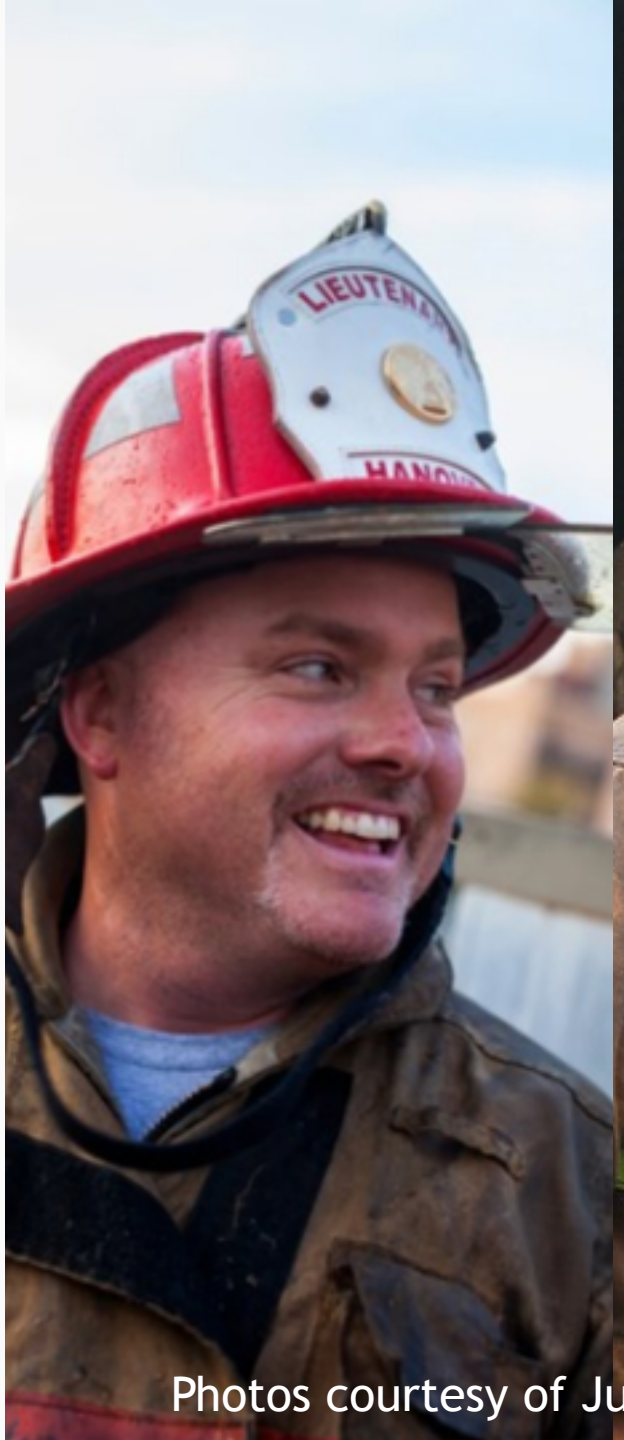
Estimating the Stretch

The Long and Short of Engine Work

Photo By M. VonAppen

Lt. Brad Clark

Last Alarm
10/11/2018



Lt. Nate Flynn

Last Alarm
7/23/2018

Photos courtesy of Justin Ide and Tim Olk


GARY LANE – MIKE DOWLING – DAVE LEBLANC – SHAWN DONOVAN
JIM MCCORMACK – GREG WHEELER – CHRIS CUMMINGS – TIM KLETT – GRANT SCHWALBE
CODY TRESTRAIL – ADAM MAIERS – DENNIS LEGEAR – DENA ALI – JOHN SPANBAUER
JEFF SHUPE– AARON FIELDS – BILL SCHNAEKEL – RAY MCCORMACK –BRIAN ABBOTT SHAWN FOUST
BILL CAREY – MARQUES BUSH – JESS RODZINKA – PAT PRIMEAUX – RYAN MCGOVERN – CHRIS TOBIN
SAM HITTLE – DAVID MOORE – ANDREW ZYSK – JIMMY GREENE – DENNY WEST – JOE LORD
BRIAN SANZO – JORDAN HOOD – BRIAN BASTINELLI – WELLS WILSON – BRIAN YONKIN – JONAH SMITH
JOE YOWLER – RIC JORGE– ANDREW PRISTACH CHRIS KNIGHT – BRIAN BRUSH – GARRETT CROTTY
MATT HARRABURDA – TODD SZELKOWSKI – DREW PRIBUSH– DAVE TOPCZYNSKI – JULIA JORDANO
NATE FLYNN – BRAD CLARK
ANDY FREDERICKS
LT. ANDREW A. FREDERICKS
FDNY
SQUAD 18
FIREFIGHTER
EDUCATOR
BROTHER
BOX 5-5-8087
9-11-01
NEVER FORGOTTEN
Photo Courtesy
of M. VonAppen

-manship

“an independent suffix with the meaning ‘skill in a particular activity, especially of a competitive nature”

Photo Courtesy of D. Hernandez

Who the is this guy?

Career Lieutenant

Fire Lt. on E-9 in the Denbigh Area Of NN

Training Coordinator

West Point Volunteer Fire Department

Instructor

Andy Fredericks Training Days, FDIC, Art of Firemanship, Portland Firemanship,

This is not a class on shortcuts

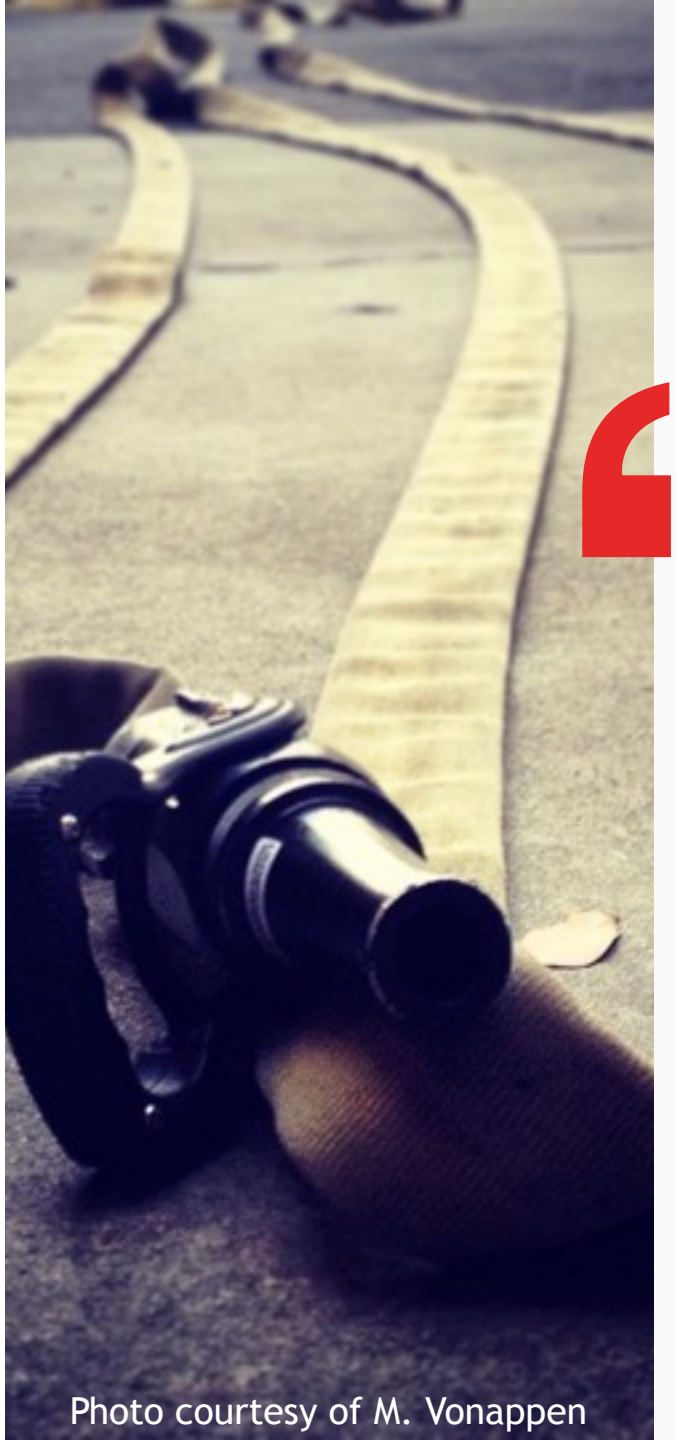


Photo courtesy of M. Vonappen

> Stretching and advancing the initial attack line is the most fundamental and important task an engine company has to perform.

-Lt. Andy Fredericks

This is not a class on shortcuts

Estimating is about making the time to take the time

Do not cut corners. It will cost you time.

As you improve, the difficult stretch ends up being the best one

Definitions

Drop point

outside location where you'll drop hose and charge it

Leader Line

usually 3 or 2.5 inches in diameter with gated wye or reducer that feeds 1.75 attack lines

Crosslay

hose on a engine that can be quickly unloaded from either side of the apparatus

Working Length

last 50 feet of attack hose leading to the nozzle

History Lesson

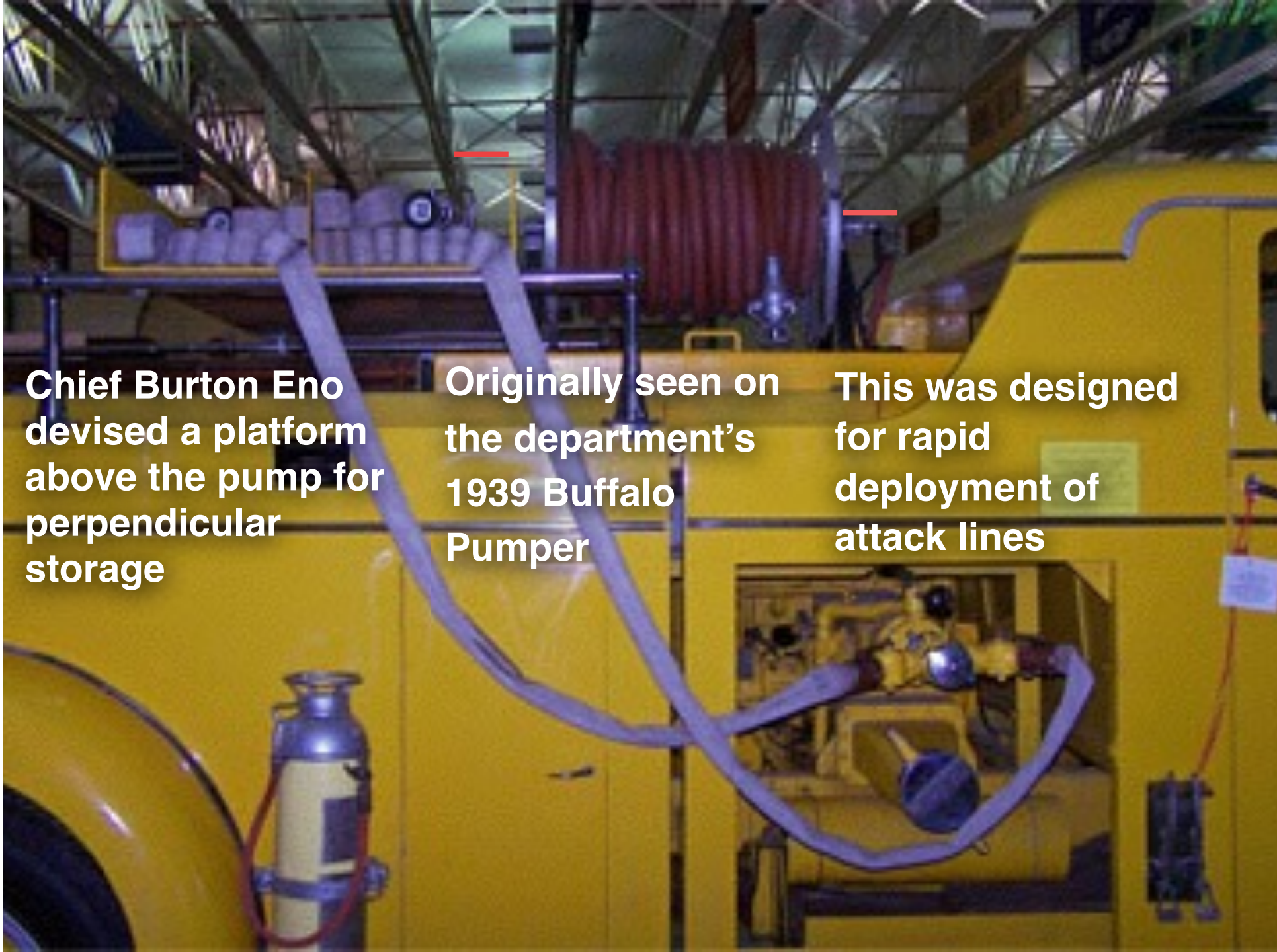
Leather hose with rivets

Hose reel

First hose beds

The basis of the modern engine

History Lesson



The perfect storm of salesmanship and convenience has ruined our ability to see beyond the pre-connect.

Why estimating the stretch

-What's old is new again

-Long lines

-Different length lines

-Static beds

Why estimating the stretch

- Shotgun houses
- Garden style apartments
- Mid/high rises
- Bigger set backs/bigger homes

Photo Courtesy of Gary Lane

Why?

In modern residential structures we face obstacles that were not around 30 years ago

Size of homes- Average new home is 2,467square feet. 61% bigger than 40 years ago

Construction techniques, materials, open floor plans, fire spread

MARK04

Parked Cars, Dumpsters

Landscaping, Fences, Trees

New giant fire engines/quints/ pumper tankers etc

Killing ladder company ops


GO AHEAD AND
I'M RELOADING

Why we estimate

Part of your size-up to determine how much hose you will need to reach the structure and then make the advance and extinguish the fire.

Second line and third line

A stretch estimate is necessary in order to avoid two common fire ground errors, stretching short and overstretching.

Why?

