Project MARTHA:
Seafarer Sleepiness and Fatigue

Nautical Institute – Hong Kong Branch – 24 November 2017

WARSASH MARITIME ACADEMY
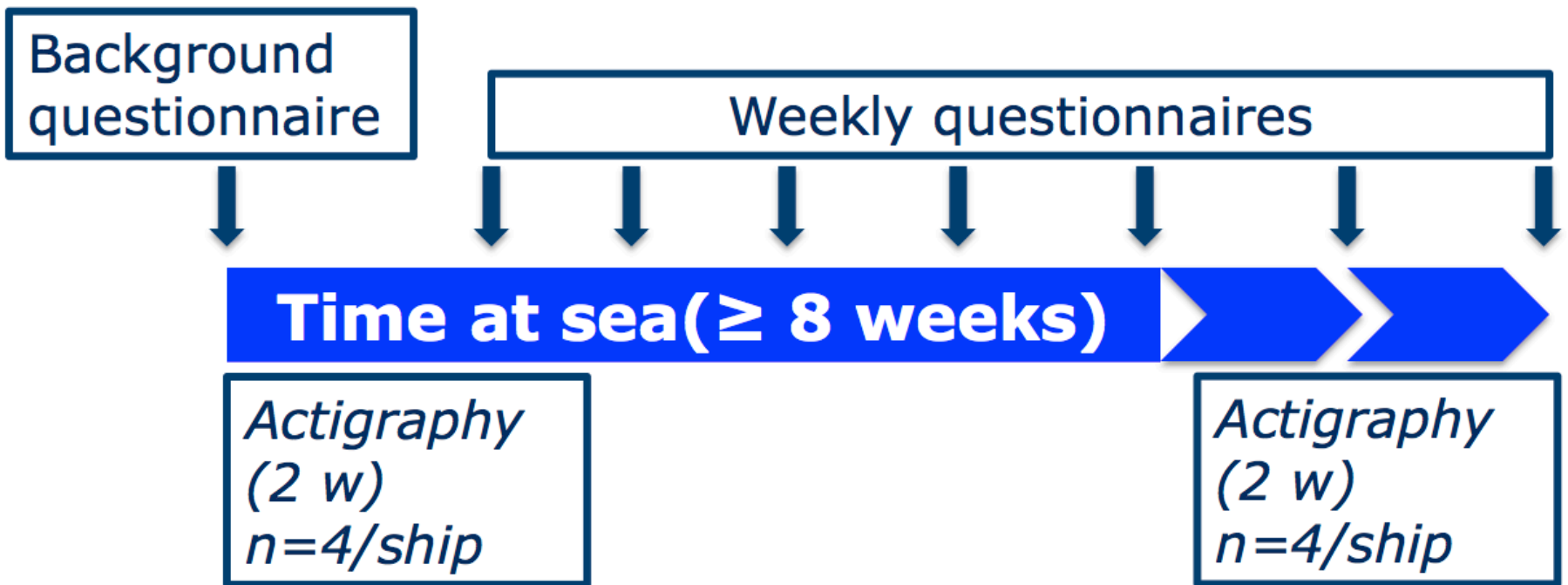
MARTHA

Southampton SOLENT University

THE TK FOUNDATION

solent.ac.uk

The Partners:

The Stress Research Institute

Project "MARTHA": Research Design

Background questionnaire

Weekly questionnaires

Time at sea(≥ 8 weeks)

Actigraphy (2 w) n=4/ship

Actigraphy (2 w) n=4/ship

Summary of key points

InterManager
International Ship Managers' Association
Promoting Excellence in Ship Management

- What do we know: the difference between "Sleepiness" and "Fatigue"

- What have we learned: Project HORIZON and Project MARTHA

- What can we do about it: Fatigue Risk Management Systems (FRMS)

Two European Ship Management Companies:

Company "A"

- 43 Small tankers
- NW Europe
- Intensive trade
- Ports every 3 days
- European officers
- Filipino crew

Company "B"

- 34 Large container ships
- Far East – Europe
- Asia – S. America
- European officers
- Filipino crew

# KSS – The Karolinska Sleepiness Scale

1. extremely alert
2. very alert
3. alert
4. quite alert
5. neither alert nor sleepy
6. some signs of sleepiness
7. sleepy, no effort to stay awake
8. sleepy, some effort to stay awake
9. very sleepy, great effort to keep awake, fighting sleep.

