hours. • Limit overtime, unscheduled overtime. • Ensure overtime does not become a regular part of working time arrangements. • Limit work to a maximum of 14 consecutive hours in any 24 hours. • Interrupt scheduled sleep periods only when critical to do so. • Implement an exceptions process to manage any work beyond 14 consecutive hours duty time or interruption of scheduled sleep periods (e.g. repair to critical item of equipment, emergency situation). • Monitor hours of work. • Defer non-urgent work.
Shift start/Shift finish	Start after 0700hrs	Start before 0700hrs	Finish after 2200hrs Start before 0600hrs	Shift duration crosses 0000hrs and 0500hrs	Early morning starts can lead to sleep loss from both the early start and from difficulties associated with trying to sleep in the early evening. • Avoid or limit shifts that start or finish between 2200hrs and 0600hrs. • Avoid scheduling tasks that are susceptible to fatigue at the start and end of these shifts. • Formalise procedures to ensure that information exchanged at shift handover is correct and complete. • Ensure enough time for effective communication at shift handover.
Breaks during work	Adequate regular breaks		Inadequate or infrequent breaks		The length of time between breaks and the number of breaks impact on the overall risk of incidents. • Ensure there are adequate and regular breaks. Consider providing short breaks of 5-15 minutes every 1-2 hours. After every 5 hours of work, consider providing a longer break of 30 minutes to enable meals to be taken. • Provide some flexibility and allow employees to take breaks as required.

Fatigue risk factors	Risk assessment				Control measures
Work scheduling and planning	Lower			Higher	
Break between shifts	12 hrs or more (Adequate time for travelling, eating, washing and sleeping.)	10-12 hrs (5)	8-10 hrs	<8 hrs (Inadequate time for travelling, eating, washing and sleeping.)	Inadequate breaks between shifts will reduce time available for **sleeping**. Sleep is the time the body regenerates, as well as allowing for memory consolidation, learning and other brain functions. Note: this should be considered in conjunction with shift timing. A 12 hour break across the night, is much more effective for sleeping than a 12 hour break across the day. • Ensure breaks between shifts allow enough time for travelling, eating, washing and **sleeping**. • Provide a protected 8 hour sleep opportunity. • Advise employees that they should not consume tea, coffee or other sources of caffeine within 4-6 hours of going to sleep. • Provide adequate facilities for sleep, rest and meals. • Provide a good range of fitness equipment. Maintain a basic level of fitness.
Shift pattern (Length of tour)	14 days or less	14-21 days	21-28 days	>28 days	Long tours of duty increase accident risk due to cumulative fatigue. 14 day tours • Provide an alternating shift pattern with 14 days on one tour and 14 nights on the next. This shift pattern removes the mid-tour roll-over and also halves the numbers of circadian adjustments over the working year. • Avoid rotating from nights to days mid-tour. 28 day tours • Provide a shift pattern where employees change shifts from days to nights mid-way through their tour.
Break between tours of duty	14 days or more		7-14 days	<7 days	Breaks of sufficient duration enable individuals to recover from a sleep debt built up following a long work schedule. Longer periods at work require longer periods for recovery. 14 day tours • Provide, as a minimum, a break of 14 days between tours. • Provide a break of 21/28 days after night work tours, e.g. 14 Work Days/14 Rest Days/14 Work Nights/21 Rest Days 28 day tours • Provide a break of 28 days between tours. Second jobs • Discourage employees from taking second jobs during breaks between tours of duty. Extended breaks between tours may impact employee ability to maintain situational awareness of operating processes. • Ensure effective crew handover procedures are in place.

Fatigue risk factors	Risk assessment				Control measures
Work scheduling and planning	Lower			Higher	
Consecutive night shifts	<7	7-14	>14	>21	Long tours of night shifts are associated with cumulative fatigue due to a lack of restorative sleep. Reliable execution of safety critical/complex tasks is highly susceptible to employee fatigue. • Plan safety critical/complex work for daytime. • Avoid scheduling safety critical/complex work between 0200 - 0600hrs and to a lesser extent between 1400 - 1600hrs. • Avoid scheduling higher risk tasks on the first and second nights of a tour of night shifts. • Minimise routine administrative tasks so that employees can focus on their primary tasks. Planned naps are an effective fatigue countermeasure. Emergency naps • Schedule emergency naps for around 40 minutes to allow employees to prepare for their nap, to sleep for 20 minutes and to refresh and regain alertness before returning to work. Scheduled rest • Provide a 90 - 100 minute sleep opportunity plus 30 minutes to refresh and regain alertness before returning to work. Where a safety critical task is to be undertaken, this should be done with a colleague not suffering from sleep inertia. Facilities • Provide appropriate facilities for napping.
Speed and direction of shift rotation	Forward rotation (day/afternoon/ nights)		Backward rotation (night/ evening/ morning) Slower rotation (weekly/3-4 weekly)		The speed and direction of rotation influence individual fatigue and individual adaptation. • Avoid rotating shifts quickly (e.g. every 2-3 days). • Avoid rotating shifts every week. • Use forward rotation (morning/afternoon/night) whenever possible. • Minimise the number of circadian adjustments over the year.

