

GRAID IT™

User Guide

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1. GRAID IT Introductory Notes

Developed by InterDynamics and Integrated Safety Support, the GRAID Investigation Tool can be used to rate the likelihood of fatigue contributing to an accident or incident. This systematic and situation specific assessment tool offers organisations a consistent and practical approach to reviewing incidents, accidents, occurrences, or fatigue reports as part of their Fatigue Risk Management System (FRMS). A key outcome of the Tool is a GRAID IT Scorecard, and an indication from Low to Very High of the likelihood that fatigue was a significant contributor to the occurrence.

InterDynamics has developed the GRAID Investigation Tool to support organisations in the ongoing improvement of their FRMS. In an occurrence investigation, GRAID IT facilitates a systematic approach, and the ability to identify the relative contribution of fatigue-related elements. Organisations can use the GRAID IT Scorecard results to target high priority areas for improvement or further detailed review.

		Likeliho	ood That Fatigue Contributed to Occurrence: Very High		
Level	Element	Туре	Element Name	Influence Factor	Completed
Stage 2	PR3	Preliminary	Work environment impacts	Н	С
Stage 2	PR4	Preliminary	Non-compliance to work/rest rules	M	D
Stage 2	PR5	Preliminary	Karolinska Sleepiness Scale	VH	В
Stage 2	PR6	Preliminary	Self observed symptoms/behaviours	M	A
Stage 2	PR7	Preliminary	Personal health/medication	M	D
Stage 2	PR8	Preliminary	Third party observations of symptoms/behaviours	M	С
Stage 3	EP1	Extended	Use of rest days	M	A
Stage 3	EP2	Extended	Secondary employment	Н	С
Stage 3	EP3	Extended	Jetlag/significant time zone changes (within past week)	M	С
Stage 3	EP4	Extended	Prior sleep in previous 48 hours	VH	В
Stage 3	EP5	Extended	Fatigue-related training	L	С
Stage 3	EP6	Extended	Sleep disturbance due to alcohol	L	D
Stage 3	EP7	Extended	Commute times prior to occurrence	M	С
Stage 3	EP8	Extended	Sleep inertia	M	В
Stage 3	EP9	Extended	FAID Quantum combined hours of work assessment	н	A
Stage 3	EP10	Extended	Fatigue detection technology	M	D
Stage 3	EC11	Extended	Alerting strategies	M	В
Stage 3	EC12	Extended	Quality of employer provided sleeping environment	M	A
Stage 3	EC13	Extended	Predictability of working hours	L	С
Stage 3	EC14	Extended	Medical screening and monitoring	M	В
Stage 3	EC15	Extended	Record of absenteeism/sick days	M	D
Stage 3	EC16	Extended	Expectations and incentives which may increase personal fatigue	Н	В
Stage 3	EC17	Extended	Fatigue risk management policies and procedures	L	A
Stage 3	EC18	Extended	Fatigue hazard analysis	M	D
Stage 3	EC19	Extended	Rostering practices take into account fatigue	Н	D
Stage 3	EC20	Extended	Response/control measures	M	С

GRAID IT applies a risk grading system developed by Zurich Risk Engineering. Information from the grading process can be used to enhance the development and implementation of the organisation's fatigue risk management initiatives.

GRAID IT provides users the opportunity to review 28 fatigue-related elements to test the likelihood of fatigue as a contributing factor. The elements are grouped into 3 review stages:

Stage 1: Details, prompts the user to document any facts, data, and/or comments associated with the occurrence or fatigue report being investigated.

Stage 2: Preliminary, takes the user through eight initial questions pertaining to the specific individual(s) involved and circumstances surrounding the occurrence. The grading of these questions determines whether there is a strong indication that there was a Low likelihood that fatigue was a significant contributing factor in the occurrence. If so, the grading may be concluded at that

A	Low Risk or Extensive Control
В	Medium Risk or Comprehensive Control
С	High Risk or Limited Control
D	Very High Risk or Severely Lacking Control
E	Don't Know
N/A	Not Applicable

GRAID IT Grading Scale

point. If however; the likelihood was not determined to be Low, any of the preliminary questions were answered 'N/A', 'Don't Know', or not answered, then the user is required to continue through the complete grading to receive a GRAID IT outcome and likelihood rating.