Some results from the analysis of Weekly Diaries and Actigraphy
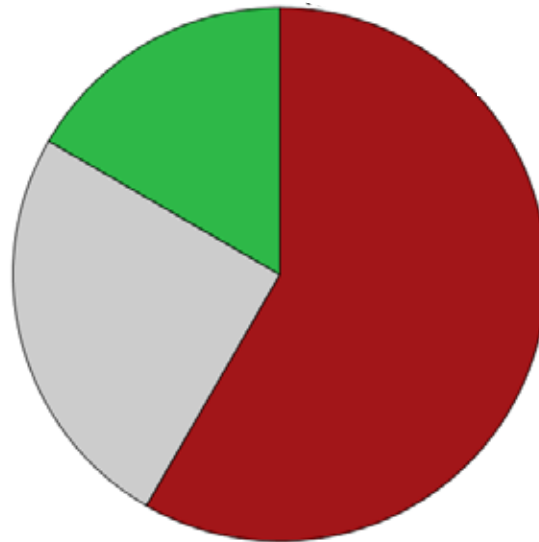
Fatigue: is it higher or lower at the end of a voyage?

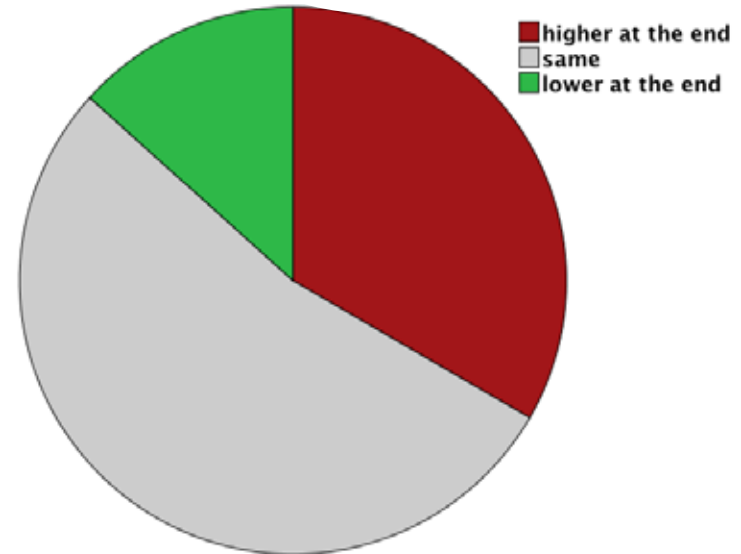*A closer look at the 3 ranks (Third officer, Captain, AB) for which there is the highest number(i.e.: n>10)*
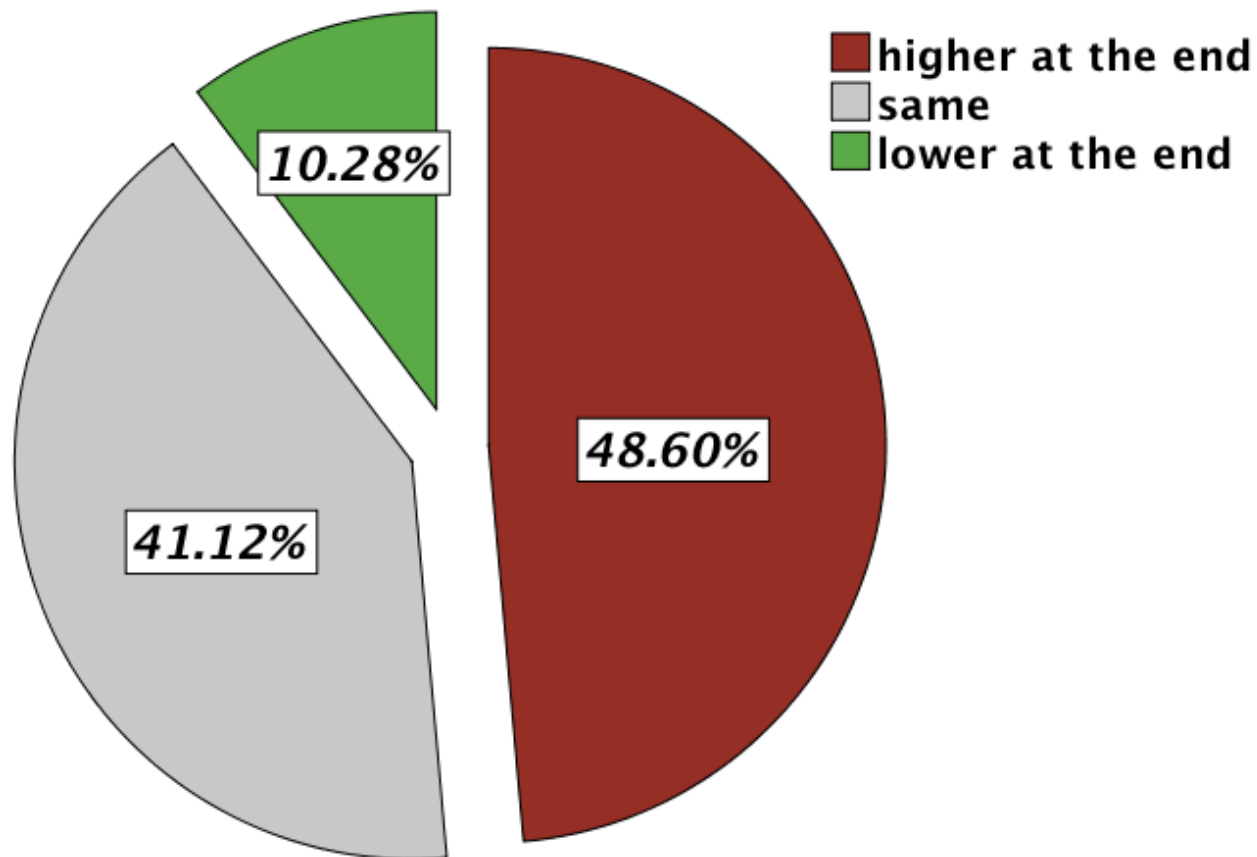