Fatigue risk factors	Risk assessment				Control measures
Hours of work	Lower			Higher	
Total hours worked in a 7-day period.		60hrs	84hrs	>84hrs	
Total hours worked over a 4 week period.		240hrs	336hrs	>336hrs	Longer periods at work require longer periods for recovery.
Commute from camp to workplace.	<15mins	15-30mins	30-60mins	>60mins	Long commuting times to and from camp to work increase the working day and may reduce time available for **sleeping**. In addition, driving at the end of a shift may be hazardous. • Reduce hours worked to account for long commute time. • Provide company transport. • Provide a sleep opportunity before commute begins.
Overtime/Shift Extensions.	Predictable shifts	Occasional shift extended by <2hrs or on-call	Regular, unpredictable shift extensions of <2hrs or on-call	Unpredictable shift extensions of >2hrs or on-call	Unpredictable overtime/shift extensions can cause difficulty in scheduling sufficient sleep and cause acute or cumulative fatigue. • Avoid regular overtime when working 12hr shifts. • Set a limit of 14hrs work in any one shift or any period of 24hrs. • Implement an exceptions process to manage any work beyond 14hrs duty time (e.g. repair to critical item of equipment, emergency situation).
Split Shifts (length of the total working day)		12-13hrs	14 -16hrs	>16hrs	Split shifts reduce time available in which to obtain restorative sleep. • Eliminate/avoid the use of split shifts for particular jobs or activities. • Reduce working hours. • Increase staff numbers. • Optimise timing so that employees are provided with the best sleep opportunity.

Operational and site factors	Lower			Higher	
Employee fatigue	Employees report feeling well-rested, generally getting 6+ hours sleep per night, and rarely exhibit fatigue-related symptoms	Employees report periods of fatigue, generally get 6+ hours sleep per night, and exhibit low level fatigue-related symptoms	Employees report periods of fatigue, often get less than 6 hours sleep per night, and exhibit moderate level fatigue-related symptoms	Employees report regular periods of fatigue, regularly get less than 6 hours sleep per night, and exhibit severe level fatigue-related symptoms	Fatigue increases the risk of incidents and long-term health problems. • Inform all employees of their responsibility to report for work fit, rested and alert. • Foster a site culture in which employees are comfortable declaring they are fatigued or have observed fatigue in a colleague. • Encourage employees to discuss personal sleep or other health issue with their line manager or a member of the site health team. • Adopt a fatigue impairment checklist that supervisors can use to make decisions regarding the management of declared or observed fatigue (see Annex 1). • Implement a 'just culture' that supports intervention to address observed or declared fatigue.

Fatigue risk factors	Risk assessment				Control measures
Operational and site factors	Lower			Higher	
Physical or mental demand	Minimal physical or mental effort required. Varying task demands		Sustained physical and/ or mental effort required.		Physical and mental demands can increase fatigue risk and adversely impact human performance. • Re-design jobs to eliminate or reduce repetitive or boring work, sustained physical or mental effort, or highly complex tasks. • Plan an appropriate workload for the length and timing of the shift. • Consider shortening the length of the shift if work is particularly demanding. • Schedule demanding tasks for when employees are most alert and least likely to be fatigued. • Ensure that rest breaks, task variation and job rotation during shifts allow recovery from physical and/or mental fatigue. • Ensure staffing levels are sufficient to address task demands. • Provide training and experience to enable multi-skilling and effective job rotation.
Seasonal variability (hours of light/hours of darkness)			Prolonged hours of light/ darkness.		The long daylight hours of summer and the long dark days of winter experienced in many countries both impact employee ability to obtain the restorative sleep they need. Long daylight hours • Advise employees to practise good sleep hygiene. • Provide adequate facilities for sleep, i.e. cool, quiet and dark. • Provide eye masks and ear plugs. Dark days • Advise employees to practise good sleep hygiene. • Provide adequate facilities for sleep, i.e. cool, quiet and dark. • Schedule time outside in natural daylight . • Encourage regular exercise.
Religious requirements of fasting or extended wakefulness (e.g. Ramadan)	Not applicable		Applicable		Employees who observe Ramadan may experience increased levels of fatigue. • Educate employees about how the observance of religious practice can increase the risks of fatigue and of the fatigue countermeasures that can be adopted.
Staffing levels	Adequate staffing levels		Inadequate staffing levels		Inadequate staffing levels may lead to excessive hours of work which are fatiguing and to planned maintenance activities being delayed. • Provide adequate staffing levels and relief systems to avoid regular working of excessive hours or overtime.

