



# HILLSIDE STRUCTURE FIRE TRAINING

Chula Vista Fire Department  
National City Fire Department  
San Diego Fire-Rescue Department

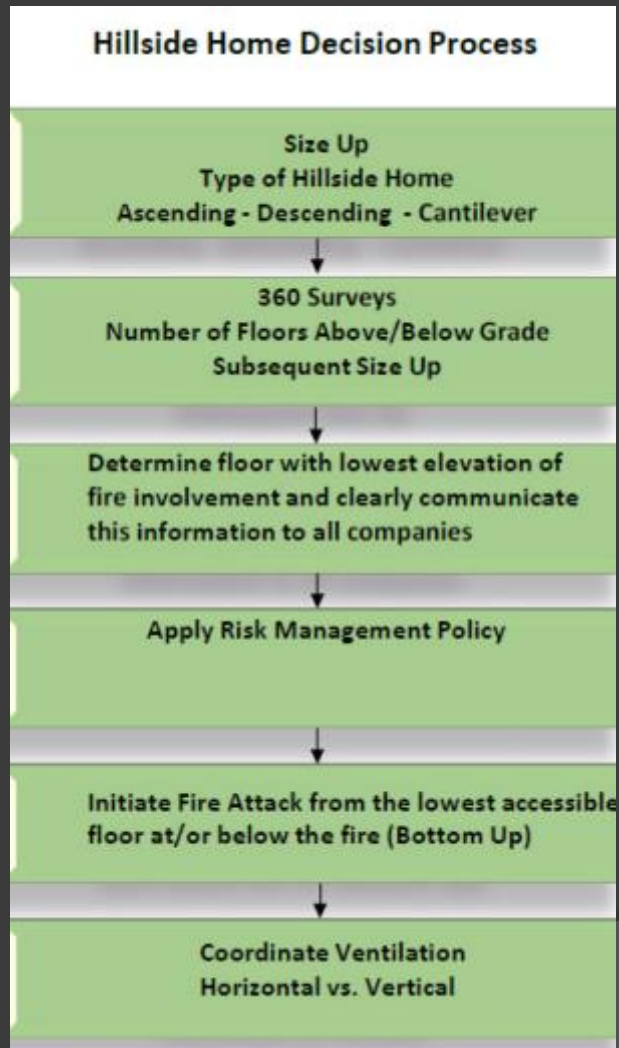
# Disclaimer

Information presented in this presentation is not all encompassing of the skills and tactics required to safely respond to fires in hillside structures. It is intended to raise awareness of some of the hazards associated with these incidents as well as to provide tactics to assist incident commanders, company officers, and firefighters.

# Overview

- Hillside Structure Decision Process
- Building Features & Terminology
- Hazards
- ICS and Tactical Considerations
- Fire Attack Considerations
- Ventilation Considerations

Firefighters must effectively manage their exposure to risk by recognizing danger, considering and weighing alternatives, and balancing anticipated benefits with potential consequences.



# Building Features & Terminology

## Ascending Structures

Built on the upslope side of the roadway.

Main access is from the first floor at street level



# Building Features & Terminology

## Cantilever

AKA stilt homes.

Main access is from the first floor at street level

The supports for these homes are typically concrete pilasters with wood pillars.





# Building Features & Terminology

## Descending

The main entrance is located at the street level with one or more levels below grade.

Presents the greatest threat to firefighters if the fire is located below the floor of entry.



# No Access Basement

No windows, doors, or any other potential openings to either flow water, vent or gain entry to the basement other than the interior stairs.





# Limited Access Basement

Windows that do not provide direct access for a firefighter to enter the basement but could be used for suppression(water application) and/or ventilation.



# Full Access Basement

Large window or door that would allow for ventilation, suppression, and entry to the basement.



# Descending Hillside Structure Hazards

- Limited access to Bravo, Charlie, and Delta Sides of the building
- Unprotected stairwells provide a path for superheated smoke and/or fire spread
- Unexpected failure of building features such as windows and doors can lead to rapid changes in flow path and/or flashover.

