Readi / Analytics™

Instant Insights

Validated Fatigue Simulation Tool for Schedule & Roster Optimization, based on the SAFTE Biomathematical Fatigue Model

FATIGUE SCIENCE

Readi /

Table of Contents

Introduction

ReadiAnalytics Instant Insights is a component of Readi FMIS, the Fatigue Management Information System software, that performs reporting which allows you to **predict fatigue, reduce risk and maximize productivity.**

Readi FMIS is broad and comprehensive software suite **designed** to empower leadership, HSE teams, supervisors and operators to **take meaningful actions to manage the risks and productivity** impacts of on-duty fatigue in high-risk shiftwork-based environments.

Readi is a fundamentally predictive fatigue solution. It is the **exclusive software** solution to make use of the scientifically-validated SAFTE Biomathematical Fatigue Model ("SAFTE") for fatigue predictions.

What is the SAFTE Model?

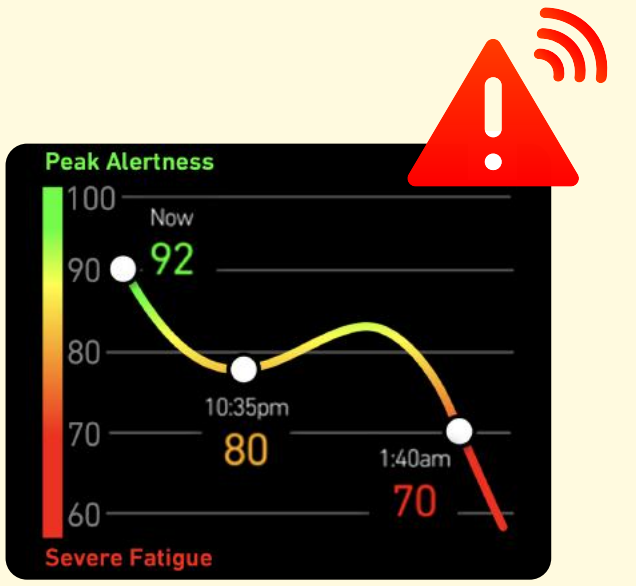
The SAFTE (Sleep, Activity, Fatigue, and Task Effectiveness) Model is a biomathematical model developed by researchers at the US Army's Walter Reed Army Institute of Research.

It is designed to predict fatigue levels in individuals based on a variety of factors, including cumulative historical sleep duration, quality, and timing, as well as circadian factors like sunrise/sunset times, night shifts, and time zone travel. These factors are considered not just for the prior 24 hours, but for the past 10 days, as indicated by the science.

What is the ReadiScore?

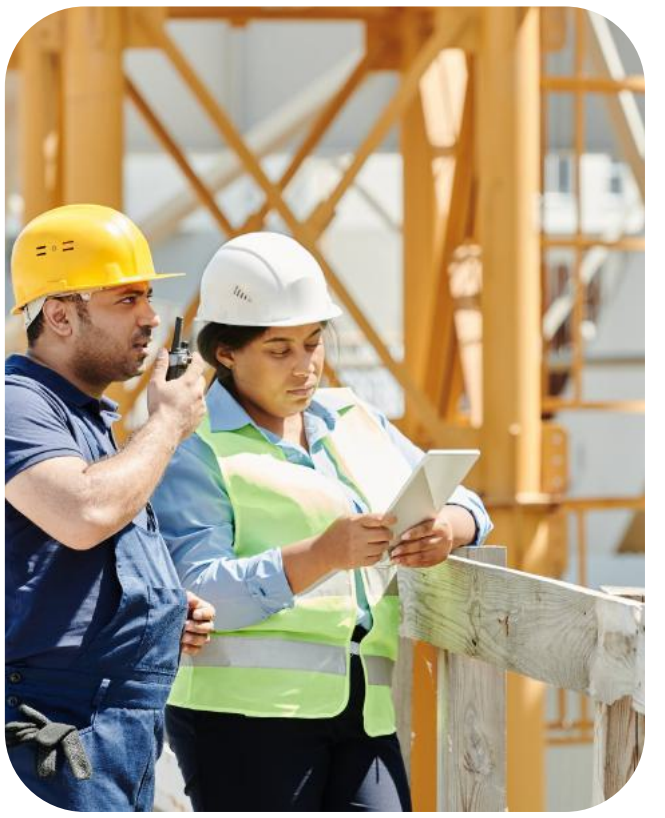
SAFTE produces an hour-by-hour fatigue prediction for each operator, known as the ReadiScore, which quantifies fatigue on a scale of 1 to 100. The ReadiScore predicts cognitive effectiveness, reaction time, and lapse likelihood, with a lapse being a measure of attention deficit closely related to the tendency for a microsleep or "nodding off at the controls."

