



Roles within Fire Protection Engineering

Introduction

There are a variety of topics which are considered core competencies related to fire protection engineering. The SFPE published the *Recommended Minimum Technical Core Competencies for the Practice of Fire Protection Engineering* in December 2018. Summaries describing the role of fire protection engineers with regard to fire science, human behavior, fire protection systems and fire protection analyses have been developed for many of those core competencies. The minimum skills that are associated with those core competencies for each role within fire protection will be detailed to understand the qualifications needed to perform different functions within a fire protection engineer's job.

Fire Protection Roles within the Core Competencies

Some fire protection engineers have a broad range of knowledge spanning many, if not all, of the knowledge areas described within the core competency document referenced above. Others are more specialized and have expertise in one or a few knowledge areas. Both engineers can still be considered competent in fire protection engineering. The fire protection roles are intended to capture the core competency (knowledge areas) required for specific roles and further define the knowledge levels needed to be competent in each of those areas. The roles incorporate a description of scope, typical stakeholders and common activities associated with that role. The fire protection roles will serve to establish and aid in clarifying the knowledge areas necessary to ensure a minimum level of competency.

Fire Protection Roles

Within fire protection there are a variety of possible jobs, tasks and functions that a fire protection engineer could perform. Although all roles benefit from a well-rounded education in fire science, human behavior and evacuation, fire protection systems, and fire protection analysis, each role utilizes a different combination of the knowledge areas.

Fifteen (15) fire protection roles have been identified. Many professionals use a combination of these roles within their job. The table below indicates the fire protection role and the proposed scope.

Fire Protection Role	Scope
Alarm & Detection	The objective is to identify the fundamental principles, design criteria and installation requirements for fire detection (including smoke detectors, heat detectors, flame detectors, gas detectors, etc.) and occupant notification (including horn/strobe devices, speaker/strobe devices, etc.), emergency communication systems, based on hazard and occupancy, including how to identify risks and analyze, evaluate and specify the systems performance and coordinate with other fire protection and life safety systems.
Clean Agent Suppression	The objective is to identify the fundamental principles, design criteria and installation requirements for clean agent extinguishing systems. Clean agent systems suppress fire through chemical interference with combustion through gaseous flooding of the volume containing a fire incident. Clean agents are non-conducting and leave no residue on evaporation.
Egress	The objective is to identify the fundamental principles, design criteria and evaluation methodologies for means of egress based on hazard and occupancy. The ability to utilize both code-based and performance-based techniques, incorporating the impact of behavioral response to emergencies, are important concepts that should be known and utilized by engineers.
Explosion Protection	The objective of this brief is to provide documented engineering guidance related to the knowledge base of principles and competencies required in the subject of explosion protection (deflagration and detonation). The domain of this guidance includes requisite knowledge of general fire protection and fire science principles directly related to explosion protection, as well as an in-depth understanding of the application of prevention, protection, and mitigation of consequences of an explosion. The description in this subject area of explosion protection pertains specifically to dust, gas, vapor, and mist protections and excludes explosive materials (high explosives).
Fire Protection & Life Safety Modeling	The objective of this brief is to provide documented engineering guidance related to the knowledge base of principles and expertise required to establish recognized competency in the subject of fire and egress modeling, particularly with respect to buildings, occupants and high value assets. The domain of this guidance includes requisite knowledge of general fire protection and fire science principles directly related to predictive simulation, as well as an in-depth understanding of the application of influencing techniques to control fire spread and maintain occupant egress and emergency responder ingress pathways as viable routes.