# Initial Radio Report Example

“Metro E12 at scene, we have a large descending hillside single family structure with moderate smoke showing from the Alpha side on the first floor. We are spotted on a hydrant, performing a 360, and preparing for Fire Attack requesting a second alarm assignment staging at Churchward and San Jacinto. Establishing Churchward IC.

# Size Up

- If possible, determine if all occupants are out and accounted for
- Complete a 360 prior to committing to interior operations
- Consider Building Size and Design Features
- Determine best access to the fire location, stage of fire development including ventilation factors, and potential for spread within the structure
- Consider Wind Conditions – Is the wind having any effect on the fire/smoke conditions or will it have an effect if building features change or fail?

# Command Responsibilities

- Ensure common terminology is used to describe the structure type, building layout, and location of the fire.
- Ensure a single Fire Attack/Ventilation strategy is utilized, communicated, and well supported.
- Actively monitor and facilitate communication and coordination of Fire Attack/Ventilation activities.



# Announcement of Fire Attack Strategy by IC (Follow up to Initial Report and 360)

## Units responding the the Churchward Incident...

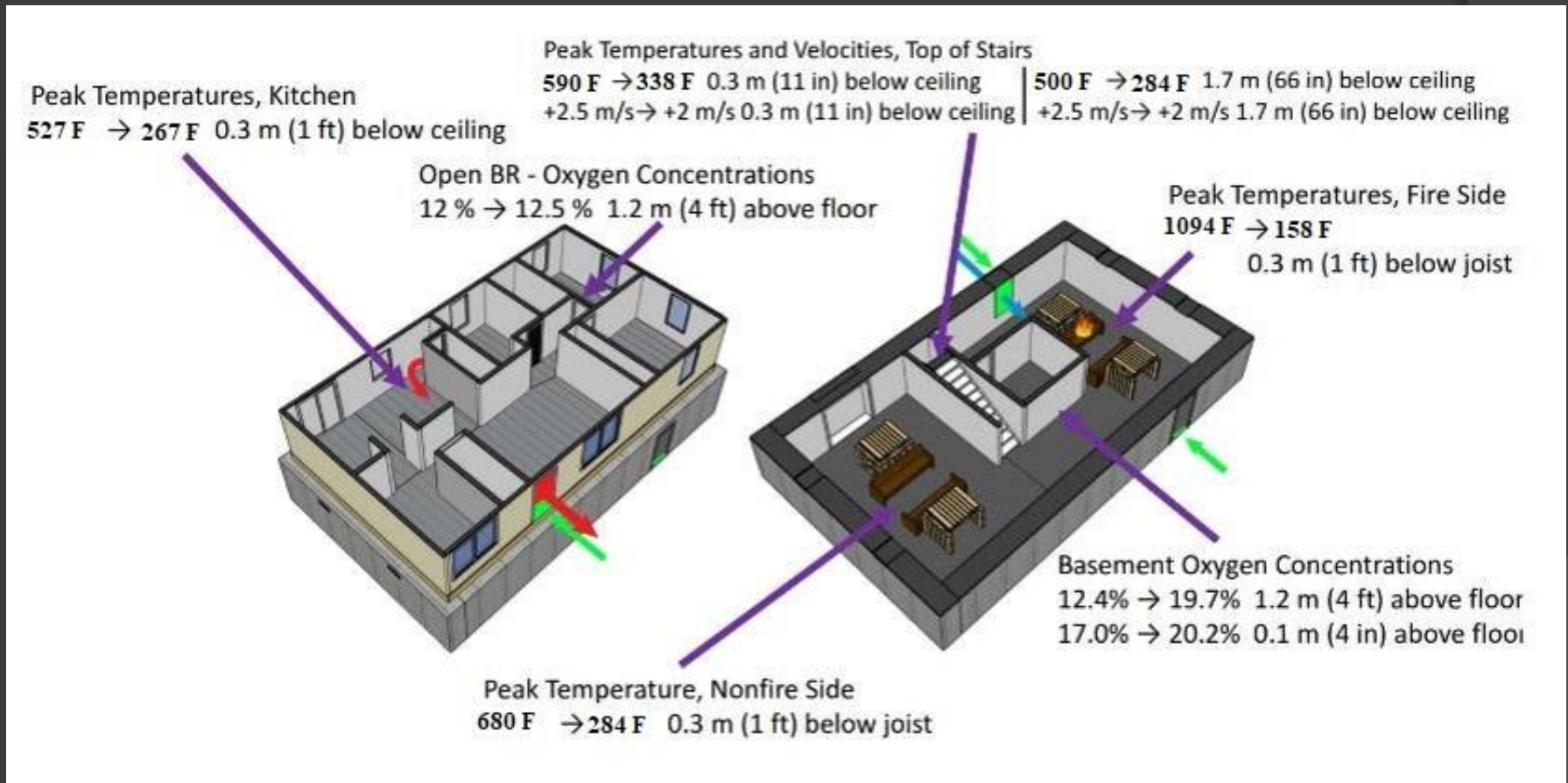
- ***“The Fire attack is going to be made from the floor below the fire from the Bravo Side. E12 will be Basement 1”***
- ***“The Fire attack will be a transitional attack line on the Delta side with an additional interior attack line from the Alpha to push down the stairs. E12 you will be Delta Exposure coordinate your transitional stream with NCE34 who will be Basement 1 attacking from the Alpha Side ”***
- ***“The Fire attack will be made from entrance on Delta side same level as the fire. E12 you will be Basement 1”***
- ***“The Fire attack is going to be made from Alpha Side down the stairs. We will need horizontal ventilation once we have lines in place. NCE34 you will be Basement 1”***

