

# STATE FIRE MARSHAL'S OFFICE

## Firefighter Fatality Investigation



**Investigation Number 06-166-12**

### **Firefighter Chad Ernest Wessels**

Briggs Volunteer Fire Department

December 11, 2005

Texas Department of Insurance  
Austin, Texas

# TABLE OF CONTENTS

Summary..... 3  
Introduction ..... 3  
Origin and Cause Investigation..... 4  
Building Structure and Systems..... 4  
Investigation of the Death of the Firefighter ..... 4  
Training of Vehicle Operators ..... 7  
Personal Protective Equipment and Injury Evaluation ..... 7  
Cause of Death ..... 7  
Findings & Recommendations ..... 8

# **STATE FIRE MARSHAL'S OFFICE**

## **TEXAS DEPARTMENT OF INSURANCE**

### **AUSTIN, TEXAS**

#### **Firefighter Fatality Investigation**

#### **Firefighter Chad Ernest Wessels**

Briggs Volunteer Fire Department

#### **Summary**

---

Firefighter Chad Ernest Wessels, age 31, died in a motor vehicle incident while driving a 1,200-gallon water tender to a structure fire in Burnet County on December 11, 2005. Firefighter Wessels was a member of the Briggs Volunteer Fire Department (BFD).

Firefighter Wessels lost control of his vehicle while exiting a curve on Ranch Road 963, causing the truck to leave the roadway twice. Wessels was killed in a post-crash fire and was pronounced dead at the scene. He was not wearing a seat belt.

Firefighter Wessels served in the Briggs Volunteer Fire Department for eight years. He is survived by his wife and two children.

#### **Introduction**

---

The Texas State Fire Marshal's Office was notified of the death of Briggs Firefighter Chad Wessels on December 11, 2005. State Fire Marshal's Office (SFMO) Chief Inspector Larry Youngblood was assigned as the SFMO fatality investigation team leader. Youngblood traveled to the scene of the incident in Burnet County on December 12, 2005 to conduct an investigation of the incident. This investigation was transferred to Assistant State Fire Marshal Richard Bishop in July, 2006.

The SFMO commenced a firefighter fatality investigation under the authority of Texas Government Code Section 417.0075. The statute requires SFMO to investigate the circumstances surrounding the death of the firefighter, including the cause and origin of the fire, the condition of the structure, and the suppression operation, to determine the factors that may have contributed to the death of the firefighter. The State Fire Marshal is required to coordinate the investigative efforts of local government officials and may enlist established fire service organizations and private entities to assist in the investigation.

The National Fallen Firefighter's Foundation and the National Institute for Occupational Safety and Health (NIOSH) Fire Fighter Fatality Investigation and Prevention Program were notified.

## **Origin and Cause Investigation**

---

The structure fire at 19634 Ranch Road 963 involved a single family residence with injuries to the occupants. Briggs VFD received mutual aid assistance from the Oakalla, Burnet, Betram, and Lampasas Fire Departments. No origin and cause investigation was conducted by the responding fire and law enforcement agencies.

## **Building Structure and Systems**

---

The residence was reported by BFD as a two-story wood frame structure with rock veneer. The majority of fire damage was on the east side of the home, with the west side receiving minimal smoke damage. The presence of fire protections systems was not determined.

## **Investigation of the Death of the Firefighter**

---

On December 11, 2005 at approximately 12:37 AM, the Burnet County Sheriff's Office notified the Briggs Volunteer Fire Department (BFD) of a structure fire at 19634 Ranch Road 963.

At 12:40 AM Unit 4240, a 1200-gallon water tender driven by BFD Firefighter Chad Wessels, departed Wessels' residence on County Road 212 , approximately six miles from the fire. There were no passengers aboard the truck. BFD acquired Unit 4240 approximately 8 years ago and converted the 1986 GMC dump truck to a water tender by modifying the truck bed, removing the dumping mechanism, installing a metal 1,200-gallon fuel truck cargo and a water pump, hose, and fittings. The vehicle was routinely kept at Firefighter Wessels' residence due to a lack of space at the BFD station.

