

歴史都市防災論文集 Vol.7 掲載論文・報告一覧

【論文】

1. 清水寺周辺地域における災害時避難の所要時間に関する考察

Required time for evacuation from disasters in areas around Kiyomizu temple

川崎 佑磨・大岡 優・伊津野 和行・小林 祐一郎・久能木 慎治

Software countermeasures are especially important for mitigation of disaster due to post-earthquake fires at sight-seeing area, because hardware countermeasures are sometimes difficult to conduct at the beautiful location. Further, sightseeing people are vulnerable during natural disasters, as they are not familiar with the location and don't know where to evacuate. This paper conducted numerical simulation on the evacuation activities of sight-seeing people from postearthquake fires at Kiyomizu temple in Kyoto. Required time for evacuation and countermeasures to reduce evacuation time are discussed. This study also deals with the universal design for disaster mitigation at the same area. It is important to show the refuge routes intelligible for everyone when a disaster occurs.

2. 歴史都市における観光客の避難経路に関する検討

A Study on the Evacuation Routes for Tourists in Historical Cities Considering Traffic Capacity

小川 圭一・南 和憲・前川 貴哉・塚口 博司・安 隆浩

In this paper, evacuation routes for tourists from cultural heritage as sightseeing spots to evacuation sites are identified and analyzed in Higashiyama Ward in Kyoto City, which is a typical historical city in Japan. Evacuation routes from cultural heritage to evacuation sites are identified from the viewpoints of distances, reach ability rates in disaster situation and numbers of links. Then, problems of current situations in identified evacuation routes are evaluated from the viewpoints of traffic capacity.

3. 京都市における避難所の収容人数に関する定量的把握

A Quantitative Analysis on the Admission Capacity of Evacuation Sites in Kyoto City

松宮 かおる・及川 清昭

The purpose of this paper is to clarify the admission capacity of temporary evacuation sites in Kyoto city and to obtain basic data for disaster prevention planning. First, we compiled data of daytime and night-time population by each school districts, and made a distribution map of temporary evacuation sites. After that we calculated the number of indoor and outdoor refugees admitted in temporary evacuation sites by using disk sweeping method in morphology and analyzed the admission capacity for the population. We found that there is an acute shortage of the indoor capacity of the temporary evacuation sites, however outdoor capacity of those is enough for almost all refugee population.

4. 地震時における避難行動の意思決定プロセスに関する研究

ー京都清水寺周辺地域をケーススタディとしてー

A Study on Decision Making Process of Evacuation after Earthquake: A Case Study of the Vicinity of Kiyomizudera-Temple in Kyoto

崔 青林・豊田 祐輔・谷口 仁士・鐘ヶ江 秀彦・伊津野 和行

Tourist evacuation plan is essential in historic cities as it attracts a great deal of tourists. To contributing to understanding tourists' evacuation behaviors, to making tourists evacuation plan and disaster management in tourism destinations, this study addresses tourists' decision making process of evacuation after earthquake in historic tourism destinations. Based on an attitude survey conducted in the vicinity of Kiyomizudera Temple in Kyoto, the study demonstrates their prioritized factors to decide temporary evacuation sites and evacuation routes, leading to their decision making process of evacuation.

5. 土地利用の高機能化による史跡保全に配慮した土砂災害対策

Counterplans for hazards due to debris flow around a historic site: site considerations

原田 紹臣・里深 好文

Care must be taken to preserve historic relics as the surrounding infrastructure changes. The site of the Omi Jingu shrine requires an evaluation for debris flow and prevention measures. However, installation of conventional large-scale protective structures may disturb or obstruct the historic site. Thus, we propose the use of a small-scale debris-flow steel-grid sabo dam. Using this approach, the parking lot could be used for debris flow deposition. In this study, to identify the ideal structure for controlling sediment runoff, we experimented with the structure of the dam to show how the capture rate is affected under different conditions.