It has been validated extensively by the US Department of Transportation, the Federal Aviation Administration, and many other institutions, with 13 published papers, available at FatigueScience.com. The ReadiScore has been observed to have a direct relationship to real-world operator performance metrics in mining, trucking, and other high-risk industries.



Product Overview

Instant Insights is a Roster Fatigue Simulation Tool that enables the user to access the SAFTE™ Biomathematical Fatigue Model for purposes of simulating the fatigue impacts of schedules, shift patterns, and potential sleep scenarios.



Scenario Configuration:

Instant Insights enables users to construct shift patterns or schedules for use in simulations via a variety of convenient methods. Input methods include:

1. Graphical user interface
2. CSV Upload
3. Pattern-based looping (e.g. 7D-7N-7o)
4. Manual input (e.g. adding one shift at a time)

Once a scenario contains all parameters concerning shifts, sleep assumptions can be constructed. Using Fatigue Science's AutoSleep 2.0 algorithm, sleep simulations based on user-defined assumptions can automatically be configured for any schedule. The configurable sleep assumptions enable the use of a variety of sleep profiles (e.g. "Ideal", "Moderate", "Poor").

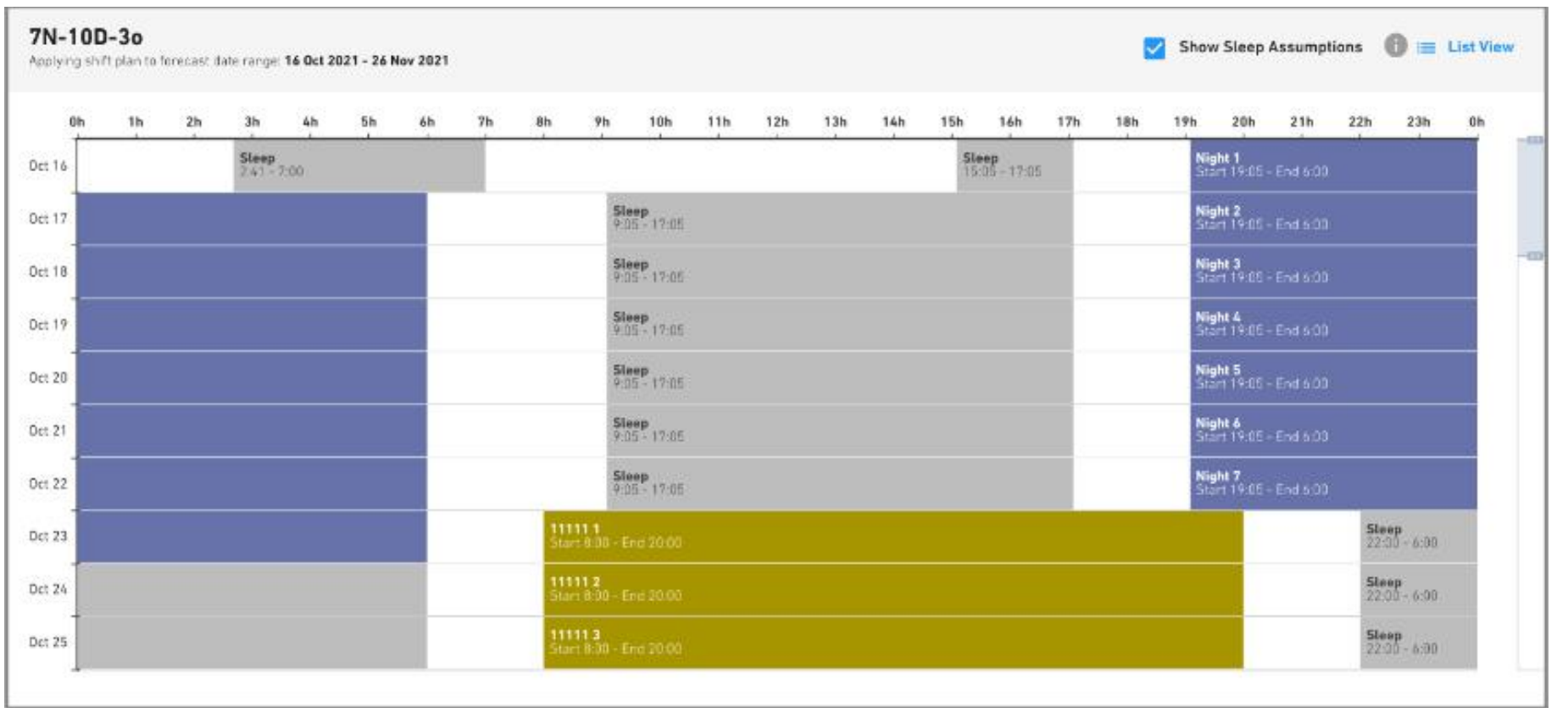


Figure 1: Sleep and Work assumptions populated in a scenario

Biomathematical Modeling:

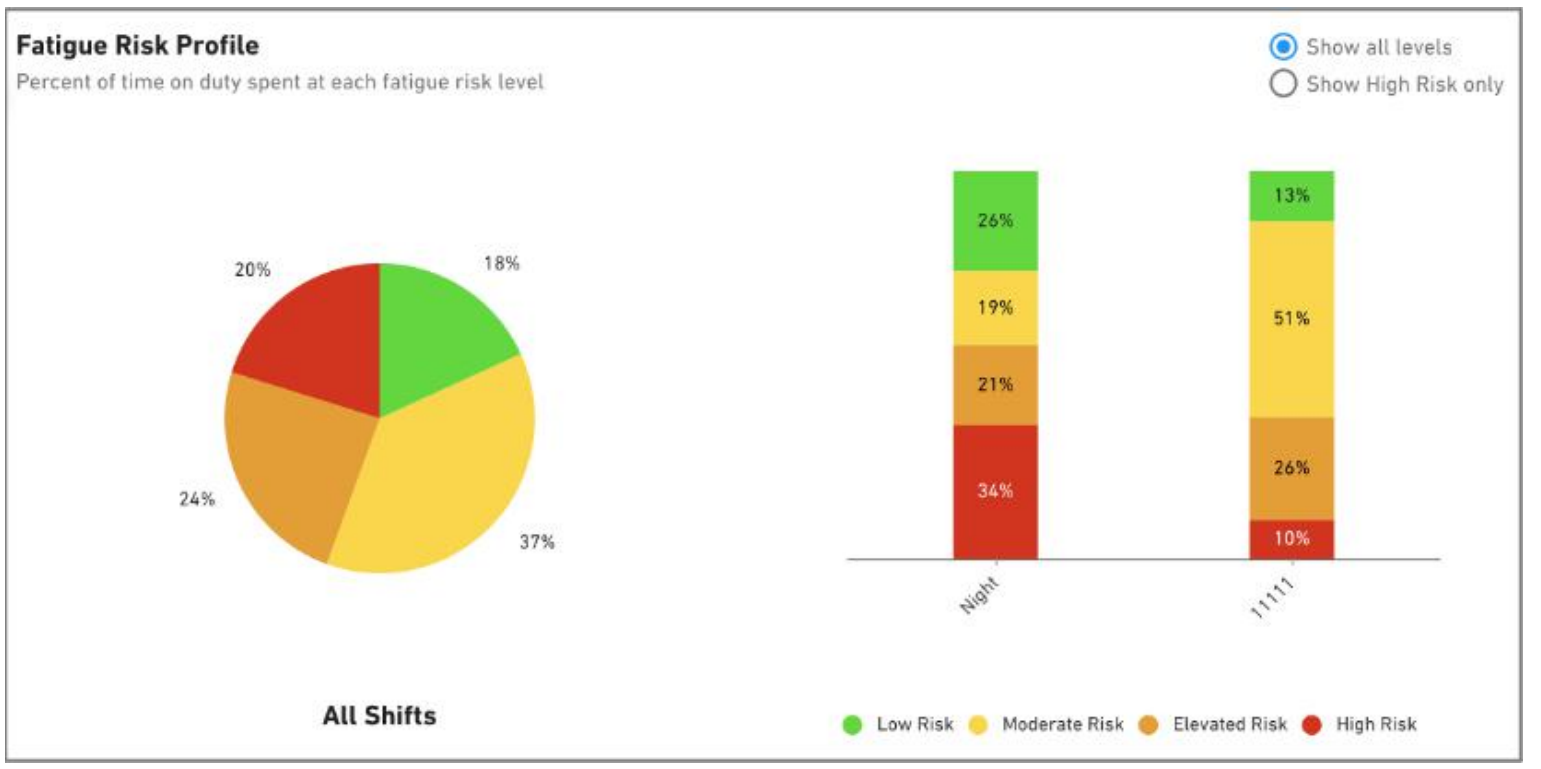
Once a scenario has been fully configured with work or sleep assumptions, the user can run that scenario through the SAFTE™ Biomathematical Fatigue Model for processing. The model accepts the sleep and work parameters, and returns a predicted time series of ReadiScore, indicating the expected fatigue level at each point in the on-duty and off-duty periods within the scenario.