# Application of Water is Key

- Early water application into the below-grade space is key to cooling of the overall environment and greatly improves conditions for both victims and firefighters.
- All FSFI Basement Study results showed that all suppression actions (application of water) except for a straight stream through the floor had a significant impact in lowering temperatures in the basement as well as the temperatures of the gases at the top of interior stairwell.

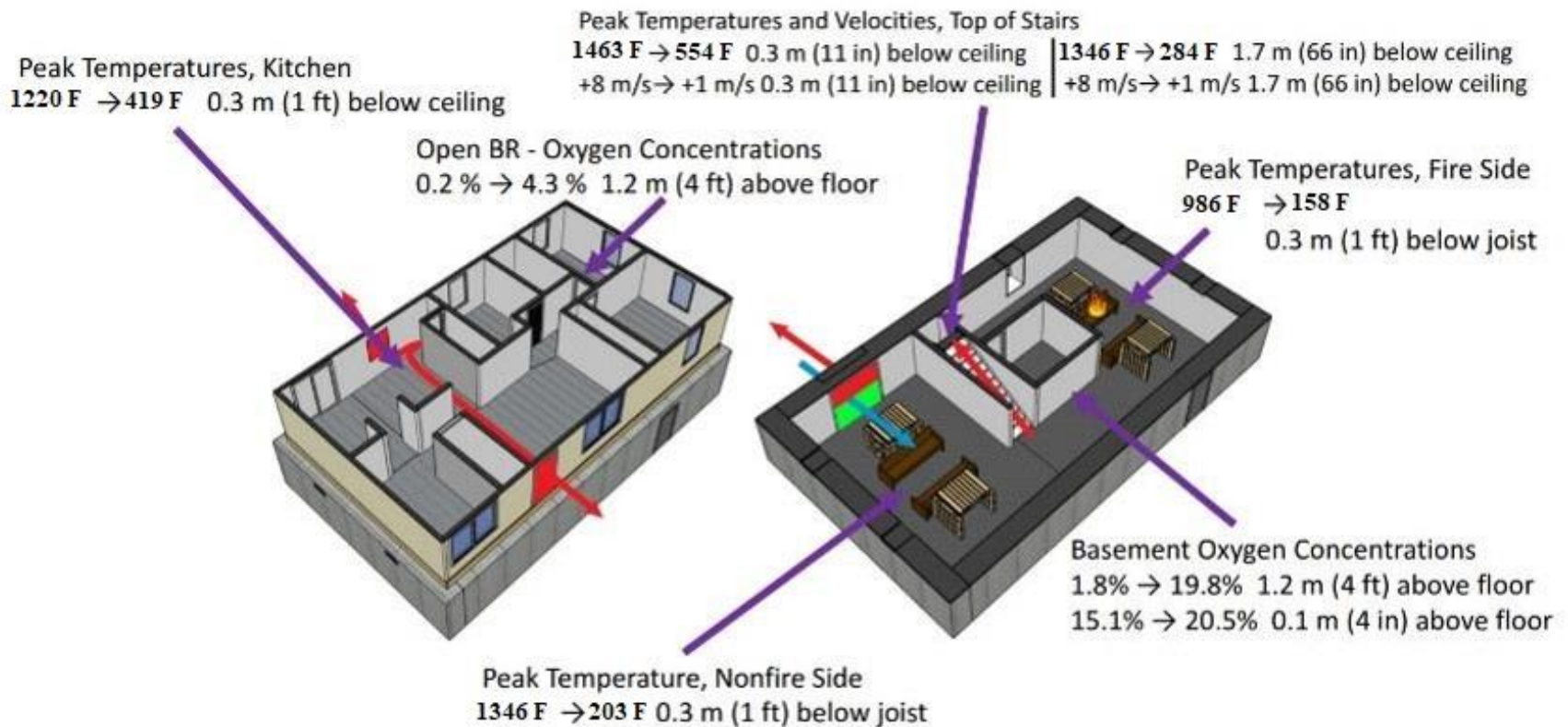
# Exterior Application of Water Directly into the Fire Room. Note conditions before and after Exterior Application of a 150 GPM hose stream for 30 Seconds.

