

Night work

Working Together for Safety Recommendation 040E/2019



SfS
Samarbeid for Sikkerhet

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1. Introduction

Night work is necessary in a number of industries, and the petroleum industry is one of these. In addition to continual shift work for operations and drilling personnel, it may on occasion also be necessary to perform other night work, such as in connection with work stoppages, urgent repairs and other unforeseen events.

It is well-documented that shift work and night work can have a negative impact on an individual's health. Getting enough sleep is just as important as regular exercise and eating a healthy diet, and considering the risks relating to tiredness (fatigue), it is important to establish measures and routines that facilitate good sleep.

Although everyone requires sleep, there are significant individual differences when it comes to the amount of sleep people need. Furthermore, it is not necessarily the number of hours' sleep that is important. If you are able to sleep after your shift and wake fully rested, this is a good sign that you are able to cope with shift and night work effectively.

This recommendation is not an exhaustive list of things that should be in place to permit individuals to perform night work. It contains practical tips for both organisations and individuals. Organisations can facilitate good conditions for night work, and there is plenty that individuals can do to remain focused and work safely at night.

The part of the recommendation that discusses sleep and good sleep hygiene has been prepared by Working Together for Safety in collaboration with Professor Bjørn Bjorvatn at the Norwegian Competence Centre for Sleep Disorders at Haukeland University Hospital. Much of the included advice is taken from Bjorvatn's book, *Shift Work and Sleep: How to Master Night Work and Irregular Working Hours* (available in Norwegian).¹

2. Purpose

- To provide increased knowledge to help reduce problems relating to night work.
- To help safeguard the individual employee's health and safety in connection with night work.

3. Target group

The target group for this recommendation includes anyone who manages, organises or performs night work within the petroleum industry, both offshore and at onshore facilities.

4. Relevant regulations

Section 10-2 of the Working Environment Act, titled Working Hours, applies to both offshore and onshore facilities. This section of the Act states that:

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Working hours shall be arranged in such a way that employees are not exposed to adverse physical or mental strain, and that they shall be able to observe safety considerations.

The following sections of the Working Environment Act are particularly relevant to onshore facilities:

Section 10-8 Daily and weekly off-duty time

Section 10-11 Night work

The following sections of the Framework Regulations are particularly relevant offshore:

Section 39 Off-duty periods

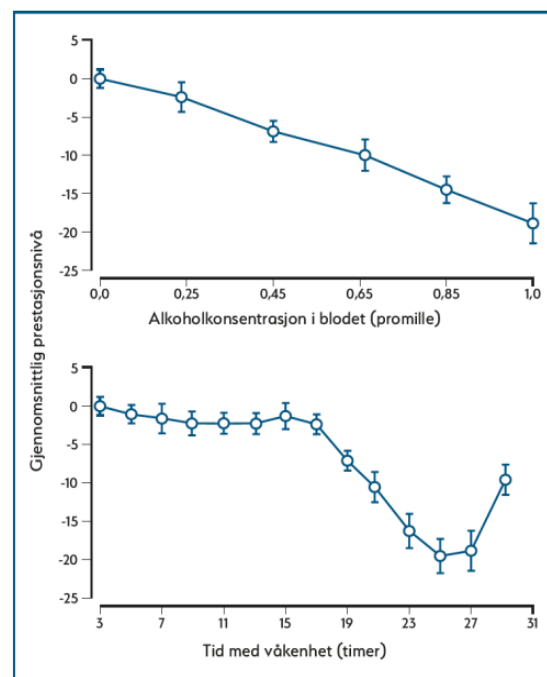
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5. Health and safety

Shift and night work may have a negative impact on health and safety. In addition to immediate effects, such as increased drowsiness and trouble sleeping, this type of work may also have long-term effects such as weight gain, diabetes, high blood pressure, etc.

Many undesirable incidents are due to inattentiveness, and individuals not being 'fully present' when performing their work. This can happen during daylight hours under normal conditions, and may therefore occur to an even greater extent in connection with fatigue and night work.

If you remain awake for more than around 17 hours, your performance starts to decline significantly. After 19 hours, your performance is equivalent to that achieved with a blood alcohol level of around 0.5 – and after being awake for 24 hours will be equivalent to that achieved with a blood alcohol level of around 1.0. See the figure to the right, which compares how a lack of sleep negatively affects performance compared to alcohol intake and blood alcohol level¹. Poorer performance means poorer reaction times and a reduced ability to think clearly and act rationally.