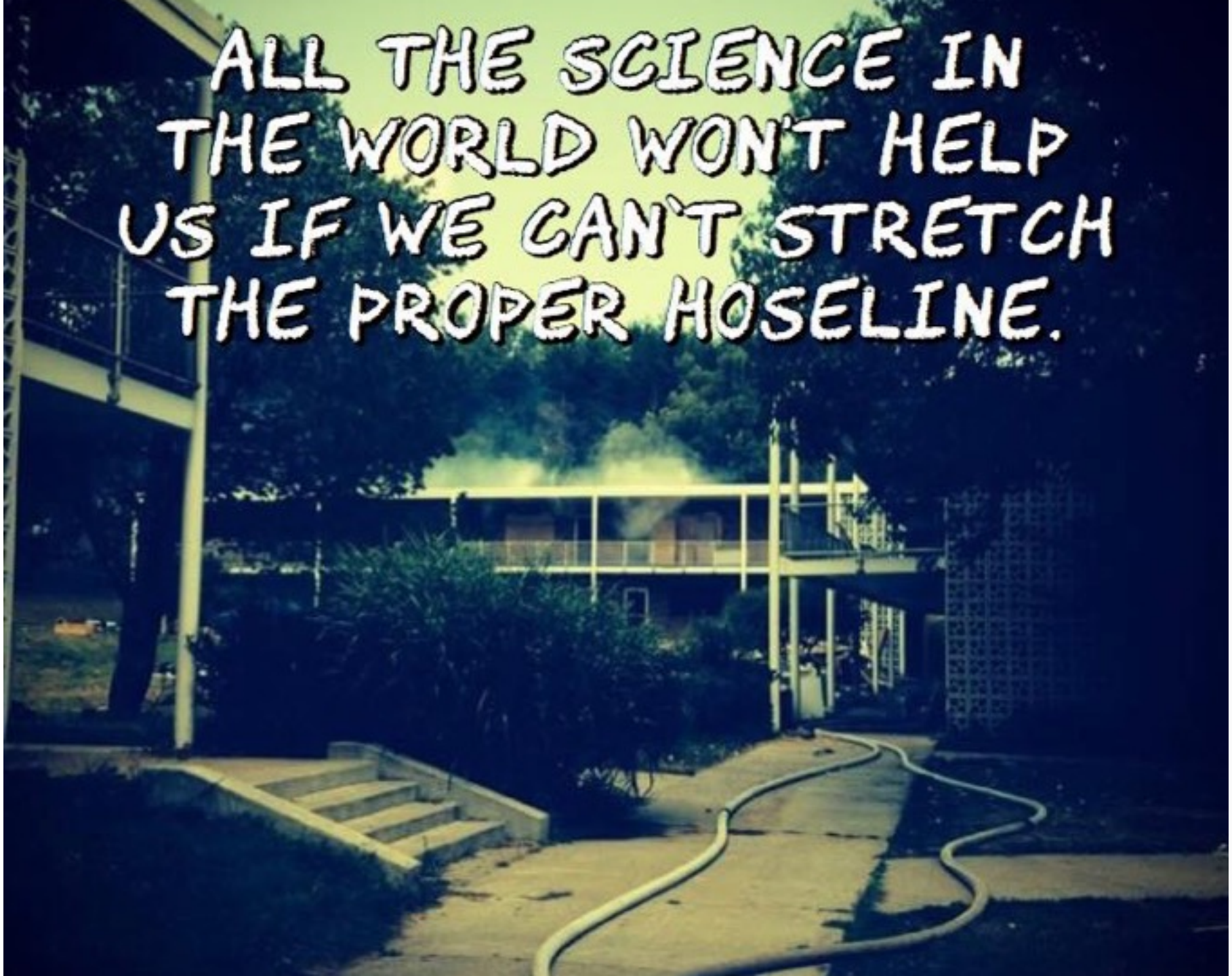
75% of fire are out on arrival or handled by pre-connects

Less than 2% of fires cause most of the loss of life and 70% of the damage

Less than half of 1% of the fires produce losses more than $10000. But this half of 1% causes 25% of our fire loss.

CONCLUSION: We are good on the average fire but questionable on problem fires.

MARK04


ALL THE SCIENCE IN
THE WORLD WON'T HELP
US IF WE CAN'T STRETCH
THE PROPER HOSELINE.

The Short Stretch

01 The attack line and nozzle will be unable to reach the fire

02 Extinguishment will be delayed until the line can advance into the occupancy or room of origin.

03 Allows unchecked fire growth and extension

The Short Stretch

04 It will delay the search and reduce the survival chances for trapped occupants.

05 Stretching short isn’t always about not having enough hose.

06 Embarrassing as fuck

Too Much Hose

Too Much Hose

You lose time because extra hose has to be flaked out and staged

Too much hose reduces your speed and ability to advance hose in the fire building

Increases possibility of kinks and reduces flow.

6827 Clowser Ct

At 0755 hours on January 22, 2011 Fairfax County Fire and Rescue Department units were dispatched to a reported structure fire at 6827 Clowser Court in the Springfield area. The first arriving unit (Engine 422) reported an end unit townhouse with smoke showing from the Alpha, Charlie, and Delta Sides, with fire on the first floor

The fire originated in the kitchen due to unattended cooking

6827 Clowser Ct.

While advancing on the fire, there was rapid fire progression* on the first floor. This event occurred approximately 5 minutes after the 1st unit arrived. The truck crew, consisting of two personnel, and the Engine Officer were able to self-evacuate to the exterior on Side Alpha. Two other members were assisted from the structure by members of Rescue 426

**There was material found in the rooms, after the fire that indicated that the compartments did not reach flashover conditions*

Finding:

The first attack line deployed from Engine 422 was 300 feet in length and was unable to advance fully into the structure. Engine 422 was positioned within 50 feet of the front door.

Contributing Factors:

The crosslays on Engine 422 were packed with the front crosslay of 200 feet and the nozzle on the driver's side. The rear crosslay was 300 feet and the nozzle on the officer's side. The crew made the decision which line to deploy based on the nozzle being on the same side of the apparatus as the fire, which in this case was the officer's side. This resulted in an attack line of 300 feet being deployed and flaked in a 'short set back' situation. Too much hose in this small front yard posed a challenge in both deploying and pulling the hose into the interior of the building.

Lessons Learned and Recommendations:

The choice of attack line length should be based on the distance required to engage the fire. Crosslays should be packed in a manner which allows deployment from either side.

Action Plan:

Station Captains are to evaluate hose line configurations and ensure compliance with Standard Operating Procedure 3.07.01, Nozzles and Hose, Supplies and Configurations.

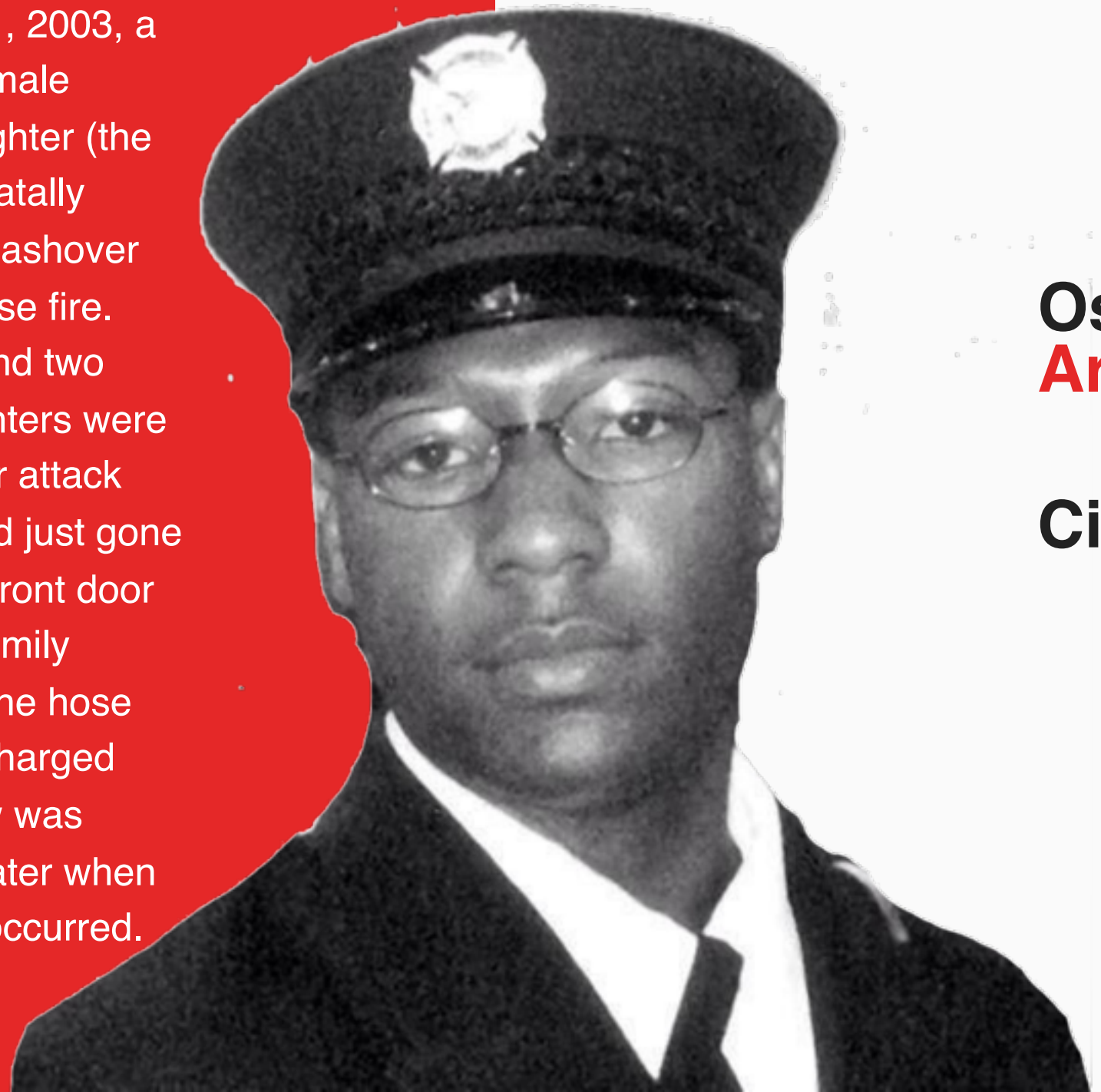
Finding:

The Officer entered the structure after the nozzle firefighter and the backup firefighter.

Contributing Factors:

As a result of processing information, communicating orders and other necessary actions, the Officer was last on the line as it entered the structure. The Officer was not in a position to monitor the fire area, direct the nozzle team's advance, or determine the effect of the stream on the fire. When the line was unable to be advanced any further, due to the narrow hallway the

On March 21, 2003, a 25-year old male career fire fighter (the victim) was fatally injured in a flashover during a house fire. The victim and two other fire fighters were on an interior attack crew and had just gone through the front door of a single family residence. The hose line was uncharged and the crew was calling for water when a flashover occurred.



Oscar “Ozzie” Armstrong III

Cincinnati Fire

MARK04

1131 Laidlaw Ave

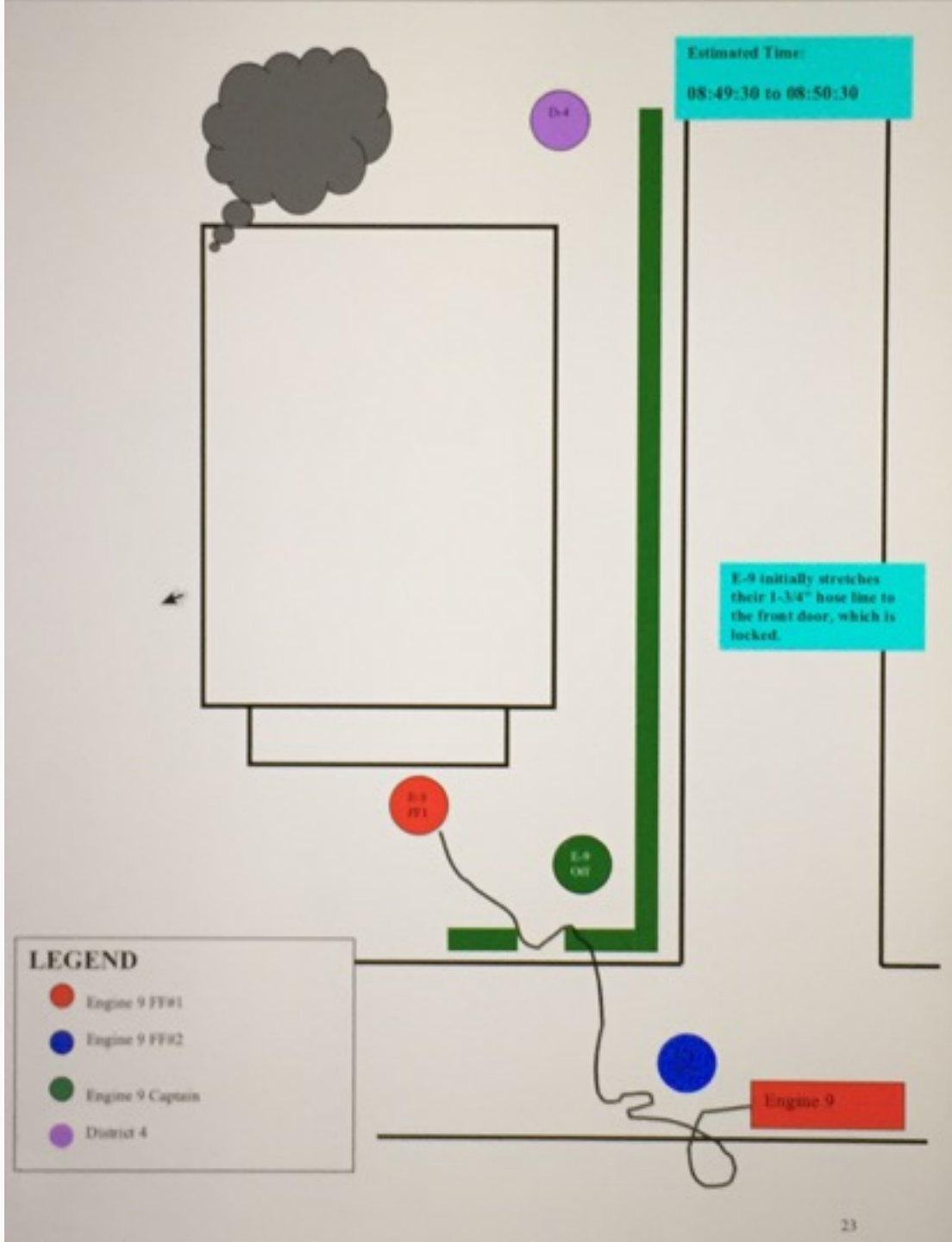
The fire originated in the kitchen of the two-story single-family residence. It was determined to have started on the stovetop from a burner that was left on with grease in the cooking pot. There was heavy fire showing from the first floor rear (side “C”) of the structure.

1131 Laidlaw Ave

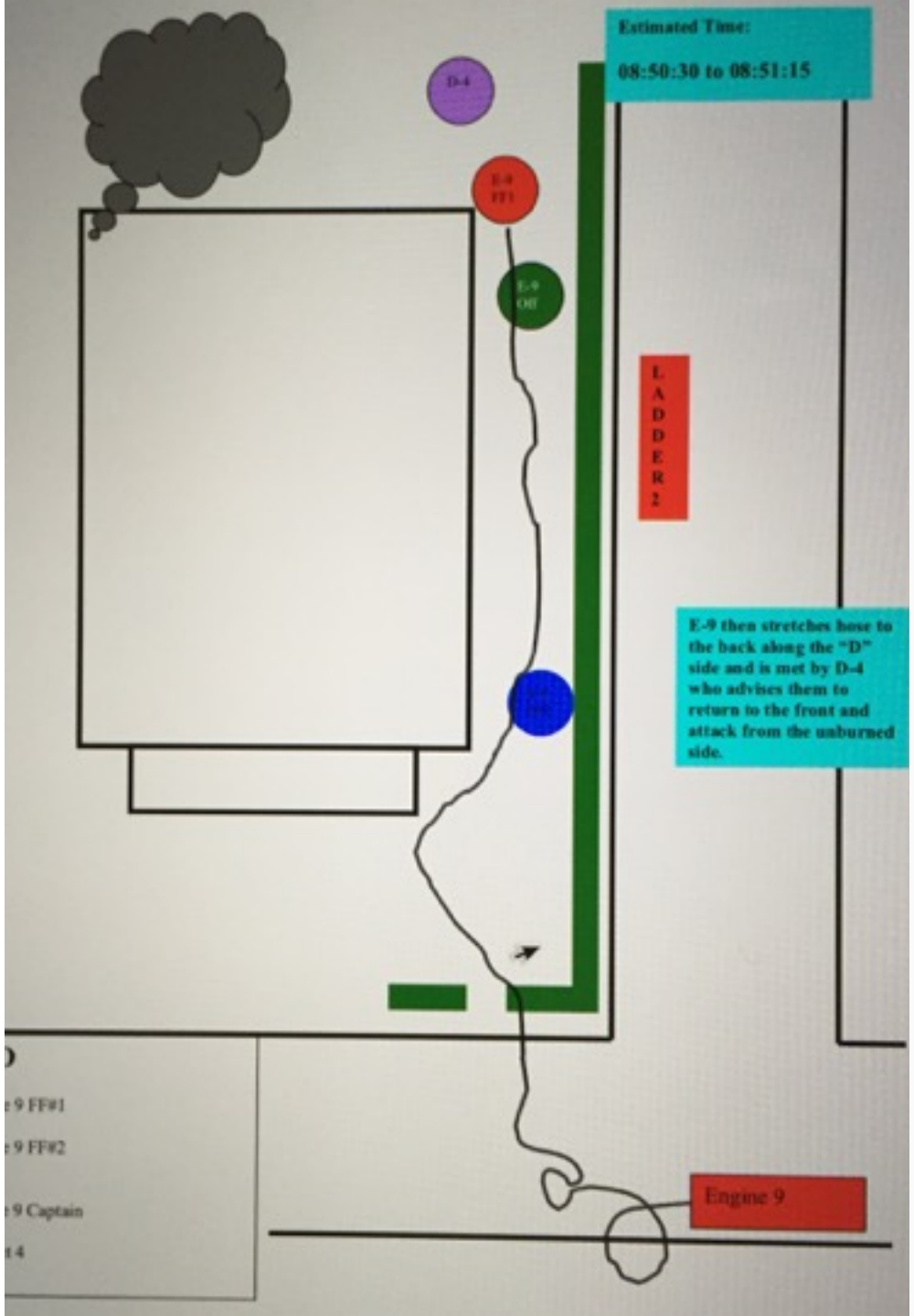
The fire progressed to the flashover stage in approximately 3 minutes 40 seconds after the arrival of Engine 9, the first engine company on the scene.

