



# Ventilation Operations

Firetown Truck Operations



Firetown Truck Academy



# Ventilation Operations

- **Building Size-Up**
- **Ventilation Size-Up & Needs**
- **Laddering Objectives**
- **Ventilation Operations:**
  - **1. Residential**
  - **2. Commercial**
  - **3. Industrial**
  - **4. Firefighter & Civilian Rescue**





# Ventilation Operations





# Ventilation Operations

- Eliminates “Hostile Events”
- Reduces Firefighter Deaths and Injuries
- Reduces **70%** of all fireground damage
- Establishes “Line in the Sand” Situations
- Paramount operation for civilian rescues
- Increases effectiveness of **RIC** operations
- Reduces “Surround & Drowned” fires





# Ventilation Operations



# Ventilation Operations

- Eliminates “Hostile Events”
- Reduces Firefighter Deaths and Injuries

## “When Done Properly”

- Reduces **70%** of all fireground damage
- Establishes “Line in the Sand” Situations
- Paramount operation for civilian rescues
- Increases effectiveness of **RIC** operations
- Reduces “Surround & Drowned” fires





# Ventilation Operations





# Ventilation Operations

## “When Done Properly??”

The entire WORLD gets to watch via CNN, FOX News and all the other media outlets.

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# Ventilation Operations

## Why are Ventilation Operations So Important in Today's Fires?

- **Increased Fuel Loading** within occupancies.
- **Fuel Modeling** has changed to higher density.
- **Energy Efficient Homes:** Create ventilation controlled fires
- **Increased Thermal Insulation:** Produces faster rapid fire progression events
- **Construction** Types, Features and Density of today's housing has changed the need for ventilation on today's fires.



## Underwriters Laboratories

In November 2009, Underwriters Laboratories conducted a side by side comparison of two simulated living room fires. The purpose was to gain knowledge on the difference between modern and legacy furnishings. The rooms measured 12 ft by 12 ft with an 8ft ceiling and had an 8 ft wide by 7 ft tall opening on the front wall. Both rooms contained similar amounts of like furnishings.

Both rooms were ignited by placing a lit stick candle on the right side of the sofa. The fires were allowed to grow until flashover.

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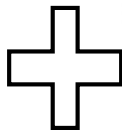




# Fire Formula of Modern Homes



Large Homes



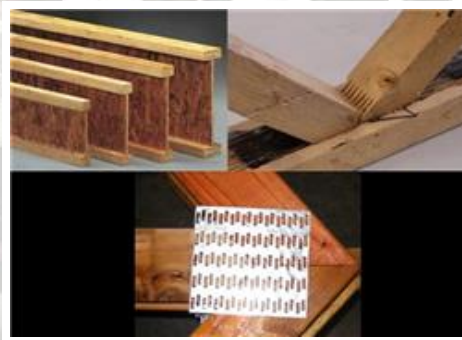
Open Spaces



Inc. Fuel Loads



Voids Spaces



Changing Bldg Materials



• faster fire propagation

• shorter time to flashover

**Rapid changes in fire dynamics**

• Shorter escape times

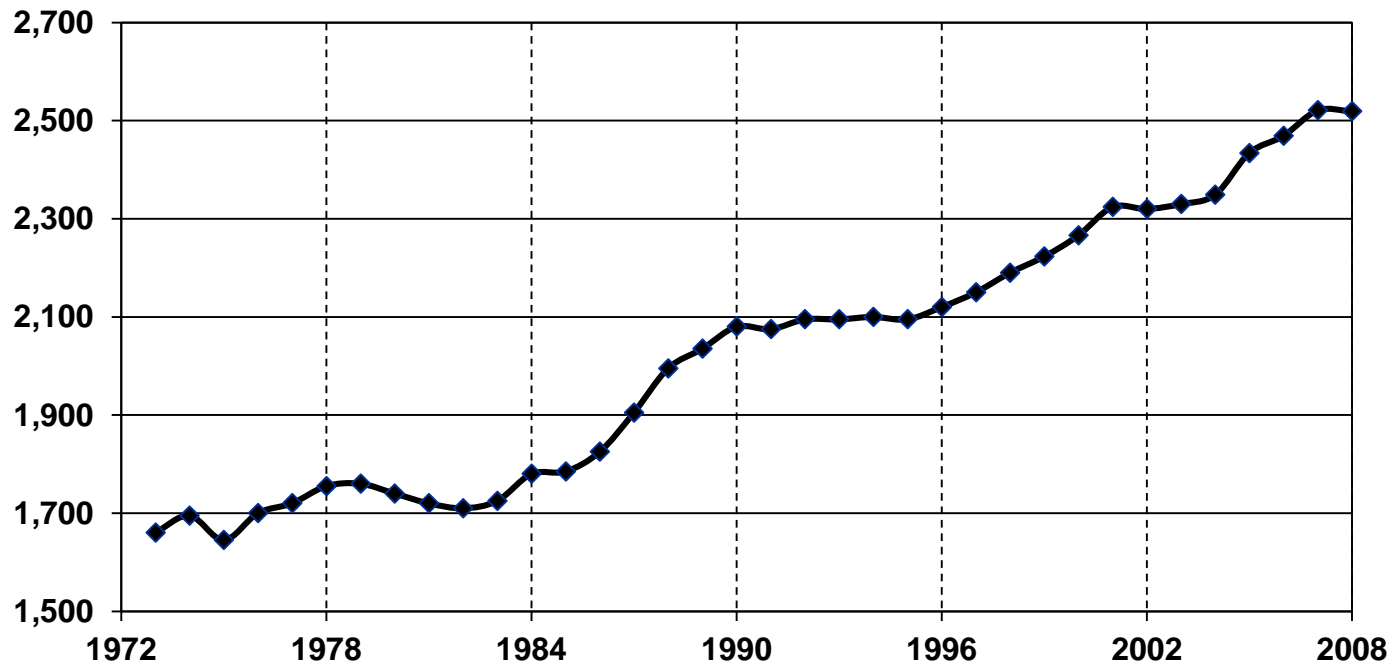
• Shorter time to collapse



# Larger Homes



Average Square Footage of New Single-Family Homes



**26% of Houses  
built in 2008  
were greater  
than 3000 ft<sup>2</sup>**

Source: <http://www.census.gov>

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# Open Spaces

Great Rooms



Open Floor Plans



Open Foyers



9-14 ft Ceilings



- All of these features add volume/air which allows the fire to grow and smoke to spread.

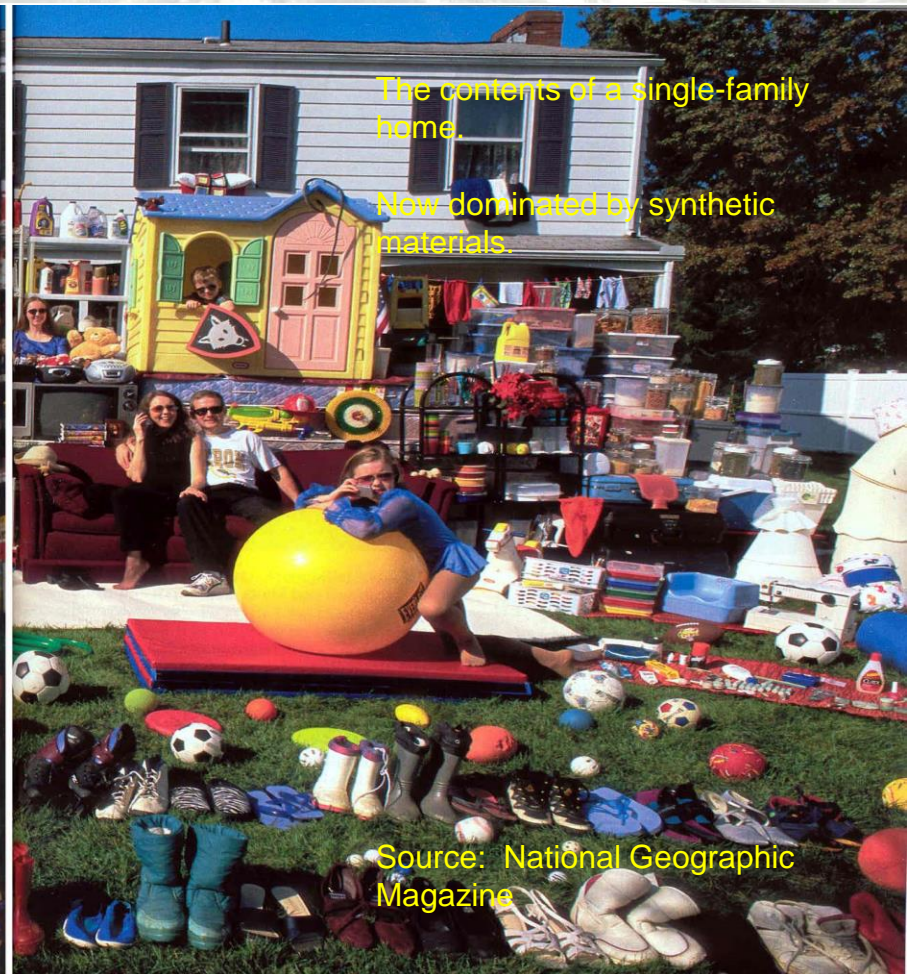
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# Increased Fuel Loads

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The contents of a single-family home.

Now dominated by synthetic materials.

Source: National Geographic Magazine





# Firetown Truck Operations



6 Sec



48 Sec



2 min



# CRITICAL FIREGROUND FACTORS

## Truck Personnel Size-Up's

Good Truck Company Personnel approach the scene as if all CFG's are present and eliminate them by direct observation from:

- Strong Truck Company Placement
- Dynamic Risk Assessment by 360 or Division Assignments





# 7 SIDES OF THE FIRE & THE 360

- Upon arrival you see, 2 maybe 3 sides of the fire
- Truck Officers should not commit resources until they get info on as many sides as possible
- 4 sides, top and bottom and inside
- If you buy into this philosophy then laddering the building takes on a whole different meaning.
- Especially in lightweight construction, attic fires and or potential heavy fire involvement



# GETTING EVERYONE ON THE SAME PAGE

- Understanding that truck operations are not optional
- Training at all levels and creativity on how to get it done with a lack of resources
- Leadership at all levels. Especially at the top
- Training with mutual/automatic aid agencies
- Pre-Designated or Not? Remember the fire ground is a lousy place to decide who, what, when where and why is going to happen
- As a rule of thumb - you are a product of your environment could be good or bad



# Ventilation Operations

Why are Ventilation Operations So Important in Today's Fires?

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# Ventilation Operations

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## PPV Dangers





# PPV Dangers in the Modern Fire Environment

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# Ventilation Operations



# Ventilation Operations

- **Roles & Responsibilities of crew members**
- **Two, Three, or Four person Operations**
- **Tools & Equipment**
- **PPPN: Company Discipline**





# Ventilation Operations

The Need for a Working Set

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# Ventilation Operations

- **Age of the Building:**
- 1. Pre-33
- 2. 1933 to Early 60's
- 3. Early 60's to Present
- 4. Green Homes!!!





