TOPIC: Causes of Entrapments

TIME FRAME: 45 minutes

LEVEL OF INSTRUCTION: II

BEHAVIORAL OBJECTIVE:

Condition: Written exercise or quiz

Behavior: The student will:
• Describe firefighter entrapments
• Describe primary causes of entrapments
• Describe the unique hazards leading to structure protection entrapments
• Describe Common Denominators of Fire Behavior on Tragedy Fires

Standard: With a minimum of 80% accuracy according to the information contained in Fighting Wildfires, Module 3 Safety and Survival, CFFJAC, 2012

MATERIALS NEEDED: Fighting Wildfires, Module 3 Safety and Survival, CFFJAC, 2012 Lesson plans, DVD, Student Information Sheet 3-1, and Student Notes
Monitor (TV/projector/computer)
Writing board/chart with markers
Other materials as determined by instructor

REFERENCES: Firefighter’s Handbook on Wildland Firefighting, Teie
Fundamentals of Wildland Fire Fighting, IFSTA
Wildland Firefighting, Clayton, Day, McFadden
Fireline Handbook, NWCG (NFES 0065)
Fire Command 1C Student Manual SFT
Other materials as determined by instructor

PREPARATION: Each instructor must develop a motivational statement on why the student should learn this material. Cite examples or use related illustrations of injuries or even death. Write this section “from the heart.” Be creative! Have fun with it or be serious, but remember—motivate, motivate, motivate!
I. Causes of Entrapments

A. Unit objectives

1. Describe firefighter entrapments
2. Describe common causes of entrapments
3. Describe the unique hazards leading to structure protection entrapments
4. Describe Common Denominators of Fire Behavior on Tragedy Fires

Instructor Note: Some references for firefighter entrapment information include:
http://www.firefighternearmiss.com/
http://www.wildfirelessons.net/Home.aspx

Instructor Note: This introductory video regarding entrapments is a personal account by an experienced and respected Fire Captain. Most of the fire images in the piece are from the actual incident. While no one was seriously injured, it is a poignant reminder that entrapments can occur at any fire. It is hoped this account will help motivate students to learn and practice the safety and survival training.

Instructor Note: Have students locate each of the safety guidelines and mnemonics in the IRPG Green section as instruction occurs. They should become familiar with the contents so it can be used effectively when needed.
B. Entrapments

1. Firefighters unexpectedly caught in a Fire Behavior related, life threatening position where planned escape routes or Safety Zones are absent, cut off or inadequate

2. Most often occurs during
   a) High risk tactics
   b) Hasty tactical decisions
   c) High tempo operations

II. Entrapment Causes

A. Several issues can cause entrapments
   1. Failure to recognize problem Fire Behavior
   2. Inadequate Safety Zone
   3. Fuel between you and the fire
   4. Hasty tactical decisions
   5. Inadequate escape plan
B. Failure to recognize problem Fire Behavior
   1. Fire Behavior appears innocuous
      a) Complacency
   2. Failure to predict change in fire environment
   3. Underestimating fire intensity or ROS

C. Inadequate Safety Zones
   1. Inadequate Black
   2. Too Small
   3. In an area exposed to convection

D. Inadequate black
   1. Underslung line
   2. Downhill
   3. Re-burn
   4. Too small
   5. Residual heat
E. Too small
   1. Less than 4 times potential flame length

F. In an area exposed to convection
   a) Steep slope
   b) Chutes
   c) Ridge tops under Foehn winds

G. Fuel between you and the fire
   1. Change direction/intensity
   2. Can cut off escape route
H. Hasty tactical decisions
1. Escape fires
2. Structure threats
3. High tempo operations
4. Lack of risk assessment
5. False urgency

I. Inadequate escape plan
1. Warning too late
   a) Inadequate lookouts
   b) Inadequate communication
2. Route too long
   a) Fatigue factors
   b) Steepness
   c) Distance
III. High Risk Tactics

A. Extreme caution is necessary
   1. Downhill
   2. Underslung lines
   3. Spot fires
   4. Indirect tactics
   5. Firing operations
   6. Frontal assault
   7. Structure protection
   8. Rescue

B. Downhill
   1. Line construction
   2. Progressive hose lays
   3. On a hillside with Green below your position
   4. Adjacent Black exposed to convection
C. Underslung line (USL)
   1. Similar hazards to downhill
   2. Can become USL when working uphill

D. Spot fires
   1. May require travel through The Green
   2. Black usually too small

E. Indirect tactics
   1. Fuel between you and fire
   2. Inadequate time for escape
   3. Often involves firing tactics
   4. Most roads are not adequate Safety Zones
F. Firing tactics
1. Similar hazards as indirect tactics
2. Adds new hazards
3. May change path of main fire
4. Used in high tempo operations
5. Often uncoordinated

G. Frontal Assault
1. Head attack
2. Requires travel through The Green
3. Often ordered in high tempo operations

H. Structure protection
1. May include rescue operations
2. Fuel between you and the fire
3. Requires travel through Green
4. Fire is often below you
5. Marginal Safety Zones
I. Rescue
   1. May need to seek refuge to protect people
   2. May need to accept extreme risk
   3. Extreme fire conditions

IV. Common Denominators of Fire Behavior on Tragedy Fires

A. Common Fire Behavior causes of entrapments
   1. Usually a sudden change in Fire Behavior
   2. Firefighters were surprised

B. Better analysis of potential Fire Behavior can reduce probability of surprises

C. The Four Common Denominators often occur
   1. On relatively small fires or deceptively quiet areas of large fires
   2. In relatively light fuels
      a) Grass/Herbs
      b) Light brush
   3. With unexpected shifts in wind direction or speed
   4. When fires run uphill surprisingly fast in chimneys, gullies and on steep slopes

Refer students to IRPG green section
D. Relatively small fires or deceptively quiet areas of large fires
   1. Low intensity fire seems safe
   2. Fire Behavior factors create potential for sudden change
   3. Flawed Situation Awareness (SA) causes complacency

E. Flare-ups occur in relatively light fuels
   1. Light fuels on steep slopes can have extreme ROS
   2. Spot fire or slope reversal can add unexpected new threat

F. Fires respond quickly to wind shifts
   1. Topography/local weather can cause wind shifts
   2. Weather and strong columns can cause down-drafts
   3. Sudden wind changes can compromise escape routes
G. Fires run uphill surprisingly fast in chimneys, gullies and steep slopes

1. Chimneys and gullies affect direction and ROS
   a) Spanish ranch example

2. Firefighters on slopes and in saddles are surprised by intensity and ROS

Summary
- Several factors may lead to entrapment
  - Sudden changes in fire behavior
  - Topographic influence on fire behavior
  - Inadequate escape plans
  - High risk tactics
  - Rescue operations
- Recognizing entrapment causes is key to safety and survival.
SUMMARY

Several factors may lead to entrapment

- Sudden changes in Fire Behavior
- Topographic influence on Fire Behavior
- Inadequate escape plans
- High risk tactics
- Rescue operations

Recognizing entrapment causes is key to safety and survival

EVALUATION

Instructors’ discretion

ASSIGNMENT

Read Student Information Sheet 3-1 and the green section in the IRPG. This information may be on quizzes and the final exam.