Output & Insights:

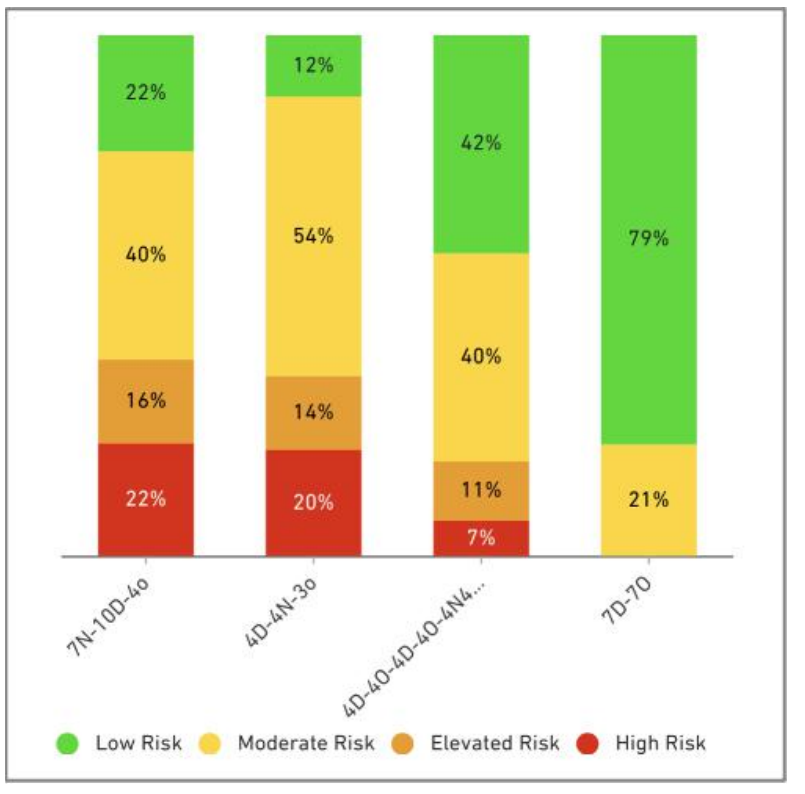
Once a simulation has been run and ReadiScores have been generated, a variety of charts can be automatically and instantly produced for actionable insights.

Chart types:

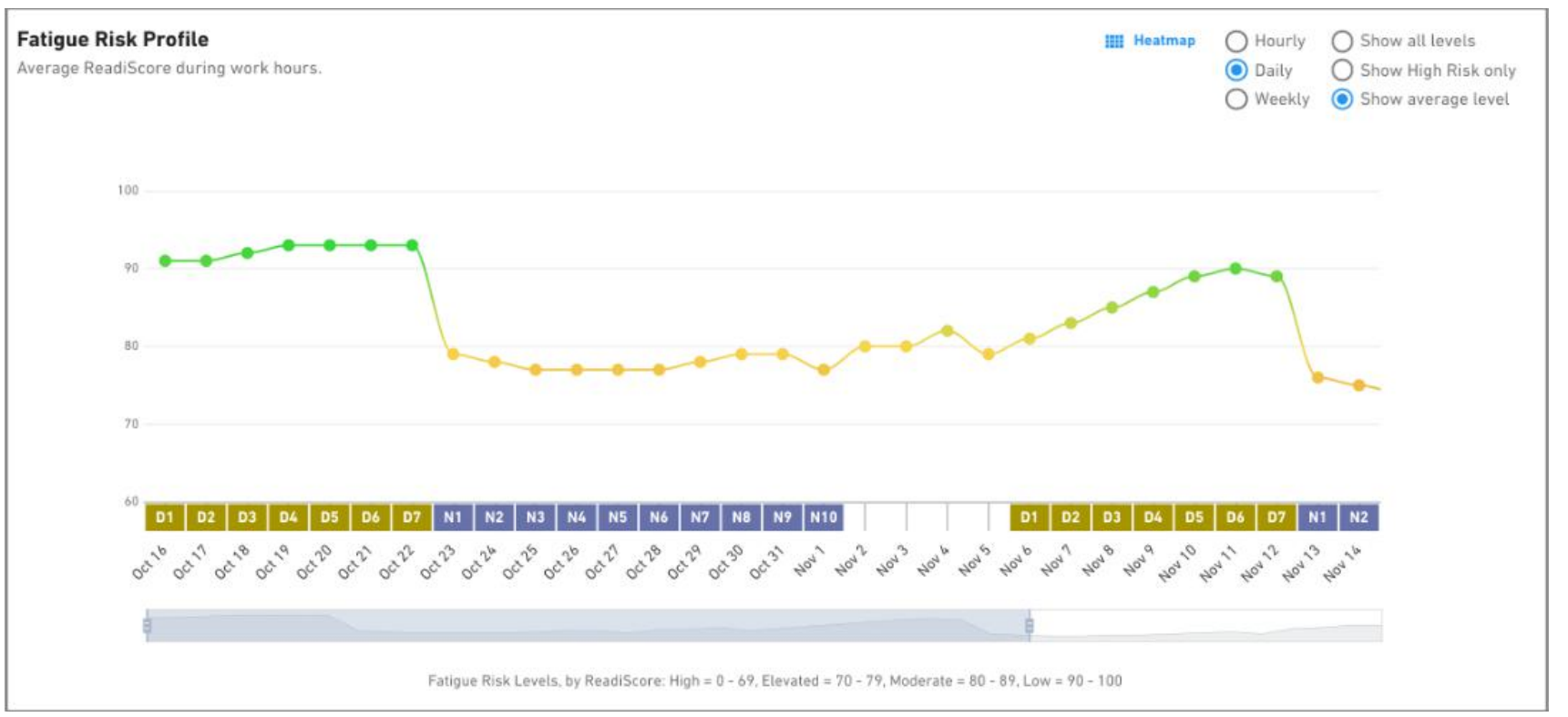
1. **Snapshot:** Providing overall level of expected fatigue risk exposure during a defined window of time



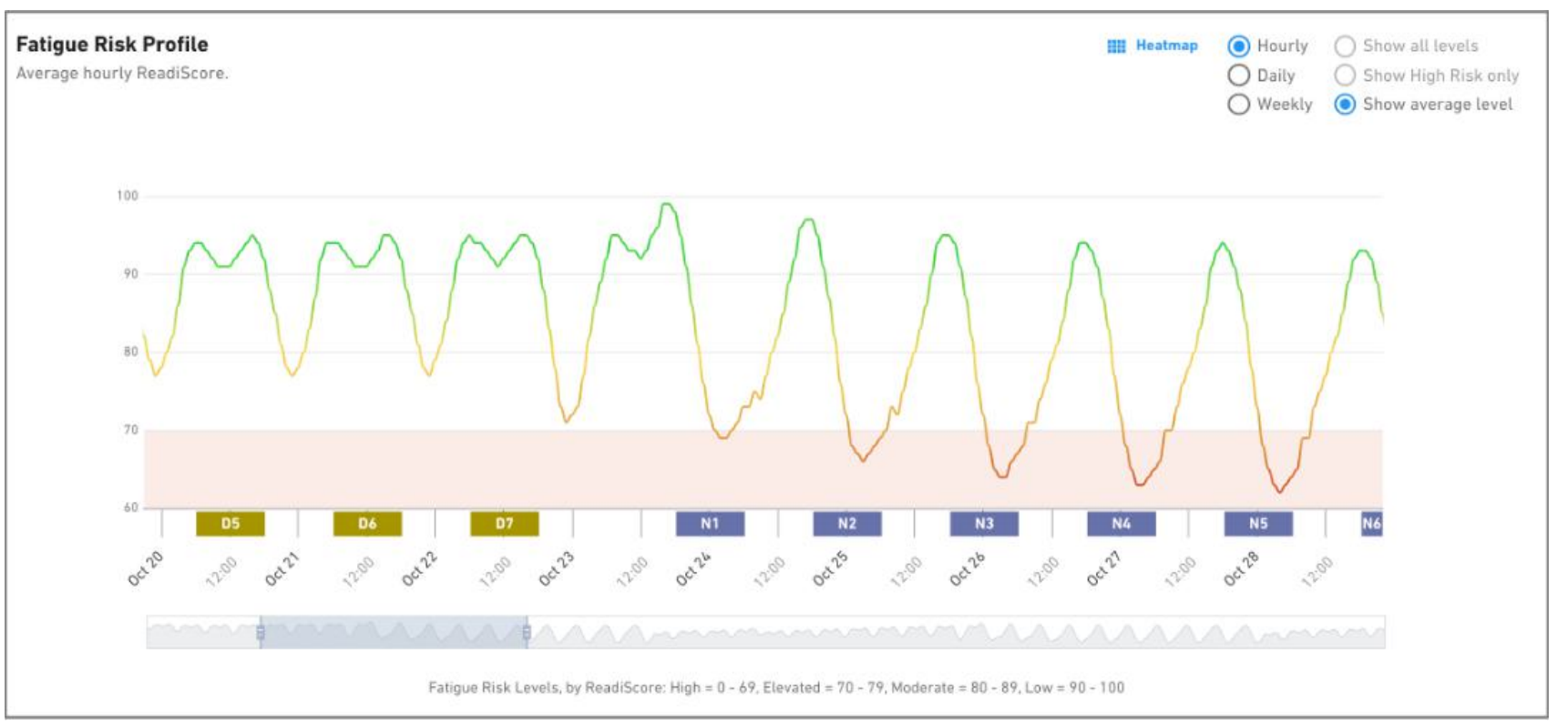
2. **Snapshot Comparison:** Revealing the summary results of multiple different analyses side-by-side, for comparison of aggregate fatigue exposure between different potential scenarios or schedules. This is useful for comparing different shift patterns (e.g. 6D-6N-6o vs. 4N-3D-4o), as well as different start and end times in the same shift pattern.