Stage 3: Extended provides a higher resolution of investigation, with consideration to both personal and corporate/systemic fatigue-related contributors.

Once selected, grading scales for each element are summarised in the GRAID IT Scorecard and can be reviewed at any time.

NOTE: There are no mandatory elements within GRAID IT, although users will need to complete a sufficient number of Stage 2 and 3 elements to receive feedback on the likelihood of fatigue being a contributing factor.



1.1. External Resources

GRAID IT utilises the following external resources in Stage 2 of its grading process:

FAID Quantum – See FAID Quantum Hours of Work Assessment

NASA Task Load Index (NASA-TLX) – See Workload Impacts

Swedish Occupational Fatigue Inventory (SOFI) – See Work Environment Impacts

2. Introduction

This User Guide incorporates all the functionality of GRAID IT.

2.1. Set up



The first time a user loads GRAID, the user will be taken through GRAID Setup. Follow the prompts, read the license agreement and choose which features of GRAID to install.

🞯 GRAID Setup	_		\times
GRAID [™]	Completing GRAID Setup		
Risk Grading Tool by InterDynamics	GRAID has been installed on your computer. Click Finish to close Setup.		
	Run GRAID		
www.interdynamics.com			
	< Back Finish	Can	icel

2.2. First Time User Instructions

Once setup up is complete and GRAID first loads:

License file for GRAID the browse button to select a license file or copy and pasts the text of the license issued to you	×
	9 1001
Browse For License File Paste Cipboard Test	Cancel
	Browse For License File Paste Cipboard Text

- 1. A valid license must be submitted. When entering the license file for GRAID, the user can either:
 - a. Use the Browse For License File button to select a license file, or
 - b. Copy and Paste the text via the **Paste Clipboard Text** button.



2. Once the user has submitted a valid license, select Enter.

3. Control Panel

GRAID [™]	
Information	
Settings	
User Guide	
Stage 1: Details	
Stage 2: Preliminary	
Stage 3: Extended	
Scorecard	
New Grading	

The user can navigate around the GRAID IT sections via the orange 'control panel' on the left hand side by simply clicking on the appropriate section to be navigated to it's screen.

The process of completing an investigation follows the control panel from top to bottom.

The tab that is active is highlighted by black outline.

3.1. Navigation

At any time, the user can view the current scorecard by selecting the **Scorecard** tab. The user can click any element in the scorecard to be taken directly to that element.

In each of the **Stage** tabs, the back and forth arrows can be used to navigate between Elements.

Element Stage 2
PR1
1 of 8

3.2. Grading Scale



The 'Likelihood That Fatigue Contributed to Incident' Grading Scale appears on the left in the Control Panel in each of the Grading Stages and in the Scorecard.

The scale automatically adjusts as the user makes selections through the Elements.

3.3. Editing

In the **Scorecards** tab, the Control Panel provides **Editing** options; Open, Save, Copy to Clipboard.

3.3.1. Open Scorecard

To open a saved GRAID IT Scorecard, select **Open GRAID Scorecard**, select the file (graid File) and Open.

3.3.2. Save Scorecard

To save a GRAID IT Scorecard, select **Save GRAID Scorecard**, name the file (graid File) and Save.

3.3.3. Copy Scorecard to Clipboard

To copy GRAID IT Scorecard to clipboard, select **Copy Scorecard to Clipboard**, and select Okay. The information can then be pasted in Excel or other application as required.

3.4. Help

Help can be accessed via the Help Menu in the top left corner (second tab from the left).



