ATTACK OF THE 2 ½”

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THE BASICS

The 2 ½” line has been a staple in the fire service for many years.

Early in the fire service, it was the only size hose on the engine, serving as both attack hose and supply hose.

THE BASICS, CONT.

Attack lines were commonly fitted with tip sizes that included 1”, 1 1/8”, and 1 ¼”; eventually, these began being manufactured in a stacked tip configuration.

This allowed for versatility in flows that covered both offensive and defensive operations.

Obviously, these tips are still widely being used today.

What are We Flowing?

1 1/8"= 265 gallons per minute @ 50 psi

1 ¼"= 325 gallons per minute @ 50 psi

WHAT ARE WE FLOWING?

More important even than GPM is Gallons per Second!

According to Bernard Klaene, the effectiveness of our flows will often be apparent within about 10 seconds of opening the nozzle onto the fire.

The nozzle has to be open to flow water!

NOZZLE REACTION

Non-scientific definition: The force acting upon the firefighter as a result of water flowing out of the nozzle.

- “Some instructors use a rule of thumb which states that a firefighter can safely handle one-half of his or her body weight in nozzle reaction force”- David Fornell

- Lt. Andy Fredricks (FDNY) felt the acceptable nozzle reaction for a single firefighter was about 70 lbs.

SMOOTH BORE NOZZLE REACTION

Hose	Nozzle	40 PSI		50 PSI		60 PSI	
		GPM	NR LBS	GPM	NR LBS	GPM	NR LBS
1 ¾”	7/8”	144	48	161	60	176	72
1 ¾”	15/16”	165	55	185	69	202	83
1 ¾”	1”	188	63	210	79	230	94
2 ½”	1 1/8”	238	79	266	99	291	119
2 ½”	1 3/16”	265	89	296	111	325	133
2 ½”	1 1/4"	294	98	328	123	360	147

Equation: 1.57 x (D X D) x (NP)

