

# Schlumberger



## **Fatigue Management Guide For Front Line Operations**



## INTRODUCTION

Fatigue is a significant risk in Schlumberger operations. Sleep loss due to demanding hours of operation and limited time between assignments increases the likelihood of fatigue.

Fatigue impairs alertness, often without you realizing it. In fact, sleepiness or fatigue can produce performance problems similar to those caused by alcohol.

Staying awake for over 18 hours will impair a person's performance as much as having a blood alcohol concentration of .05% or higher, above the legal limit for driving in many countries.

This guide provides information and tips on how to reduce the risks caused by fatigue.

## HOW TO GET THE MOST OUT OF THIS GUIDE

You will get the maximum benefit from this guide by first completing Fatigue Management Training Level 1. People working irregular hours, night shifts and on-call work outside of the hours 07:00 to 18:00 will benefit from the advice within when feeling drowsy or fatigued.

This guide is designed for use by front line workers of all levels who may or may not have immediate access to a computer or on-line resources.

Schlumberger does not encourage anyone to work to the limit of fatigue. Prevention is better than countermeasures.

## WHAT IS FATIGUE?

Fatigue is the lack of energy resulting from prolonged, extensive mental or physical activity, exposure to environmental stresses, or from insufficient sleep or body-clock disturbances. The fatigue from sleep loss is the most dangerous of these in terms of its impact on mental performance.

Fatigue affects driving performance and other tasks in which vigilance is important, especially outside of "normal" operating hours: 07:00 – 18:00.



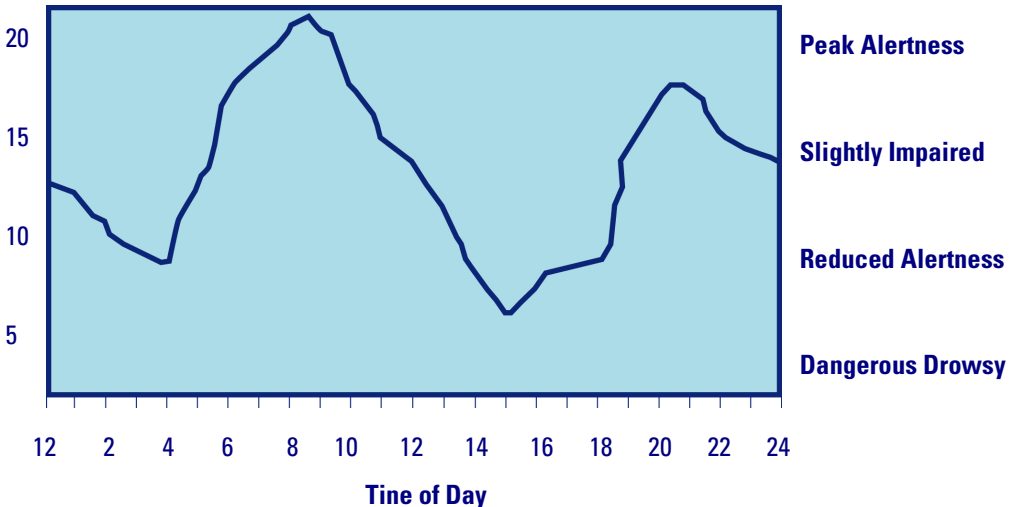
## WHEN IS THE RISK OF FATIGUE GREATEST?

We normally experience two periods of maximum sleepiness each day:

- In the morning between 2 and 6 am
- In the afternoon between 2 and 4 pm

Most major accidents which are caused by decreased alertness occur around these two periods of natural sleepiness.

### 24-Hour Alertness Cycle



## WHAT ARE THE WARNING SIGNS OF FATIGUE?



### Physical

Fidgeting and moving around in your seat

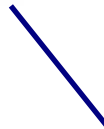
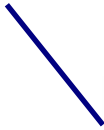
Rubbing eyes and repeated yawning

Staring blankly, with your eyes going in and out of focus

Frequent and long blinks

Difficulty keeping eyes open

Head nodding



### Mental

Negative mood

Reduced communication

Slips and lapses

Poor memory

Reduced attention

Impaired problem solving

Increased risk taking



Each person may also have some unique symptoms of fatigue. Work on identifying your personal patterns and make a plan to control fatigue before it reaches an unsafe level.

