

歴史都市防災論文集 Vol.15

掲載論文・報告一覧

歴史都市防災論文集 Vol. 15 掲載論文・報告一覧

【論文】

1. 固有周期3秒を目指した1層伝統構法木造建物の検討

One-storied Traditional Wooden Structure with 3 Seconds Natural Period

山田耕司

The main hall of Japanese Buddha temple is a one-storied wooden structure. This hall demands that its base shear coefficient is over 0.25, and that its maximum deformation angle is 0.1. Because the natural period of this hall is less than 1.0 second usually. In this report, the hall with 3 seconds natural period is discussed. To make the natural period 3 seconds, The section of columns is supposed as 0.5 – 0.6 m square. The restoring force characteristics are supposed as the column rocking and the embedment of horizontal cross member. Results are as follows: 1) The large section and low height of columns are recommended. 2) The columns with 0.6 m square and 5 m height give the main hall the seismic design against almost all observed earthquake motions.

2. 每重裳階付き三重塔の構造特性に関する実験的研究 ～水平載荷位置・屋根荷重をパラメータとした静的水平載荷実験～

An Experimental Study on Structural Characteristics of Three Storied Pagoda with Pent Roof ~Static Horizontal Loading Which the Horizontal Loading Point and the Roof Load Regard as an Experimental Variable~

大橋佳祐, 中嶋裕典, 西澤英和

In this study, the 1/10 scale scaled model of the East Pagoda of Yakushiji Temple was built and static horizontal loading tests were conducted. The model consists of three layers, and the side columns of each layer are surrounded by a layer called pent roof, which is an unusual structural form. In this study, the deformation of the entire model was measured and analyzed at the maximum deformation angle of 1/60.

3. 明治修理前後の當麻寺東塔の構造改変に関する考察

Consideration on Structural Modification of Taimadera-temple East Pagoda Before and After of Meiji-repair

中嶋裕典, 西澤英和

In this paper, we will consider each layer about the structural changes and the accompanying changes in the members due to the introduction of the “Hanegi” in many buildings in the repair business after the Ancient Temples and Shrines Preservation Law. This time, the target building is “National Treasure Taimadera East Pagoda”. It was designated as a special protected building in 1897. The repair project was carried out from January 15, 1902 to September 30, 1903 by Junichi Tsuchiya, the Nara prefecture director engineer, and Jirokichi Yoshida, the chief engineer. In the repair project in the Meiji era, two types of drawings, an actual measurement drawing showing the state before the repair and a completed drawing showing the state after the repair, and a report to the Ministry of Education were created. It is a valuable resource for understanding the appearance of the tower before it was repaired. Using the drawings, we will consider what kind of changes have occurred in the east pagoda of Taimadera before and after the repair.

4. 乾燥収縮率および静弾性係数の違いが断面修復コンクリートにおけるひずみおよび応力発生に及ぼす影響

Effect of Drying Shrinkage and Static Modulus of Elasticity on Strain and Stress in Patched Concrete

平田佳奈実, 金侖美, 福山智子

In general, a repaired concrete can re-deteriorate in few years because properties on drying shrinkage and static modulus of various patch materials and concrete are different, and stress generation on the repaired interface induces re-deterioration. In this study, we,

therefore, examined the effect of drying shrinkage and static modulus on patch material and concrete on the strain and tensile stress, to understand the mechanism of re-deterioration. The experimental results indicated that the smaller static modulus of patch material gets the smaller tensile stress and makes the smaller interfacial peeling and surface cracking.

5. 壁土の圧縮強度の寸法効果

Size Effect of Compressive Strength on Mud Plaster

山田耕司, 木下航輝

There are some feature sizes of mud plaster strength in former studies. Concrete has the size effect on its strength because of its coarse aggregate. In this paper, the size effect of compressive strength on mud plaster is researched. The results are as follows.

1. The compressive strength of the mud plaster without fiber does not depend on both its sectional area and its shape of cross section.
2. The compressive strength of the mud plaster with fiber depends on both its size and its form.

6. 曲げ変形を受ける断面修復コンクリートの補修範囲が早期劣化に及ぼす影響

Effect of Repair Range of Patched Concrete with Bending Deformation on Premature Deterioration

神代康輔, 金侖美, 吉富信太, 福山智子

RC buildings deteriorate over time. It has been reported that when the deteriorated part is repaired by the patched repair method, it deteriorates again. In historic buildings, the phenomenon of premature deterioration of repaired parts can adversely affect existing concrete. Therefore, it is necessary to carry out the construction by an appropriate repair method. In this study, we performed a numerical analysis of the stress-strain relationship considering the morphological conditions of the repaired part. As a result, it can be seen that deterioration of the existing concrete can be prevented by repairing a wider area than the deteriorated part.