Captain

Third Officer

AB
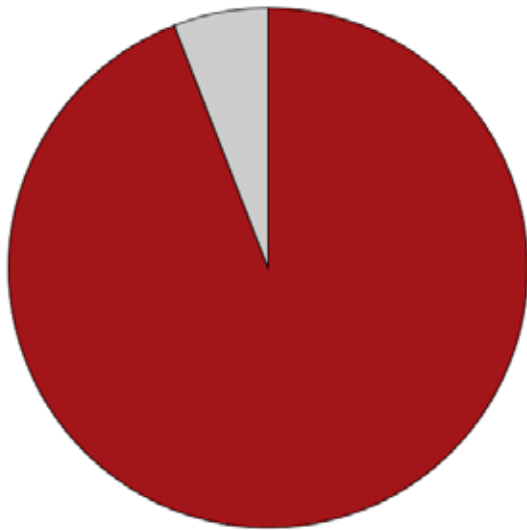
Legend:
- higher at the end
- same
- lower at the end

Is Stress higher or lower at the end of a voyage?

- higher at the end
- same
- lower at the end
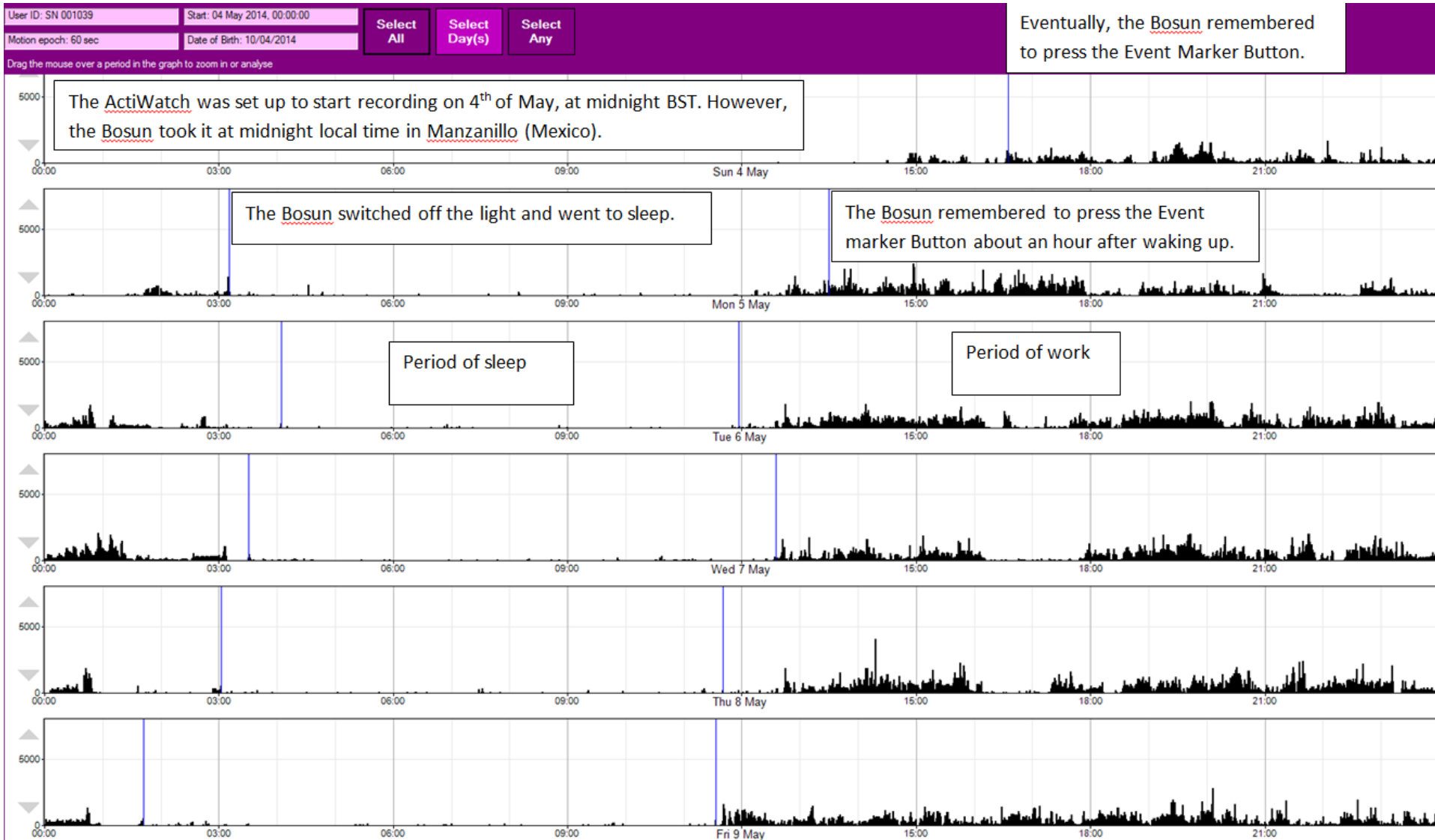
48.60%
41.12%
10.28%