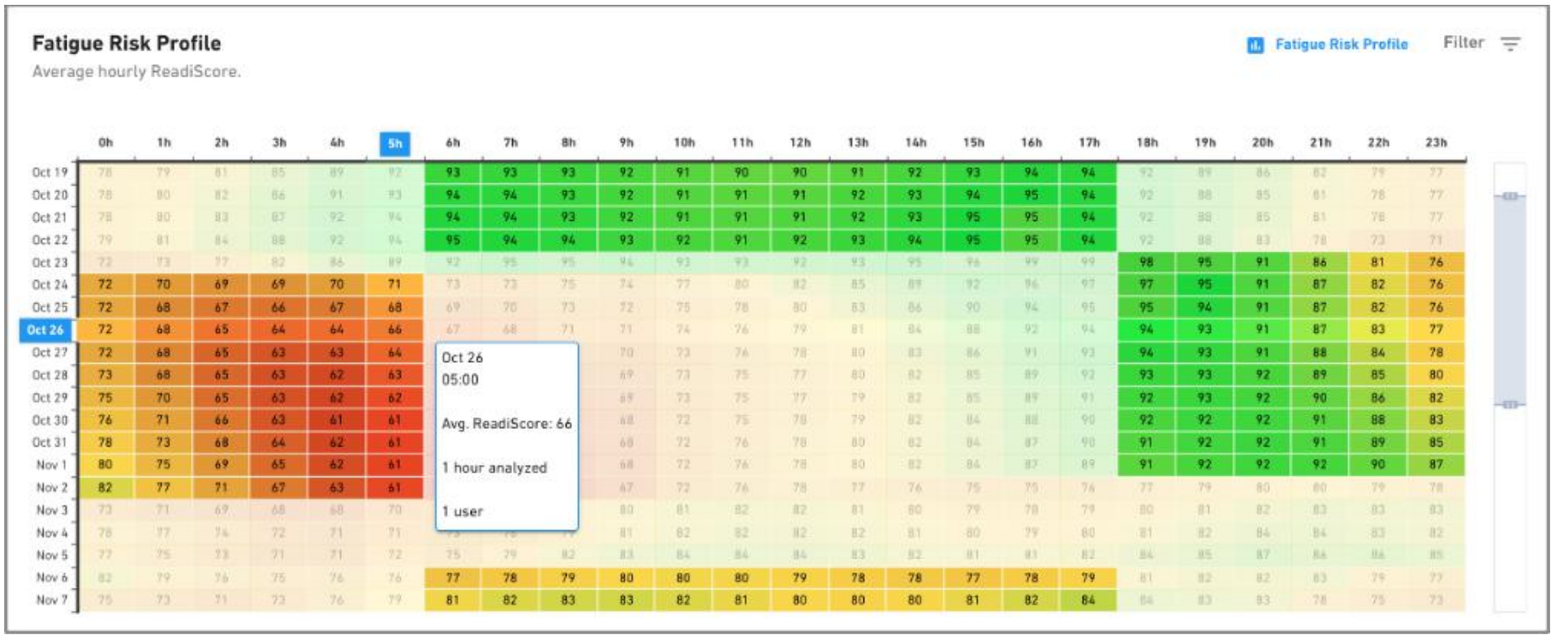
3. **Daily Timeline:** Revealing predicted progression of average on-shift fatigue levels over time throughout the course of a shift pattern, with an overlay of the pattern itself. This view reveals which days in a pattern are expected to be most severe or conversely most safe and productive, and how long recovery is expected to take during a stretch of off days.