D= Tip diameter

NP= Nozzle Pressure

*Table created by Dennis LeGear

FOG NOZZLE REACTION

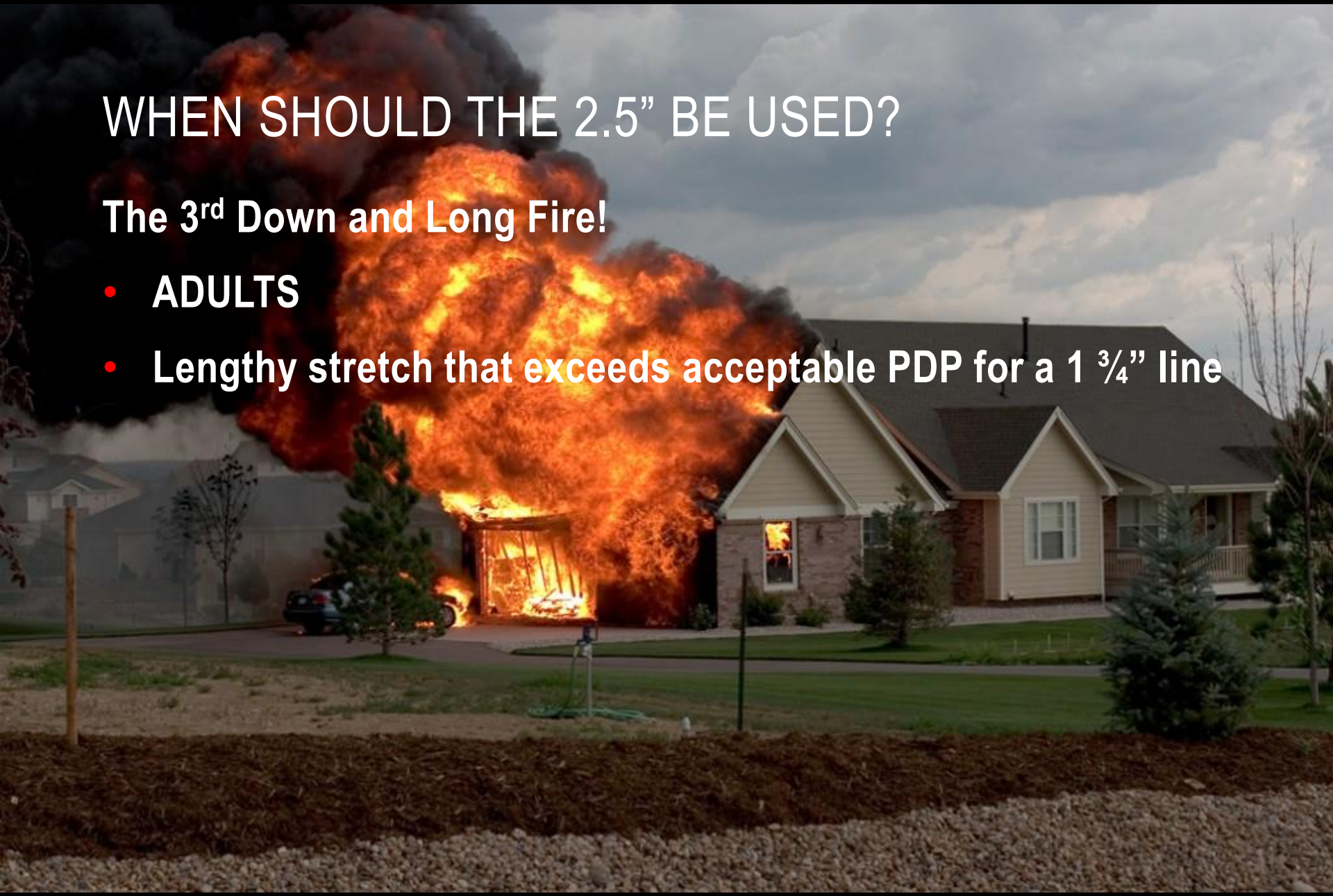
Hose	Nozzle	GPM	NR LBS	GPM	NR LBS	GPM	NR
1 ¾”	Fixed Gal. @ 50 PSI	N/A	N/A	175	62	n/A	N/A
1 ¾”	Automatic @ 75 PSI	100	44	150	66	N/A	N/A
1 ¾”	Selectable @100 PSI	95	43	150	76	200	101
2 ½”	Fixed Gal. @ 50 PSI	200	71	250	89	N/A	N/A
2 ½”	Automatic @ 75 PSI	200	87	250	109	300	131
2 ½”	Selectable @ 100 PSI	200	101	250	126	325	164

Equation: .0505 x (Q) x (Sq. Root of NP)

Q= GPM Flow

NP= Nozzle Pressure

ARE OUR CURRENT TACTICS WORKING?



WHEN SHOULD THE 2.5” BE USED?

The 3rd Down and Long Fire!

- **ADULTS**
- **Lengthy stretch that exceeds acceptable PDP for a 1 ¾” line**

ADVANCED FIRE ON ARRIVAL

7 sec.

17 sec.

40 sec.

DEFENSIVE OPERATIONS

UNABLE TO DETERMINE THE SIZE OR LOCATION OF THE FIRE

LARGE, UN-COMPARTMENTALIZED SPACE

TONS OF WATER

STANDPIPE OPERATIONS

Photo Credit: David DeStefano

WHY DO WE HESITATE TO GRAB IT?

- Manpower
- Maneuverability
- Misunderstanding


Manpower

MANPOWER

We have to change our perception of the 2 ½ “ line. Don’t buy into the scare tactics!

MANEUVERABILITY

“The most important thing about 2.5” is that it is not 1.75”.” – Brian Brush

We get into trouble when we treat the two lines the same way:

Proper body mechanics must be used.

Personnel likely need to be positioned at every obstacle.

Always try to maintain around 10’ of slack.