The Help Menu provides access to:

- A Help Document (includes detailed information regarding terms, concepts and process steps),
- Online Support Documents (internet access required),
- Email Support (internet and email account required), and
- About Application information relating to the Application such as version and serial number

3.5. License



The **License** tab can be found in the top left corner (third tab from the left).

The License Menu provides access to read in a License Key file via the **Get License Key** selection.

A browse for license file display will appear.

When entering the license file for GRAID the user can either:

a. Use the **Browse For License File** button to select a license file, or

b. Copy and Paste the text via the **Paste Clipboard Text** button.

4. Information

The first tab, **Information**, provides information regarding Fatigue Risk Management Systems and the place of GRAID IT within this process.



5. Settings

The **Settings** tab allows the user to add details for a new investigation.

To fill in the details of **Investigation For** and **Occurrence Reference**, select the box to the right and type in details.

To fill in the **Date of Occurrence** and **Proposed Completion**, select the box to the right and select date from drop down calendar or type in date.

	Risk Grading Tool	Sottings		
GRAID	by InterDynamics	Settings		
Information				
Settings				
User Guide				
Stage 1: Details				
Stage 2: Preliminary				
Stage 3: Extended				
Scorecard		GRADING INFORMATION		
	Investigation For		Date of Occurrence	
	Occurrence Reference			
			Proposed Completion	
New Grading				

6. User Guide

The User Guide tab provides brief details of how to use GRAID IT.

	Risk Grading Tool	Usor Guido
GRAID	by InterDynamics	<u>Oser Guide</u>
Information Settings User Guide Stage 1: Details Stage 2: Preliminary	Welcome to the Investigat	tion GRADING system.
Stage 3: Extended Scorecard	To perform a grading, sta	rt by clicking the Details button or another Stage button or to go to a
	specific Element click on	the appropriate row on the Scorecard.
	When grading, you will ne	ed to assign a Grade to the appropriate Element.
	Grade B C D E N/A	Low Risk or Extensive Control Medium Risk or Comprehensive Control High Risk or Limited Control Very High Risk or Severely Lacking Control Don't Know Not Applicable
	Use the back and forward	arrows to navigate between Elements.
	During the grading proces	ss you can return to the Scorecard by clicking on the Scorecard button from the menu.
	The Scorecard will displa	y the selections, as well as the overall rating.
New Grading		GRAID™ is a trademark of InterDynamics Pty Ltd.

7. Stage 1: Details

The **Stage 1: Details** tab allows the user to record the background details of the occurrence.

Stage 1 prompts the user to document any facts, data, and/or comments associated with the occurrence or fatigue report being investigated.

GRAID [®]	Risk Grading Tool	Details	Details	
Information		Date of investigation		
Settings	Context			
User Guide				
Stage 1: Details				
Stage 3: Extended	Record the date of the investigation and any review dates.			
Scorecard				
Details				
Stage 1				
	Information Details			
1 of 14				
Likelihood That Fatigue				Don't know?
Contributed to Incident				
Very High				
High			SUBMIT	?
Moderate				
Low				
				N/A
New Grading				

7.1. Elements in Stage 1

Stage 1: Details takes the user through 14 elements to complete. These are:

- 1. Date of investigation
- 2. Investigation type
- 3. Investigation level
- 4. Investigator details
- 5. Occurrence shift details
- 6. Personnel data
- 7. Employment type
- 8. Personel observation
- 9. Confirmation of assessed person
- 10. Roster manager details
- 11. Internal distribution list
- 12. Detail of safety occurrence & relationship to fatigue
- 13. Reviewing manager's details
- 14. Additional information

The **Context** box provides further context for each element.

NOTE: These elements do not directly impact the grading, but allow for incident details to be recorded.

7.2. Completing Stage 1

The user can select between 3 options when completing a Stage 1 element:

- Enter information by typing in the Information Details box for each element. Once
 SUBMIT
- If the element is not known, the user can select
- If the element is not applicable to the investigation, the user can select

Once a selection has been made, the program will automatically move to the next element.

Details Stage 1
DT4
4 of 14

The user can also navigate between elements using the arrows on the control panel on the left hand side.

