Hoses and Fire Streams

Objectives

Objective 1  Overview of fire streams

Objective 2  Overview of fireground hose lays

Objective 3  Overview of water delivery equipment maintenance

Water Supply System

Gets water from source to fire
Fire Stream
Various types

Fire Stream
Identified by size and type

Size: volume of water/minute
Type: pattern of water

Hose Discharge
Gallons of water per minute
Low Volume Streams
Less than 40 gallons per minute

Hand Line Streams
40 to 350 gallons per minute
Supplied by 1.5” to 3” hoses

Master Streams
Greater than 350 gallons per minute
Large and fixed stream of water
Master Stream Supply
Fed by multiple large hose lines

Fire Streams
Right amount of water to extinguish fire

Enough Water
To absorb heat more rapidly than it is generated

Engine regulates hose pressure and volume

Water supply
Supply hoses and valves
Proper nozzle
Appropriate fire stream

Water is a safety barrier between firefighter and fire
Volume of Water
Determined by several factors

Fire Stream Goal
Extinguish fire and minimize water damage

Enough Water
To assure extinguishment
Fire Streams
Three types for firefighting with water

- Solid Stream
- Fog Stream
- Broken Stream

*International Fire Service Training Association

The Interaction, Straight Water Stream, has been removed.
The Interaction, Fog Streams, has been removed.

The Interaction, Broken Streams, has been removed.

Nozzle Kickback
Newton’s Third Law of Motion

For every action, there is an equal and opposite reaction
Nozzle Use
Always close and open slowly

Sudden closing can create a water hammer

Hose Lays
Move water from source toward fire

Hose Lays
Forward lay, reverse lay, and split lay

Which end of hose coupling is exposed?
Forward Hose Lay
Laid from water source toward fire

Stop at water source and move toward fire

Preparation of Hose Bed
Female coupling is first off

Female hose end connected to water source

Forward Lay Advantage
Locate and connect to water source

Connect to water source during fireground assessment
Forward Lay Disadvantage
Potential of unnecessary hose lay

Large amount of unused hose to re-roll

Reverse Hose Lay
Supply hose pulled toward water source

Male end of hose is first coupling off

Female end connected to water source
Reverse Hose Lay
Fireground size-up before laying hose

- Avoids unnecessary hose drops for false alarms
- Provides pumping source at water supply

Reverse Hose Lay
Apparatus and equipment away from fire scene

Split Hose Lay
Focus on one of many possible combinations
**Split Hose Lay**
Combines forward lay and reverse lay

**Prepare Hose Bed**
For reverse and forward lays

- LDH with Stortz fittings are quick to connect
- Eliminates need to split hose bed for forward and reverse lays
- Preferred supply line for rural tender ops
Mutual Aid Responses
Be aware of how hose is laid

Be prepared to add adaptors to connect hoses

Coupling and Adaptors
Need to know how to locate and use

Forward or Reverse Lay
Look at couplings – male or female
Hose Connections
Plan for additional connections

Equipment Maintenance
For hoses, nozzles, couplings, and valves

Regular Checks
For defects and potential problems

Flow from water source affects safety
Regular Checks
Extra couplings and full complement of fittings

Damage and Debris
Possible to coupling threads and gaskets

Check Spinning Rings
Ensure female coupling spins freely
Regular Checks
Inspect valves to ensure integrity

Regular Checks
Inspect levers, internal balls, spinning rings, and threading

Valve failure could be fatal

Regular Checks
Nozzles for damage

Inspect and replace gaskets if they appear damaged

Functional Nozzle
Can be difference between you and high heat
Inspect Nozzle Parts
Handles, external rings, and shut-off controls

Inspect nozzle nose openings for damage and debris that might affect water stream.

Nozzles should be easy to use, not stiff.

Hose Maintenance
Starts with cleaning after each use

Cleaning method is dependent on hose type.

Hose Maintenance
Rubber hose vs. woven hose

Rubber hose does not need drying.

Woven hose requires rinsing and scrubbing.
Woven Hose
Must be dried before repacking

Commercial Hose Dryers
Speed up drying time
- Stack hose loosely for sufficient air movement

Hose Drying Tower
Lengths of hose hung from racks in tower
- Dry air pumped through tower hastens drying process
Pressure Testing Fire Hoses
Ability to withstand water pressures

Time-consuming, but extremely important

Pressure Testing Overview
Need an engine, test valve, nozzles, and hose

Pressure Testing
Follow these step by step instructions

1. Attach an open test valve to appropriate discharge valve on pumper
2. Tighten connections with spanner wrench
3. Connect hose sections to make a hose length of no greater than 300'
4. Be sure all washer gaskets have been

Waterway, Inc.
Pressure Testing
Follow these step by step instructions

1. Attach hose lengths to test valve
2. Tighten connections with spanner wrench
3. Secure hose to fire apparatus near discharge connection

4. Fill hose length with pump pressure of 45 psi
5. Hose nozzles open as hose line fills with water
6. Burp air pressure from within hose line by raising nozzle above discharge valve
7. Open nozzle
8. After all air discharged from hose, close nozzle

Mark Hose at Coupling
Check if hose has begun to pull away from coupling

Space between marking and coupling edge, before and after test
Assure Hose Integrity
Look for twists, kinks, and leaks

Replace any leaking lengths of hose

Increase Hose Line Pressure
Constant pressure for 3 minutes

Be sure there is no leakage at couplings

Reduce Hose Pressure
Slowly reduce per normal pump operation protocol

Again, be sure that there is no sudden change in water pressure
Completion of Testing
Perform normal disconnection and breakdown

Inspect each coupling
mark for increased gap

Coupling Failure
Widened gap at coupling edge

Remove from service and
designate for re-coupling

Review
Hoses and Fire Streams

Hose Stream Types
- Straight
- Fog
- Broken

Nozzle Types
- Straight
- Fog
- Broken

Hose Lay Types
- Forward
- Reverse
- Sprinkler
Review
Hoses and Fire Streams

Properly maintain all elements of water supply.
Ensure all elements are working together.
Pressure testing steps.

Properly maintained equipment contributes to ensuring that all firefighters return to the station safely.

References
Hoses and Fire Streams

# Credits

## Hoses and Fire Streams

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