# Ventilation Operations

## Bowstring or Arch Truss (Know the Difference)

- True bowstring is held together by steel rod and turnbuckle
- Arch Truss is all wood
- More common on west coast
- Are very strong due to large members





# Ventilation Operations

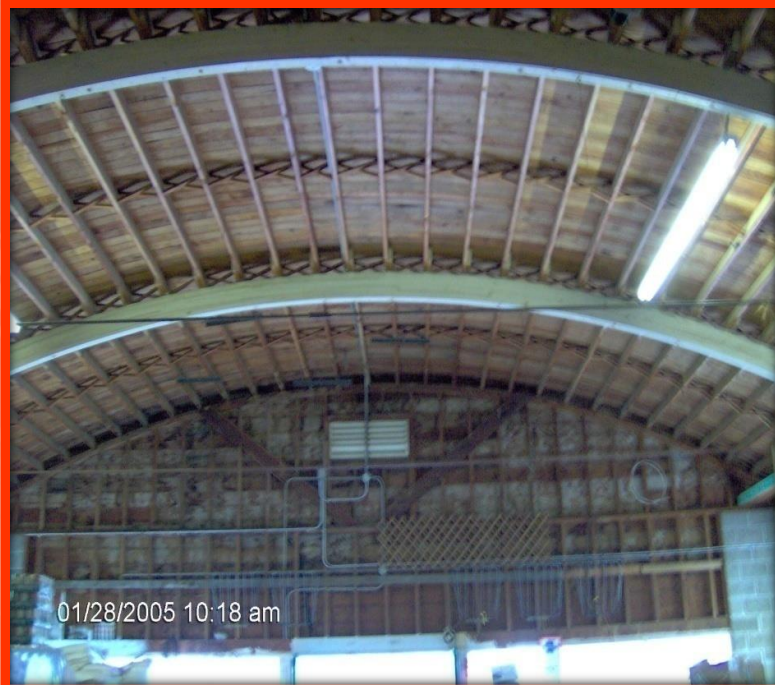
- Ordinary Construction
- Lightweight Engineered
- BowString/Tie Rod
- Metal Corrugated
- Foams: OOOOOOOOH  
BOOOOY





# Ventilation Operations

## *BowString Truss*







# Ventilation Operations

## *Rib Arch Truss*





# Ventilation Operations



# Foam

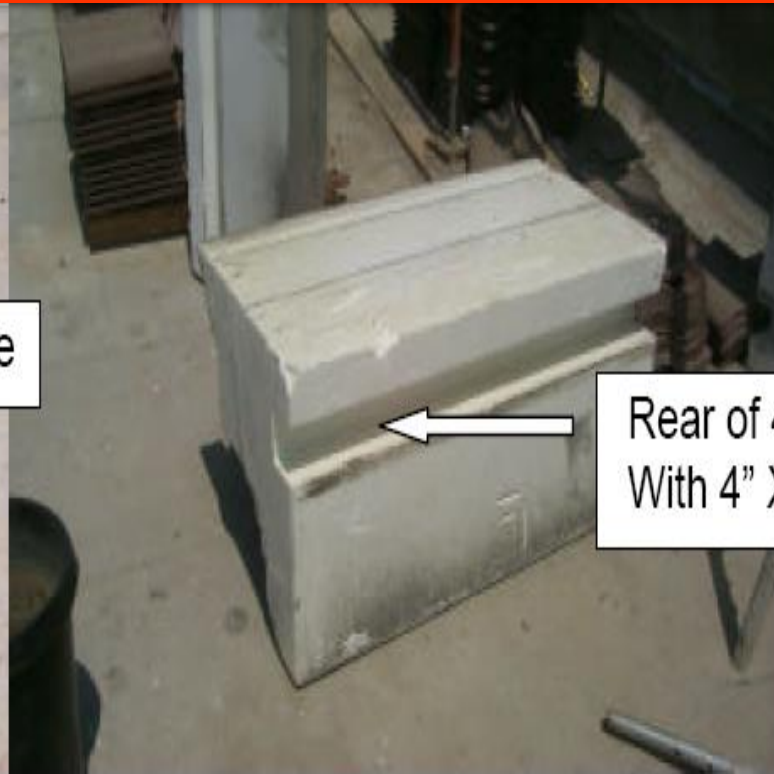


# Ventilation Operations



Face

Cement based  
Coat.

