



Fire Protection

When companies build facilities in undeveloped areas, such as forest and grassland, they are exposed to potential wildfires/bushfires. FM Global can help you evaluate the risk this hazard presents to your facility and recommend steps you can take to protect your business.

UTH topic categories:

- Construction
- Equipment
- **Fire Protection**
- Human Element
- Natural Hazards
- Process Hazards

This series of publications is designed to help you understand the everyday hazards present at your company's facilities. For more information on how you can better understand the risks your business and operations face every day, contact FM Global.



Understanding the Hazard

Wildfire/Bushfire Exposure

The Hazard

Wildfires can occur when prolonged dry weather causes the moisture levels of grass, brush and trees to become low. Called “bushfires” in Australia, other terms, such as “forest fire,” “grass fire,” and “brushfire,” also refer to this phenomenon. When strong winds (such as those in California, USA, called “Santa Ana winds”) are present, they increase the intensity of the fire and quickly spread it over a wide area, exposing all buildings and equipment in the vicinity.

In 2003, approximately 62,000 fires burned roughly 3.87 million acres (1.57 million hectares) in the United States alone. The December 2001 bushfires in southeastern Australia burned more than 1.8 million acres (730,000 hectares) and raged for 23 days. And, more recently in 2007, wildfires in southern Greece consumed 500,000 acres (202,000 hectares) of forest and olive groves, while wildfires raged in southern California, involving 15 separate burn areas fed by gale-force winds, burning approximately 267,000 acres (108,000 hectares) stretching from Santa Barbara to the Mexico border. Although residential homes continue to be most at risk, wildfires are becoming a serious threat to many industrial and commercial enterprises, as well.

Science of the Hazard

The wildfire/bushfire hazard exists throughout the world wherever there is a large amount of vegetation together with weather patterns that include periods of low rainfall. Climates with cool, wet winters and hot, dry summers (with little or no rain for two to three months) are ideal. Global climate changes in recent years seem to be increasing the frequency and severity of these fires. Some parts of the world are already well known for wildfires, including southeastern Australia, southern France, Spain and the western United States.

Wildfires are a particular hazard in the “wildland-urban interface.” A wildland-urban interface is an area where man-made structures intermingle with undeveloped terrain, such as forest and grassland. The vegetation in these areas is a huge potential fuel source that, when allowed to grow too near a building, can expose the facility to a wildfire/bushfire.

What you can do at your facility

Now:

- Keep gutters free of debris.
- Cover vents with wire mesh to keep burning embers out.
- Treat wooden exterior walls with fire-retardant paint.
- Remove all combustible yard storage.
- Develop a written contingency plan with the public fire service.
- Fully train and equip your emergency response team (ERT) to deal with a wildfire/bushfire emergency.

Soon:

- Replace any asphalt roof shingles with tiles or slate material.
- Create a clearance zone around buildings and structures. The clearance zone should be a minimum of 100 ft. (30 m) from a grassland exposure and 330 ft. (100 m) from a woodland or forest exposure.
- Protect windows and frames with permanently fitted one-hour fire-rated shutters.
- Consider protecting any combustible exterior walls with outside sprinklers.
- Provide an adequate and reliable water supply to meet automatic sprinkler and hose stream demands.

Fuel (vegetation), weather and topography work together to determine how fast a wildfire will travel and at what intensity. A “surface” forest fire, which primarily burns undergrowth and leaf litter, burns faster than a “ground” forest fire, which burns below vegetation, shielded from air currents. Grass fires will burn faster than surface forest fires because they are exposed to the full force of the wind. “Crown” fires occur in the tops of trees and, under extremely windy conditions, have been known to jump rivers and even lakes.

Wind speed and direction have a huge impact on the path a wildfire ultimately will take. It is not unusual for one structure to be completely destroyed by fire, while the building next door to it remains unaffected. If the prevailing winds at your site come from the direction of grasslands or forest, the side of your facility exposed to these wildlands will be at a significantly greater risk than the other sides, where fire spread may not be aided by the wind.

The slope of the land around a structure also will affect how fast the wildfire may reach it. For example, a grass fire can climb a hillside with a 30-degree slope four times faster—and with flames twice as high—as a fire on level ground.

There are three ways in which a wildfire/bushfire can spread to a building:

- Flying embers blown by wind can land on and ignite combustible building construction.
- Fire can spread from vegetation directly to the building walls.
- The heat generated from a wildfire can cause combustible building components to reach their autoignition point.

The best way to mitigate the hazard of a wildfire is to create a “defensible space” or clearance zone, free from vegetation and outdoor storage, around buildings and structures. Generally, a clearance zone of 100 ft. (30 m) from a grassland exposure and 330 ft. (100 m) from a woodland or forest exposure should be maintained. For structures on steep slopes, the vegetation should be removed for 200 ft. (60 m) down the slope in order to create an adequate clearance zone.

Often, wildfires are set by an individual, either intentionally or accidentally. However, they also can be the result of lightning or burning debris. The public fire service works to reduce the wildfire threat by conducting “prescribed” burning that thins out the forest and removes dead trees, limiting potential fire spread.

The possible consequences of a wildfire also include mudslides and falling rocks. These occur when fire burns away trees and bushes that keep soil on hillsides in place. When rainfall eventually saturates the soil, rapid erosion and slope failure can result.