7. 面格子壁を用いた土蔵の耐震補強工法に関する実験的研究

Experimental Study on the Seismic Reinforcement Method of Clay Storehouse Using Wooden Grid Wall

瀧野敦夫, 村本真, 中村航

In this paper, as a new method of seismic reinforcement for clay storehouses, we proposed a reinforcement method that a wooden thin grid wall is attached to the outer side of the clay wall, and the structural performance of this method was verified by an experiment. In this testing result, the shear failure of the column base occurred due to the insufficient shear strength of the wood screws. Therefore, during the actual reinforcement, it is necessary to prevent the shear failure of the column base by connecting the reinforcement to the existing frame. In addition, because the used wooden grid wall was very thin, it is necessary to take measures against buckling.

8. 炭素繊維を混和したセメントペーストの圧電特性に関する基礎的検討

Basic Study on Piezoelectric Effect of Cement Paste Containing Carbon Fiber

Ma Jiachen, 福山智子, 金侖美

To grasp mechanical properties of reinforced concrete (RC) structure, core fracture test is often adopted. Since core sampling requires structural damage, a structure self-monitoring is desirable to assess mechanical properties. The purpose of this study is to develop a self-monitoring method utilizing piezoelectric effect. In this paper, the effects of water content and W/C on the cement paste's piezoelectric properties containing carbon fibers (CF) are examined. Results show that the samples added with CF have good piezoelectric properties in the wet state. However, the self-monitoring of RC structure needs further research about the influence of CF length and content on cement mortar piezoelectricity.

9. 含水状態や載荷条件がモルタルの圧電効果に及ぼす影響*Effect of Water Content and Loading Conditions on Piezoelectric Properties of Mortar*

出口侑弥, 金侖美, 福山智子

In recent years, piezoelectric materials have been attracting attention for diagnosing structures. However, conventional piezoelectric sensors are expensive and have durability limitations. Therefore, the authors consider concrete itself as piezoelectric sensor and examine the possibility of performing maintenance without damaging historic buildings. This paper aims to figure out how water content and loading speed affect piezoelectric characteristics of mortar. The results reveal that water content and loading speed play important roles in charge transfer and piezoelectric electricity generation.

10. 修正 I-D 法による斜面崩壊危険度予測の精度向上に向けた一連の降雨イベントの設定に関する検討*Consideration of Setting up a Series of Rainfall Events to Improvement of Hazard Prediction Accuracy on Slope Failure by Modified I-D Method*

檀上徹, 酒匂一成, 藤本将光, 石澤友浩, 伊藤真一, 深川良一

A prediction method of rainfall-induced slope failure using a Modified I-D Method is employed, and the accuracy of the prediction method is analyzed in the paper. The Modified I-D Method is one of rainfall indexes, and the rainfall duration and its average rainfall intensity are used as the rainfall index. These rainfall indexes are influenced by the definition of the series of rainfall. The optimum duration of the series of rainfall to obtain a prediction result of high precision is discussed in this paper.

11. カーボンナノチューブのセメントペースト中への分散状況の定量評価に関する検討*Quantitative Evaluation of Carbon Nanotubes Dispersion in Cement Paste*

福山智子, 金侖美, 山田悠二, 田中章夫

Carbon nanotubes (CNTs) are used for concrete reducing cracks and increasing strength and sensors for traffic monitoring. However, since CNTs tend to agglomerate in water, CNT must be dispersed sufficiently and homogeneous to use CNT economically and effectively. However, it is difficult to grasp the dispersion condition of CNTs in water visually. In this present study, we considered methods to quantify CNT dispersion status in water and cement paste by image analysis and showed that percentage of CNTs black area represents dispersion condition in water.