## MYTHS ABOUT FATIGUE

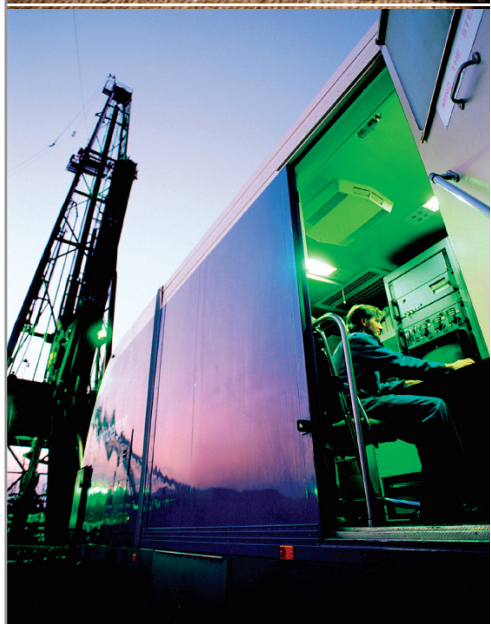
*“When I’m getting tired while driving, rolling down the window and turning up the music will wake me up.”* – If you begin to feel tired while driving, the only effective countermeasure is to safely pull over, stop, and take a 15 to 20-minute nap. Any other countermeasure has only a temporary effect and will not solve the real problem.

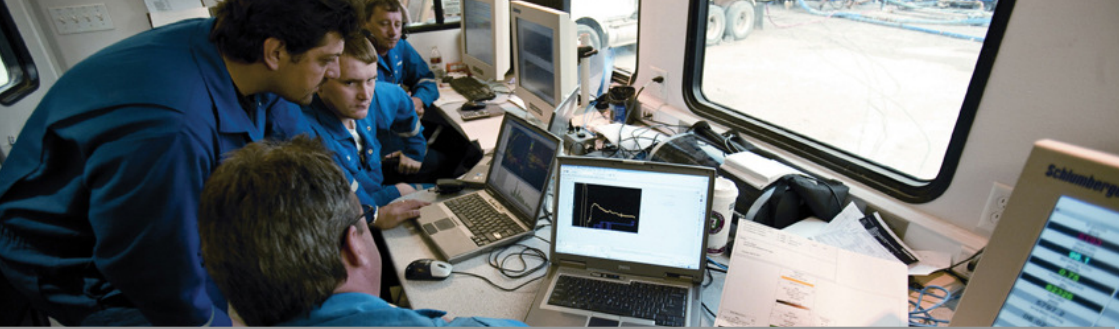
*“I can train myself to need less sleep.”* – You can practice some simple tasks until they become automatic and are not affected by sleep loss, but this will not work with tasks that require vigilance, thought or judgment.

*“My manager would never allow me to nap during work hours.”* – Schlumberger management will support your decision to stop a job and take strategic naps when you are fatigued. The company’s Accountability Initiative is clear: Stopping a job when you are fatigued is not only your right, it is your duty!

*“If I drink enough coffee, I will be able to stay awake with no problem.”* – The caffeine in coffee has a temporary effect, lasting 3 to 5 hours. If you drink coffee or other caffeinated beverages regularly, their stimulating effect will decrease over time. Any side effects of caffeine consumption (including digestive problems and poor sleep) will get worse as you increase the amount you drink.

*“I can easily tell when lack of sleep is starting to affect my abilities.”* – Sleep-deprived individuals are often unaware of their level of impairment or their poor performance.





## MANAGING FATIGUE

Here is an effective, four-step approach to help you cope with fatigue when working long or irregular schedules.

### Step 1: Optimize your sleep opportunities

Sleep problems while off duty lead to decrements in alertness while on duty, so it is essential to take most advantage of every sleep opportunity.