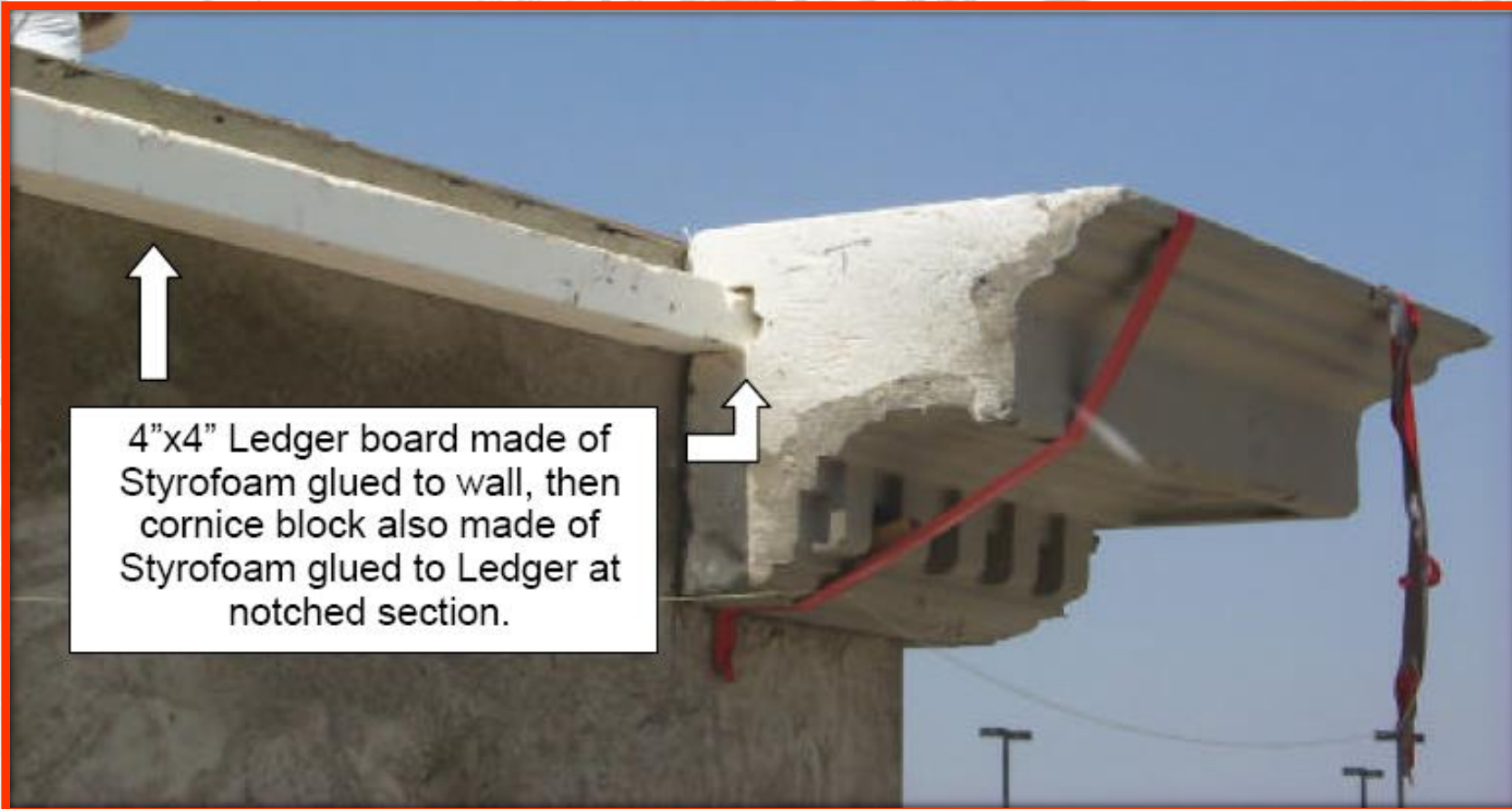


Rear of 4' section  
With 4" X 4" notch





# Ventilation Operations





# Ventilation Operations





# Dealing with PV Systems

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# Ventilation Operations

## The MGP Urban Myth

Firetown Truck Operations

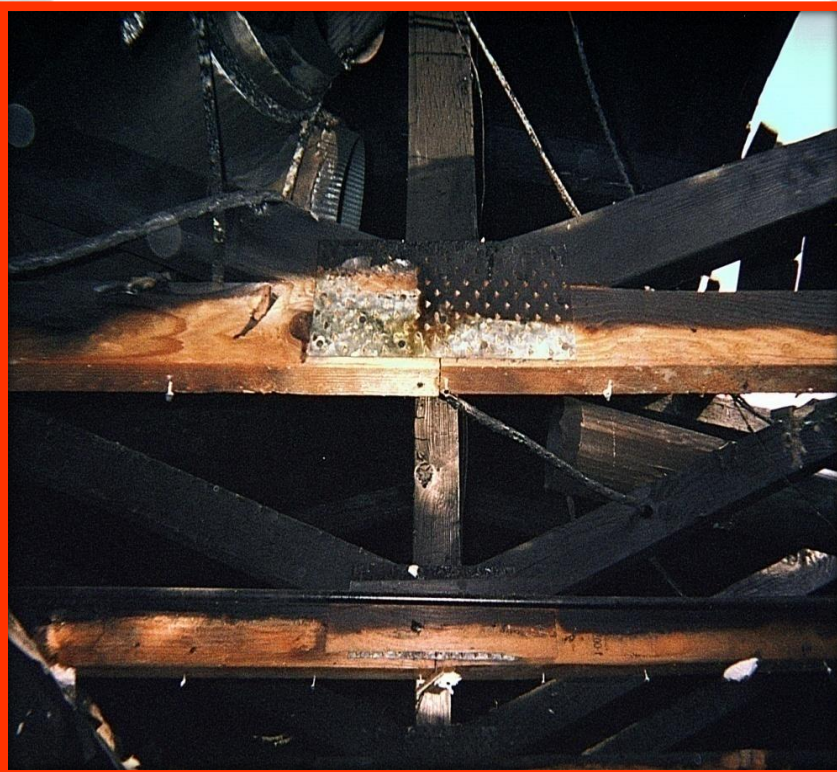




# Ventilation Operations

## The MGP Urban Myth

Firetown Truck Operations

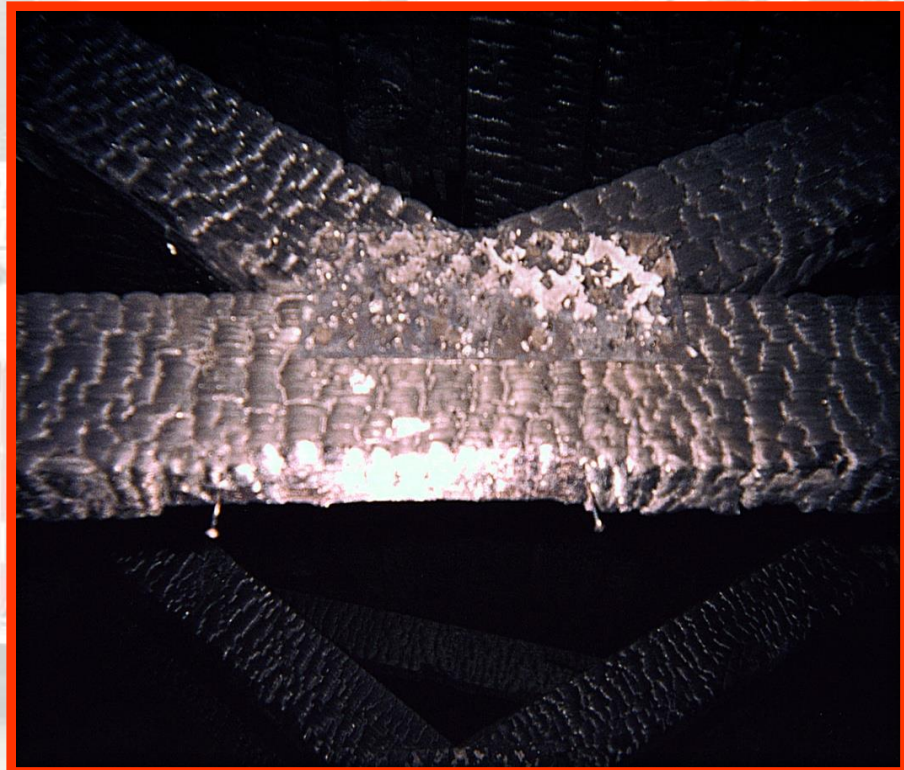
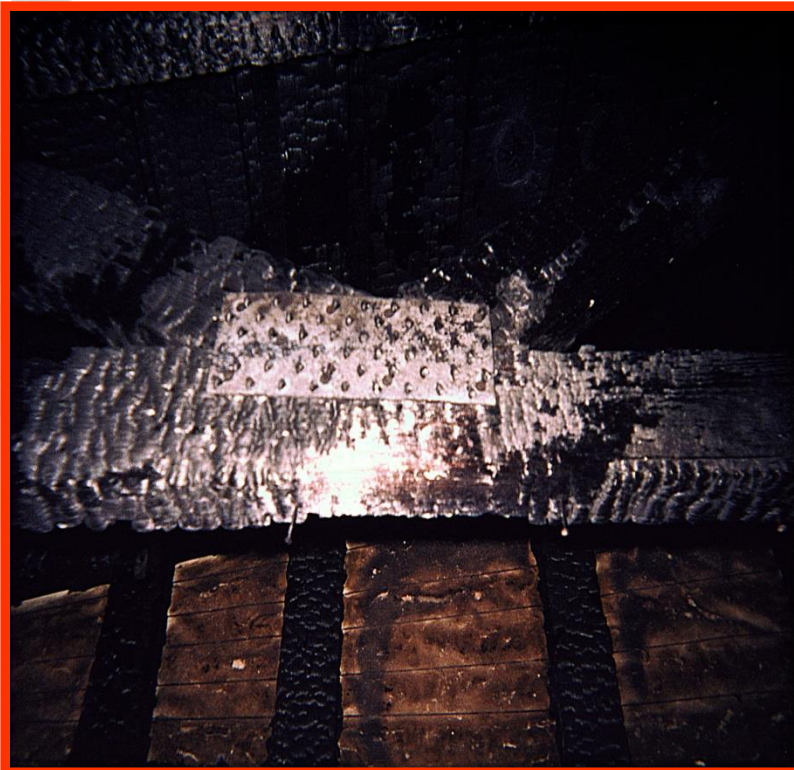






# Ventilation Operations

## The MGP Urban Myth







# Ventilation Operations

## Beware of the Facia

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# Ventilation Operations

## Beware of the Facia

Firetown Truck Operations





# Ventilation Operations

## Beware of the Facia

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# Ventilation Operations

## Situational Awareness

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# Ventilation Operations

## The 4 “C’s of Ventilation

The Four "C's" of  
the  
Ventilation  
Profile



# Residential Ventilation

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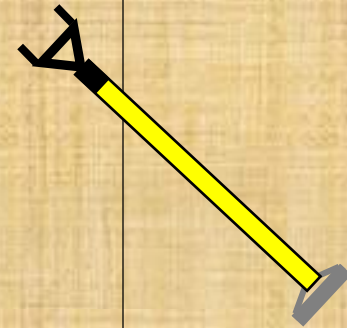


