The Spatial Distribution and Resource Allocation of Fire Safety Service Systems

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Abstract. An urban setting is by nature a system of spatial relationships and socio economic interactions. Protection and safety is a service subsystem in this setting. This kind of subsystem is influenced by the needs, spatial distribution, type, and location of activities of the population as well as by communication and transportation networks. The character and structure of such a subsystem also depends on its organization and the management of services allocation, location, and delivery. In this paper, we review principles affecting the performance of these service systems with regard to spatial relationships and communication patterns within cities. We thereafter discuss principles related to the location and allocation of fire services. Finally, we evaluate two widely used computer based models integrating several of the analytical principles toward satisfaction of the desired objectives for the location and delivery of fire services.

Introduction

Emergency services include police patrol, ambulances, fire protection, towing, and emergency repair for gas, electricity and water. Fire Service has conceived of as an organized public service having the primary objective of preventing fires from occurring and reducing the loss of life and property due to fires. Fire protection services and fire service related activities are conducted in relation to both the characteristics of the spatial environment as well as to the socio economic and demographic characteristics of the population. Individually or in combination, spatial, social, and economic factors, contribute to the incidence of fire and to the response capability of a fire protection service. These factors, to a large extent, determine the nature of fire hazards and influence the location of fire stations and the effective delivery of services.

Spatial considerations are primary to planning fire services, in order to determine the distribution of fire stations and their specific locations given social and economic needs and the existing communication and transportation networks. Non-spatial aspects, ranging from the nature of the fire to that of the fire service itself, its resource inputs, organizational set-up, and resource allocations and deployment