8. Stage 2: Preliminary

The **Stage 2: Preliminary** tab allows the user to record the prelimary grading elements.

Stage 2 takes the user through initial questions pertaining to the specific individual(s) involved and circumstances surrounding the occurrence. The grading of these questions determines whether there is a strong indication that there was a Low likelihood that fatigue was a significant contributing factor in the occurrence. If so, the grading may be concluded at that point. If however; the likelihood was not determined to be Low, any of the preliminary questions were answered 'N/A', 'Don't Know', or not answered, then the user is required to continue through the complete grading to receive a GRAID IT outcome and likelihood rating.

GR /	ND™	Risk Grading Tool by InterDynamics		Grading	Preliminary		
Informat	ion		FAID Quant	um hours of work	assessi	ment	
Setting	gs	Context			Influence		
User Gu Stage 1: D Stage 2: Pre Stage 3: Ex Scoreca	iide Details Iiminary ctended ard	Assessment of the impact of his days of actuals), including time z TZ) if applicable. Focus is shift o	torical rostered hours (15 cone effects (through FAID f occurrence.	Influence Factor	A high influenc	fluence factor applies.	
Elem Stage PR1	ent 1	A Grade Detail	B Grade Detail	C Grade Detail	D	Grade Detail	
Likelihood Tha Contributed to	at Fatigue	Low (Peak FAID Score <= 65, OR hours worked above FTL = 0).	Medium (Peak FAID Score 65 to 80, OR hours worked above FTL < 1 hour).	High (Peak FAID Score 81 to 95, OR hours worked above FTL between 1 to 3 hours).	Extren Score worke hours)	ne (Peak FAID > 95, OR hours d above FTL > 3).	Don't know?
High Moderate		A	В	С		D	E
Low New Gra	ding	FAID® is a registered trademar	k of InterDynamics Pty Ltd.				N/A

8.1. Elements in Stage 2

Stage 2: Preliminary takes the user through 8 prelimary grading elements. These are:

- 1. FAID Quantum hours of work assessment
- 2. Workload impacts
- 3. Work environment impacts
- 4. Non-compliance to work/rest rules
- 5. Karolinska Sleepiness Scale
- 6. Self observed symptoms/behaviours
- 7. Personal health/medication
- 8. Third party observations of symptoms/behaviours

The **Context** box provides further context for each element.

The **Influence** box provides information on the influence factor of each element. L - Low, M = Medium, H = High, VH = Very high

8.2. Completing Stage 2

The user can select between 3 options when completing a Stage 2 element:

- The user can select the applicable box **A**, **B**, **C** or **D**. Details are provided to define selections.
- If the element is not known, the user can select
- If the element is not applicable to the investigation/incident, the user can select

A Grade Detail	B Grade Detail	C Grade Detail	D Grade Detail	
Low (Peak FAID Score <= 65, OR hours worked above FTL = 0).	Medium (Peak FAID Score 65 to 80, OR hours worked above FTL < 1 hour).	High (Peak FAID Score 81 to 95, OR hours worked above FTL between 1 to 3 hours).	Extreme (Peak FAID Score > 95, OR hours worked above FTL > 3 hours).	Don't know?
A	В	С	D	E
FAID® is a registered trademark	of InterDynamics Pty Ltd.			N/A

NOTE: There are no mandatory elements within GRAID IT, although users will need to complete a sufficient number of Stage 2 elements to receive feedback on the likelihood of fatigue being a contributing factor.

8.3. FAID Quantum Hours of Work Assessment

To complete Element PR1, the user must first complete a FAID Quantum fatigue assessment of 15 days actual hours of work. Focus is shift of occurrence. See <u>FAID Quantum Software</u> and <u>What You Need To Know About FAID Quantum</u>.

8.4. Workload Impacts

To complete Element PR2, the user must first complete the NASA Task Load Index (NASA-TLX). See <u>Appendix C</u>.