12. 兵庫県豊岡市出石地区における流木を伴う洪水氾濫検討*Flood Runoff Analysis with Consideration of Drift Woods at Izushi-cho, Toyooka City*

井上雄登, 山田脩策, 藤本将光, 里深好文

Recently, flood and sediment disasters due to heavy rain have been increasing. Land use in boundary areas between mountains and plains is a factor of the risk of damage increase. Izushi area, Toyooka City is one such place, but it is also designated as a Important Preservation District for Groups of Traditional Buildings, and the conservation of the district is crucial. Therefore, we verified the effectiveness of an existing flood bypass, and further examined the case where the driftwoods stopping facility installed at the entrance of the bypass was clogged in the event of a flood disaster beyond expectations

13. 歴史的建造物の含水分布検知に向けたコンクリート用電気インピーダンストモグラフィ実現に関する基礎的研究*Basic Study on the Implementation of Electrical Impedance Tomography for Concrete to Estimate the Moisture Content Distribution of Historical Structures*

金侖美, 福山智子

It is important to grasp water content distribution of concrete for maintenance of structures. This study aims to apply electrical impedance tomography (EIT) to concrete as a non-destructive inspection method for historical structures. It is necessary to figure out effects of water content and cracks on impedance as traverse lines for EIT image construction. In this study, we conducted measurements on cement mortar specimens with 12 pairs of electrodes.

We clarified the need to increase applied voltage to measure high impedance cement mortar and showed possibility to detect embedded materials.

14. 別府市鉄輪の空き家活用による防災・減災の可能性に関する基礎的研究

Basic Research on the Possibility of Disaster Prevention and Mitigation by Utilizing of Vacant Houses at Kannawa in Beppu City

木村智, 大坪真子, 平尾和洋

The subject area taken up as a case study in this research is Kannawa district, Beppu city. Its area has a lot of vacant houses that were damaged by the 2016 Kumamoto Earthquake. In recent years, the utilization of vacant houses is gradually progressing in Beppu. Seismic repairs are rarely included in the utilization of vacant houses, but if they are done at the same time, they may lead to disaster prevention and mitigation in the area. In this study, we clarify the current situation of vacant houses and evacuation shelters in the target area, and consider the possibility of disaster prevention and mitigation of the vacant houses utilized.

15. 街路をまたぐ燃え広がりに対する平入町家の延焼抑止性能評価と要因分析

Evaluation and Factor Analysis on the Performance of Traditional Townhouse with Side-Gabled Roof Against Fire Spread from Across the Street

遠藤裕太郎, 大窪健之, 金度源

In many historic areas of Japan, traditional townhouses with side-gabled roof are in line with both sides of the street. According to one theory, it is believed that such a streetscape has been created historically to prevent the fire spreading from across the street ; however, the effectiveness is not revealed. In this paper, to evaluate effectiveness of fire spreading mitigation caused by traditional houses with side-gabled roof, the analysis of fire spreading was conducted for each one constructed in early modern and modern period using mathematical fire spread model based on fire experiment. The result shows that early modern's one delay the fire spread compared to modern one. The result indicates that the eaves height of townhouse influence the speed of fire spreading.

16. 姫路城の周辺街路における天守・石垣・櫓の見え方の定量的分析 —歴史的景観保全と復興事前準備に向けた基礎的研究—

A Quantitative Analysis on the Visibility of the Castle Tower, Stone Wall and Turret of Himeji Castle : Basic Research for Historic Landscape Conservation and Reconstruction Preparations

藤井健史, 大下玲音

In this study, we will quantitatively analyze the visibility of Himeji Castle in the streets around Himeji Castle as a basic study for preserving the historical landscape of Himeji Castle and preparing for reconstruction. We use a 3D CG model and a calculation program to geometrically calculate the visibility of the castle tower, stone walls, and turrets in the streets around Himeji Castle, and grasp their distribution. In addition, the Himeji Castle landscape is classified based on the calculation results of the visibility of the castle tower, stone wall, and turret, and the distribution of each landscape type is also analyzed.

17. 史跡等に所在する復元建造物における火災対策の現状と課題 ～未指定文化財を火災から守り伝えるために～

Current Status and Issues of Fire Countermeasures in Rebuilt Buildings Located in Historic Sites To Protect and Convey Undesignated Cultural Properties from Fire

長谷川諒, 大窪健之, 金度源

In Japan, many important cultural properties are built of wood and the risk of fire is extremely high. Although rebuilt buildings located in historic sites have a high risk of fire, fire countermeasures and fact-finding surveys have not been sufficiently conducted compared to designated cultural properties. In this study, the situation of the recent cultural property fire and rebuilt Shurijo Castle fire and the fire prevention management system of the rebuilt buildings were investigated. These investigations clarified the current status and issues of fire countermeasures for rebuilt buildings.

