ABSTRACTS OF THE ARTICLES

STUDIES ON PREVENTION OF EARTHQUAKE DISASTERS

Takamasa Nakano*

Comprehensive Urban Studies, No. 2, 1978, pp. 3—18

Prevention of earthquake disasters is recognized as one of the project themes of the Center for Urban Studies, Tokyo Metropolitan University. The aims and topics of this project are described in this paper.

1. Seismoengineering studies of buildings should be reexamined from the viewpoint of earthquake disaster prevention.
2. Earthquake disasters should be studied not only from the viewpoint of seismoengneering, but also from the viewpoint of the social sciences.
3. The effects of earthquake disasters in urban areas are clearly characterized by urban structures and functions.
4. Social scientific studies of earthquake disasters are basically necessary in order to elucidate the socio-economic damage due to earthquake.

* Center for Urban Studies, Tokyo Metropolitan University

ON THE METHOD TO EVALUATE THE DISTRIBUTION OF SEISMIC INTENSITY IN THE SEISMIC MICROZONING

Part 1: The Approach based on the Relation of the Seismic Intensity estimated from the Investigation of Tombstones and the Damage of Structure

Toshio Mochizuki*, Takahiro Kunii*,
Iware Matsuda*, and Michio Miyano**

Comprehensive Urban Studies, No. 2, 1978, pp. 19—30

When seismic microzoning is discussed, one of the main points is seismic intensity. Studies estimating the distribution of seismic intensity have been made by means of the analysis of the investigation of the overturned tombstones or the analysis of the distribution of damaged wooden houses. These estimated values, however, are generally indicated by several rough ranks of intensity, and are thus impractical for use in earthquake engineering dealing with seismic microzoning.

In this study, the degree of accuracy of the intensity estimated by overturned tombstones is discussed by introducing a theoretical analysis. Studies of the relation between seismic intensity (or acceleration) and extent of damage to wooden housing are reappraised.

The main conclusion of this study is that the distribution of seismic intensity which is useful to earthquake engineering must take many factors into consideration.

* Center for Urban Studies, Tokyo Metropolitan University
** Graduate School of Engineering, Tokyo Metropolitan University

THE ANALYSIS OF SEVERAL METHODS TO ESTIMATE THE INTENSITY OF EARTHQUAKE MOTION

Takahiro Kunii* and Tsutomu Tanaka**

Comprehensive Urban Studies, No. 2, 1978, pp. 31—38

To estimate the intensity of an earthquake the maximum acceleration have been used because of its simplicity. In this study, other methods, such as power, total acceleration area and Spectral Intensity, are compared with the maximum acceleration. Data from the 13 accelerograms which were recorded in the Ochiai Bridge both on the top of a pier and on a ground surface during the Matsushiro earthquake are used. It is analyzed from the view point of mutual correlation, response amplification in the top relative to the ground and the dominant frequency of the pier in each method. The main conclusion is that power and Spectral Intensity are the most appropriate measures in evaluating the intensity of earthquakes.

* Center for Urban Studies, Tokyo Metropolitan University
** Graduate School of Engineering, Tokyo Metropolitan University

SOME CHARACTERISTICS OF EARTHQUAKE GROUND FOR ASEISMIC DESIGN OF STRUCTURE IN URBAN SYSTEM

On a Generation of Time History of Earthquake Motion

Kohei Suzuki* and Shigeru Aoki**

Comprehensive Urban Studies, No. 2, 1978, pp. 39—54

This report is a historical survey of the study of earthquake ground motion from the engineering viewpoint. Attention is focussed on the generation of artificial earthquake motion which is necessary for the dynamic design of structures subjected to destructive strong earthquake motion such as buildings, bridges and some facilities in urban systems, chemical plants and nuclear power plants and so on.

Usually earthquake ground motion waves are considered to be random motions. This randomness is divided into two categories, namely randomness in amplitude and in frequency. The former is closely concerned with the intensity and the time duration of

the earthquake motion and the latter is affected by the ground condition and also the characteristics of the recording device. Moreover these characteristics of real earthquake motions are nonstationary, that is, they vary with time.

When we hope to simulate an earthquake motion credible for the site of construction, the problem is how we can assume abovementioned characteristics. From this point of view, the hitstory of several studies and techniques of earthquake simulation are summarized and discussed in this report. Then it points out some important problems which have yet to be solved.