5.1 Fatigue

Fatigue is a term that is used in several contexts. In this document, fatigue is used to refer to tiredness/exhaustion as a consequence of insufficient sleep. Fatigue causes reduced attention and impaired judgement, erroneous assessments and irritability, and may pose a significant safety risk.

Fatigue is your body's way of telling you to stop whatever you are doing – whether this is a physical activity, a mental activity, or simply just being awake. You can find more information about fatigue under reference 3.

5.2 Pregnant workers

Current knowledge indicates that there is no general reason to advise against pregnant workers performing shift or night work². However, in line with the precautionary principle, many employers offer alternative work to employees who become pregnant. If you find that performing night work while pregnant is placing extra strain on your health, you should take this up for discussion with your employer / occupational health service. Employers should have a low threshold for granting exemptions from night work.

6. Recommendations for individuals performing shift/night work

6.1 Recommended measures before you start your night shift:

- Start the night shift as well-rested as possible, and without a lack of sleep.
- Take a little power nap before your night shift, if you can. It helps!
- If possible, plan any longer journeys prior to the night shift so that you arrive at the workplace early enough to sleep or rest before the night work. Consider staying at a hotel close to the heliport the day prior to departure if you have a long journey.
- If you are going to work at least four night shifts in a row, you should follow the advice in Chapter 8 about changing your circadian rhythm.

6.2 Recommended measures during the night shift:

There are a number of things you can do to stay awake and alert on your night shift. The following points apply regardless of the number of nights you will work:

- Interactions: Speaking with others is stimulating and can prevent you from falling asleep.
- Lighting: Get sufficient exposure to light during the night. Light makes us more awake. If possible, spend time in less well-lit areas during the last few hours before going to sleep.
- Activity/exercise: You won't be able to sleep if you are actively moving. If you start to feel very sleepy, get out of your chair, walk around a little and perform some active

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movements with your arms and legs. Exercise in the middle of the night if you can, but avoid exercising right before going to sleep. The more active you are, the greater the effect.

- Diet: Eat healthy food. Research provides no specific advice regarding particular types, but you should eat small portions of easily digestible foods. If you are going to work 14 nights in a row, you will naturally eat more and more food at night. Avoid feeling too full or hungry when you end your night shift and are about to go to sleep. In general, it is important to maintain a healthy diet and to eat at regular intervals.
- Power nap: If you have the opportunity to take a power nap, this should be between the hours of 01:00 and 04:00. Remember that you should nap for no more than twenty minutes.
- Caffeine and nicotine: The most commonly used stimulant that is available to everyone is caffeine. Caffeine is present in coffee, tea, cola and energy drinks. Avoid caffeine and nicotine during the final hours of your shift. Note that caffeine-free coffee can also contain as much as 15-30% of the amount of caffeine found in ordinary coffee. Also be aware that the effect of caffeine increases with age, because it takes longer to digest it the older you get.

NB: Remember that both you and your co-workers/managers are responsible for ensuring that you do not perform work when you are too tired to do so. If you believe you are too tired to perform the job you have been allocated, tell someone. If, despite following all the advice in this recommendation, you still find yourself struggling with night work, you can ask that your work schedule be adjusted so that it does not involve night work (ref. section 4-6 of the Working Environment Act).

6.3 Recommended measures after you have finished a night shift:

These measures apply regardless of how many night shifts you have worked or will work. See also Chapter 9 regarding changing your circadian rhythm from night to day.

- Avoid strong daylight before going to bed after a night shift (do not sit beside a window if you eat breakfast straight after your night shift). If possible, you can also wear sunglasses or glasses that block the blue wavelengths of light (blue light blocking glasses).
- Avoid smoking or using snus before going to bed and upon waking up.
- Keep the cabin/room dark and quiet when going to sleep.
- Put mobile telephones and tablets into night mode (reduced/warm light) and on silent.
- Consider your state and your ability to drive a car if commuting over long distances between work and home, etc., after the night shift.

