



Scope of Work  
for 60 User Trial  
to Fatigue Science Readiband Solution

Prepared for:  
Federation of Piling Specialists  
Date: June 13, 2019



## Table of Contents

1. Objectives
2. Tools and Intended Use Cases
3. Quantity and Scope of Work
4. Evaluation Metrics
5. Training & Worker Communication
6. Data Privacy
7. Timeline & Execution of Deliverables
8. Pricing

### 1.0 Objectives

---

Federation of Piling Specialists has presented an interest in exploring a fatigue management program based around the use of the "Readiband Solution," a wearable and mobile application-based solution from Fatigue Science.

Fatigue Science's fatigue management platform is designed to empower workers – including oil and gas workers and others subject to the risks of on-duty fatigue – to measure, manage, and reduce their own fatigue via validated sleep tracking paired with fatigue analysis.

The purpose of this project will be:

- Project to optimise the operational efficiency of teams working in the Foundation industry
- Study a number of typical activities and working patterns assess whether there are trends in productivity (in terms of individuals outputs) across the week.
- Activities to be studied; CFA piling, rotary piling and mini-piling plus potentially Anchoring/soil nailing depending on projects available etc.
- Assess the effects of working time, travel time and individual lifestyles on performance during the working week

---

To provide workers with a clear insight into their baseline fatigue levels and a path toward setting measurable goals for improvement, the Readiband Solution leverages the SAFTE Biomathematical Fatigue Model, an algorithm developed by the US Army Research Lab with over 25 years of research, which has been studied by the US Federal Aviation Administration and is in use worldwide for both scheduling optimizations as well as personal fatigue self-management.

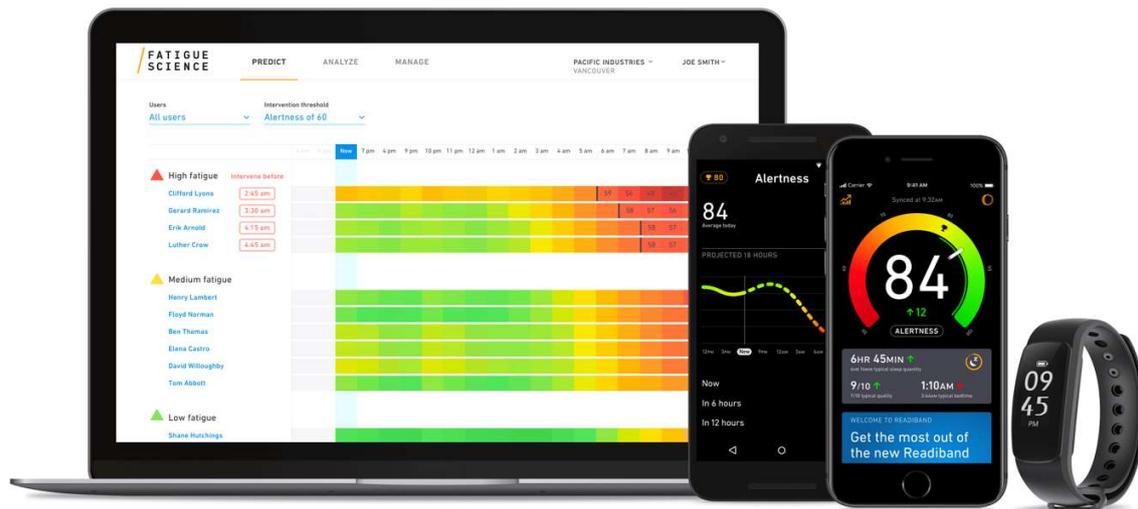
Specific objectives of this program are defined for both workers and management as follows:

- For workers wearing the Readiband:
  - Obtain a clear understanding of sleep habit, hygiene, and environment best practices that can be applied in daily life via the mobile Readiband App
  - Generate awareness of the science of sleep and fatigue, how one's own habits affects one's own on-duty fatigue, and what tangibly can be done to improve it
  - Become oriented to the practice of fatigue goal-setting, including understanding one's baseline fatigue levels and determining what goals are personally achievable
- For Federation of Piling Specialists management:
  - Gain insight into the sources and extent of worker fatigue by leveraging anonymized, aggregated insights in order to improve schedules & conditions that affect fatigue.
  - Ultimately, use these data to benchmark current risk levels and measure efficacy of improvements as fatigue is reduced over time, improving safety and well-being
  - Use of our Predict Tool so that Supervisors could make early interventions (subject to section 6.0 Data Privacy)