8.5. Work Environment Impacts

To complete Element PR3, the user must first complete the Swedish Occupational Fatigue Inventory (SOFI). See <u>Appendix D</u>.

N/A

9. Stage 3: Extended

The **Stage 3: Extended** tab allows the user to record the extended grading elements.

Stage 3 provides a higher resolution of investigation, with consideration to both personal and corporate/systemic fatigue-related contributors.

GRAID [™]	Risk Grading To by InterDynamics	loc	Grading	G Extended			
Information			Use of rest days				
Settings	Context			Influence			
User Guide Stage 1: Details Stage 2: Preliminary Stage 3: Extended Scorecard	Personal: How did the indiv "weekend" (recent block of	idual feel after their last rest days after block of shifts)?	Influence Factor	A medium influence factor applies.			
Element Stage 3							
EP1							
1 of 20	A Grade Detail	B Grade Detail	C Grade Detail	D Grade Detail			
Likelihood That Fatigue Contributed to incident	Fully rested.	Partially rested.	Minimal sleep obtained. Somewhat tired.	Alternate work performed. Minimal sleep obtained. Exhausted.	Don't know?		
Very High							
High	A	В	С	D	E		
Moderate					_		
Low					N/A		
New Grading							

9.1. Elements in Stage 3

Stage 3: Extended takes the user through 20 extended grading elements. These are:

- 1. Use of rest days
- 2. Secondary employment
- 3. Jetlag/significant time zone changes (within past week)
- 4. Prior sleep in previous 48 hours
- 5. Fatigue-related training
- 6. Sleep disturbance due to alcohol
- 7. Commute times prior to occurrence
- 8. Sleep inertia
- 9. FAID Quantum combined hours of work assessment
- 10. Fatigue detection technology
- 11. Alerting strategies
- 12. Quality of employer provided sleeping environment
- 13. Predictability of working hours
- 14. Medical screening and monitoring
- 15. Record of absenteeism/sick days

- 16. Expectations and incentives which may increase personal fatigue
- 17. Fatigue risk management policies and procedures
- 18. Fatigue hazard analysis
- 19. Rostering practices take into account fatigue
- 20. Response/control measures

The **Context** box provides further context for each element.

The **Influence** box provides information on the influence factor of each element. L = Low, M = Medium, H = High, VH = Very high

9.2. Completing Stage 3

The user can select between 3 options when completing a Stage 3 element:

• The user can select the applicable box **A**, **B**, **C** or **D**. Details are provided to define selections.

Е

- If the element is not known, the user can select
- If the element is not applicable to the investigation/incident, the user can select



NOTE: There are no mandatory elements within GRAID IT, although users will need to complete a sufficient number of Stage 3 elements to receive feedback on the likelihood of fatigue being a contributing factor.

10. Scorecard

The **Scorecard** tab allows the user to review the grading. The Scorecard may be viewed at any time.

