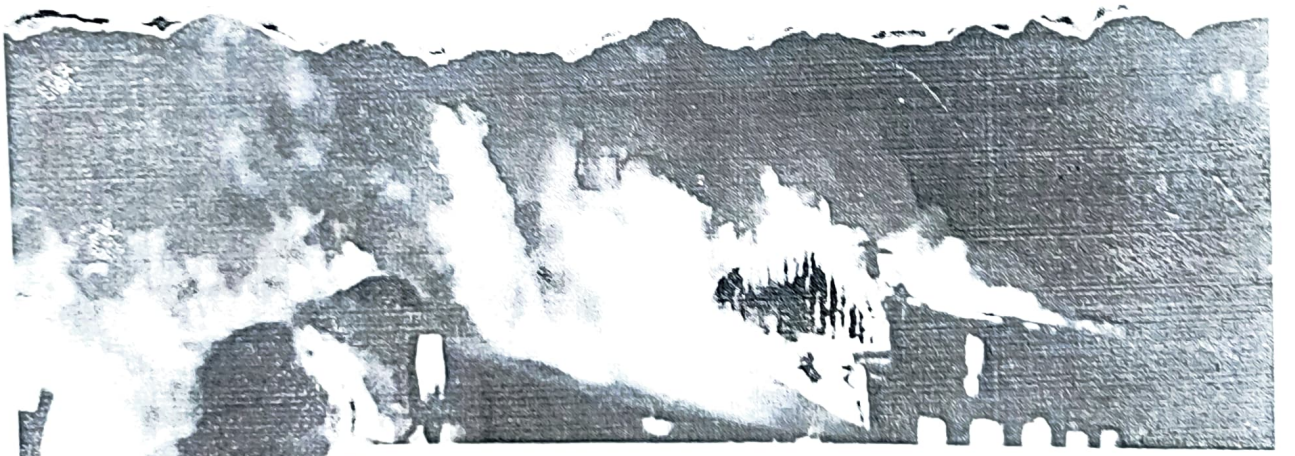
RISK ANALYSIS OF AN EFFECTIVE FIRE HAZARD : A STUDY IN KOLKATA MUNICIPAL CORPORATION (KMC) AREA,WEST BENGAL,INDIA.



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- Bubai Nankar.

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OBJECTIVES AND METHODOLOGY

Literatures of geography on fire hazards are somehow limited. However, a number of studies mainly by the scholars of other disciplines have been done on the hazard and its consequent disasters in the different part of the world. [illegible] et al (2007) have discussed about the remote sensing [illegible] that can be applied for environmental resources mapping and modelling. [illegible] et al (2006) have used remote sensing technique in assessment of fire hazard as an effective technology with the assertion that it has great potential for [illegible] dists and managers seeking to map, predict and assess the ecological effect of fire. De Vliegher and Basigos (1995) have prepared fire hazard modelling using remote sensing and GIS with the case study in [illegible]. [illegible] and [illegible] et al (2010) have attempted to test the accuracy of Remote sensing technology in forest fire damages.

The present study is an attempt to focus on :

(a) The investigation of actual and potential fire hazard prone areas of the KMC.
(b) Construction of GIS data base and generation of thematic maps to study the risk and management strategies of the hazard.

Thus, The Methodology includes:-

(a) preparation of fire zoning map of the KMC area based on fire frequency.
(b) Identification of the class of fire situated within the fire zone as well as water body;
(c) preparations of road maps according to their width and also produce the alternative road during the traffic congestion, applying different shades of colours.

Geospatial analysis techniques are used to process the collected data (both spatial and non spatial) to represent various parameters. Network analysis for FSM has been prepared and a large scale LULC Map (Anderson et al, [illegible]) (Table-1) has been prepared with the help of the base map.

TABLE 1 : Remote sensing data products used in the study.

SL	DATA TYPE	RESOLUTION (m)	SOURCE	YEAR	DATA FORMAT	APPLICATION
1.	LANDSAT (MSS, TM, ETM+)	15/30	USGS	2016	Raster	urban LULC map.
2.	ASTER	15	USGS	2011-15	Raster	Preparation of the image.
3.	IRS (LISS-III + PAN, LISS-IV, IRS-P5 PAN, AFT IRS P6 LGMX)	2.5/5.6	USGS	2001-14	Raster	Identification of the inland waterbodies
4.	GEO EYE	0.5	Google Earth	2015-18	Raster/vector.	Identification of the location of fire events, network analysis.

THE STUDY AREA

The KMC is located at 22°32' N of latitude and 88°20' E of longitude and is one of the oldest urban centres developed by the British.

Kolkata is a pioneering city in India in terms of industrialization and also one the most important cities of the country to serve the national economy, polity and culture. It is characterized by a large number of migrant population, communal harmony and political stability (Basu and Sil, 2010). Due to growth of population the land use pattern has been changing with the shrinking of residential -s is replaced by the ever increasing residential commercial as well as industrial and international institutional areas. It is very important to have clear knowledge about the physical structure of the city to reach quickly to the fire-affected Place. The Kolkata city may be conveniently divided by into two clear segments:

1. The relatively older parts of the city located in the central and northern parts.
2. The peripheral built up areas in the east, south and the south-western parts.