6. 史跡内遊歩道の侵食対策のための竹チップを用いた改良土の耐侵食性に関する研究

Erosion resistant Properties of Improved Soil using Bamboo Chips for Erosion Prevention of Alameda in Historic Places

酒匂 一成・北村 良介・川路 達也・四田 崇之

There are many castle ruins located on Shirasu plateau, e.g. Kiyoshiki castle in Satumasendai city, Kagoshima and Shibushi castle in Shibushi city, Kagoshima. Cut slopes and alamedas around castle ruins have been eroded due to rainfall. Many trees and bamboos grow thick around castle ruins. It is important to fell trees and bamboos in order to protect shirasu slopes from strong wind during a typhoon. The authors have proposed an erosion mitigation of alameda in historic places using an improved soil composed of bamboo chips, ash from Mt. Shinmoe, and cement. In this paper, erosion resistant properties of the improved soil using bamboo chips are investigated.

7. 平成23年台風12号による熊野那智大社裏山における大規模斜面崩壊の解析条件設定に関する研究

Analysis method of the large landslide occurred behind the Kumano Nachi-Taisha shrine triggered by Tayphoon Talas

藤本 将光・石田 優子・梅本 啓介・小杉 賢一朗・里深 好文・深川 良一

The Tayphoon Talas in September 2012 caused the landslide and debris flow behind the Kumano Nachi-Taisha shrine. The total amount and peak of rainfall by Typoon Talas were 707 mm and 93 mm/hr, respectively. A large landslide occurred at the peak rainfall around 3 pm September 4 and hit the building of shrine as debris flow. Based on the filed investigation and topographical analysis, the landslide with about 30 m wide, 50 m long, 15m depth was collapsed at the peak of rainfall event. Our results indicated that the large landslide was simulated by considering the deep weathered bedrock conditions.

8. 地盤強度特性の空間分布を考慮した急傾斜地崩壊発生場の予測

Prediction of occurrence of slope failure taking into account spatial distribution of foundation strength character

石田 優子・藤本 将光・平岡 伸隆・株丹 啓介・深川 良一

To predict which part of slope will collapse is important for disaster prevention and mitigation. However, it is difficult because of diversity of ground condition and mechanism of slope failure. The slope behind Hougan-ji temple which is in Kaya, “an area of important preservation district groups of traditional buildings”, is designated as hazardous slope by law. Thus, the slope is divided into 12 section and slope configuration and soil properties are investigated. In addition, in this paper, slope stability is analysed by infinite slope method and shear strength reduction method, and it is revealed that weak part is located near the center of slope.

9. 熊野那智大社後背山地において発生した土石流に関する研究

Study on debris flow disaster occurred on mountain behind Kumano Nachi Shrine

赤澤 史顕・藤本 将光・里深 好文・深川 良一

Kumano Nachi Shrine is a part of World Heritage in Wakayama Prefecture. In the mountain behind Kumano Nachi Shrine, a debris flow disaster occurred on September 4, 2011 by heavy rain. This debris flow flowed into Shrine and deposited in the ground of Shrine. We simulated this disaster by using Knako2D debris flow simulator. We compared results of simulation and situation of this disaster. This comparison shows our simulation is almost same with situation of disaster. In addition, we consider the effective sabo works for this disaster. It is difficult to prevent this disaster only constructing sabo dam. In the result, it showed that sabo dam using with training dike is effective countermeasure to prevent of this debris flow disaster.

10. 清水寺地域における集中豪雨時の土石流氾濫解析

Numerical analysis of debris flows in torrential rain at Kiyomizu temple area

速見 智・大塚 亮介・里深 好文

This paper describes the numerical simulation of debris flow caused by local downpour at Kiyomizu temple area. Kiyomizu temple is a historical heritage, including the national treasure and important cultural property. In the past, Kiyomizu temple was damaged by flood disaster and landslides several times. Mountain stream on the east side of Kiyomizu temple has been designated as area where disasters caused by debris flow may occur by Kyoto prefecture. Then, we apply numerical simulation model Kanako2D on the debris flow runoff process in this watershed. The calculated results show that the risk of debris flows disaster caused by torrential rain is low.

11. タイ・アユタヤの文化遺産防災に向けた現地調査と洪水解析

In-situ investigation and flood analysis for disaster mitigation of cultural heritage in Ayutthaya

檀上 徹・赤澤 史顕・田中 七裕・藤本 将光・豊田 祐輔・谷口 仁士・深川 良一・里深 好文

Ayutthaya has been registered as a world heritage by UNESCO in 1991. Ayutthaya is located in a low elevation area, surrounded by three rivers. Therefore, the flood occurred frequently. The flood in October, 2011 had continued more than a month. Bricks of many remains had been deteriorated and the ground under the remains is unequally settled due to floods. If this situation continues, there is a possibility that the value of cultural heritage decreases. So flood analysis for the sandbank surrounded by three rivers is conducted. In addition, four cases with different conditions were analysed. Based on the results of analysis, this paper proposes the future disaster mitigation of the culture heritage in Ayutthaya.

