

THE ART OF READING BUILDINGS and TEN COMMANDMENTS OF TRUCK COMPANY OPERATIONS

WORKSHOP



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HOSTED BY JACKSON FIREFIGHTERS LOCAL 2280

THE ART OF READING BUILDINGS

WHY IS READING A BUILDING POTENTIALLY THE MOST IMPORTANT FIREGROUND RESPONSIBILITY?

- (1) We often assume we are safe if we are outside the building
- (2) Determining the safety of the building's interior
- (3) Fire Prevention – knowing your fireground office (familiarity)

YOUR SAFETY IS OFTEN DEPENDENT ON CORRECTLY READING A BUILDING AND APPLYING THAT KNOWLEDGE

- It falls on you
- You fall into it
- Flashover
- &
- Lightweight construction & tighter buildings
- Synthetics
- Less time

WHY BUILDING CONSTRUCTION CAN BE DETRIMENTAL TO YOUR HEALTH

- Old favorites
- Recent additions

CLARK COUNTY NEVADA FIRE

- Simple trash fire and lightweight roof
- An era of structural degradation/ failure from heat only?

ARE NEWER BUILDINGS AFTER YOUR SAFETY?

- Compare older construction with modern construction
- Conventional materials vs synthetic materials

READING BUILDINGS.....A CHALLENGE

- Evolution of American buildings
- Brannigan's and Dunn's books
- NFPA 220

UNDRESS THE BUILDING IN YOUR MIND

- What do you see past the *external* construction
- What are your relevant hazards
- Time

NFPA FIVE TYPES OF BUILDINGS

- Type I Fire resistive
- Type II Non-combustible
- Type III Ordinary
- Type IV Heavy timber
- Type V Wood frame

NFPA FIVE TYPES.....WHAT ARE THE ISSUES?

- NFPA is a code based system
- Linked to occupancy intentions in NFPA 500 and the IBC
- *Codes are written for occupant safety – not firefighters*
- Buildings and building materials have evolved
- Hybrid buildings are more common and not addressed

ARE THE NFPA FIVE TYPES OF BUILDINGS A FIREFIGHTER TRAP?

- Type I vs Type II?
- Hybrid buildings?

REMEMBER.....THE BUILDING IS "HOSTING" OUR OPERATIONS. TO CLASSIFY THE HOST, WE NEED TO UNDERSTAND FOUR ELEMENTS

- **TYPE** – General

- **ERA** – Construction
- **USE** – Building
- **SIZE** – Area

CLASSIFYING BUILDINGS BY - TYPE - ERA - USE - SIZE

- Improves knowledge of your enemy
- Requires front loading (practice)
- Provides a foundation for *Rapid Street Reads*
- Assist in formulating strategic and tactical decisions
- Assist in predicting collapse
- Enhance fireground safety

TYPE CONSIDERATIONS

Type I

- Monolith
- Concrete & coated steel
- *Coated/protected steel*

Type II

- Masonry & steel
- All steel
- *Un-protected steel*

Type III

- Brick & wood
- URM or conventional masonry
- Concrete masonry unit and wood

Type IV

- True mill
- Brick & timber
- Block & timber
- Block & gluelam

Type V

- Log
- Post & Beam
- Wall Framed (wood)

3 & OUT QUIZ TIME

ERA CONSIDERATIONS (*You need to know the typical hazards of each Era*)

Pre WW 1 (pre 1914)

- *Historic era predominant hazards:*
 - URM
 - K&T wiring
 - Balloon construction
 - Heavy construction/connection points
 - Remodels likely
 - Heavy roofs (*heavy materials and multiple layers of roofing materials*)

Pre WW 2 (pre 1939)

- *Industrial era predominant hazards:*
 - URM
 - K&T wiring - balloon construction
 - Heavy timber (*Hackensack fire*)
 - Connection points
 - Heavy roofs (*spans*)

Post WW 2 (post 1945)

- *Legacy era predominant hazards:*
 - Conventional masonry (*Portland cement, rebar, etc*)
 - Platform construction
 - Full-size lumber
 - Connection points
 - Improved building codes

Millennial Era (60's & 70's to today)

- *Engineered lightweight wood and metal predominant hazards:*
 - Geometry replaces mass

- Engineered wood platform
- LVL, etc.
- Rapid/catastrophic collapse
- Common use of adhesives
- Facades

Several ERA Tips

- *What is common to your fireground office*
- Obvious *lightweight* buildings such as townhomes, dwellings, etc
- Center mounted URM fireplaces
- Small garages (*single small cars*)
- Older roofs (sawtooth, arch, etc)
- Older 1X4 wood siding on older structures
- Exposed 2X4-inch rafter tails
- URM construction
- Etc.....

