

THE COMPREHENSIVE PLANNING AGAINST URBAN DISASTERS
IN WAKAYAMA CITY

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SUMMARY

This paper presents the study titled " The Comprehensive Planning against Urban Disasters in Wakayama City " performed between 1977 and 1982. The study started after an earthquake swarm. The potential danger was judged by clarifying the situation of the city. This comprehensive planning based on the situation was divided into three stages, such as city level area level and residential unit level, considering how a local core city prepares for disasters. The lifeline concept preventing disasters, earthquake-proof and fire-proof of the public facilities were examined. Moreover a pamphlet " Preparation for disasters " including raised type was published. In order to establish a strong city against disasters, the concrete recommendation is proposed on improvements considering priority locally.

INTRODUCTION

In Japan some countermeasures preventing urban disasters have been developed and promoted in large cities, such as Tokyo Osaka and Shizuoka, and they have been more specific after " Large-Scale Earthquake Countermeasures Act " (1978) had been issued. On the contrary, local cities have become more dangerous for disasters as they grow larger. In other words local cities are growing with potential dangers structully arising from disasters.

This paper presents the results of the studies, which show how the planning against urban disasters in a local city should be. Taking account of many problems which a local city has, we chose Wakayama City as a model.

In 1977 an earthquake swarm occurred for some long period in Wakayama City. Taking this opportunity, Wakayama City started basic studies, of which purposes are to construct a strong city against disasters. This paper summarizes basically the studies of " The Comprehensive Planning against Urban Disasters in Wakayama City ", which were performed from 1977 to 1982. (Wakayama City entrusted the work to " The City Planning Institute of Japan "

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WHY DOES WAKAYAMA CITY NEED THE PLANNING ?

Felt earthquake including an earthquake swarm in 1977 have occurred frequently in Wakayama City. As the city has been developed and urbanised rapidly, influences caused by a foreseen earthquake become more serious to the city. The earthquake, for which the city has to prepare countermeasures against potential disasters, is to be equivalent to the Nankaido-Earthquake in the past, and it is expected to be a shallow near-field earthquake. Although either of its seismic intensity is no more than 5.0, and there is no possibility that its seismic intensity is over 6.0, we have to make every citizen recognize the importance of protecting from disasters, let alone the necessity of administrative countermeasures.

HOW TO MAKE THE PLANNING IN WAKAYAMA CITY

We provide the basic principles how to make the planning as follows.

1. Countermeasures based on daily activities to protect from disasters.
2. A long-term masterplan, of which purposes are to make a safer city on the basis of grasping the existing circumstances of the city correctly.
3. Clarifying safety measures, which are to be basic standards in making the plan.

GRASPING THE EXISTING CIRCUMSTANCES FOR PREVENTING DISASTERS

In order to grasp the situation of Wakayama City, we divided the urbanized part of the city into 46 residential units and made a " karte " of each unit.

The features of the existing situation for preventing disasters are as follows.

1. There are many residential units, where wooden houses stand very close.
2. The central part of the urbanised area is mixed up industrial districts with residential districts.
3. The buildings in the area, where people escaped from the calamities caused by World War 2, have been superannuated.

These areas have a lot of problems on preventing disasters. Furthermore in sprawl-progressing area located north of the Kinokawa River, people are urbanizing the area without order. Different types of danger are likely to happen.

ASSUMPTION OF DAMAGE

It is very difficult and complicated to foresee damage caused by an earthquake. Damage by an earthquake equivalent to the case of the Nankaido-Earthquake in 1946 is assumed that wooden houses are collapsed and fired. Damage is assumed in each residential unit and potentially divided into 6 grades

combined with three kinds of pattern. As the result of an investigation of characteristics, it is finally decided to make 8 groups of damage-pattern. The object for improvements of each residential has been decided on a basis of the characteristics of damage-pattern.

ESTABLISHING " THE COMPREHENSIVE PLANNING AGAINST URBAN DISASTERS " IN WAKAYAMA CITY

This planning consists of three groups according to ranges. The first one is " The Basic Concept Preventing Urban Disasters " intended for the whole Wakayama City (City Level). The second is " The Concept Protecting from Disasters in each Area (Area Level). We divide the urbanised part of the city into 9 areas. And the last one is " The Basic Planning against Disasters of each Residential Unit " (Residential Unit Level). We make plannings on each residential unit karte.

The Basic Concept Preventing Urban Disasters.

Basic Policy

In order to develop the basic planning against disasters specifically, the city has to be divided into two blocks across the Kinokawa River. Characteristics of each block across the river are so different that countermeasures for each block has also to be different. Accordingly this concept must be developed on the assumption that different countermeasures are needed to be done.