Likelihood That Fatigue Contributed to Occurrence: Very High							
Level	Element	Туре	Element Name	Influence Factor	Completed		
Stage 2	PR3	Preliminary	Work environment impacts	Н	С		
Stage 2	PR4	Preliminary	Non-compliance to work/rest rules	M	В		
Stage 2	PR5	Preliminary	Karolinska Sleepiness Scale	VH	A		
Stage 2	PR6	Preliminary	Self observed symptoms/behaviours	M	D		
Stage 2	PR7	Preliminary	Personal health/medication	М	В		
Stage 2	PR8	Preliminary	Third party observations of symptoms/behaviours	М	D		
Stage 3	EP1	Extended	Use of rest days	М	D		
Stage 3	EP2	Extended	Secondary employment	Н	В		
Stage 3	EP3	Extended	Jetlag/significant time zone changes (within past week)	М	A		
Stage 3	EP4	Extended	Prior sleep in previous 48 hours	VH	С		
Stage 3	EP5	Extended	Fatigue-related training	L	D		
Stage 3	EP6	Extended	Sleep disturbance due to alcohol	L	С		
Stage 3	EP7	Extended	Commute times prior to occurrence	М	В		
Stage 3	EP8	Extended	Sleep inertia	М	С		
Stage 3	EP9	Extended	FAID Quantum combined hours of work assessment	Н	A		
Stage 3	EP10	Extended	Fatigue detection technology	M	D		
Stage 3	EC11	Extended	Alerting strategies	M	A		
Stage 3	EC12	Extended	Quality of employer provided sleeping environment	M	В		
Stage 3	EC13	Extended	Predictability of working hours	L	С		
Stage 3	EC14	Extended	Medical screening and monitoring	M	D		
Stage 3	EC15	Extended	Record of absenteeism/sick days	M	A		
Stage 3	EC16	Extended	Expectations and incentives which may increase personal fatigue	Н	В		
Stage 3	EC17	Extended	Fatigue risk management policies and procedures	L	С		
Stage 3	EC18	Extended	Fatigue hazard analysis	M	В		
Stage 3	EC19	Extended	Rostering practices take into account fatigue	Н	D		
Stage 3	EC20	Extended	Response/control measures	М	D		

From the Scorecard, the user can:

- Clicking an 'Element Name' on the Scorecard to take the user back to the relevant element section.
- Edit the Grade Selection for any element by clicking the 'Completed' column for an element. A drop down will appear, allowing the user to reselect a Grade.

10.1. Likelihood Scale



Throughout the grading process, the user can view 'Likelihood that Fatigue Contributed to Incident' via the Scorecard and via the scale in the Control Panel.

These scales will continually adjust as the grading elements are completed.

NOTE: The rating given is not indicative of the overall likelihood that fatigue contributed to incident until all grading elements have been considered and completed.

Appendix A: InterDynamics' Methodology

Many organisations faced with the challenge of managing fatigue can easily become daunted by the prospect. Impairment associated with fatigue can be difficult to detect, and harder still, is judging the level of impairment that could present a danger. Added to the complexity of individual differences in experiencing fatigue is the context for individuals (e.g. job type, activities, environment, time of day, etc.) and the degree to which this is vulnerable to fatigue.

Given the diverse factors needing to be taken into account in managing work-related fatigue, a risk-based approach that gives consideration to models like James Reason's 'Swiss Cheese' model is often recommended.



The Defences-in-Depth model (Dawson & McCulloch, 2005) applies James Reason's model to the fatigue context, targeting prevention through a series of barriers, safeguards, and defences. InterDynamics has included these concepts and ideas in its Risk-Based Approach to managing fatigue, summarised in the diagram *Our Risk-Based Approach to Managing Fatigue* at the end of this Appendix.

InterDynamics' approach recognises the development of an appropriately informed plan to manage fatigue (a Fatigue Management Plan) as foundational to the effective implementation and on-going improvement of a Fatigue Risk Management System (FRMS). Staff engagement and consultation is key to a smooth FRMS implementation, as cultural change is often required for the organisation to transition its perception and management of fatigue in line with the organisation's fatigue policy commitment.

Our experience assisting clients of all sizes across various industries and circumstances has brought insights into the most effective organisational team structures and project plans for successful implementation.

The aim of the Risk-Based Approach is to provide our clients with the best possible tools and resources to manage fatigue risks. It is founded on four pillars: consultation, staff engagement, shared responsibility and effective risk management.

This comprehensive methodology includes three key steps:

- 1. **Determining** the fatigue risk profile of the organisation
- 2. Protecting against unacceptable fatigue-related risks
- 3. **Reviewing** systems to ensure protection measures remain adequate

Suggested FRMS Scope and Implementation activities are outlined in the second & third columns of the diagram, respectively. The last column presents supporting InterDynamics services and products that facilitate the FRMS journey. Deliverables and findings from each implementation activity give additional insight into the organisation's specific requirements for managing fatigue effectively, as well as providing valuable input into the Fatigue Management Plan and supporting Work Procedures.