4. **Hourly Timeline:** Revealing predicted progression of hourly on-shift fatigue levels for based on progression of circadian rhythm throughout the day, with an overlay of the pattern itself. This view is useful for developing an intuition of the progression of circadian rhythms, as well as to identify the peaks and troughs in expected human performance. This chart is also useful for reconstructive retrospective incident analysis, with intent to pinpoint expected fatigue level at which an incident may have occurred.



5. **Heatmap:** Revealing in a single glance an hour-by-hour view of predicted fatigue levels over the course of an upcoming shift pattern, enabling instant identification of the most and least fatigued periods to expect over a month or more of shifts. This view is often used to support direct guidance to a workforce, such as using the knowledge to perform the most safety-sensitive and complex tasks at times other than the ~1% of hours in a month exhibit an outlier level of fatigue. As with the hourly timeline, this chart is also useful for reconstructive retrospective incident analysis, with intent to pinpoint expected fatigue level at which an incident may have occurred.



What can you do with ReadiAnalytics?

Simulate Your Operation

- Derive meaningful insights in minutes, not weeks (no wearables required)
- Readi auto-simulates likely sleep patterns for the unique constrains of your roster or schedule

Generate Fatigue Insights

- Benchmark overall fatigue risk in your shift pattern
- Identify fatigue risk hotspots at key times of day
- Identify riskiest days in a shift pattern (e.g. 4th night shift)
- Compare and contrast alternate schedules & start times

Take Action, Reduce Risk

- Plan safety-sensitive tasks for lowest risk times
- Recommend operator caution during expected hotspots
- For schedulers: determine lowest-risk schedules

Compare simulations vs. actuals

- Optionally use wearables to sample on-the-ground fatigue
- Compare real-world fatigue to simulated expectations
- Determine root causes of fatigue
- Identify crews and individuals in need of support, preserving sleep data privacy
- Track progress of highly-targeted fatigue reduction efforts

FATIGUE SCIENCE

Readi /

Conclusion & Next Steps

Eager to know what benefit ReadiAnalytics can have **on your own operation**?

Our dedicated Professional Services team at Fatigue Science supports each client's Readi program through all aspects of deployment and ongoing operations, to ensure you're getting the most out of your investment.

Predictive fatigue technology is one of the few areas where worker well-being and safety truly coincide with increases in operational productivity.

It is a rare "**win-win**" for employees and employers alike. It's why mine sites and industrial operations on 96 countries are using Readi to improve operations – with adoption growing rapidly.

Reach out to our sales team to get started improving operational productivity and safety, and become a part of the predictive data revolution today.

Sales Inquiries:
sales@fatiguescience.com

+1 (604) 408-0085 - Canada
+52 (5) 568278152 - Mexico / Latin America (hablamos español)

www.fatiguescience.com

Readi /

Trusted and Deployed Globally

Relied on by Global Leaders in Heavy Industry, Transportation, and Military

---

FRESNILLO®

Newmont™

GLENCORE

KINROSS

THIESS

SOUTH32

BARRICK

newgold

BHP

MINSUR

MMG

PAN AMERICAN SILVER

MARCOBRE

TOTAL

lundin mining

PEPSICO

PETRONAS

NASA

U.S. Department of Transportation

Federal Aviation Administration

Transport for London

U.S. AIR FORCE