These two areas have different urban characteristics. The older parts are characterized by poor urban infrastructure, although having close proximity to the CBD. On the other hand the 'outer crescent of the city', exhibits planned urban developments with primarily residential built up areas (Dhar, 2013). It seems difficult for the quickest arrival of the fire fighters at the five affected place in Kolkata because road space is very less in the city, but vehicular density is very high (about 800 vehicles/km). which often creates traffic congestion in the major roads.

In general, there is an individual fire extinguishing system is almost every apartment, hospital, industry and other installations against small fires at the nascent stage. But unfortunately, there is major infrastructural lacking and communication Gap between fire events and their management especially for the large scale fires. In many cases it is noticed that the department of fire and emergency services is not properly informed. Sometimes narrow roads do not permit to enter the big fire engines and very often fire fighters have to fetch water from distance place.

FIRE MANAGEMENT

A. PREPAREDNESS AND QUICK RESPONSE

Planning is one of the most efficient tools to deal with disasters. The quick response indicates the data the methods to include the identification of the vulnerable area and the response to it. A disaster preparedness plan should be clear, realistic, flexible, and easy to use and it must be covered every stage of disaster management cycle (Joshi and Joshi, 2005). Identification of vulnerable area and section of appropriate measures should be the first stage of disaster preparedness.

Identification of the fire victim place can be done through Gps and GDPC. The response of fire disaster demands a quick rescue operation as soon as possible. And time is a very important factor to control the fire impact. So the duration of the gap between a fire events and its rescue operation is very crucial. Moreover, the response to fire disaster is a systematic damage assessment process to restore the utilities.

B. PREPARATION OF THE ROUTE MAP :

An attempted has been taken to find out the shortest route between the fire victim wards and its nearest fire stations. Beside this, during the office time a number of alternative routes have been proposed to reach the fire affected ward to avoid road congestion. There are two wards, which have been identified for their highest fire occurrence or frequencies (fr) ward no. 32, (frequency 18) and 36 (frequency (0).

J CHART FROM FIRE STATION TO WARD NO 32 AND 34 :

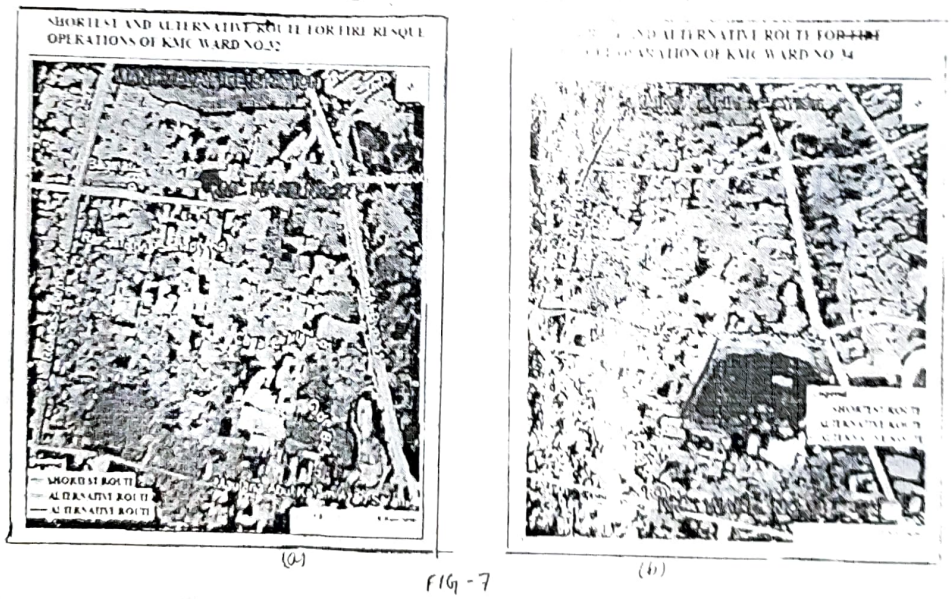
The nearest fire station at these two wards is Maniktala fire station (Ward no. [illegible]). The ward are situated within the 2 km buffer zone of the fire station. The shortest route direction between Maniktala fire station and ward no. 32 is given below (Fig-).

Maniktala fire station → CIT Road (W: 18 M) → ward no. 32

In the case of traffic jam at shortest route i.e. the alternative route between Maniktala fire station and ward no 32 is (Fig-7)

Maniktala fire station → Maulana Abul kalam Azad Road → EM Bypass → Maniktala Main Road → CIT Road → ward no. 32.

The shortest Route direction between Maniktala fire station and ward no. 34 (Fig-7,
Maniktala fire station → CIT Road → Hem chandra Barkan Road → ward no 34.
The Alternative route / routes between Maniktala fire station and ward no. 34 (Fig-7
Maniktala Fire station → CIT Road → Nanketdangha road → Kavi sukanta Sarani
→ Dr. Suresh chandra Bannerjee Road → ward no. 34 .



(a) (b)

FIG-7

C. SELECTION OF THE APPROPRIATE FIRE ENGINES :

The selection of the fire engine for the fire events is an important task. The Layout of the Road is an important factor for the quick rescue operation. If the selected fire engine is too big for the selected Road it can be easily overturned. The appropriate fire engine do be selected according to the road width presented below (Table-).