



Fatigue Risk Management in a Major Turnaround

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Background

Turnarounds (TA) can be extremely demanding

- Extended working schedules and significant overtime
- Sleep deficits and fatigue, performance reduction and increased numbers of accidents

The first TA for Pearl GTL in Qatar was largest in the history of Shell

- Involved over 7,000 additional staff with nearly 3,000,000 exposure hours
- Comprehensive set of fatigue management measures was implemented
 - **Partnership** between Pearl GTL leadership and Shell Health
 - Emphasis on **planning** and **prevention**
 - **Care for People** and **Show You Care**

Building a Safety Culture

Invested much time and thought into Safety Culture

- Development of the TA Fatigue Risk Management Plan
- Shift schedules
- Sleeping accommodation
- Commuting
- Measurement strategy
 - Hours worked
 - Clear and standardized way of collecting incident information
- Educational components
- Show You Care



Show You Care

- Built from already successful Care for People program
- Qatar Shell LT and ELT spent a night in the Contractor Partners Migrant Work force accommodation
- Informal interaction with the workers
- Sought worker feedback and concerns
- Opportunity for senior leadership to interact with emerging leaders
 - Demonstrated leaders developing leaders behaviors
 - Care for people mindset

Planning and Prevention

- Health and Workers Welfare **Training pack** was delivered
 - Addressed Fatigue
 - Specific sessions were held with Drivers, Fasting workers and Major Turnaround (MTA) workers
- **Tool Box Talk** was specifically made to reinforce the content of the training pack
 - Cascaded through HSSE with the expectation of having it delivered in all TBT sessions of Contractor Partners
- Health coordinated with HSSE and participated in **"Go and See"** walks using the Health and Welfare checklist that had a Health focus to include Fatigue
- An **audit schedule** by Qatar Shell Health was implemented covering Health and Welfare areas to include Fatigue
- **24/7 Helpline** to address concerns as they arose and escalated as needed

Planning and Prevention

FATIGUE AWARENESS CARD

WHAT IS FATIGUE?

Drowsiness, loss of alertness due to lack of sleep.

It can not be treated by: taking a break, relaxing, washing face or stretching

WHAT ARE THE DANGERS OF FATIGUE?

- Personal Injuries
- Process Safety incidents
- Road Traffic accidents

HOW TO PREVENT FATIGUE?

- Exercise daily to promote sound sleep
- Sleep in dark room
- Sleep in a quiet environment
- Avoid Caffeine close to bed time

FATIGUE AWARENESS CARD

If you are executing one of the following activities and you did not have minimum 12 hours of sleep during the last 48 hours then report to your supervisor before starting the work:

- Driving
- Permit to Work and Process isolation activities
- Lifting activities
- Signing as Technical Authority 1 & 2
- Field and Panel Operations
- Shift managing and supervision

For Turnaround, be aware that only a maximum of 2 consecutive 16 hours shifts in 14 days period is allowed.

ONLY CURE FOR FATIGUE IS SLEEP

Most people need at least 7 hours sleep

To aid and provide a constant reminder, **awareness materials** were setup in all common areas

Planning and Prevention

EFFECTS OF FATIGUE
Fatigue can affect:

- Your psychological state
- Your performance
- Your health

Most people do not realise when they are fatigued.

PSYCHOLOGICAL STATE

- Drowsiness and lack of alertness
- Reduced motivation and energy
- Change of mood and emotions

PERFORMANCE

- Losing the 'big picture'
- Impaired thinking and reasoning
- Lack of awareness of risk
- Poor communication

HEALTH
Fatigue may affect your health. Lifestyle and other factors are also involved.

For more information:
Shell staff can go to:
www.shell.com/health/fatigue
Or email:
ShellHealth@shell.com

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**FATIGUE
KEY
FACTS**

**THE ONLY
CURE FOR
FATIGUE IS
SLEEP**

- Fatigue is drowsiness or lack of alertness caused by lack of sleep.
- Fatigue causes accidents.
- Fatigue can have similar effects to drinking alcohol.

WORKING HARD
This makes us tired physically and mentally. This is not the same as fatigue. Rest, or a change of activity, can overcome tiredness from hard work. The only cure for fatigue is sleep.

SLEEP DEBT
Lack of sleep builds up. The only way to pay back a sleep debt is to sleep.

WORK SAFELY
Fatigue may affect your ability to work safely if:

- Before starting your shift - you had less than 6 hours' sleep in the previous 24 hours.
- At the end of your shift - you will have been awake for more than 18 hours.