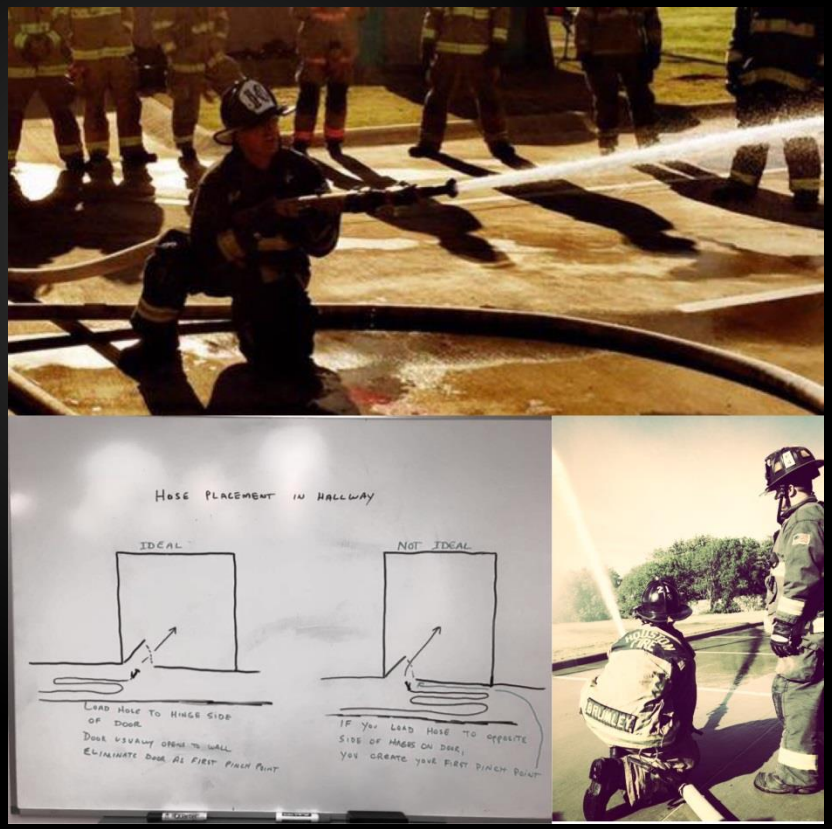
A well-positioned back-up man may not see the nozzle firefighter.