InterDynamics' Risk-Based Approach to managing fatigue targets improved safety and performance as key outcomes of the FRMS.

InterDynamics and Zurich Risk Engineering have developed an organisational fatigue risk grading system (GRAID[™]) to provide senior and operational managers with a systematic methodology to ascertain the quality of their organisational risks associated with fatigue. In conducting FRMS reviews, InterDynamics can provide a valuable third-party perspective on the depth, breadth and relevance of your Fatigue Risk Management System.

Our Risk-Based Approach to Managing Fatigue

Managing Work-Related Fatigue Risks	Scope	Implementation	Supporting InterDynamics Services & Products		
	Risk Profile of Hours of Work planned, unplanned / overtime, actual hours, standby	Diagnostics of planned & actual Hours of Work	FAID [®] Quantum Diagnostic Reports, Implementation of FAID Tools, Data analysis		
1. Determine: Fatigue Risk Profile	Risk Profile of Individual commuting to/from work, sleep disorders, lifestyle	Risk Profile of Individual commuting to/from work, sleep disorders, lifestyle			
	Risk Profile of Job Type / Role time on task, environment, demand of task	Risk Assessment of day-to-day activities in the context of fatigue	Fatigue Hazard Analysis (FHA) Risk Assessment Workshops & Reports		
2. Protect: Against Fatigue Risk	Adequate treatments / controls Prepare for emergencies & unplanned work, Fatigue risk assess changes	Fatigue Management Policy, Plans, Procedures & operational work instructions Supporting supervisory, team & individual management strategies	Transition planning & support, Managing Fatigue education, Facilitation of Fatigue Management Policies, Plans & Procedure development, FAID Quantum Roster Tool / Shared Object Library		
3. Review: System & Occurrences	Fatigue occurrences, Causal & risk factors, Work plans and procedures, New information	Review / investigate fatigue reports, existing controls, business processes & changes	FRMS Review & Grading (GRAID FRMS), A&I Investigation (GRAID IT), FAID Quantum Hours of Work Audits		
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Appendix B: GRAID IT References

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- 6. Hystad, S. W., Saus, E.R., Saetrevik, B., Eid, J., (2013) Fatigue in seafarers working in the offshore oil and gas re-supply industry: effects of safety climate, psychosocial work environment and shift arrangement, *Int Marit Health* 2013; 64, 2:72-79

Appendix C: NASA Task Load Index (NASA-TLX)

What does the NASA-TLX measure?

The NASA-TLX was originally designed to obtain estimates of workload from one or more operators while they are performing a task or immediately afterwards. This workload was defined as the cost of accomplishing mission requirements for the human operator. It covers six dimensions:

- Mental Demand
- Physical Demand
- Temporal Demand
- Frustration Level
- Effort
- Performance

How does the NASA-TLX work?

Workload is measured with six subscales, one for each of the six dimensions. Participants are asked to give a rating from 0 to 10 for each subscale, in regards to the task they have performed.

The Performance subscale ranges from 0 (Perfect) to 10 (Failure). This assumes tasks with higher workloads are harder to accomplish. The other five subscales have identical ranges of 0 (Very Low) to 10 (Very High). The ratings are then added to give a NASA-TLX Value.

How can I use the NASA-TLX in my investigation?

Complete the following modified version of the NASA-TLX to obtain an estimated Workload Value for the task being undertaken when the incident occurred.

How do I add the NASA-TLX Value to the GRAID IT Tool?

The NASA-TLX Values for this measure have a possible range of 0 - 60. When you obtain the NASA-TLX Value, please add it to the GRAID IT tool using the following classifications:

А	В	С	D
0-15	16-30	31-45	46-60

NASA-TLX – Modified

Think about the task being undertaken at the time of the incident. Please read each question and circle the number you feel best represents that task.

