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Participatory mapping for urban fire risk reduction in high-density urban settlement

Dian Rahmawati[a]*, Adjie Pamungkas[a], Belinda Ulfa Aulia[a] Kesumaning Dyah Larasati[a], Gusti Aditya Rahadyan[a] ,Abdiel Hardwin Dito [a]

[a]*Urban and Regional Planning Dept -Sepuluh Nopember Institute of Technology Surabaya, Indonesia*

Abstract

Surabaya is a densely populated city prone to urban fires. Fire outbreaks occur annually causing billions of dollars of damage. Kelurahan Nyamplungan is part of Ampel strategic socio-cultural area. The Kelurahan experienced recurring fires with severe physical damage. High fire risk level in Kelurahan Nyamplungan is caused by high level of vulnerability and the low community capacity. Fire risk reduction through participatory mapping is an alternative to vulnerability reduction and capacity enhancement of communities through community involvement. This public outreach attempt generated fire risk maps through overlay analysis and public perception of fire risk in their neighborhood. Most of the Kelurahan fall under level 4, meaning it has high fire risk. At the end of the participatory mapping activity, public awareness towards urban fire safety increased. The community now acknowledges their need of fire safety equipment and vigilance in activities that could potentially cause a fire outbreak.

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Keywords: Urban fire risk; participatory mapping.

1. Introduction

Urban area identical to the area of dense habitation so prone to fire. Fires accounted for 15 percent of the total disasters in Indonesia, especially in urban areas with high population density. Fires in the city of Surabaya occurred repeatedly each year. Recorded in the year 2012 as many as 573 events occurred, while in 2013 decreased to 397

* Corresponding author. Tel.: +62-81 23261832
E-mail address: d_rahmawati@urplan.its.ac.id

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events. 2014 fires again increased as many as 596 events. Fires that continue to occur each year are physically affect billions of rupiah each month. Event fires in the region Ampel village, Village Nyamplungan a repeated occurrence. In 2013 a fire in Nyamplungan settlement involving four units PMK. In March 2014 a fire occurred in the township Nyamplungan lead to 3 homes sold and involves one major FMD unit. The next information on Month 6 September 2014 a fire engulfed a house in the settlement Nyamplungan plot that involves 12 units PMK. The basic thing to be risk factors of fire occurrence is suspected behavioral patterns of society, both the case of a short circuit or LPG cylinder blast. In the Village Nyamplungan with dense residential areas, the condition is exacerbated by the difficulty of fire fighting efforts because of the condition of houses huddled.

The frequency of fires are frequent in Sub Nyamplungan shows a lack of public awareness of fire-related hazards in their environment. The recurring incident also showed during this community rely on firefighters in fire pemadamam process. Whereas the efforts undertaken outage firefighters can be optimized when getting help and support from the community[I]. This shows that the community preparedness in the face of the threat of fire is needed in support of the performance of firefighters and minimize losses due to fire. Surabaya City Government's efforts in reducing the risk of fire in the township Ampel is through the optimization of firefighters (PMK) and the reconstruction or rebuilding of public facilities were burnt (RTR Strategic Region Old City 2012). However, these efforts have not considered optimal because of the efforts of fire management is done inclined after the incident and has not been actively involving the community as those prone to the risk of catastrophic fires, participated undertake preventive measures and responses related to the potential for catastrophic fires in the neighborhood. This suggests the need for a participatory approach attempts to encourage people to participate actively and independently in kesiapsiaan fire and disaster mitigation. To improve the preparedness of the public, is necessary to formulate an urban fire disaster contingency plans that integrate local knowledge society, as well as experience in handling FMD fire disaster.

2. Literature Review and Methods

According Suprapto [5] the fire hazard is the fire that is not desired. Fire events occur starting with the fire burning then no longer be able to control and threaten the safety of life and property. Persitiwa these fires have some process until the fire is extinguished. According Mantra [4] are some of the developmental process in the event of fire flames which consist of:

1. Phase ignition / explosion. This stage is characterized by the emergence of fire caused by heat energy of the material in space.
2. Stage Fire growth has begun to develop in accordance with the quantity of fuel available. This stage is the most good for evacuation.
3. Stage Flashover. A phase transition from the growth phase to the phase of full combustion. This stage is very fast, the temperature usually ranges between 300º C - 600º C.
4. Phase Combustion Full. At this stage, the heat that is released is the greatest because the fire has spread to the entire space. The temperature can reach 1200º C.
5. Phase ebb. At this point all material was burned and the temperature has begun to fall and the firing rate also declined.

According to the General Guidelines for Disaster Risk Assessment for Disaster Management Plan by BNPB [6] there is a calculation based risk assessment 3 variables:

Hazard

The indicators used to map fire hazard and residential buildings is the frequency of the number of fires, economic losses, the number of dead and seriously injured casualties. Defined danger zone at the fire hazard map based classes and weights for each parameter. Expressed in the following equation:

Table 1. Hazard Assessment Indicators

Parameter	Weight (%)	Class			Score
		Low	Medium	High	
Fire incident frequency	60	<2% (1-2 times)	2-5% (3 times)	>5% (>3 times)	Class/Max Value Class