Alert at work

Active Fatigue Management: Practical Countermeasures for Transport

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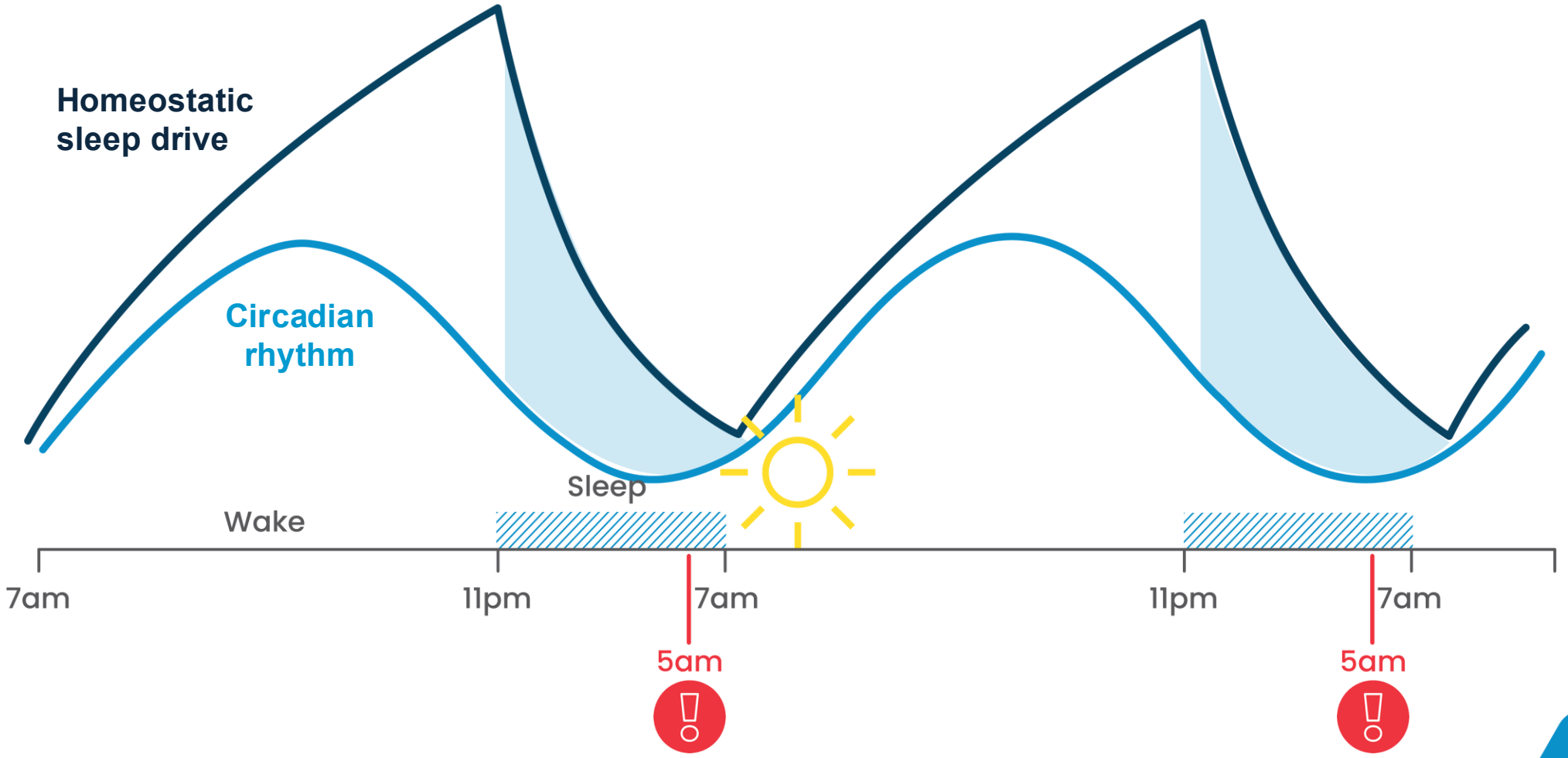
Biology of fatigue