Mental	Mental Demand How mentally demanding was the task?									he task?
0	1	2	3	4	5	6	7	8	9	10
Very Lo	Very Low Very High									
Physical Demand How physically demanding was the task?										ne task?
0	1	2	3	4	5	6	7	8	9	10
Very Lo	W	I	1		I	I	I	I	Ve	ery High
Tempo	ral Dema	and			How	hurried o	r rushed	was the	bace of th	ne task?
0	1	2	3	4	5	6	7	8	9	10
Very Lo	W								Ve	ery High
Perform	nance				Но	w succes	sful do w ace	vorkers te complishi	end to fee ment of th	l in their ne task?
0	1	2	3	4	5	6	7	8	9	10
Perfect										Failure
Effort				Нои	/ much ef	fort do w	orkers ha	ive to put this level	in to acc of perfor	omplish mance?
0	1	2	3	4	5	6	7	8	9	10
Very Lo	Very Low Very High									ery High
Frustra	Frustration How insecure, discouraged, irritated, stressed, and annoyed do workers tend to get while accomplishing this task?								annoyed nis task?	
0	1	2	3	4	5	6	7	8	9	10
Very Lo	W								Ve	ery High

Please add the numbers circled to obtain a NASA-TLX Value:

Appendix D: Swedish Occupational Fatigue Inventory (SOFI)

What does the SOFI measure?

The SOFI was developed as a way of measuring perceived fatigue in occupational settings. It covers five dimensions of fatigue:

- Lack of energy
- Physical exertion
- Physical discomfort
- Lack of motivation
- Sleepiness

How does the SOFI work?

Fatigue for each of the dimensions is measured using 4-5 expressions. Participants are asked to report on a scale how well each expression describes their own feelings at a certain point in time. The scale used ranges from 0 (not at all) to 8 (to a very high degree). The resulting scores are added to obtain a total SOFI Score.

How can I use the SOFI in my investigation?

Ask participants to complete the SOFI keeping in mind their feelings of fatigue at the time the incident occurred.

How do I add the SOFI Score to the GRAID IT tool?

The SOFI Scores for this measure have a possible range of 0 - 200. When you obtain the SOFI Score, please add it to the GRAID IT tool using the following classifications:

А	В	С	D
0-50	51-100	101-150	151-200

SOFI – Modified Measure

Think of how you felt at the time of the incident. To what extent do the expressions below describe how you felt? For each expression, please circle the number that corresponds to how you felt at the time of the incident. The numbers vary between 0 (not at all) and 8 (to a very high degree).

	Not at a	n//					Toa	/ery high	n degree
Palpitations	0	1	2	3	4	5	6	7	8
Lack of involvement	0	1	2	3	4	5	6	7	8
Lazy	0	1	2	3	4	5	6	7	8
Worn out	0	1	2	3	4	5	6	7	8
Tense muscles	0	1	2	3	4	5	6	7	8
Numbness	0	1	2	3	4	5	6	7	8
Sweaty	0	1	2	3	4	5	6	7	8
Exhausted	0	1	2	3	4	5	6	7	8
Listless	0	1	2	3	4	5	6	7	8
Falling asleep	0	1	2	3	4	5	6	7	8
Spent	0	1	2	3	4	5	6	7	8
Drowsy	0	1	2	3	4	5	6	7	8
Passive	0	1	2	3	4	5	6	7	8
Stiff joints	0	1	2	3	4	5	6	7	8
Warm	0	1	2	3	4	5	6	7	8
Indifferent	0	1	2	3	4	5	6	7	8
Hurting	0	1	2	3	4	5	6	7	8
Out of breath	0	1	2	3	4	5	6	7	8
Yawning	0	1	2	3	4	5	6	7	8
Drained	0	1	2	3	4	5	6	7	8
Sleepy	0	1	2	3	4	5	6	7	8
Overworked	0	1	2	3	4	5	6	7	8
Aching	0	1	2	3	4	5	6	7	8
Breathing heavily	0	1	2	3	4	5	6	7	8
Uninterested	0	1	2	3	4	5	6	7	8

Please add the numbers circled to obtain a SOFI Score: _____