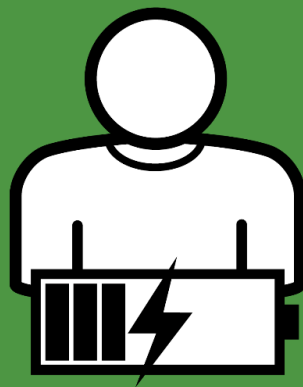


# Fatigue Reduction:

## How to use the Fatigue and Risk Index Tool (FRI) in Excel



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## Introduction

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To find out what the FRI tool is and what fatigue and risk indexes mean, please read “How to manage your team’s fatigue” on the [fatigue reduction site](#). This document tells you how to use the tool from a practical point of view. Before you get started using the tool, the key points to note are:

### **You should use the FRI tool when...**

- Creating a new roster/working pattern
- Comparing between rosters/working patterns during negotiation
- An incident has occurred or during an investigation, to assess whether fatigue might have been a contributing factor
- You need to assess the impact of changes to a roster/working pattern
- There is reason to believe an existing roster/working pattern might cause fatigue for those working to it

### **The FRI tool should not be used on its own to assess and manage fatigue.**

- It doesn’t consider all factors that may impact fatigue (like personal ability to adjust to night working)

### **Fatigue Triggers: FRI index scores**

- The Health and Safety Executive (HSE) have suggested that:

- **Fatigue index should be no more than 35 for day shifts and no more than 45 for night shifts**
- **Risk index scores should not be above 1.6**

- If Index scores are higher than this, actions need to be taken to mitigate against the risks or shifts would need to be rescheduled
- You can find a list of suggested options for mitigating fatigue on [fatigue reduction site](#), in the Mitigation Guide

A roster that has mostly high fatigue index scores (high 30s and 40s all the way through) is likely to be a highly fatiguing roster. Rosters with a lot of nights might show this pattern. In this situation its sensible to mitigate the risk of fatigue or reschedule shifts.

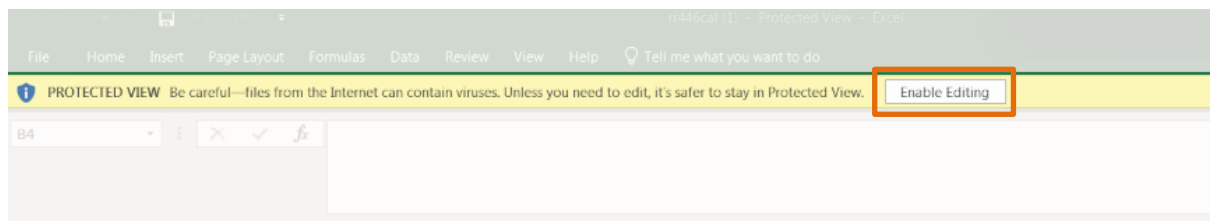
## Using the FRI tool in Excel

1. You can access the FRI tool, created by HSE, by copying and pasting this link into your web browser:

<http://www.hse.gov.uk/research/rrpdf/rr446cal.xls>

You should then save it somewhere you can access it easily next time you need it.

2. The document will open in in 'Protected view'. You need to click 'Enable Editing' in the yellow bar for the tool to work, the button will then change to say 'Enable content'. Click it again.



3. The 'defaults' page will then appear. This contains information about factors that can influence how fatigued someone feels. You can leave these defaults as they are or alter them depending on the people you are looking at and the work they are doing.

If you're looking at a roster that covers a whole team, you should set these values as an average (e.g. you'd need to work out the average commute time for the team and enter that). Just make sure you bear this in mind when you are interpreting the outcome data.

Once you're happy with the defaults, click on OK and it will take you to the main spreadsheet.

**Defaults**

### Fatigue / Risk Assessment

**Commuting Time**  
What is the typical commuting time of employees to OR from work (to the nearest 10 minutes):  
About  hours  mins  
(Please specify the typical commuting time)

**Type of Job: Workload**  
The workload and/or work pace of the job is typically:  
☐ Extremely demanding, no spare capacity.  
☒ Moderately demanding, little spare capacity.  
☐ Moderately undemanding, some spare capacity.  
☐ Extremely undemanding, lots of spare

**Type of Job: Attention**  
The job typically requires continuous attention:  
☐ All or nearly all the time  
☐ Most of the time  
☒ Some of the time  
☐ Rarely or nearly none of the time

**Breaks**  
How frequently (to the nearest 15 mins) are rest breaks typically provided OR taken?  
Every  hours  mins  
(please specify the typical interval between breaks)

What is the typical average length of these breaks (to the nearest 5 minutes) that are provided or taken?  
 hours  mins  
(please specify the average length of breaks)

What is typically the longest (to the nearest 15mins) period of continuous work before a break?  
 hours  mins  
(please specify the longest period between breaks)

What is typically the length of the break taken after this longest period of continuous work (to the nearest 5 minutes)?  
 hours  mins  
(please specify the length of the break following the longest period between breaks)

NB Please note that the answers you provide above will be set as the 'default' for the entire work schedule, but that you can alter the value(s) for any given duty if appropriate.

**Note:** An individual assessment will be needed if one person has much longer commute than their colleagues who are on the same roster. The same applies if an individual's role is more demanding than that of the rest of the team on the roster. A separate assessment may also be needed if a person has a medical condition that could cause them to become fatigued more quickly.