18. 震災時の延焼火災に備える水源確保と消火可能範囲に関する研究 –伝統的木密地域を有する京都市上京区を対象として–

Study on Water Resources Used Against Widespread Fire After Earthquakes and Study on Effective Range of Fire Fighting Activities at an Earthquake – Case Study of Traditional High-Densitized Urban Areas in Kamigyo-ku, Kyoto –

松本昂大, 大窪健之, 金度源

The purpose of this study is to evaluate the possibility of widespread fire because of destruction of fire-hydrants and roadblocks on narrow roads, so there were wide range of fire at the Great Hanshin-Awaji Earthquake. There are a large number of wooden buildings and numerous narrow roads in the city of Kyoto. The fact was shown in order to proceed following steps that calculating the amount of fluid flowing in a river and making the effective range of fire extinguishing considering these obstructions against fire-fighting and natural water supply.

19. 出石旧城下町の歴史的災害による罹災範囲の復元的考察

A Reconstructive Consideration of Areas Damaged by Historical Disasters in Izushi, Old Castle Town

吉川奎, 青柳憲昌

In this paper, the history of disasters in the early modern period of Izushi and the restoration of the damaged area are examined based on the local history literature. The research area, Izushi Town, Hyogo Prefecture, prospered as a castle town in that period, and has been recognized as having great traditional importance building group because it still retains its appearance. This paper considers the damage caused by past disasters based on the descriptions in the literature, and the mechanism of flooding of the Taniyama River and taking into account examining the extent of damage caused by fires in 1876 and 1823, and floods in 1722 and 1850. As a result, the area affected by the fires of 1876 and 1823 was reconstructed. This paper confirms that the fire of 1876 was a large-scale fire that covered the entire old castle town, but there is a high possibility that some areas escaped the fire. Furthermore, the damage caused by the floods of 1722 and 1850 was analyzed and shows that the flood flowed through Zaimoku-machi and Iki-machi, into Uchi-machi and the inner moat, and overflowed from the west end of the inner moat into Tainosho-machi.

20. 京都駅周辺地域を対象とした社寺の防災拠点活用に関する評価 –広域災害時に不足する帰宅困難者への支援の補完を想定して–

A Study of the Capacity for Accepting Stranded Commuters Using Temples Around the Kyoto Station, Japan

金度源, 清水弘樹, 大窪健之

This case study focuses the capacity of the temples for using as evacuation places and shelters near the Kyoto station. Japanese traditional temple has the important function of the assembly place or hall so that these potentialities can support the over tourist evacuees to stay for the first stage on post-catastrophic disaster. The study could classify and evaluate the potentiality of post-disaster response resources existing and the management system by the result of both questionnaire and interview survey for the community activities and both indoor and outdoor spaces of the temples.

21. 都市縮小時代での伝統的建造物群保存地区の社会的脆弱性と今後のコミュニティ防災に関する考察 –豊岡市出石伝統的建造物群保存地区を事例として–

A Study on Community-Based Disaster Management for the Preservation District for Groups of Historic Buildings with Increasing Social Vulnerability amid Urban Shrinkage: A Case of Izushi, Toyooka City, Japan

大橋弘明, 留野僚也, 豊田祐輔, 酒井宏平, 鐘ヶ江秀彦

In Japan, the continuing progress of urban shrinkage has been increasing social vulnerability in the Preservation Districts for Groups of Historic Buildings, which are designated under the Law for the Protection of Cultural Properties. This increase has led to a weakening of community capabilities for disaster management and resulted in a difficulty of preserving

traditional assets for next generations. This research explores the Izushi Preservation District for Groups of Historic Buildings as one of transformation patterns based on an investigation into the possible futures of the preservation districts across the nation, and addresses desirable policy and planning approaches for the restructuring of community-based disaster management systems for the preservation districts in an era of urban shrinkage.

22. 感染症拡大状況下におけるオンライン防災訓練の有効性に関する評価 ～豊岡市出石重伝建地区を対象として～

Evaluation of the Effectiveness of the Online Emergency Drill Under the COVID-19 Pandemic Case Study in Toyooka-shi Izushi Preservation District for Group of Traditional Architectures

千葉陵平, 大窪健之, 金度源

Because of COVID-19 pandemic in Japan, it is difficult to hold the emergency drill of conventional form which many people gather in one place. In this kind of situation, the online emergency drill is one of alternatives to improve the skills of disaster prevention while avoiding closed spaces, crowded places and close-contact settings. This study aims to evaluate the effectiveness of the online emergency drills and suggest the improvement measures for future.