#### If sleeping outside of a typical bedroom:

- Cover your eyes to block out all forms of light.
- Use earplugs to help block out noise.
- Use a constant white-noise source while sleeping.
- Lie as flat as possible.
- Progressively relax your body, breathe slowly and deeply.
- Take advantage of sleeper berths when available.
- Find a sleep environment with a comfortable temperature and adequate fresh air flow
- When possible, use the tips below for sleeping in a normal bedroom environment.

#### If sleeping in a normal bedroom environment:

- Maintain consistent wake/sleep times every day when possible.
- Use the bedroom only for sleep and intimate moments.
- Resolve daily problems away from your sleep area.
- Use a consistent routine to get ready for bed, when possible.
- Maintain an aerobic exercise routine, but avoid intense exercise immediately before going to bed.
- Create a quiet and comfortable sleep environment.
- Don't consume caffeine within four hours of bedtime.
- Don't use alcohol as a sleep aid.
- Don't take naps during the day if eight hours of sleep time is available at night.
- Don't smoke immediately before bed.

## Step 2: Fight fatigue while on duty

Sleep loss is often unavoidable during Schlumberger operations. Operational demands are unpredictable and there is no time to adjust to a new schedule.

If this happens to you, try these strategies to help stay awake on duty:

- Obtain as much sleep as possible before reporting for duty.
- When on duty, take a short break whenever possible to relieve monotony.
- Work with a buddy – you can talk and swap tasks to stay alert.
- Constantly check each other for signs of drowsiness.
- Physically move around or do your Warm Up to Work routines.
- When fatigue is a concern, stand up rather than sit down to a task.
- Try to do the most boring tasks when you are least tired.
- When working indoors, keep the lighting as bright as possible. (Recommend at least 1,000 Lux)
- In controllable environment, make the temperature colder.
- If you are monitoring a radio, turn the volume up.
- Periodically eat high-protein snacks; avoid sugar and fatty foods.
- Strategically use caffeine as a stimulant.
- Make use of any down time to take a quick nap of 15-20 minutes.





## STRATEGIC USE OF CAFFEINE

Caffeine may be effective in helping you stay awake. But remember, there are medium-term and long-term prices to pay.

- Caffeine mildly stimulates your alertness, energy and ability to concentrate.
- Don't use caffeine when you are already alert.
- Caffeine usually takes 15 to 30 minutes to take effect and lasts for 3 to 5 hours.
- Don't use caffeine 3 to 5 hours before going to bed.
- Don't use high doses of caffeine – it can impair performance.

### How much caffeine is safe to use?

Experts consider 250-300 mg of caffeine (about the amount in 3-5 cups of coffee) as a moderate intake. Caffeine is found in coffee, tea, chocolate, some colas, and other soft drinks, and even in some medications. Energy drinks such as Red Bull can be very high in caffeine and sugar.

### Step 3: Implement a napping strategy

Napping before or during a shift is one of the most effective ways to fight sleep deprivation. Here are some possible elements of an effective napping strategy:

- Use eye shades and ear plugs to block out light and noise.
- Use an "egg timer" alarm to help you wake up reliably after a short nap.
- Fatigue-prevention napping is much better than fatigue-recovery napping, so time your last full sleep cycle to end as close to your shift start time as possible.
- Naps should last no longer than 30 minutes unless you have time for a full sleep cycle, in which case a 1.5 to 2-hour nap is recommended.
- Allow 15 to 20 minutes after your nap to recover from "sleep inertia" before resuming critical work.
- If you must return to duty in 5 minutes or less after waking, splash cold water on your face and do a Warm Up to Work session for around 8 minutes to help regain your alertness.
- Nap whenever and wherever possible when not engaged in operational tasks.
- When on an irregular schedule, napping every 3 to 4 hours can help you avoid falling asleep during a vigilance task.

#### Step 4: What if you can't take a nap?

- Try to allow a minimum of 8 hours quality rest or sleep per 24-hour period.
- Eat high protein foods like yogurt, cheese, nuts and meats.
- Avoid high-fat, high-sugar foods, like those from “fast food” restaurants.
- Drink plenty of fluids.
- Communicate frequently with your co-workers.
- Change your posture as often as possible – standing upright is best.
- Engage in a Warm Up to Work session.
- Once fatigue becomes noticeable, consume caffeine strategically.