1131 Laidlaw Ave

- E9 proceeded past the fire building and went into front suction at the hydrant located at 1124 Laidlaw across the street from the fire building.
- The Acting FAO began hooking up his supply lines and preparing for pumping operations.
- E9 initially stretches their 1-3/4” hose line to the front door, which locked



1131 Laidlaw Ave

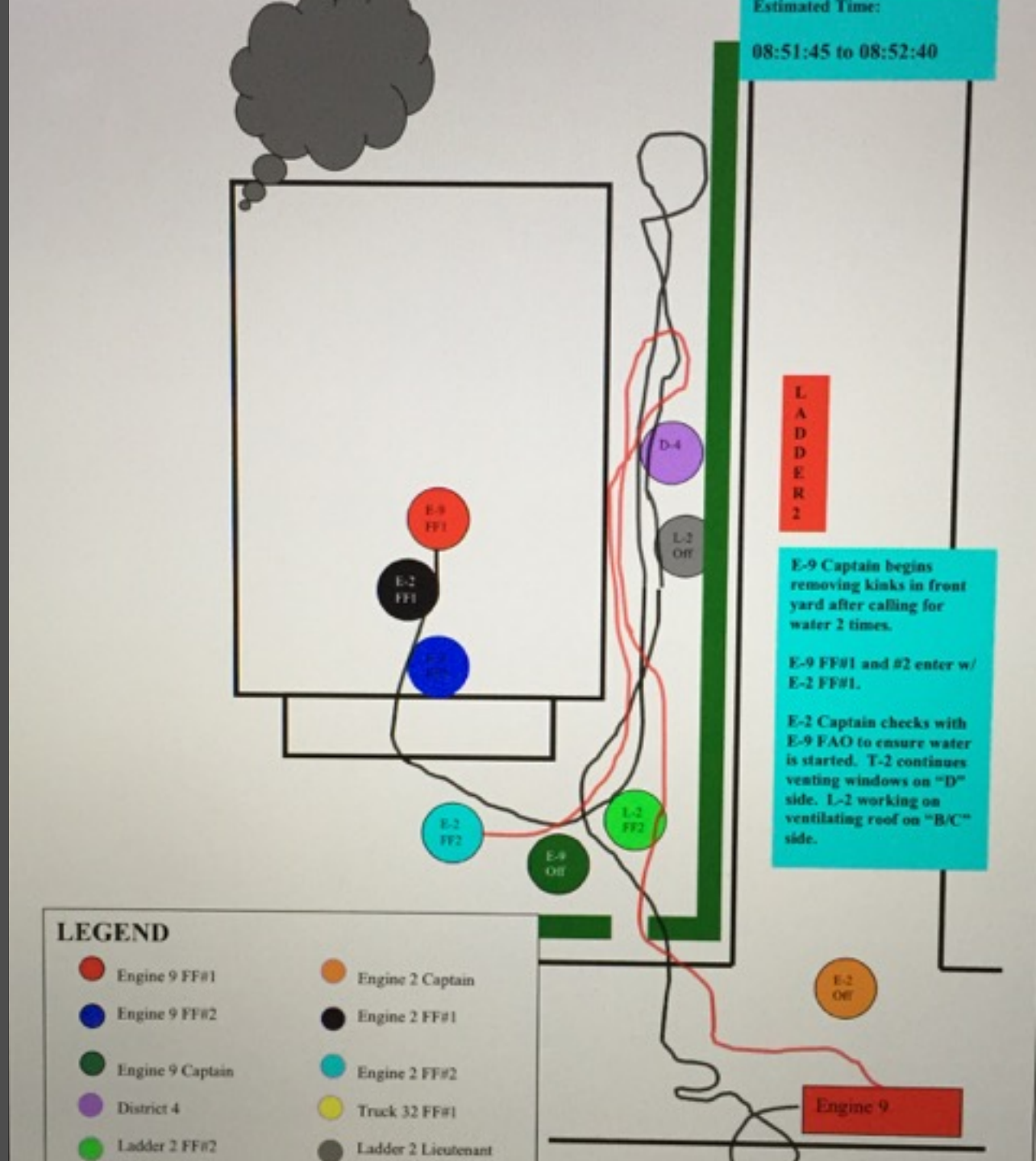


- E-2 FF #1 meets E-9 crew on the front porch and also dons his mask.
- The E-9 Captain calls for water 2 times and one time by hand signals from the porch. The Acting FAO started the water in the fire hose line.
- Upon arrival at the front door, the door was locked and they proceeded to the rear of the structure with the Captain of E-9 joining them.

MARK04

1131 Laidlaw Ave

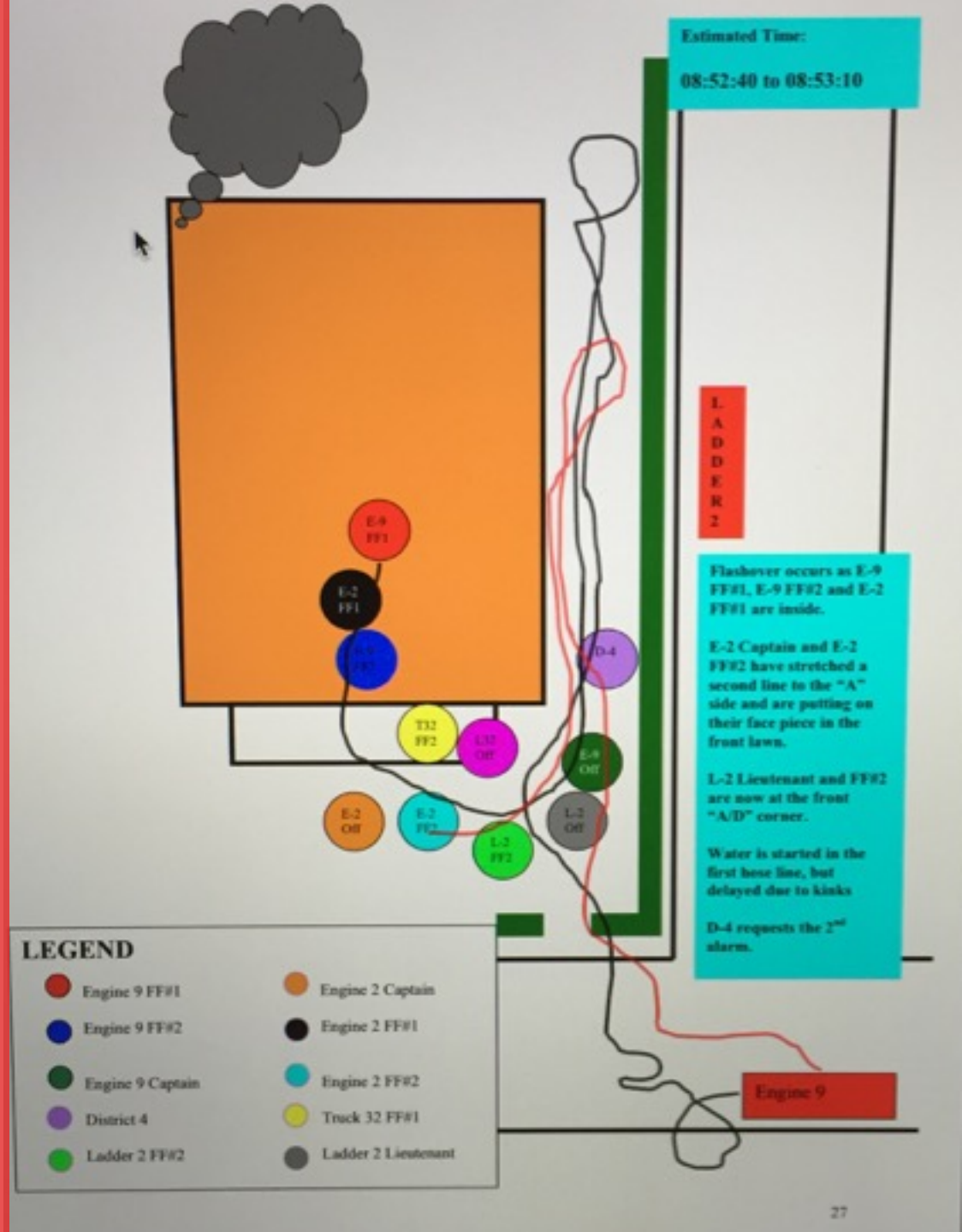
- E-9 Captain begins removing kinks in front yard after calling for water 2 times.
- E-9 FF#1 and #2 enter w/ E-2 FF#1.
- E-2 Captain checks with E-9 FAO to ensure water is started.



1131 Laidlaw Ave

FLASHOVER OCCURS

- E-9 FF#1, E-9 FF#2 and E-2 FF#1 are inside.
- E-2 Captain and E-2 FF#2 have stretched a second line to the “A” side
- Water is started in the first hose line, but delayed due to kinks



1131 Laidlaw Ave

- “The initial 1¾-inch hose line from Engine 9 was 350 foot long (seven 50 foot sections) which became severely kinked restricting water flow”

- “Firefighters should continually train in establishing water supply, proper hose deployment, and advancing and operating hose lines to ensure successful interior attacks.”

1. Basic fire fighting skills are critical. These skills should be reinforced at every opportunity.

Fire fighters at this incident from the first two engine companies initially began stretching their hose lines to the rear of the structure and were ordered to attack from the unburned area in the front by the incident commander. Fire fighters also improperly stretched the initial hand line resulting in piles of hose and kinks, restricting the flow of water to the nozzle. Ventilation of the structure began without a charged attack line in place. A coordinated fire attack (coordinating ventilation with hose deployment and discharge of water) is essential to limit fire spread. Fire fighters need continual training and reinforcement of basic fire fighting skills after their recruit-training period to enforce these skills throughout their entire career.

2. Proper hose deployment is crucial to saving lives and protecting fire fighters during interior operations. A well placed; appropriately staffed attack line putting water on a fire saves more lives than any other single fire ground function.

If fire fighters initially entering the structure had deployed the hose line appropriately then they could have applied sufficient water onto the fire, thus limiting its size, thermal output, and preventing the flashover from occurring.

MARK04

> It is also important for the company officer to call for the right amount of hose. Having 100 feet of extra hose in the hallway is too much to distribute without kinking. Although it is generally thought to be better to err on the side of stretching too much hose than not enough (stretching short), the overestimation should not be more than one 50-foot length. The officer must estimate how much hose will be needed

Is it really that bad?

Slide 46

Charts and info courtesy of Knapp, Flatley, and Leihbacher

Table 3. Automatic Nozzle

KINK(S)	PDP	GPM	NP	GPM REDUCTION	REACH
No kink	150	150	110	—	—
1-90°	150	120	115	20%	NSC*
1-135°	150	105	105	30%	NSC
1-180°	150	75	100	50%	POOR
2-90°	150	115	115	23%	NSC
2-135°	150	100	110	33%	NSC
2-180°	150	30	90	80%	POOR

* no significant change

Table 1. 15/16-Inch Smooth Bore Nozzle

KINK(S)	PDP	GPM	NP	GPM REDUCTION	REACH
No kink	120	180	54	—	—
1-90°	120	175	50	3%	NSC*
1-135°	125	150	40	17%	NSC
1-180°	125	135	25	25%	POOR
2-90°	120	155	40	14%	NSC
2-135°	135	105	20	42%	POOR
2-180°	130	115	20	36%	POOR

* no significant change

Where do we start?

