

Testimony

Delivered to the

*House Committee on Transportation and Infrastructure
Subcommittee on
Railroads, Pipelines, and Hazardous Materials*

Fatigue in the Railroad Industry

Professor Patrick Sherry

National Center for Intermodal Transportation
Intermodal Transportation Institute

Fatigue in the U.S. Railroad Industry

**Professor Patrick Sherry, Ph.D.
Professor, Intermodal Transportation Institute
Co-Director, National Center for Intermodal Transportation
University of Denver
&
Mississippi State University**

February 13, 2007

Good Afternoon Congresswoman Brown, Representative Oberstar, and other committee members. It is my pleasure to have the privilege of testifying before the committee once again on this important topic. As you may recall I testified before the committee in August on the topic of intermodal transportation. The two topics are actually related. The U.S. railroad system and its intermodal operations are the envy of every major economy in the world because of its capacity, efficiency, and profitability. One of the reasons for its competitiveness and efficiency is the fact it is operated in a very flexible manner allocating resources and equipment in a very effective fashion. Ensuring the safe and efficient movement of goods is key to our nations' economic security and viability.

It is my pleasure to testify on this topic because I believe that fatigue is a complex issue affecting thousands of railroad employees everyday. This issue is complicated by the fact that it is the result of complex biology and physiology of the circadian rhythms, as well as compounded by the operational and economic issues affecting railroads. The Human Factors Coordinating Committee of the U. S. Department of Transportation (USDOT, 1999) defined fatigue as "a complex state characterized by a lack of alertness and reduced mental and physical performance, often accompanied by drowsiness". Generally, fatigue in the railroad industry indicates that an individual suffers a loss of alertness, a loss of mental or cognitive capacity, and self-reports sleepiness. For the railroad workers, these issues also include the more practical concerns of pay, time away from home, and other quality of life issues.

In the few minutes I have I want to impress upon the committee three crucial points:

1. First, simply changing the hours of service law, such as decreasing on-duty hours or lengthening time off, will not necessarily reduce fatigue and may make it worse in some cases.
2. Second, in order to fully address the fatigue issue railroads should be required to establish fatigue countermeasures plans evaluated by an independent scientific panel that include an accountability mechanism.
3. Third, making available additional research dollars to a consortium of research universities for the continued study of fatigue countermeasures and measurement tools calibrated to everyday operational criteria will expedite the successful management of fatigue in the railroad industry.

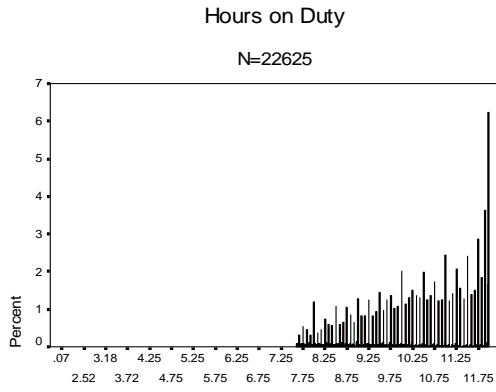
Variability in Operations and Conditions

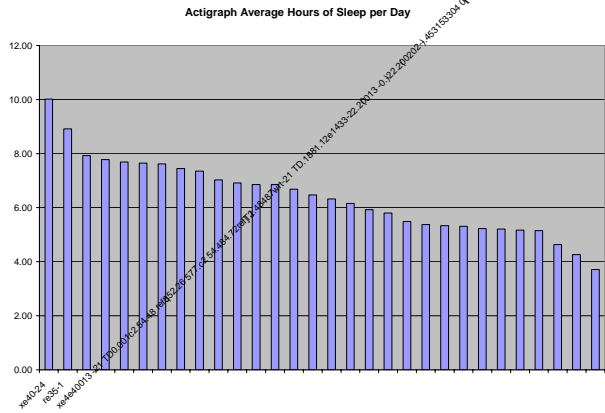
Beginning in the mid- 1990s I engaged in a number of studies for the railroads, the FRA, and the labor organizations to examine fatigue and to identify effective countermeasures that can be used to manage it. Over the past 12 years we have conducted over a dozen studies in which over 3,500 railroad employees have completed fatigue surveys. In addition to survey completion, many of these same employees have also kept sleep logs, worn actigraphs, and participated in interviews and focus groups. We have looked at a number of different scheduling programs such as time windows, 8 hours on and 3 hours off, 7 hours on and 3 hours off, 10 hours on and 5 hours off, etc. In a number of these instances (described in greater detail in my book Managing Fatigue in the Railroad Industry - a pre-publication draft is available for the committee's review) fatigue was reduced or mitigated and in many cases satisfaction with quality of life was improved. I want to publicly thank the many engineers, conductors, brakemen and dispatchers and their managers who took the time to help us understand the complexities of this important issue. Their support helped us determine that there is no one single approach that is going to solve the problem and eliminate the risk of fatigue.