7. Recommendations for the organisation

In order to ensure that employees can start their night shifts as rested as possible, and work as safely as possible, the organisation should consider the following:

Planning:

- *The necessity of the night work shall be discussed with the employee representatives before the work is started.* In cases where extra night work is required, this should also be discussed as early as possible. This gives individual employees time to plan their sleep/rest prior to the night work, as well as any change of circadian rhythm.
- Give night workers priority / the opportunity to take an early helicopter – this will give employees an opportunity to sleep and rest before the night shift begins.
- Also inform employees of the expected number of night shifts (ref. Chapter 8 regarding changes of circadian rhythm).
- Minimise the use of ‘quick returns’ (less than eleven hours’ rest between two shifts) as this is detrimental to good sleep.
- If possible, offer varied work during the shift, e.g. swapping between the roles of site operator and control room operator.
- Use voluntariness as a principal in connection with extra work due to illness or other circumstances that may result in operators having to perform an extra night shift, or having to start their next shift earlier than planned.
- Avoid employees having to work alone (ref. section 35 of the Activities Regulations).
- Remember that people are more easily able to handle shift changes ‘clockwise’ (e.g. day, afternoon, night on a three shift rotation; day, night on a two shift rotation).
- If the need for non-planned night work consists of four nights or more, the work should be divided between several employees wherever possible, and/or the night work should be added to the end of the shift period. This prevents employees from having to reverse their circadian rhythm within the same shift period.
- The employer shall ensure that the employees are offered regular health checks in order to identify any long-term effects of environmental factors. Night work may be such a factor.

Cabins/rooms:

- Make cabins available prior to the night shift if possible.
- Make it possible to regulate the temperature of the cabin – most people sleep better in a cool room with good ventilation.
- Ensure that cabins for night workers are exposed to as little noise as possible – consider extra noise insulation and establish a separate wing/department for employees working night shifts (both those working permanent nights and those performing extra work).
- Ensure adequate signage of cabins/corridors where people are sleeping.
- Ensure that cabins have blackout curtains / the ability to reduce glare.

The workplace:

- Ensure that workplaces used at night are well lit.
- If the nature of the work permits, facilitate power naps during the shift in quiet, dim rooms, or during breaks.

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Food:

- Offer easily digestible, healthy meals both during and after night work.
- Establish a dedicated dining area away from windows for those who have just completed a night shift. These employees should be exposed to as little daylight as possible when eating breakfast before going to bed.

Follow-up:

- Encourage employees to prioritise sleep, rest and relaxation.
- Make it easy to discuss sleep and problems sleeping.
- Offer health checks to everyone who mainly works at night (ref. section 10-11 of the Working Environment Act), and consider offering the same to others who also work nights for certain periods of time.
- Offer individual guidance to employees struggling to sleep.

Technical aids:

- Consider the establishment of equipment and dedicated spaces for light treatment.
- Consider offering employees glasses that block the blue wavelengths of light (blue light blocking glasses).

Extra overnight stays:

- Consider offering opportunities to rest prior to night work, and preferably hotel accommodation prior to departure for those with a long journey to work who are about to start a night shift.
- Consider possibilities to offer night workers the chance to sleep in a cabin (or hotel) before travelling/driving home.

Special conditions:

In connection with technical or weather-related problems that result in delays or cancellations of helicopter departures, affected individuals who are about to start on a night shift should be given the opportunity to rest/sleep in quiet surroundings at the heliport. In the event of delays of a longer duration, hotel accommodation close by should be offered.

In the event of delays and cancellations prior to journeys home, which may result in the outgoing night shift having to continue working for the coming night, it must be ensured that these employees receive the necessary rest and restitution before returning to work. Such employees must have the opportunity to sleep in a bed. If necessary, the day shift must work overtime (within regulatory limits), so that the night shift is able to get the necessary rest and restitution before returning to work.

During shift changes for certain positions, it may be necessary to call out personnel from the night shift in the middle of their shift period to relieve those on the current shift, e.g. on the drill floor, while the outgoing shift prepares for their helicopter departure and until the incoming shift

is dressed and ready for work. This is because the incoming shift arrives on the same helicopter that the outgoing shift will return on.

In cases where this is necessary, the helicopter's arrival must be planned as close to the time for the ordinary changeover between the day and night shifts as possible. Night staff who are called out during the daytime should experience the least possible disruption to their sleep, and have a minimum of eight consecutive hours' time off before returning to their ordinary shift.