CULTURE OF HEALTH

Fatigue Brochure

MYTHS ABOUT FATIGUE

FATIGUE CANNOT BE OVERCOME BY

- Washing your face
- Blowing cold air on your face
- Listening to the radio
- Chewing gum
- Stretching your arms and legs
- Willpower

The only cure for fatigue is sleep. You cannot 'bank' sleep. It takes at least two good sleeps to pay back a sleep debt.

SLEEP, DIET AND EXERCISE

SLEEP HYGIENE

- Keep a regular bedtime routine
- Unwind from your daily activities
- Limit food/alcohol/stimulants before sleep
- Keep your bedroom dark, quiet, cool, well ventilated
- Get a comfortable mattress and pillows
- Eliminate distractions from TV, children, phones, alarms, outside

DIET

- Some foods and alcohol make it difficult to get to sleep or stay asleep
- Other foods promote sleep

www.shell.com/health/fatigue

EXERCISE

- Regular exercise helps you fall asleep quickly and improves the quality of sleep.
- Don't exercise too close to bedtime.

CAFFEINE AND NAPPING

Caffeine takes 20 minutes to work. It can improve alertness for up to four hours.

Caffeine should not be used regularly to overcome fatigue.

NAPPING
You must have approval by your local management before napping.
If napping is allowed:

- Nap for between 10 and 25 minutes
- Set an alarm
- Find a cool, quiet location
- Adopt a comfortable posture
- Wear an eye mask
- Turn your phone off

Napping for longer than 25 minutes can lead to grogginess after waking up. This can last for 30 minutes.

Do not nap for longer than 25 minutes.

MANAGING FATIGUE AT WORK

If work arrangements are making you fatigued discuss this with your line manager.

Strategies that can reduce the risk of fatigue include:

- Taking regular breaks
- Sharing the work - interacting with people
- Taking a nap - if your business allows it
- Delaying the activity
- Not working alone
- Heading back the steps of the procedures to someone else
- Not distributing critical information until it has been checked
- Not making critical decisions alone

TEAMWORK
Teamwork can help you

- Maintain alertness and deal with the experience of fatigue
- Spot mistakes
- Recognise fatigue in others

CAUSES OF FATIGUE

FATIGUE IS CAUSED BY THREE THINGS

- How long you've been awake
- The time of day or night
- The amount of prior sleep.

HOW LONG YOU'VE BEEN AWAKE
The 'sleep urge' grows from the time you wake up until the time you go to sleep.

TIME OF DAY OR NIGHT - THE CIRCADIAN RHYTHM
The body clock makes us most sleepy between 02:00 and 06:00, and between 13:00 and 16:00.

It is difficult to sleep when the body clock is telling you to be awake.

PRIOR SLEEP
Most people need at least 7-8 hours' sleep every day.

SLEEP DISORDERS
A number of medical conditions disrupt sleep, causing fatigue. These include:

- Obstructive sleep apnoea
- Insomnia
- Periodic limb movement in sleep (PLMS)

These are treatable.

STIMULANTS AND MEDICATIONS
Always read the warning label and information leaflet. Tell your Supervisor if you are taking medication that may make you drowsy.

INDICATORS OF FATIGUE

Fatigue can often be recognised by how people look, how they behave and how they communicate.

THE FACE

- Eyes not fully opened - sometimes closed for a few seconds
- Red eyes
- Frequent eye blinks
- Mouth and jaws drooping
- Poor skin pallor

BODY POSTURE

- Slouched
- Drooping head and shoulders
- Poor body posture

BEHAVIOUR

- Yawning
- Rubbing eyes
- Nodding head/head resting on desk
- Drinking a lot of coffee or high energy drinks
- Opening windows while driving
- Washing face
- Clair
- Errational, moody, easily angered
- Lack of care or concern
- Simple mistakes
- Talking chimes, ignoring risks

INDICATORS OF FATIGUE

- Not engaging in conversation
- Not contributing to meetings

COMMUNICATION

- Speaking less often and more abruptly
- Not completing sentences
- Losing track
- Giving details wrong or forgetting points
- Speaking unusually quietly

COMMUNICATION

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INDICATORS OF FATIGUE

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SUSTAINED CONCENTRATION, SUCH AS IN

- Driving
- Drilling operations
- Lifting operations
- Control room operators
- Trading