# Low Pitched Roof Cutting Sequence





**Sound the roof for  
integrity**





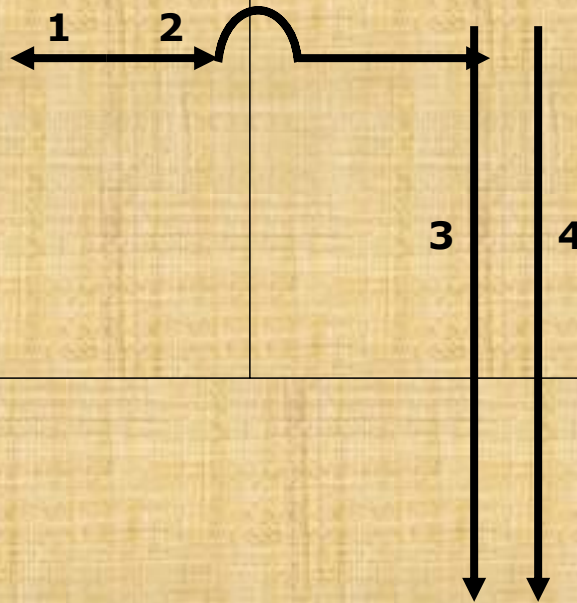
1  
←

**ID cut – to establish  
outside rafter**

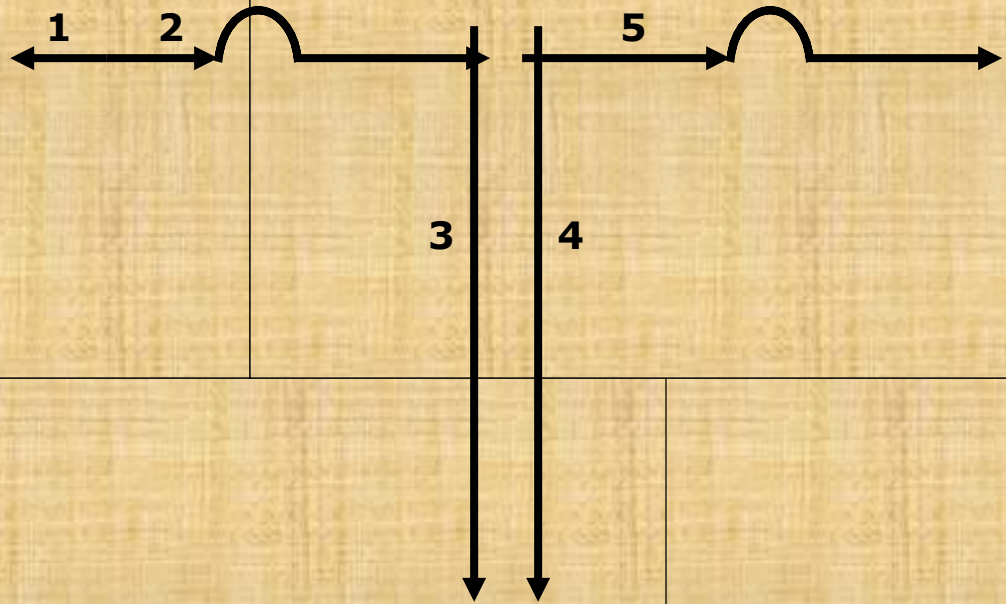




**“Roll one, stop at two”**

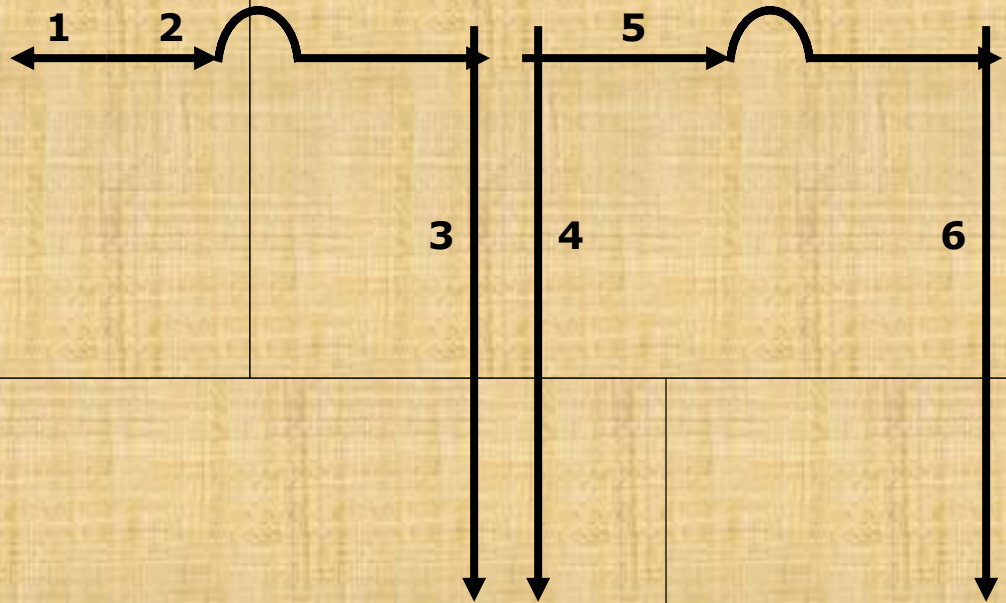


**Vertical cut, vertical cut**

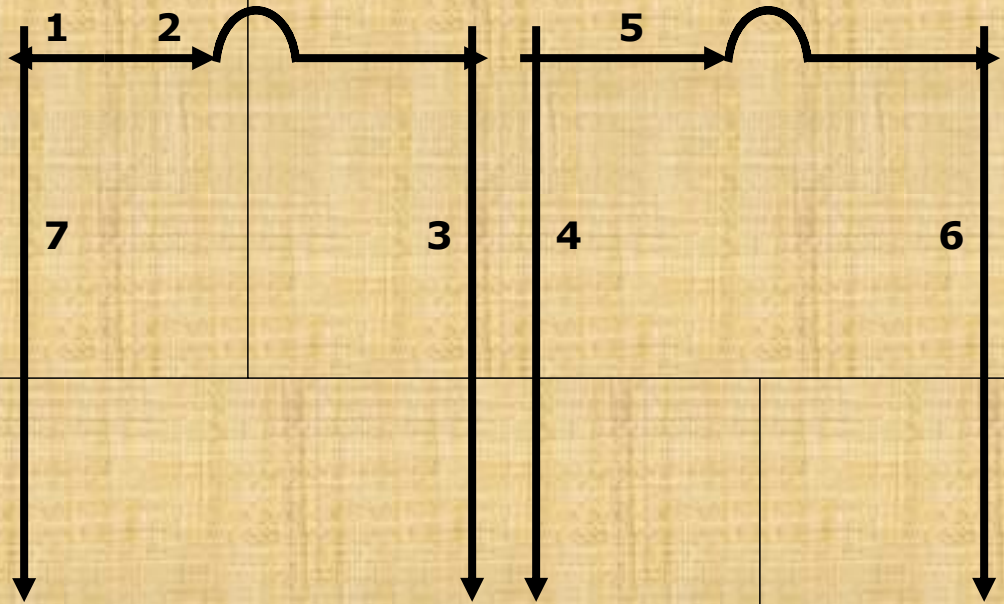


**“Roll one, stop at two”**

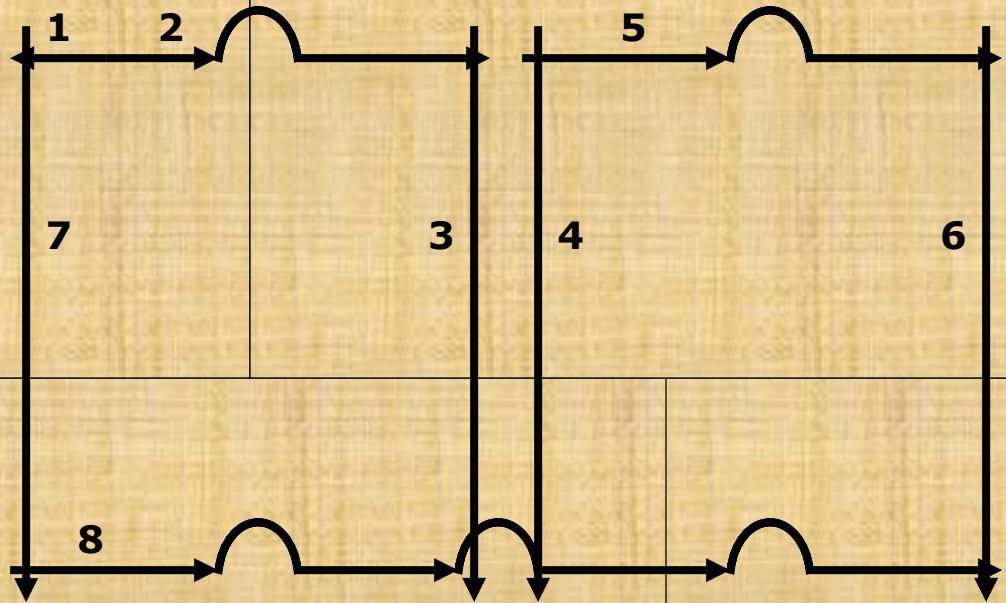




**Vertical cut**

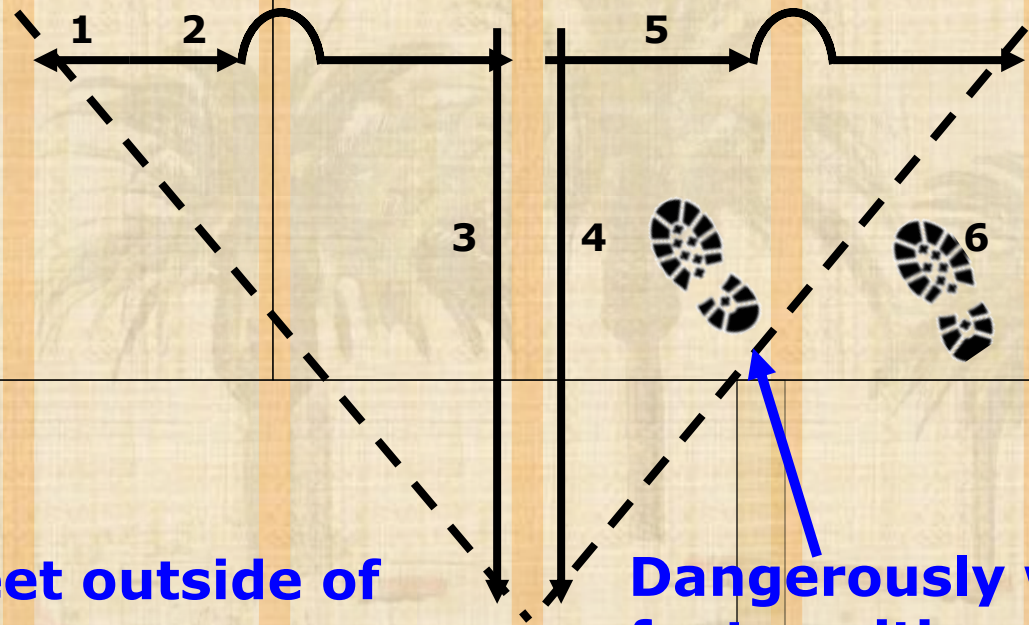


**Vertical cut**



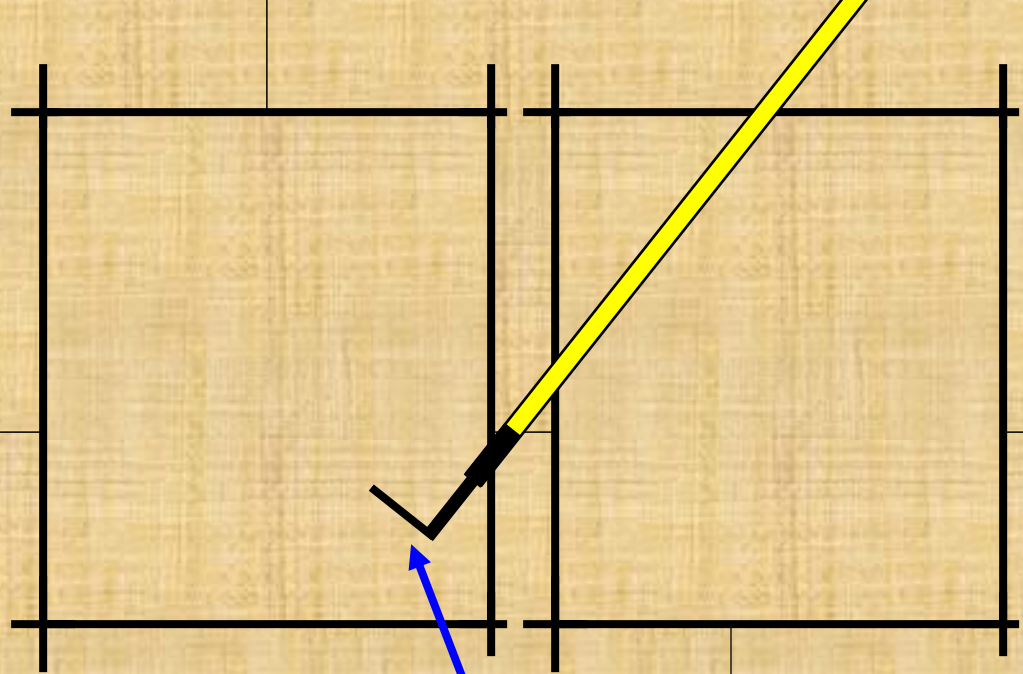
**Skim cut bottom**





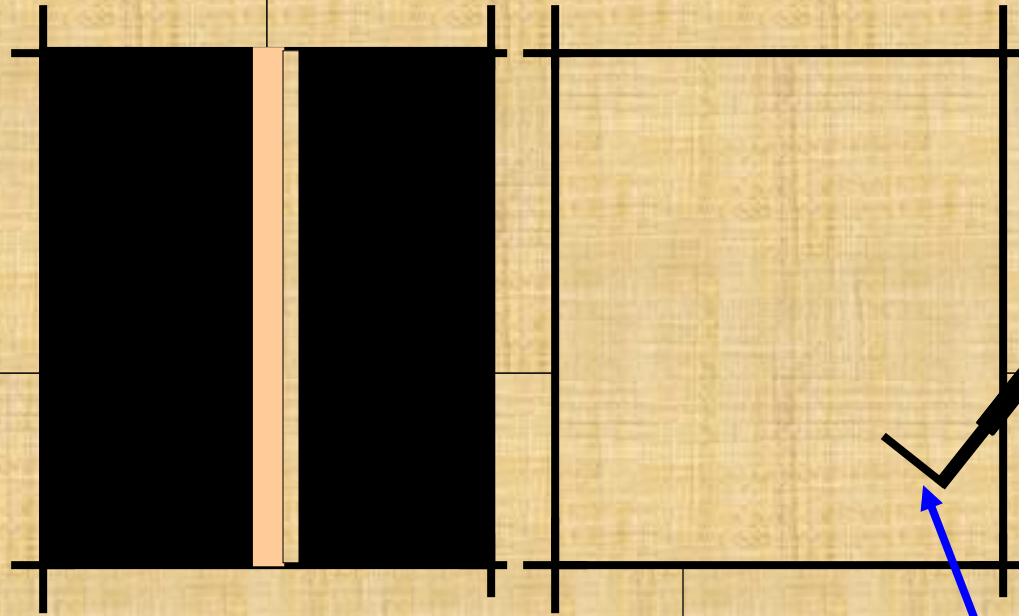
**Caution:** Keep feet outside of line between any two cuts

**Dangerously weak foot position**



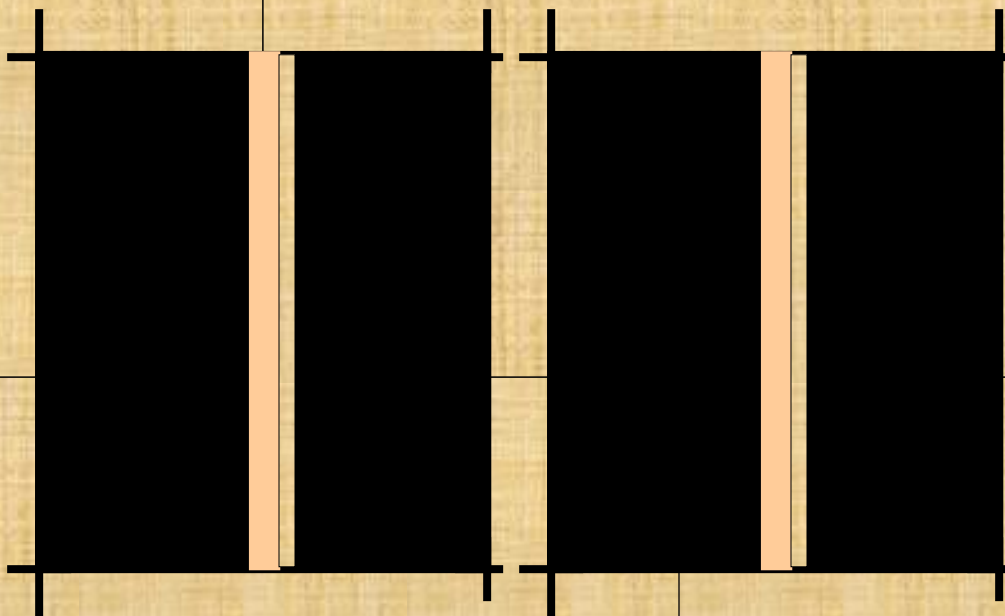
**Be sure to overlap cuts  
by a couple inches**