## WORKING IN EXTREME COLD AND HEAT

Schlumberger operates in a wide variety of environmental conditions that can have an impact on fatigue.

### Extreme Cold

Prolonged exposure to extreme cold can worsen fatigue, mental alertness, decision-making and the ability to follow safe working procedures. Extreme cold can lead to reduced blood flow, resulting in more rapid muscle fatigue and decreased manual dexterity.

The following steps can help combat the effects of extreme cold:

- Limit exposure times, take frequent breaks.
- Use Warm Up to Work exercises.
- Dress in layers so clothing can be removed as your body heats up.
- When getting into a warm vehicle, dress for the inside temperature.
- Drink warm fluids often (soups are best).
- Caffeinated drinks increase urine production and cause dehydration.
- Alcohol impairs your ability to regulate temperature.

Use this wind-chill chart to determine the effective temperature where you are working, and take appropriate measures to reduce the effects of cold:

## Temperature (°F)

Cal/m	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Wind Chill (°F) = 35.74 + 0.6215T - 35.75 (V<sup>0.10</sup>) + 0.4275T(V<sup>0.10</sup>)

Frostbite occurs in 15 minutes or less

Where T= Air Temperature (°F)  
V = Wind Speed (mph)

## Extreme Heat

Prolonged exposure to extreme heat can cause sleepiness and fatigue, resulting in problems with coordination, performance, alertness and vigilance, and increasing the frequency of workplace accidents.

The best coping strategy for working in extreme heat is a period of gradual adjustment to the hot environment.

The following chart will help you judge the amount of additional fatigue you may experience from the effects of heat:

### Heat Index Chart

		Relative Humidity (%)												
		40	45	50	55	60	65	70	75	80	85	90	95	100
Temperature (°F)	110	136	-	-	-	-	-	-	-	-	-	-	-	-
	108	130	137	-	-	-	-	-	-	-	-	-	-	-
	106	124	130	137	-	-	-	-	-	-	-	-	-	-
	104	129	124	131	137	-	-	-	-	-	-	-	-	-
	102	114	119	124	130	137	-	-	-	-	-	-	-	-
	100	109	114	118	124	129	136	-	-	-	-	-	-	-
	98	105	109	113	117	123	128	134	-	-	-	-	-	-
	96	101	104	108	112	116	121	126	132	132	-	-	-	-
	94	97	100	102	106	110	114	119	124	124	135	-	-	-
	92	94	96	99	101	105	108	112	116	116	126	131	-	-
	90	91	93	95	97	100	103	106	109	109	117	122	127	132
	88	88	89	91	93	95	98	100	103	103	110	113	117	121
	86	85	87	88	89	91	93	95	97	97	102	105	108	112
	84	83	84	85	86	88	89	90	92	92	96	98	100	103
	82	81	82	83	84	84	85	86	88	88	90	91	93	95
80	80	80	81	81	82	82	83	84	84	85	86	86	87	

Caution:  
Fatigue possible

Extreme Caution:  
Sunstroke, muscle cramps, and/or heat exhaustion possible

Danger:  
Sunstroke, muscle cramps, and/or heat exhaustion likely

Extreme Danger:  
Heat Stroke or Sunstroke likely



## IN SUMMARY

Let's review what we've learned about managing the causes and risks of fatigue.

- Be familiar with your location's Fatigue Management Plan.
  - Agree with your manager on an optimum work schedule that allows for ample rest breaks and sleep between shifts.
  - Complete your assigned levels of fatigue management training.
  - Report any fatigue-related incidents in Quest or directly to your manager, regardless of how minor they may seem.
  - Consider how your level of alertness can affect your safety and the safety of others when you conduct a vigilance task.
  - Know and use the many tools available to support your fatigue-management efforts – ask your line manager or QHSE manager for help.
  - Keep a copy of these guidelines with you while working irregular shifts.
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For more information, tools and resources please visit the Fatigue Management Hub:

<http://www.hub.slb.com/display/index.do?id=id2935428>