23. 小学校・中学校・高等学校の防災教育における地域連携の現状と課題 ー千葉県を事例としてー

Current Issues of Community Cooperation for Disaster Education in Elementary, Junior High, and High Schools: A Case Study in Chiba Prefecture, Japan

八巻栞

This study examined the current issues of community cooperation for disaster education in elementary, junior high, and high schools in Chiba Prefecture, Japan. The results of the analysis of the reports on practice models of disaster education in Chiba Prefectural schools are as follows: 1) Most elementary schools achieved the disaster education goal, which means that pupils were able to look after themselves and others in self disaster mitigation. 2) Most junior high schools also achieved the educational goal for mutual disaster mitigation, which means that, for example, students in some junior high schools shared useful skills and knowledge on disaster prevention with their peers. 3) In almost all high schools, a lack of community cooperation was found; however, high school students tended to take up important leadership roles in disaster prevention activities.

24. 地域コミュニティに内在する防災と文化遺産保全の隔たり ー都市縮小段階をむかえた京都市を事例にー

A Gap Between Disaster Management and Cultural Heritage Conservation in Local Communities: A Case of Kyoto City in an Era of Urban Shrinkage

留野僚也, 大橋弘明, 豊田祐輔, 酒井宏平, 壽崎かすみ, 鐘ヶ江秀彦

This research explores the relationship between the activity fields of disaster management and cultural heritage conservation in Kyoto City, which is confronting urban shrinkage, from the perspective of local communities. It is, through the analysis of text mining, identified that these two activity fields have tended to be segregated between nonprofit organizations and neighborhood community associations, both of which are the key players in local communities. In conclusion, we suggest that, for the better functioning of the disaster management of cultural heritage, it is vital to create more sophisticated linkages between these two key players while promoting more locality-oriented revitalization.

25. The Social Reduction of Risk: History, Tangible, and Intangible Heritage in Minamisanriku, Japan

Wesley Cheek

Sociologists have detailed what they term the 'social production of risk' (1) (2). This means that disasters are not natural occurrences, rather they develop from social processes. We can see from the history of Minamisanriku how risk was socially produced. Early populations moved

down out of the mountains to the seaside. From there they filled in land closer to the ocean. However, through these same accounts we can observe what could be called the 'social reduction of risk.' Through community reactions to previous tsunamis, the town relocated important buildings to higher ground. That these social reductions of risk were swathed in ritual behavior that was familiar to many people in the area enabled the actions.

26. 歴史都市金沢市での立体駐車場を活用した洪水時避難の有効性評価 ～感染症対策を考慮した車両による垂直避難の可能性～

The Capacity of Multistory Parking Garages for Using as Evacuation Site in Case of Flood Disasters at Historic City, Kanazawa

大窪健之, 堀田育美, 金度源

Existing evacuation shelters can be high risk places of COVID-19 due to high density of evacuees. And risk of flood damages is increasing recently therefore more evacuation sites are needed. In this situation, multistory parking garages can be evacuation destinations and evacuees can use each car for temporary evacuation space. This study evaluated the capacity of multistory parking garages as evacuation sites in flood disasters by a questionnaire survey for each manager of parking and a field survey of the each surrounding environment. This study aims to expand the possibilities of decentralized evacuation for dwellers and visitors in historic city, Kanazawa.

27. 木造密集市街地における避難シミュレーションを用いた路地の安全性評価法に関する研究

A Research on Alley Safety Evaluation Method Using Evacuation Simulation in Densely Built-up Wooden Area

角井孝行, 宗本晋作

The purpose of this paper is to provide a safety evaluation method for blind alleys in historic districts using evacuation simulation. This paper applies this method to the case of the north district of Kyoto city, where the wooden houses are standing close to each other and the most blind arrays remain. In our simulation, the width and length of the street, the population of the district, the location of the accommodation and the capacity are accurately represented on the map. The safety of alleys is evaluated by comparing the number of people passing by with and without utilizing alleys that can be passed through. We demonstrated proposed method by evaluating the possibility of passage of the found routes by the field survey.

28. 歴史都市における道路整備の時期と道路構造による交通事故多発状況の比較 —京都府と滋賀県を対象として—

Comparison of the Situation of Traffic Accident Frequency by the History of Road Construction and the Characteristics of Road Structures in Historical Cities -Case Study in Kyoto Prefecture and Shiga Prefecture-

溝口万里江, 小川圭一

In historical cities, land use extends back to ancient times, and the roads have been constructed for the traffic of citizens accordingly. Previous studies have pointed out the relationship between the history of road construction and traffic accident frequency, such as the phenomenon that residents tend to cross new roads based on their historical behaviors, causing traffic accidents. In addition to the behavior of residents, the history of road construction is considered to affect the characteristics of the road structures. Thus, this study aims at analyzing the relationship between the history of road construction, characteristics of the road structures, and traffic accident frequency in historical cities.