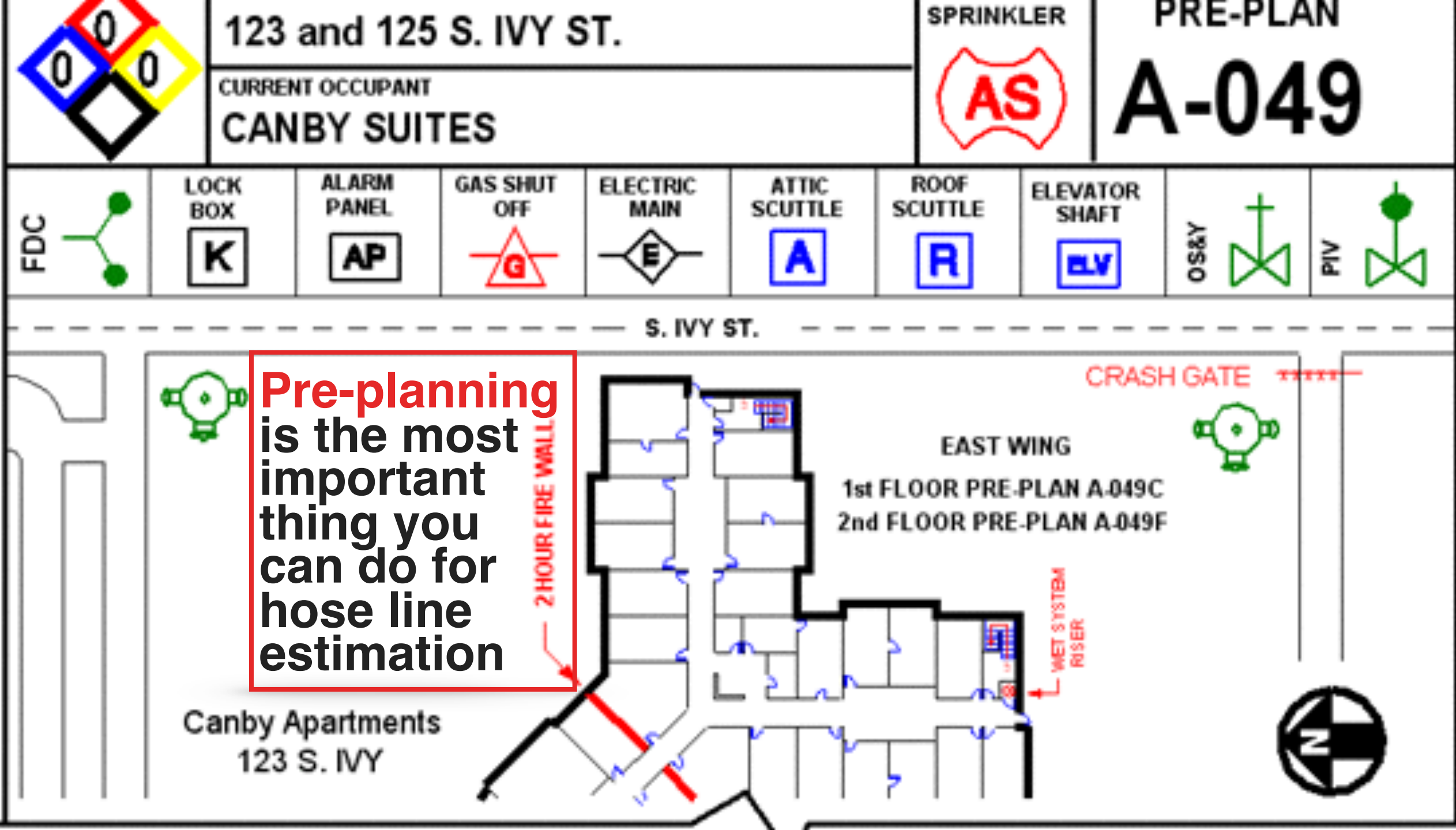
Pre-planning

Unnecessary sentence here just to see if you're paying attention

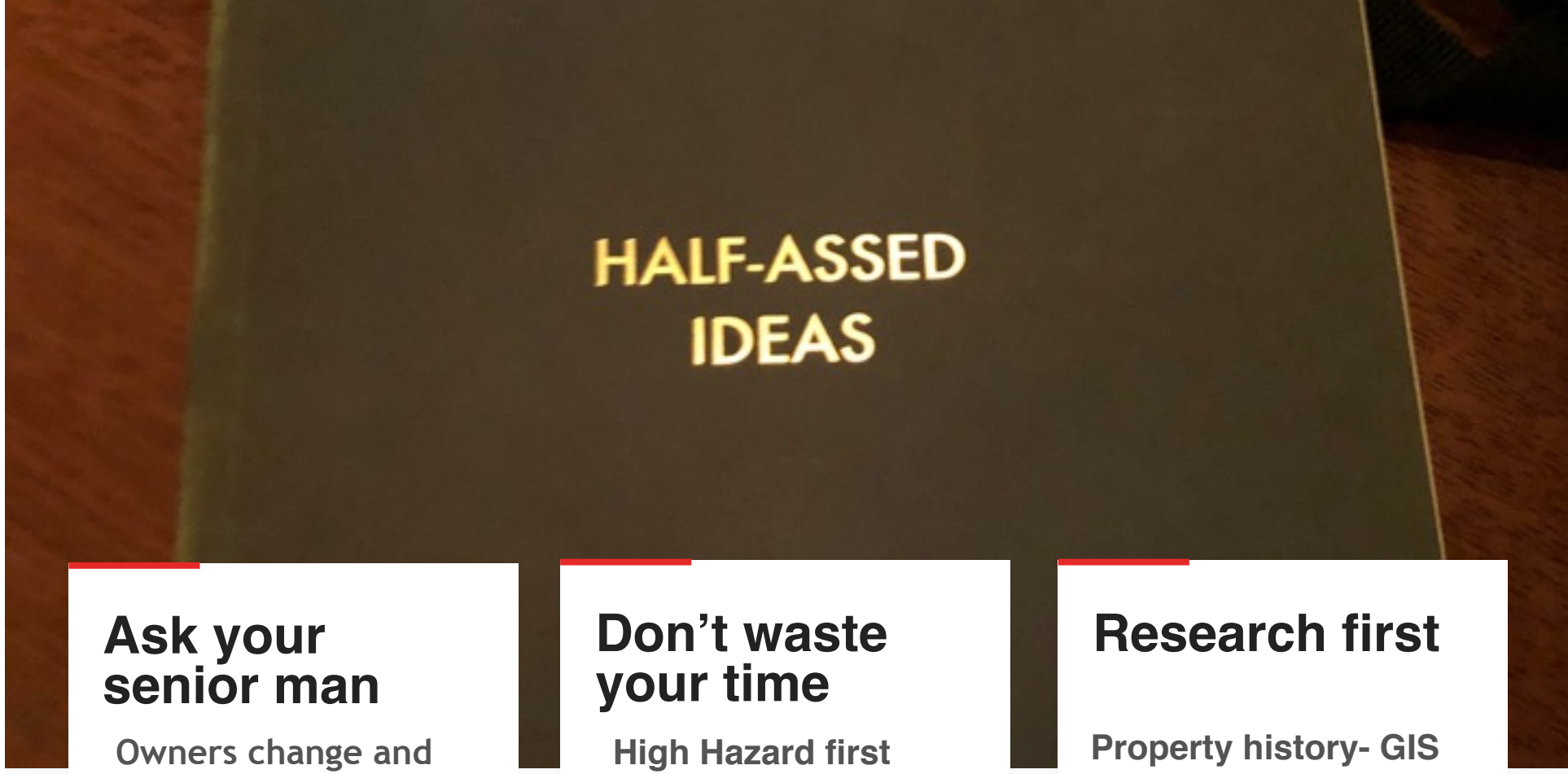
Rules

The traditional rules vs new rules

Training


0
0
0
123 and 125 S. IVY ST.
CURRENT OCCUPANT
CANBY SUITES
SPRINKLER
AS
PRE-PLAN
A-049
FDC
LOCK BOX
K
ALARM PANEL
AP
GAS SHUT OFF
G
ELECTRIC MAIN
E
ATTIC SCUTTLE
A
ROOF SCUTTLE
R
ELEVATOR SHAFT
ELV
OS&Y
PIV
S. IVY ST.
Pre-planning is the most important thing you can do for hose line estimation
2 HOUR FIRE WALL
CRASH GATE
EAST WING
1st FLOOR PRE-PLAN A-049C
2nd FLOOR PRE-PLAN A-049F
WET SYSTEM RISER
Canby Apartments
123 S. IVY
N

Pre planning



Ask your senior man

Owners change and who knows more about buildings in emergencies than us?

Journal/Knowledge Books

Don’t waste your time

High Hazard first

Priorities

Try to schedule

Research first

Property history- GIS

Zillow

Google Maps

Pre Planning

Research

Google Maps
Zillow
Property Search

Start at the top

Start at the the roof and work down.

Take Photos

Drawing is great but photos are better

Software & Sharing

Don’t hoard your knowledge

Fire departments are essentially the de facto historians of buildings in their communities

During your preplanning efforts, you’ll learn more not only about specific buildings, but also about buildings in general. While you’re in a building on an EMS run, take a few moments to make some notes about the building; this will help you if you have to return when it’s on fire.

Seize every opportunity

Medic calls

60-80% of your calls. Get the hell out there and learn something on your toe pain call.

Vehicle accidents

Get out of the road and walk the block while waiting on the tow truck

False Alarms

Why waste this trip?

Just Bullshitting

Get off your ass and talk to people

MARK04


DO NOT
ENTER


©2018 Google

MARK04

MARK04


MARK04

Where do we start?

X

Fire

Where are your conditions on arrival?

Starting Point

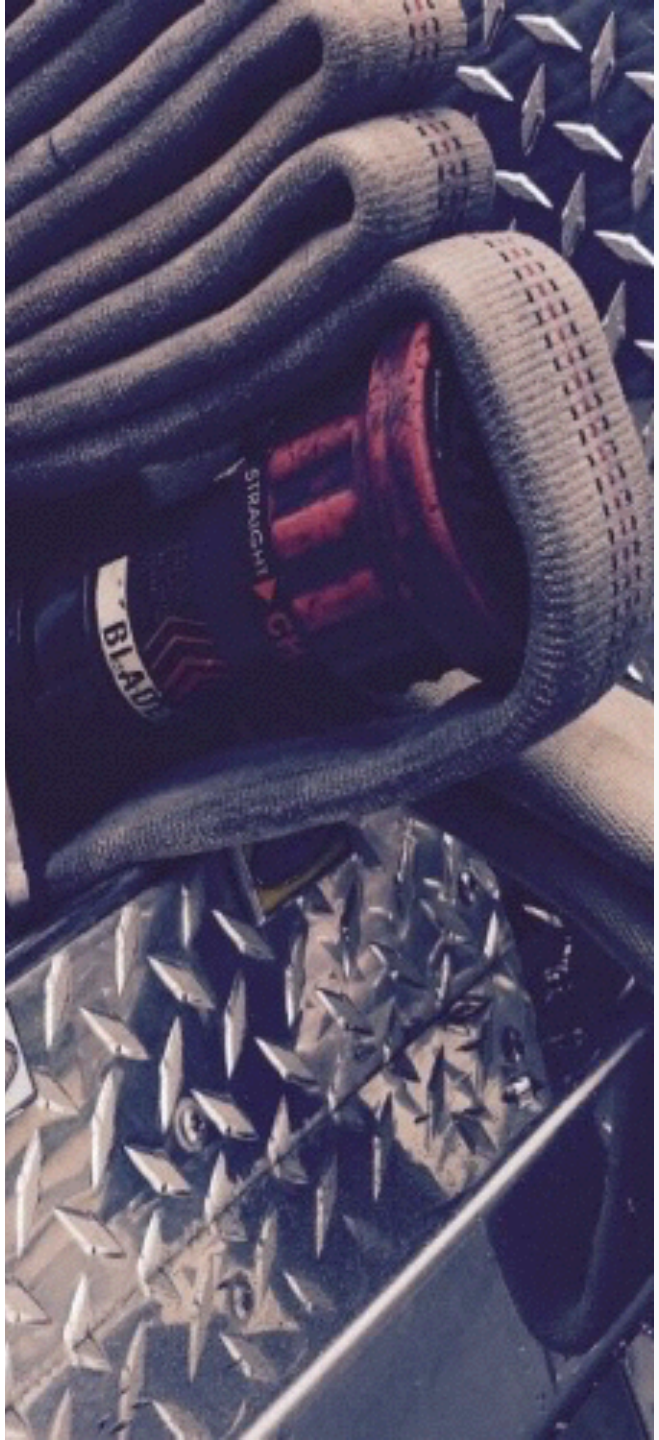
Start from the engine and work your way to the fire.

(I'm ADD as hell, I can't work backwards)

Tunnel Vision

Don't be a moth to the flame

Don’t freak the fuck out because there is fire



> Another key I practiced was to not get distracted by the call itself. I tried to stay disciplined to the facts of the location and sizeup, and not the hysteria and passion. Many members still go to the fire as a moth to a flame.
>
> *- Bill Carey*

Fire conditions on arrival

B Building Type

O Occupancy- What's in the building

E Extent and Location of fire

W Water

L Life- Who's in the building

Which line do I need to pull?

One of the most ignored skills

Not what you need now, but what you're going to need

The key to firefighting is anticipation

Most common failure is a hose that is too small to meet the fires needs

Which line do I need?

Don’t bring a knife to a gun fight

GPM’s over BTU’s

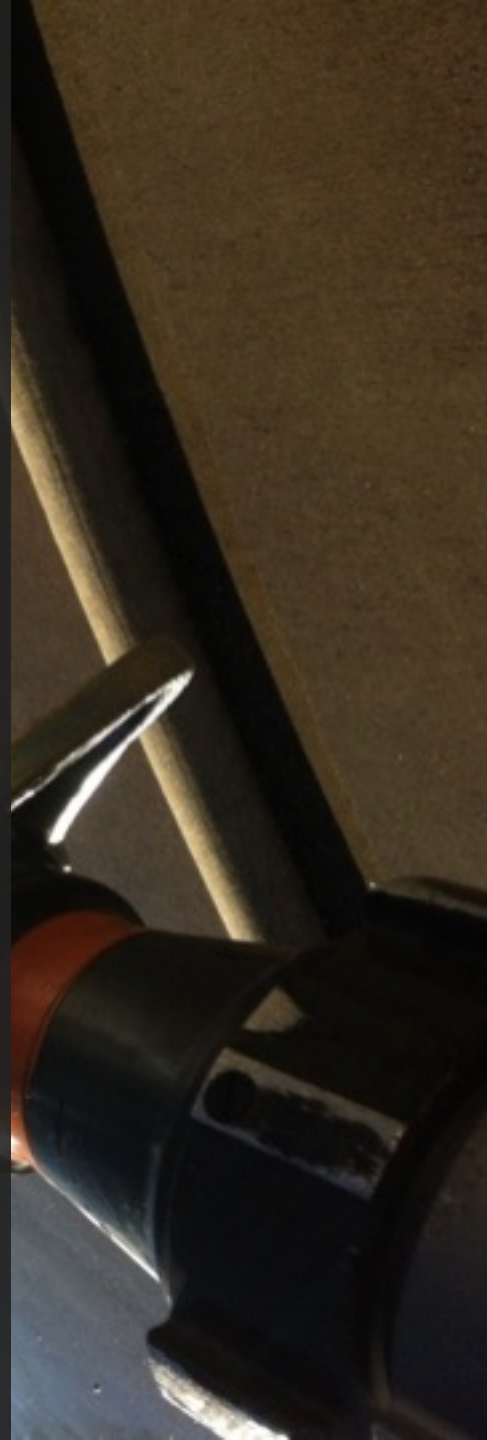
Pick a fight you can win

First decision is strategic

Type of building, response time, staffing.
Residential = 150gpm
Commercial = 250gpm

Second decision is tactical

Fire problem on arrival, SOP’s, Nature of fire occupancy, length of stretch



I will not dispute that 2 1/2-inch hose is difficult to use. Many a big, burly firefighter has been humbled by its sheer size and weight. But no combination of smaller handlines can duplicate the volume, reach, and pure knockdown power of a single, well-placed 2 1/2-inch line.

-Andy Fredericks

A- Advanced Fire
D- Defensive Ops
U- Undetermined Location
L- Large Open Areas
T- Tons of Water
S- Standpipe


40 60


6
N. N. F. D.
City of
NEWPORT
NEWS


After a fire is located, you must determine the path to the fire

01 Which door, hallway, or stairway should be used to reach the fire

02 Length of hose needed to cover the fire area

03 Need to determine the best way to go vertical

Factors to be considered before you stretch a line

D Distance from the engine to the drop point

D Distance from drop point to the foot of the stairs

O Obstacles

S Stairs- What type? (straight run, enclosed, return, around elevator, presence/absence of a well hole.)

N Number of floors to ascend

D Distance to fire area from stairs/entrance

S Size of the Area

*This is not an acronym just trying to have cool looking slides

D.O.S.E.