**Louver  
and *push*  
out  
ceiling**



Louver  
and *push*  
out  
ceiling







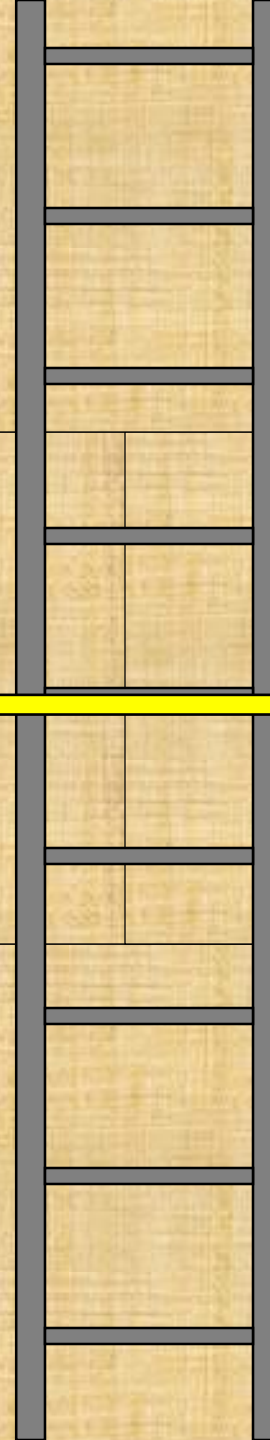
# High Pitched Roof Cutting Sequence

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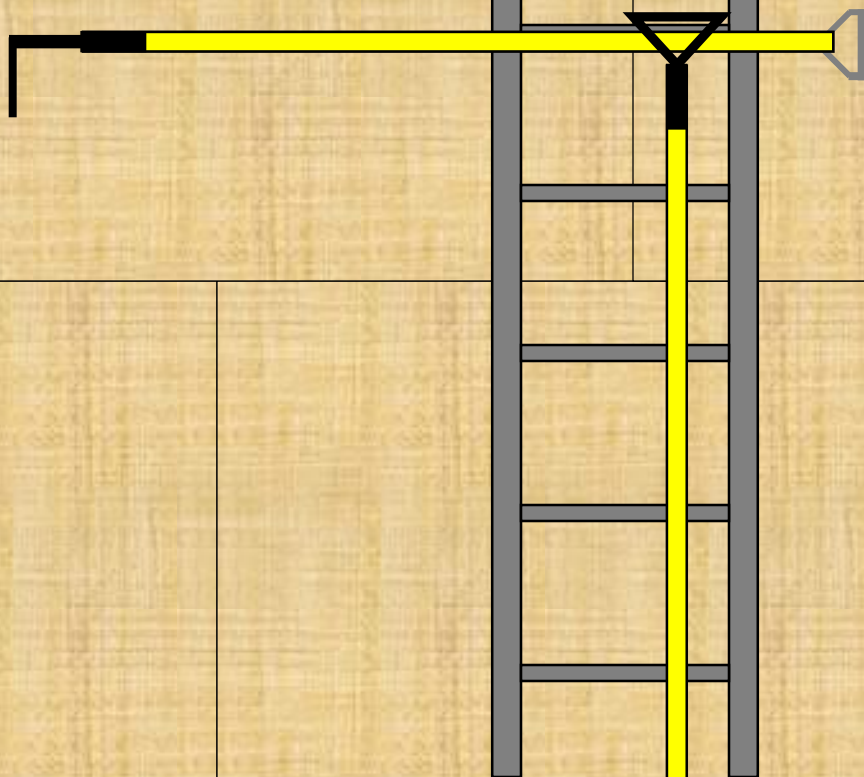
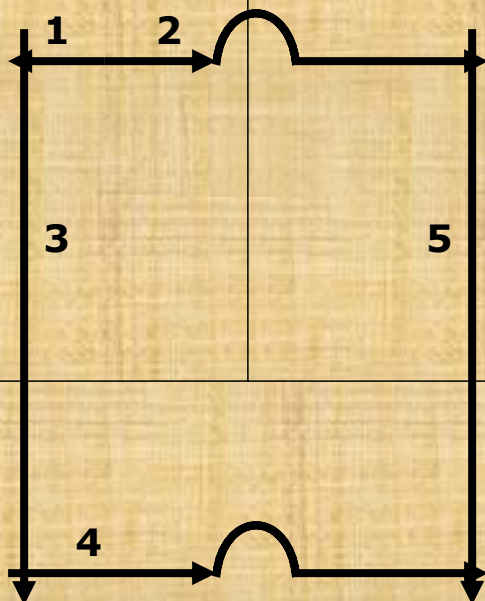


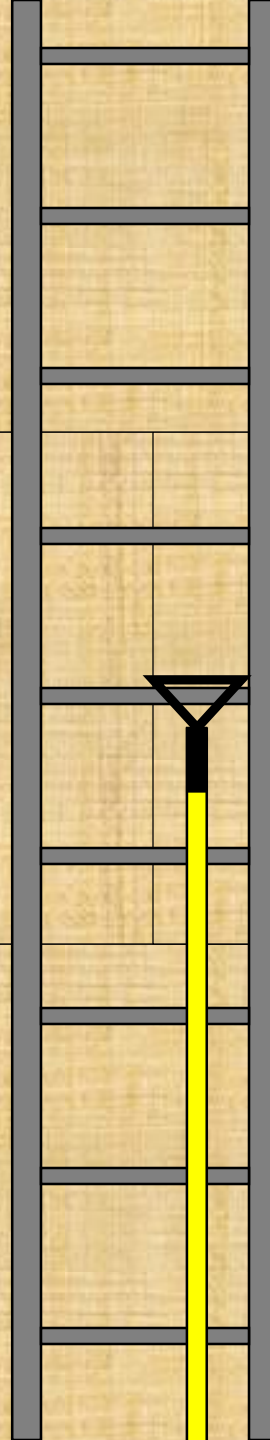
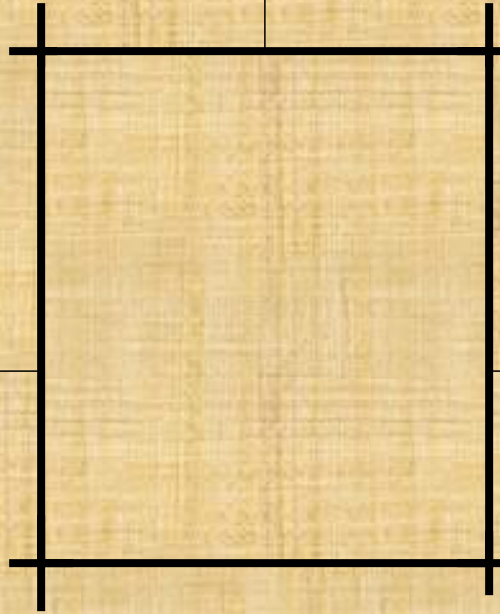


**Establish secure foot hold**

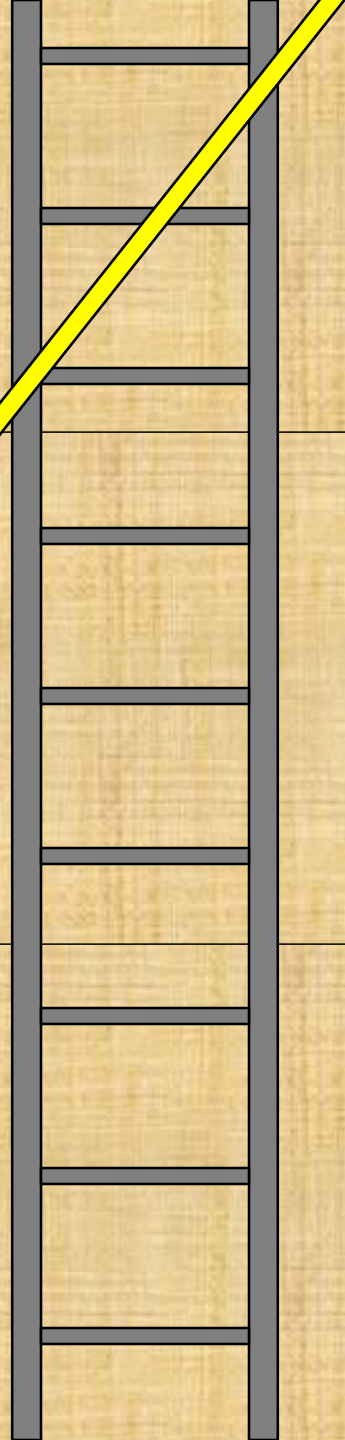
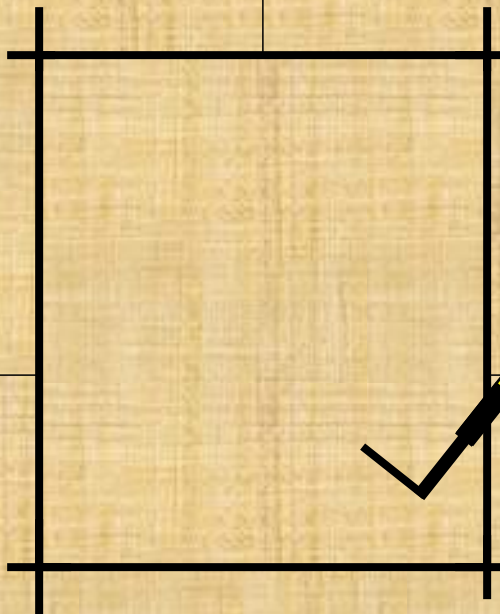




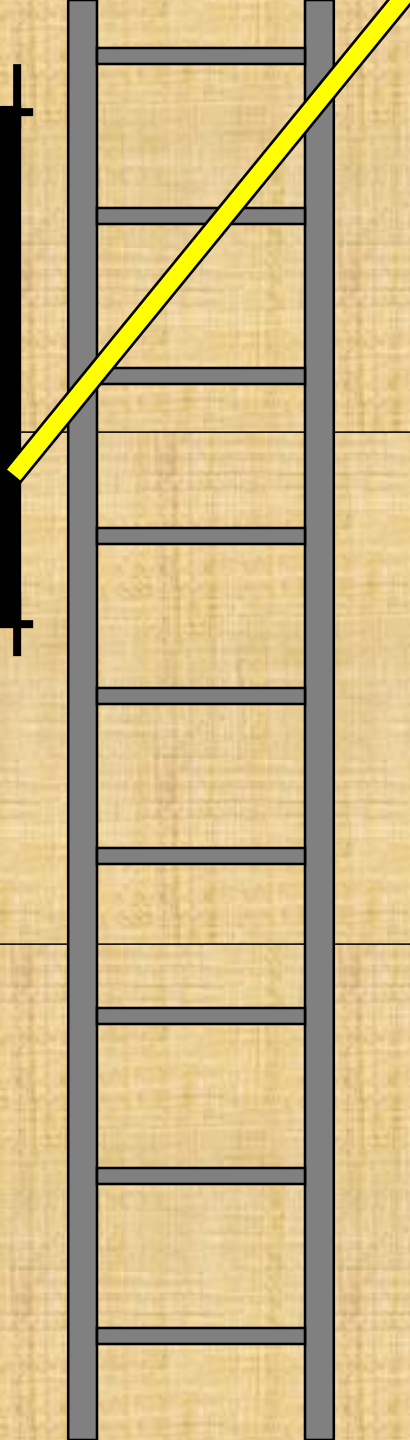
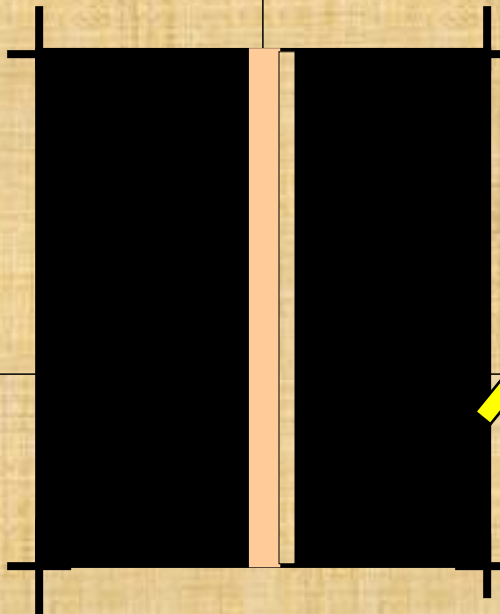