Fire Protection Role	Scope
Governance of Fire Protection	The objective is to identify a fundamental understanding how regulations are created, apply to fire protection and the impact they have on engineering methods and solutions.
Human Behavior	The objective is to identify a fundamental understanding of the information needs of effective ways of communicating with, and expected actions of building occupants in response to fire and other emergencies. This includes requisite knowledge on social behavior, fire alarm and notification systems, and egress systems.
Process Fire Safety	The objective is to identify fundamental engineering guidance related to the knowledge base of principles and expertise required to establish recognized competency in the subject of Process Fire Safety. The domain of this guidance includes requisite knowledge of general fire protection and fire science principles directly related to LOC (Loss Of Containment) and subsequent fires of chemicals / hydrocarbons, as well as an in-depth understanding of the application of management and mitigation techniques to control chemical/ hydrocarbon fires within process industries to achieve defined safety objectives.
Passive Fire Protection Systems	The objective is to identify the fundamental principles, design criteria and installation requirements for passive fire protection systems. Working knowledge of prescriptive installation requirements and application as well as understanding and evaluating the performance requirements of these systems is key to this role. It is important to understand how these systems effect other fire protection systems and protection methods as well as where these systems end and structural fire protection begins.
Performance-Based Design	<p>The objective of this document is to identify the fundamental knowledge areas necessary to develop or independently review a performance-based design.</p> <p>Performance-based designs may be applied to a narrow set of fire protection or building features, larger portions/areas of a building, or to an entire facility. It is a process in which appropriate evaluation techniques are applied and developed by individuals with competency in the application of those techniques, in order to identify fire protection related design solutions or alternatives that address the objectives of stakeholders involved (e.g. Authorities-Having-Jurisdiction, building owners, building users, architects, insurers, or fire protection engineers).</p> <p>This document identifies the competencies necessary to perform or develop performance Based Design. This document also highlights the most common activities that occur in the development and implementation of a performance-based design.</p>

Fire Protection Role	Scope
Smoke Control Systems	The objective is to identify fundamental engineering guidance related to the knowledge base of principles and expertise required to establish recognized competency in the subject of smoke ventilation. The domain of this guidance includes requisite knowledge of general fire protection and fire science principles directly related to smoke, as well as an in-depth understanding of the application of management and mitigation techniques to control smoke by natural and mechanical means using air movement to achieve defined safety objectives.
Special Hazard Systems	The objective is to identify a fundamental understanding of the principles, design criteria and installation requirements for the protection of special hazards. Working knowledge of prescriptive installation requirements and application as well as understanding and evaluating the performance requirements of these systems is key to this role. This includes Carbon Dioxide - CO ₂ , Dry chemical, and Wet chemical.
Structural Fire Protection	The objective is to identify a fundamental understanding regarding the impact of fire exposure on structural elements, using either the prescriptive compliance method or structural fire engineering. The role involves technical competency in areas such as fire resistance qualification, fire resistance equivalencies, and demonstrating that structural systems have the ability to resist structural design fires.
Water-Based Suppression Systems	The objective is to identify a fundamental understanding of system design and functionality. Working knowledge of prescriptive installation requirements and application as well as understanding and evaluating the performance requirements of water-based suppression systems is key to this role. Various water-based systems include wet pipe sprinkler systems, dry pipe sprinkler systems, preaction sprinkler systems, and foam systems (foam-water/foam-water spray).
Wildland Urban Interface	The objective is to identify fundamental guidance related to the principles and expertise required to establish recognized competency in the subject of Wild/Urban Interface (WUI) Fire Protection Engineer. The includes requisite knowledge of general fire protection and fire science principles directly related to the protection of fire risks facing urban-wildland interface communities; where humans exist and their development meet or intermix with wildland fuel. WUI Fire Protection Engineers assists those who plan for, coordinate, invest in, respond and recover from WUI Fires.

Public Comment

At this time, the Committee on Professional Qualifications (CPQ) – Professional Competency and Credentialing Subcommittee is requesting public comment on the identified fire protection roles and their scope. These roles and their scope can be used to help define metrics used to assess the competency of professionals serving these roles. Also, if there is a role that is not identified, please let us know. The comment period will run from March 8, 2021 through April 7, 2021.

If this topic is of interest to you and you would like to participate beyond public comment periods, the committee always welcome new volunteers. You can join the committee through the SFPE [website](#) or contact [Victoria Valentine](#) for additional information.