This Month's *Working Fire*...

Volume 98-12: December 1998
Approx. Program Length 52:03

FIRELINE

Semi-Trailer/Minivan Collision **Approx. length: 9:00**
Odessa, DE

A minivan had stopped behind a semi-trailer on a highway and then was rear-ended by another semi. The minivan was pushed totally under the first rig which burst into flame. The incident was complicated by a 55-gallon drum of sodium hydroxide which was positioned at the rear of the first trailer. Both truck drivers survived; the occupants of the minivan were killed. A hazardous materials team was brought in as well as a firefighter decon station. Water supply was also a problem owing to the rural location of the accident so tankers were also involved. A local construction crew's front-end loader was borrowed to help locate the drum of sodium hydroxide on the truck. For more information, contact Assistant Chief Wayne Riale, Odessa Fire Company, P.O. Box 81, Odessa, DE 19730 or contact him at 302-378-7075.

High-Angle Water Tower Rescue **Approx. length: 6:57**
Beaumont, TX

A maintenance worker fell while working inside a large water tower. Rescuers with high-angle experience were brought in along with EMS personnel who also made the climb to the top to assess the victim's injuries. Access in and out of the tower was through a hatch that was too small for a stokes basket so the victim was removed through the opening on a backboard and then transferred to the stokes. Anchor points were rigged from the top of the tower to a heavy piece of machinery at the bottom. Extreme heat conditions demanded a thorough rehab operation. For more information, contact Captain Brad Penisson, Beaumont Fire/Rescue Services, P.O. Box 3827, Beaumont, TX 77704 or call him at 409-880-3905.

HANDS-ON

Water Streams Management **Approx. length: 8:30**

This training concentrates on the management of water streams, types of streams and when to use them, and environmental factors affecting streams. For more information contact Steve Stokely, Sr., Coordinator, Fire Technology, Lamar University Institute of Technology, 855 E. Lavaca St., Beaumont, TX 77705 or contact him at 409-833-7491.

This Month's "Working Fire"

HANDS-ON (cont.)

Emergency Vehicle Driver Training **Approx. length: 9:31**
Part II

Trooper Richard Vasser of the Texas Department of Public Safety concludes our two-part segment on safe driving techniques for the emergency responder by demonstrating on-the-road techniques discussed in the classroom last month. These include appropriate steering, turning, and stopping techniques. For more information contact Trooper Richard Vasser, Texas Department of Public Safety, 7200 Eastex Frwy, Beaumont, TX 77708 or call him at 409-898-0770 ext. 253.

FIRE MEDICS

Spinal and Extremity Traction **Approx. length: 9:59**

Following up on last month's soft-tissue management segment, this month we cover appropriate procedures for spinal and extremity traction. These include cervical spine traction, foot/ankle traction, and various traction devices as well as appropriate assessment procedures. For more information, contact Dave Herman, Battalion Chief/EMS, West County EMS & Fire Protection District, 123 Henry Ave., St. Louis, MO 63011 or contact him at 314-227-9350.

EVOLUTIONS 2000

Kramer vs. Kramer: **Approx. length: 2:20**
Haz-Mat Response Procedures and Choices

Working Fire and Professor/Chief Bill Kramer presents our Continuing Education segment that's worth one credit from the University of Cincinnati. This month, Bill investigates the conventional wisdom of haz-mat procedures used at appropriate incidents. For more information, contact the Open Learning Fire Service Program, College of Applied Science, 2220 Victory Parkway, ML #103, Cincinnati, Ohio 45206 or call 513-556-6583.

This Month's "Working Fire"

From the Departments Involved...

DISCUSSION QUESTIONS FOR THIS MONTH'S INCIDENTS

The departments involved in this month's incidents pose some discussion questions that you can use as discussion-starters in your own department's training sessions. Let's kick it around!

Semi-Trailer/Minivan Collision/Odessa, DE
Assistant Chief Wayne Riale, Odessa Fire Company, Odessa, DE

1. Do you have access to a dedicated haz-mat response team for incidents such as this? Are there specifically trained responders in your department for haz-mat incidents?

2. As an Incident Commander, do you take wind and weather conditions into account in terms of their effect on responders and citizens in the vicinity? Do you involve other appropriate agencies into an interagency command?

3. Speaking of citizens, do you have crowd control procedures worked out with local police authorities and evacuation plans ready if need be?

HIgh-Angle Water Tank Rescue, Beaumont, TX
Captain Brad Penisson, Beaumont Fire/Rescue Services, Beaumont, TX

1. Does your department pre-plan and train on specific structures in your jurisdiction where high-angle rescues might be necessary?

2. Do you take extra care in maintaining high-angle rescue equipment and rigging?

Enhanced Training

Water Streams, Pt. I

Objectives

After watching this program the student shall:

1. understand the basic characteristics of water
2. understand the concepts and terms dealing with hydraulics.

Standards and Regulations

This training is consistent with NFPA 1500 and relevant OSHA regulations.

