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# NIGHT FIT AT BLUEWATER

## Improving the quality of sleep, health and safety at the Aoka Mizu


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## The problem in the offshore industry

At the modern offshore industry, many shift workers fail to get the high quality of sleep they need. People who are fatigued think and move more slowly, make more mistakes, and can have memory difficulties. These effects reduce productivity and increase the risk of work related errors and accidents.

## The solution: Night Fit

Quality sleep helps our brain to function optimally. Improving the quality of sleep for offshore workers will result in an immediately increased focus as well as increased concentration. This will enable offshore workers to be more productive and to make better decisions. Additionally, it will help to improve their mental and physical health, as well as the safety of them and others.

## Night Fit, it works

Night Fit is based on solutions already applied at NASA and the military industry. This method optimizes work performance, health and safety by improving sleeping patterns and reducing overall stress levels. By focusing on the exposure to light –by making use of special glasses and blue lights– Night Fit increases the quality of sleep without the help of medication.

*"Without Night Fit my brain needs more time to switch off and to calm down. Last week I found it easier to switch off at night and I experienced better sleep."*
**A. Turner – Ndt Technician**

*"Normally I find it hard to get to sleep and I only sleep for about six hours. Now I sleep deeper and I can sleep for 8 hours or more."*
**A. McGill – Control Room Operator**

## Summary of the results at Bluewater

- **40%** reduced time to fall asleep
- **30 minutes** increased total sleep per night
- **20%** improved overall quality of sleep
- **53 out of 67** wanted to keep using Night Fit

## Night Fit: The next step in a profound health and safety system

NIGHT FIT

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### Summary of the results for the target group 'Bad sleepers'

24 Out of 67 shift workers were categorized as 'Bad sleepers' (i.e. persons with minor to large sleeping difficulties). For this group the Night Fit method has the most effect. The following results were found:

- **25 minutes** reduced time to fall asleep
- **60 minutes** increased total sleep per night
- **40%** improved overall quality of sleep
- **All 24 persons** wanted to keep using Night Fit

*The quality of sleep has a huge effect on performance and alertness!*

*"I found it easier to fall asleep, I slept deeper and this week I kept waking up before my alarm." -T. Hughes.*

*"There is always background noise from the vessels night shift duties. This week I slept deeper and was able to ignore the background noise." - F. Canavan.*

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## Night Fit at Bluewater

### An overview of the current situation

Without the implementation of Night Fit, shift workers experience a decrease in their quality of sleep when compared to sleeping at home. Shift workers have reported that they find it hard to stay alert and concentrated, especially when working shifts in the midnight hours. People who are tired think and move slower, make more mistakes, and can have memory difficulties. This makes shift work fatigue –especially in high risk environments such as the offshore industry– a serious health and safety hazard.

*Managing shift work fatigue is a top priority in 'high risk industries'*

One of the main reasons for the existence of sleeping difficulties is that many shift workers find it hard to calm down and relax mentally during offshore shift work operations. Prolonged periods with high levels of stress eventually lead to a reduction of the quality of sleep, decreased work performance and lower levels of safety.

*Without a good night's rest we don't perform at our maximum potential!*

*Control Room Operator using the bright blue light during a night shift at the Aoka Mizu.*

# Night Fit at Bluewater

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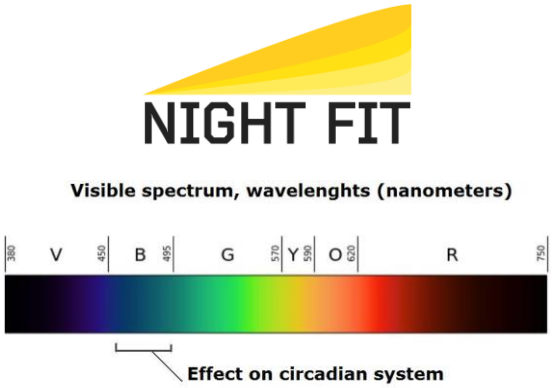
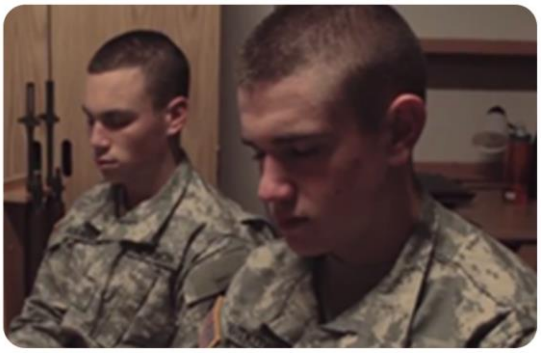
## The Night Fit approach