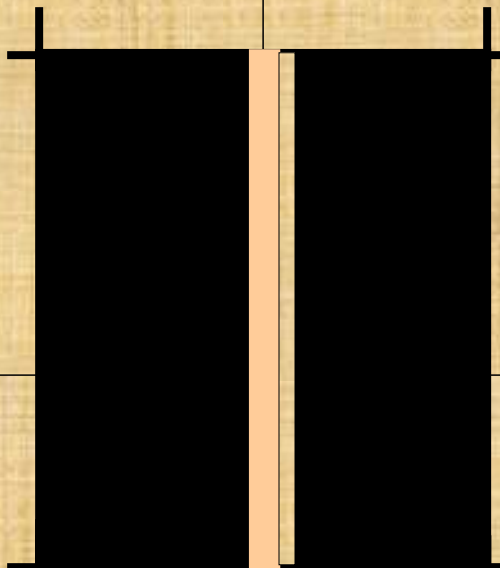


**Be sure to overlap cuts**





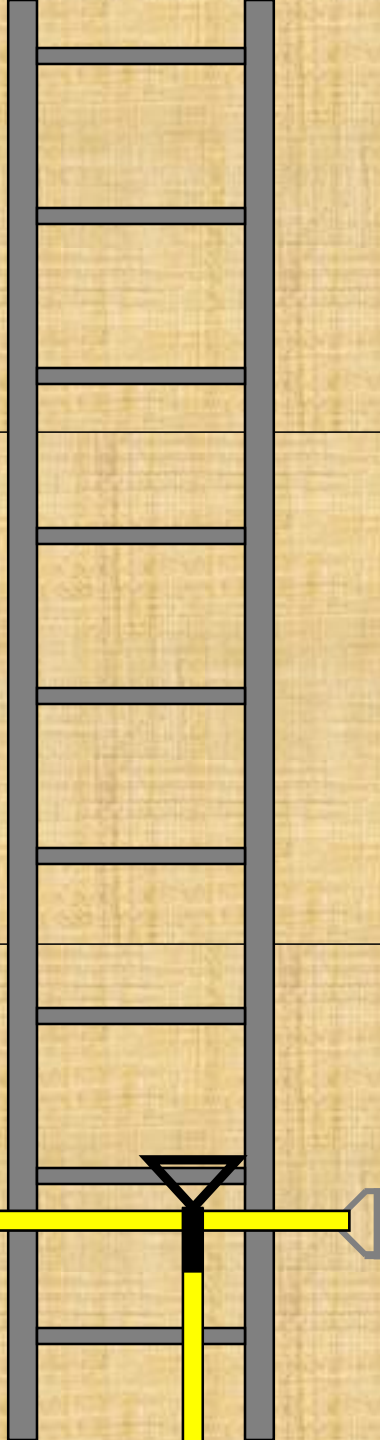
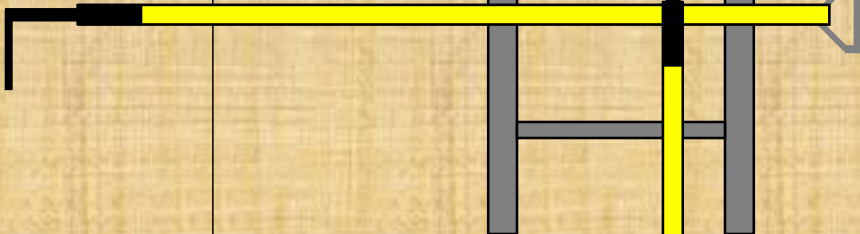


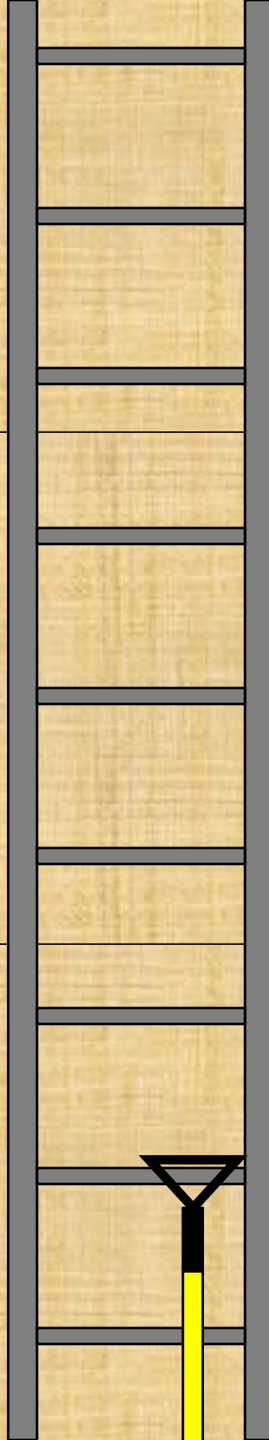
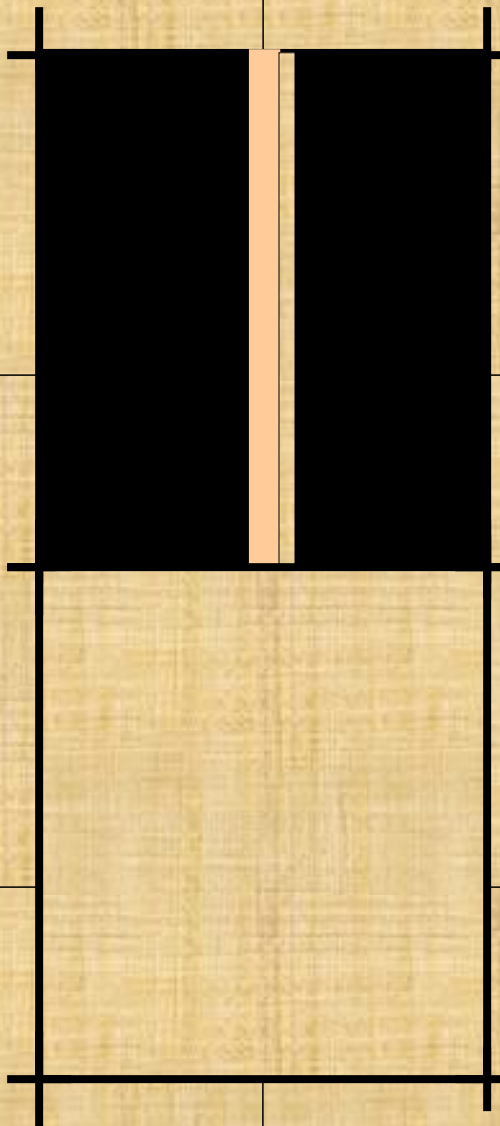


