

# Firewise Construction

DESIGN AND MATERIALS

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## About the Author

**Peter Slack** lives in Boulder, Colorado and has been a practicing architect for twenty-five years. Mr. Slack's practice has included many homes and other buildings in the Interface. His design emphasizes the integration of fire resistive elements with other important design principles such as proper site development for limited impact, low energy and water consumption, and the use of appropriate, resource conserving materials.

Mr. Slack has been a fire fighter and an officer in a high-risk mountain fire district for 18 years. He has specifically worked with wildland fire suppression and mitigation issues for much of that time. Since fighting Boulder County's two major interface fires, Black Tiger, 1988 and Olde Stage, 1990, Mr. Slack has been directly involved with Boulder County's WHIMS Program (Wildfire Hazard Identification and Mitigation System) that was funded by FEMA. as a result of those fires. This publication developed from a lecture on fire wise construction that he has been presenting for the past four years.

## Acknowledgements

This publication combines my professional knowledge as an architect and builder in the Interface with my experience as a fire fighter for eighteen years. To my experiences I have added the wealth of information and experience so generously given to me by the fire fighting community. Most of all, it was their assistance in learning to visualize fire in its environment and around our buildings that facilitated the creation of these illustrations.

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# I. Introduction

This publication provides homeowners and builders in the Wildland Urban Interface with design and building techniques that can offer more protection from wildland or forest fires. It is funded by the Federal Emergency Management Agency (FEMA), the Colorado State Forest Service, and the Colorado Office of Emergency Management.

## What is the urban wildland interface?

The Urban Wildland Interface, or Interface, is any area where man-made buildings are built close to or within natural terrain and vegetation where there is high potential for wildland fires.

During the past few decades population growth in the Interface has increased. Subdivisions and other high-density developments have created a situation where a wildland fire can put more buildings at risk than any amount of fire equipment can possibly protect.

## Fire suppression and increased fuels

The suppression of wildland fires has created more vegetation for fuel.

As population in the Interface has increased, so too has the difficulty of protecting that population from wildland fires. When fires have occurred in the Interface we have put them out to prevent the destruction of homes, and this has created a problem because forests have historically been dependent on fire to maintain good health. Fire thins trees and brush and eliminates dead material. By suppressing fires to protect our homes

and population, we have interfered with this natural process. Since natural fires are now infrequent, vegetation density has increased which provides more fuel for fires. When fires do occur, the denser vegetation burns with more intensity and the fire is more destructive and dangerous.

## How can we protect our buildings?

This publication offers a two-part approach to the problem:

1. Build more fire resistive structures and
2. Reduce the hazards of forest fuels.

If we consider the specific needs of Interface structures, we can combine design elements and construction materials to build more fire resistive structures. Our goal is to create buildings that can either resist fire on their own, or at least, make it easier for fire department to protect many structures, instead of focusing on just a few during a fire.

We recognize that building a fireproof structure the way we do in an urban setting can be prohibitively expensive. This publication shows you how to consider a combination of cost effective strategies that increase the probability a building will survive a wildland fire.



*Combustible House with no Defensible Space*

The solution must depend on the two-part approach: make our buildings more fire resistive and manage the surrounding wildlands. If we leave the surrounding wildland in its natural state, we need to build structures that are nearly fireproof, which makes them much too expensive to build. Conversely, trying to provide a defensible space large enough for a typical, combustible structure may not be practical, or even desirable. Choosing the best combination of these two strategies for a particular site requires a basic understanding of wildland fire behavior.

Another goal of this publication is to give the homeowner and builder a better understanding of how buildings in the Interface ignite during a wildland fire, so they can make better choices when considering building techniques.

As you read this publication keep in mind that fire is only one of many considerations during building construction. We are not suggesting that any one technique is absolutely necessary, or that you cannot use certain materials or design elements. Rather, we want to show you how an

awareness of the unique issues facing Interface buildings can direct you towards a more comprehensive solution in your design process. Some design elements and materials you chose may be very helpful in mitigating fire hazards and some may not. You can, however, compensate for those less appropriate fire protection choices and meet all your design goals.

### **Fire intensity and duration related to the fire resistance of a house**

How fire resistive should a house be? The answer to this question depends on the fire intensity, how hot the fire is, and the fire duration, how long the fire will last at your site. If the fire hazard is low-to-moderate, you may only need to take a few precautions for your protection. If the fire hazard is high or very high, you may need to use most, or all, of the strategies we describe.

In Colorado, generally any area surrounded by natural vegetation has some hazard due to wildland fires. In mountainous regions between elevations of 5,000 ft. and 10,000 ft., hazard is increased due to topography and increased vegetation density. This is discussed in more detail in the next section.

### Evaluating your fire hazards

A good way to determine the specific hazard rating at your site is to look at a fire hazard map or study located at your county building or land use department. You can also contact the Colorado State Forest Service or your local fire protection district. If this information is not immediately available, you can use this short evaluation to determine your site's hazard level.

Note: We refer to this hazard rating throughout this publication with respect to design and material elements in a building design.

This short evaluation is based on the *Wildland Home Fire Risk Meter* developed by the National Wildfire Coordinating Group.

Slope	Score
Level:	0
0° - 10°	1
10° - 20°	2
20° - 30°	3
30°+	4
<b>Vegetation</b>	
water, bare rock, irrigated lawn	0
grass, shrub, less than 2' tall, no trees	1
grass, shrub, less than 4' widely dispersed trees	2
dense young shrubs, no dead wood or trees	2
many trees, touching, some grass and brush	3
dense shrubs with some trees	3
thick, tall grass	3
dense evergreen trees with grass & shrubs	4
dense mature shrub with dead branches	4
<b>Add the slope and vegetation scores:</b>	
<b>Scores</b>	<b>Hazard Rating</b>
0	0
1 - 2	low
3 - 4	medium
5 - 6	high
7 - 8	very high