**Timed bright light exposure:** The disruptive effects of shift work fatigue can be prevented. The past two decades, both NASA and the American military successfully provided a special form of light treatment to their shift work crew. KM Human Factors Engineering has complemented and adjusted this method into a compressive solution for the offshore industry. This method is called 'Night Fit'. By focusing on the exposure to light –by making use of special glasses and blue lights– Night Fit increases the quality of sleep without the help of medication. The optimal time that offshore workers are exposed to this light depends on the work schedule and the specific characteristics of a user.




*Just a small part of the visual spectrum has an effect on our circadian system (i.e. our biorhythm). By focusing on timed exposure to this part of the visible light, Night Fit increases the quality of sleep without the help of medication*

**Reducing workforce stress levels:** The second aim of the Night Fit Method is to reduce the stress levels that the offshore workforce experiences. This is done by providing short relaxation and meditation exercises (approximately five to ten minutes per day). The American army currently offers similar exercises to their soldiers. Studies have shown that these exercises relieve stress, increase sleep quality and result in better performance. During the Night Fit project 22 shift workers applied for these exercises.



*The American army provides relaxation and meditation exercises to their soldiers in order to achieve better performance.*

## Results total population: The effects of Night Fit on the quality of sleep

Questionnaires were used to assess whether Night Fit had an effect on sleep quality and fatigue levels. Most participants reported Night Fit had a general positive effect on the quality of sleep (53 out of 67). The overall **quality of sleep improved from 6.5 to 7.7** (on a 10-point scale). Night Fit enabled them to fall asleep quicker. On average they needed 30 minutes to fall asleep without the Night Fit Method, whereas they needed 18 minutes when using the Night Fit Method. **The total duration of their sleep increased from 6.7 hours to 7.2 hours.**

Feedback from the crew shows that the majority (53 out of 67) wants to be able to use the Night Fit strategies during future shift work operations. 60 out of 67 indicated Night Fit would be an improvement for Bluewaters' health policy and 58

out of 67 indicated that it would be an improvement for Bluewaters' safety system. See Appendix B for a detailed overview of the rest of the results.

## Results target group 'Bad sleepers'

24 out of 67 shift workers were categorized as 'Bad sleepers' (i.e. persons with minor to large sleeping difficulties). For these individuals the **quality of sleep was improved from 5.5 to 7.8** (on a 10-point scale). On average they needed 46 minutes to fall asleep without the Night Fit Method, whereas they only needed 21 minutes when using the Night Fit Method. **The total duration of their sleep increased with more than an hour from 6.0 hours to 7.1 hours.** Everyone in this group was positive about the Night Fit method, and indicated that they would use Night Fit during future shift work operations. See Appendix A for a detailed overview of the rest of the results.

*"The quality of sleep while offshore can be very mixed, normally I don't have the deepest of sleeps. The glasses have helped a lot with this. It has definitely improved my sleep quality."*
*-F. McHardy.*

*"Night Fit helps me in setting up a sleeping routine. I think any method that improves sleep time quality is a positive addition in terms of safety and productivity." -S. Underwood.*

## Night Fit: The next step in a profound health and safety system

Night Fit provides the following benefits for your organization:

- a significant reduction in shift work fatigue
- a reduction of human errors
- increased mental and physical health

The proactive approach the Night Fit method offers contributes to the continuous improvement of health and safety.

## Appendix A: Overview results target group 'Bad sleepers'

24 out of 67 shift workers were categorized as 'bad sleepers' (i.e. persons with minor to large sleeping difficulties). In the following tables the results of this group are presented.

| | **Normally without Night Fit** | **With Night Fit** |
|---|---|---|
| What grade would you give the **quality of sleep**? | 5.5 | 7.8 |
| How easy is it for you to **go to sleep**? | 5.5 | 7.8 |
| How **deep** do you sleep? | 5.1 | 7.0 |
| How easy is it for you to **wake up**? | 6.4 | 8.0 |
| How **fit** are you during the shift? | 6.6 | 7.5 |
| How **alert** are you during the shift? | 6.7 | 7.7 |