Many of these pilot programs are no longer in existence due to the fact that they were single problem solutions. They addressed scheduling, quality of life, or line-up concerns but failed to fully address fatigue, operational, compensation, or other issues. Nevertheless, some of the lessons learned from the pilots have made it into existing

practice. For example, the BNSF has developed the 7-3 overlay, the NS has greatly increased the number of scheduled work assignments, the CSX has a very large number of assigned days off, and the CN/IC has developed the meet- and return or mid-route crew change approach. But, none of these programs fully or completely manages the fatigue issues faced in the railroad operating environment. In some cases these approaches are too voluntary and can be circumvented by clauses in the contracts and in others the problem is simply transferred to the extraboard. The lessons learned are that in order to fully manage fatigue a comprehensive plan must be developed that includes all aspects of the operation and all members of the work group.







rest but that even with the opportunity to book up to 10 hours undisturbed rest there were still occasions when the individual did not obtain an adequate amount of sleep.

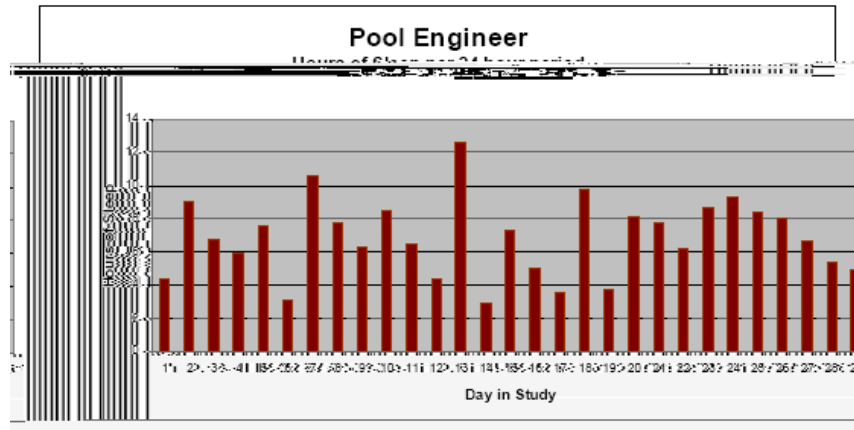


Figure 6. Daily Hours of Sleep for Pool Engineer.

Again, this is likely due to the time of day that the person tried to sleep and the influence of the circadian rhythms.

This pattern of results also points up the phenomenon of sleep debt which occurs when an individual obtains less than 7-8 hours of sleep per night over consecutive nights. The best research available suggests that a person’s reaction time decreases as the sleep debt builds. Persons in this study appeared to have accumulated a sleep debt due to working on less than 5 hours of sleep more than 50% of the time. Therefore, efforts to reduce sleep debt through the use of fatigue countermeasures plans would be the most desirable approach.

Fatigue Management Plans

Most fatigue experts agree that a non-prescriptive approach is the most desirable

The overriding principle that should guide decisions in this area is the need to address, not just the number of hours worked, but the number of hours off between duty periods. Such rest hours will facilitate adequate rest for recovery.

Efforts should be made to reduce consecu

knowledge. While some changes or alterations to the existing hours of service would make some specific improvements a mechanism for addressing the overall risk of working fatigued would not have been addressed.

I would like to thank the committee for inviting me to testify on this very important topic.