Compartment Fire Behavior Training (CFBT)

Hose & Nozzle Technique: Drill 6

CFBT-US
Not just what and how, but why!

Prerequisite Training

Learners must have received basic instruction in the use of personal protective equipment, hose, nozzles, have developed basic proficiency in nozzle operation from a fixed position (see Hose & Nozzle Technique: Drill 1), movement of hoselines coordinated with nozzle operation (see Hose & Nozzle Technique: Drills 2 & 3), and Door Entry Procedures (see Hose and Nozzle Technique Drills 4 & 5).

Learning Outcomes

Note: The following learning outcomes must be demonstrated under conditions ranging from poor to no visibility.

1. Demonstrate the procedure used for safe entry into a compartment that is or may be involved in fire. This process must include:
    a. Size-up (dynamic risk assessment)
    b. Door control
    c. Gas Cooling
2. Demonstrate the following nozzle techniques in conjunction with movement of a hoseline forward and backward:
    a. Gas Cooling (Short and Long Pulses)
    b. Surface Cooling/Direct Attack (Painting and Penciling)
3. Demonstrate gas and surface cooling while advancing a hoseline in compartments having varied configurations (small, large, narrow)

Reference

Grimwood, P., Hartin, E., McDonough, J., & Raffel, S. (2005). 3D Firefighting: Training, Techniques, & Tactics. Stillwater, OK: Fire Protection Publications.

Resource Requirements

This drill requires a pumping apparatus and sufficient hose and nozzles to provide each team of learners with a hoseline. If possible teams should be limited to no more than five learners to maximize practice and minimize session duration. If possible, the same nozzles that will be used operationally should be used for this drill.

Translucent or opaque facepiece covers, cold smoke (e.g., from a smoke machine), or simple darkened conditions may be used to provide conditions of limited visibility.

Training Prop

This evolution requires a structure with varied size compartments (rooms, hallways, stairwells) and doorways of different configurations (inward and outward opening, position, etc.) where water can be discharged and sufficient water supply to allow all learners to have ample opportunity to practice their skills. If possible, several three dimensional targets should be provided in one or more of the compartments (simulating fuel packages) for learners to practice painting and penciling techniques.

CFBT Instructors

One instructor is required for each team of learners during this lesson.

Learners

The maximum number of learners is dependent on the availability of resources and instructors.

Safety

Inspect the training area prior to conducting this evolution to ensure that there are no walking or working surface hazards. Instruct the participants to use caution when directing water from hoselines.

Personal Protective Equipment

Learners should wear structural firefighting clothing and self-contained breathing apparatus during this drill.

Scene Control

Scene control will vary to some extent based on the specific training location. The immediate training area will be limited to participants and (accompanied) observers of the training activity.

If in-service apparatus is at the training location, position it to ensure ease of egress.

Instructional Activities

This lesson involves the following instructional activities. Base your instructional approach on learners experience level and understanding as the lesson progresses.

Movement of a hoseline forward and backward in a straight line while operating the nozzle (Hose and Nozzle Technique: Drill 2) increased complexity from operating in a fixed position (Hose and Nozzle Technique: Drill 1). However, this was still a simple task in comparison to movement of a hoseline within a building and adjusting nozzle techniques to varied size compartment and changing conditions. This drill develops skill in these more complex tasks.

1. Provide a quick review of nozzle technique and the skills that learners will be practicing.
    a. Short Pulse
    b. Long Pulse
    c. Painting
    d. Penciling
    e. Advancing Forward and Backward
    f. Observation of Conditions

g. Door entry (inward and outward opening)

2. Review the sequence and technique for door entry procedures. Reinforce that these procedures must be adapted based on conditions and the configuration of the building.

    a. Size-Up (approaching and at the door)

    b. Control the door. Discuss use of a hose strap to control inward opening doors.

    c. Two pulses above and open the door, assess conditions inside, and cool the gases inside the compartment (short or long pulses depending on the compartment and conditions)

    d. Close the door and assess the risk of entry

    e. Two pulses above the door and make entry if safe to do so.

    It may be necessary to repeat this procedure multiple times to gain control of the space inside the door.

3. Review the position of the nozzle operator and other members of the hose team when working with a charged hoseline. The number of personnel used should reflect the learners' operational reality (e.g., don't use three or four firefighters on a hoseline if they will typically operate with two).

    a. The nozzle operator needs to maintain control of the nozzle at all times and be aware of the pattern setting (review how to resent when working in a dark or smoke logged space).

    b. Backup firefighter should be close (but not too close). Gas cooling requires that the hose behind the nozzle operator be lower than the nozzle (at higher flow rates it should be on the floor to redirect nozzle reaction.

4. Discuss the impact of compartment size and conditions on the nozzle operators selection of pattern and duration of pulses for gas cooling and use of penciling and painting for surface cooling.

    a. Reinforce the importance of conversion of water to steam in the hot gas layer (not on contact with surfaces) when gas cooling. Water vaporized in the hot gas layer does not add to the total volume of hot gas and vapor in the space due to contraction of the hot gases.

    b. On the other hand, when cooling surfaces, it is important that water reach the surface and not vaporize prior to getting there.

    c. When gas cooling, the pattern should maximize the volume of hot gases that are cooled and the duration of droplet travel in the hot gas layer.

    d. It is often difficult to see compartment size and exact nozzle pattern due to darkness or smoke logging. The nozzle operator must visualize the compartment based on likely conditions (type of building and occupancy) and tactile feedback on water application (sound and feel).

5. Have the learners practice the door entry procedure working in both the nozzle and door position. Provide the learners with information about observed conditions, changing conditions each time that they perform the procedure.

a. Size-Up (approaching and at the door). Have the learners verbalize their thought process as they perform this element of the door entry procedure.

b. Control the door. Have the learners practice using a hose strap to control inward opening doors.

c. Two pulses above and open the door, assess conditions inside, and cool the gases inside the compartment (short or long pulses depending on the compartment and conditions).

d. Close the door and assess the risk of entry

e. Two pulses above the door and make entry if safe to do so.

It may be necessary to repeat this procedure multiple times to gain control of the space inside the door. Provide varied conditions so that the learners must make this decision.

6. Have the learners practice moving the hoseline forward and backward in conjunction with nozzle operation (short and long pulses, penciling, and painting) in varied size compartments.

   a. Coach the learners to maintain good technique (when gas cooling the fog pattern should be adjusted to prevent or at least minimize contact with compartment linings).

   b. Provide the learners with feedback on fire conditions (e.g., hot gas layer rising/lowering, getting hotter/cooler, water droplets completely vaporizing/dropping back to the floor).

7. Debrief all participants focusing on observations and conclusions.

Integration

Hose and Nozzle Technique Drill 6 can be used as a stand-alone training exercise or elements of this drill can be integrated into other training activity. For example, when conducting hose evolutions (focused on deployment of supply and attack lines), elements of Hose and Nozzle Technique Drill 6 can be integrated with deployment of attack lines. In fact, any time that a charged line is being used for training focused on structural firefighting, elements of this drill can be integrated to maximize the effectiveness and efficiency of training in nozzle techniques.