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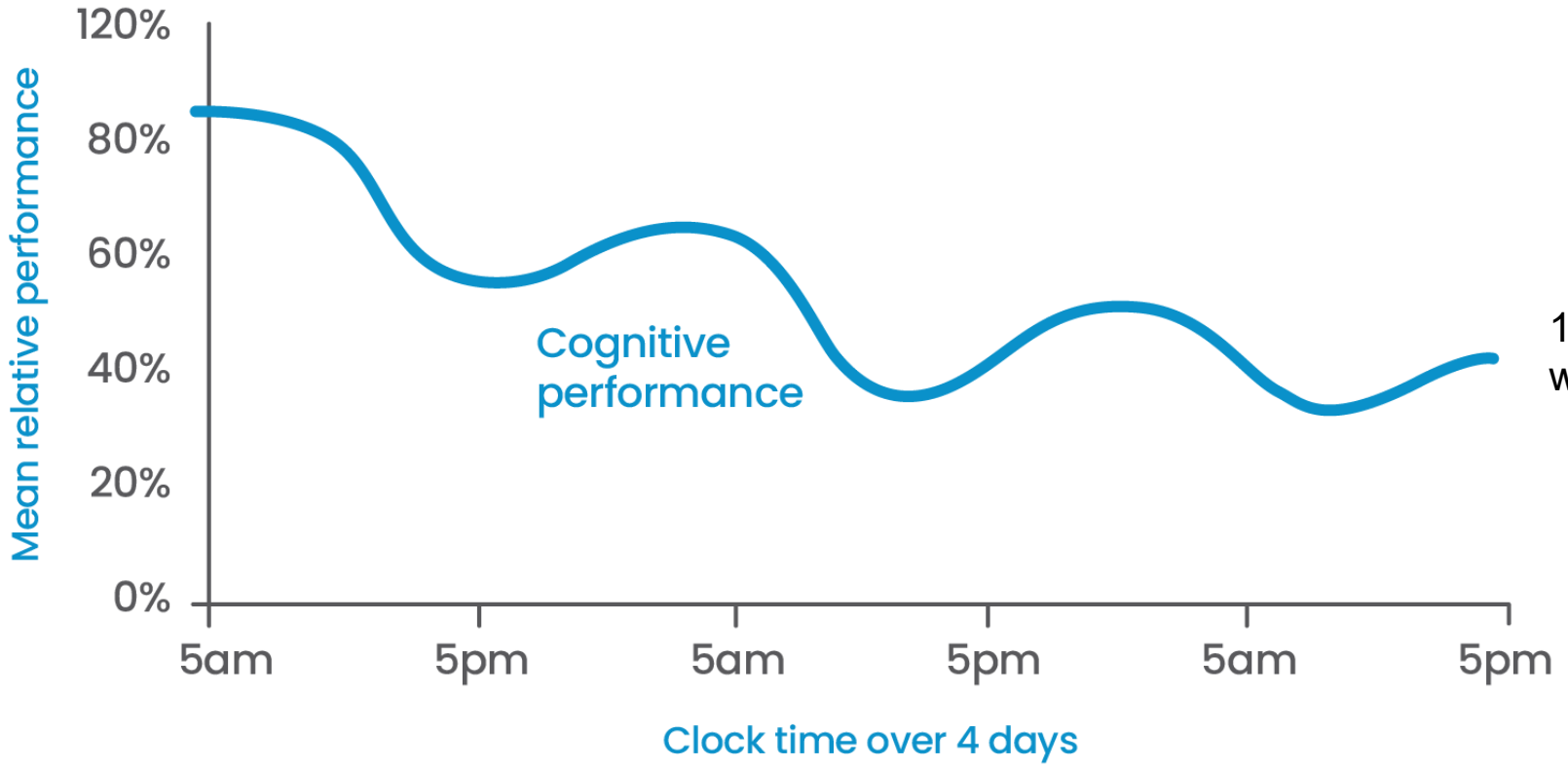
Combined Impact of Sleep Loss & Circadian Rhythm



100 hours of extended wakefulness and restricted sleep

Source: Lamond & Dawson (1999), Journal of Sleep Research

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Stages of sleep

NREM 1
(Lightest Sleep)

- Heart rate and breathing slows down
- Muscles begin to relax
- Woken up like you did not sleep at all
- Hypnic jerks

NREM 2
(Light Sleep)