D — Distance

From apparatus to entrance, entrance to fire area, hose needed to cover the entire fire floor

O — Obstacles

Any obstacles that you may have to overcome that would add length to the stretch

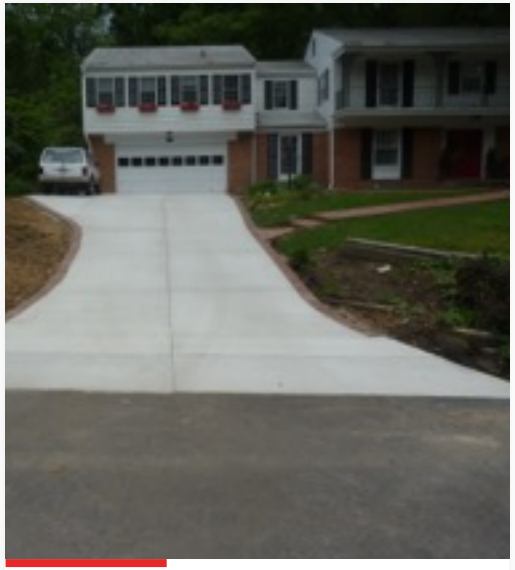
S — Stairs

the length of hose needed to overcome the stairs can only be determined by the type of stair present

E — Elevation

The height of the building must be considered when estimating the hose stretch

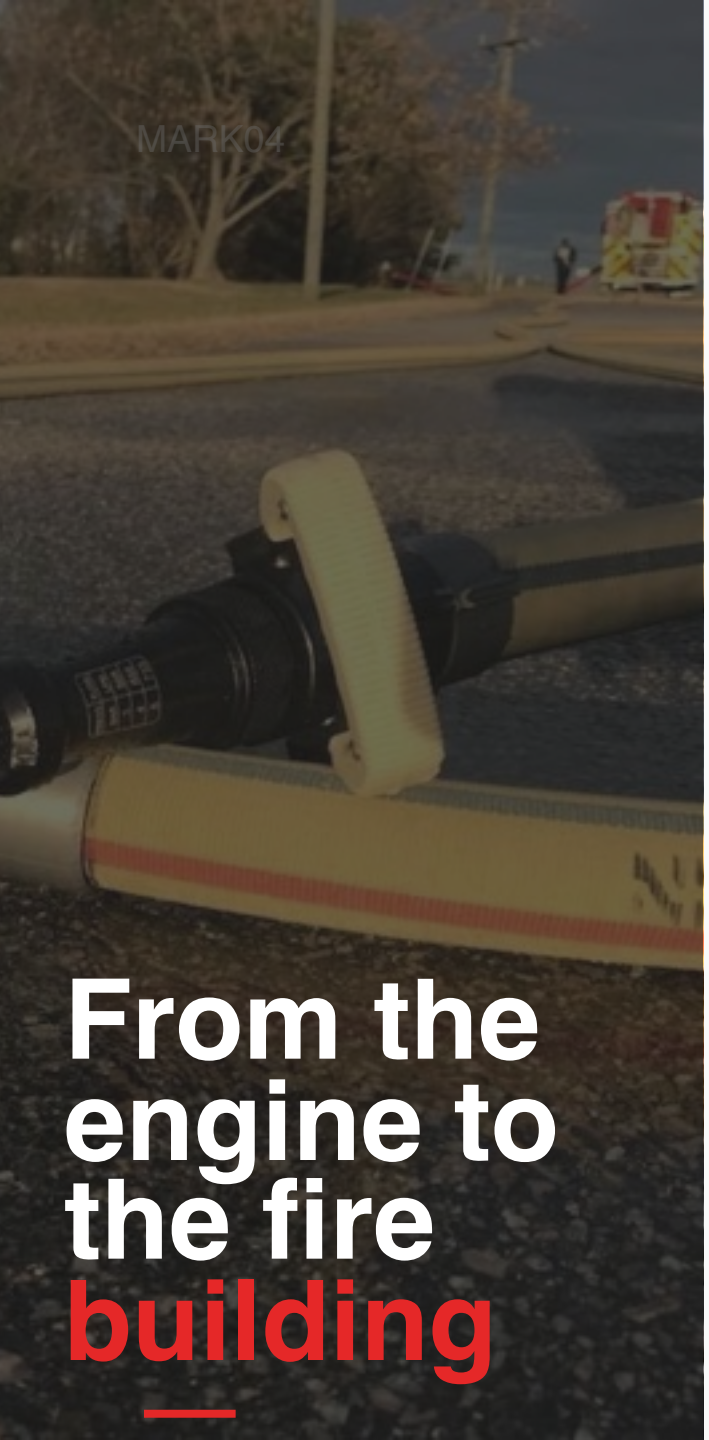
How much hose is needed?



How far is the setback?

The size of the fire building

Obstructions



From the engine to the fire building

Traditional Method

50 feet from the engine to the house

The Known Distance Method

Bracketing

Halving

\

The known distance method

Just like it sounds; you take something you know the distance of and use that to estimate how far away something is.

Relies on using items that you are very familiar with

Use simple stuff like parking spaces and fire trucks.

- 16-18 feet long
- 8-9 feet wide
- Round to 20x10 for idiots like me

Parking spots

Apparatus

Engines

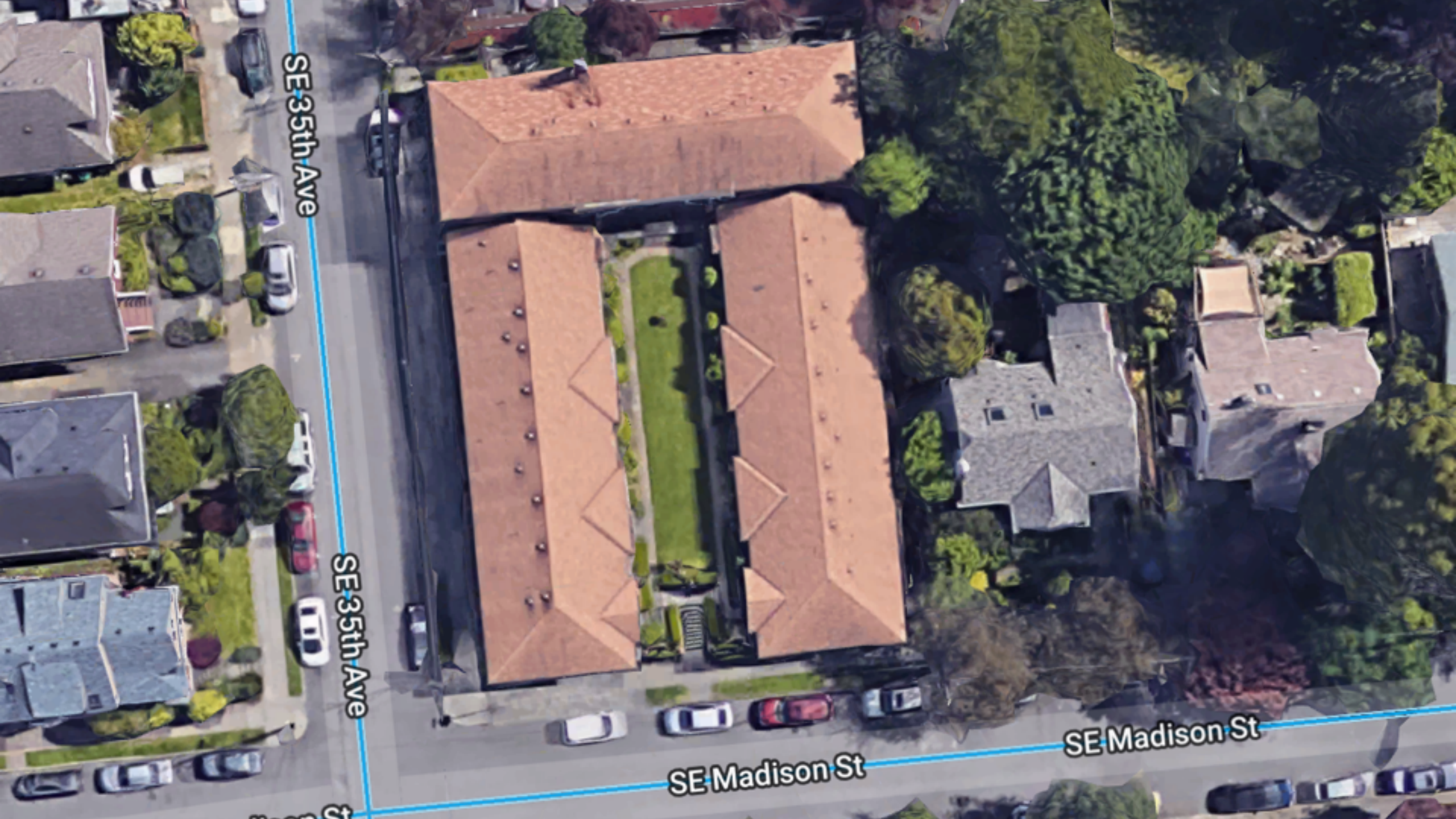
30 feet long

Ladder/ Tower

40 - 50 feet long

Medics

20 feet long


SE 35th Ave
SE 35th Ave
SE Madison St
SE Madison St


2017

Known Distance Method

Utility Poles

Urban Areas

50-125 feet

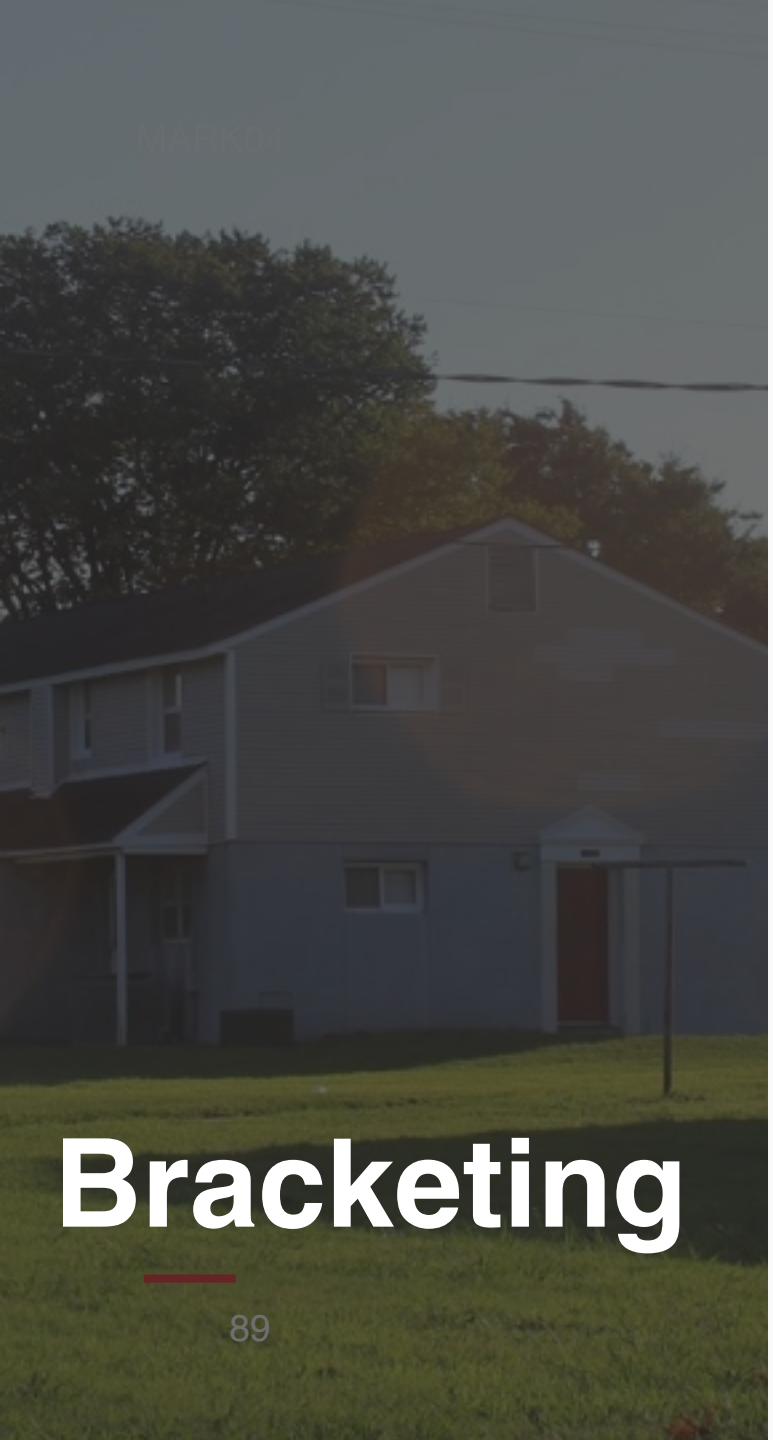
Rural Areas

300 feet apart

Known Distance Method

Distance between houses

- Planned Neighborhoods
- Block Similarities
- Row Homes



Bracketing

The bracketing method of range estimation involves estimating the shortest possible distance and the greatest possible distance to the drop point

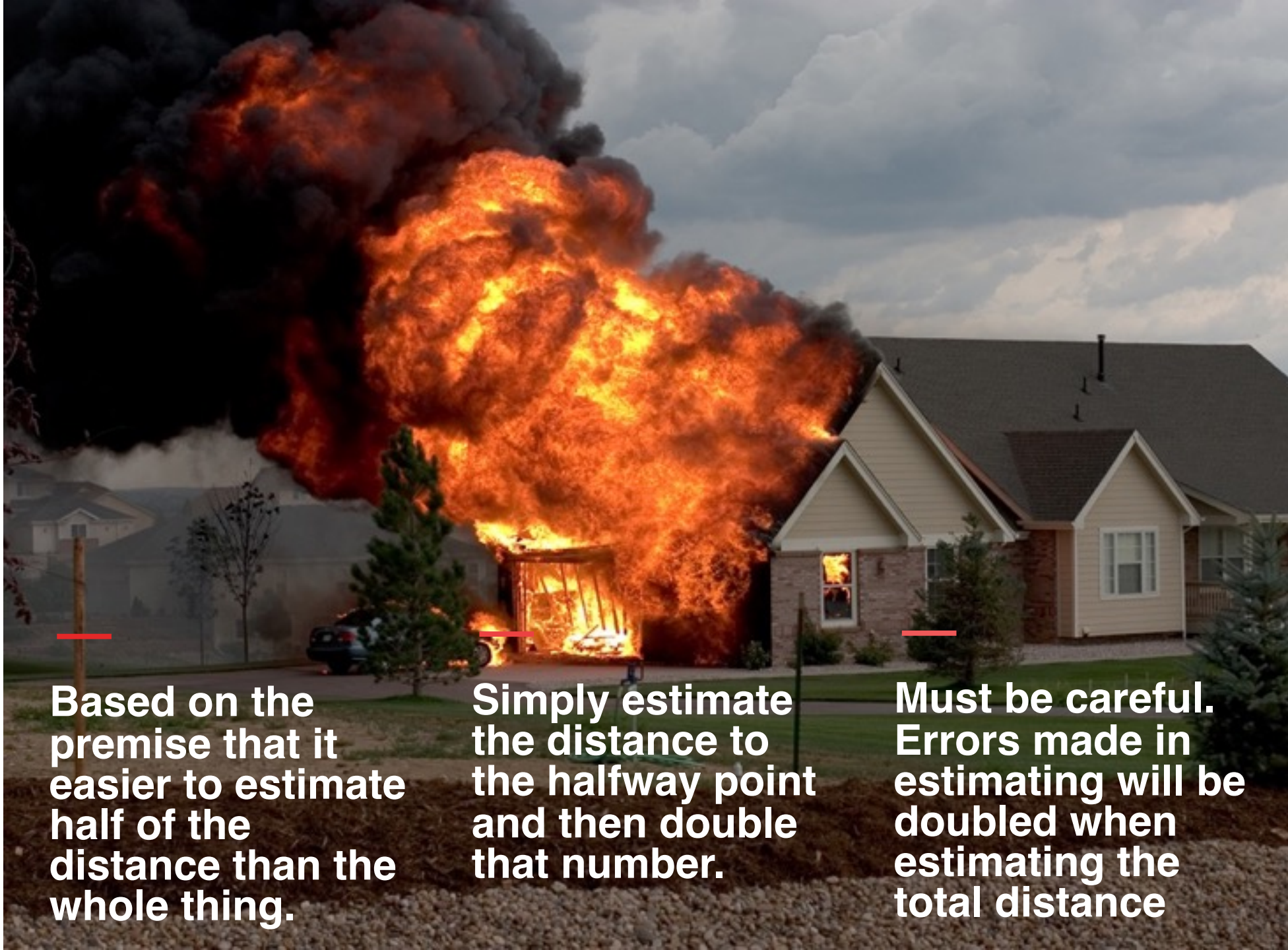
1. Find your drop point
2. Estimate that it’s no more than and no less than a certain number of feet away,
3. Then take the number in the middle

Bracketing

For example, you would look at a the front door of a house with a large font yard and say it’s no more than 300ft away and no less than 100ft away. The front door would be about 200ft away.


