

歴史都市防災論文集 Vol.14 掲載論文・報告一覧

【論文】

1. 通し柱を考慮した限界耐力計算について

Calculation of Response and Limit Strength in Consideration of Continuous Columns

山田耕司

The traditional Japanese wooden structure collapses at its 1st floor in the calculation of response and limit Strength. To prevent the structure collapse at a given floor, equation of every story deformation angle is required. The continuous column of heavy timber over than 180 mm square is projected to average story deformation angles. In this paper, the calculation method for the section size of continuous columns is proposed. Results are as follows: 1) The calculation method for the section size of continuous columns is consist of 2 equations: the equation for flexure capacity and the equation of difference between defomation angles. 2) The proposed method decreases the negative gradient of a Sa-Sd curve

2. 柱脚浮き上がりを許容した壁を含む架構の水平耐力の実験的検証

Tests for Resisting Force Characteristic of a Bearing Wall without Fixing on its Foundation

山田耕司

A bearing wall needs the fixing the wall on its foundation to resist the horizontal force. But the column of a Japanese traditional wooden structure is not fixed on its foundation. In the previous paper, the resisting force calculation method of a mud plaster in a wooden frame without fixing the bottom of a column is proposed. In this paper, 1/2 scale test pieces are loaded to present the facual evidence of the proposed method. Results are as follows: 1) The 1/2 scale tests show the effects of both dead load and the stiffness of beams. 2) The proposed method also gives rhe storey displacement against test results using the MOE of beams.

3. 柱の傾斜復元力特性を含む礎石建ち板壁構面の繰り返し載荷実験

Cyclic loading tests of traditional timber frames with board wall on foundation stone including restoring force characteristics of column rocking

瀧野敦夫・佐藤滯・日比野惇・江南桃・宮本裕司

In this study, we conducted the horizontal shear loading tests of the board wall on foundation stone under the axial compressive force acting on columns. Under low axial force, there was almost no difference in strength with or without board walls. This is likely due to the fact that the columns were pushed horizontally by the compressive resistance of the board walls and therefore the board walls did not resist effectively. Under high axial force, the horizontal deformation of the column was suppressed due to the increased frictional force of the column base, and it was confirmed that the strength was increased by inserting the board walls compared to the specimen under low axial force.

4. 木材の部分横圧縮のひずみ硬化のメカニズムとシミュレーション

Strain hardening mechanism of lateral partial compression of wood and its simulation

棚橋秀光・鈴木祥之

This paper shows the mechanism of the strain hardening which is found in the behaviors of lateral compression in wood. The strain hardening behaviors have already been examined and formulated by some researchers. However, they were limited within full compression. Therefore, the authors study the mechanism of partial compression in details and try to formulate the stress-strain relation of the strain hardening behaviors in partial compression. Thus, Elasto-plastic Hardening Pasternak Model (EHPM) formulation is proposed on the basis of the Elasto-plastic Pasternak Model (EPM) which have already been proposed by the authors and the validity of the formulation is verified by the simulation.

5. 伝統木造建築の振動特性に関する実験的研究—実大町家模型の静的載荷実験および振動観測—
Experimental study on vibration characteristics of Traditional wooden architecture -static loading experiment and vibration measurement of full scale traditional wooden house model-
高田悟志

Since 1995 South Hyogo Prefecture Earthquake, it has become more and more necessary to clarify the earthquake resistance of traditional wooden architecture and evaluate whether structural reinforcement are necessary. It is difficult to completely model the characteristics of traditional wooden architecture that exhibit complex behaviors different from steel structures and RC structures and evaluate them only by calculation. Therefore, in this study, we examined the seismic performance evaluation in consideration of the actual vibration characteristics by vibration measurement by a model experiment.

6. 木造建築物の振動計測と立体解析モデルを用いた連結制震による応答低減効果の検討
Study on connecting seismic control system for wooden building using vibration measurement and three-dimensional analysis model
中西裕也・吉富信太

In this paper, the effect of connecting seismic control system for traditional wooden building is examined. The target building is traditional old house with a roof of thatch. In this study, the three-dimensional analysis model of the old house is conducted considering the actual vibration measurement data, and the effect of connecting seismic control system is examined by using conducted 3D models with different damping performance and floor stiffness. As a result, it is shown that the floor stiffness affect the response reduction performance of connecting vibration control system.

7. 多点同時振動計測に基づく柔床立体建物の部位別剛性・減衰・質量推定法
Estimation method of rigidity, damping and mass for each part of soft-floor three-dimensional building based on simultaneous multipoint vibration measurement
西川慶・吉富信太

This paper proposes a method to estimate partial stiffness, mass and damping ratio of buildings based on measurement of horizontal vibration caused by exciter. The proposed method assumes multiple floor and multiple plane 3D shear building models with flexible floors and determines the stiffness and damping of each structural surface and floor and the mass of each location. This method can estimate the physical properties which minimize the error of equations of motion by using recorded response values. The validity of this method is demonstrated through numerical examples.