Sleepiness and Fatigue:
High levels of sleepiness at all times and increasing fatigue

Actigraphy and Amount of Sleep

Example of Actiwatch data:
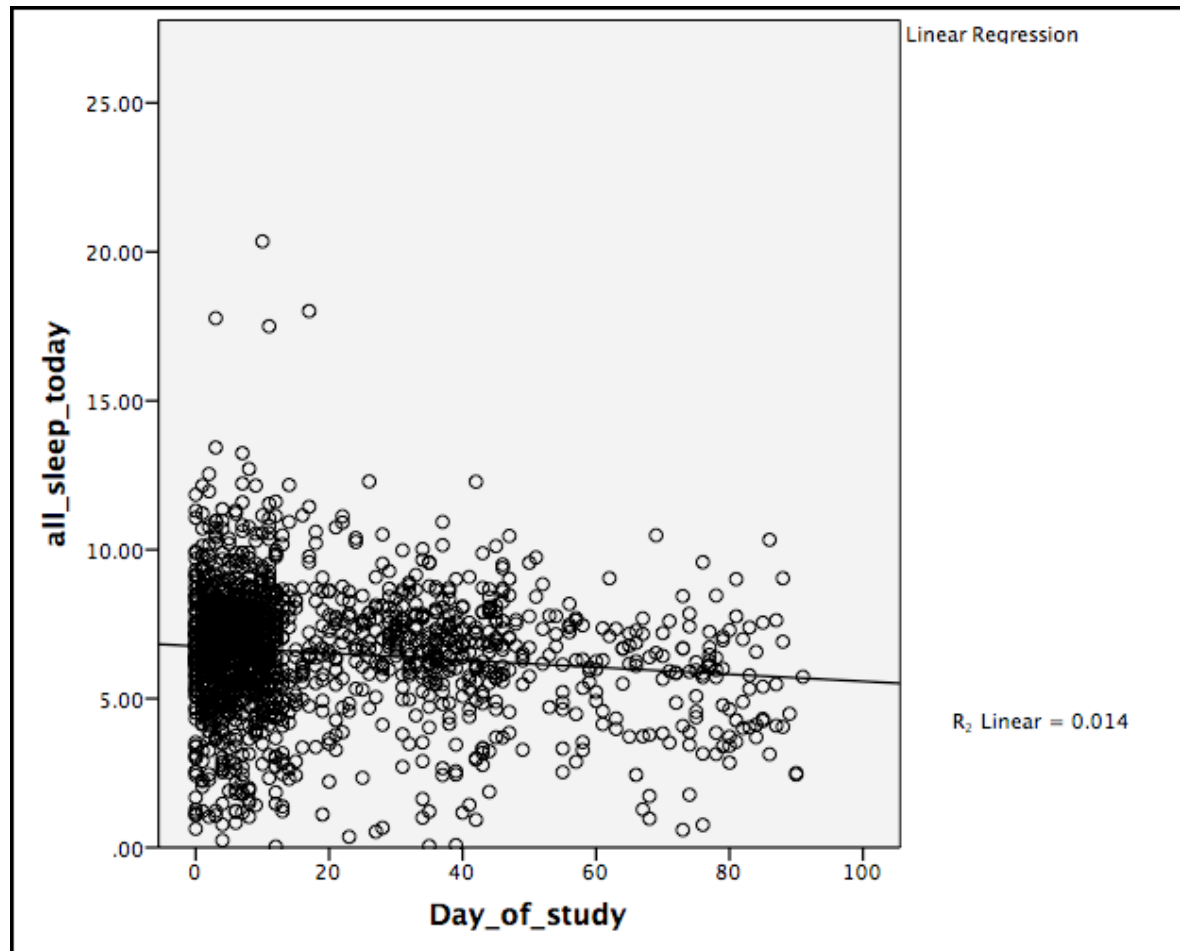# A Bosun on Day work