## 2.0 Tools and Intended Use Cases

---

### Readiband Solution



- The Readiband Solution is comprised of the wearable wrist-worn actigraph known as the Readiband™, as well as the mobile application for iOS and Android devices known as the Readiband App.
- The Readiband Solution captures validated sleep data and processes it privately and securely using the SAFTE Biomathematical Fatigue Model to assess the cumulative impact of that sleep on the individual's fatigue risk. The Readiband Solution then presents daily sleep and fatigue insights privately to each individual, in order to enable that individual to understand their baseline sleep and fatigue patterns, as well as to empower that individual to set and sustain personally achievable goals for Fatigue Reduction.
- Personally identifiable data are fully private to the individual by default, and management have no access to these data. Optionally, management may elect to adopt the Predict Tool as part of its configuration, which enables supervisors to proactively view predicted on-duty risk levels of its workers and make early interventions to mitigate upcoming critical fatigue risks. (See more discussion in section "6.0 Data Privacy")
- The basic workflow of our Readiband Solution would be as follows:
  - 1) Wake up
  - 2) Open the app
  - 3) Check if you're going to be fatigued / not going to be fatigued during your upcoming work hours
  - 4) Proceed to work with a clear awareness of your fatigue
  - 5) Adjust sleep behaviors over time to achieve higher alertness during on shift hours

*Fatigue Risk Assessment & Participation Report – Quarterly Analysis Reports:*

- A Fatigue Risk Assessment provides anonymized, aggregated insights into fatigue risk exposure levels of the workforce, including trend data around the sources and extent of fatigue such as hotspots of risk concentrated in certain schedules, and other related factors.
- Fatigue Risk Assessments will be generated for management and will be used to help management assess and improve factors that affect the sleep and fatigue of workers at large, such as schedules, sleep environments, and other tools that management may invest in with the intent of helping workers obtain better sleep and be more alert on duty. (See more discussion in section "6.0 Data Privacy")
- Typical teams sizes in the study will be approximately 5 people. The study will track 3 teams of each then we get to 45 operatives plus we would want to pick up supervision and engineers/PM's so probably 50-60 people in total.



- The SAFTE Bio-Mathematical Fatigue Model analyzes high-resolution sleep data into order to construct an accurate, hour-by-hour prediction of upcoming fatigue. The resulting SAFTE Alertness Scores are an objective measure of one's fatigue at any given moment.
- The Fatigue Science Predict Dashboard enables supervisors to pre-emptively perform On Duty Interventions – hours before critical fatigue risks arise.
- The Predict Dashboard does not require a supervisor to observe it at all times. Instead, a supervisor should generally look at the tool once per shift, before work begins. From there, the supervisor can easily observe any workers who are predicted to have High Fatigue at some point in their upcoming shift.
- This approach enables proactive intervention, based on advance planning, instead of reactive intervention at the last moment.

### 3.0 Quantity and Scope of Work

---

#### Quantity:

As an initial proof of concept, Fatigue Science recommends 60 workers be enrolled in this trial of the Readiband Solution. Fatigue Science believes the sample size is sufficient to derive meaningful initial impressions from the use of the technology.

#### Duration:

Fatigue Science recommends a 3-month evaluation period. This is a sufficient amount of time to answer the evaluation criteria and equip the client team with the information necessary to decide on advancement with the use of the solution.

#### Reporting:

Fatigue Science will provide Insight Reports which will include:

- A Fatigue Risk Assessment providing anonymized, aggregated participant fatigue levels and general sleep metrics and insights for participants
- User engagement metrics such as; software & hardware utilization rates
- Aggregated Survey results revealing participants feedback on their Readiband Solution experience

The purpose of the reporting provided is to provide Federation of Piling Specialists management with visibility around engagement progress and to equip project stakeholders with collateral necessary to form the foundation of a business case for expansion.