8. Changing your circadian rhythm from day to night

If you are going to work nights for more than 3-4 days, it will be natural to shift your circadian rhythm. In addition to the general advice described in Chapter 5, there are a number of specific things you can do to help your body adjust to the new routine. The use of melatonin and light treatment are the most well-known aids in this process, and their effects are well-documented – presuming that they are used at the correct times. These aids can be used together when changing your circadian rhythm. Medicines that contain melatonin are registered as prescription-only medications in Norway, and shall therefore be taken in consultation with a doctor.

Light treatment has a stimulating effect and will extend your circadian rhythm if it is used before the nadir (the 'lowest point' of the circadian rhythm – see Definitions). Melatonin will make you sleepy and must be taken after the nadir in order to extend your circadian rhythm. In practice, this means that when working night shifts you should use light treatment (or be exposed to strong light) until approx. 2-3 hours *before* the night shift ends, and melatonin directly *after* completing the shift.

Light treatment can be used to reverse your circadian rhythm and is particularly relevant for those working several nights in a row. When starting the night work, light treatment will be administered late in the evening or early in the night to shift the circadian rhythm to a later point in time. This will make it easier to function during the night, and ensure improved sleep after the night shift.

NB: Light treatment – 10,000 lux for thirty minutes – appears to have few side-effects, but some individuals complain of eye discomfort and headaches. Light treatment shall not be used if the individual has bipolar disorder, or certain eye diseases. Some medications may also make you sensitive to light. If you take such medications you should exercise caution when using light treatment.

When changing your circadian rhythm from day to night and working long night shifts, you should change your diet and other habits so that the entire day is completely reversed. This means eating breakfast just before going to work and dinner in the middle of the night. It is also advantageous if you can exercise at the end of your shift, and wait a couple of hours before going to bed, just as you would on a normal working day.

9. Changing your circadian rhythm from night to day

When returning your circadian rhythm from night to day after more than four night shifts, forcing the body to shift back quickly is not recommended. It usually takes 3-4 days to reverse the circadian rhythm from night back to day. Attempting to change your circadian rhythm faster than this generally results in sleep problems lasting for a longer period, rather than reducing them. This means that such changes should be avoided wherever possible.

If you use light treatment, you must use it after the nadir (right after you have got up). Melatonin should be taken as late as possible before going to bed, preferably approx. 12 hours after light treatment. Your diet should be adjusted gradually, in line with the change of circadian rhythm.

Appendix 1 provides an example of how you can shift your circadian rhythm from night to day if you are on your off-duty period and able to set your daily routine yourself.

10. Sleep hygiene

In addition to the advice provided in Chapter 6, the following advice regarding good sleep hygiene applies:

Advice for maintaining a good circadian rhythm:

- Get up at around the same time every day, including at weekends.
- Get at least half an hour of daylight daily – preferably within two hours of getting up.
- Avoid exposure to strong light if you are involuntarily woken from sleep.
- Focus on eating a healthy diet and getting regular exercise, as well as enough sleep – this is particularly important for those of you who work at night. Getting too little sleep can result in you having insufficient energy for regular exercise, and maybe one of the reasons that night workers are less physically active and often struggle with weight gain.

Some of the explanation as to why night workers often gain weight may also be due to changes in hormone production. If you get too little sleep, your appetite may also increase – particularly for sweets and foods rich in carbohydrates.

Advice for facilitating good sleep:

- Avoid using the bedroom and the bed as a workplace.
- Avoid using your mobile and tablet in bed after bedtime.
- Avoid coffee, tea and other caffeinated drinks for at least six hours before bedtime.
- Ensure that your bedroom is dark and quiet.
- Do not look at the clock if you keep waking up.
- Take a hot bath a couple of hours before going to bed.
- Learn to practice a relaxation technique (see Chapter 11) and use this whenever you wake up.

Alcohol should never be used to help you sleep. Although it may seem to help you fall asleep more easily you will sleep restlessly, and the quality of your sleep – especially REM sleep – will be poorer. Sleeping medications should only be used under the guidance of a doctor or nurse.

11. Relaxation

Relaxation exercises can have a sleep-promoting effect, as they reduce both mental and bodily arousal. For many people, emotions and worries can make it difficult to fall asleep. It is also important to reduce your general stress level. If you practice a relaxation technique, this will reduce your stress level and help you to fall asleep more quickly. There are various relaxation techniques that can be used – different people will benefit from different techniques, and you will have to try to find something that works for you.