12. 1896年9月の大水害における琵琶湖周辺の社寺の避難所利用に関する研究

The Shrines and Temples utilized as Evacuation Shelters in the Great Flood Damage around Lake Biwa in September 1896

江藤 匠平・林 倫子・大窪 健之

Before the completion of construction of Seta river dam (Araizeki), waterfront areas along Lake Biwa in Siga were sometimes flooded, because people had never been able to control the water level of the lake. The greatest water damage was recorded in September 1896. At that time, a lot of waterfront cities and towns along the lake were flooded for many days. This study aims to reveal the actual condition on utilization of many shrines and temples as temporary evacuation shelters for disaster victims, according to press reports at the time.

13. 伝統構法木造の告示波に対する最大変位応答

Maximum Displacement Response of Traditional Wooden Houses subjected to Earthquake Motions in Notification

山田 耕司・鈴木 祥之・向坊 恭介・須田 達

It is useful to know the maximum displacement response of traditional wooden houses subjected to earthquake motions in notification. The maximum displacement responses are calculated in 2 skeleton curves, 3 levels of base shear coefficient, and 3 ground properties. The result may be summarized as follows: the maximum displacement with unfixed plinth is less or equal than the maximum displacement with fixed plinth in case of the predominant displacement at ground floor. The maximum slide displacement is 15cm subjected to earthquake motions in notification at the 3rd ground property.

14. 伝統的構法の楔をもつ仕口のめり込みメカニズム

Embedment Mechanism of Traditional Wooden Joints with Wedges

棚橋 秀光・大岡 優・伊津野 和行・鈴木 祥之

Wedges of traditional wooden buildings are used in order to stiffen the joints. Also, cyclic loadings make the joints loose due to permanent compressive displacements and slip out of wedges. However, their behaviors and mechanisms have not been established so far. The authors carried out loading tests of column tie-beam joints with four types of wedges and the effects of wedges and cyclic loadings on the restoring force characteristics were investigated. Then, their embedment mechanisms are made clear. These results will contribute the seismic evaluation of traditional wooden buildings.

15. 伝統木造建築物の全体架構モデルに関する研究

Numerical Study on the Whole Structural Model of Traditional Wooden Structure

吉富 信太・尾崎 訓応・向坊 恭介

In this paper, some static and dynamic response analyses are performed using detailed 3D structural model of traditional wooden structure. Though several models of joints of wooden members have been proposed, characteristics of whole structural model of traditional wooden structure have not been examined sufficiently. Therefore, a model of Amida-do at Higashi Honganji is used as an example of traditional wooden structure with large roof and some response analysis is demonstrated. In the previous investigation on the earthquake-resistant performance of Amida-do, buckling of a column have been reported. A cause of this phenomenon is examined by using of detailed 3D model.

16. MEMS技術を活用した寺院建築の振動計測に関する研究

Study on vibration measurement of temple architecture utilizing MEMS technology

松本 慎也・光井 周平・大久保 孝昭・藤谷 義信

Many traditional temple architecture is built in Japan. However, Japan is an earthquake-prone country. In order to maintenance these traditional temples, more rational building maintenance systems are demanded in Japan. In this study, the technology to support more effective repair planning methods for the traditional temples is considered. We built the wireless monitoring system using the MEMS(micro-electro-mechanical systems) technology. In this paper, we investigate the effectiveness of the monitoring system. And we shows the results of measuring the Jodoshinshu temples in Yamaguchi Prefecture, which was measured to accumulate the basic sample data.

17. 長野県北部地震で被災した伝統的木造軸組構法家屋の3次元地震応答解析

3D Earthquake Response Analysis for Damaged Traditional Wooden Houses of Nagano-ken Northern Earthquake

村田 晶・大門 功昌・宮島 昌克・池本 敏和

In this study, seismic response analysis is conducted by the three-dimensional model considering the aseismic element for the traditional wooden house by Naganoken Northern Earthquake. It is considered the characteristics of traditional joint, earth wall and horizontal diaphragm stiffness, etc. It aims at acquiring the validity of damage presumption of the tradition wooden house in this earthquake from this analytical result.