Fire Protection Tools for the Interface

There are several tools available to protect property situated in a wildland-urban interface from fire. Outside sprinklers can be used to protect combustible walls (rather than covering the walls with noncombustible sheeting). However, an adequate and reliable water supply is needed for the sprinkler system.

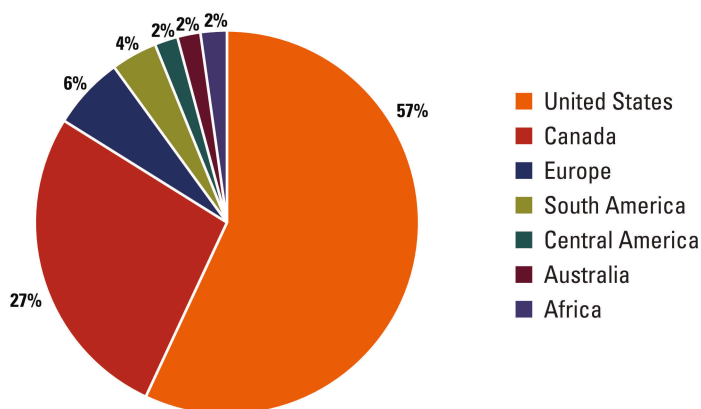
Foams and gels are other tools that have proven to be effective. Compressed air foam systems are used to coat structures. Detailed training is required to learn how to apply the foam correctly, and it should be applied approximately 30 to 60 minutes before fire reaches the structure.

Fire-blocking gels will stick to just about anything, even windows, and only minimal training is required to learn how to apply them. Another advantage of gels is that they can be applied from two to 12 hours before fire reaches the structure, and can last from 12 to 36 hours after application. However, clean-up procedures can be difficult and may ruin paint or stain on the exterior of a structure.

Loss Experience

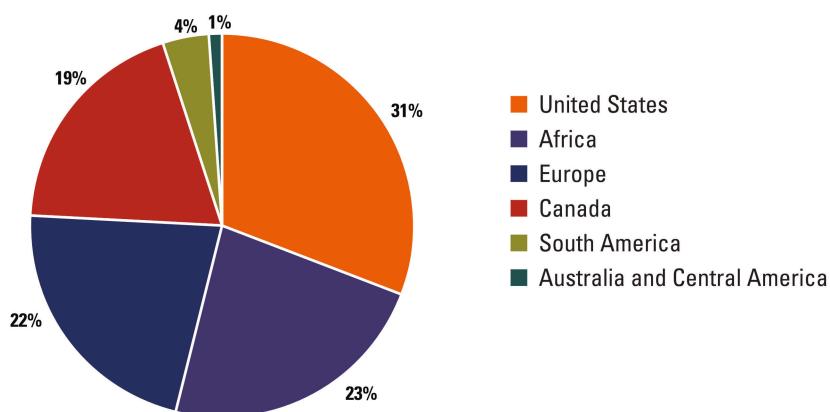
From 1985 to 2004, FM Global clients reported a total of 103 wildfire-related losses. The gross cost of these losses totaled US\$191 million (all amounts indexed to 2004 values), for an average loss of approximately US\$1.9 million. The largest single wildfire loss experienced by an FM Global client amounted to approximately US\$38.2 million.

Location of Wildfires/Bushfires by Number of Losses



SOURCE: FM GLOBAL CLIENTS

Location of Wildfires/Bushfires by Loss Costs



SOURCE: FM GLOBAL CLIENTS

Wildfire/Bushfire Loss Costs by Industry (US\$ Millions)

Industry	# of Losses	Gross Lost Cost
Paper, Paperboard, Carton Mfg.	13	123.8
Standing Timber	17	40.4
Sawmill	9	5.0
Outdoor Property	18	3.7
Steel, Metal, Electronics	27	1.2
Other	19	17.1

Need more information?

Ask your FM Global engineer or client service team about the following:

- How to design outside sprinkler systems per FM Global Property Loss Prevention Data Sheet 2-0, *Installation of Sprinkler Systems*
- Examples of wildfire/bushfire losses
- FM Global Property Loss Prevention Data Sheet 9-19, *Wildfire/Bushfire Exposure*
- Understanding the Hazard publication, *Arson and Other Incendiary Fires* (P0336)

Ordering Information

For additional copies of *Understanding the Hazard* publications, contact your FM Global engineer or client service team.

Additional FM Global brochures and educational material can be found in the FM Global Resource Catalog and ordered or downloaded online at www.fmglobalcatalog.com. Or, for personal assistance worldwide, contact our U.S.-based customer services team, Monday – Friday, 8 a.m. – 5 p.m. ET :

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But What About

...managing the vegetation around my building perimeter? Can I conduct prescribed burning on my own? Prescribed, low-intensity burning to remove vegetation should only be conducted under certain weather conditions. Plan and coordinate this activity with the local fire service. Also, you may need to obtain a permit before conducting any burning.

...the distinction between a wildfire and a bushfire? Is there any real difference?

Wildfires and bushfires occur and spread in exactly the same ways. The only real difference is the fuel load. Bushfires in Australia commonly are fueled by eucalyptus trees, while wildfires in the United States usually are fueled by pine trees. Eucalyptus trees burn significantly hotter than pine trees.

Don't Let This Happen to You



Increasingly, companies are building their facilities in remote areas, creating a wildland-urban interface. Failure to properly manage vegetation surrounding these structures can result in a catastrophic loss if a wildfire/bushfire occurs.