3 & OUT QUIZ TIME

USE CONSIDERATIONS

- **Institutional:**
 - Questionable staff
 - Extreme rescues
- **Public Assembly:**
 - Typical no life loss
 - Kitchens
- **Manufacturing (warehouse):**
 - Potential fire load
 - Mezzanines
- **Office:**
 - Partitions vs work stations
 - Foam copings

- **Business-Retail:**
 - Type of business
 - Interior fire load
- **Single-Family Dwelling:**
 - Most death/injuries to FF's and civilians
 - Flashover
- **Multiple-Family Dwelling:**
 - Construction
 - Centerhallway vs garden apartments
- **Storage:**
 - Box of chocolates
 - Open partitions
- **Historic:**
 - Incorporate original appearances
 - URM - K&T wiring
 - Hidden upgrades
- **Miscellaneous:**
 - Your familiarity with the premises/operation
 - Sky is the limit

3 & OUT QUIZ TIME

SIZE CONSIDERATIONS

- **Mega Big Box:**
 - Super Walmart
 - Bass Pro shops
- **Big Box:**
 - Sportsmans Warehouse (etc)
 - Lowes
- **High-Rise:**
 - Over 75-feet height of residential and/or commercial
- **Small – Moderate – Large** (*what is the definition?*)

- 2 – 4 – 6 principle:
 - Principle of 2 (2 stories or less, 2,000 sq ft or less, 200' of handline, 2 handlines for an offensive operation)
 - Principle of 4 (4 stories or less, 4,000 sq ft or less, 400' of handline, 4 handlines for an offensive operation)
 - Principle of 6 (6 stories or less, 6,000 sq ft or more, 600' of hose, 6 handlines for an offensive operation)

3 & OUT QUIZ TIME

JOE'S BUILDING TRIAGE

Do you have a preplan/methodology to enable you to evaluate whether to put people inside a building and/or how long to leave them in?

1. Limited ways in and out
2. Can't tell what the building is being used for
3. Can't tell where the fire is
4. Has the potential to having been burning undetected
5. Can't determine the potential floor plan
6. Buildings whose construction features frequently result in unexpected fire behavior

A FEW SIZE-UP CONSIDERATIONS FOR ALL BUILDINGS

180/360 SIZE-UP

- The importance of initially conducting a quick look at the sides and/or back of a building (even common SFD's) cannot be overstated for the following primary reasons:
 - What you see from the front may not be the complete picture
 - Your "fire problem" may change dramatically (positive or negative) depending on your particular view

BASE OF OPERATIONS

- Defined as "ensuring what you are standing on (roof or floor) will *safely* support your weight until you exit the building"
- Foundations (perimeter and poured slab)

- Basements
- Walkout basements
- Roofs

WHAT IS BURNING

- Conventional (2x6 or larger)
- Lightweight (2x4 or smaller)

GREEN MOVEMENT

- Primarily a result of the American and Reinvestment Act – National Green Building
- Standards (ICC 700)
- Reduced “Carbon Footprint”
- Enhanced flashover
- Reduced structural stability
- Cell arrays (*electrical and radiation concerns*)

ROOFS

- Each of the following 8 roofs are easy to identify
- Compare the type of roof with the approximate age of the building
- Often gives clues to the age of a building and structural stability:
 - Flat (most common on commercial bldgs)
 - Gable (most common on SFD’s)
 - Hip (common on SFD’s)
 - Monitor (unique for commercials)
 - Gambrel (not as common on SFD’s)
 - Sawtooth (typically not found after 1960)
 - Arch (typically not found after 1950-1960)
 - Bridge truss (typically not found after 1950)

FACADES

- External common attic positioned over the front access/egress to a building

- Size-Up:
 - Overhang
 - Height
 - Supported-unsupported
 - Height from roof
- Accessing the façade interior for suppression/overhaul
- Newer foam facades for perceived strength

ACCESS AND EGRESS

- What should be the minimum ways to exit a building?
- How many ways do you have out of a building from the interior?

