



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Research and Engineering
Washington, DC

Medical Factual Report

April 9, 2019

Nicholas Webster, MD, MPH
Medical Officer

A. ACCIDENT: HWY18FH015 - Boise, Idaho

Location: Eastbound Interstate 84 (I-84) in the vicinity of post mile marker 47, near Boise Idaho
Vehicle #1: 2003 Volvo tractor in combination with a 2008 Great Dane trailer
Operator #1: Zhuk Express LLC USDOT # 2888227.
Vehicle #2: 2009 Jeep Wrangler
Operator #2: Private
Vehicle #3: 2019 Volvo tractor in combination with a 2015 Great Dane trailer
Operator #3: Krujex Freight Transport Corp USDOT # 2314662
Vehicle #4-7: 4 Private Vehicles
Date: June 16, 2018
Time: Approximately 11:32 pm. Mountain Daylight Time (MDT)
Transported: 3 Occupants of other vehicles
Fatalities: 3 Jeep Occupants, 1 Truck Driver Vehicle 3

B. GROUP IDENTIFICATION

No group was formed for the medical evaluation in this accident.

C. RELEVANT REGULATION AND MEDICAL GUIDANCE

Title 49 *Code of Federal Regulations* (CFR) Section 391.41 covers driver physical qualifications; interstate drivers of commercial vehicles must undergo routine medical evaluation and certification using forms available from 49 CFR Section 391.43 which include questions about previous medical conditions, current conditions, medications, a physical examination including vital signs, vision testing, and urine dip testing.

Obstructive Sleep Apnea

Obstructive sleep apnea (OSA) occurs when the musculature of the airway relaxes during sleep and obstructs the flow of air into and out of the body during sleep. When carbon dioxide levels in the blood rise as a result, the person arouses from sleep, often gasping. When repeated, these arousals interfere with normal sleep architecture and lead to fatigue.¹ Based on high quality medical evidence, male gender, age, obesity, hypertension, neck circumference, hip circumference, and episodes of nocturnal gasping are all risk factors for obstructive sleep apnea (OSA).^{2,3,4,5,6} The relationship with obesity is particularly strong; forty to ninety percent of individuals with a body mass index (BMI) above 40 kg/m² are reported have moderate to severe sleep apnea.⁷ A 2002 study conducted by the University of Pennsylvania that was sponsored by FMCSA and the American Transportation Research Institute of the American Trucking Associations found that 28 percent of commercial truck drivers had some degree of sleep apnea.⁸

Individuals with untreated obstructive sleep apnea are at significantly increased risk of motor vehicle crashes and other occupational injuries.^{9,10,11} A task force created by the American Academy of Sleep Medicine developed a Clinical Guideline for the Evaluation, Management, and Long Term Care of Obstructive Sleep Apnea in Adults which was published in 2009.¹² The task force reached consensus that patients with obesity, congestive heart failure, atrial fibrillation, treatment refractory hypertension, type 2

¹ An apneic episode is the complete absence of airflow through the mouth and nose for at least 10 seconds. A hypopnea episode is when airflow decreases by 50 percent for at least 10 seconds or decreases by 30 percent if there is an associated decrease in the oxygen saturation or an arousal from sleep. The apnea-hypopnea index (AHI) sums the frequency of both types of episodes per hour. An AHI of less than 5 is considered normal. An AHI of 5-15 is mild; 15-30 is moderate and more than 30 events per hour is considered severe sleep apnea.

² Peppard PE, Young T, Barnet JH, Palta M, Hagen EW, Hla KM. Increased prevalence of sleep-disordered breathing in adults. *Am J Epidemiol.* 2013;177(9):1006-14.

³ Seidell JC. Waist circumference and waist/hip ratio in relation to all-cause mortality, cancer and sleep apnea. *Eur J Clin Nutr.* 2010;64(1):35-41.