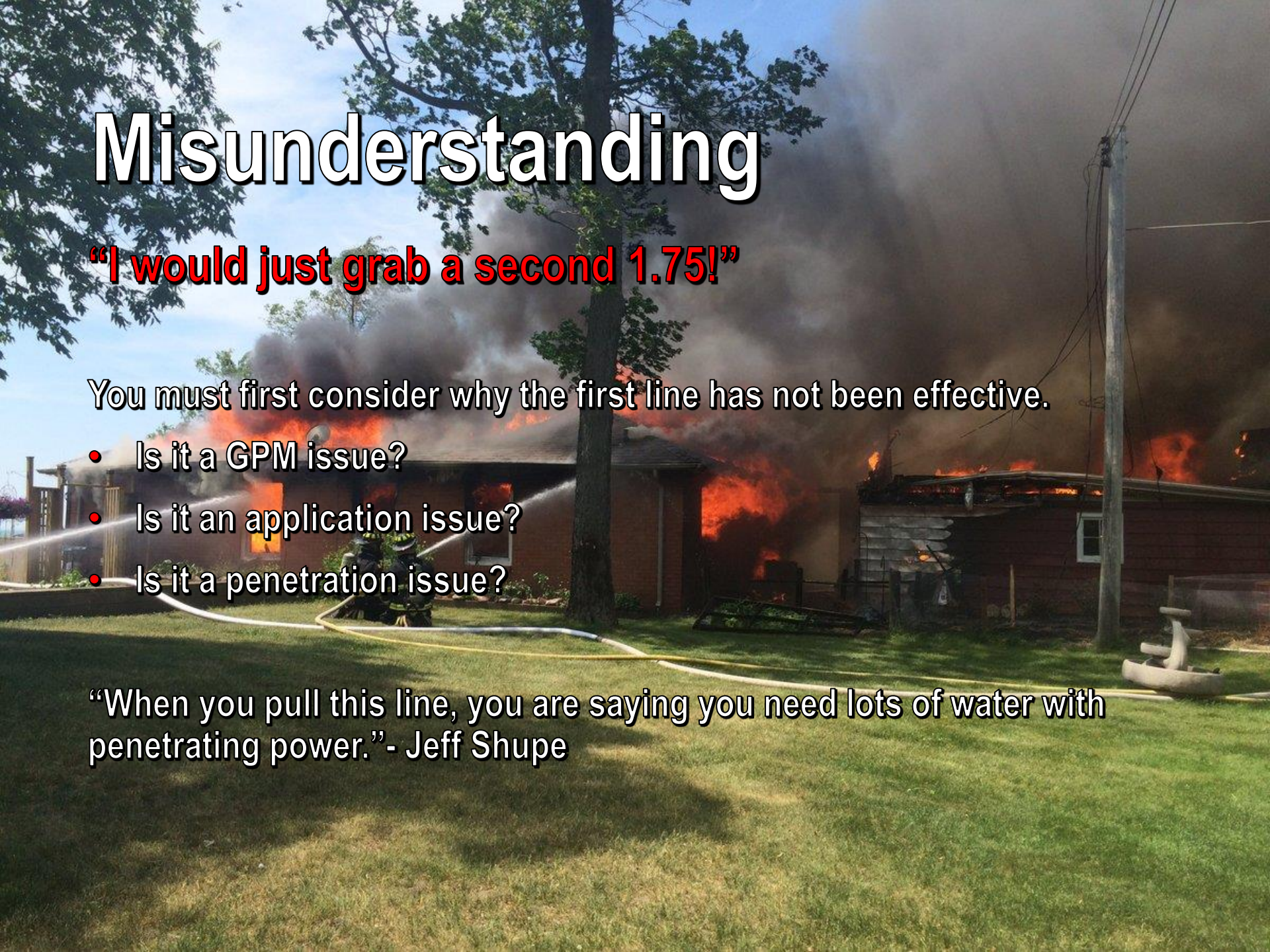
WATER WEIGHT

	Internal Diameter	Gallons per 100’	Weight per 100’
Traditional Double Jacket	2.5”	25.4	212 lbs.
Modern Double Jacket	2.75”	30.9	258 lbs.
Modern Lightweight	2.88”	33.7	281 lbs.

HAVE TO GO BACK TO FUNDAMENTALS

- Due to the size and weight of the 2.5” line, it is very unlikely that “muscling through” will be an effective approach.
- Areas of Focus
  - Grip
  - Body positioning
  - Line placement





Misunderstanding

"I would just grab a second 1.75!"

You must first consider why the first line has not been effective.

- Is it a GPM issue?
- Is it an application issue?
- Is it a penetration issue?

"When you pull this line, you are saying you need lots of water with penetrating power."- Jeff Shupe

HOW CAN WE USE IT MORE?

- Recognize how effective the line is
- Setting up the line for usage
- Training

IT IS EFFECTIVE

IT IS EFFECTIVE

MISAPPLICATION… YET, STILL EFFECTIVE

THE SET-UP

Have a plan in mind for how the hose will be stretched, and adjust the hose loads accordingly.

The flat load might be good enough, but it is up to the firefighter to deploying the line to make it great!

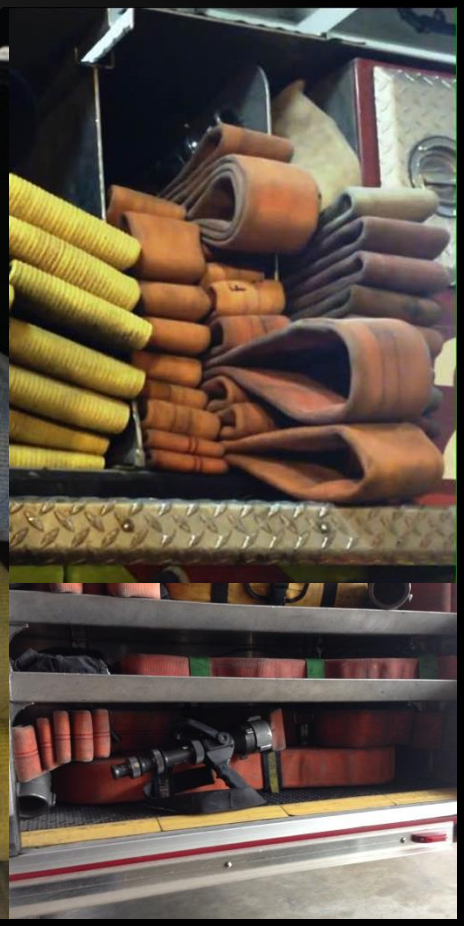
CONSIDER USING BUNDLES

Bundles offer numerous benefits to engine crew including:

- Timeliness in Deployment
- Ease in Advancement
- Have predictable layouts of the working length.