- You only need to enter data for days worked, but rest days still need to be accounted for. You do this by skipping rest days in the running total in the 'Day' column. For example, if you're testing someone who has worked 4-day shifts, had 3 days off, then worked 4-night shifts, the data you enter will look like this:

Note how the day number skips from 4 to 8, as days 5,6 and 7 were rest days.

- Click here to calculate the fatigue index

6. You can switch between viewing the risk index and fatigue index by clicking the button next to 'Mode'.

Day	On Duty	Off Duty	Job type / breaks	Commuting Time	Duty	Rest	Breaks	Component	Fatigue Index
1	06:00	14:00	Default	Default	8h	Fully Rested	8h	0.1	2.6
2	06:00	14:00	Default	Default	8h	16h	8h	2.4	4.9
3	06:00	14:00	Default	Default	8h	16h	8h	6.2	8.6
4	06:00	14:00	Default	Default	8h	16h	8h	10.0	12.3
8	22:00	02:00	Default	Default	4h	4d 8h	4h	0.1	7.2
9	22:00	02:00	Default	Default	4h	20h	4h	1.2	8.1
10	22:00	02:00	Default	Default	4h	20h	4h	3.3	10.1
11	22:00	02:00	Default	Default	4h	20h	4h	5.8	12.4

Day	On Duty	Off Duty	Job type / breaks	Commuting Time	Duty	Rest	Breaks	Component	Risk Index
1	06:00	14:00	Default	Default	8h	Fully Rested	8h	0.89	0.67
2	06:00	14:00	Default	Default	8h	16h	8h	0.94	0.71
3	06:00	14:00	Default	Default	8h	16h	8h	0.99	0.75
4	06:00	14:00	Default	Default	8h	16h	8h	1.04	0.79
8	22:00	02:00	Default	Default	4h	4d 8h	4h	0.89	0.80
9	22:00	02:00	Default	Default	4h	20h	4h	1.00	0.90
10	22:00	02:00	Default	Default	4h	20h	4h	1.12	1.00
11	22:00	02:00	Default	Default	4h	20h	4h	1.23	1.10

You can change the defaults for individual shifts by right clicking the blue 'Default' cell to the right of the shift that needs adjusting. Once you've done this, make sure you click the 'Calculate Index' button to update the risk and fatigue index values; if you don't click this, the values will not update.

Shift ID Date Mode							■ Display charts				
	Fatigue		Defaults		Reset Index	Calculate Index	© Crown Copyright 2005 Version 2.3				About
Day	On Duty	Off Duty	Job type / breaks	Commuting Time	Duty Length	Rest Length	Average duty per day	Cumulative component	Duty timing component	Job type / Breaks component	Fatigue Index
1	06:00	14:00	Default	Default	8h	Fully Rested	8h	0.1	1.0	1.6	2.6
2	06:00	14:00	Default	Default	8h	16h	8h	2.4	1.0	1.6	4.9
3	06:00	14:00	Default	Default	8h	16h	8h	6.2	1.0	1.6	8.6
4	06:00	14:00	Default	Default	8h	16h	8h	10.0	1.0	1.6	12.3
8	22:00	06:00	Default	Default	8h	4d 8h	4h 27m	0.1	10.6	16.2	26.9
9	22:00	06:00	Default	Default	8h	16h	4h 48m	3.1	10.6	16.2	29.1
10	22:00	06:00	Default	Default	8h	16h	5h 5m	8.4	10.6	16.2	33.0
11	22:00	06:00	Default	Default	8h	16h	5h 20m	13.1	10.6	16.2	36.4

## Interpretation

The excel FRI tool is designed to highlight any “Hidden” exceedances. These will show up in bold if they occur anywhere in the roster.

**Risk Index Calculator**  
Read the manual before using! Go to <http://www.hse.gov.uk/RESEARCH/rpdf/r446g.pdf>

Company:   
Location:   
Shift ID:   
Date:   
Mode: ☐ Risk ☐ Defaults ☐ Reset Index

Assessor:   
☐ Display schedule  
☐ Display charts  
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Day	On Duty	Off Duty	Job type / breaks	Communting Time	Duty Length	Rest Length	Average duty per day	Cumulative component	Duty timing component	Job type / Breaks component	Risk Index
1	06:00	14:00	Default	Default	8h	Fully Rested	8h	0.89	0.72	1.05	0.67
2	06:00	22:00	Default	Default	<b>16h</b>	16h	12h	0.94	1.32	1.05	1.30
3	06:00	14:00	Default	Default	8h	<b>8h</b>	10h 40m	1.05	0.72	1.05	0.79
4	06:00	14:00	Default	Default	8h	16h	10h	1.10	0.72	1.05	0.83

The main things to look for when interpreting the index are:

- The Fatigue values and Risk values – are they in the right range?
- The number of consecutive shifts, especially if:
  - They involve more than seven 8-hour shifts or four 12-hour shifts in a row
  - They are longer in length (10 or 12-hour shifts)
  - Involve a lot of nights
  - Have less opportunity for breaks within them
- The impact of factors like travel time and workload
- How often are high values occurring and is there variation over the roster? So, lots of shifts with low values and few shifts with high values would be better than consistently high scores.
- The number of rest days and how they are distributed across the roster; particularly following blocks of night shifts. Good practice is two full nights' sleep after a block of nights.
- Are any of the other Fatigue Risk Management standard triggers being exceeded.