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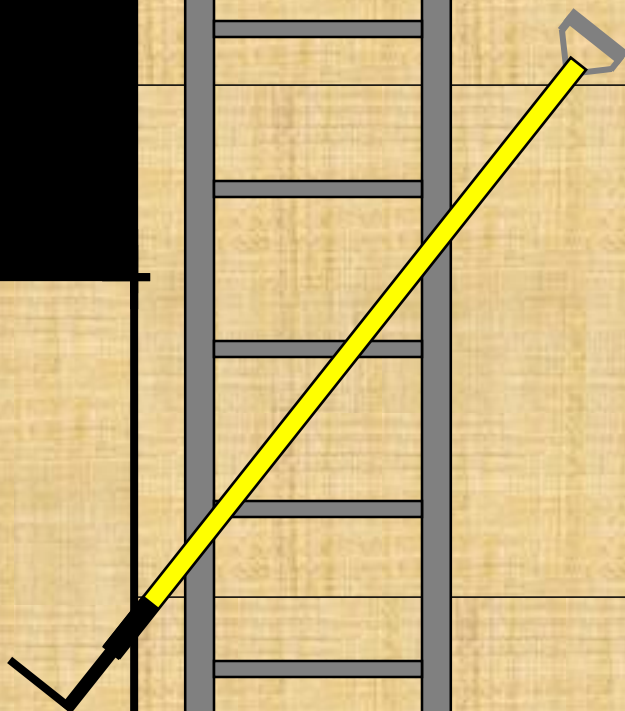
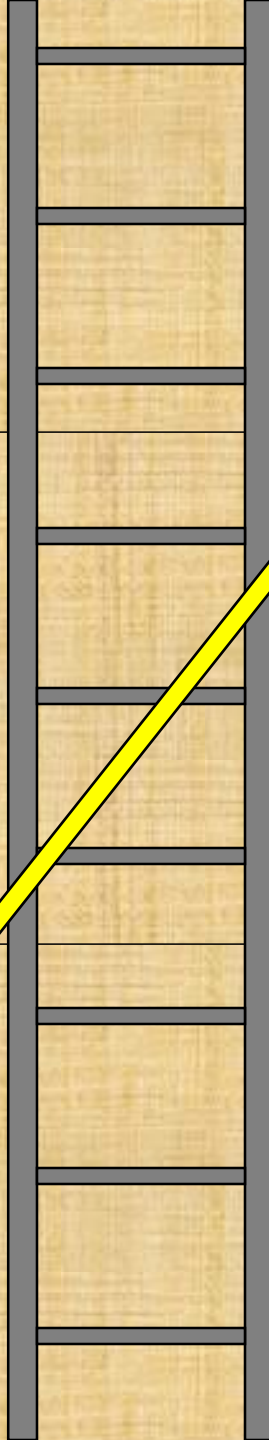
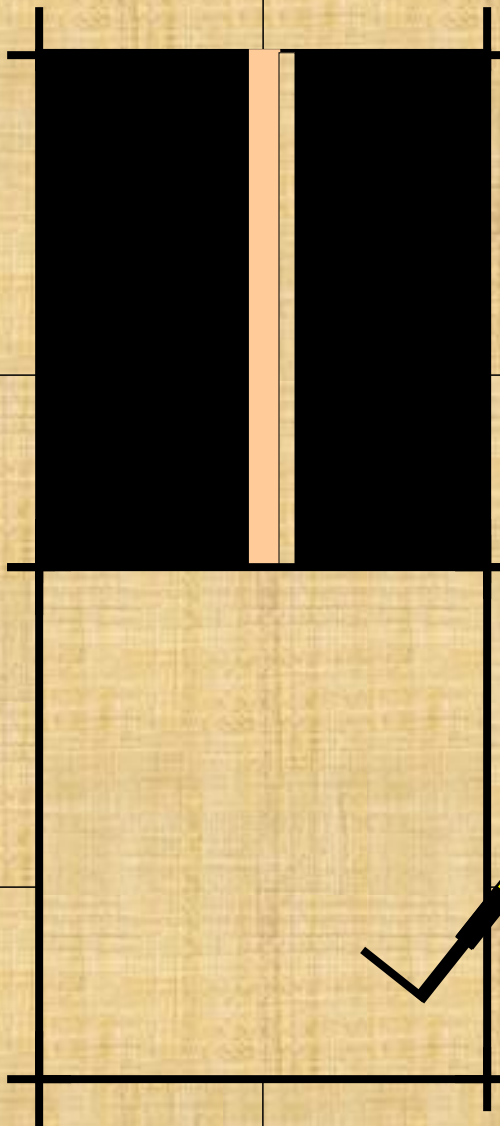
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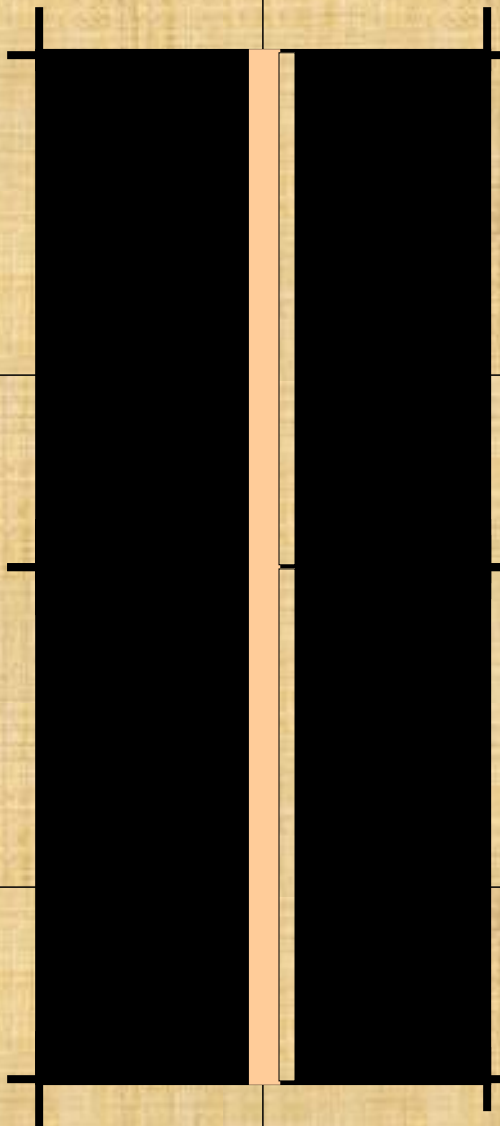
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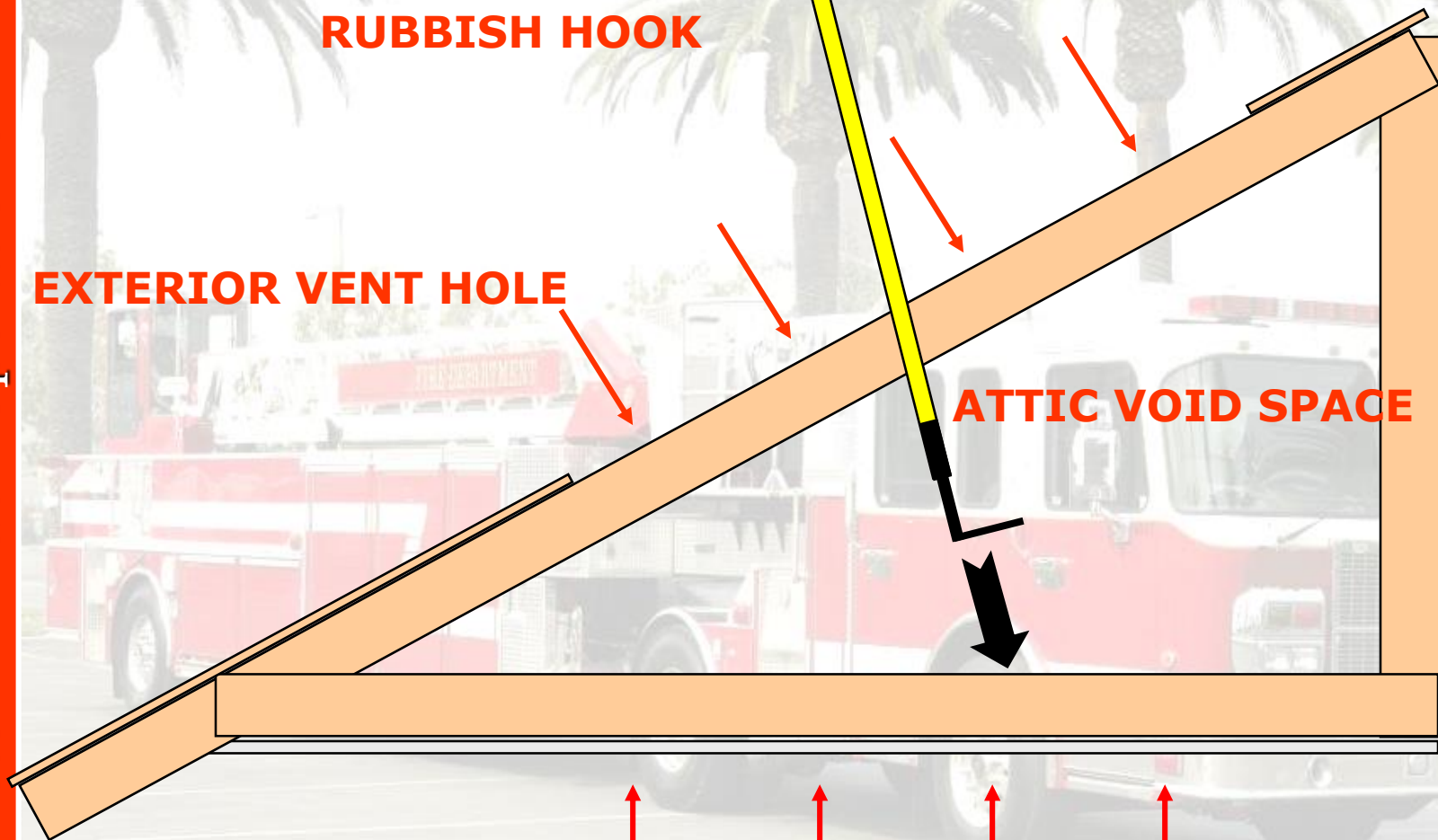


**RUBBISH HOOK**

**EXTERIOR VENT HOLE**

**ATTIC VOID SPACE**

**INTERIOR CEILING SHEET ROCK**







# Saw Handling Skills

PROPER SAW ANGLE

IMPROPER SAW ANGLE





# “Rolling the Rafter”



Roll the TIP of the saw over the rafter. Maintain full throttle during cutting operations / “rolling” rafters



# “Rolling the Rafter”

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While “rolling” the rafter reduce the angle of the saw for ease of operation and comfort of the user





