

# FATIGUE MANAGEMENT PLANS

**Scott Resch**

Safety & Occupational Health  
Chief

USACE, Detroit District

*“The views, opinions and findings contained in this report are those of the author(s) and should not be construed as an official Department of the Army position, policy or decision, unless so designated by other official documentation.”*



US Army Corps  
of Engineers®



# AGENDA

What is Fatigue?

Causes and Contributing Factors

Impacts and Risk Factors

Control Measures

EM 385-1-1 (2014) Requirements

Fatigue Management Plan

Conclusion



US Army Corps  
of Engineers<sup>®</sup>



# WHAT IS FATIGUE?

Fa-tigue  
fə'tēg/

*noun.* Extreme tiredness, typically resulting from mental or physical exertion or illness

Synonyms: weariness, sleepiness, drowsiness, exhaustion, lethargy



US Army Corps  
of Engineers<sup>®</sup>



# IMPACT OF FATIGUE

Affects your ability to think clearly and act appropriately

Less alert, don't perform well, less productive and are more likely to have accidents and injuries

Not good at recognizing their own level of impairment and can be unaware that they are not functioning at their best

Worst case scenario =  
they can drop off to sleep in the middle of a task



US Army Corps  
of Engineers<sup>®</sup>



# EFFECTS OF FATIGUE VS ALCOHOL

Awake for 17 hours =  
0.05% BAC performance

Awake for 24 hours =  
0.10% BAC performance

On 4 hours of sleep, 1 beer  
can have the impact of 6



US Army Corps  
of Engineers<sup>®</sup>



# CAUSES AND CONTRIBUTING FACTORS

Equipment and Handling  
(weight/stability)

