

論文 / 著書情報
Article / Book Information

題目(和文)	Evaluation method of open spaces for earthquake disaster prevention in urban residential areas in China
Title(English)	Evaluation method of open spaces for earthquake disaster prevention in urban residential areas in China
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出典(和文)	学位:博士(学術), 学位授与機関:東京工業大学, 報告番号:甲第9577号, 授与年月日:2014年3月26日, 学位の種別:課程博士, 審査員:大野 隆造,翠川 三郎,山田 常圭,中村 芳樹,那須 聖
Citation(English)	Degree:Doctor (Academic), Conferring organization: Tokyo Institute of Technology, Report number:甲第9577号, Conferred date:2014/3/26, Degree Type:Course doctor, Examiner:,,,,
学位種別(和文)	博士論文
Category(English)	Doctoral Thesis
種別(和文)	論文要旨
Type(English)	Summary

(博士課程)
Doctoral Program

論文要旨

THESIS SUMMARY

専攻： 人間環境システム 専攻
Department of
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申請学位 (専攻分野)： 博士 (Philosophy)
Academic Degree Requested Doctor of
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要旨 (英文 800 語程度)
Thesis Summary (approx.800 English Words)

Evaluation method of open spaces for earthquake disaster prevention in urban residential areas in china

China is a seismically active country, and in the last few decades the threat of a natural disaster to the living environment has grown. Earthquake has resulted in many fatalities and extensive damage, disaster mitigation and prevention has been major concerns. In accordance with the characteristic of earthquake damage in China and the physical characteristics of China's cities, creating a proper open space system is a very effective approach for earthquake disaster mitigation in the residential areas of Chinese cities.

In the chapter 1 of introduction, we denoted the utilization of open spaces in the post disaster period is comprehensive distributed in lots of countries. Cases can be found in the US, Japan, Chile and other earthquake prone countries. Residents prefer to use open spaces near their houses right after a disaster which greatly contributed to the physical resilience. The open spaces provided to evacuation sites, disaster relief, life support, a lifeline system, and temporary housing distribution has been proved to facilitate disaster mitigation efficiently.

Through the analysis in Chapter 2 - Requirements of an open space for earthquake disaster prevention in residential environments in Chinese cities. We found in the urban area of China, the urban elements can be classified into five categories based on their scale: buildings, neighborhoods, communities, superblocs, and city. Although the avenues which divide urban area into superblocs are regarded as safe evacuation routes, they may not be directly accessible due to difficulties within the superblocs (e.g., a natural barrier or a human-caused barrier). Thus, the open spaces inside superblocs are very important to provide direct evacuation routes and spaces for short-term activities, to facilitate disaster mitigation.

In the chapter 3-Concept of circulation space to evaluate earthquake vulnerability and its detection method, the concept of "circulation space" is developed which identifies the continuous open spaces between buildings, creates a passage that facilitates the free movement

of people in a particular area. It is used as a criterion to evaluate earthquake vulnerabilities in the different areas. Additionally, an AutoCAD programming application is provided to assess open spaces between buildings and automatically output numerical data which is useful for various space analyses under different scenarios. It was applied to examine vulnerabilities against an earthquake in a residential environment and provide numerical measures for an objective evaluation.

In Chapter 4-Analysis of physical characteristics of circulation space for earthquake disaster prevention in superblocks, observations of outdoor spatial arrangements and environmental details from a field survey is conducted in different types of residential areas in city of Tianjin, China. 5 types of residential area are applied for programming analysis (High-rise building area, New Middle-rise building area, Old Middle-rise building area, Traditional Concession area, Traditional Neighborhood area). In different layout of residential site, it has various performances towards earthquake disaster. The physical characteristics of residential sites affect the circulation for different levels of damage. Analyses on the changing of circulation spaces and usable spaces are confirmed possible to describe and evaluate the performance of residential environments according to the damage situation. In conjunction with survey observations, the vulnerabilities on the physical environment are clarified. In five types of residential area, middle-rise building areas possess the most stable situation against earthquake while the traditional neighborhood faces extremely dangers.

In Chapter 5- Identification and modifications of constraints of activities along circulation spaces, though the identification of constraints of activities along circulation spaces, it interpreted the earthquake vulnerability into the effects on post disaster activities, the earthquake vulnerability and space utilization are read through intuitively. The constraints of evacuation, accessibility and space utilizations are distinguished. Improvement proposals modified vulnerabilities through both comprehensive suggestion and implementation approaches area brought forward targeted to different stage of disaster mitigation. The vulnerability evaluation system is suggested as the primal stage of disaster mitigation. Measures to improve the accessibility, choose usable spaces and demolish certain constructions are proposed for ameliorating the environment in built up area. Proposals facilitating for future designs are also addressed in terms of the evidence based design.

備考：論文要旨は、和文 2000 字と英文 300 語を 1 部ずつ提出するか、もしくは英文 800 語を 1 部提出してください。

Note : Thesis Summary should be submitted in either a copy of 2000 Japanese Characters and 300 Words (English) or 1copy of 800 Words (English).