18. 組積造壁の部分模型の静的荷重における耐震補強に関する研究*A study on seismic retrofitting under static loading on shear strength of masonry walls.*

山口 和輝・Reza Amiraslazadeh・池本 敏和・深田 幸史・宮島 昌克

As we know large numbers of URM structures around the world have not been designed for seismic loads and structural walls of these buildings were primarily designed to resist gravity loads. Therefore moderate to strong earthquakes can devastate entire cities or villages resulting in massive death toll and cause extensive losses. Hence retrofitting of these structures and improving their strength is significant and vital. There are different types of retrofitting methods for rehabilitation of brick walls. In this paper among these several types of retrofitting techniques, we tried to model center core method to see how efficient it could be on reinforcing brick walls against shear forces. For this reason experimental tests carried out on triplets in order to specify mechanical parameters of brick-mortar interface, and diagonal tensile test in order to define shear strength of masonry panels. Also in order to define mechanical properties of masonry components (brick, mortar and fiber concrete), tests were performed in line with the criteria of America.

19. 丹後加悦重伝建地区における防火意匠の現状調査*A survey on present condition of fire prevention design in Kaya District, Tango Kyoto*

金子 佳弘・中辻 浩介・向坊 恭介・平尾 和洋

In this paper, the present condition of fire prevention design of timber buildings in the Kaya district, which is registered as a traditional architectures preservation district, is clarified based on field survey, and a guideline for prevention of fire damage is proposed. Fire prevention design is here defined as ingenuity for fire prevention that has changed to a scenery motif with changing times. In the Kaya district, we can find fire prevention design on the external walls. However, some of the eaves and wooden fixtures are vulnerable to fire. Based on the difference of fire prevention performance between five local community units, suitable modification for each unit are proposed.

20. 江戸の地震火災における防火建築に関する研究*A Study on Earthquake Fire in the City of Edo, Fireproofing Japanese traditional town houses*

森下 雄治

Fireproof buildings in Edo include Dozo-zukuri (thick-plaster-walled) type and Nuriya (thin-plaster-walled) type. Originated from an architectural regulation in early Kyoho period, the fireproof buildings have taken roots to some extent in late Kyoho period. However, as these fireproof buildings had been aimed at just preventing accidental fire from spreading, a lot of thick-mortar-walled type buildings and Dozoes (storehouses) were damaged and burned down in the spreading fire triggered by Ansei-Edo earthquake in late Edo era. Being unable to take effective measures, Edo government had nothing but to wait for proposal of fire control manuals from communities.

21. ネパール・カトマンズにおける歴史的組積造建造物群の構造分類と地震リスク評価*Building Classification and Seismic Risk Evaluation for Historic Masonry Buildings in Kathmandu, Nepal*

古川 愛子・清野 純史・谷口 仁士・鈴木 祥之・土岐 憲三・辰巳 雅俊・H.R.Parajuli

Kathmandu Valley is a center of culture in Nepal. Unfortunately, a large number of historic buildings have been damaged due to earthquakes in Kathmandu over the centuries since it is located on the earthquake-prone zone. Especially, an earthquake which hit Kathmandu in 1934 had a magnitude over 8 and it destroyed most of the cultural heritage, such as temples, shrines and monuments. Jatapol is an old area in Kathmandu where many historic masonry residential buildings are built without special attention to earthquake. It is very important to leave those buildings for posterity. To take measures to save those buildings from earthquakes, it is necessary to evaluate their seismic risk. However, there exist no sufficient statistical data to evaluate the risk from the past earthquakes. With this background, this study aims to numerically evaluate seismic risk of buildings using the refined version of the DEM.

22. DEVELOPMENT OF PROBABILISTIC SEISMIC HAZARD MAP OF PENANG ISLAND, MALAYSIA

Mastura Azmi, Junji Kiyono and Aiko Furukawa

Evaluation of peak ground accelerations (PGAs) for Penang Island, Malaysia, was performed using probabilistic seismic hazard analysis. The PGA results were obtained using the model of Young et al. for moment magnitudes (Mw) lower than 8.0 and the model of Petersen et al. for Mw larger than 8.0. Amplification factors from bedrock to the surface were obtained by ground motion analysis using the SHAKE program and ground motion data collected at a nearby station. The results are PGA maps of Penang Island reflecting the 40%, 10%, 5%, and 2% probabilities of occurrences within 50 years.

