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RAPID VISUAL SURVEY OF GANDHINAGAR CITY

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Abstract: India is earthquake prone country. According to IS-1893-2002 all four zones (Zone- 2, 3, 4, 5) lies in Gujarat. Gandhinagar city capital of Gujarat lies in zone – 3 according to the IS 1893-2002. Many high rise building are constructed and many different construction practice are carried out in the city and around the city. Survey reports conducted by experts suggested that there is a need for seismic evaluation of Constructed buildings and under construction buildings. Different kind of methods for seismic evaluation of buildings have been developed in various countries in past years. Generally most of the methods follow three level assessment procedures namely, (a) rapid visual survey, (b) prelims Evaluation, and (c) detailed Study. In this study we will carry out rapid visual survey of Gandhinagar city and surrounded area. Based on this survey we will try to prepare out possible hazard map and carry out provision of necessary safety measure to overcome future earthquakes.

Keywords: Rapid, Visualization, Survey, Seismic, Earthquake, Hazardous.

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INTRODUCTION

India faces severe earthquake problems by a rapid growth of urban population and construction. Around 60% of landmass in India is under moderate to severe earthquake prone area. Bihar Nepal border in 1988, Uttarkashi, Uttaranchal in 1991, Latur, Maharastra in 1993, Jabalpur, Madhya Pradesh in 1997, Chamoli, Uttaranchal in 1999, Bhuj, Gujarat in 2001 and Muzzafarabad, Kashmir in 2005 and Sikkim in 2011. These earthquakes caused around 2 lakh causalities. [1]

Gujarat is one of the most seismic prone regions of the Country. Gujarat has has experienced two large earthquakes of magnitude Mw 7.8 and 7.7 in 1819 and 2001 respectively and seven earthquakes of magnitude seven earthquakes of Mw 6.0, during the past two centuries.

Gandhinagar is the capital city of the state of Gujarat in Western India. Gandhinagar is located approximately 23 km north of Ahmedabad, on the west central point of the Industrial corridor between Delhi, the political capital of India, and Mumbai, the financial capital of India.

Gandhinagar, Gujarat's new capital city, lies on the west bank of the Sabarmati River, about 545 km north of Mumbai, the financial capital of India and 901 km (560 miles) southwest of Delhi, the political capital. There is a provision of parks, extensive planting and a recreational area along the river giving the city a green garden-city atmosphere. Gandhinagar city is divided into thirty sectors. Each sector has its own shopping and community center, primary school, health center, government and private housing. Apart from this there is a generous provision for wide open green parks, extensive planting and a large recreational area along the river giving the city a lush green garden-city atmosphere. Gandhinagar's roads are numbered, and have cross roads named for Gujarati alphabets like "K", "KH", "G", "GH", "CH", "CHH", "J". All roads cross every kilometre, and at every crossing traffic circle to decrease the speed of traffic.

Different methods for seismic evaluation of existing buildings have developed in various countries. Most of the methods follow three level assessment procedures namely,
(a) Phase-I: Rapid visual screening,
(b) Phase-II: Prelims Evaluation
(c) Phase-III: Detailed study. [1]

Generally methods for seismic evaluation of building are carried out in three steps of assessment. RVS methods vary from those requiring 15-30 minutes on site for each building to more detailed ones involving some basic calculations. Preliminary study techniques are employed to analyse the building performance when a more reliable study is required. This requires detailed information regarding the structural components, material properties and site

conditions. The in-depth evaluation through sophisticated structural analysis falls within the third category of vulnerability assessment. [1]
Rapid Visual Survey does not include calculations, and formulas, so assessments of seismic capacity are carried out on general considerations related to building type, Structure type geometric irregularities, and site soil conditions. [2]

This study is used to improve the simplicity and usefulness of Rapid Visual Survey methodology to determine the scores for seismic vulnerability of various buildings using Linear vulnerability functional form. [3]

OBJECTIVES

To determine the vulnerability of existing building in Gandhinagar City. Zonewise Division of Gandhinagar City according to Damage.

To increase the strength of existing building to resist against Earthquake.

STUDY AREA

[fig – location – gandhinagar, Gujarat.]
Source: -
[https://www.google.com/maps/place/Gandhinagar,+Gujarat/@23.2207058,72.6105285,13472m/data=!3m2!1e3!4b1!4m5!3m4!1s0x395c2b987c6d6809:0xf86f06a7873e0391!8m2!3d23.2156354!4d72.6369415]

- Gandhinagar is the capital of the state of Gujarat in Western India. Gandhinagar is located approximately 23 km north of Ahmedabad, on the west central point of the Industrial corridor between Delhi, the political capital of India, and Mumbai, the financial capital of India.

- Gandhinagar, Gujarat's new capital city, lies on the west bank of the Sabarmati River, about 545 km (338 miles) north of Mumbai, the financial capital of India and 901 km (560 miles) southwest of Delhi, the political capital. There is a provision of parks, extensive planting and a recreational area along the river giving the city a green garden-city atmosphere.
- The new capital city was planned by Chief Architect H.K. Mewada, educated at Cornell University, and his assistant Prakash M Apte. Gandhinagar has an average elevation of 81 meters (266 feet). The city sits on the banks of the Sabarmati River, in north-central-East Gujarat. The 20,543 km^2 Area around Gandhinagar is defined by Gujarat capital Territory. It spans an area of 205 km^2 (79 sq. mi). The river frequently dries up in the summer, leaving only a small stream of water. Gandhinagar is India's tree capital with 54% green cover on its land area.
- Gandhinagar has a tropical wet and dry climate with three main seasons: summer, monsoon and winter. The climate is generally dry and hot outside of the monsoon season. The weather is hot to severely hot from March to June when the maximum temperature stays in the range of 36 to 42 °C (97 to 108 °F), and the minimum in the range of 19 to 27 °C (66 to 81 °F). It is pleasant in the winter days and quite chilling in the night during December to February. The average maximum temperature is around 29 °C (84 °F), the average minimum is 14 °C (57 °F), and the climate is extremely dry. [Website 2]

METHODOLOGY

According to Dr. Jahangir Alam, Th. Kiranbala Devi, A P Singh, the seismic vulnerability assessment procedure has been summarized in the following ways: [4, 5]

STEP 1: Investigation of structure type and location identification by surrounding structures
STEP 2: Walks by Survey & assessment
STEP 3: Calculation of structure score according to guidelines
STEP 4: Categorization of Buildings according to Building Seismic performance Score
STEP 5: Selection of buildings for Preliminary Assessment & Selection of Basic Estimation Parameters
STEP 6: Calculation of the Damage index and Cut-off Values for each Performance Classification.
STEP 7: Comparison of damage index and cutoff value & Classification of Building into Different Performance Group.

RESULT AND DISCUSSION

This paper precises the conclusion carried out by discussion and analysis of Rapid Visual Survey Methodology and to check the vulnerability of existing building by obtaining various numeric scores obtained based on this methodology.

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