

PLENARY SESSION—ISSUES

The Oakland-Berkeley Hills Fire of 1991¹

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Sunday, October 20, 1991, will be remembered as the date of America's most costly urban-wildland fire (FEMA 1992) and one of the worst fires involving loss of life and property since the Great San Francisco Earthquake and Fire of 1906 (OFD 1992).

The magnitude and range of what is simply referred to as the "Tunnel Fire" is far beyond the experience of any living American firefighter. Only those who fought the Chicago Fire last century and those who battled the Great Fire in San Francisco would be able to identify with this conflagration and firestorm.

A firestorm is defined as a fire which creates its own weather. This was certainly the case in Oakland, California—the fire itself contributed to its own spread by supplying wind to an already very windy day. A conflagration has been described as a fire which exceeds the boundaries of the city block of origin. The Tunnel Fire did much more than this by burning neighborhood after neighborhood. Both firestorm and conflagration are accurate terms when applied to the Tunnel Fire; neither, however, comes close to adequately describing what actually transpired.

The origin of the fire was on a steep hillside in what some refer to as a box canyon, above California State Highway 24, near the entrance to the Caldecott Tunnel. This is a wooded area with heavy underbrush, narrow streets, and steep terrain, densely populated with expensive houses. The unusual weather conditions of that day resulted in:

a foehn wind that, at speeds in excess of 65 miles per hour, raced down from the crest of the Oakland-Berkeley Hills. Coupled with record high temperatures well into the nineties, the hot dry winds gusted and swirled through five years of drought-dry brush and groves of freeze-damaged Monterey Pines and Eucalyptus groves. All the conditions for a major fire disaster were present that morning of October 20, 1991. (FEMA 1992)

Firefighters were on the scene overhauling hot spots from a fire the previous day. It is important to note that Saturday's fire had been completely doused, hose lines had been left in place surrounding the burn area, and the fire area had been checked by an Oakland Fire company during the

night. Fire crews had returned that morning to check for any hot spots and to pick up equipment, and were on the scene for 2 hours before the fire suddenly escaped the area of origin because of high winds.

Eyewitness accounts testify that a sole ember blew into a tree just outside the burn area, and the tree exploded into flames. The resulting fire was quickly out of control—raging around and over firefighters who were suddenly fighting for their lives. Over the course of the next several days, the fire would leave 25 dead, 150 injured, and a total of 3,810 dwelling units destroyed. The fire, which burned over 1,500 acres within an area of 5.25 square miles, would result in over \$1 billion in damages (OFD 1992, FEMA 1992).

Rescue and evacuation efforts were made as firefighters were forced to fall back to defensible space.

Immediately, calls were placed to request additional fire units and air drops. Soon, streets were clogged with residents trying to get out and sightseers and emergency personnel trying to get in.

The fire quickly established four fronts: west downhill toward California Highway 24 and the Rockridge district, north toward the Claremont Hotel, south toward Broadway Terrace, and east toward Contra Costa County.

The Oakland Fire Department

The Oakland Fire Department is composed of three geographic districts, known as battalions, that are commanded by district chiefs 24 hours a day. As the fire progressed, the on-duty chiefs assumed new roles. Assistant Chief Donald Matthews was the Incident Commander, Battalion Chief James Riley was assigned as Division "A" Commander, and Battalion Chief Ronald Campos responded to Oakland Fire Dispatch Center to coordinate logistics, recall, and dispatch functions.

Later, Assistant Chief John K. Baker responded from home and was assigned the role of Incident Commander when Assistant Chief Matthews became Operations Chief. At approximately 11:45 a.m. Fire Chief P. Lamont Ewell arrived on the scene at the Command Post and officially assumed command.

The Oakland Fire Department uses the Incident Command System (ICS) to manage all emergency incidents, as was the case with the Tunnel Fire. The system consists of an Incident Commander who directly supervises four functional groups: operations, planning, logistics, and finance.

The operations and planning functions were conducted at the scene from the Department's Mobile Command Post, while logistics and finance functions were conducted from the Dispatch Center.

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The Dispatch Center was the basic structure of initial management of the Tunnel Fire. This structure remained intact until late in the evening on October 20 when the California Department of Forestry and Fire Prevention (CDF) provided an overhead management team to assist with the enormous task of managing such a large fire.