29. 観光スポットにおける訪日観光客に対する地震防災対策の枠組み —多数の訪日観光客が訪問する清水寺を事例とした基礎研究—

A Framework for Earthquake Disaster Management for Foreign Tourists at Tourist Spots: A Foundation Study at Kiyomizu-dera Temple Visited by Many Foreign Tourists

陸歆, 豊田祐輔

Foreign tourists to Japan are commonly defined as the vulnerable group in disaster.

Therefore, it is important to consider how to ensure their safety. The purpose of this study is to propose a framework for earthquake disaster management for foreign tourists at tourist spots. The tourism spot was defined in this study as sites of tourist destination such as temples and shrines. The framework was induced from previous studies and lessons with focus on Kiyomizu-dera Temple and the relevance between a series of disaster management taken by the tourism spots and the foreign tourists, leading to appropriate disaster management activities. An internet questionnaire survey and an interview with Kiyomizu-dera Temple were conducted, and data was inputted into the framework, finding that the framework could provide outputs which the tourism spot should take for foreign tourists.

30. 消費者余剰の推定による観光資源としての京都市内の文化遺産の価値の考察

A Study on the Evaluation of Urban Cultural Heritage as Tourist Attractions in Kyoto City by Estimating Consumer Surplus

森祐輔, 小川圭一

It is necessary to make clear the necessity of cultural heritage disaster mitigation in disaster mitigation planning in historical cities, to reach a social consensus about protecting urban cultural heritage from natural disaster. For this purpose, it is necessary to show the necessity of cultural heritage disaster mitigation in historical cities objectively and quantitatively. In this paper, evaluation of cultural heritage as tourist attractions in Kyoto City is estimated using travel cost method. As a result, it is shown that consumer surplus of tourists makes up a large share of the evaluation of cultural heritage as tourist attractions.

31. 中央アジア・ザラフシャン川流域における 1960 年代以降の遺跡環境の変化 — CORONA 衛星写真と Google Earth の判読から —

Changes in Archaeological Site Environment Since the 1960s in Zarafshan Valley of Central Asia: Result of Interpretation of CORONA Satellite Imagery and Google Earth

宇佐美智之

This paper focuses on the monitoring of archaeological site environment since the 1960s in Zarafshan valley, one of the most important and the largest oases in Central Asia. A rapid and huge landuse change occurred due to the agricultural intensification and other human activities for the last several decades in oases of Central Asia, and it has led to the massive destruction of archaeological sites and cultural resources. The paper presents a preliminary interpretation of changing archaeological site environment in Pakhtachi region located in mid-Zarafshan valley as a case study, with the use of CORONA satellite imagery and Google Earth.

32. アユタヤ Wat Krasai 仏塔の保全に関する一考察

Consideration on Conservation of the Wat Krasai Pagoda in Ayutthaya

石田優子, 伊藤肇, 深川良一

The Wat Krasai pagoda in Ayutthaya, Thailand, inclines mainly toward the north. The soft clay in the foundation ground and the deterioration of the bricks and joint mortar that composed the pagoda are the main causes of the deformation. In 2013, the lower part of the pagoda was covered with new restoration bricks and the base was reconstructed. The purpose of this study is to extract the necessary considerations on the occasions in the restoration plan based on conditions of the pagoda after restoration for better conservation of similar brick buildings. The results show it is important to consider surface protection, drainage planning, and the additional weight of new bricks.

33. 2015 年ゴルカ地震後の公的な災害対応体制と自主的避難所の運営 ネパールの歴史都市パタンにおける地域資源を活かした災害対応マネジメントに関する研究

Governmental Disaster Response System and Management of Spontaneous Emergency Shelter after the 2015 Gorkha Earthquake -Study on Disaster Response Management Utilizing Local Resources in Historic City Patan, NEPAL-

サキヤラタ, 大窪健之, 小川和馬, 金度源

This paper purposes to obtain knowledge on the ideal way of disaster response management

in densely populated urban areas of historic city in Nepal. Firstly, based on a literature review, the legal system on disaster countermeasures and the governmental disaster response framework focusing on operation system of the emergency shelters quick after the 2015 Gorkha Earthquake is clarified. Secondly, case studies of spontaneous emergency shelters created in historic courtyards that managed by local community is introduced. As a result, the huge lack of consideration of emergency shelter management on governmental framework is figured out. The spontaneous emergency shelters' operation was handled by local community very well in the case study area utilizing their existing area management system. It proves that local community has potential to manage the emergency shelters but various governmental and other organization's support is also essential to provide good environment and sustainable service to victims.