Approximately 5 miles from the Wessels residence eastbound on Ranch Road 963, Briggs Unit 4240 passed a diamond left curve sign. No speed advisory sign is attached. (See attached diagram)

No warning chevrons delineated the curve. The asphalt roadway was dry, in good condition, and had a slight downhill grade transitioning from a slight left curve into a straight section. The roadway was marked with a double yellow centerline. The edges of the roadway are not marked with a white line, and loose asphalt and rock material is present at the edges of the roadway. The terrain of the shoulders and adjacent land is rocky and uneven.

The incident occurred during the hours of darkness and the only illumination of the roadway in that area was from moonlight. The US Naval Observatory lists the phase of the moon on that date as 84% of a full moon. Moonrise was 2:07 PM on the previous day and moonset was 3:21 AM on the morning of 12/11/05.



**RR 963-crest of hill**

After cresting the hill, the right front tire of Unit 4240 left the right hand side of the roadway at the exit of the left curve to the downhill straight section, after passing the curve warning sign. The Texas Department of Public Safety (DPS) report stated no tire marks were present that would have indicated that Firefighter Wessels applied heavy braking action.

Unit 4240 reentered the highway and veered left across the roadway at an angle and left the roadway on the left side. The water tender passed through a barbed wire fence and traveled parallel to the roadway approximately 600 feet before reentering the roadway, crossing it an angle and crashing through a barbed wire fence on the right side of the road. After traveling approximately 112 feet off road, Unit 4240 came to rest in a grove of cedar trees and brush.

A post-crash fire ignited and consumed the front and cab interior of Unit 4240. The investigating DPS trooper surmised that the movement of the truck through fences and across rocky terrain disrupted the fuel system of the Unit 4240, leading to the fire. The DPS report stated that it was believed that Firefighter Wessels, who was not wearing a safety belt, was thrown about and possibly rendered unconscious during the off-road excursion of the truck and was not able to respond and escape the burning truck. There was collision damage to the front bumper area of the truck, but none to the cab area.



**RR 963-exit from curve after cresting hill**

Texas Department of Public Safety trooper Ricky Mintz investigated the motor vehicle incident and cited “unsafe speed (below legal limit), and faulty evasive action” as contributing factors on his official report.



Texas Department of Transportation records show that the 1986 GMC chassis had an empty weight of 11,500 pounds and a maximum permissible weight of 16,500 pounds for a maximum payload of 5000 pounds. Filling the cargo tank on this truck with 1,200 gallons of water weighing 10,008 pounds, (8.34 pounds/gallon) produces a vehicle weight of 21,508 pounds.

This is 5,008 pounds over the maximum 16,500-pound gross weight listed on the vehicle title. This does not take into account the weight of the truck bed and the water tank, pump, hoses and additional equipment installed by BFD.

Exceeding the gross vehicle weight may have an adverse effect on vehicle handling, braking, and performance and may violate state motor vehicle laws.

The former fuel truck cargo tank originally had two compartments divided by a bulkhead. SFMO investigators found that BFD modified the bulkhead by cutting holes in them to facilitate the transfer and discharge of water. While the modified bulkhead may have served as a baffle to control the movement of water from front to back in the cargo tank, there were no baffles to control the lateral movement of water, which would tend to affect the handling characteristics of the vehicle as the weight of the water shifted from side-to-side.

## **Training of Vehicle Operators**

---

Firefighter Wessels served on the BFD approximately eight years prior to this incident. Wessels was also employed by the Fort Hood (TX) Fire Department as a full-time structure firefighter. Firefighter Wessels was certified by the Texas Commission on Fire Protection as an Aircraft Rescue Firefighter, Hazardous Materials Technician, Driver/Operator-Pumper and Intermediate Firefighter. Firefighter Wessels held a Class B Texas driver's license.

BFD Chief Bill McQueen stated that BFD firefighters must complete a tiered in-house driver/operator program which includes monitored over-the-road driving exercises prior to being permitted to drive departmental vehicles.

## **Personal Protective Equipment and Injury Evaluation**

---

Firefighter Wessels was not wearing any firefighter protective equipment as he drove the water tender. The driver's seat of the 1986 GMC truck owned by Briggs VFD is equipped with a lap type safety belt, but Firefighter Wessels was not wearing it at the time of the motor vehicle incident.