User ID: SN 001039 **Start:** 04 May 2014, 00:00:00
Motion epoch: 60 sec **Date of Birth:** 10/04/2014

Select All Select Day(s) Select Any

Drag the mouse over a period in the graph to zoom in or analyse

Eventually, the Bosun remembered to press the Event Marker Button.

The ActiWatch was set up to start recording on 4th of May, at midnight BST. However, the Bosun took it at midnight local time in Manzanillo (Mexico).

The Bosun switched off the light and went to sleep.

The Bosun remembered to press the Event marker Button about an hour after waking up.

Period of sleep

Period of work

Sun 4 May
Mon 5 May
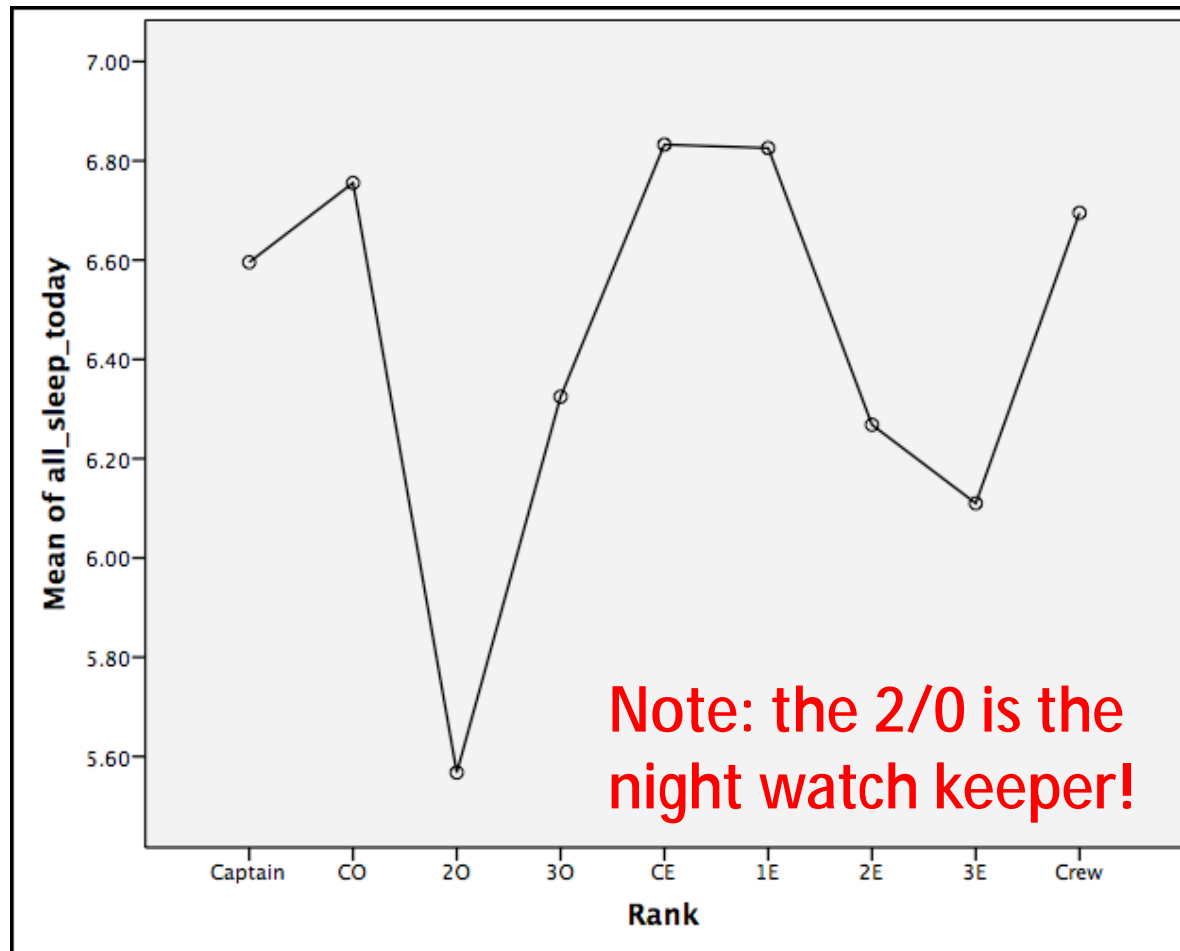Tue 6 May
Wed 7 May
Thu 8 May
Fri 9 May