# Tool Swap

- Saw to the inside
- Tool to the outside





# Foot Hold

- Set foot hold into the deck

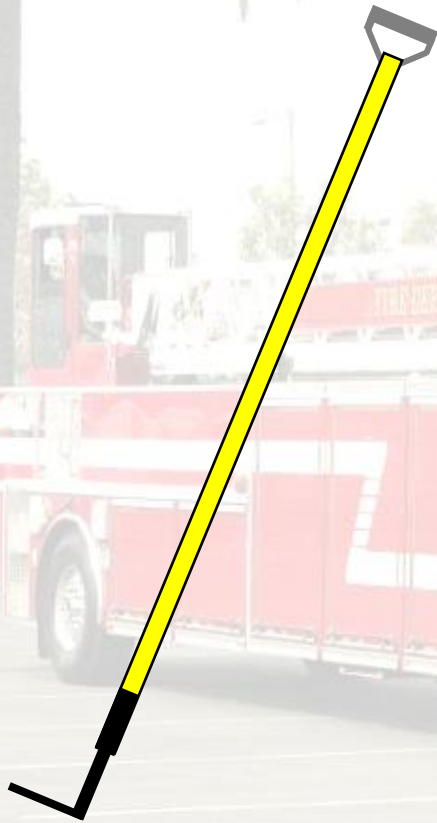






# Rubbish or Trash Hooks

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# Ventilation Operations

*Ventilation Operations*

*Ventilation Operations*  
*Anaheim I/C*

Center Hallway Flat Roof

5 Step Plan



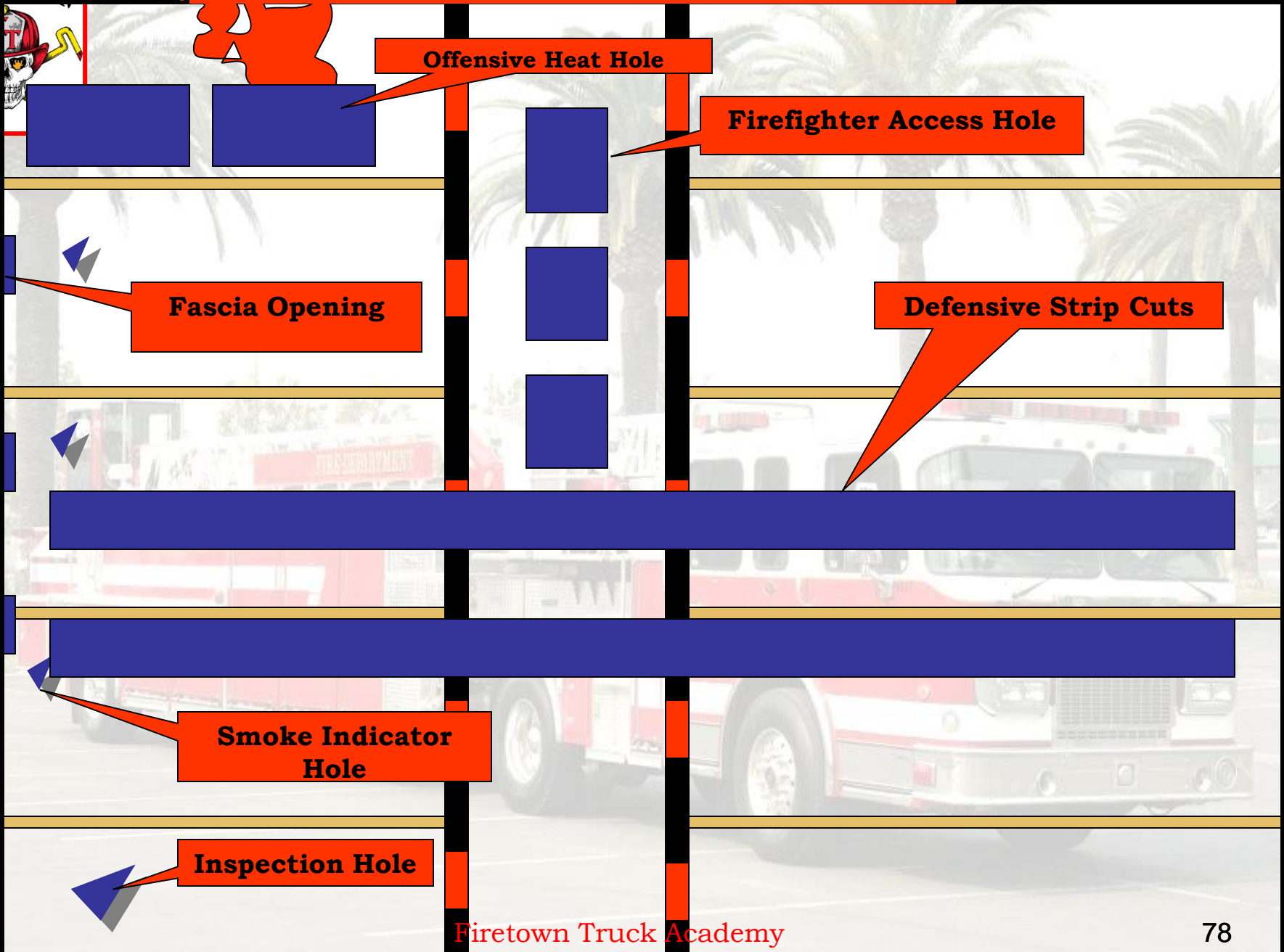
# Commercial Ventilation Operations

*Ventilation Operations*  
*Ventilation Operations*  
*Anaheim I/C*

Firetown Truck Operations



# Center Hallway Apartment Operations







# Commercial Ventilation Operations

## *Ventilation Operations*

Rib Arch / Flat Conventional

Dicing Operations



# Commercial Ventilation Operations

## *Ventilation Operations*

MAIN BEAM



JOIST

JOIST

JOIST

**Dice Cuts**

**Skim Cut**

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MAIN BEAM

BEAM

BEAM

BEAM

BEAM





# Commercial Ventilation Operations

## *Ventilation Operations*

## *Ventilation Operations* *Lightweight Engineered*

- Louver-in-Lieu
- Strip With Construction
- Strip Against Construction



# Commercial Ventilation Operations

*Ventilation Operations*

*Ventilation Operations*  
*Lightweight Engineered*

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**Offensive Heat Hole**



**Processing Area**

**Defensive Strip Cuts**



**Smoke Indicator Hole**

**Inspection Hole**

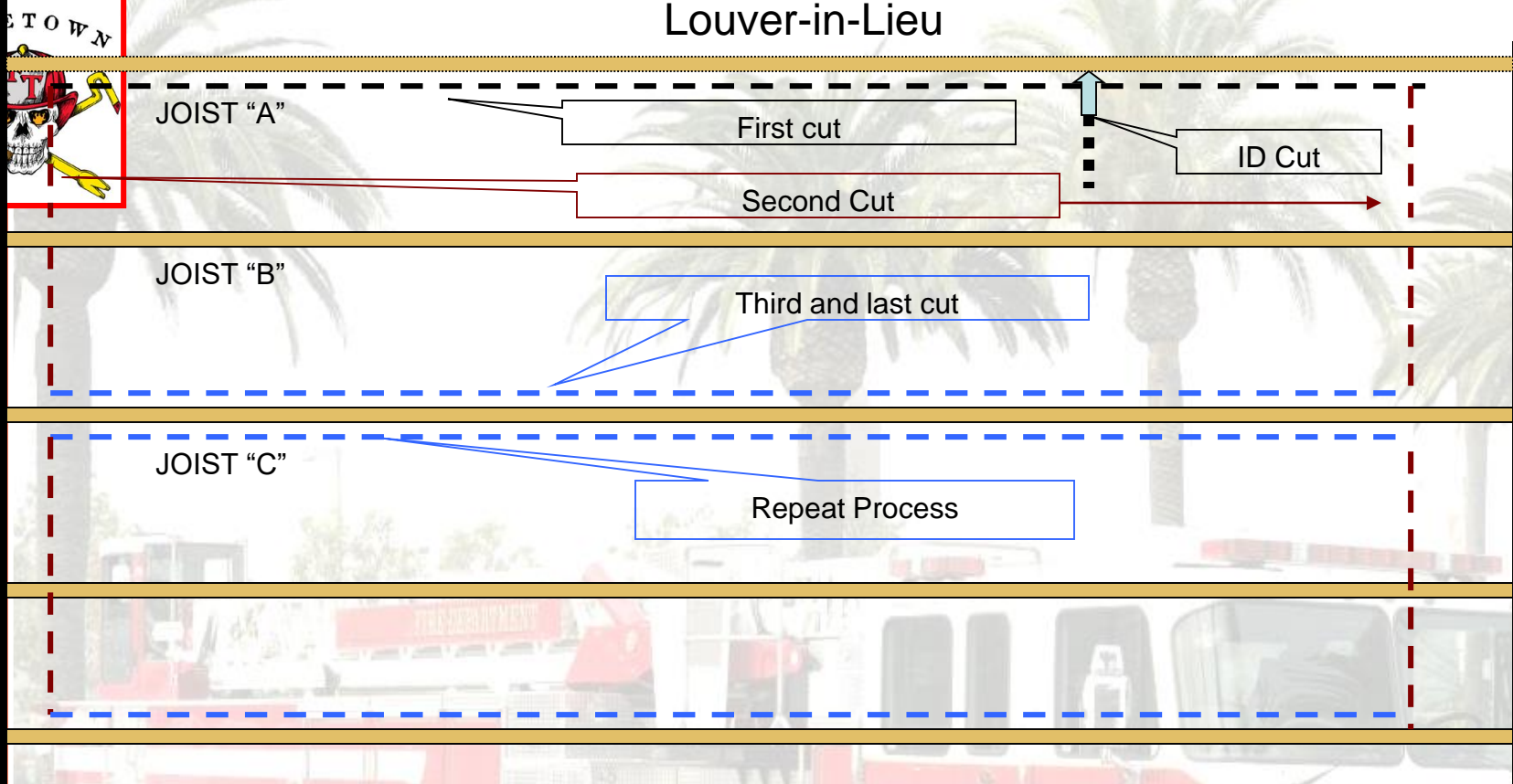
**Office Area**



## Louver-in-Lieu

PURLIN

PURLIN



## MAIN BEAM

### Louver-in-Lieu

1. Establish a starting point for your head cut by cutting toward the fire till you find a structural member. This is known as the ID Cut. Once the topline member is identified, start the second (Head Cut) 4" below the topline member.
2. Make the first cut parallel to JOIST "A", cutting as close to the joist as possible without cutting into it. One firefighter will be on each purlin and reach in halfway.
3. Make the second cut starting at JOIST "A" far enough from the purlin as not to cut into the joist hangers. Roll rafter "B" and finish the cut just short of rafter "C"
4. Make the third and final cut reaching out halfway above JOIST "C" back to the purlin.

MAIN BEAM



JOIST

JOIST

JOIST

PURLIN

PURLIN

PURLIN

PURLIN

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MAIN BEAM





## Strip Against Construction

#2 cut

#3 cut louver

Your First cut will be done by the Captain and will be a "head cut"  
(only cut deep enough to cut through the plywood)



# Strip Against Construction

PURLIN

PURLIN

1. The first cut head cut is done by the (Captain) When doing this cut you will reach out as far as possible and just do a skim cut (enough to only go through the decking). When finished the Captain will then watch for overall safety concerns.
2. The second cut( Firefighter) will start on the inside of rafter "A". Then cut parallel with the purlin rolling over rafter "B" and stopping at rafter "C". Continue this as far as needed.
3. The third thing to do is louver (Engineer/AO) the cuts and clear out any insulation or ceiling below the louver.

Head Cut (Captain)

Third Cut (FF)

Second Cut (FF)

RAFTER "C"

RAFTER "B"

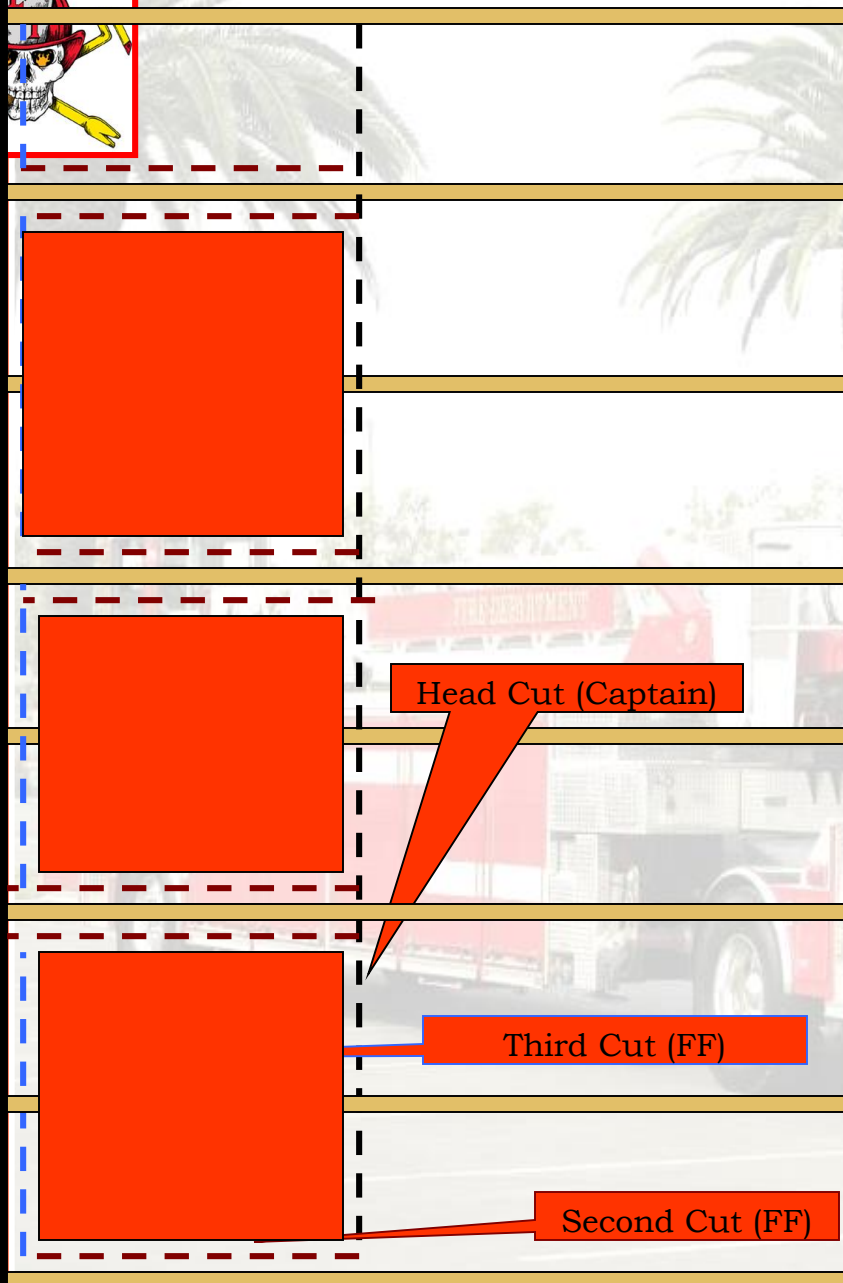
RAFTER "A"

Coronado Truck Academy

# Strip Against Construction

PURLIN

PURLIN



1. The first cut head cut is done by the (Captain) When doing this cut you will reach out as far as possible and just do a skim cut (enough to only go through the decking). When finished the Captain will then watch for overall safety concerns.
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3. The third thing to do is louver (Engineer/AO) the cuts and clear out any insulation or ceiling below the louver.

RAFTER "C"

RAFTER "B"

RAFTER "A"



JOIST

JOIST

JOIST

PURLIN

PURLIN

PURLIN

FIRST CUT (Captain)

SECOND CUT (FF)

THIRD CUT (FF)





# Ventilation Operations



# *Thank You*