Shift Work/Night Shift

Physically Demanding or  
Repetitive Tasks

Time Pressure to Complete  
Task

Amount of Concentration  
Required

Complex and Difficult Tasks

Unplanned Work, Overtime,  
and Emergencies

Commuting Times

Environmental Conditions

Sleep/Rest Cycle

Quality of Rest Time/Hours of  
Sleep

Other Health Conditions/  
Medications

Social Conditions at  
Work/Home

Increased Workload

Stress

Altitude



US Army Corps  
of Engineers<sup>®</sup>



# FATIGUE RISK FACTORS

Irritability

Cognitive impairment

Memory lapses or loss

Impaired moral judgment

Severe yawning

Tremors

Aches

Difficulty concentrating

Digestive problems

Hallucinations

Impaired immune system

Risk of Diabetes

Increased heart rate

Risk of heart disease

Decreased reaction time  
and accuracy

Obesity

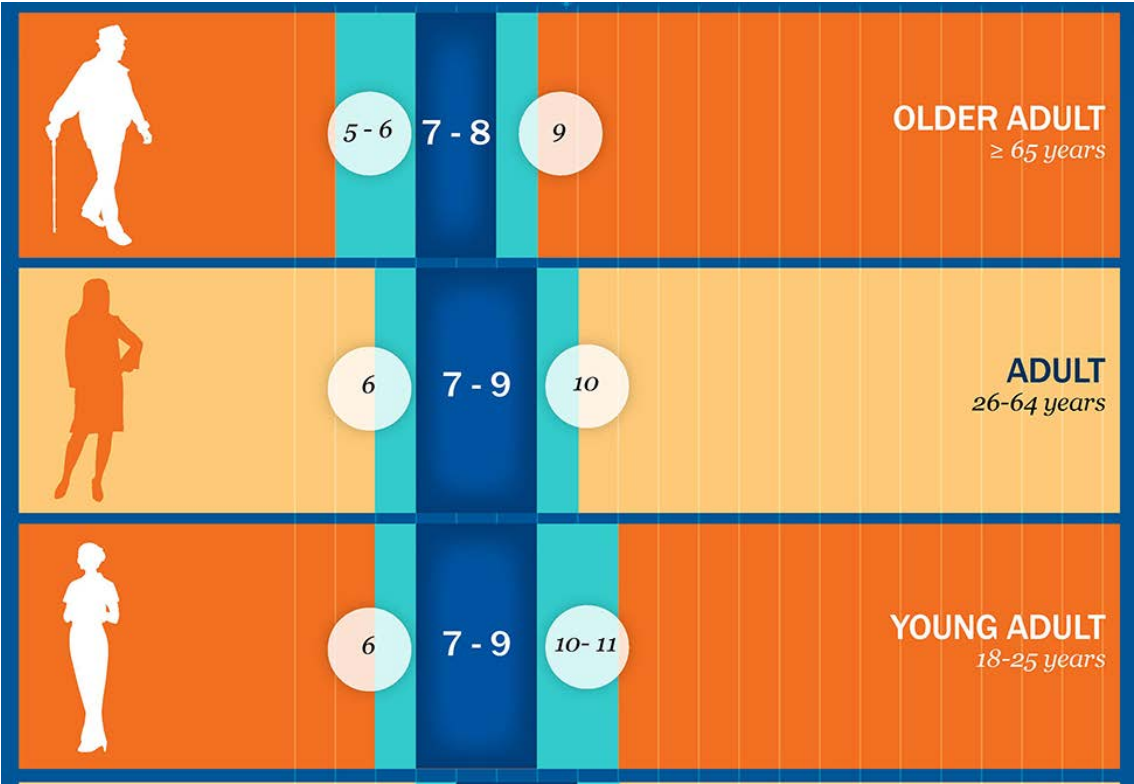
Depression



US Army Corps  
of Engineers<sup>®</sup>



# RECOMMENDED HOURS OF SLEEP



*Recommended Range*

*May be Appropriate*

*Not Recommended*



US Army Corps of Engineers<sup>®</sup>





# PERSONAL CONTROLS

Have a bedtime routine

Sleep in a quiet,  
comfortable, and dark  
bedroom

Ensure quality and  
quantity sleep

Seek medical attention for sleeping disorders

Avoid excessive consumption of alcohol

Avoid stimulants like coffee or tea before bed

Maintain a basic level of fitness and exercise regularly



US Army Corps  
of Engineers<sup>®</sup>



# ADMINISTRATIVE FATIGUE CONTROLS

- Alternate work tasks
  - Allow for more frequent or longer breaks
  - Alternative commutes
  - Eat healthy food (lower sugar)
  - Take walks (administrative employees)
  - Alternate, limit, or eliminate night shifts
- Schedule high risk tasks when most alert



US Army Corps  
of Engineers<sup>®</sup>



# WORKPLACE FATIGUE CONTROLS

- Fatigue mats
- Lifting devices
- Work assistance in lifting and holding
- Good ventilation (cool or heat, depending)
- Ability to move around every hour or so
- Use of personal protective equipment
- Use of alarms or monitors



US Army Corps  
of Engineers<sup>®</sup>



# EM 385-1-1 (2014) REQUIREMENTS



US Army Corps  
of Engineers<sup>®</sup>



# EM 385-1-1 (2014)

A Fatigue Management Plan (FMP) is a requirement added in the USACE Safety & Health Requirements Manual, EM 385-1-1, 2014.



US Army Corps  
of Engineers<sup>®</sup>



## EM 385-1-1 (2014)

A FMP is required whenever work hours:

1. Exceed 10-hours a day for more than 4 consecutive days;
2. Exceed 50-hours in a 7-day work week;
3. Exceed 12-hours a day for more than 3 consecutive days, or
4. Exceed 58-hours a week for sedentary (to include office) work.

A FMP is required for *government employees* in the Project Safety and Occupational Health (SOH) Plan and for *contractors* as part of their Accident Prevention Plan (APP).



US Army Corps  
of Engineers<sup>®</sup>



## EM 385-1-1 (2014)

The FMP needs to address certain conditions for operator work hour limitations in the following areas:

- Equipment Operators
- Motor Vehicle Operators
- Floating Plant Personnel



US Army Corps  
of Engineers<sup>®</sup>



## EM 385-1-1 (2014)

### Equipment Operators

Operators of equipment, such as hoisting equipment and draglines, mobile construction equipment, electrical power systems, hydropower plants, industrial manufacturing systems, hydraulically operated equipment, powered vessels, and boats.

Not be permitted to exceed 12-hours of duty time in any 24-hour period, including time worked at another occupation.

A minimum of 8 consecutive hours of rest between shifts in a 24-hour period is required.



US Army Corps  
of Engineers<sup>®</sup>





## EM 385-1-1 (2014)

### Motor Vehicle Operators

While on duty, cannot operate vehicles for a continuous period of more than 10-hours in any 24-hour period.

While on duty, cannot operate a motor vehicle after being in a duty status for more than 12-hours during any 24-hour period.

A minimum of 8 consecutive hours shall be provided for rest in each 24-hour period.



US Army Corps  
of Engineers<sup>®</sup>



## EM 385-1-1 (2014)

### Floating Plant Personnel

Must be scheduled to receive a minimum of 8-hours rest in any 24-hour period

### Exceptions:

- a. When quarters are provided immediately adjacent to, or aboard the work site, these hours of rest may be divided into no more than 2 periods, one of which must be at least 6 continuous hours in length.
- b. Rest periods may be interrupted in case of emergency, drill, or other overriding operational necessity.