23. 文化財所有者を対象とした人災・獣害の現状と防御システムに関する調査研究

A Study on Actual State of Disaster Defense System and Damage of Human-made Disaster and Animal-derived Cultural Properties

朴 ジョンヨン・崔 青林・金 玟淑・谷口 仁士

In late years, the damages of cultural properties by natural disaster (including the earthquake), human-made disaster (including the arson), animal (raccoon) in the Japanese Buddhist temple and Shinto shrine are reported frequently. The damage degree of cultural properties may remain on a small scale, but the heavy damage to lead to annulment of cultural properties designation due to losing their value as cultural properties. The purpose of this report is to clarify actual state of damage of human-made disaster and animal-derived cultural properties and disaster defense system for them by carrying out the questionnaire survey for the owner of the Japanese Buddhist temple and Shinto shrine, to build higher defense system of the future comprehensive cultural properties protection.

24. 火災発生情報を即時共有できる地域防災情報システムの開発

～ハードウェア開発と実証訓練を通じた防災活動指針の検証～

Research and Development of Regional Fire Disaster Information System and Operational Guideline for Effective Utilization by Citizens

大窪 健之・森 主成・福山 大典・深田 亮介・川合 誠

Once a fire occurs at a traditional wooden house like in the Preservation District for Groups of Historic Buildings, there is a serious risk of fire spread. And the community cooperation system for self-defense collapsed when aging proceeds, there is a possibility that the precious traditional streetscape is lost without quick alarm system. The aim of research is to develop a new disaster information sharing system by combining the existing facilities there, for sharing the information of fire in the area immediately by all of the community members, to improve the initial fighting capability.

25. 伝統的建造物群保存地区における防災活動指針に対する持続的な評価・改善手法に関する研究 ～与謝野町加悦地区を対象として～

Sustainable Evaluation Method for Disaster Prevention Activity Guidelines That Have Been Proposed in Kaya Historic District of Kyoto Pref.

和佐田 陵亮・大窪 健之・林 倫子・金 度源

In Kaya Historic District of Kyoto Pref., that disaster prevention activity guidelines have been proposed in March 2012. However, considered it is difficult to carry out ongoing activities to carry out the guidelines for local residents. Also, ongoing activities related to the improvement of regional disaster prevention force. There, it is need to create the action plan through workshops and to establish method to reevaluate the action plan and disaster prevention activity guidelines sustainable for carrying out the guidelines by local residents.

26. 京都の町家および民家と庭の特徴および防災対策

The Characteristics and Disaster Mitigation of Townhouses and their Openspaces in Kyoto

板谷(牛谷) 直子・山崎 正史・飯塚 隆藤・今江 秀史

World Heritage Site of Kyoto is well known as having a lot of designated and undesignated gardens. But the investigation of undesignated garden and open spaces of townhouses has not progressed. This paper aims to find the characteristics and disaster mitigation measure from the investigation of these in historic city Kyoto. At the result, we found that the planning composition of townhouses and their open spaces are affected by their production. And for disaster mitigation measure, city block of townhouses are linked by the open spaces and assistance measures. But now a day the relationship of these are being lost.

27. 既存の防災コミュニティ支援ツールによる地域の文化遺産防災への効果

Effects of Conventional Tools for Community-based Disaster Mitigation on Disaster Mitigation for Local Cultural Heritage

豊田 祐輔・鐘ヶ江 秀彦

Partnership between local cultural heritages and surrounding communities are essential for disaster management for urban cultural heritage. To find out a way to reach the partnership, this study aims at re-evaluating conventional tools for community-based disaster reduction. With a case study being local communities where temples as local cultural heritages are located, the study shows that the conventional tools let participating residents identify how the local cultural heritages contribute to the safety of surrounding communities. In doing so, the tools became tools for not only identifying the contribution but also promoting communication between local residents and local cultural heritages.

