FIRE HOSE
&
APPLIANCES
• Fire hose, nozzles and hose appliances are among the most basic equipment used by firefighters.

• Individual applications of these firefighting tools are sometimes misunderstood, resulting in incorrect and unsafe practices.

• Firefighters need to develop a good understanding of each type of hose, nozzles & appliance carried on the engine’s along with their intended use(s).

• This knowledge will provide a more efficient fire fighting operation, vastly enhanced safety and possibly limiting water damage.
The **Engine Companies** Responsibility is to:

1. Get a **Water** Supplied **to the Engine**

2. Get **Water** from that Engine **to the Fire**

*We Accomplish this through the use of Fire Hose & Appliances*
Fire hose - is identified and placed in four categories.

a) **Attack hose** – Any hose that is used to directly control and extinguish fire. (your Basic Fire Fighting hose)

b) **Relay-supply hose** – Designed to move large volumes of water at low pressure, < 100 psi. (Our typical 5” hose)

c) **Intake hose** – Connects pumpers or a portable pump to a nearby water source. (Hard Suction – used in drafting - “suction”)

d) **Extinguisher hose** – Used on large extinguisher units, that may be stationary, wheeled, or mounted on a vehicle. (Booster Line)
The **four classifications of hose** is based on their method of construction.

a) **Woven jacket** (everyday jacketed hose)
b) **Rubber covered** (our 5” hose)
c) **Braided** (booster hose)
d) **Wrapped** (Hard Suction)
The three basic types of **hose couplings**.

a) Threaded couplings.

b) Sexless couplings. (Storz type)

c) Snap couplings
The most commonly used **Hose Appliance** is the **Nozzle**

**Types of nozzles:**

a) Solid stream.

b) Fog stream.

c) Broken stream.

d) Master Stream.

Operating pressures  50 - 80 lbs – **Solid steam nozzles**

100 lbs – **Fog Stream nozzles**
Major components of nozzles:

a) Nozzle **control valves**: such as ball, slide, and rotary control valves.

b) **Tips** such as fog, smoothbore or special purpose.

c) **Play pipe** usually with double handles and tapered.

d) **Stream sharpeners** improve laminar flow to nozzle tip.

e) **Accessories** such as pistol grips and large double handles.

f) **Gallon adjustment** with some fog nozzles
Components of nozzles:

Note:
2.5” Nozzle when the tips are removed
– has 1.5” male end.

This can be used to reduce line to 1.75” line - or - be a Gate to control water flow.

Usually done when reducing the 2.5” attack line to a 1.75” line to do overhaul.
Special Purpose Nozzles:

a) Cellar nozzles.
b) Water curtain nozzles.
c) Piercing nozzles.
d) Chimney nozzles.
e) Low velocity Fog nozzles.
f) High-pressure Fog nozzles.
**Nozzle Streams:**

**Solid**
- Little Shower or Spray
- Good Reach and Penetration

**Broken**
- Coarsely Divided Drops of Varied Size
- Good Heat Absorption

**Fog**
- Fine Particles
- Adjustable Pattern
- High Water to Stream Ratio
Fog Nozzle Streams:

- Little Shower or Spray
  - Good Reach and Penetration

- Fine Particles
  - Definite Pattern
  - High Water to Stream Ratio

- Coarsely Divided Drops of Varied Size
  - Good Heat Absorption

Straight Stream

- 15° to 45°

Narrow Fog

- 45° to 80°

Wide Fog
The **four basic components** of an **effective fire line**:

a) Reliable water supply.

b) Fire apparatus equipped with adequate pumping capacity.

c) Appropriate fire equipment such as hose & nozzles.

d) **Most importantly** - **Properly Trained Personnel** to put all together and into operation, efficiently.
Common problems occurred with an **ineffective Fire Line**: 

a) Broken or inadequate hydrant or water source  
b) Kinks in hose lines, reducing flow (supply or attack)  
   or - over pumping lines to compensate for them making them difficult to operate or control.  
c) Water Hammers (damage line or pump)  
d) Inadequate size line or nozzle for the job  
e) Over heated pump – *not moving water*  
f) Inadequate training
When establishing lines – there may be a need for additional **hose appliances** such as:

**Siamese** (2 into 1) 2 females intakes making 1 output

Remember “Female in – Male out”

**Wye** – (1 into 2) 1 female intake making 2 outputs

Either can be found **with or without** gates
When establishing lines – there may be a need for the use of an additional hose appliance such as:

- **Manifolds** (1 making 3-5)
  - 1 females intakes making
  - Multiple (3 / +) outputs