⁴ Young T, Shahar E, Nieto FJ, Redline S, Newman AB, Gottlieb DJ, Walsleben JA, Finn L, Enright P, Samet JM; Sleep Heart Health Study Research Group. Predictors of sleep-disordered breathing in community-dwelling adults: the Sleep Heart Health Study. *Arch Intern Med.* 2002;162(8):893-900.

⁵ Olson LG, King MT, Hensley MJ, Saunders NA. A Community Study of Snoring and Sleep-disordered Breathing Prevalence. *Am J Respir Crit Care Med* 1995;152:711-6.

⁶ Young T, Skatrud J, Peppard PE. Risk factors for obstructive sleep apnea in adults. *JAMA.* 2004;291(16):2013-6.

⁷ Alan R. Schwartz, Susheel P. Patil, Alison M. Laffan, Vsevolod Polotsky, Hartmut Schneider, Philip L. Smith Obesity and Obstructive Sleep Apnea: Pathogenic Mechanisms and Therapeutic Approaches. *Proc Am Thorac Soc.* 2008; 5(2): 185–192.

⁸ Pack AI, Dinges DF, & Maislin G. (2002). A study of prevalence of sleep apnea among commercial truck drivers (Report No. DOT-RT-02-030). Washington, DC: U.S. Department of Transportation, FMCSA.

⁹ A.T. Mulgrew, G. Nasvadi, A. Butt et al. Risk and severity of motor vehicle crashes in patients with obstructive sleep apnoea/hypopnea. *Thorax.* 2008; 63(6):536–541.

¹⁰ E. Lindberg, N. Carter, T. Gislason et al. Role of snoring and daytime sleepiness in occupational accidents. *Am J Respir Crit Care Med.* 2001;164 (11): 2031–2035.

¹¹ Basoglu OK, Tasbakan MS. Elevated risk of sleepiness-related motor vehicle accidents in patients with obstructive sleep apnea syndrome: a case-control study. *Traffic Inj Prev.* 2014;15(5):470-6.

¹² Adult Obstructive Sleep Apnea Task Force of the American Academy of Sleep Medicine. Clinical Guideline for the Evaluation, Management, and Long Term Care of Obstructive Sleep Apnea in Adults. *J Clin Sleep Med.* 2009;5(3): 263-276.

diabetes, stroke, nocturnal dysrhythmias, pulmonary hypertension, those who were members of high-risk driving populations (such as commercial truck drivers), and those being evaluated for bariatric surgery were either at increased risk of having OSA, having serious complications of OSA, or having undiagnosed OSA complicate their medical care. Patients with any of these conditions or situations were identified as “high risk,” suggesting increased vigilance for the diagnosis.

The FMCSA has been working to address the need to screen, diagnose, and ensure effective treatment for commercial drivers with moderate to severe OSA. Guidance suggested in 2012 led Congress to pass PL 113–45 [HR 3095] on October 15, 2013; Commercial Motor Vehicle Operator Requirements Relating to Sleep Disorders which requires any “requirement providing for the screening, testing, or treatment of individuals operating commercial motor vehicles for sleep disorders is adopted pursuant to a rulemaking proceeding.”¹³ Current guidance from FMCSA is not in the form of a requirement. However, recommendations from the FMCSA’s Medical Review Board were updated in August 2016 and include a recommendation that drivers with a BMI ≥ 40 kg/m² be further evaluated for sleep disorders. For drivers with a BMI ≥ 33 and < 40 kg/m², a formal sleep evaluation is recommended if they meet three or more additional criteria.¹⁴

D. DETAILS OF INVESTIGATION

1. Purpose

This investigation was performed to evaluate the involved drivers for medical conditions, the use of medications/illicit drugs, and the presence of toxins.

2. Methods

The CDL records autopsy and toxicology results for the striking truck driver, and the investigators reports were reviewed. No personal medical records were available for the striking truck driver. Other pertinent scientific and regulatory issues were reviewed.