28. 世界遺産カトマンズ・パタン地区における地区防災計画を実践するための活動指針の提案 ー防災ワークショップによる住民評価を通してー

Study of the guidelines of activities for implemention of local disaster management plan in Patan, Kathmandu Valley as World Heritage Site - through the local residents' estimation by the workshop for disaster management -

長嶋 治樹・大窪 健之・林 倫子・幸野 郁・古川 真史

Patan, Kathmandu Valley as World Heritage Site, has the vulnerability for disaster such as fire and earthquake because of traditional urban structure formed by narrow streets, small entrances and the courtyards which are enclosed by old houses. Although the regional disaster management plan for this area was designed in 2011, it has not been sufficient as action plan because it has not been estimated its feasibility by local people as manpower for practice. This study aims to examine the evaluation method by local residents for regional disaster management plan through the implement of the workshop focused on the local community activities. In conclusion, this study has demonstrated feasible action plan for disaster management build on the results of the workshop.

29. 京都市「ちびっこひろば」の活用法の評価に対して防災的活用がおよぼす効果に関する研究

A study of evaluation structure on the "Chibikko-Hiroba as small community openspace for the purpose including disaster mitigation

五味 慶一郎・武田 史朗

Residents living in the vicinity of the Chibikko-Hiroba evaluate different types of event program designed for disaster prevention training and community building. Through SEM analysis, the evaluation structure model on the event program which includes the two latent variables, "recreational value" and "Instructiveness" is proved to be highly appropriate, and it is clarified that disaster mitigation training programs can increase the value of "Instructiveness" that then promote "recreational value", which ultimately encourages citizens to take part in the operation of the programs.

30. 歴史都市における減災計画のための道路ネットワークの脆弱性把握方法に関する研究

A method for estimating a vulnerability of road network in order to mitigate disaster in historical city

安 隆浩・塚口 博司・久下 紗緒里・小川 圭一

There are many historical heritages in Kyoto and over 50 million tourists a year have been visited in this sightseeing city. But, there are many active faults for example Hanaore fault. So many researchers expect a big earthquake will be happened in the near future. We estimated traffic situation during disasters by person trip survey data and questionnaire data about traffic behaviors on disasters. And we developed a method for estimating vulnerability of road network in order to mitigate disaster and compared estimated vulnerable area in this study with important road links to be estimated in former study. In the results, we found that isolated nodes and links might appear nearby important road links.

【報告】

1. 伝統的構法の古材・新材の仕口接合部の比較実験

Loading Tests of Traditional Aged Wooden Joints Compared with New Ones

棚橋 秀光・大岡 優・山崎 真理子・佐々木 康寿

The restoring force characteristics of aged existing wooden joints should be estimated accurately for seismic evaluation and reuse of existing traditional wooden buildings. The authors carried out loading tests of column-beam joints in a built-up state removed from two demolishing buildings, comparing with the same joints with new members for the restoring force characteristics. Some aged joints showed very poor stiffness and resistance depending on the looseness of joints. These results will contribute accumulation of structural databases of aged wooden joints for the seismic evaluation, reuse and conservation of traditional wooden buildings.

2. 安政東海・南海地震(1854年)による大阪湾岸での被害

—摂津国西成郡伝法村(現・大阪市此花区)の史料による—

The Damage Caused by the Ansei Tokai and Nankai Earthquakes (1854) in the Region Along Osaka Bay. According to the Documents in Dempo Village, Nishinari, Settsu Province (Now Konohana Ward, Osaka City).

長尾 武

This report analyzes the damage caused by the Ansei Tokai and Nankai earthquakes in the region along Osaka Bay-Dempo Village (now Konohana Ward, Osaka City). Dempo was situated by the Dempo River, which was one of the tributaries of the Yodo River. In Dempo, the damage to buildings was larger than in Osaka City. I estimated the seismic intensity at over 6+ in Dempo, and 5+ in Osaka City. The damage caused by the tsunami was minimal in Dempo. In Osaka City, many people who took refuge in boats, frightened by the earthquake, drowned in the tsunami. In Dempo, people also took refuge in boats, but then got out when the tsunami came. As the result no people drowned.

3. Comparison of Damaged Heritages in 512 Earthquake and 420 Earthquake

Hongtao Liu, Ruheng Wang, Yong Yao, Bin Jia, Ale Girá

A magnitude 8.0 earthquake caused severe damage of heritages in Sichuan Province in 2008. After 5 years, a magnitude 7.0 earthquake hit this area in 2013. Few heritages were damaged again. Comprising with the damage situation in these two earthquakes, this report will evaluate the problems of disaster preparedness. The purpose of this report is to study lessons of damage heritages after the earthquakes. Also it will be beneficial to the emergence management and protecting against and mitigating earthquake disasters.