Specific Countermeasures

1. Bases protecting from disasters
2. A shelter for each residential unit
3. A shelter for each area
4. Terminals to prevent disasters
5. Main belts protecting from disasters
6. Subsidiary main belts protecting from disasters
7. Belts against disasters along the river
8. Adjustment zones of fire-proof buildings
9. Improvement zones against disasters
10. Dangerous area against disasters
11. Green tracts of large-scale factories as absorber
12. Green tracts preventing disasters

The Concept for Protecting from Disasters for each Area

Basic Policy

Problems specified by residential unit karte are to be arranged and considered from Area Level. This concept should be made based on the characteristics of each area, at the same time, directions to improve functions for each area are required to be shown.

Specific Countermeasures

1. Bases for protecting from disasters
2. A shelter for each residential unit
3. A shelter for each area
4. Spaces required to hasten to be incombustible around shelters
5. Incombustible spaces preventing disasters
6. Maintaining vacant lots after the factories moved
7. Main belts protecting from disasters
8. Subsidiary belts for refuge
9. Incombustible zones along the existing roads
10. Green-belts as absorber

The Basic Planning against Disasters for each Residential Unit

Basic Policy

Measures preventing disasters are required to study in detail on the ground of the directions of "The Basic Concept Preventing Urban Disasters", and the main subject of the planning of residential level is established according to the studies in detail.

We chose seven residential units as models by danger degree which was classified by assuming damage, and we made the planning for each unit.

It is important for the city to promote the planning step by step. This planning consists of the following three steps. The planning is a consistent guiding to improve measures.

Specific Measures

1. The Basic Planning against Disasters (1/5,000)
A long-term planning based on the characteristics of each residential unit in detail in order to make a strong city against urban disasters
2. The Planning to Restore the City (1/2,500)
A medium-term planning for setting countermeasures to be done within five years.
3. The Improvement Planning for Emergency (1/2,500)
In order to make a tough city against disasters, it is important to make the planning with short-term measures, which can be done within one or two years.

LIFELINE PLANNING TO MAKE THE CITY STRONG AGAINST DISASTERS

Today cities consist of the highly organised society. Considering functions of a city with respect to protecting from disasters, we have to give priority to problems of the urban system in order to reduce damage to a minimum. We define lifeline that is inevitable in maintaining life in a city. We attach importance to energies such as power, gas, oil...etc. To realize this planning, we analyzed the energy system of the city as the first step. Each energy company makes its own counterplans to reduce damage and to improve restoration systems. We investigated the conditions of the factories, and

most of them do not consider any countermeasures against disasters. Administrative guidance are to be expected for them. Mesh analyses were also given on distributions of energy consumption and on important facilities of the city.

Taking account of grasping the situation of these functions, the planning on lifeline from energy suppliers was investigated as the second step. Valuation of degrees against an earthquake was set to be the first aim from energy suppliers. Respecting the valuation on power supply routes, the valuations of the areas, south of the Kinokawa River and west of the Wakagawa River, are estimated low. As supply routes of power and other energies which have problems do not pass the central part of the city, there are no problems at present, but we will have to consider in the future.

SURVEYS OF THE PUBLIC PROPERTIES USED FOR REFUGES EXAMINED ON FIRE AND EARTHQUAKE PROOF

The public properties used for refuges when a calamity happens were comprehensively examined on fire and earthquake proof. The surveys were done on twenty two buildings as the first summary surveys, and the second summary surveys were done on three buildings used for bases and refuges, two of them were required to be reinforced.

As to the surveys on fireproof, nine wooden and fireproof school buildings in the high density area were examined, and problems of each school building were clarified on karte forms.

A PAMPHLET " PREPARATIONS FOR AN EARTHQUAKE " WAS PUBLISHED AND DISTRIBUTED TO EVERY CITIZEN

From the results of the investigations, a pamphlet " Preparations for an Earthquake " was published and distributed to every house in order to promote concerns for protecting from disasters and at the same time to make every citizen recognize his role when disasters happen. " Preparations for an Earthquake " in raised type was also distributed to a blindman with a light for emergency.

CONSIDERING THE ORDERS OF PRIORITY ON IMPROVEMENT WORKS PROTECTING FROM DISASTERS

As the basic planning against urban disasters in Wakayama City has been ready to be completed on city, area and residential unit levels, the orders of priority have to be studied on " The Concept Preventing Disasters for each Area ", which is based on the measures developed on the administrative levels. In considering priorities in improvement works, we basically aim at " Formation of City Fire Preventions Block, which intends to prevent big fires structually and we adopted " Planning Technical of City Fire Preventions Block " issued by the

Ministry of Construction. The range of putting priorities we studied was the area south of the Kinokawa River, where it was necessary to study the situation of the urbanized part as well as the concrete measures of " Planning Technical of City Fire Preventions Block ".