NOW
RENTING

Halving

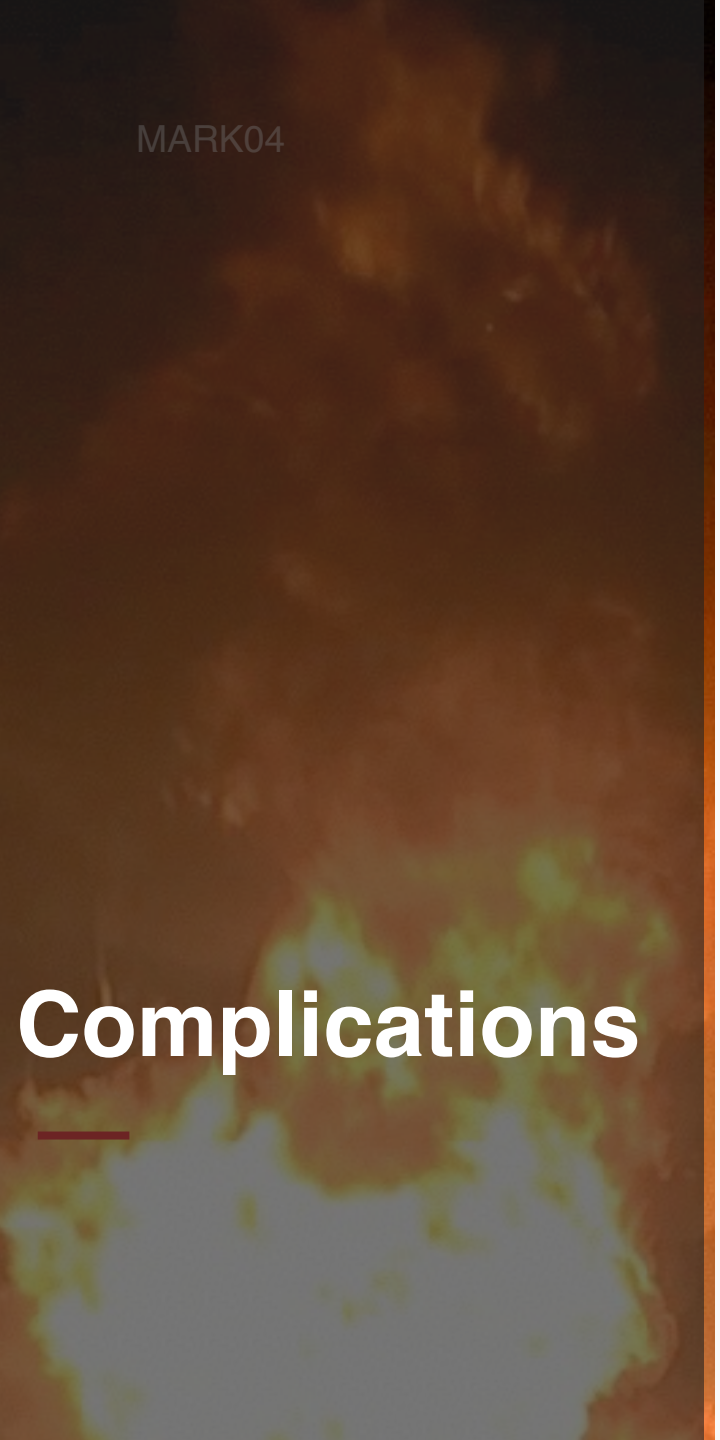


Based on the premise that it easier to estimate half of the distance than the whole thing.

Simply estimate the distance to the halfway point and then double that number.

Must be careful. Errors made in estimating will be doubled when estimating the total distance


©2015 Tim Olk



Complications

Sloping terrain may throw your estimation off and you must take it into account.

Upward sloping terrain can make the stretch seem shorter

Downward sloping terrain can make it appear longer, so pay close attention to the topography

Dead Space- Terrain with dead space tends to make the drop point appear to be closer.

Smooth Terrain- Smooth terrain such as sand, water, or snow will give the illusion of greater distance.

Complications

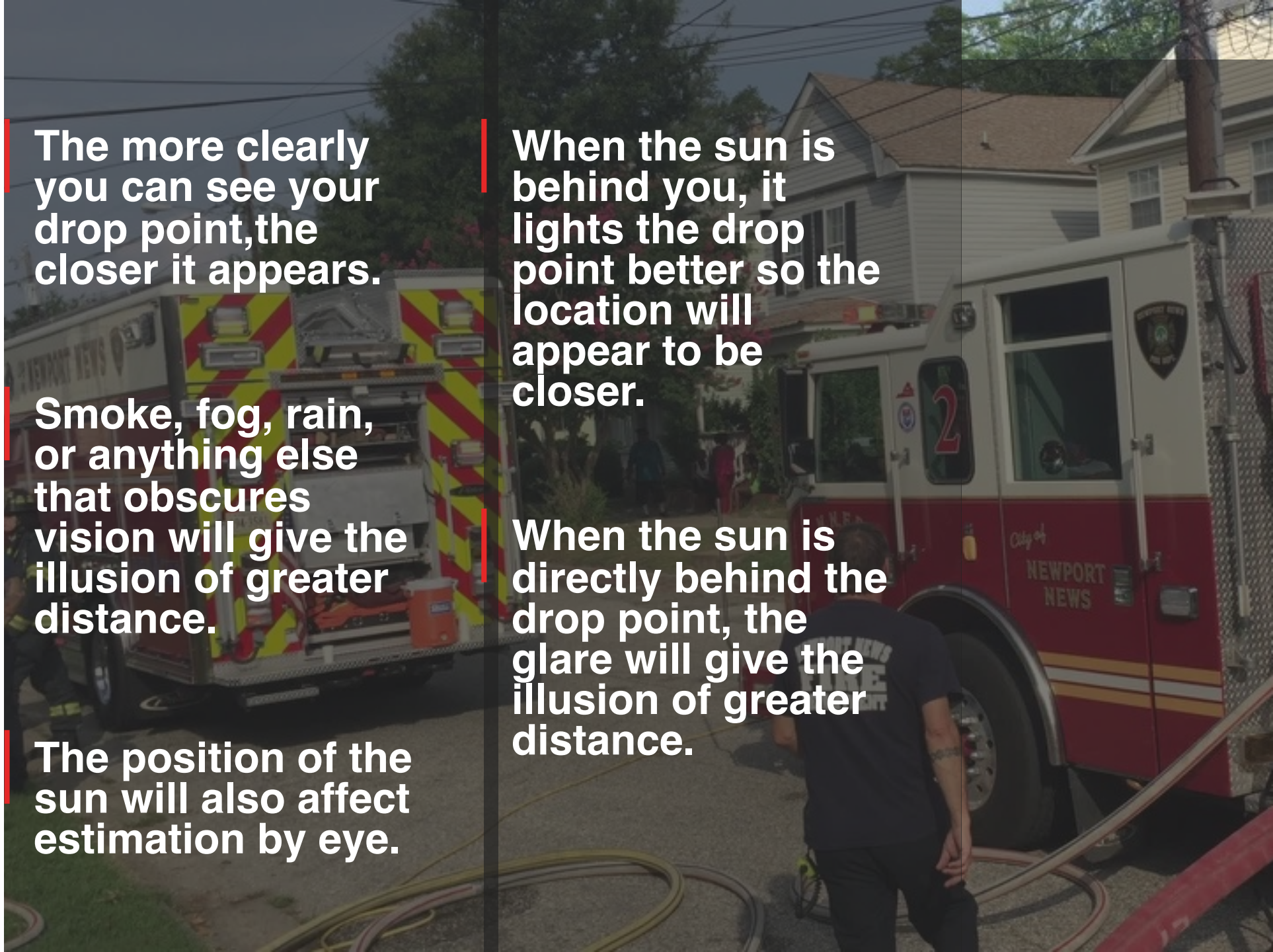
The more clearly you can see your drop point,the closer it appears.

Smoke, fog, rain, or anything else that obscures vision will give the illusion of greater distance.

The position of the sun will also affect estimation by eye.

When the sun is behind you, it lights the drop point better so the location will appear to be closer.

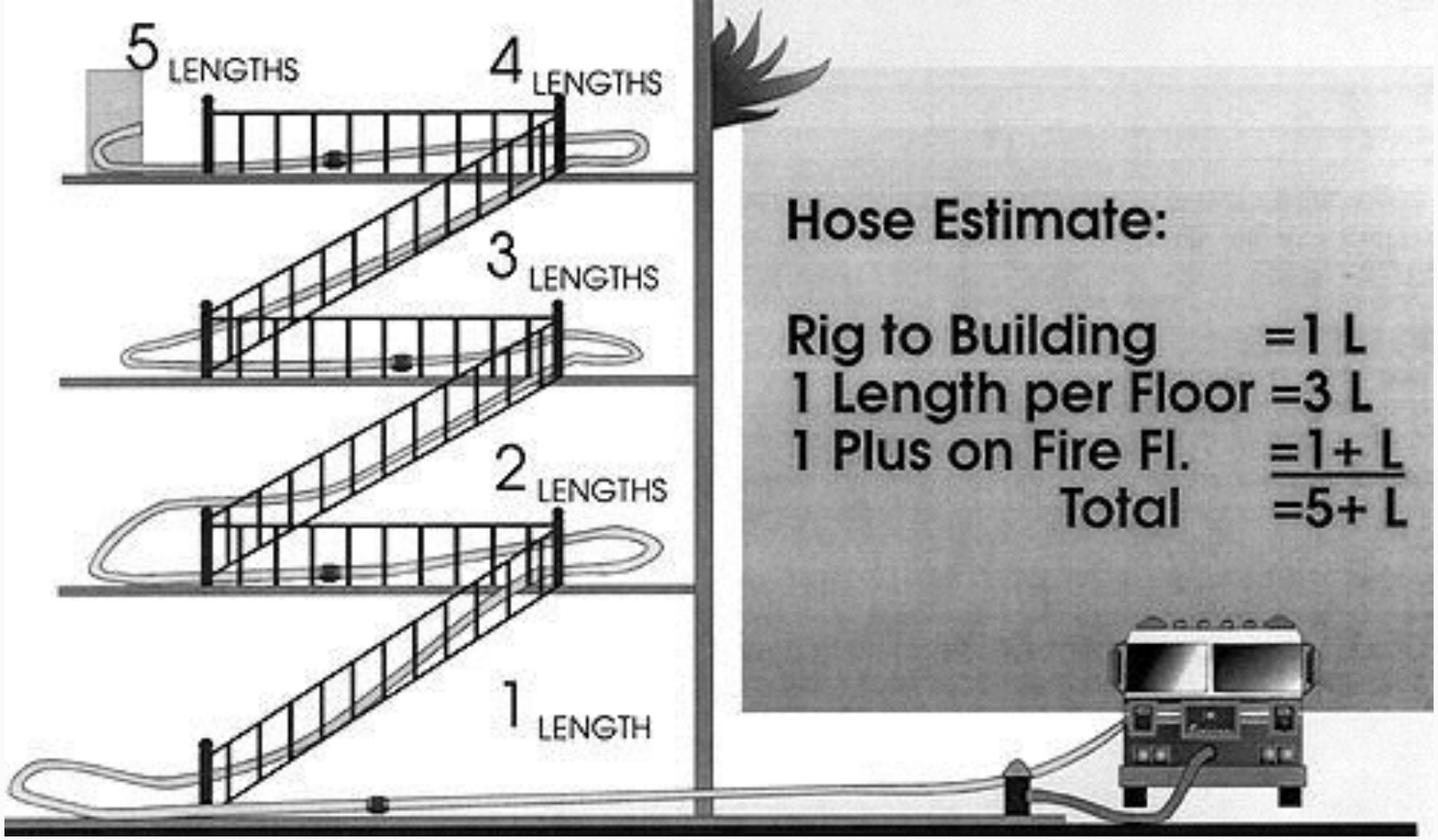
When the sun is directly behind the drop point, the glare will give the illusion of greater distance.




VIRGINIA
XBL-8564


672
688

From the drop point to the fire



These are not hard and fast numbers

May change depending on building size and layout

Traditional methods rely on standard lengths

From drop point to the seat of the fire

Non-traditional methods

Not every building is the same

Size up should include:

- Geometry of building
- Expected layout
- Length x Width

Single family dwelling

- Single family homes typically require 50ft of hose per floor
  - 1st story = 1 length,
  - 3rd story = 3 lengths
- Larger houses will require more lengths.
- Always ensure sufficient hose is stretched to cover the entire building
- Fire travels quickly throughout void spaces, so you need to make sure you are prepared

Multi family dwelling

Smaller apartments can be reached using the same method as the single family dwelling

For larger apartments, start with the floor number and add a length of hose

2nd floor = 3 lengths
4th floor = 5 lengths

If the apartment is particularly large, add 2 lengths to the floor number

Geometry and layout

- Do a 360 (if possible/feasible)

- Look for clues:
  - Windows
  - Size/Location
  - Vent Pipes
  - Bathrooms
  - Stairs

Residential Stairs

Two main types
Open
Enclosed

Straight run can’t be more than 12ft without a landing

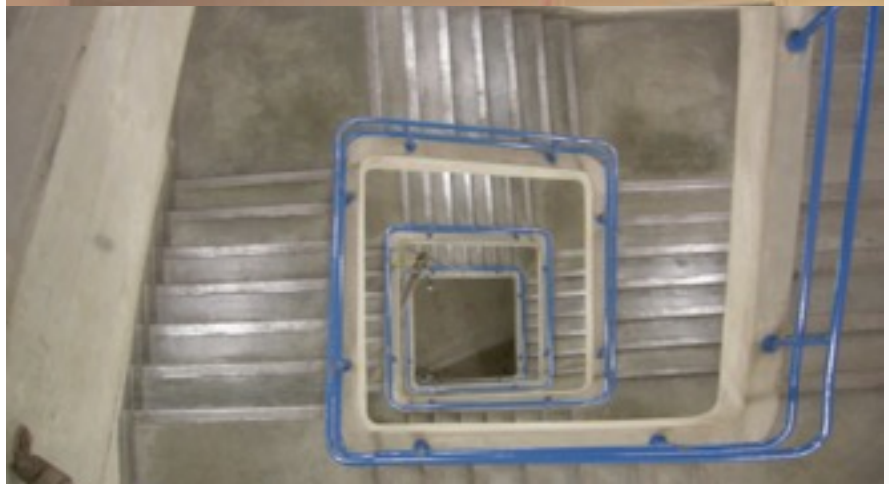
Return with half landing
45-90 degree turn

