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Procedia Engineering 20 (2011) 325 – 328

**Procedia
Engineering**www.elsevier.com/locate/procedia

The 2nd International Building Control Conference 2011

Fire Risk Assessment of Heritage Building – Perspectives of Regulatory Authority, Restorer and Building Stakeholder

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Abstract

This paper examines the perspectives of different parties involved in fire management/risks/protection system of heritage building. A survey questionnaire was developed based on the identified criteria of fire risks for heritage buildings in Malaysia. The survey questionnaire was administered to Fire Rescue Department Malaysia (FRDM) personnel, consultant and contractor, maintenance personnel (representing stakeholder). The data were analysed based on pair-wise comparison. It was found the perceptions of different parties differed from one another.

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Keywords: Fire risk assessment; heritage building; pair-wise comparison

1. Introduction

Heritage building is a listed building of historical significance. Most of them were built prior to the formulation of Uniform Building By Laws 1984. Hence the buildings are not subjected to the provision of fire safety requirement provided by the by-law. Nevertheless, the Fire Rescue Department Malaysia (FRDM) requires these buildings to be protected from fire risks. In Malaysia, the fire protection system of the building is normally maintained by the stakeholder. However, the maintenance works is normally

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outsourced to the contractor. At least 3 parties may be involved in the assessment of fire risk of heritage building: Fire Rescue Department Malaysia (FRDM) personnel, consultant and contractor, and maintenance personnel (representing stakeholder). The three parties may have different perceptions.

The criteria and attributes of fire risks in building were reviewed by several authors Chow [1], Watts & Kaplan [2] and Khirani [3]. However, it could be inferred the perceptions of various parties were different. Watts & Kaplan [2] developed the checklist of fire risk assessment for heritage building based on the criteria and attributes which were selected from BOCA & FSES list and the judgement of selection were their own. Chow [1], developed similar checklist for existing high-rise non residential buildings in Hong Kong, it was also based on his own judgement. Khirani [3] developed risk assessment method for heritage building. Based on the works of previous researchers the method was refined with a technique known as Analytical Hierarchy Method (AHP) (refer Table 1). The original method, based on the opinion of single person, was also improved by using a panel of four experts. The expert panel were people from FRDM, fire consultant, maintenance personnel and insurance professional. Khirani [3] did not compare the perceptions of the four expert panels.

Table 1. Criteria and Attributes – Listed according to AHP Principle

GOAL OF STUDY			
To Evaluate Fire Risk In Heritage Buildings			
CRITERIA			
Passive Protection System	Active Protection System	Fire Management	Building Characteristic
ATTRIBUTES (extract from literature reviews)			
Compartmentation	Detection and Alarm System	Housekeeping and Maintenance	Building Contents
Egress/Evacuation Route	Automatic Suppression System	Management Fire Safety Plan	Building Fabric/ Material
Corridor Width	Fire Hydrant	Security	Architectural Features
Number of Exit	Portable Fire Extinguisher	Staff Training	Building Status
Maximum Travel Distance	Emergency Lighting	Fire Officer/Marshall	Historical significance
Exit Signages	Hose Reel and Stand pipe	Emergency Response	
Site Accessibility	Communications	External Exposure to Fire	

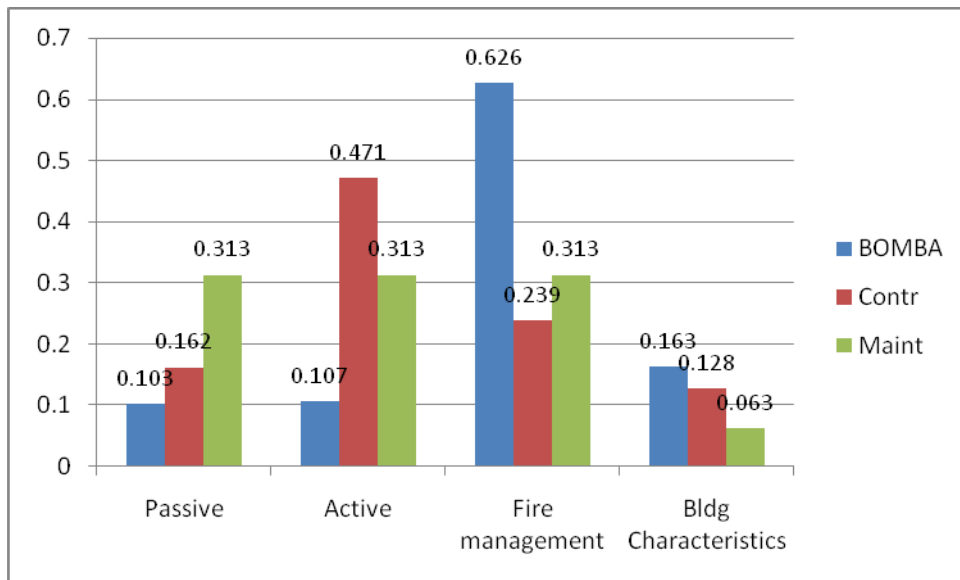
This paper will compare the perception of people involved in the fire protection aspect of heritage building.

2. Methodology

Using the questionnaire developed by Khirani [3], the perception of Fire Rescue Department Malaysia (FRDM) personnel, contractor/consultant and building maintenance personnel were surveyed. The data were analyzed based on AHP principles using Expert Choice 2000 software.

3. Result and Discussion

The results were presented in the form of the following histogram for comparison.



- i. To Fire Rescue Department Malaysia (FRDM) personnel the most important criterion is fire management. The reason is in their involvement in heritage building the personnel see mostly operational matter. In general, they do not involve in the design of active or passive protection systems.
Fire management means management fire safety plan, housekeeping and maintenance, security, staff training, fire officer/ marshal, emergency response and external exposure to fire.
- ii. To contractor perceive active protection system as important criterion since originally active system was not part of heritage building that the first task assigned to the contractor is to install active protection system. Active protection system includes detection and alarm system, automatic suppression system, hose reel and stand pipe, communication systems, portable fire extinguisher, emergency lighting, and fire hydrant

- iii. To maintenance personnel, active protection system, passive protection system and fire management are equally important criteria since they involve in ensuring all three aspects are well maintained.
- iv. Building characteristics are relatively not considered important criterion except to Fire Rescue Department Malaysia (FRDM) personnel. The reason is the FRDM personnel is more concern to flammability level of building material than the others. Building characteristic means building contents, building fabric, architectural features, building status and historical significance.

4. Acknowledgements

This paper would not have been possible without the assistance of several organizations and individuals also parties directly or indirectly involved including Fire Rescue Department Malaysia Putrajaya, Spaz Sdn. Bhd. and IIUM Entrepreneurship Consultancies Sdn. Bhd. (IECSB) for the software. The authors also wish to thank Research Management Centre of International Islamic University Malaysia and Ministry of Higher Education Malaysia for providing the FRGS research grant.

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