Firefighter Shift Schedule Analysis

Compiled and prepared by Alex Zielinski for training and outreach purposes – December 2025

This guide is intended to help the fire service evaluate shift schedules using both research evidence and practitioner perspectives.

Executive Summary

The 24/72 shift schedule (24 hours on, 72 hours off) is the healthiest and safest option for firefighters. It prevents fatigue stacking, protects circadian rhythms, reduces injury risk, and supports family/work balance. Evidence from sleep science, operational data, and case studies consistently shows that 48/96 schedules carry higher risks of injury, burnout, and hidden costs. If 24/72 is not feasible, 24/48 is a safer fallback (Billings & Jahnke, 2025; Jahnke, 2025).

1. Scientific Evidence

Chronic sleep deprivation impairs cognition, increases risks for cardiovascular health, and and can cause hormonal balance (NIJ, 2011; National Policing Institute, 2011). Consecutive 24-hour shifts compound sleep debt and disrupt circadian rhythms (Billings & Jahnke, 2025). Studies in policing and healthcare confirm longer shifts increase errors and accidents (Police1.com, 2020).

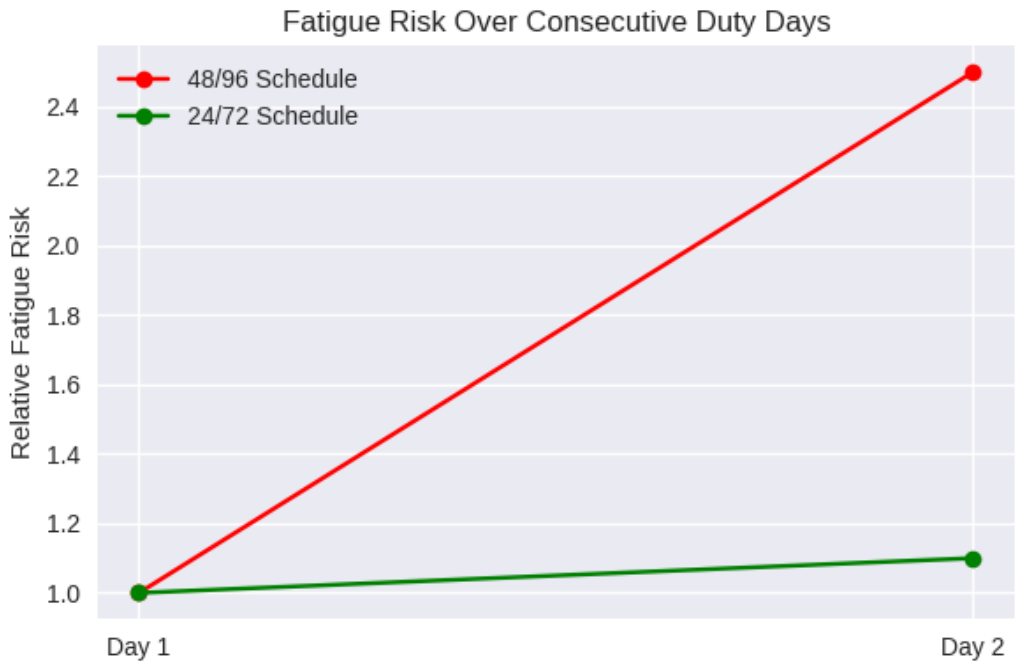

Figure 1. Sleep Debt Accumulation Curve — Sleep debt increases sharply under consecutive 48-hour shifts, while 24/72 and 24/48 schedules allow recovery and maintain more stable fatigue

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levels.

2. Fatigue and Injury Risk

- **Second-Day Hazard:** Injuries peak on the second day of 48-hour shifts due to cumulative fatigue (Jahnke, 2025; Clack, 2003).
- **Project Mayday Data:** Most firefighter maydays occur in the final 12 hours of 48-hour shifts (Project Mayday, 2023).
- **Performance Decline:** Fatigue impairs judgment and reaction time, with effects comparable to alcohol intoxication (Jahnke, 2025).