## **Cause of Death**

---

Burnet Fire Department units, responding to a mutual aid request from the Briggs Fire Department, observed a wildfire at as they traveled along Ranch Road 963 at 1:00 AM. Burnet firefighters attacked the wildfire and observed Briggs Unit 4240 on fire near some burning cedar trees. Upon extinguishing the wildfire and vehicle, firefighters found Briggs Firefighter Chad Wessels inside the cab of the truck.

Firefighter Wessels had sustained catastrophic burn injuries and was obviously deceased. Burnet County Precinct 2 Justice of the Peace James McElroy examined the scene of Firefighter Wessels' death and ordered an autopsy.

Travis County Chief Medical Examiner Roberto J. Bayardo, M.D. performed an autopsy on Firefighter Wessels and determined the cause of death to be carbon monoxide poisoning and smoke inhalation. Dr. Bayardo noted that there were no traumatic injuries sustained by Firefighter Wessels before his death.

## Findings & Recommendations

---

The following recommendations are based upon nationally recognized consensus standards for the fire service. All fire departments should be aware of the content of the standards and should develop programs based on them to increase the level of safety for fire department personnel.

**Finding #1 – Briggs Volunteer Fire Department Unit 4240, driven by Firefighter Chad Wessels, entered a marked curve at an unsafe speed. Firefighter Wessels was unable to maintain control of the vehicle, causing it to leave the roadway several times.**

Contributing factors:

- The fully loaded water tender exceeded the maximum gross weight listed on the vehicle title by at least 5,008 pounds.
- The existing baffle in the cargo tank was inadequate to control water movement and subsequent weight shifts.

The overloaded vehicle, combined with inadequate water tank baffles presented an extreme challenge to the driver to maintain control, even at low speeds.

**Recommendation:** All fire departments should consider safety and health as primary concerns in the specification, design, construction, acquisition, operation, maintenance, inspection, and repair of all fire department apparatus. Fire departments should utilize the resources discussed in this report to evaluate their water tender (tanker) policies.

*Texas Transportation Code § 545.351 (Reasonable and Prudent Speed requirement) NFPA 1500, Standard on Fire Department Occupational Safety and Health Program, Chapter 6.1.1, Quincy, MA: National Fire Protection Association.*



**Finding #2 – The Briggs Volunteer Fire Department did not implement measures to prevent the cargo tank on the vehicle from being loaded over the maximum permissible gross weight when it was converted to firefighting use.**

**Recommendation:** Any fire department acquiring a vehicle, chassis, or trailer not originally designed as firefighting apparatus should proceed with caution when converting equipment for use in firefighting. Fire departments should take into account factors such as the weight of tank water and equipment, center of gravity, load distribution, capacity of the drivetrain, tires, steering, and braking systems during fire apparatus construction.

**Recommendation:** All fire departments acquiring vehicles, chassis, or trailers should refer to all available manuals or documentation prior to commencing conversion or modification operations. Water tanks should be clearly marked with the tank capacity and full gross weight. Fire departments should install positive physical safeguards, such as overflow vents, to prevent vehicles from exceeding maximum permissible gross weight when fully loaded.

*Texas Transportation Code § 622.952 Fire Department Vehicle (maximum weight may not exceed manufacturer's gross vehicle weight capacity); USFA/FEMA [2003]. Safe operation of fire tankers. Emmitsburg, MD: U.S. Fire Administration, Publication No. FA 248; NIOSH [2001]. NIOSH Hazard ID: Fire Fighter Deaths from Tanker Truck Rollovers. Cincinnati, OH:U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication No. 2002-111.*

<b>Incident #:</b> 06-166-12 FIREFIGHTER FATALITY INVESTIGATION	
<b>Address:</b> RR 963, 3.7 MILES FROM US 183 BURNET COUNTY, TEXAS	
Page 2	NOT TO SCALE
Created: 8/17/2006	ALL DIRECTIONS AND DIMENSIONS ARE APPROXIMATE
Drawn By: RICHARD L. BISHOP, CFI STATE FIRE MARSHAL'S OFFICE	