*Table 1: The effects of Night Fit on perceived quality of sleep and performance (10-point scales) for the target group (n = 24).*

| | **Normally without Night Fit** | **With Night Fit** |
|---|---|---|
| On average how long do you sleep? | 6.0 hours | 7.1 hours |
| How long does it take for you to go to sleep? | 46 minutes | 21 minutes |

*Table 2: The effect of Night Fit on perceived sleep duration and time to fall asleep*

| Did the use of Night Fit: | **Positive effect** | **No Effect** | **Negative effect** |
|---|---|---|---|
| Have an effect on the **overall quality** of sleep? | 24 | 0 | 0 |
| Help you **fall asleep**? | 24 | 0 | 0 |
| Help you to **sleep deeper**? | 20 | 4 | 0 |
| Make you feel **healthier**? | 18 | 6 | 0 |
| Resulted in **less fatigue** during your shift? | 19 | 5 | 0 |
| Make you feel **more alert** during your shift? | 21 | 3 | 0 |
| Make you feel **more energetic** during your shift? | 20 | 4 | 0 |

*Table 3: Number of participants (out of a total of 24) that reported a positive, negative or no effect on sleep quality and performance.*

| | **Yes** | **No** |
|---|---|---|
| Would you like to be able to use the Night Fit materials during future shift work? | 24 | 0 |
| Do you think the implementation of Night Fit is a positive addition to Bluewaters' **Health policy**? | 24 | 0 |
| Do you think the implementation of Night Fit is a positive addition to Bluewaters' **Safety policy**? | 23 | 1 |

*Table 4: General evaluation Night Fit*

# Appendix B: Overview results total population

In the following tables the results of all (n = 67) participating shift workers are presented.

| | **Normally without Night Fit** | **With Night Fit** |
|---|---|---|
| What grade would you give the **quality of sleep**? | 6.5 | 7.7 |
| How easy is it for you to **go to sleep**? | 6.6 | 8.0 |
| How **deep** do you sleep? | 6.4 | 7.4 |
| How easy is it for you to **wake up**? | 6.7 | 7.3 |
| How **fit** are you during the shift? | 7.0 | 7.5 |
| How **alert** are you during the shift? | 7.1 | 7.8 |

*Table 5: The effects of Night Fit on perceived quality of sleep and performance (10-point scales) for the total population (n = 67).*

| | **Normally without Night Fit** | **With Night Fit** |
|---|---|---|
| On average how long do you sleep? | 6.7 hours | 7.2 hours |
| How long does it take for you to go to sleep? | 30 minutes | 18 minutes |

*Table 6: The effect of Night Fit on perceived sleep duration and time to fall asleep*

| Did the use of Night Fit: | **Positive effect** | **No Effect** | **Negative effect** |
|---|---|---|---|
| Have an effect on the **overall quality** of sleep? | 53 | 13 | 1 |
| Help you **fall asleep**? | 47 | 20 | 0 |
| Help you to **sleep deeper**? | 43 | 23 | 1 |
| Make you feel **healthier**? | 35 | 32 | 0 |
| Resulted in **less fatigue** during your shift? | 38 | 29 | 0 |
| Make you feel **more alert** during your shift? | 38 | 29 | 0 |
| Make you feel **more energetic** during your shift? | 38 | 29 | 0 |

*Table 7: Number of participants (out of a total of 67) that reported a positive, negative or no effect on sleep quality and performance.*

| | **Yes** | **No** |
|---|---|---|
| Would you like to be able to use the Night Fit materials during future shift work? | 53 | 14 |
| Do you think the implementation of Night Fit is a positive addition to Bluewaters' **Health policy**? | 60 | 7 |
| Do you think the implementation of Night Fit is a positive addition to Bluewaters' **Safety policy**? | 58 | 9 |

*Table 8: General evaluation Night Fit*

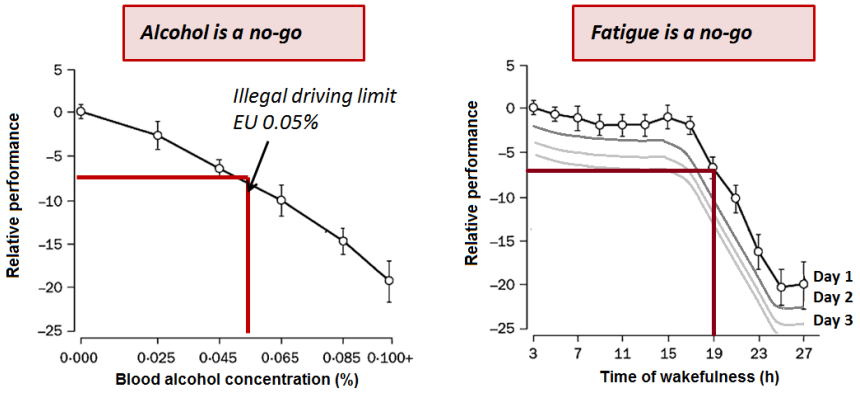
# Appendix C: Fatigue and safety a short overview