Fires broke out from 17 blocks in spring and autumn, from 5 blocks in summer and from 25 blocks in winter. The amount of damage is supposed to be about 930 billion yen in case of excellence wind in spring and autumn.

The following items are our basic thinking of putting priorities in improvement works preventing disasters.

1. To reduce blocks from which fires break out
2. To sweep all blocks where fires break out
3. To contain violently assailable residential units
4. To protect the important residential units
5. To improve belts for isolation to increase functions for refuge
6. To improve the belts for isolation to extinguish fires

We analyzed the items above in order to decide putting priorities comprehensively, and the following items were chosen to be done first to make the planning against disasters.

1. The improvement works on one dimensional level
2. The improvement works on two dimensional level
3. The improvement works on point level

SUGGESTIONS TO MAKE A STRONG CITY AGAINST DISASTERS IN WAKAYAMA CITY

Considering the results of studies and investigations, we would likely to propose the ways of making a strong city, at the same time we expect that these suggestions are to be guiding principles which Wakayama City should do in the near future.

Subjects on making the planning

1. Continuation of renewal works on data of residential unit kartes
2. To increase fundamental data
3. Continuation of making a plan against disasters
4. Continuation of making a city lifeline concept preventing disasters
5. To build up the comprehensive surveys of most suitable places for refuge
6. Studies of a seismic sea wave and countermeasures against it
7. Making softwares preventing urban disasters
8. Review of planning technical of city fire preventions
9. Recognition of " The Comprehensive Planning against Urban Disasters in Wakayama City "

Proposals for improvement works against disasters

1. Making the basic ways of thinking consistent as to the improvement works
2. Forming the land readjustment protecting from urban disasters
3. Combining the improvement works and their related works
4. Making the specific improvement works be done immediately

Subjects on promoting measures against disasters

1. Enhancing the movement protecting from disasters
2. Enriching the system against disasters
3. Specifying the countermeasures on the administrative level
4. Establishing and practicing the system to make a strong city by all citizens

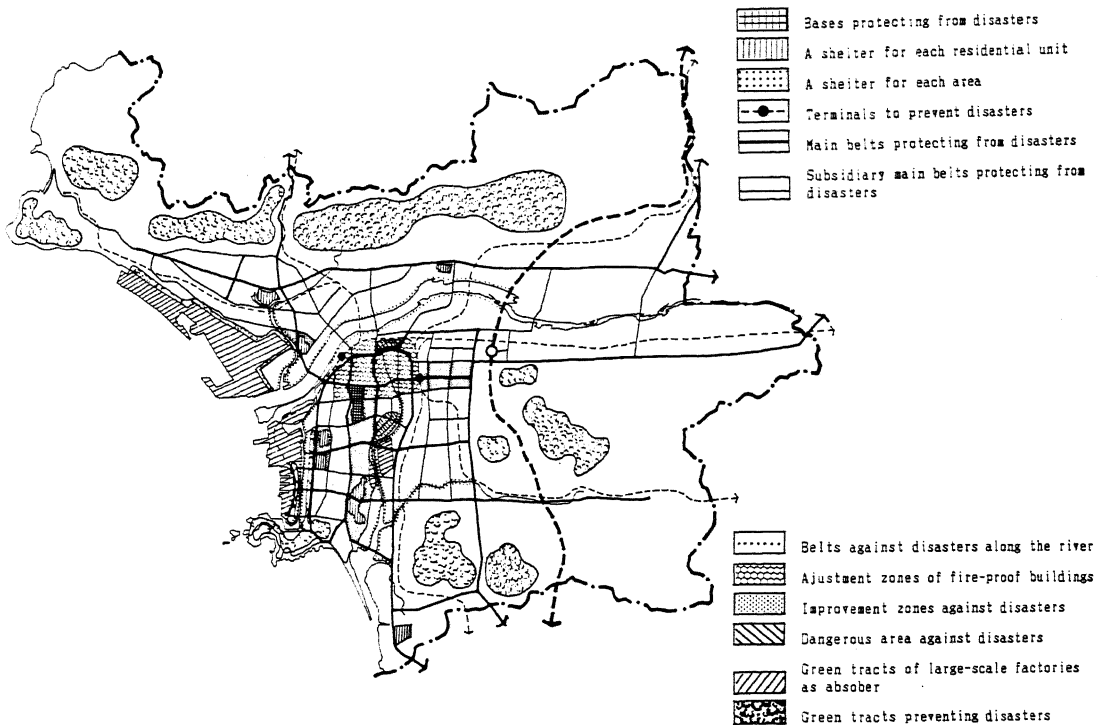


Fig.-1 THE BASIC CONCEPT PREVENTING URBAN DISASTERS

(F-unit)

