Excerpts From *Fatigue: Sleep Management During Disasters*
by Robert J. Koester

"Changes in mental alertness can play an important role in any incident. Surprisingly, the rhythm in alertness is not directly linked to the sleep/wake cycle. In sleep-deprived rescuers, the alertness rhythm becomes more pronounced. The minimum occurs around 0800, which is when the greatest number of sleep-related accidents occur. After 0800, alertness increases until 1600–1800, with a sharp drop after 2200. While activity that requires only a burst of concentration is relatively immune from circadian rhythms, vigilance types of tasks (long delays or driving) are significantly affected."

"However, researchers prefer a test known as the Mean Sleep Latency Test (MSLT). This test measures how long it takes the subject to fall asleep in a 7-minute time period. The quicker they fall asleep, the more sleepy the subject. This test is usually used in a laboratory stetting that is quiet, has the patient lying down, and the subject is monitored to determine the precise moment they fall asleep. Subjects are often told whether to try to sleep or to resist falling asleep. Tired subjects, even when attempting to resist sleep, usually fall asleep during the 7-minute time span. … The MSLT test is not ideal, since it only measures sleepiness at that particular point in time; however, it offers a potential tool for a Safety Officer. Departing members are simply asked to lie down for 7 minutes prior to departure. If the searcher falls asleep, they are left sleeping for 30 minutes or longer. If they get up after the 7 minutes, they are free to leave."

"A strong relationship between sleepiness and accidents has always existed. Several major industrial accidents have occurred because of shift workers at the circadian minimum late at night. Three Mile Island (0400), Chernobyl (0135), Challenger (0800 with mission control up all night) are noted examples. The graph for tired driving accidents is identical to the circadian rhythm for mental alertness. Most sleep-related accidents occur at 0800 and the safest time to drive is between 1600 and 1800. It is estimated that between 2.5% and 16% of motor vehicle accidents are sleep related. This would account for 1,255 to 6,000 fatalities; 45,000 to 220,400 injuries; and 1.75 to 11 billion dollars a year."

"Searchers familiar with lost civil airplane crashes recognize pilots who fly into bad weather. A common cause of poor judgment is a strong desire to reach the final destination. Pushing safety limits to reach home also occurs among searchers. After 16 hours awake (the end of a typical day), loss of reaction time in a simulator is the same as someone who is at 0.05% blood alcohol content. In many regards, driving home fatigued should be viewed the same as driving home drunk. To avoid the problem, the most important mitigation step is to figure in sleep time as part of on-scene time."

Notes on Naps:

- Naps may be the most effective method to increase performance during continuous operations, and can be used before a period of expected sleep deprivation.
- The highly restorative power of a 2-hour nap is clearly proven. The longer the nap, the greater its effectiveness.
- However, naps have a side effect known as sleep inertia or sleep drunkenness. For a short period of time (usually just a couple of minutes), the napper awakens in a state of confusion and performance is worse than no nap at all. Sleep inertia is best corrected by simply walking around for 5–10 minutes after taking a nap.

Accurately judging the sleepiness of a responder is impossible, but several questions can provide revealing information for the Safety Officer, or subtly encourage the responder to nap before driving.

Safety Officer Sleep-Related Questions

- How many hours has it been since you last slept?
- How long did you sleep?
- How long is your drive home?
- Is anyone going to be with you?
- How are you feeling now?
- Do you promise to pull over and take a nap if you become sleepy?

Standard Firefighting Orders

1. **Keep informed regarding weather conditions and forecasts at the site of the fire.**

2. **Know what your fire is doing at all times.**

3. **Base all actions on the current and expected behavior of the fire.**

4. **Identify escape routes and safety zones, and make them known.**

5. **Post lookouts when there is possible danger.**

6. **Be alert. Keep calm. Think clearly. Act decisively.**

7. **Maintain prompt communications with your forces, your Supervisor, and adjoining forces.**

8. **Give clear instructions and ensure that they are understood.**

9. **Maintain control of your forces at all times.**

10. **Fight fire aggressively, having provided for safety first.**

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Watch Out Situations

1. Fire not scouted and sized up.
2. In country not seen in daylight.
3. Safety zones and escape routes not identified.
4. Unfamiliar with weather and local factors influencing fire behavior.
5. Uninformed regarding strategy, tactics, and hazards.
6. Instructions and assignments not clear.
7. No communications link with crew members or Supervisor.
8. Constructing line without safe anchor point.
9. Building fire line downhill with fire below.
10. Attempting frontal assault on fire.
11. Unburned fuel between you and fire.
12. Cannot see main fire, not in contact with someone who can.
13. On a hillside where rolling material can ignite fuel below.
14. Weather becoming hotter and drier.
15. Wind increases and/or changes direction.
16. Getting frequent spot fires across line.
17. Terrain and fuels make escape to safety zones difficult.
18. Taking nap near fire line.

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