Vincent Dunn
Deputy Chief F.D.N.Y.(Ret.)
For lecture information call 1-800-231-3388

JUNE/JULY NEWSLETTER- BRUSH AND WOODLAND FIRES

Brush and woodland fires

In August 1995 there were two major fires in New York State. One was defined as a conflagration and one was not. In Suffolk County, on Long Island, 6,000 acres of woods and 20 structures burned. That same week in Brooklyn a 16-alarm fire raged out of control and spread to six buildings, including the St. George Hotel.

Both the Suffolk and Brooklyn fires were the largest of their types in the past 50 years. However, technically speaking, a fire protection engineer would classify the Suffolk County fire as a "conflagration" and the Brooklyn fire as a "group" fire.

Conflagrations, Group Fires, and Large Loss Fires

A conflagration is defined as a "major building-to-building flame spread over a large area." This occurred in Suffolk. A "group" fire is defined as a "major building-to-building fire spread within an industrial complex or among adjacent buildings within a city block." The

difference is the area of fire spread. The conflagration spreads over a large distance; the group fire is limited within a complex or city block. If the Brooklyn fire had spread across the street to buildings and not been confined to adjacent buildings on the same city block, it could have officially been called a conflagration. A large loss fire is neither a group fire nor a conflagration. A large loss fire is defined as a fire that causes 5 million dollars or more of direct property loss. Large loss fires occur in manufacturing, storage and stores and office buildings most often.

Urban/Wildland Interface Fires

Today the most common conflagration is a wildfire. The classic conflagration of the last century, in which flames spread across narrow city streets to closely packed manufacturing buildings, is rare. Today's conflagration is a forest or woodland fire. It is called an urban/wildland interface fire. This strange term is fire service jargon used to describe a "major fire in grass, brush or forest which spreads to mobile homes, parked vehicles or houses in or around the area." (I'll bet that most firefighters in the FDNY do not know the last true conflagration in New York City was an urban/wildland interface fire. On April 23, 1963, a wildfire spread over four square miles and destroyed 100 houses in the borough of Staten Island.) Firefighting in brush and forests is extremely dangerous and the dangers are underestimated by many structural firefighters. Only residence fires killed more firefighters in 1994 than did wildfires. On July 6, 1994, 14 firefighters were killed in a wildfire in Colorado. And on July 28, 1995, Firefighters Bill Buttram and Josh Oliver of the Kuna Rural Fire Department in Idaho were trapped in their fire truck during a wildfire and killed. "Fire's all around us and we need help! Our engine quit!" That was their last radio transmission. A surviving firefighter said, "All of a sudden we got 70 mile-an-hour winds that entrapped the truck in a wall of flame. That's it."Urban Wildland interface fire, California

A 10-year study of wildfires conducted by the National Fire Protection Association (NFPA) revealed that 152 firefighters died battling brush and forest fires. That's one out of every

eight firefighters during that decade. The study also identified four types of wildland fire behavior that kill firefighters:

1. Firefighter fatalities often occur at the edge or perimeter of a large wildfire. 2. Firefighters are often killed when working in and around light fuels, such as grass, brush or marsh weeds; they are not killed in large forest fires. 3. Unexpected wind shifts are a contributing factor in firefighter deaths. Sudden increases in wind speed and sudden changes in wind direction cause the light fuels to "flare up" or "blow up," which can trap and kill firefighters. 4. Change in ground elevation increases fire spread, which traps and kills firefighters on the side of a hill or mountain or on a cliffside. A rule of thumb is that a brush fire spread can double for every 10 degrees of elevation. For example, a hill or slope of 10 degrees can cause a fire burning at a rate of 10 mph to increase to 20 mph. A slope of 20 degrees will increase the speed of the same fire to 40 mph. And a 30degree slope will increase the speed of the same fire to 80 mph. Firefighters must realize large urban/wildland interface conflagrations start out as small brushes fires. There are 140,000 wildfires in the United States each year, which burn 2.3 million acres of brush and forest. However, most of these blazes are extinguished when they are smaller than one acre by firefighters using rakes, shovels, axes, portable extinguishers, and small all-terrain firefighting vehicles. If you extinguish the small brush fire, you can prevent the large urban/wildland interface conflagration. To survive firefighting in brush or woodlands we must know how a wildfire spreads and how to safely extinguish one. Methods and equipment used to extinguish a structure fire are not effective against wildfires.