At this point a Joint Command was established that consisted of Oakland, Berkeley, and Piedmont Fire Departments and the CDF. Oakland firefighters were assisting with evacuation efforts as they were forced to retreat from the advancing inferno. Division “A” Battalion Chief James Riley and Oakland Police Officer John Grubensky were killed while trying to help citizens escape the fire. Both Battalion Chief Riley and Officer Grubensky were found with the remains of those people they were trying to help. These courageous men were very aware of their risky positions and had ample opportunities to save themselves, but refused to leave before the evacuation of residents was complete.

The rapid spread of the fire in four different directions presented both line firefighters and chief officers with numerous strategic challenges.

Evacuation

Even though evacuation of residents is a responsibility assigned to the Oakland Police Department, fire units were heavily involved with this effort while trying to stop the advancing flames. It has been estimated that more than 10,000 people were evacuated from the burn area, some by way of very narrow streets, through blinding smoke and blowing debris.

The Wind

The wind played a most crucial part in the scenario which manifested once the fire was established. The wind blew into the Oakland Hills from the east and over and down ridge tops. It forced flames to swirl in many different directions causing the fire to burn downhill as quickly as, and in some cases more quickly than, uphill.

The strength and speed of the wind prevented firefighters on the scene from falling back to defensible space because there was no place to hide. Fire crews were trapped and forced to protect themselves under umbrellas of water as the flames roared over and around them. One veteran firefighter observed the fire progress 100 yards in 15 seconds.

This Santa Ana-type wind pushed the fire along wide fronts, bypassed firefighters who were making a stand, and then left them in isolated pockets of unburned areas. The wind whipped the fire into the Hiller Highlands Development and consumed all combustibles (homes, vegetation, and vehicles) in 16 minutes. The wind caused the fire to pre-heat everything in its path which resulted in structures and contents exploding into flame almost instantly (OFD 1992).

Pilots flying California Department of Forestry helicopters complained that their bucket drops were not

effective because the water vaporized as the strong winds dispersed it over the intensely hot fire.

Communications

The Oakland Fire Department used two operational radio frequencies to communicate between the Dispatch Center and the 30 fire companies in the City. Communication with other jurisdictions is usually accomplished on the state-wide mutual aid frequency which is referred to as the “White Fire” channel.

The effectiveness of these frequencies was soon reduced because of the overwhelming load placed upon them by fire units requesting assistance, commanders trying to place resources, and the Dispatch Center’s attempts to send fire companies into the burn area.

These problems were compounded by additional fire units from surrounding cities as they began to arrive to assist with the fire. The steep hilly terrain in the Oakland Hills also interfered with radio signals, in some cases creating “dead spots” which drastically reduced radio effectiveness.

Mutual Aid

Requests for mutual aid in the form of air support and fire suppression units were made during the initial stages of the fire, and additional requests continued throughout the day.

Mutual aid requests are processed through the California Office of Emergency Services (OES). Requests were channeled through Alameda County OES which is divided into north and south zones, and then from the county level to the state.

By late afternoon, 370 fire engines from as far away as the Oregon-California state line in the north, from Bakersfield in the south, and from Nevada to the east, were in, or on their way to, Oakland.

Aircraft in the form of helicopters and large air tankers from hundreds of miles away made hundreds of water drops on the fire.

This was the largest mutual aid effort ever undertaken, at that time, in the State of California (OFD 1992).

Water Supply

Fire units lost water at the height of the fire, forcing them to retreat because the supply tanks and reservoirs which provide water to the hill area were emptied. Reasons for the loss of water were :

- Extraordinary fire suppression efforts used a tremendous amount of water (an estimated 20 million gallons).
- Residents were hosing down their roofs and vegetation, and many sprinklers were left running after evacuation.
- As homes were consumed by the fire, the water service supplying those homes began to flow freely.

Hiller Highlands alone accounted for over 400 water services.

- Water supplying the tanks and reservoirs is pumped from lower parts of Oakland to the higher elevations. The electrically powered supply pumps could not replenish depleted tanks once the fire destroyed power lines to the pumps.
- Some areas, such as the Rockridge district (which was developed in the 1920's), were supplied by 4-inch mains that are considered to be insufficient by today's standards. They could not supply enough water to fight a fire of this magnitude.

Many mutual aid fire engine companies could not hook up to Oakland fire hydrants because their 2.5-inch hose couplings were not compatible with Oakland's 3-inch couplings.