Actigraphy:
Example of a Master – disturbed sleep?

Amount of Sleep over the Voyage

Average Amount of Sleep by Rank

Note: the 2/O is the night watch keeper!
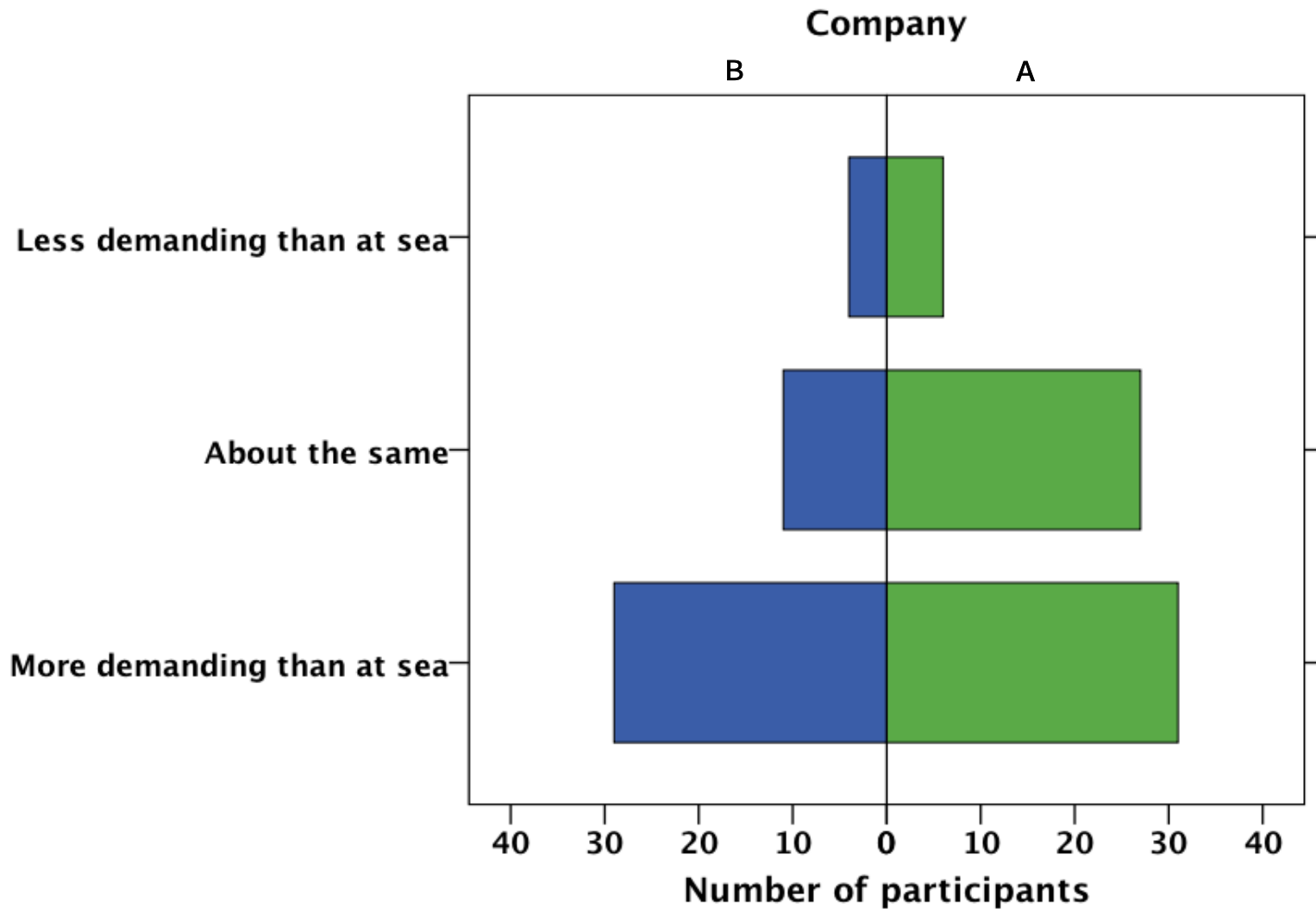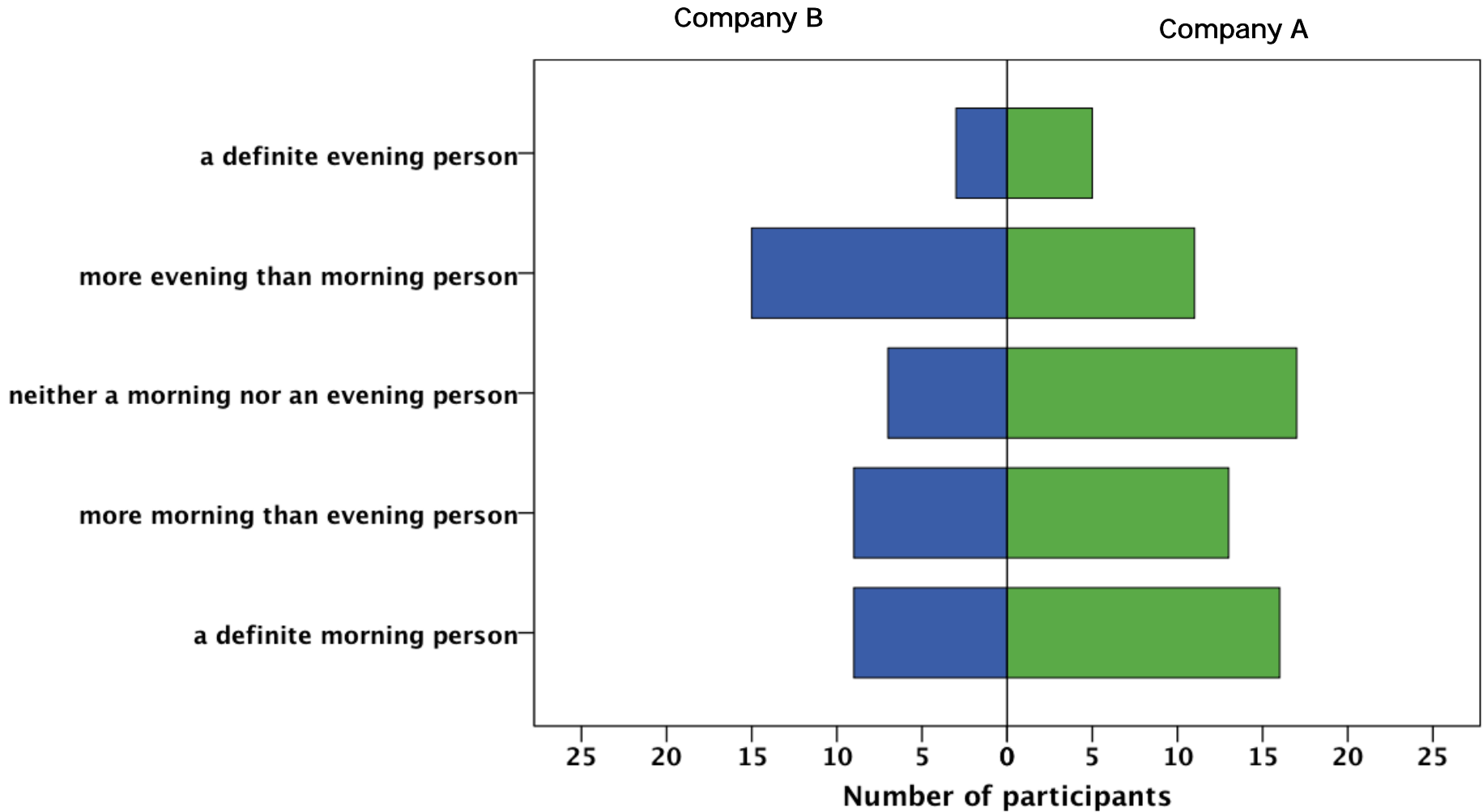
Weekly working hours (overtime not included)
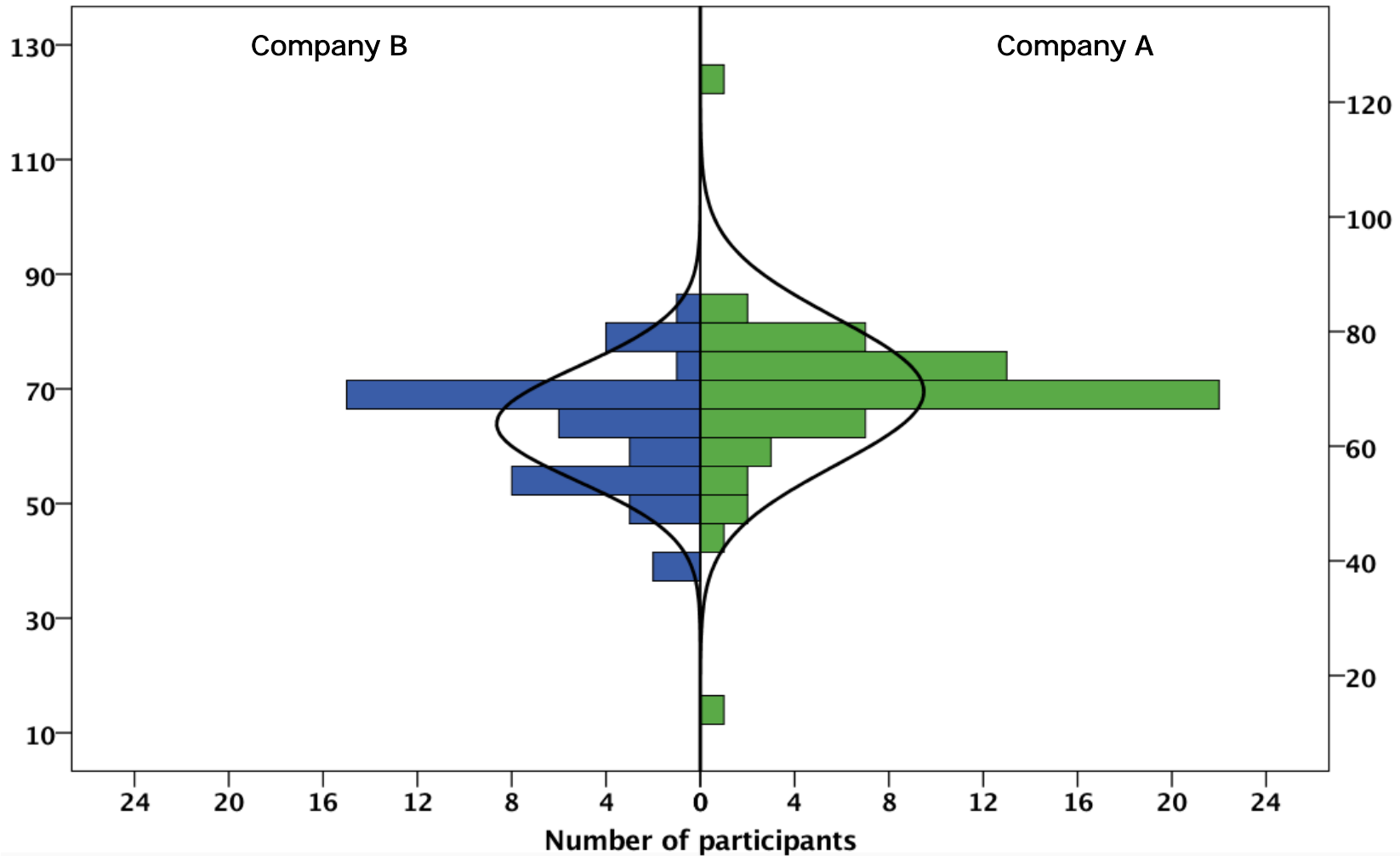
Workload whilst in port

Circadian type

Regulatory Options to Mitigate Fatigue Risk:

- "Hours of rest" – STCW and MLC

- Prescriptive

- Negotiated Contract

- Compliance culture: minimum standards

- Inflexible

- Provides certainty

- PSC Inspection and audit

- FRMS within the IMO revised guidelines on fatigue

- Non-mandatory (as part of SMS)

- "Goal-based" systems approach -

- "Data driven" – science based

- "Best practice" - flexible

- Custom-built to own company – not "one-size fits all"

- Maturity model ladder

Three Core Elements of FRMS

1 Fatigue Awareness training and <u>cultural change</u> programmes;

2 Fatigue reporting system within a <u>just culture</u>;

3 "Data-driven" <u>analysis</u> for fatigue risk assessment, workload management and monitoring adequate sleep*

*Tools may include subjective reporting, actigraphy, and fatigue prediction models

Thank you!

If you have any questions about this presentation, please contact Capt. Kuba Szymanski

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