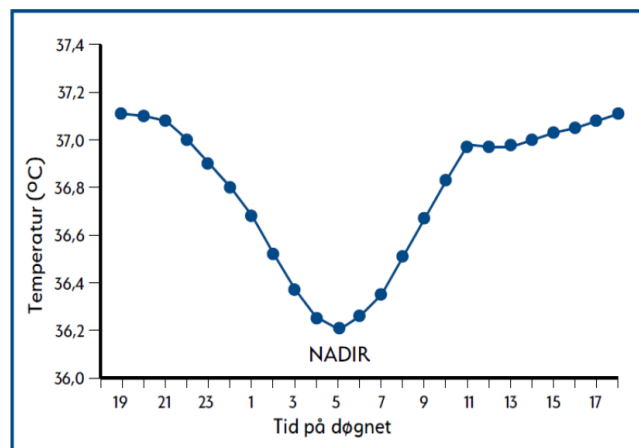
It isn't just before bedtime that you should calm your body – in your day-to-day life, mindfulness can help you to focus your mind and be more present in the now. One tip is to focus on your breath by following your natural breathing pattern, simply observing how you breathe normally, without trying to control it. This is a technique that can be useful prior to going to sleep.

12. Definitions

Night work: Work between 23.00 and 06.00 or between 00.00 and 07.00

Nadir: This is the time of day when your body temperature is at its lowest. This is usually around 2 hours before you normally get up. This is the time at which you will feel chilly and find it hardest to stay awake.

The nadir will gradually change when you make the switch to working at night and start to shift your circadian rhythm.



REM (Rapid Eye Movement): REM sleep is characterised by the rapid eye movements that give this phase of sleep its name. REM sleep constitutes around the same proportion of the total sleep period as deep sleep, approx. 20-25%. The brain is fairly active during REM sleep, and REM sleep and dreams are important for our emotional well-being, creativity and ability to solve problems.

A power nap (often called a 'Høneblund' in Norwegian) is a brief period of sleep that can be extremely effective in reducing sleepiness. A power nap should not last longer than twenty minutes, as this will make it more difficult to wake up afterwards.

Melatonin: The hormone that regulates sleep-wake cycles, and which is produced by the brain when it is dark. The production of this hormone is disrupted by night work due to changes in lighting conditions. Melatonin medications are also available in various forms, most commonly as tablets.

13. References

- 1) Bjørn Bjorvatn, *Skiftarbeid og Søvn: Slik mestrer du nattarbeid og uregelmessig arbeidstid (Shift Work and Sleep)*, Fagbokforlaget 2019
- 2) Norsk elektronisk legehåndbok (Norwegian Electronic GP Handbook) (NEL), Chapter “Helseovervåking (Monitoring health)”, sub-chapter “Gravide (During pregnancy)”
- 3) IOGP/OGP Report Number 392 “Managing fatigue in the workplace”, 2007

Appendix 1: Example of how to change your circadian rhythm from night to day

This example is based on you sleeping until between 14.00 and 17.00 after your night shift during the work period and getting up at 14.00 after your last night shift before going on your off-duty period. Here, we also presume that you want to set your body clock back, so that you’ll sleep until around 08:00 – you must therefore shift your circadian rhythm by a further six hours. It is recommended that you use 3-4 days to change your circadian rhythm – and to divide the time into equally sized chunks, i.e. 2 hours every day in this case.

Day no.	Get up	Bedtime*	Light treatment (or ordinary strong light)	Any melatonin	Mealtimes
0 (end of night shift)	14:00	Between 02:00 and 04:00	As early as possible after getting up	02:00 (12 hours after light treatment)	Shift by approx. 2 hours in line with new circadian rhythm
1	12:00	Between 24:00 and 02:00	As early as possible after getting up	24:00 (12 hours after light treatment)	Shift by approx. 2 hours in line with new circadian rhythm
2	10:00	Between 22:00 and 24:00	As early as possible after getting up	22:00 (12 hours after light treatment)	Shift by approx. 2 hours in line with new circadian rhythm
3	08:00	22:00 / usual bedtime	As early as possible after getting up	20:00 (12 hours after light treatment)	Shift by approx. 2 hours in line with new circadian rhythm

*In general, you should go to bed when you are tired – the specified times must therefore be adjusted to your individual need for sleep.