Truck Driver

Commercial Driver License Medical Exams

The long forms regarding a CDL examination performed on the 42-year-old male truck driver by a Chiropractor Designated Medical Examiner on December 29, 2016 was obtained and reviewed. The driver answered “no” to all the historical question including, “sleep disorders, pauses in breathing while asleep, daytime sleepiness, [or] loud snoring.” His height was recorded as 5 feet 10 inches and his weight as 278 pounds. No neck or hip circumference was documented, and his BMI was not calculated. (The NTSB medical staff calculated the driver's BMI at the time of the exam to be 39.9 kg/m².)¹⁵ The examiner did not identify any abnormal

¹³ <https://www.congress.gov/113/plaws/publ45/PLAW-113publ45.pdf> Accessed 6/26/2017.

¹⁴ Letter to FMCSA Administrator Darling from The MOTOR CARRIER SAFETY ADVISORY COMMITTEE and MEDICAL REVIEW BOARD

<https://www.fmcsa.dot.gov/sites/fmcsa.dot.gov/files/docs/Final%20MRB%20Task%2016-01%20Letter%20Report%20from%20MCSAC%20and%20MRB.docx> Accessed 6/26/2017.

¹⁵ National Institute for Health, National Heart, Lung, and Blood Institute, Body Mass Index Calculator https://www.nhlbi.nih.gov/health/educational/lose_wt/BMI/bmicalc.htm Access 09/13/2018

findings on physical examination. His medical certificate was marked valid for 2 years.

Autopsy

The Ada County Idaho Coroner's Office autopsy report documented the cause of death for the 42 year old male truck driver was thermal injuries and inhalation of products of combustion and the manner was accident. The autopsy identified severe thermal injuries and extensive soot deposition in the upper airways. The autopsy did not identify any significant blunt traumatic injuries. Natural disease included obesity and an enlarged heart with severe atherosclerotic cardiovascular disease. The proximal left anterior descending coronary artery had 80 to 90 percent narrowing and both the right coronary and left circumflex had 20 to 30 percent narrowing of the vessel lumens. However, the general and microscopic examination heart muscle showed no evidence of recent or old ischemic changes (heart attack).

Coroners Death Investigation

The death investigation documented that the driver was from the Ukraine and had not seen a physician since 2004.

Toxicology

Toxicology testing performed as a part of the autopsy detected carboxyhemoglobin of 18% but was negative for ethanol, drugs of abuse and other tested for prescription drugs.¹⁶ Department of Transportation Postaccident toxicology testing was not performed.¹⁷

¹⁶ According to the Ada County Idaho Forensic Coordinator, The county contracts with NMS laboratory and the NMS Expanded Postmortem Blood Panel 8052B - was negative for 232 analytes.
<https://www.nmslabs.com/tests/8052B> Accessed 4/9/2019

¹⁷ Federal Motor Carrier Safety Administration (FMCSA) Drug and Alcohol Testing -
<https://www.fmcsa.dot.gov/regulations/drug-alcohol-testing/what-tests-are-required-and-when-does-testing-occur> Accessed 4/9/2019

E. SUMMARY OF MEDICAL FINDINGS

The 42-year-old male truck driver had reported no medical conditions and no medications on the last CDL medical examination prior to the crash, dated December 29, 2016. He answered “no” to the historical question on the form which asks, “sleep disorders, pauses in breathing while asleep, daytime sleepiness, [or] loud snoring.” His height was recorded as 5 feet 10 inches and his weight as 278 pounds. However, neck or hip circumference was not documented, and his BMI was not calculated by the medical examiner. His medical certificate was marked valid for 2 years.

The Ada County Idaho Coroner's Office autopsy report documented the cause of death for the 42 year old male truck driver was thermal injuries and inhalation of products of combustion and the manner was accident. The autopsy identified extensive soot deposition in the upper airways but did not identify significant blunt force injuries. The driver's natural disease included obesity and severe coronary artery disease with up to 90 percent occlusion of the left anterior descending coronary artery. However, there was no evidence of a recent or old heart attack.

Toxicology testing performed as a part of the autopsy detected carboxyhemoglobin of 18% but was negative for ethanol, drugs of abuse and other tested for prescription drugs.