- Heart rate and breathing slows down further
- Body temperature drops
- Brain produces sleep spindles – memory consolidation

NREM 3
(Deep Sleep)

- Sleep Inertia
- Critical for restorative sleep – allowing the body recovery and growth
- Strengthens immune system

REM
(Dream Sleep)

- Breathing and heart rate picks up
- Provides “emotional first aid”
- Vivid dreams
- Atonia

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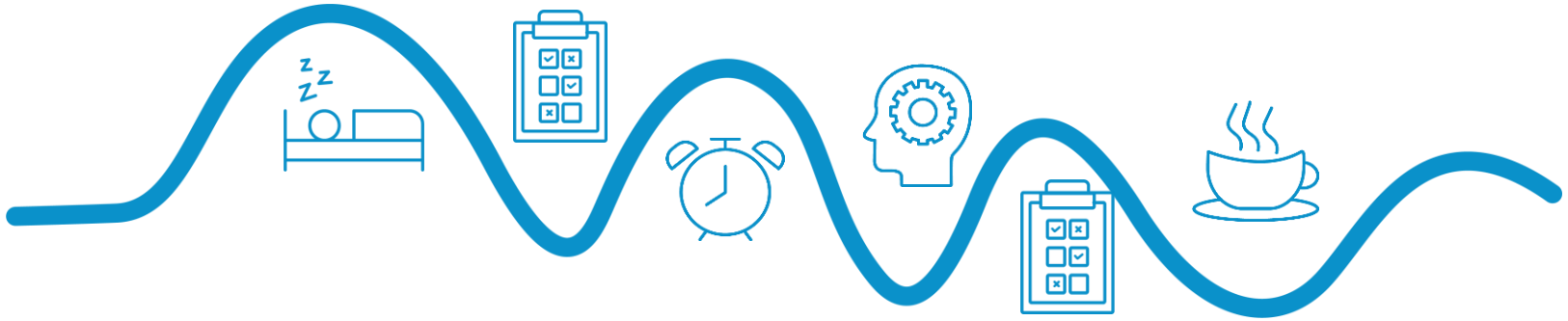
Why active fatigue management matters

Traditional thinking: linear fatigue model

Real-world fatigue fluctuation



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Why active fatigue management matters

Fatigue fluctuates from moment to moment, and is affected by:

Time of day (circadian rhythm)

Sleep quality and duration

Stimulation or stress levels

Task type, workload and environments

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Not all fatigue is the same

Understanding the two main types:

Sleep-related fatigue

Caused by insufficient or poor-quality sleep

Circadian disruption

Untreated sleep disorders

Task-related fatigue

Caused by prolonged concentration

Monotony

High workload

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Signs of fatigue

- Daydreaming, wandering or disconnected thoughts, memory loss
- Restlessness, poor concentration, slow reactions, boredom
- Making fewer or larger steering corrections
- The speed you drive at creeps up or down
- Blinking frequently
- Drowsiness
- Decreased tolerance to others (road rage)

Common effects of fatigue

Cognitive Performance

Work Performance

Safety Performance

Health Consequences

Economic Consequences

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Sleep-related fatigue countermeasures

Use these when true sleepiness occurs:

- **Caffeine:** 1 cup of coffee or energy drink for 2–3 hours of alertness (avoid within 6 hours of bedtime)
- **Short nap:** 10–26 minutes followed by a few minutes to wake fully
- **Sleep extension:** Add 1–2 hours before a long or night shift
- **Split sleep:** Two shorter sleeps (e.g., 5h + 2h) across 24 hours
- **Sleep hygiene:** Dark, cool, quiet environment; consistent routine
- **Medical treatment:** Seek assessment for sleep apnea, insomnia, or restless leg

Task-related fatigue countermeasures

Aim to re-stimulate attention and vary activity:

- **Change activity:** Swap tasks, adjust route, or tidy cab to re-engage focus
- **Physical activity:** Short bursts of movement increase blood flow
- **Hydration and nutrition:** Drink water and eat light, avoid heavy meals
- **Cab conditions:** Cool air, fresh ventilation, or bright lighting
- **Social interaction:** Chat with dispatch or family/friends - avoid isolation
- **Mental stimulation:** Play engaging (not relaxing) audio, podcasts, quiz show etc.