- **Water Thief's** - Output(s) tapped off a Large Gate
  - (Used to maximize a water supplies)
  - *Think of it as a Gated Hydrant w/ a 4.5” and (2)gated 2.5” spuds*
When establishing lines – there may be a need for the use of an additional hose appliance such as:

**Gate:** “a Shut off”

- **Wheel Type**
  - Found on standpipes

- **¼ Turn ball valve**
  - aka Hydrant gate

- **Crank Type**
  - Still out there - positive is it Prevents Water Hammers
When establishing lines – there may be a need for the use of an additional hose appliance such as:

**Adaptors**: “adapts” one style hose or thread into another

- Storz to Steamer “Hydrant”
- Storz to 2.5” Male aka reducer
- Female to Male aka Double Male
- 2.5” Male – Male 1.5” aka reducer
- Male to Female aka Double Female

- Just a few - Many find any combination
When establishing lines – there may be a need for the use of an additional hose appliance such as:

**Adaptors:** *also adapt one style thread into another*

When we see **female to male adaptors**

- PIPE THREAD
- DEPT’S THREAD

Can also converts one style **thread** into another.

A lot of the time the thread **NOT being used** by the dept. will be painted a **different color.** *(to made to stand out)*

It will also be stamped the thread type.
When establishing lines – there may be a need for the use of an additional hose appliance such as:

**Stream Shapener:**
- Improves laminar flow to a nozzle

**In-line Pressure Gauge:**
- Displays the pressure being supplied to a line, at the point of attachment.
- *Used in our stand pipe connections*
- *Water need to me flowing for accurate readings*
When establishing lines – there may be a need for the use of an additional hose appliance such as:

**30, 45 & 90 degree elbows**: used to either soften the water as it enters a line or used to directed a line in a different direction, preventing kinks.
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When establishing lines – there may be a need for the use of an additional hose appliance such as:

**End Caps:**

- Cap for a Male coupling
- Cap for a Female coupling
- Cap for a Storz coupling
When establishing lines – there may be a need for the use of an additional hose appliance such as:

**Wrenches**: To Tighten/Loosen these appliances – we use:

- **Spanner Wrench**
  - 1.5” & 2.5” Hose
- **Stortz Wrench**
  - Sexless Stortz
- **Combo Stortz Wrench**
  - All: stortz – 2.5” & 1.5”
- **Hydrant Wrench**
- **Rubber Mallet**
- **Steamer couplings**
- **Pipe Wrench**
- **Combo Hydrant/Spanner Wrench**
When establishing lines – there may be a need for the use of an additional hose appliance such as:

**Hose Bridges/Rams:**

For extended operations – Bridges/Rams may be used to keep the needed apparatus and resources flowing to scene if the roads are blocked by hose.
When establishing lines — there may be a need for the use of an additional hose appliance such as:

**Hose Straps:**

- **Hydrant Strap**
- **Hose Strap**

These straps are used to help hose movement or securing hose to an object such as a hydrant or ladder.

A “hose strap” isn’t the strap that hold a high rise pack together!
Other appliances:

**Hose Roller:**

Used to drain water from the hose (mainly 5’’), before we load back on the rig.

**Hose Clamp:**

Used to stop water flow in a line, as a gate would, when ability to do so is lost.
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Hydrant Bag:

A bag that carries all appliance needed to secure a hydrant.
Stand Pipe Bag:  

( Have Class - Name components & their use )

A bag that carries all appliance needed to secure a stand pipe.
High-rise packs:

50’ of hose – packed so it can be carried easily to a location of stand pipe.
High Rise Pack:

- Fold 50’ length in half - 25’
- Tighten
- Fold 25’ in half - 12’
- Repeat
- Fold 6’ in half - 3’
- Repeat
- Flip over

1st Line Connects 1 floor below fire
2nd Line - 2 floors below ...
(these secondary line require more hose)

Connecting High Rise Packs
Since a length of 5” hose is 100’ long, when we lay a line to/from a hydrant we may only need 20 -40’ to finish the connection.