【報告】

1. 伝統木造建物における柱脚の滑りを考慮した解析モデルの検討

Examination of Analysis Model Considering the Characteristics of Slipping Column Bases in Traditional Wooden Buildings

中本蒼馬, 向坊恭介, 吉富信太

It is an urgent problem to estimate the seismic performance of traditional wooden buildings in order to give them enough performance especially to avoid severe damage of traditional wooden buildings due to expected large earthquakes. The purpose of this study is to examine the validity of the seismic analysis method by comparing responses of experimental shaking table test and numerical analysis. For this purpose, detailed three-dimensional analysis models are conducted that consider the sliding and uplifting characteristics at the base of column of shaking table test specimen with eccentricity and soft floor. Based on the constructed analysis models, the effects of model parameters, i.e. wall stiffness, floor stiffness, base stiffness and base friction ratio, are examined.

2. 宮大工の技術的暗黙知の多角的保存と可視化 – Human Computer Interaction 技術を用いた伝統技術の継承–

Preservation and Visualization of Carpenter's Technical Tacit Knowledge -Succession of Traditional Techniques with Human Computer Interaction-

小島尚之, 山田悟史

At present, one of the problems in Japanese building industry is decrease and aging of the carpenter population. Especially, "Miyadaiku" who are carpenter connected with temples and shrines have the most serious problems. Therefore, it is necessarily to make new indicator to learn Miyadaiku's techniques. In this research, we verify the effects that three kinds of carpenter's tools (Dai kanna, Nokogiri and Yari kanna) affect Miyadaiku from three points of view (muscle strength, motion posture and gaze point). Through this verification, we investigate Miyadaiku's delicate skills that they do instinctively.

3. 彦根銀座商店街における防災建築街区の現況とその活用の可能性

Research on Current Situation and Possibility of Renovating Disaster Prevention Building District in Hikone Ginza Shopping Street

阿部俊彦, 小野雄翔, 西井智哉

This study targets the Ginza Shopping Street in Hikone City, Shiga Prefecture, which was constructed by the Disaster Prevention Building District Creation Law from around 1961 to 1973. First, we will clarify the current state of the Street by referring to the survey conducted by Hikone City up to last year. Next, interview the landowners, shop owners, and residents to clarify the issues. Furthermore, we propose a method to reuse the disaster prevention building district, which has been regarded as a negative heritage, not only by rebuilding but also by renovation. Then, the landowner, shop owner, and residents will evaluate the proposal. From the above, we consider the feasibility of the proposal.

4. 文化遺産防災マニュアルの改訂に向けた一考察 ～都道府県・政令指定都市が発行した文化財を対象とする災害対策マニュアルの運用事例調査を通して～

A Study for the Disaster Risk Management Manual of Cultural Property on Japanese Prefectures and Ordinance-Designated Cities, to the Purpose of Revision of the Handbook for Disaster Mitigation of Cultural Heritage, R-DMUCH

金度源, 山口葵, 大窪健之

In March 2013, Handbook for Disaster Mitigation of Cultural Heritage was compiled as a result of the Global Center of Excellence (G-COE) Program of Disaster Mitigation for Historical Cities, Ritsumeikan University. 6 years passed since the handbook was published, the research of disaster mitigation for urban cultural heritage have been progressed. The necessity to reflect the results of the research has been increasing. This study targeted the manuals for disaster risk management of cultural property which has been published by Japanese prefectures and ordinance-designated cities. The study organized the causes of the difference in the background, the feature and the contents. The manuals need to consider the change in disaster mitigation in recent years and the differences of users.

5. 世界遺産樂山大仏の洪水被害と防災対策の研究

Study on Flood Damage and Disaster Prevention Measures of World Heritage Leshan Giant Buddha

門意偉, 唐玉佳, 劉弘濤

In August 2020, an extreme heavy rain occurred in the whole country of China. Sichuan Province became the center of the heavy rains. Leshan Giant Buddha of World Natural and Culture Heritage is located in the southwestern of Sichuan Province. After the flood caused by rainstorm, Leshan Giant Buddha was submerged by the foot for the first time in a century, and each part of the body was suffered in different damage. The purpose of this study is to investigate the flood damage situation, the damage mechanism of the Leshan Giant Buddha and the flood prevention measures of the Great Buddha.