Aftermath

The Tunnel Fire will long be remembered for the magnitude of its destruction. The fire was viewed on prime time television around the world; it has been documented by professionals and laymen alike. The origin of the fire has been and continues to be the focus of investigation.

The Fire Investigation Unit of the Oakland Fire Department Fire Prevention Bureau has ultimate responsibility for finding the cause of the fire. Inspectors from the Fire Investigation Unit have worked with the Governor's Task Force which is represented by the California State Fire Marshal's Office and the Alameda County Fire Investigation Team. The Alameda County Fire Investigation Team is composed of representatives from the District Attorney's Office and the Bureau of Alcohol, Tobacco, and Fire Arms, along with investigators from the surrounding fire districts.

Fifteen hundred man-hours were spent in the first week following the fire, most of that time conducting interviews with survivors and performing overhaul operations by sifting through debris, searching for evidence.

The origin of the Tunnel Fire is located next to 7151 Buckingham Road. The cause of the fire, however, is still under investigation.

The Oakland Fire Department, as well as every other fire department in the state, has learned much about wildland/urban intermix fires. Much has been accomplished in the past 3 years since the fire. The Oakland Fire Department is committed to doing everything possible to prevent a repeat of the 1991 Firestorm. The following is a partial account of actions taken by the Oakland Fire Department since the conflagration.

Firefighting Training and Tactics

OFD personnel have received intensive wildland training from the California Department of Forestry and Fire Prevention as well as other agencies with wildland expertise. New tactics include cold trailing (scraping the perimeter of the burn area to reveal unburned soil), utilizing new

technology, such as Forward Looking Infrared Radar to find subterranean hot spots, and testing new products such as Class "A" foam.

Weather Monitoring

Two "Remote Automated Weather Stations" (RAWS) have been installed in strategic locations in the Oakland Hills. These weather stations continuously provide the Fire Department with updates in weather conditions. The Fire Department increases its level of response accordingly, as the wind speed and the temperature rise and the humidity drops.

Initial response to the report of fire varies with the severity of weather conditions. For example, low hazard dispatch requires three fire engines and two patrols. Response on high hazard days requires six fire engines, four patrols, and a helicopter, as well as the predeployment of engine companies to locations in and around high fire hazard areas.

Communications Improvements

The Oakland Fire Department has recently converted to an 800 megahertz radio system which provides a virtually unlimited number of radio talk groups. It is expected that this will mitigate much of the overload of tactical channels that was experienced during the initial stages of the fire.

In addition, proposals have been made to fire departments surrounding the City of Oakland to permit those jurisdictions to participate in the 800 megahertz radio system.

Water Supply

Adapters have been purchased and installed on all fire hydrants within the City of Oakland. These adapters will change the coupling size on the hydrants to 2.5 inches. This will standardize Oakland's hydrants, thus allowing mutual aid fire departments to hook up to Oakland's water supply.

Vegetation Management

Approximately 16,000 Oakland Hills area parcels have been inspected by Oakland Fire Department units. Fire inspectors are requiring brush to be cleared 30 to 100 feet away from structures, and at least 10 feet away from property lines and the street. All chimneys are required to have an approved spark arrestor with no trees or bushes within 10 feet. Compliance has been for the most part good, and violators have been cited and forced to abate their hazardous conditions.

Mutual Aid

Oakland has negotiated agreements with the cities of Berkeley, San Leandro, Alameda, Piedmont, and with the East Bay Regional Parks District to establish Mutual Response Area (MRA) Agreements. These agreements provide for an automatic response when a fire is reported within the MRA.

Borderline residents who report a fire will have a response from both sides of the City limits, and in many cases they will receive a faster response.

The Oakland Fire Department is committed to providing the highest quality of fire protection to the residents of Oakland.

Codes and Ordinances

The City has adopted an ordinance which requires Class “A” roofs on new structures and replacement roofs within the high fire hazard area. Further, all siding on new structures

will have a one-hour rating. Additionally, the citizens of Oakland have passed a \$51 million bond to prepare the City or future disasters.

References

Federal Emergency Management Agency (FEMA) 1992. Hazard mitigation report for the East Bay Fire in the Oakland-Berkeley Hills in response to the October 22, 1991 Federal disaster declaration covering Alameda County, California. FEMA-919-DR-CA.

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