NAME AND UTILITIES

- Exterior name can be an indicator of the interior layout/contents
- The size and number of utilities is also an indicator of the interior

**FINAL THOUGHT.....TAKE YOUR TIME, READ
THE BUILDING.....AND BE SAFE!**

TEN COMMANDMENTS OF TRUCK COMPANY OPERATION ("TRUCK STUFF")

THREE BASIC TRUCK FIREGROUND RULES OF ENGAGEMENT

- 1) Use the right terminology!
- 2) An engine company in a hallway is nothing more than a couple speed bumps to a good truck company!
- 3) Who does "*truck stuff*" without a truck company?

HAVE WE CHANGED THE WAY WE DO BUSINESS?

WHAT TASK IS RESPONSIBLE FOR THE ANNUAL LOSS OF OVER 100 FIREFIGHTERS?

ARE TRUCK OPERATIONS (LOGISTICS) MORE IMPORTANT TODAY THAN YESTERDAY?

WHY DO WE CONTINUALLY MAKE THE SAME MISTAKES OVER AND OVER AGAIN?

FIVE BASIC RULES OF FIREGROUND SAFETY

- Falling debris always has the right of way
- Equipment on your apparatus in the street is unusable on the fireground
- If the fire is in range, so are you
- What you see may not be what you get
- Your fireground time is slowly being minimized

BASIC ENGAGEMENT RULES FOR TRUCK COMPANIES

AWARNNESS AND STAFFING

Be aware of inherent blind spots

Staffing:

- Interior operations:
 - Search
 - Forcible entry
 - Extension
- Exterior operations:
 - Ladders
 - Ventilation
 - Forcible exit
- Pre-designated assignments
- Staffing considerations for 3, 4, or 5

MANAGE THE IC SYSTEM; DON'T LET IT MANAGE YOU

Initial size up:

- Responsibilities of the *initial* company (IC)
- First-in company:
 - Who you are
 - Where you are
 - What you see
 - Resources
- Incidents that are within your control (somewhat);
 - Type of building
 - Anything showing
 - Priority (access, search, water)
 - Anything showing
 - Priority (access, rescue, water)
 - Exposures
 - Wind direction
- 6-Side concept

Truck Placement:

- Straight Truck first on-scene:
 - Need for aerial device
- Quint first on scene:
 - Staffing
 - Water vs aerial device
- General Considerations:
 - Spotting for aerial use (triangle)
 - Pivot point
 - Inside – outside
 - Setup parameters
 - Aerial ladder vs platform placement
 - Facades
 - Far vs near corners of buildings
 - Defensive operations (collapse zones, windward side, nozzle, distance from building, personnel on ladder with nozzle, pinning the waterway)
 - Personnel on aerial ladder while being extended?
 - On or off the objective?

DETERMINE AVAILABLE FIREGROUND TIME

THE FIREGROUND CLOCK

- What does the fireground clock mean to you?
- **Clock #1** – Time fire was burning, discovered, dispatch notified, dispatch resources, your response time
- **Clock #2** – You stop in front of incident, conduct a size-up, force entry, find fire, open the nozzle. At this point, how long will it take you to make a visible impact on the fire?

John's Baseline

- If fire is exposing lightweight structural members for *more than 5 minutes*, rethink interior operations
- If fire is exposing conventional structural members for *more than 15-20 minutes*, rethink interior operations

- John's Baseline:
 - 5 to 7 minutes for lightweight construction
 - 15 to 20 minutes for conventional construction
 - Remember to *read* the attic vents for potential collapse potential

PRIORITIZE FIREGROUND CONSIDERATIONS

- 6 Basic fireground priorities:
 - Fire attack
 - Ventilation
 - Forcible entry / exit
 - Search
 - Ladders
 - Back-up line
 - *(notice that 4 of the 6 preceding basics are truck priorities that are responsible for enhancing firefighter safety)!*
- Top fireground priority
- RECEO
- Has search been over-emphasized at the expense of safety?
- 2018 Fireground Truck Priority *(if search is not mandatory)*:
 - Firefighter safety
 - Ladders (if immediately necessary)
 - Forcible entry / exit
 - Ventilation
 - Search
 - Etc
- Seattle priorities:
 - Firefighter safety
 - Rescue
 - Forcible entry / exit
 - Search
- Risk & priority assessment (life risk assessment):
 - Occupied
 - Non-occupied