Small Brush Fire Spread

An aerial view of most brush fires will reveal a large blackened area with flames at the perimeter edges where fresh shrubs provide fuel. The blackened area in some instances has what are called “fingers." These are strips of long, thin sections of fire which extend outward from the

main area of blackened earth. Some distances downwind from the main fire and fingers can be found isolated pockets of small spot fires. These spot fires are caused by airborne burning embers which the wind has blown ahead of the main fire. These embers land on the vegetation and create little patches of fire. One of the most important size-up factors is to determine the wind direction. Brush fires are wind driven. The leading edge of a moving brush fire is called the "head" of the fire. The opposite side of the head of a brush fire is called the "rear.' And looking at the fire from the rear of the blackened area, the left side is the "left flank"; the right side of the blackened area is called the "right flank." Inside of the large blackened area of a brush fire may be several sections of unburned shrubs or trees. These are called "pockets." Firefighters must attempt to control the head of a brush fire. However, firefighters must not attempt to do this by a frontal assault into the head of a fire. An onrushing wall of brush fire can overcome the extinguishing effects of a large master stream.

Brush Firefighting

The control of a small brush fire at the head by firefighters using hand tools and portable extinguishers controls 90 percent of most blazes. The head of a small brush fire can be approached safely from either the burned-out blackened area or from the flanks of the fire. Positioning firefighters on a road or firebreak area in front of fast-moving brush fire can be extremely dangerous and should be undertaken only to protect life. An escape route or refuge must be available to firefighters. When directing a hose stream on a brush fire the water stream should be directed at the brush that is burning and not at the flames. Firefighters may also play the hose streams on a house with the purpose of wetting down unburned fuel. Do not waste precious water supply attempting to break up heat waves. Firefighters must realize the priorities of brush firefighting are different from those of structural firefighting. When fighting a brush fire the priorities are the safety of lives (including those of the firefighters), protection of property and containment of the fire. As long as life and property are safe you may not need to contain the

brush fire. Sometimes you let it burn out. Structural firefighting priorities are the safety of lives first, fire containment second, and lastly protection of property.

Types of Wildfires

There are three classifications of wildfires l. Ground fires Sometimes called "bog fires," these are slowly spreading, smoldering fires that burn in dried, decomposed leaves, twig, or pine needles that have fallen from the trees to the ground. 2. Brush fires. These are fast-moving fires that ignite grass, shrubs, bushes, scrub oak, chaparral, marsh grass (cattails) and grain fields. 3. Crown fires. Most crown fires are caused by the vertical spread of flames of a brush fire. Firefighters using hand tools and a small brush truck cannot extinguish a crown fire or even a large, fast-spreading brush fire. When the 1995 Suffolk County urban/wildland interface fire spread beyond the capabilities of the exhausted local firefighters the federal Forest Service firefighters came to their assistance. The Forest Service firefighters responded to the scene and instituted a multi-phase attack of the 6,000 acre fire using fire companies with pumpers, hand crews with brush vehicles and C-l30 aircraft dropping water and fire-retardant chemicals. Companies with pumpers were limited to areas of brush that contained roads. Heavy engines are not designed to enter woods or swamp areas. They can quickly become stuck in soft ground or mud. Firefighters assigned to pumpers were directed to respond to houses threatened, evacuate people and protect the structures from the onrushing brush fire. These firefighters also extinguished blazes inside homes after they were ignited by the spreading brush fire. Other firefighters were assigned to smaller brush trucks that could drive through the woods. These hand crews were directed to extinguish small brush fires near the perimeter of the conflagration. These firebreaks were several feet wide and were increased up to the final firebreak of 150 feet wide. They removed brush, grass and dried out pine needles down to the dirt, so no fire could pass over the open area. The C-130 airplanes, when they finally arrived, were assigned to drop tons of water and fire-retardant liquids over the remote areas of the large fire where hand crews could not reach. The general targets of wildfire aircraft are inaccessible, wildland preserve