## 4.0 Evaluation Metrics

---

Fatigue Science proposes the following metrics be used in order to determine whether the technology is appealing for ongoing use, as well as to determine whether sufficient fatigue risk exists to invest in its mitigation:

### A. End-User Engagement Statistics

1. Hardware Utilization Rate (Wear device to track sleep consistently during trial)
2. Software Utilization Rate (Regular engagement with the Readiband App)

### B. Online Qualitative Survey

1. Worker feedback around experience of solution

### C. Objective Data on Fatigue Risk Exposure

1. Levels of exposure to elevated and critical fatigue risks as a percent of hours on duty, as captured by the Fatigue Risk Assessment. (To be benchmarked against industry norms)

## 5.0 Training & Worker Communication

---

### *Fatigue Science Education and Onboarding*

Stakeholder education, including management and workers, is important in ensuring all participants understand what's involved in a Fatigue Science evaluation and why it matters.

Fatigue Science will provide project stakeholders with pre-deployment onboarding to ensure all are fully informed on project details and deployment requirements.

Fatigue Science will engage participants via an email-based "onboarding" program with the participants to provide relevant training and engagement around:

1. The Science of Sleep and Fatigue
2. How to Improve Your Sleep & Fatigue
3. How to Use the Readiband App to sustain daily sleep improvement habits
4. How their personally identifiable data will remain fully private (or shared on a limited basis, in the case of the use of the on-duty Predict tool), and how anonymized, aggregated insights will help management improve schedules and worker conditions to increase well-being and reduce fatigue

This education enables:

1. Participants' voluntary "buy-in," support and participation in achieving project objectives
2. Participants to better understand the relationship between sleep and on-duty fatigue

Moreover, we would categorize as follows:

**Self-Management (Wearer only)** - Wearers are enabled with a Readiband and access to their own sleep and fatigue data and the Fatigue Science onboarding / education scheme (delivered through the app and email).

**Readiband Management (Program Manager - Admin access only)** - Selected Readiband program manager(s) are permitted access to the Fatigue Science web app for the purposes of administering Readiband accounts, viewing usage stats and driving Readiband program participation. These account privileges do not permit access to any users sleep or fatigue data.

Readiband Management with Predict (Program Manager, Supervisor - Fatigue Data access) - Selected Readiband program managers, and/or team supervisors are permitted access to the Fatigue Science web app with same privileges above, but added access to the Predict tool (visibility into current and predicted fatigue levels) for the purposes of intervening on fatigue exposure.

**Readiband Management with Analyze (Medical or support member - Sleep Data access)** - Selected Readiband program managers, and/or team supervisors are permitted access to the Fatigue Science web app with same privileges as Readiband Manager, but added access to the Analyze tool (visibility into historic sleep data and past fatigue exposure) for the purposes of working with individuals to improve sleep over time.

Training for wearers / management typically involves (but is designed around how things will roll out within the specific company):

### **Managers / Program Managers**

- Review of Fatigue Science platform and all associated tools
- Review of Readiband user roles (above) to align on what is most appropriate for their operations
- Review of Pre-deployment internal communication tools (presentation, recruitment poster, self-pairing doc, deployment plan/schedule, manager guide (PDF & online) consent form template)
- Training on specific aspects of the tool deemed appropriate for the program manager use
- Training on best practices for talking to wearers about Readiband and where to get support when needed

### **Supervisors**

- Review of Fatigue Science platform and all associated tools - Confirmation of which tools are being used by the company
- Review of Pre-deployment presentation and self-pairing doc
- Training on specific aspects of the tool deemed appropriate for the supervisor use
- Training on best practices for talking to wearers about Readiband and where to get support when needed

## Wearers / Volunteers

- Overview of the Readiband Program and company goals (presented by company or Fatigue Science)
- Direction on the set up of a Readiband (via one-page PDF, in app instructions, Program Manager or Fatigue Science in-person support)
- Onboarding and Sleep & Fatigue Education Scheme (delivered in app and via email)

The above is fairly high-level but if we need to we can break things down more detailed, for example: Readiband Manager training may include: How to set up Readibands or guide individuals in setting up their own Readibands, How to observe syncing activity via the Web app or on an iPad, How to deactivate and set up a new Readiband (when one is lost or broken) etc..

## 6.0 Data Privacy

---

Readiband only tracks physical wrist movements ("actigraphy"). Based on your wrist movement, Readiband is able to detect whether you are asleep and how well you sleep. Readiband does not contain GPS or other sensors. It doesn't track location or any other type of activity. However, Fatigue Data for workers will be accessible by supervisors who have been authorized to use the Predict Tool.

