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OCCUPATIONAL HEALTH AND SAFETY OF DRIVERS: THE CAUSES OF FATIGUE AND SLEEP DEPRIVATION

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Fatigue and sleep deprivation are common problems for truck drivers of Ukraine. Many long-haul truck drivers face chronic partial sleep deprivation. Scientists studied eighty long-haul drivers over a five-day period, finding that their electrophysiologically verified sleep averaged only 4.8 hours per day – and only 3.8 hours of sleep per day for those drivers on a steady night schedule.

While research on fatigue has emphasized long-haul drivers, fatigue also affects local/short haul truck drivers. Researchers monitored 42 local/short haul drivers for approximately two weeks each with video cameras and sensors, finding evidence of driver fatigue such as driving for periods with eyes 80-100 % closed.

What causes driver fatigue? Researchers identified three aspects of working arrangements that determine fatigue:

- (1) the length of continuous work spells and daily duty periods;
- (2) the lengths of time away from work that are available for rest and for continuous sleep;
- (3) the arrangement of duty, rest, and sleep periods within the 24-h cycle of daylight and darkness, which normally entrains individuals' circadian rhythms.

Truck drivers are particularly at risk for fatigue because their work schedules are irregular and beyond the driver's personal control; their sleep breaks often occur during the day when conditions are not favorable for sleep; they experience stresses in the truck cab such as heat, noise, and vibration; and they continue working even when fatigued in order to reach their destination.

The schedule pressures often induced truck drivers to violate regulations or speed limits, particularly for drivers who were driving solo, had long trip distances, or refrigerated loads.

Researchers have several studies on work schedules, sleep, and fatigue. An study showed that ships' engineers who worried about being awakened while they were on call did not sleep well. Truck drivers are commonly in this situation, having sleep breaks while awaiting telephone notification at an unpredictable time informing them of the availability of their next load.

The strongest correlates of fatigue were nightwork, a long time awake, and backwards rotation of shifts; day sleep and early shift starting times had weaker correlations with fatigue. A study by researchers noted the importance of circadian principles in designing work schedules. They studied 85 industrial shift workers who initially had a weekly backward shift rotation (an 8-hour phase advance, in which workers' start times rotate from day to night to afternoon). Workers were happier, and

their productivity was higher, when their shift rotation was changed to a forward rotation (an 8-hour phase delay, in which workers' start times rotate from day to afternoon to night) once every 21 days. The problem was identified with slow rotation (such as every 21 days) or steady night shifts: workers revert from a nocturnal schedule to a diurnal schedule during the weekend in order to spend time with family and friends, undermining the adaptation to night work.

This irregular nature of driver work/rest cycles presents an additional systemic problem. Truck drivers often must work or attempt to sleep at an inappropriate circadian phase. If a person's work/rest cycle is synchronized with the solar day, the endogenous circadian signal helps the individual maintain alertness for a full 16 hours. In the early evening homeostatic sleep pressure – the need for restorative sleep after a long time awake – begins to build, and eventually helps the individual fall asleep. At 3 AM, after the first few hours of sleep have relieved the homeostatic pressure, the circadian signal helps the individual stay asleep. Similarly, if a person whose circadian clock has been entrained to the solar day tries to work all night, homeostatic pressure and the circadian signal will combine to make him or her sleepy.

There is a need for further study regarding how much sleep truck drivers actually get.