Finally a conventional simulation technique is proposed and the results are compared with real earthquake motion characteristics.

* Center for Urban Studies, Tokyo Metropolitan University
** Research Assistant, Tokyo Metropolitan University

EARTHQUAKE-INDUCED LANDSLIDES

Their Characteristics and Investigations

Toshikazu Tamura*

Comprehensive Urban Studies, No. 2, 1978, pp. 55—64

Earthquake-induced landslides are attracting attention in urban areas also as many Japa -nese cities are expanding to the hills from the plaines. However, they have not been as fully investigated as landslides caused by heavy rainfall and other earthquake-induced phenomena. In order to determine the characteristics of earthquake-induced landslides in urban areas, the role of earthquake in initiating landslides is discerned after the presentation of suitable classification of landslides in Chapter 1 of this paper. It is stressed that not only the failures of artificial slopes with or without retaining walls but also slides of natural or seminatural hillslopes in and around residential districts should be considered.

In Chapter 2 the method of investigation of earthquake-induced landslides is discussed. It is pointed out that official records on earthquakes often contain only insufficient information on landslides. An example of utilization of such records in the analysis of the relation between areal distribution of landslides and earthquake magnitude is demonstrated. It is also pointed out that only the root areas of slides are noted and the affected areas, where usually most damage takes place, are rather neglected in most previous scientific investigations of landslides. In conclusion, methods for investigating the future earthquake-induced landslides are proposed.

* Center for Urban Studies, Tokyo Metropolitan University

LOWERING OF STREET FUNCTION AND TRAFFIC OBSTRUCTION IN AN EARTHQUAKE DISASTER

Hirotane Inoue*, Hitoshi Yamakawa** and Tetsuo Akiyama**

Comprehensive Urban Studies, No. 2, 1978, pp. 65—84

When an earthquake occurs, it is important that the street function be maintained so emergency vehicles can run smoothly. This report elucidates the road traffic obstructions caused by earthquakes.

1) Reports from recent disasters (Kanto, Fukui, Niigata, Tokachioki) were analyzed to define street function and explain the relation between the function and emergency vehicles' action.

2) Obstructions to road traffic can be classified into four groups: ground condition, constructions related to the street, constructions along the street and traffic volume. A table of the degree of traffic obstruction was made.

3) As a case study, the method of 2) was applied to Meguro Dori street and the degree of obstruction was estimated in 42 short sections, each about 100m.

Another issue should be the vehicles running or parked on the street when an earthquake occurs. Being relevant to the traffic obstruction, the number of vehicles and behavior of their drivers should be analyzed to predict and control obstructions to emergency vehicles.

* Faculty of Technorogy, Tokyo Metropolitan University

** Center for Urban Studies, Tokyo Metropolitan University

THE PRESUMABLE FLOOD DISASTERS AFTER A HEAVY EARTHQUAKE IN TOKYO

Nobuo Marui,* Hiroshi Yasukawa*
Masakazu Ui,* Kunio Arai*

Comprehensive Urban Studies, No. 3, 1978, pp. 85—94

The damages due to secondary disasters, such as fire or flood, following on the heels of an earthquake may be even more serious.
This report is an outline of the resulting water disasters after a heavy earthquake in Tokyo.

The structures and/or facilities in general whose destruction are apt to cause floods or inundations are as follows:

1) dams
2) stand pipes or tanks
3) bistribution network
4) embankments surrounding an area at or below sea level

5) submersions of underground facilities such as subways, tunnels and markets.

An outline of these facilities in Tokyo and of their responses to previous earthquake is given.

* Center for Urban Studies, Tokyo Metropolitan University

STUDIES ON HUMAN BEHAVIOR IN DISASTERS

Takamasa Nakano* and Ryoichi Kazama**

Comprehensive Urban Studies, No. 2, 1978, pp. 95—101

Studies on human behavior in disasters have been conducted in the United States and other English-speaking countries by sociologists, geographers and psychologists. These studies constitute one of the most important topic in disaster research. Representative papers of this field should be reexamined and new methods applicable to such densely populated and highly industrialized countries as Japan developed. Major concerns here are human behavior immediately after an earthquake warning and in earthquake, fire and flood. Panic and related secondary influences lead to greater disaster and loss of life. Two papers on panic by Alexander Mintz and by Enrico Quarantelli are reviewed and analyzed for further development of this field.

* Center for Urban Studies, Tokyo Metropolitan University

** Institute of Rural Culture