Privacy options are highly configurable within the Readiband Solution, and by default, all personally identifiable sleep & fatigue data that is collected via Readiband are kept private and confidential.

Optionally, management may elect to adopt the Predict Tool as part of its configuration, which enables supervisors to proactively view predicted on-duty risk levels of its workers and make early interventions to mitigate upcoming critical fatigue risks. Readiband wearers may also elect, on their own volition, to grant specific authorized medical personnel access to their sleep data for further support if needed.

In terms of non-personally identifiable data, such as broad sleep and fatigue trends and de-identified, aggregated data used to improve schedules, Fatigue Science will make available such anonymized, aggregated insights on a periodic basis to [Company ABC] management. The express intent of these efforts will be to help management assess and improve factors that affect the sleep and fatigue of workers at large, such as schedules, sleep environments, and other tools that management may invest in with the intent of helping workers obtain better sleep and be more alert on duty. These anonymous, aggregated reports will not only help inform the optimal strategies for such well-being improvement, but they will also serve to quantify the efficacy of any such actions, such that tools can be adjusted as needed to ensure continual improvement.

## 7.0 Timelines & Execution of Deliverables

	Description	Date	Responsible
<b>1.0</b>	<b>Pre-Deployment</b>		
1.1	Align on Solution: 1. Objectives 2. Success Criteria		FS/SB
1.2	Subscription Details: 1. Quantity of participants 2. Geographic location 3. Training methodology		FS/SB
1.4	Receipt of purchase order from Federation of Piling Specialists		SB
1.5	Submit invoice to Federation of Piling Specialists		FS
<b>2.0</b>	<b>Engagement Timeline</b>		
2.1	Engagement Commences: Client Kick-Off Meeting	Two weeks before deployment	FS
2.2	Upon Readiband arrival: Client Manager/Project Stakeholder Training	One week before deployment	FS
2.3	Deploy Readibands (remotely) Worker Training commences via mobile app	Day 1	FS
2.2	Worker Training continues via mobile app	Week 1	FS
2.3	Participant surveys deployed	Week 10	FS
2.4	Engagement Ends: (Optional) Client provides Time & Attendance data if available to refine inputs for more precise Fatigue Risk Assessment analysis	Week 12	SB
2.5	Fatigue Risk Assessment delivered to Federation of Piling Specialists	Week 14	FS
<b>3.0</b>	<b>Expansion</b>		
3.1	Align on solution for expansion	Week 14	FS/SB



# Quotation

Created Date                      June 14, 2019

Contact Name		Prepared By	David Trotter
Phone		Phone	
Email		Email	david.trotter@fatiguescience.com

Customer	Federation of Piling Specialists	Ship To Name	Federation of Piling Specialists
Bill To	Foundation Court, Riverside Way, Watchmoor Park, Camberley, GU15 3RG United Kingdom	Ship To	

Item Description	Start Date*	End Date*	Term (mos.)	Unit Price	Quantity	Total Amount
Data Analysis & Reporting	31-07-2019			5,000.00	1	5,000.00
On-site Setup & Deployment	31-07-2019			1,500.00	1	1,500.00
Readiband (RB5) Wrist-worn Actigraph				0.00	60	0.00
Readiband Solution Subscription	31-07-2019	31-10-2019	3.00	150.00	60	9,000.00
Shipping				150.00	1	150.00
Travel Expenses				500.00	1	500.00

Payment Terms: Due on receipt of invoice. This quotation is valid for 30 days and excludes applicable sales taxes. All dates displayed as (DD-MM-YYYY). Grand Total                      GBP 16,150.00

\*If this quotation is executed and/or returned to Fatigue Science by Customer after the Service Start Date above, Fatigue Science may adjust these terms, without increasing the Total Price, based on the date Fatigue Science activates the products above.

QUOTATION ACCEPTED	
Customer agrees to purchase the items listed above. This Quotation is issued pursuant to and forms part of the applicable license or subscription agreement between Customer and Fatigue Science, which governs Customer's use of the above items (e.g. Evaluation License Agreement or Master Subscription Agreement).	
Signature	Name
Date	Title