Location and cues

Length and width

Known Distance
Bracketing
Halving

Multi family considerations



- Interior or Exterior Hallways
- Standpipe vs NO Standpipe
- Stairway configuration

Standpipe VS no standpipe

- Having a standpipe makes estimating easier
- High Rise Pack should be 200 feet
- No standpipe means you have to stretch the stairwell or do a drop stretch from an adjacent apartment

Well hole stretch

Commercial buildings

Store with aisles

Open floor plans

MARK04

Without aisles or shelves

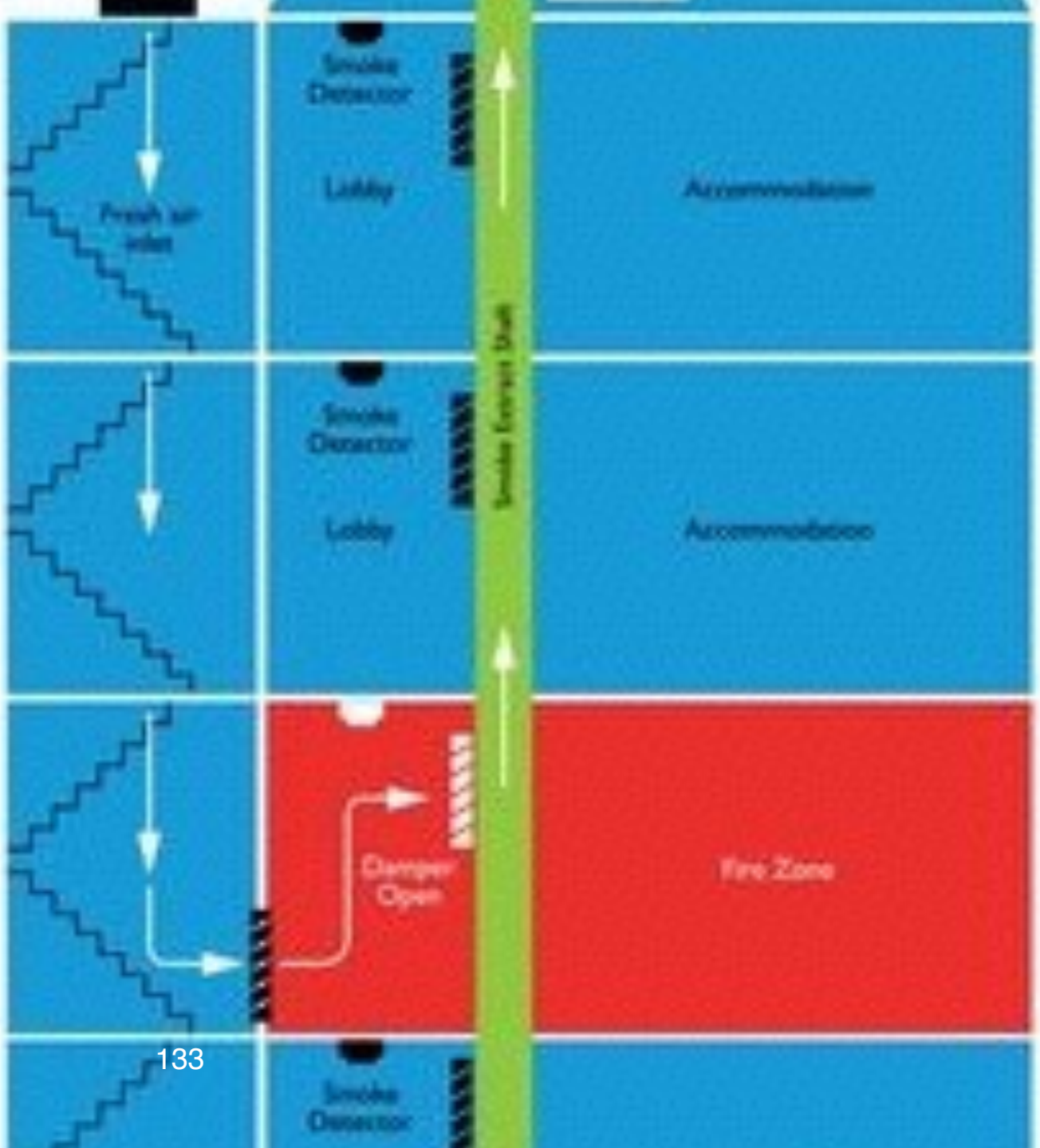
Estimate by taking the longest side and adding half the length of the other side.

Aisles

Aisles in stores require different rules because we have to go around them and anticipate the fire is in the farthest spot from the drop point


MAXIMUM
A22
A24
9.99
9.99


664
JACKSON HEWITT
TAX SERVICE

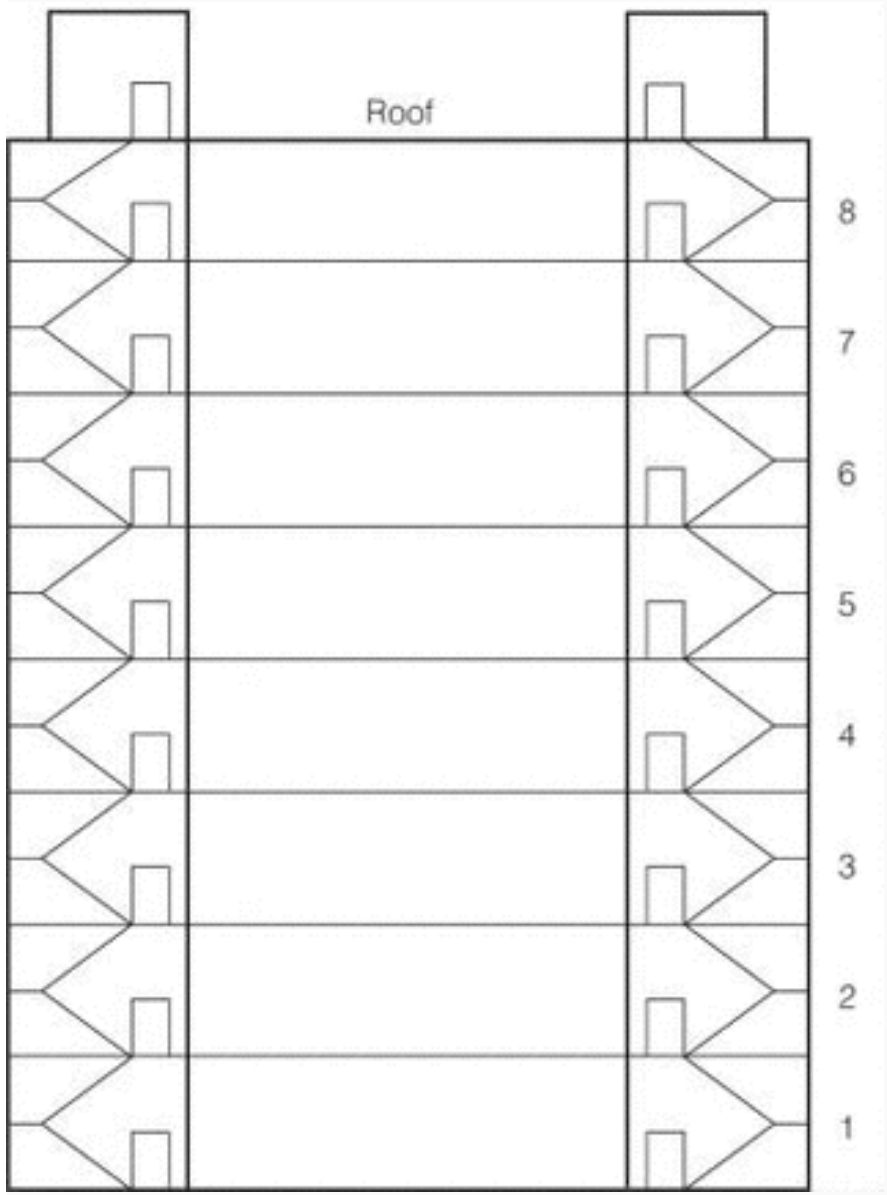


Return/ U stairs

Scissors Stairs

Commercial stairs

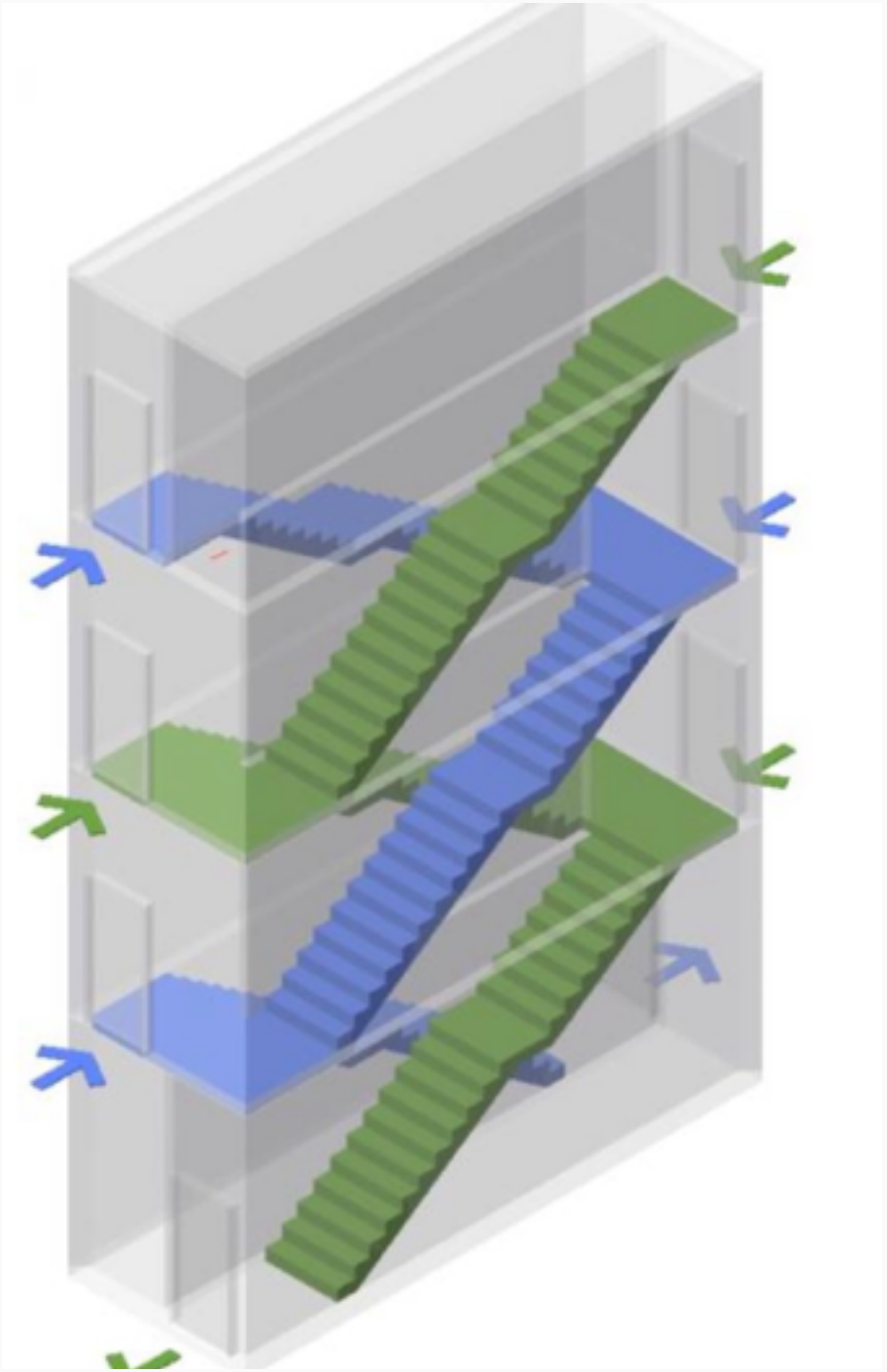
Return stairs



- Returns to to the same geographic location of the building at each floor landing.
- Smaller landings in between floors at the half-flight level
- Will turn or reverse direction at the landing
- Orientation to the fire floor may be made by observing the floor below the fire

Scissor stairs

- Unlike return stairs, will exit at different geographical locations in the building.
- The design of allows for two separate stairwells to be contained in one vertical shaft.
- More common in newer buildings.
- The stairwells may only be separated by rated sheetrock.



Short set back

Never be afraid to shorten a preconnect if you don’t need all of it

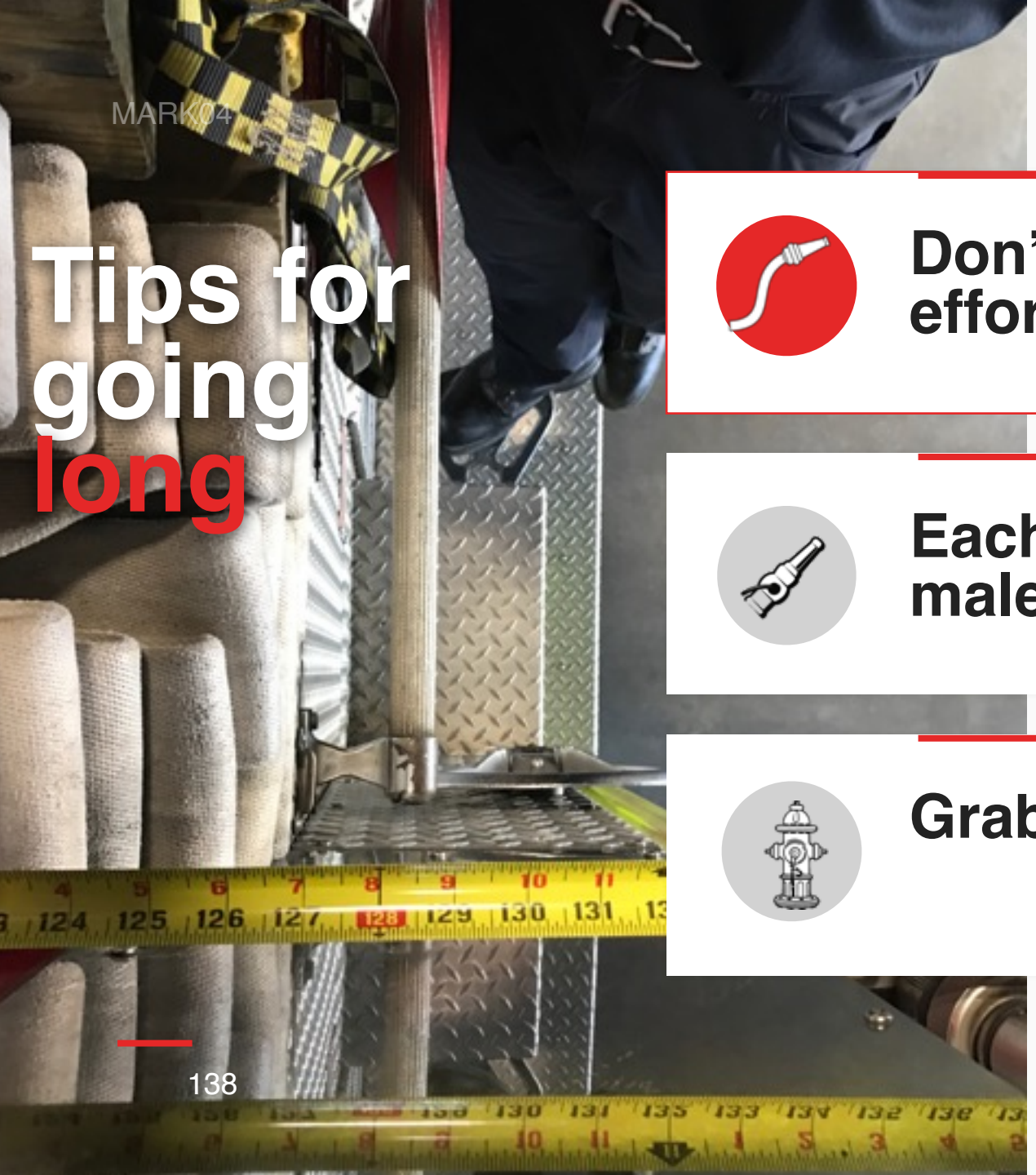
Why make the job harder than you have to?