Training Outline

PRINCIPLES OF HYDRAULICS

A. CHARACTERISTICS OF WATER

1. At normal temperatures (32 degrees to 212 degrees F), water exists in a liquid state.
2. Below 32 degrees (the freezing point of water) it converts to a solid state in the form of ice.
3. Above 212 degrees F (the boiling point of water), it converts to a gas called water vapor or steam.
4. The primary way water extinguishes fire is by cooling or removing heat from the fire. Another way is by smothering the fire.

B. ADVANTAGES AND DISADVANTAGES OF WATER

ADVANTAGES

1. Water has a greater heat-absorbing capacity than other common extinguishing agents.
2. A relatively large amount of heat is required to change water to steam. This means that more heat will be absorbed from the fire. The surface area exposed can be expanded by using fog streams or deflecting solid streams off objects.
3. Water converted into steam occupies 1,700 times its original volume.

DISADVANTAGES

1. High surface tension (lowers soaking/penetrating ability)
2. Reactivity with certain materials
3. Low opacity

Answers to the quiz on page 6:

1. false 2. true 3. false 4. d. 5. b.

Water Streams, Pt. 1

4. Freezing temperature (causes malfunction when it freezes)
5. Low viscosity (doesn't readily adhere to vertical surfaces)
6. Electrical conductivity (stay away from power lines)

C. PRINCIPLES OF PRESSURE

1. Fluid Pressure is perpendicular to any surface on which it acts.
   a. If this pressure is exerted in any other direction, the water would start moving downward along the sides and rising in the center.
2. Fluid at a point in a fluid at rest is the same intensity in all directions
   a. Fluid pressure at a point in a fluid at rest has no direction.
3. Pressure applied to a confined fluid from without is transmitted equally in all directions.
4. The pressure of a liquid in an open vessel is proportional to its depth.
5. The pressure of a liquid in an open vessel is proportional to the density of the liquid.
6. The pressure of a liquid on the bottom of a vessel is independent of the shape of the vessel.

D. TYPES OF PRESSURE

1. Atmospheric Pressure
   a. The atmosphere surrounding the earth has depth and density and exerts upon everything on earth.
   b. Atmospheric pressure is the greatest at low altitudes, consequently, its pressure at sea level is used as a standard
   c. The atmosphere exerts a pressure of 14.7 psi
2. Head Pressure
   a. "Head" refers to the height of a water supply above the discharge orifice.
3. Static Pressure
   a. The word "static" means at rest or without motion.
   b. Pressure on water may be produced by an elevated water supply, by atmosphereic pressure, or by a pump. If the water is not moving, the pressure exerted is static.
   c. The pressure in a water system before water flows from a hydrant is static pressure.
4. Normal Operating Pressure
   a. Pressure found in a water distribution system during normal consumption demands.
5. Residual Pressure
   a. That part of the total available pressure not used to overcome friction loss or gravity while forcing water through pipe, fittings, fire hose, and adapters.
   b. The remainder pressure or that which is left.

Answers to the quiz on page 7:

1. false 2. true 3. true 4. d. 5. b.

Water Streams, Pt. 1

6. Flow Pressure (Velocity Pressure)
   a. That forward velocity pressure at a discharge opening while water is flowing.
   b. The rate of flow or velocity of the water coming from a discharge opening produces a force called “flow pressure” or “velocity pressure.”
7. Pressure Loss and Gain
   a. When a nozzle is above the pump, there is a pressure loss.
   b. When the nozzle is below the pump, there is a pressure gain.
   c. These losses and gains occur because of gravity. Both pressure loss and pressure gain are referred to as “elevation pressure.”

Master Streams, Pt. I: Quiz

Date_____ **Chief/T.O.**_____

Firefighter (print)_____ **Education Credits/ Hours/Units**_____

Signature_____

Select the best answer:

1. True or False When water freezes, it turns into a rock.

2. True or False A large amount of heat is required to change water to steam.

3. True or False Water has reactivity with certain materials.

4. When considering Static Pressure:
   a. The word “static” means at rest or without motion.
   b. Pressure on water may be produced by an elevated water supply, by atmospheric pressure, or by a pump.
   c. The pressure in a water system before water flows from a hydrant is static pressure.
   d. All of the above are true.

5. When considering Pressure Loss and Gain:
   a. Wnen a nozzle is above the pump, there is a pressure gain.
   b. When the nozzle is below the pump, there is a pressure gain.
   c. These losses and gains occur because of hydrostatics.
   d. All of the above are true.

(Correct answers can be found at the top of page 6.)

Enhanced Training

Emergency Vehicle Driver Training, Pt. 2

Objectives

After watching this segment the student shall have a basic understanding of the techniques that are necessary for the safe operation of emergency vehicles.

Standards and Regulations

This training is consistent with NFPA 1500 and driving regulations for emergency vehicles in the State of Texas. Responders should check for specific differences with regulations in their areas.

Training Outline

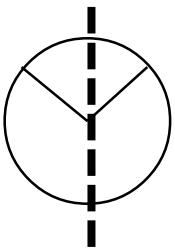
A. EMERGENCY DRIVING

1. Some of the biggest killers of firefighters and emergency responders are the accidents which occur while responders are en route to an emergency.