6. Study on Typhoon Damage and Renovation of Cultural Relic Buildings in China -Taking Honglincuo as an Example-

Wenjiang Zou, Shanshan Zhu, Yiwei Men

Typhoon frequently hits China's southeast coast, causing damage to a large number of historic buildings. In the process of participating in China's 13th Five-Year National Key Research and Development Program "Study on Natural Disaster Risk Assessment and Emergency Disposal of Immovable Cultural Heritage" (2019YFC1520800), found that Fujian, located in the southeast coastal area, is affected by typhoon disasters, and the disasters characteristics and protection and restoration work of cultural relic buildings are representative in the region. Honglincuo, the provincial cultural relics protection unit in Fujian as the research project, based on literature and information, it analyzes damage characteristics and renovation process of the buildings after the disaster. Furthermore, three suggestions are put forward including improving the policy, regulation system and disaster prevention technology, establishing the disaster prevention and protection mechanism, and enhancing the protection management and public participation.

7. Research on Disaster Damage of Immovable Cultural Relics in China in Flood Season of 2020

Peijia Sun, Hengyu Wang, Yiwei Men, Hongtao Liu

2020 China floods were the worst in more than two decades, causing severe damage to immovable cultural relics. Through a large number of literature collection, the damage relics affected by floods in China in 2020 was summarized and sorted. The damaged immovable cultural relics are summarized into three types: ancient bridge, ancient architecture and ancient site. The typical damaged cultural relics, such as Zhenhai Bridge, Rainbow Bridge, Wind-rain Bridge, Guanyin Pavilion and Xiangyang City Wall, are listed in the form of pictures and texts. Finally, the problems existing in the protection of immovable cultural relics are summarized, and three conservation suggestions are put forward.

8. 常時微動計測を用いたイラン・聖タデウス教会の振動特性評価

Evaluation of Vibration Characteristics of Church at Monastery of St. Thaddeus in Iran Using Microtremor Measurement

東澤航平, 池本敏和, 宮島昌克, Abdolhossein Fallahi

Currently, 60% of the world's population resides in masonry structures, several of which are constructed using bricks of inferior quality. While inexpensive to construct, masonry structures are vulnerable to earthquakes. There are world heritage sites of stone structures in Iran, and it can be said that there is an urgent need to consider seismic measures to protect these structures. The authors observed the microtremors of St. Thaddeus in Iran. The safety of St. Thaddeus was evaluated from the characteristics of the church building and the ground surface using the results of microtremors. As a result, it is speculated that the church may collapse due to again and earthquake.

9. 世界文化遺産パタン地区での行政と地域による防災対策の連携に関する研究

Research on Cooperation Between Government and Local Disaster Prevention Measures in the World Cultural Heritage Patan Area

小川和馬, 大窪健之, サキヤラタ, 金度源

On April 25, 2015, the Gorkha earthquake occurred in Nepal and hit Patan district designated as World Cultural Heritage. The evacuation life was run mainly by the local community (Tole), but it was found that there was a limit to support due to disparities. Therefore, in this research, we clarified the relationship in which the local community can receive appropriate support by implementing disaster prevention support activities proposed in the past in collaboration with the government. We have compiled guidelines for disaster prevention actions for the government and local communities to cooperate in providing disaster prevention support in the event of a disaster.

10. Sustainable Geodesign of the Urban Cultural Heritage of Alexandria, Egypt Vision 2030: Homogeneity of Authenticity and Modernization

Mohamed Soliman, Tomoyuki Usami, Satoshi Imamura, Keiji Yano, Hrishikesh Ballal

Cosmopolitanism, geostrategic location, and over 2300 years of human activity have formulated the cultural heritage diversity of Alexandria since its foundation in 332 BC. However, centralization and contemporary social behavior raise the commercial value of Downtown Alexandria, which impact on its urban cultural heritage. Geodesign methodology and application provide a design framework of sustainable planning and supporting technology to leverage geographic information, resulting in designs that follow natural systems. Therefore, Geodesign Alexandria project could change mindset to preserve the authenticity of its historical urban fabric and merge it to the (NSDS), Egypt vision 2030 using interdisciplinary systems.

11. Study on Adaptive Disaster Prevention Strategy of Tibetan Traditional Village -A Case Study of Shuzheng Village in Jiuzhaigou Valley, World Natural Heritage Site-

Jianyu Yang, Bin Shi, Hongtao Liu

The security and stability of villages have an important impact on the sustainable development of heritage sites in the World Natural Heritage Site. The spatial distribution relationship between geological disasters such as debris flow and landslide and village was sorted out through investigation and GIS simulation. The village's fire risk problem was analysed in combination with the construction materials and distribution of the village. Based on the risk identification, this paper systematically summarized the specific practices and experiences of village pre-disaster prevention, planning layout, engineering implementation and disaster management.