Going long

Do not be intimidated

Do what’s right not what’s easy

Set yourself up for success



Tips for going long

Don’t just dump and pray.All your efforts in estimating are wasted

Each bite is 20 feet. 2 bites and male coupling = 50 feet

Grab your estimate and do work.

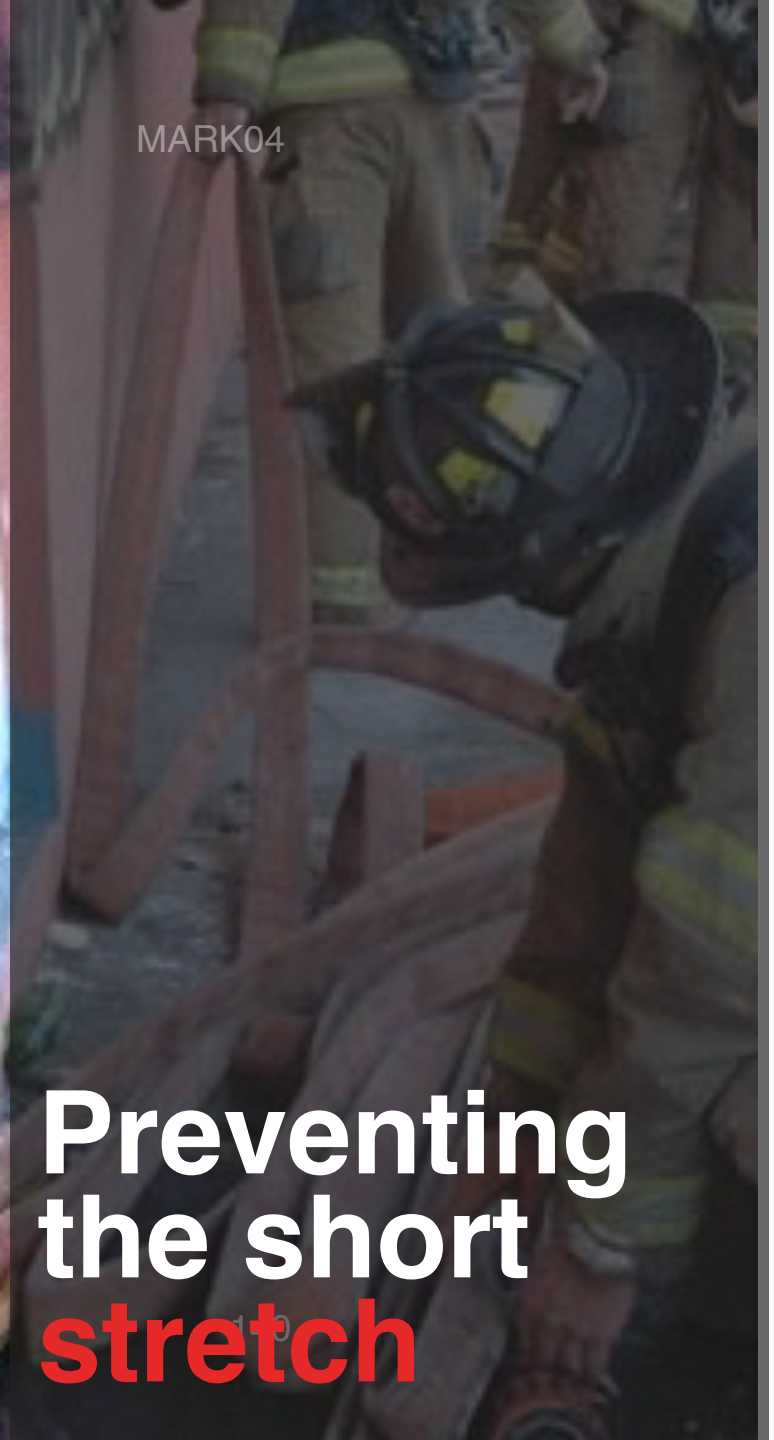
What we can do to help estimate

Knowledge of how much hose is on the apparatus.

You need to know this in case you are distracted during the stretch. You will know how much hose is off the rig based upon how much is left on the rig.

Tell engineer what you pulled

needs to know the number of lengths so that they may set the pump pressures accordingly.



Preventing the short stretch

The working length is to prevent a short stretch.

Ensures he has enough to make the fire room

Do NOT use your lead length as travel to the drop point

Most engines are 8 feet wide. count lengths on shoulder and make sure you have enough

Fixing a short stretch

The nozzle team does not need to back out

NIST/UL study show 5 mins protection behind closed door

How to fix a shirt short stretch

01 Before you charge the line

02 After you charge it

Fixing a short stretch

- Never take a length of hose from one of the other pre-connected hoselines that has not yet been stretched
- The nozzle team does not need to back out of the house
- Communication is vital

Fixing a wet short stretch

Break away nozzle/smooth bore nozzle

Shut down the line, break it, and add more hose

Secure bale

Kink Method

If no break away nozzle or extra nozzle

Form a “Z” with two 180 degree bends and open bail

Wrap bundle with webbing and hold with knee

Remove Nozzle, add section and add nozzle

Fixing a dry short stretch

Double roll two lengths of hose, with both couplings out on top.

Should be stored at or near the pump panel.

Quickly pull those lengths out. While holding the two couplings in one hand, the hose is thrown out so it unrolls away from where the FF is standing

Fixing a dry short stretch

Additional sections from the engine. Do not take from other reconnects if possible

Use leader line or high rise set up

Preassembled line extensions

MARK04

The Gustin Pack

Gustin Pack

Photos Courtesy of CFT and Curt Isakson

100 feet of 1.75

Packed in a FDNY high rise load

Simple deployment useful in difficult environments

Video Courtesy of CFT and Curt Isakson

MARK04

Where do we add hose for a wet short stretch

Five or more lengths

Inside

Shut down the line at the pumps. Remove nozzle, then add the lead length of hose to the stretch stretch.

Four lengths or less

Inside or Outside

Shut down the line at the pumps.. A new length can be added at the pump panel by engine operator. Once the hose is attached and confirmed as such, the line can be recharged and advanced back into position.

Fixing a long stretch

- Need to take the time to stage the extra hose
- Set yourself up for success
- DON’T just get it out of the way.
- Nozzle and Couplings to the door.
- Mark midpoints

Fixing the long stretch

For fires on the first floor or below grade

Flake hose to the exterior
Flake the hose so that it points into the door, NOT at an angle, to make your advance faster

For fires on upper floors

Excess hose can be flaked on the floor below, in an apartment across the hall or other living space


ENGINE 11


NOTICE
TO VISITORS

MARK04

Training on estimating the stretch

Estimate the stretch and then actually make the stretch

Stretch on all calls that come in as fires. Sets and reps pay off

Use EMS calls as mini pre-plans. Know the length of your stride

Twine or rope

Have multiple distances

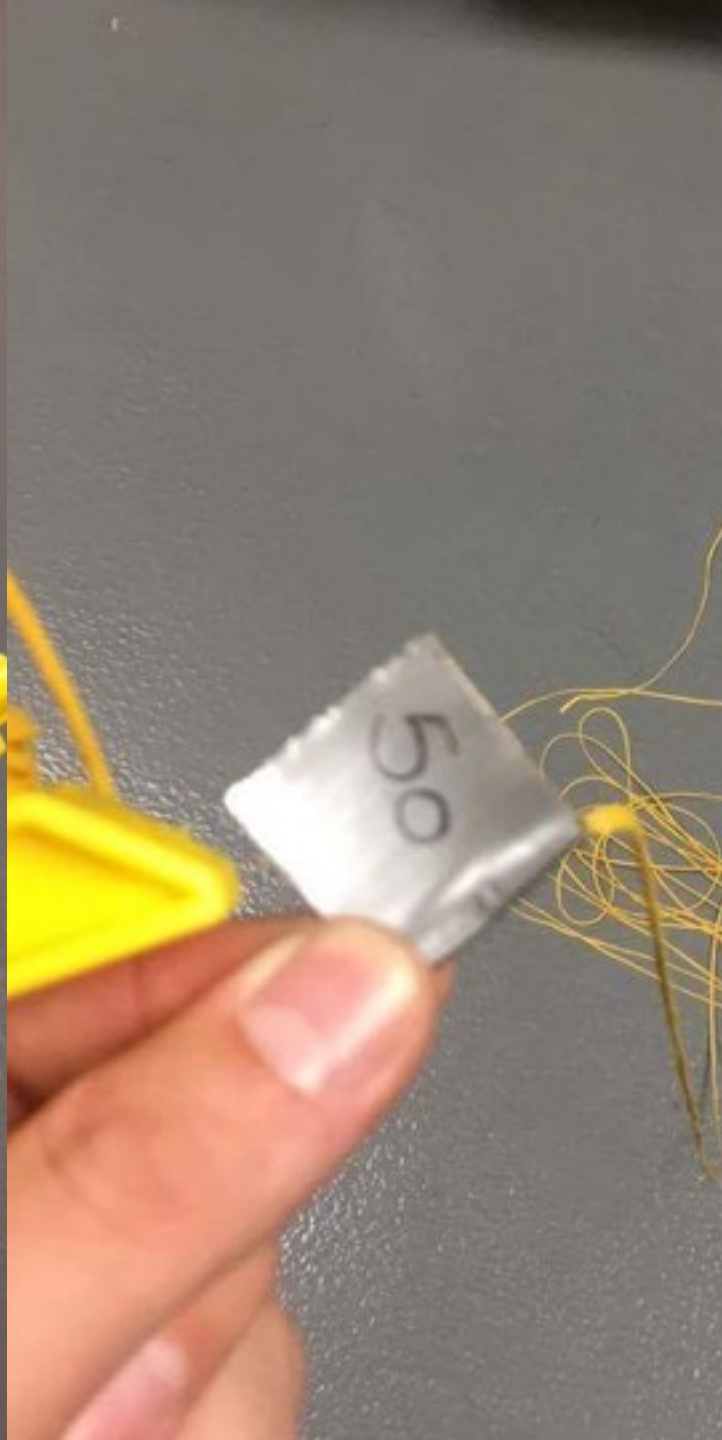
Knots/ Marker at 50 feet increments

Carabiner at end to wrap discharge on engine

If you use twine it is truly disposable

Mason’s twine

- Cheap as hell. $7 at Lowes
- Duct tape at where you have your couplings
- Available in distances up to 500 feet



What NOT to use

Distance wheels

Unreliable

Straight line distance ONLY

Laser range finders

Requires batteries

Straight line distance ONLY

WE HAVE SAFETY MARGINS FOR EVERYTHING ELSE

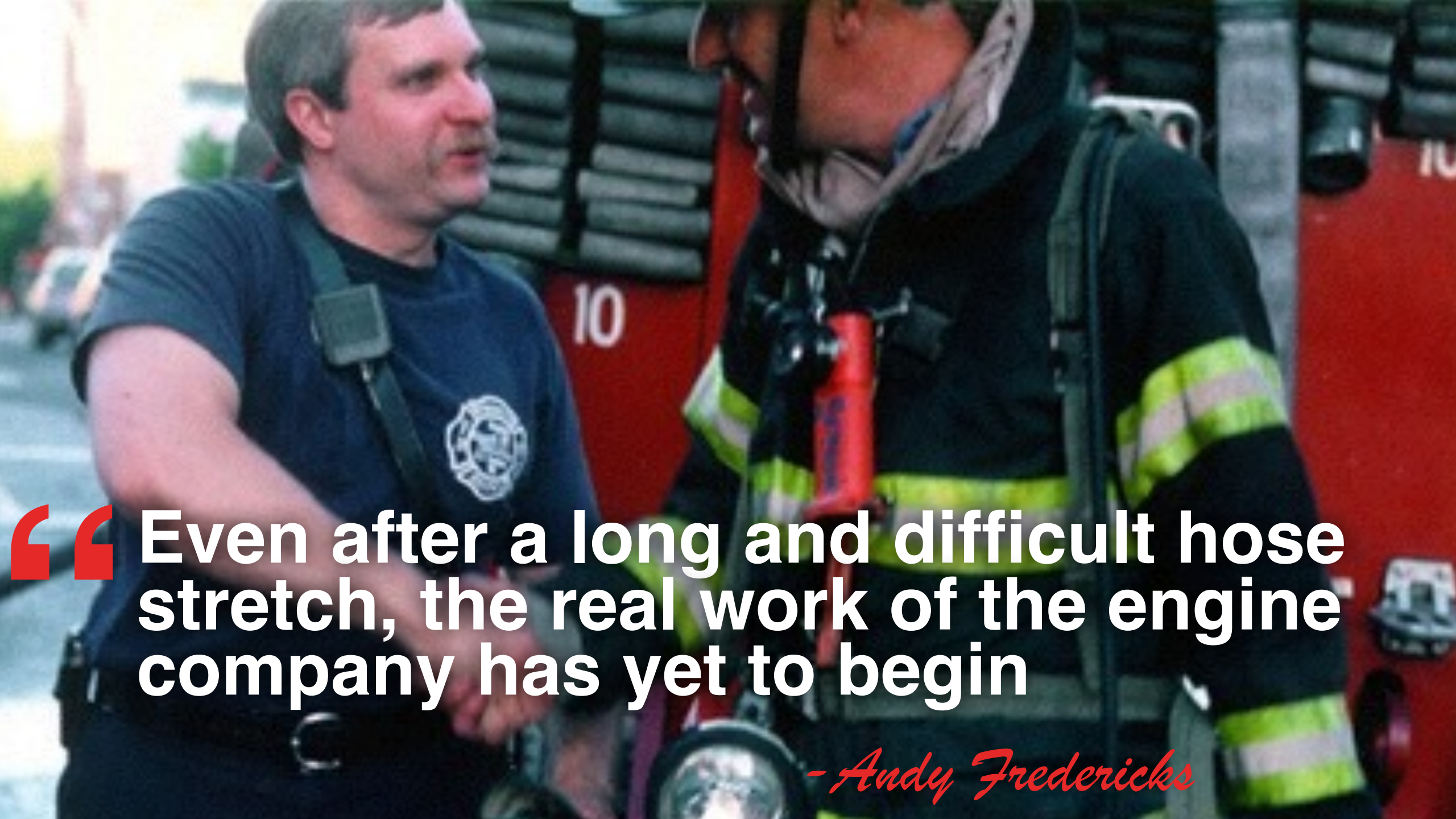
IF NOT SURE, REMOVE THE DOUBT AND ADD/KEEP IN AN EXTRA SECTION

PICK A TECHNIQUE AND MASTER IT

ESTIMATING THE STRETCH IS AN ART AND IS NOT THE SAME FOR EVERYONE

A TIME CRITICAL SKILL

PRACTICE PRACTICE PRACTICE, STRETCH STRETCH STRETCH, UNTIL IT'S SECOND NATURE



“Even after a long and difficult hose stretch, the real work of the engine company has yet to begin

-Andy Fredericks