B. STEERING TECHNIQUES

1. Steering Around a Hazard
   a. It's the best way to avoid it
   b. A driver can steer around a hazard in less than 40 feet, the minimum distance needed to stop.

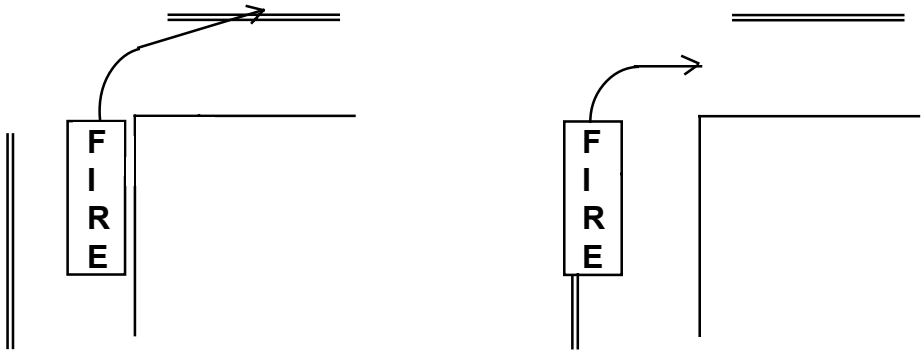
2. Shuffle Steering
   a. The "10 & 2" position usually taught in driver education is not sufficient to safely steer emergency vehicles. It's better from the "9 & 3" position to "shuffle" or hand off the wheel from one hand to the other.
   b. The driver's hands should never cross an imaginary center line down the middle of the steering wheel. This allows the driver to keep both hands in contact with the wheel and makes for a smoother, safer turn.



Emergency Vehicle Driver Training, Pt. 2

C. TURNING AT INTERSECTIONS

1. Don't begin your turn too close to the curb side of the intersection; the turning radius of the vehicle will force you to swing wide into the oncoming lane of the road or street you're turning into.



2. Instead, begin your turn close to the center line of the street or road (as far to the center as opposing traffic will allow), then cut hard into the proper lane of the road or street you're turning into.

D. EMERGENCY STOPPING

1. Lock-Wheel Skid
   a. Very undesirable; causes the vehicle to go out of the driver's control.
   b. Stops the vehicle in the greatest distance compared to other stopping methods: at 30 mph, it takes 73 feet to stop.

2. Stabbing Braking
   a. More desirable; will bring the vehicle to a stop in a shorter distance: at 30 mph, it takes 47.5 feet to stop.

3. Braking-to-Incipient-Skid
   a. Most desirable; will stop any vehicle in the shortest distance possible: at 30 mph, it takes 43.5 feet to stop.

Answers to the quiz on page 11:

1. false 2. false 3. true 4. b. 5. c.

Emergency Vehicle Driver Training, Pt. 2

E. DRIVER ATTENTION

1. Drivers need to be prepared and ready to stop in an emergency. For example, at 40 mph, it takes 13 feet, one inch for the driver just to take his/her foot off the accelerator and begin braking, even before the vehicle begins to stop. Drivers must be vigilant and pay constant attention to road conditions.

Emergency Vehicle Driver Training, Pt. 2: Quiz

Date_____ **Chief/T.O.**_____

Firefighter (print)_____ **Education Credits/ Hours/Units**_____

Signature_____

Select the best answer:

1. True or False Emergency vehicles can turn and stop on a dime.

2. True or False The Shuffle technique works great with poker.

3. True or False Avoiding a hazard is faster than stopping.

4. Crossing the imaginary center line on the steering wheel with your hands:
   a. is advisable
   b. violates the shuffle steering rule
   c. is okay if you do it with both hands
   d. all of the above.

5. The best way to stop a vehicle is to:
   a. lock up the wheels
   b. let it roll to a stop
   c. brake to incipient skid
   d. stab at the brakes.

(Correct answers can be found at the top of page 10)

Evolutions 2000

University of Cincinnati Continuing Education Program

Handling Haz-Mat Situations

If you're enrolled in the **Open Learning Fire Service Program** at the **University of Cincinnati**, here's your opportunity this month to earn one college credit hour for watching *Working Fire*.

VOLUME 98-12

HANDLING HAZ-MAT RESPONSES

Complete written responses to the following three essay questions:

1. List three technical levels of haz-mat response and briefly explain the capabilities of both.

2. Explain how, in your jurisdiction, additional higher levels of haz-mat expertise are summoned.

3. What changes would you recommend in your jurisdiction or why would you not recommend any?

Submit your responses to:

Mr. Bill Kramer
University of Cincinnati
College of Applied Science
2220 Victory Parkway, ML #103
Cincinnati, OH 45206

ENROLLMENT INFORMATION:

For more information on enrolling in the Open Learning program to gain college credit, call *Working Fire* at 800-516-3473 for a brochure or, to register directly, call the University of Cincinnati at 513-556-6583. Associate and Bachelors programs are available. Call to have your transcripts evaluated.