## Bad sleep is a serious safety risk

Regardless of the cause, poor sleep is a factor that will negatively affect the quality of life. If the quality of sleep is poor, long term adverse effects can be detrimental to health and safety as a whole (Folkard, 2006; Arendt, 2010). At the modern offshore industry, many shift workers fail to get the high quality of sleep they need. While there are individual differences in how sleep-deficiency affects alertness and performance, no-one is immune from its effects. People who are fatigued think and move more slowly, make more mistakes, and can have memory difficulties. These effects reduce productivity and increase the risk of work related errors and accidents (Smith, 2002; Landrigan, 2004).

## Alcohol is a no-go, fatigue is a no-go

In the offshore industry the use of alcohol is a clear no-go. However, just like alcohol, shift work fatigue can have detrimental effects on work performance and safety. On the image below the effects of alcohol and fatigue on performance are presented side by side. Studies have shown that after 17-19 hours of being awake, individuals perform equal or worse, when compared to individuals with an alcohol concentration of .05 percent in their blood (i.e. the drunk driving limit in Europe) (Williamson, 2000). An important factor is that if people do no start the day well rested, caused by one or more days of bad sleep, the drop in their performance is reached earlier. These findings clearly illustrate the need to manage shift work in a professional matter. Night Fit improves sleep quality and duration of shift workers, reducing fatigue related risks.




*On the left figure the effects of alcohol, and on the right side the effects of fatigue on performance are presented. It has to be noted that after one or more days of bad sleep shift workers will start the day already tired. Image adjusted from Rajaratnam, (2001).*

## Safety benefits of improving sleep in an offshore environment

Improving the quality of sleep for employees working offshore will result in an immediate increase in focus and vigilance. As a result, human error risks will be reduced. All things considered, by improving sleep duration and quality using the Night Fit method, a safer work environment will be created.

# Appendix D: Fatigue and health a short overview

## Bad sleep is a serious health risk

Health organizations from all over the world have declared shift work as a major health risk (Arendt, 2010). This is largely caused by the fact that many shift workers fail to get the high quality of sleep they need. Many things happen to the body of a shift worker if the quality of sleep is improved from poor to moderate or from moderate to good. It will result in stronger immune functioning, faster metabolism, more balanced hormones, increased energy and a greater level of focus (Scheer, 2009). However, if a shift worker is sleep-deprived, it will suffer the opposite of all those benefits. In the following paragraphs some additional health related aspects of sleep are listed.

## Bad sleep and overeating

When we experience poor sleep our brain does not receive enough glucose and as a result we crave high carbohydrates and sugary food. These changes occur because the major hormones affecting appetite (e.g. leptin and ghrelin) and metabolism are altered (Scheer, 2009). Poor sleep has also been shown to increase our urge to snack between meals, buy more junk food, buy more food overall and eat fewer vegetables. In general, the availability of junk food in the offshore canteens is seen as the main cause of the offshore obesity problem. However, it is a simple fact that due to bad sleep and night work, offshore personnel is physiologically primed to eat these foods regardless of current efforts to eat healthier.


*In the past decade research on the effects of sleep on health and performance has increased enormously. In this image some articles published on BBC/Health are presented.*

## Bad sleep and illness

Other prominent health problems among shift workers, which are related to poor sleep, include gastrointestinal disease such as stomach upset and constipation (200-300%), increased incidence of cardiovascular disease such as heart attacks and strokes (41%) and an increase in late-onset diabetes (40-50%) (Yvas, 2012).

## Health benefits of improving sleep in an offshore environment

By increasing the quality of sleep offshore, shift workers will have a more healthy appetite, better hormone function, improved immune function, and a higher energy level. It will increase overall physical and mental wellbeing and enables shift workers to operate at their maximum potential.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