- Vacant
- Abandoned

BE A "TOOL TIME" EXPERT

- *Have we forgotten about putting the fire out?*
- Ladders:
 - Using three personnel for 2 ladders
 - Using two ladders for 2 ladder rule and equipment
 - Residential (9') and commercial (10')
 - Ladder basics
- Forcible entry / exit (single person perspective):
 - Pickhead axe, rotary saw, rabbit tool, "A" tool, key tool, channel locks
 - A few forcible entry tricks
- Search-Rescue:
 - Lack of familiarity, time constraints, environment, etc
 - Primary vs secondary
 - Search types (standard, team, oriented)
 - Drop bag, axe, TIC's, etc
 - Search patterns Vs different types of buildings
 - Following hose lines
- Ventilation:
 - Chain saw, rotary saw, pike poles, rubbish hooks, blowers
 - Need
- Elevated master streams:
 - Wind
 - Collapse zones
 - Nozzles
- Salvage and utilities:
 - Electrical and gas
 - Plastic and wedges
 - A few tips

BECOME A MENTAL GENERAL CONTRACTOR

- *Art of Reading Buildings*
- Undress the building
- Construction:
 - Lightweight
 - Conventional
- 4 specific truck buildings:
 - Abandoned
 - Warehouse
 - Strip malls
 - Multi-story condos, townhomes, etc

USE YOUR PROTECTIVE EQUIPMENT DEFENSIVELY, NOT OFFENSIVELY

- Masked indicators
- Truck vs engine personnel
- 425-degrees
- Why is this of the utmost importance, particularly for truck personnel?

CONTINUALLY EVALUATE YOUR FIREGROUND ENVIRONMENT

- What is smoke?
- Pre 1970 vs post 1970
- Flashover vs backdraft
- Smoke is the fire talking to you
- Vented fires (advantages-disadvantages)
- Un-vented fires (advantages-disadvantages)
- Reading smoke:
 - Color
 - Density
 - Amount
 - Pressure

- Dynamics (static, pressurized, and negative)
- Conventional materials vs synthetic materials
- Ladder fuels and *hydrogen cyanide*
- Fireground indicators:
 - Note conditions when entering environment
 - Establish a baseline for comparisons
 - Continue to monitor conditions
- 3 Strike Rule:
 - Smoke with heat
 - Less than acceptable visibility
 - Environment is not improving

VENTILATION

- (1) Horizontal, (2) Vertical, (3) PPV
- Horizontal (windows):
 - Relationship to seat of fire
 - Different types of glass
 - Upper portion of room
- Vertical:
 - Most effective?
 - Most dangerous
 - Travel direction
 - Ventilation operations on conventional/lightweight roofs
 - Basic safety rules:
 - ✓ Ladders
 - ✓ Basic equipment
 - ✓ First member to the roof
 - ✓ Read the roof
 - ✓ **Determine the type of roof**
 - ✓ **Determine the location and extension of fire**
 - ✓ **THEN,.....determine ventilation feasibility**
 - ✓ Walk the strong areas of the roof

- ✓ Sound your path of travel
- ✓ Work from the weak area to the strong area/ means of egress
- ✓ Keep the wind at your back
- ✓ If possible, utilize natural construction features
- ✓ Only cut as deep as necessary
- ✓ Use the principle of clearspan
- ✓ Power equipment considerations
- ✓ Hose lines on a roof
- ✓ Size of ventilation openings
- ✓ Location of ventilation openings
- ✓ Use the roof construction to your advantage
- ✓ Don't be a roof shepherd
- ✓ Path of egress
- Positive pressure:
 - PPV ten commandments:
 - ✓ Goal
 - ✓ Charged line
 - ✓ Fire location and air route
 - ✓ Exhaust opening first
 - ✓ Seal the door (if possible)
 - ✓ Don't block entrance opening
 - ✓ Use of blower's
 - ✓ Proper exhaust opening
 - ✓ Carbon monoxide
 - ✓ Use of blowers
 - Entrance openings
 - Exhaust openings
 - Sequential ventilation

ENSURE THE VIABILITY OF AN ESCAPE ROUTE

- Inside:
 - Never let the fire get between interior personnel and their exit(s)

- Pull the ceilings
- Basements
- Topside:
 - Minimum of two ways off the building
 - Corners
- Outside:
 - Clear the entire opening
 - Minimum of two

HOW DO YOU MANAGE THE AIR IN YOUR SCBA

- Full
- Duration
- Monitor

**FINAL THOUGHT.....REMEMBER THAT TRUCK
OPERATIONS DON'T PUT FIRES OUT, THEY CAN
DETERMINE HOW A FIRE WILL BE PUT OUT!**