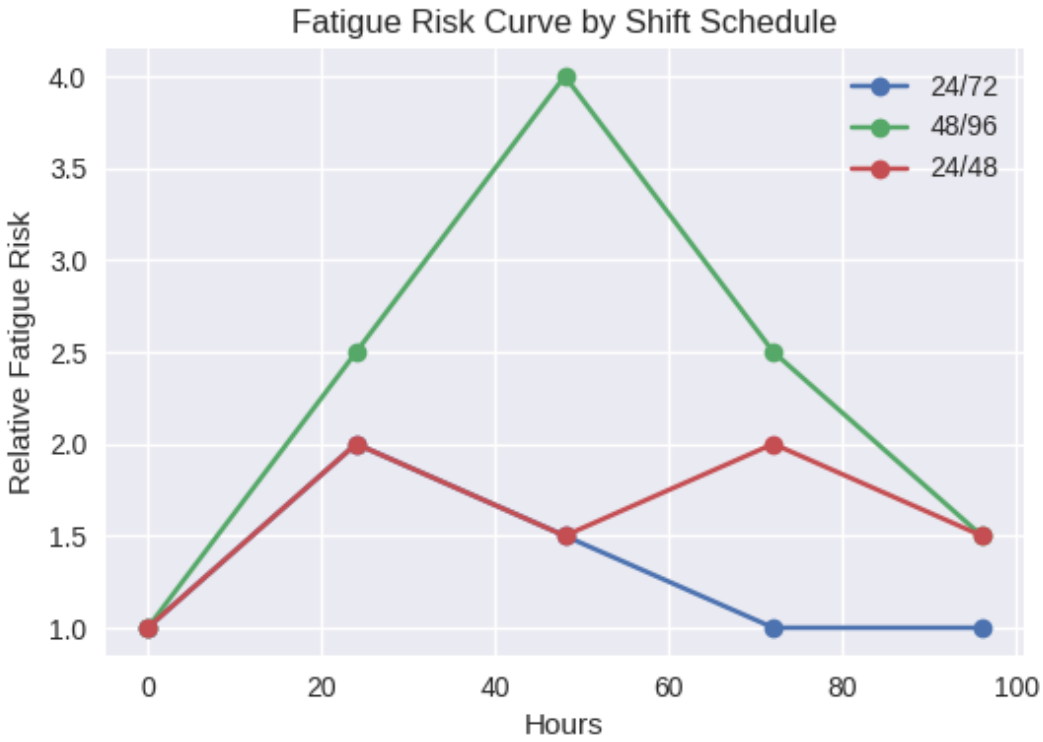

Figure 2. Fatigue Risk Curve by Shift Schedule — Fatigue risk spikes dramatically on the second day of 48/96 schedules. 24/72 and 24/48 schedules keep fatigue risk stable across cycles.

3. Operational Outcomes

Departments using 48/96 report higher injury rates, sick leave, and near-miss incidents (Clack, 2003). Agencies that transitioned to 24/72 report improved morale, reduced fatigue, fewer

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injuries, and better retention (Geering, Behind the Shield Podcast; NIOSH, 2019).

4. Family and Work-Life Balance

The 24/72 schedule provides a predictable rhythm that supports family life and psychological recovery. Longer recovery periods reduce burnout and enhance job satisfaction (Billings & Jahnke, 2025).

5. Cost vs. Safety

While 48/96 appears cost-effective, it leads to higher hidden costs from injuries, burnout, and turnover (Clack, 2003). 24/72 requires a fourth platoon (shift) but sees improvements in reduced liability, better health outcomes, and improved performance (Billings & Jahnke, 2025).

Backup Option: If 24/72 is not feasible, 24/48 is safer than 48/96, avoiding consecutive-day fatigue (NASEMSO, 2021).

6. Fatigue Risk and Napping (NASEMSO Insights)

- 24/48 without naps = HIGH RISK; with naps = MINIMAL RISK.
- 48/96 without naps = HIGH RISK; with naps = LOW RISK.
- Napping reduces but does not eliminate the risks of extended shifts (NASEMSO, 2021).

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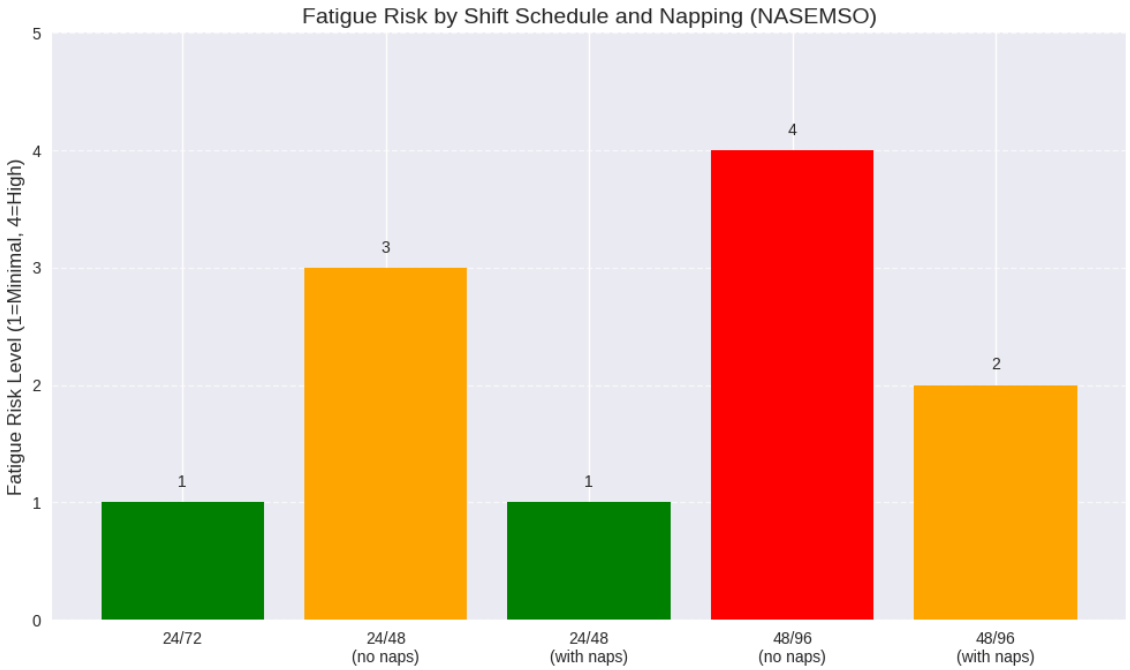

Figure 3. NASEMSO Fatigue Analyzer Results — Comparative fatigue risk levels with and without napping. Even with naps, 48/96 remains higher risk than 24/48 or 24/72, underscoring the importance of minimizing consecutive duty exposure.

References

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