BUILD A LINE WITH SPEED IN MIND

Create a rapidly deployable option that closely aligns with your engine's idle pressure.

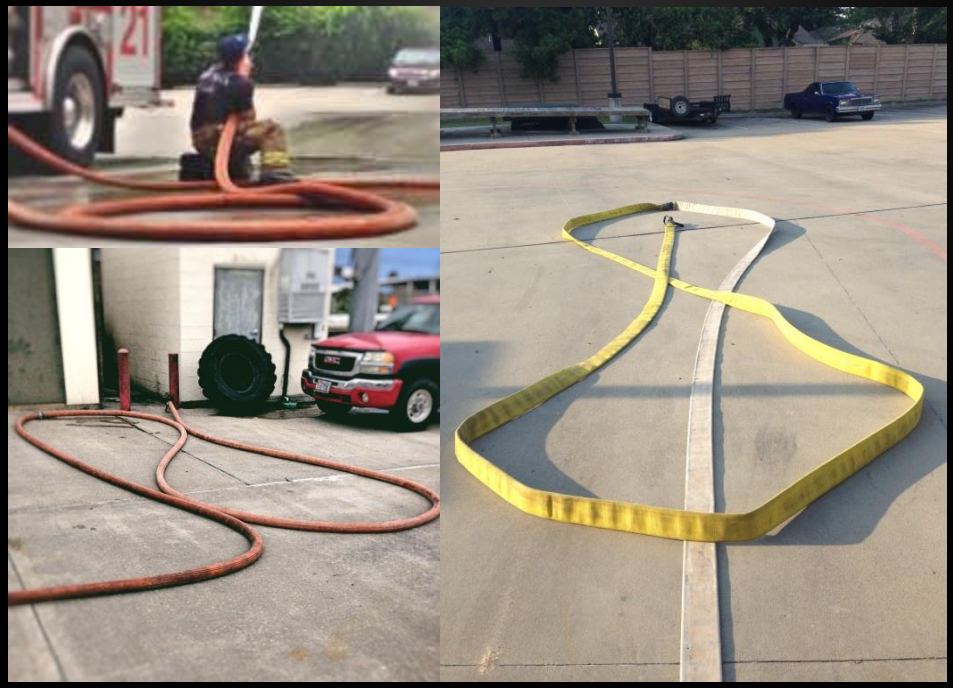


IT'S FOR MORE THAN JUST DEFENSIVE POSTURING!

THE LAY OUT

Our goals with these hose deployments should include having a staged working length that is advantageous to advancement.

“If you are fighting fire hose, you are not fighting fire.” – Aaron Fields




Training!

OVERCOMING EXCUSES

- One of the biggest excuses given for failing to train is that equipment and apparatus have to be pulled out of service.

- Quality training with the 2 ½” can be accomplished without the use of an engine!

COMMON ISSUES WITH 2.5”

- Over pumping the lines
- Failure to chase kinks
- Confusion of firefighter roles
- Slow hose deployments
- Maneuvering in confined spaces
- Fatigue (mental and physical)

HOSE MANAGEMENT

“Take time to make time!”

Prior to charging the line, go through a mental checklist

- **Is my lay advantageous to advancement?**
- **Are there any obstacles that I can still eliminate?**
- **If operating in an elevated position, are hose straps in place?**

HOSE MANAGEMENT

Build S's into your line.

- Provides extra feet of slack in the line for advancement
- Works as a loaded coil once the bail is shut.
- Aides in moving the hose around corners/other obstacles.

PINNING THE LINE

Fatigue will always be an issue when operating lines with high GPM flows. Use the weight of the line to your advantage!

- Kneel on the line
- Use walls, corners, furniture, etc. to counter nozzle reaction
- If a pistol grip/handle is present, consider bracing it on a stable object (i.e. couch, door frame, railing)

COMMIT TO BUILDING BOMB-PROOF BACK-UPS

The role of the back-up firefighter is paramount to the success of advancement!

Instruction cannot end with the nozzle firefighter!