SEEING THE 'BIG PICTURE', SUCH AS FOR

- Control room operators
- Shift team leaders and supervisors
- Offshore installation managers
- Officers of the watch

PAYING ATTENTION TO DETAIL, SUCH AS IN

- Preparing permits
- Setting or removing isolations
- Analyzing business-critical data

MAKING COMPLEX DECISIONS, SUCH AS IN

- Drilling
- Setting operational priorities
- Decisions that involve uncertainty
- Conducting risk assessments
- Diagnosing abnormal process conditions

ASSESSING RISK, SUCH AS IN

- Any safety-critical or hazardous activity

COMMUNICATING, SUCH AS FOR

- Line managers
- Supervisors
- Shift handovers
- Shift team meetings
- Sales and customer support

FATIGUE-SENSITIVE TASKS

FATIGUE AFFECTS TASKS THAT RELY ON

- Sustained concentration
- Seeing the 'big picture'
- Paying attention to detail
- Making complex decisions
- Assessing risk
- Communicating

Planning and Prevention

Posters



FATIGUE

IT IS LACK OF SLEEP

- Causes drowsiness and loss of alertness
- May result in:
 - Personal Injuries
 - Process Safety Incidents
 - Road Accidents

ONLY CURE IS SLEEP

Most people need at least 7 hours sleep.
Contact your HSSE focal point for more information



FATIGUE PREVENTION

- Exercise daily to promote sound sleep
- Sleep in a dark room
- Sleep in a quiet environment
- Avoid caffeine close to bedtime

If you have not slept 12 hours during the last 48 hours, please tell your supervisor

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Planning and Prevention

Care for People

- Worker welfare program aimed at providing an environment where people can perform at their best
- Began at Pearl GTL, now implemented globally
- Focus on CfP during the TA
 - Onsite Accommodations
 - Fatigue Education
 - Welfare Checks
 - Show You Care

PEARL GTL Worker Welfare				
PTsW number		Date & time		
Area/Unit		Safe visit team names		
Activity		Contractor		
			Yes/No?	
1	Can you please tell me the emergency number to call for: at the Worksite, at Global Village*			
2	Can you tell me the the Pearl GTL 'Helpline' number?			
3	Can you point out to me the First Aider in your work party?			
4	Do you know what to check with your doctor/Nurse when you are given a medication with regards to your work? (Will it cause any adverse effect on my fitness to work- e.g. loss of alertness?)			
5	How many hours sleep did you get during the 12 hours period prior to starting the shift ? >7 or more = Y, <7 = N?			
6	Did you have 1 day off after 6 days of work?			
7	Do you hold your own passport and other personal documents?			
8	Are your salaries being paid on time, including overtime paid as agreed when signing your contract?			
9	Are you able to speak with your family back home? (skype,whatsapp, facetime, internet etc)			
10	Are you able to have fresh fruit and vegetables and yoghurt/cheese/milk at least once daily?			
	10 questions	1 Yes = 10 % 1 N/A = 10% 1 No = 0 %	% Compliant	
SPSP: Please provide details on any other observations, interventions made to correct unsafe acts during the visit.				

Methods

Statistical Approaches

- Swipe card database used to determine worker entry/exit times
- FRMP compliance
 - Descriptive statistics: Hours Worked, Days Off, Shifts over 16 Hours, and Consecutive 16-Hour Shifts
- Association between fatigue and safety incidents was assessed using both incidents flagged as fatigue-related and proxies for fatigue using time of day (22:00-06:00 and 14:00-16:00)



Results

FRMP Compliance

- Over 95% of workers were within maximum hours allowed per week
- 91% met the requirements of one day off per week
- No Shifts over 16 Hours: 97%
- No Consecutive 16-Hour Shifts: 99%

Results

Fatigue-Related Incidents

- 220 safety incidents including near misses
- Only **one** was deemed to be related to fatigue
- Used hour of incident as a proxy for fatigue (22:00-06:00 and 14:00-16:00)
 - No difference in **incident occurrence**, **type of incident**, or **severity of incident**

Conclusions

- Risk of fatigue was managed successfully during the Turnaround through a strong leadership commitment, long-term planning and collaboration between Pearl GTL and Shell Health
- Fatigue risk management became an integral part of the Turnaround execution strategy
- Simple, focused, visually-based communication on indicators and risk of fatigue was effective
- Planning and prevention was key



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Questions and Answers

Q&A