forests and remote or dangerous area where firefighters cannot enter. A C-130 can drop up to 6,000 gallon-, of plain water, 'wet" water, viscous water or fire-retardant water. Plain water is capable of extinguishing an ordinary brush, grass or forest fire. Wet water is plain water with a chemical added to make it penetrate porous surfaces. The chemical added reduces the surface tension of water. Wet water is dropped from an aircraft onto a bog fire or a ground fire that has burrowed below the ground surface. Viscous water can be dropped from an aircraft on very hot forest fires where radiation heat may spread fire. The chemical added to viscous water makes it thickened water. There is less runoff and viscous water sticks and clings more readily to burning fuel. When a C130 plane drops a "bomb" of fire-retardant water on a brush fire, such as ammonium phosphate or ammonium sulfate, it has the extinguishing power of water and it also reduces the fire to ignite again. A hazard often found in remote woodland and forests is the high voltage towers and electric overhead wires. Ground fires and brush fires sometimes burn beneath and nearby these electric transmission lines. Utility companies warn us that heavy smoke plumes coming in contact with overhead wires can cause phase to ground shorts that may injure and kill firefighters. Firefighters should never operate hose lines beneath the high voltage wires. In addition, firefighters should treat high voltage transmission wires as an exposure attempting to keep flames 50 feet away. Firefighters operating hose streams should also remain at least 50 feet from the outer electric lines.

Lessons Learned

In New York City we have large areas of high-rise buildings, tenements, factories, apartment buildings, row houses, strip stores, private dwellings and even areas of woodlands and brush. Firefighters often spend their entire careers in one of these areas and become specialists in one type of firefighting strategy and tactics. Other firefighters transfer into as many different areas as possible in order to get a wider understanding of many types of firefighting. The one area of firefighting most FDNY firefighters do not have experience in is wildfire or brush firefighting. When I was promoted to lieutenant, myself and several other officers were

temporarily assigned to Staten Island, a borough where many brush fires occur. We complained to the chief at the promotion ceremony. Why were we being sent to fight brush fires when we were experienced structural firefighters? He answered us by telling us of his experience at a brush fire. The chief told us that he had never worked on Staten Island and had no experience in brush firefighting. After being promoted to chief of department, one day he responded to a third-alarm large brush fire. Upon his arrival he told his driver to park on a road near the top of a hill where he could survey the blaze. This spot was in front of the fast-spreading brush fire. As soon as he got out of the car a sudden flare-up caused the fire to jump the road. As flames roared over his head he started to run for his life. His driver, trapped in the car, put it in reverse and quickly backed up. In the process he almost ran down the chief with the automobile. On our next tour we went to work in what was one of the few brush fire areas of the city.

Questions for June/July Newsletter

Questions

1. A major building to building large fire in an industrial complex would be defined as a:

    A. A group fire
    B. A Conflagration
    C. A large loss fire
    D. All of the above

    Answer_____

2. True or false - The most common conflagration today is a forest or woodland fire

    Answer_____

3. Which one of the following is an incorrect statement?

A. Firefighter fatalities often occur at the edge or perimeter of a large wildfire.

B. Firefighters are often killed when working in and around light fuels, such as grass, brush or marsh weeds

C. Unexpected wind shifts are a contributing factor in firefighter deaths.

D. Change in ground elevation decreases fire spread which traps and kills firefighters on the side of a hill or mountain or on a cliffside.

Answer_____

4. What area is the most dangerous area around a brush fire?

A. The blackened area

B. The downwind area

C. The upwind area

D. The flank

Answer_____

5. True or False - After residence fires wildfire fires kill more firefighters each year than any other occupancy.

Answer_____

Answers

1.A; 2.True; 3.D; 4.B; 5.True;

Vincent Dunn

Deputy Chief F.D.N.Y.(Ret.)

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