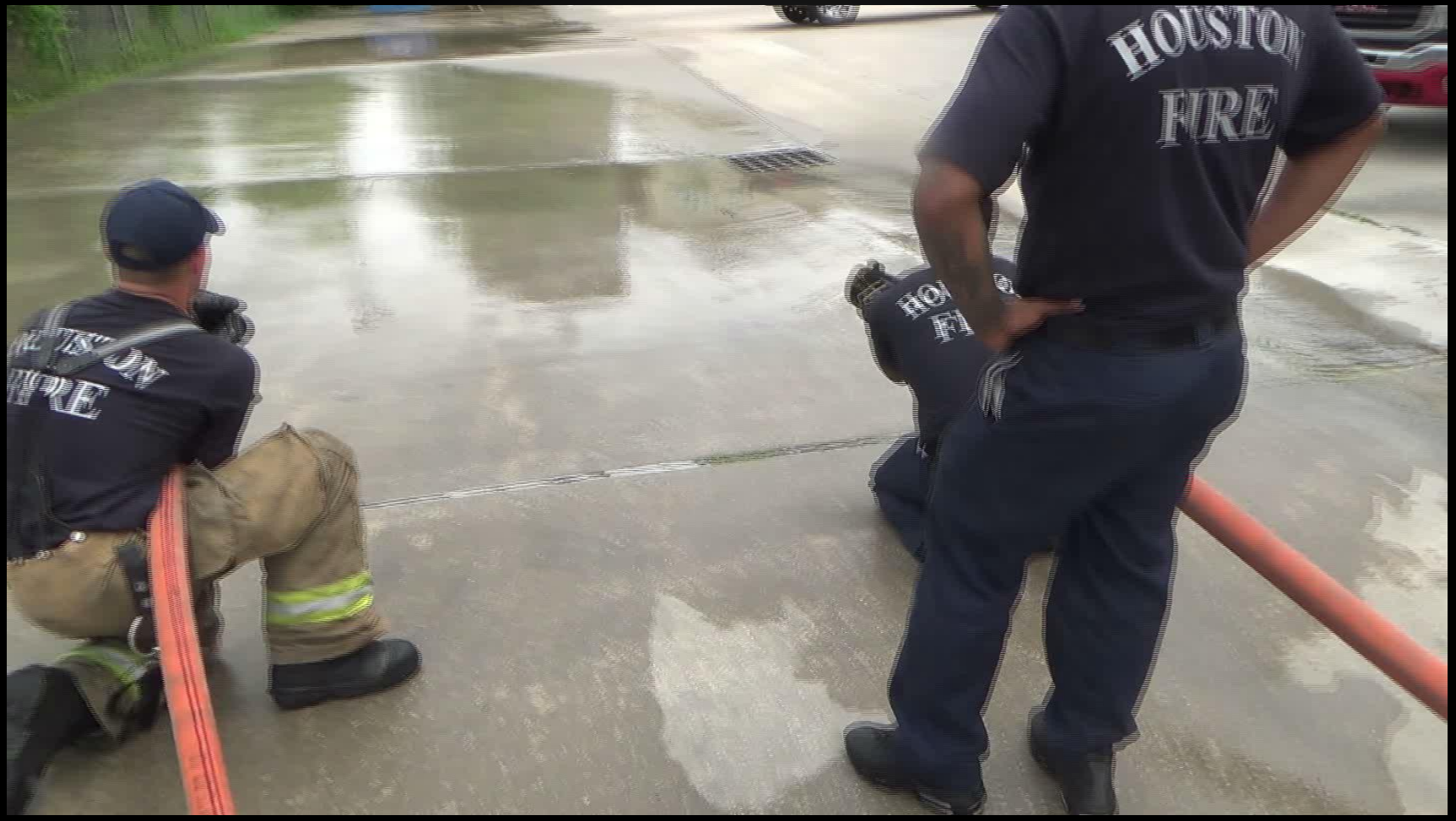
Recognize that positioning is ever changing based on whether the line is being advanced.

BRINGING IT TOGETHER

“Flow Water!” – Nate Jamison,
Denver Fire & Nozzle Forward

APPENDIX

Can you flow the same amount of water through an 1.75” line as a 2.5” line?



APPENDIX

Knowing that similar flows can be achieved, why not just use an 1.75”?

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Photos used from:

Adams County Fire Rescue, Brian Brush, David Destefano, Fire by Trade, Nozzle Forward

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