Instead of pulling another 100’ and trying to disburse that addition 60’, we’ll use either 1 or 2 of the 25’ length, on side of rig, to make up the shortage.
Putting Attack Line in Operation:

Once we’ve done an adequate size up and determined:

What size attack line is needed for Incident – (Big fire – Big water)

Rule of thumb – Commercial - 2.5”
Residential - 1.75”
Inside – Solid Nozzle
Outside – Fog Nozzle

Pull the appropriate line from the rigs -
**Pre-connects** - 200’ of 1.75” or 200’ of 2.5” = already connected to rig’s discharge.
- Or -
The appropriate amount line from the **dead bed**. **With the Appropriate Nozzle**
Putting Attack Line in Operation:

Three functional positions of an attack line:

a) Nozzle

b) Back-up

c) Control (s)

“If Available” a 4th position “Door” may be utilized
**Putting Attack Line in Operation:**

*Three functional positions* of an attack line:

a) **Nozzelman:**
- leader of the attack line crew, in the absence of a line officer,
- determines the method of attack,
- operates the nozzle,
- controls speed of advancement and retreat,
- communicates directions to crew members.

When adjusting the pattern of a Fog nozzle - (right is tight)
*the same goes for tightening hose & adaptors*

Test line, bleeding off air before getting to fire room or even in the building.
Putting Attack Line in Operation:

*Three functional positions* of an attack line:

b) **Back-up man:**
   - assists in locating hazards,
   - directly supports nozzleman in the control of hose and nozzle,
     *wants to be doing opposite nozzle – (nozzle right – back up left, nozzle up – back up down)*
   - communicates information between nozzleman and control position.
Putting Attack Line in Operation:

_Three functional positions_ of an attack line:

c) **Control:**
- insures that adequate hose is available for advancement;
- Prevents kinks at doorways, stairways, landings and obstacles;
- controls the retreat of hose line;
- watches for the development of hazards behind the hose crew.
- “Controls” all the hose line between – Back up or Door (if One),
  al the way back to the Engine.

In situation with: large stretches, multiple doors/rooms, or turns – multiple control positions should utilizes – 1 at each turn.

When there are multiple Control position, each would be responsible for all the hose in front and behind them, to the next position or the engine.
Fourth functional positions of an attack line: If resources allow – Rarely!

d. Door:
• insure that adequate hose is available for advancement,
• Prevents kinks, feeding hose into the fire area
• Stages loops in hose for future advancement ;
• watches for the development of hazards behind the hose crew.
• Controls all the hose line between – Back up person to the Door of area the hose line is operating in.

Multiple controls positions are more commonly utilizing then a Door position. This give more flexibility and more area that is covered. In these case a control person should be monitoring all the hose inside the fire room along with the other hose in their responsibility.
Putting Attack Line in Operation:

When Pulling Line from Rig (Pre-connect or Dead bed):

**Nozzleman** – should take a couple of folds*, step off rig **and stop** *(approx 50’ or 1 length of hose)*

**Backup** – should then that a few folds of hose*, step off rig **and together with Nozzleman**, they should walk to front door.

**Control** – will then take the remainder of the pre-connect & flake out between back up and the Rig.

* If pulling Dead bed, **control** will make sure **proper amount of hose** came off the Rig (50’ per length) – Break at coupling and hand to pump operator. Control will then flake hose out between back up and the Rig.
Out of all the members on the Line, (although probably the least glorious), the Control, will “Control” the success or failure of the hose team.

Having the responsibility to:

- Assure no kinks of line – (directly effect the water supply)
- Flakes line out in a way it can be easily advanced (effects how fast water will get on the fire)
- Line is not bound up at doorways and turns (effects how fast water will get on the fire)
- Monitors conditions around & behind the nozzle (effects the hose team safety)

With multiple turns and stairways the use of a 2nd & 3rd control persons is recommended when manpower permits, to allow for rapid advancement of line.
When flaking Hose:
Use Gravity & Physics to your advantage -

Charged hose - (Naturally wants to be straight) by having loops that want to be straight, that energy will make hose advancement easier.
When flaking Hose:
Use Gravity & Physics to your advantage -

Here we see:
• 1 member at turn at bottom of stairs
• 1 member at Middle of stairs
• Control has put hose up stairs so gravity can help feed hose into room
• control’s in position can see ahead and also down stairs
• control doesn’t need to move position until all hose on above stair is in door
Practical Applications:

1. Pull 2.5” pre-connect with solid nozzle – Stage at front door & flake remaining hose.
2. Connect 25’ of 5” to engine and add Manifold to opposite end.
3. To manifold add 50’ of 2.5” – reduced to 50’ of 1.75” with fog nozzle.
4. Replace the 2.5” section of hose. (reversed with female end towards fire) - Utilizing adaptors.
5. Convert 2.5” nozzle of the pulled pre-connect to a gate and add 50’ of 1.75” hose with a fog nozzle.
6. Advance 2.5” line up 2 stories of stairs.
7. Advance 2.5” line up a ladder and in 2 stories window securing the hose to ladder with hose strap.
8. Set up portable master stream devise.