\*\*\* Note the Changes in Temperature and O2 Levels Before and After the application of water \*\*\*



# Exterior Application of Water on the Opposite Side of the Basement. Note conditions before and after Exterior Application of a 150 GPM hose stream for 30 Seconds.

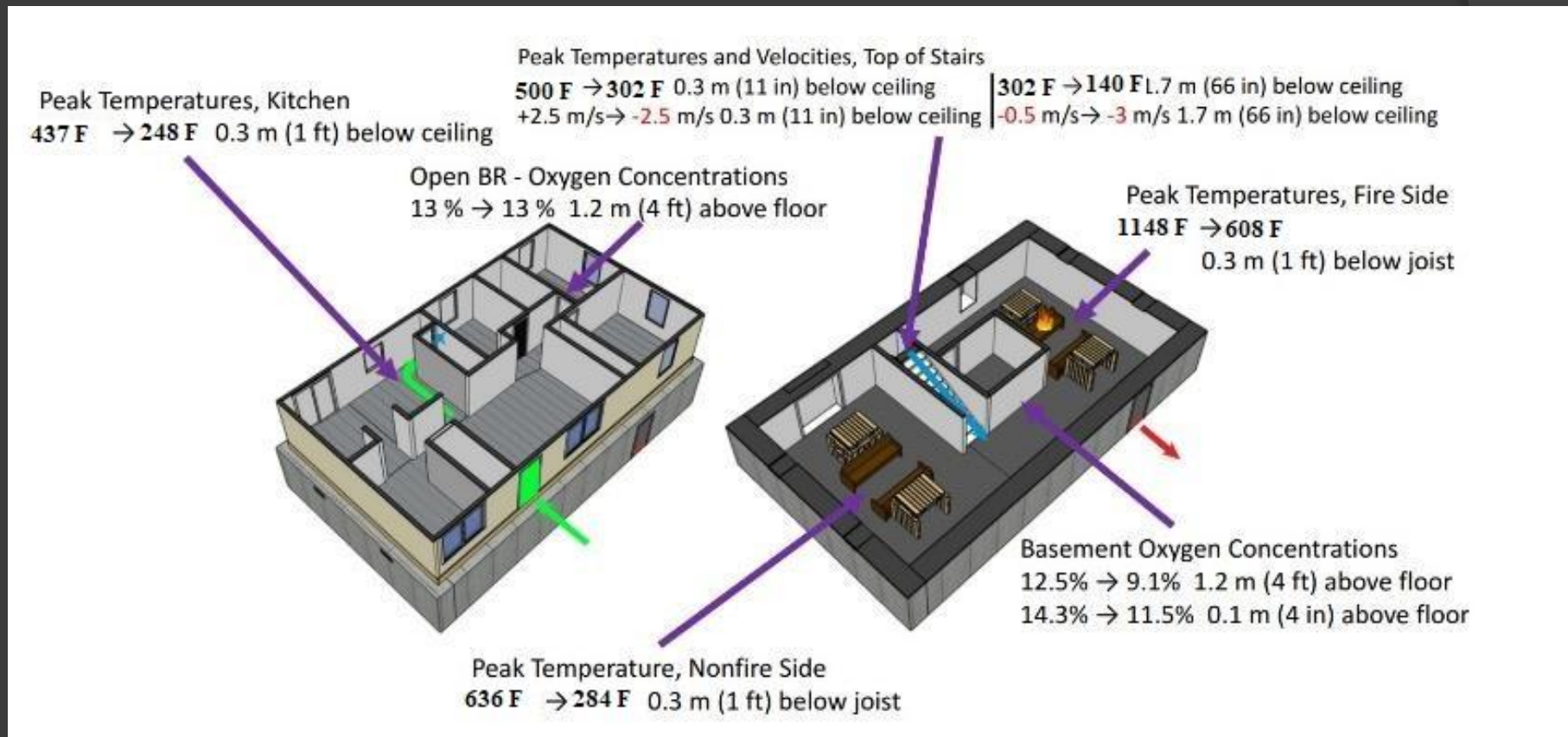
\*\*\* Note the Changes in Temperature and O2 Levels Before and After the application of water \*\*\*



# Interior Application of Water Down the Stairs. Note conditions before and after Exterior Application of a 150 GPM hose stream for 30 Seconds.

\*\*\* Note the Changes in Temperature and O2 Levels Before and After the application of water \*\*\*

\*\*\* This was a “No Access Basement” with a Ventilation Limited Fire \*\*\*





# “Downstairs Checklist”

- ⦿ Risk evaluation of tactics will be evaluated by IC and Fire Attack Officer and understood by all members.
- ⦿ IC and Fire Attack Officer will approve Fire Attack Plan.
- ⦿ If an offensive attack downstairs is considered as the only means to attack the fire a charged and staffed backup line and ventilation plan will be in place prior to the downstairs push.



# Ventilation Considerations to Support an Interior Fire Attack

- ⦿ All ventilation actions must be coordinated with the needs of Fire Attack/DIV based on the Fire Attack Plan.
- ⦿ Door Control is a high priority in all below grade fires.
- ⦿ Controlling/Opening/Closing/Controlling doors or windows can change the flow path of the fire and change fire behavior. Careful consideration should be given and only after communication with fire attack has occurred should the Controlling/Opening/Closing/Ventilating of doors and/or windows be performed.
- ⦿ Fire suppression lines must be in place before ventilation.
- ⦿ Use extreme caution when using ventilation methods that create uncontrollable openings (i.e. vertical ventilation, breaking windows, etc)

# FIRE ATTACK



## PUTTING IT ALL TOGETHER

[\(click on image or here to play video\)](#)

# Understanding and Fighting **BASEMENT FIRES**



UL's Fire Safety Research Institute offers additional free online training based on the dynamics of below-grade fires and the influence of coordinated fire mitigation tactics from full-scale fire testing in realistic residential structures.

To access this training go to:

<https://training.fsri.org/course/019-basement-fires>

For more information or questions regarding this training contact your Fire Department's lead instructor listed below:

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