Fatigue risk factors	Risk assessment				Control measures
Operational and site factors	Lower			Higher	
Workload	Appropriate and varied workload		Inappropriate workload		Individuals with an appropriate and varied workload will be more effective. • Plan an appropriate and varied workload. • Provide a variety of tasks, both physical and mental, and if practical allow employees to choose the order in which they are undertaken.
Safety critical work	Safety critical tasks undertaken during the daytime		Safety critical tasks undertaken at night		Arrange safety and production critical tasks so they are undertaken when employees are most likely to be alert. Avoid these tasks: • Towards the end of a shift. • In the early hours of the morning. • Immediately after a meal. Other job design measures that can be taken to minimise fatigue risk to safety and production critical tasks include: • Providing additional supervision. • Co-worker double check systems. • Varying workload. • Rotating between tasks.
Work environment (e.g. exposure to chemical and physical agents)	Minimal exposure		Significant exposure		The mental and physical demand of work may influence employee fatigue. • Avoid working during periods of temperature extremes. • Control exposure to chemical and physical agents to national/international occupational exposure limits. NB: Exposures may need to be adjusted to reflect shift length. • Consider whether different types of personal protective equipment are required for different shifts. • Ensure the workplace is well lit. • Avoid work environments that promote drowsiness, i.e. quite, warm, badly lit and lacking stimulation.
Fatigue awareness training	Training provided to all employees		No training provided		Training gives employees and supervisors the knowledge and skills required to implement fatigue risk controls. • Educate all employees who work extended hours or around-the-clock about good sleep hygiene, napping and of the strategic use of caffeine. • Provide comprehensive supervisor fatigue training.

Fatigue risk factors	Risk assessment				Control measures
Individual factors	Lower			Higher	
Sleep opportunity	Night time sleep		Day time sleep		Day time sleep is less restorative than night time sleep. Both sleep quantity and quality are affected. • Provide accommodation that facilitates day time sleep, i.e. cool, dark and quiet. • Provide single occupancy bedrooms/cabins. If this is not feasible consider double occupancy bedrooms where one employee works days and the other nights.
Fitness for work	Minimal FFW or health issues		Several FFW or health issues		Medical conditions, sleep disorders, prescription medicines, over-the-counter drugs and alcohol can affect sleep quantity or quality • Offer employees who are about to start work at a FIFO a pre-placement health assessment. • Educate employees and their families about sleep disorders. • Provide employees with access to professional advice, e.g. an employee assistance programme, a sleep disorder clinic, an onsite health centre. • Educate employees about the impact that prescription medicines, over-the-counter medicines and alcohol can have on sleep.
Travel to workplace	Lower			Higher	
Total travel time from home to place of work.	<4 hrs	4-6 hrs	6-12 hrs	>12 hrs	Sleep debt and circadian disruption will impact on employee alertness and performance, particularly on the first shift of the tour. • Start work on the day after arrival and travel home on the day after the tour is finished. • Provide accommodation to enable employees to sleep before/after travel, particularly before/after international travel. • Roster a shorter first day (late start/early finish) and minimise safety critical activities during the first 24 - 48 hours. • Adjust shift schedule to take account of long travel time to workplace. • Encourage employees to sleep during travel to workplace, particularly those that involve travel across multiple time zones. Consider providing international rotators with a travel pillow, ear plugs, eye mask and fleece.
Number of time zones crossed.	<2 time zones	2-4 time zones	>4 time zones	>6 time zones	
Rest on arrival at work prior to commencement of first shift.	>24 hrs	12-24 hrs	6-12 hrs	<6 hrs	

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IPIECA

IPIECA is the global oil and gas industry association for environmental and social issues. It develops, shares and promotes good practices and knowledge to help the industry improve its environmental and social performance, and is the industry's principal channel of communication with the United Nations.

Through its member-led working groups and executive leadership, IPIECA brings together the collective expertise of oil and gas companies and associations. Its unique position within the industry enables its members to respond effectively to key environmental and social issues.

International Association of Oil & Gas Producers

IOGP represents the upstream oil and gas industry before international organizations including the International Maritime Organization, the United Nations Environment Programme (UNEP) Regional Seas Conventions and other groups under the UN umbrella. At the regional level, IOGP is the industry representative to the European Commission and Parliament and the OSPAR Commission for the North East Atlantic. Equally important is IOGP's role in promulgating best practices, particularly in the areas of health, safety, the environment and social responsibility.

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