US Army Corps  
of Engineers<sup>®</sup>



## EM 385-1-1 (2014)

*Rest* is as a period of time during which the person concerned is:

- off duty;
- not performing work, including administrative tasks; and
- afforded the opportunity for uninterrupted sleep.

This does not include time for breaks, meals, or travel time to/from work.



US Army Corps  
of Engineers<sup>®</sup>



# FATIGUE MANAGEMENT PLAN



US Army Corps  
of Engineers<sup>®</sup>



# FATIGUE MANAGEMENT PLAN

A FMP must identify:

- *Affected workers*

Workers that exceed the work hours listed (10+ hours/day for 4+ days; etc.)

- *Management Responsibility*

The supervisor is ultimately responsible for ensuring his/her employees are trained, mitigating and controlling fatigue, and following the FMP.



US Army Corps  
of Engineers<sup>®</sup>



# FATIGUE MANAGEMENT PLAN

A FMP must identify (continued):

- *Training*

All affected workers and those who work with them must be trained in symptoms of fatigue, how to avoid fatigue, actions to take if a worker appears fatigued, and controls to prevent fatigue.

- *Controls*

Work scheduling, rotating jobs, breaks, etc.



US Army Corps  
of Engineers<sup>®</sup>



# WEB-BASED TRAINING & TOOLS



US Army Corps  
of Engineers<sup>®</sup>



# NIOSH FATIGUE TRAINING

<http://www.cdc.gov/niosh/docs/2015-115/>

Approximately 2.2 hours to complete

Training consists of:

- Science of fatigue
- Health risks of shift work and long hours
- Strategies to reduce risk of fatigue



US Army Corps  
of Engineers<sup>®</sup>





# FAA FATIGUE TRAINING

<https://www.faasafety.gov/files/helpcontent/courses/fatigue/index.html>

Approximately 2.5 hours to complete

Training consists of:

- Video (20 min)
- Fatigue basics (32 min)
- Sleep basics (24 min)
- Controlling/preventing fatigue (40 min)
- Exam



US Army Corps  
of Engineers<sup>®</sup>



# FAA FATIGUE RISK ASSESSMENT TOOL

Tool to assess fatigue related risk in aviation operations.

Sleep and work history over a period of 72 hours is needed.

After data is submitted, a fatigue risk report will be generated.



US Army Corps  
of Engineers<sup>®</sup>



Date/Time of report creation 09/01/2015 13:05  
Airport closest to residence HTS  
Incident number  
Date/Time of incident  
Location of incident

### Incident Description

### Work And Sleep History

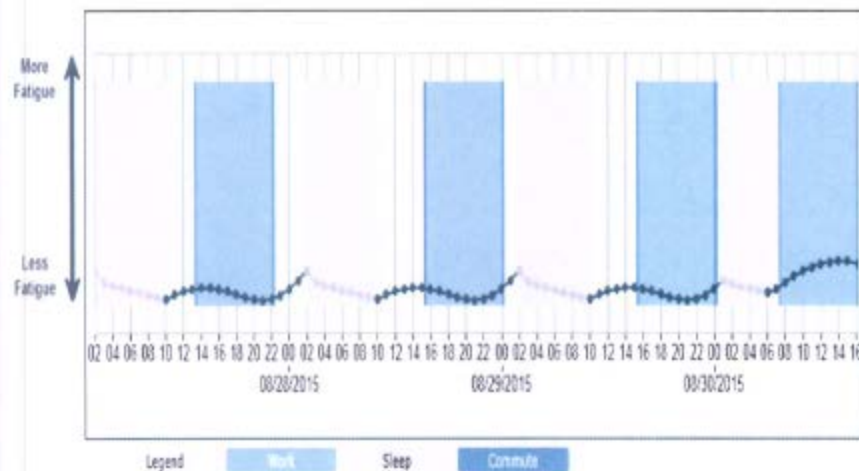
Hours worked in the last 24 hours	16.3 hrs	Hours slept in the last 24 hours	5.5 hrs
Hours worked in the last 48 hours	24.8 hrs	Hours slept in the last 48 hours	13.5 hrs
Hours worked in the last 72 hours	31.3 hrs	Hours slept in the last 72 hours	21.5 hrs
Total hours worked	34.0 hrs	Total hours slept	29.5 hrs

### Typical Commute and Sleep Times

Typical work commute	0 hrs 15 min	Typical sleep period on non-work days	Time to bed 02:00	Time out of bed 13:00
		Duration of sleep period on non-work days	8.0 hrs	

### Fatigue Estimate

Work And Sleep History (GMT-4)



# CONCLUSION



US Army Corps  
of Engineers<sup>®</sup>



**Questions?**

**Comments?**

**Concerns?**



US Army Corps  
of Engineers<sup>®</sup>