4. 金山寺本堂の火災について

Report on the Fire of Main Hall of the Kanayamaji Temple in Okayama

金 玖淑・谷口 仁士

The main hall of Kanayamaji temple is located in Okayama prefecture and is built in the Momoyama period of Japan. And this building is designated as a National Treasure in 1923, became an Important Cultural Property under the Cultural Properties Protection Act (enacted in 1950). But the terrible fire occurred in this building on December 24, 2012. Therefore we carried out the field work investigation and the hearing investigation to the owner on February 6, 2013. This article reports the result based on two above investigations.

5. Fire Safety Analysis on the Historical Heritages with Southern Fukien Style -Example on Tainan Grand Matsu Temple in Taiwan

Tzu-Sheng Shen¹, Shen-Wen Chien, Cheng-Yen Li, Chia-Chun Chen, Tsung-Yueh Chen

In early years, due to the environmental style factor, many immigrants from Fukien residents crossed the strait, moved to Taiwan and built numerous Fukien Style Buildings including curtilages, temples, ancestral shrines and academies, etc. This is the reason why the ratios of the South Fukien Style Buildings are pretty high among the Historical Heritages. The history of Tainan Grand Matsu Temple, one of valuable historic sites in southern part of Taiwan, is more than three-hundred years, it is also an official temple, its building morphology is traditional Fukien Style and it is the representation of Fukien Style Building with times and structures in Taiwan. The target of this research is Tainan Grand Matsu Temple, using Fire Dynamics Simulator (FDS) to investigate Fire Safety Analysis regarding Southern Fukien Style Buildings as a reference for future fire prevention and protection. Based on this research, it is found that different fire locations may cause diverse losses, the more they are near the roofs, the more damages may have been caused owing to the structures' features which make heat accumulation more easily. Therefore, it is essential to prevent or remove the fire factors around the roofs, and use the fireproof paints to postpone the fire spreading and to extend the response times in order to protect such Historical Heritages.

6. DISASTER RISK ASSESSMENT TECHNIQUE AND CASE STUDY FOR TAIWAN'S HERITAGES

Shen-Wen CHIEN, Ya-Ning Yen, Chun-Chieh LIEN, Huei-Ru SIE³, Yi-Ting SONG

How to educate heritage managers and stakeholders to assess risks associated with their heritage using a simple method is an important issue in promoting disaster prevention disaster mechanism. Based on Taiwan heritages' vulnerability and preservation needs, this study developed a simple disaster risk assessment method. Using disaster risk assessment basis established both in Taiwan as well as internationally, a simple method is established allowing preservation specialists, heritage managers, and stakeholders to assess the heritage's risks for assisting daily management and achieve the heritage's preservation and disaster prevention goal.

7. 歴史的な消防水道管「本願寺水道」管路の診断 -管内検査による管更生の検討-

Investigation of The Historical Honganji-Water Pipelines for Rehabilitation Through Inside Corrosion Survey

金 度源・大窪 健之・西川 源太郎

The Honganji-Water Pipelines was devised as a fire fighting water supply system for the temple Higashihonganji in Kyoto on 1897. If this historical fire-prevention facility can be conserved, it also helps to wide fire fighting water supplyment in Kyoto city. In this study, by having to carry a pipe inspection on historical diagnose the corrosion situation in line, it is clarified feasibility of the pipe rehabilitation. A secured the data to predict the status that has been degraded through X-ray inspection, camera investigation, and sample testing. While the challenges of component testing for rust in cast iron pipe, this result of this study can be a sample index to predict the corrosion of modern pipelines heritages.

8. 歴史都市防災に関する論文の分類とその時系列的変化の分析

～歴史都市防災論文集を対象として～

Classification and Time-Series Change of Research Activities on Disaster Mitigation of Cultural Heritage and Historic Cities

高野 隼也・小川 圭一・塚口 博司・安 隆浩

This study focuses classification and time-series change of research activities on disaster mitigation of cultural heritage and historic cities, to know the current conditions of research activities and to consider the future activities on this field. Academic papers related with the research activities on disaster mitigation of cultural heritage and historic cities between 2007 and 2012 are classified from the viewpoints of objects, disasters and research fields. Then, time-series change of research activities are identified from the viewpoints of objects, disasters and research fields.