8. 法隆寺東院鐘樓の縮小模型の加振実験
Excitation test for a reduced model of the bell tower in Horyuji-Touin area
田口仙市郎

It is widely known that five-storied pagoda have not been damaged by large earthquakes since ancient times, but the Bell-Tower is also one of the traditional temple buildings that are less damaged by earthquakes. The bell tower is generally open and multi-tiered in order to resonate the sound of the bells far, and because heavy bells are suspended from the roof truss, the building's center of gravity tends to be high, combined with the large roof weight. In this study, the reduced model is to be studied experimentally in order to examine the structural characteristics of the Toin-Bell-Tower, targeting the National Treasure Horyuji-Temple Toin-Bell-Tower, which was built in 1163.

9. 壁長と壁倍率から評価した伝統的木造家屋の耐震性
—被害を受けた熊本県益城町の伝統的木造家屋の熊本地震強震動に対する地震応答性状—
Earthquake resistance of traditional wooden house evaluated from length of wall and coefficient effective wall-length (Kabe-bairitsu) - Earthquake response properties of traditional wooden house in the Mashiki where the strong ground motion of the 2016 Kumamoto earthquake was input -
池田雄一

Focus was given to the investigation of a traditional wooden house in a field investigation by the author for building damage in Mashiki after the 2016 Kumamoto Earthquake. The vibration analysis model was applied from the length of the wall and the coefficient effective wall-length (Kabe bairitsu). Earthquake resistance was evaluated through earthquake response analysis.

10. 倉吉市旧明倫小学校円形校舎の構造特性に関する研究—第1次診断と微動観測について—
Study on Structural Characteristics of Old Meirin Circular Type School Building in Kurayoshi City about First Diagnosis and Microtremor Measurements

野村直樹・定村泰房

Circular school buildings were constructed by Kanao Sakamoto in the latter half of 1940, while it was necessary to secure classrooms as the number of children increased due to the post-war baby boom. Circular school buildings have spread nationwide due to the low quantity of materials and cost savings. However, in recent years many circular school buildings have been demolished due to deterioration, but the Old Meirin Elementary School circular school building in Kurayoshi City was hardly damaged by the large earthquake. Therefore, in this paper, we evaluate the structural performance of the building and consider that it will lead to the preservation of the circular school building.

11. 當麻寺東塔の明治修理における三層屋根の重量の変化について

Changes of Roof Weight in Meiji-repair of Taimadera-temple East Pagoda

中嶋裕典

Wooden pagodas have suffered many damages from the earthquake. A lot of repairs are done in that. However, there are few replacements of the members of the shaft and eaves. The turning points is the repair of pagodas in the Meiji era. The structure was modified by the repair at this time. Since it was considered that the eaves could not be supported by the previous structure, a Hanegi was introduced as a reinforcement. Since it was considered that the eaves could not be supported by the previous structure, a Hanegi was introduced as a reinforcement. In this study, we examined the changes in structure and weight due to the introduction of Hanegi.

12. 断面修復コンクリートの修復界面の形態と熱的挙動の関係

Relation between Shape and Thermal Behavior at Repaired Interface of Patched Concrete

神代康輔・吉富信太・金侖美・福山智子

Recently, it has been reported that premature deterioration is observed in the patch repaired member of the RC building structures. This paper assumes that the thermal stress increases depending on a patching shape and causes premature deterioration of the patched concrete. In order to examine this assumption, experimental tests and FEM analysis are conducted and the thermal stress of the patched concrete is estimated. As a result, the thermal stress in the patched concrete is concentrated at the patching interface regardless of the patching shape. Those results support the possibility of premature redeterioration for the patched concrete member.

13. 城郭天守台石垣の鉛直荷重時安定性について

On the Stability of Masonry Walls of “Tensyudai” of Japanese Castles under Vertical Load

榊井健・鮫島由希子

The main causes of the collapse of “Tensyudai”, base of castle tower, of Japanese castles are increasing the inertia of the masonry wall stones during the earthquake and increasing of earth pressure of the back soil. In this paper, as a fundamental study to evaluate the loading capacity of the “Tensyudai”, we investigate the effect of the increasing of the earth pressure statically. we conduct model experiments of “Tensyudai” under vertical load. We examine the collapse mechanism of the “Tensyudai” considering the three-dimensional mechanical characteristics and evaluate the collapse load.

14. 重要文化財後背斜面での現地計測結果に基づく降雨量と斜面の変位量との関係

Relationship rainfall and slope displacement based on a measurement results of a slope behind an important cultural asset

檀上徹・藤本将光・石澤友浩・深川良一・里深好文

The purpose of our research was to clarify the relationship between slope displacement and rainfall on slopes. In June 2016, we installed a field monitoring system on a slope behind a culturally important building to measure surface displacement to 1.0 m depth using inclinometer sensors. Rainfall was measured by a nearby rain gauge. Measurements suggest that a slip surface formed at GL-0.6 to -1.0 m. The relationship between rainfall and maximum displacement indicated the coefficient of determination with the highest relationship between hourly rainfall and maximum displacement.

15. 江戸・東京の土蔵の変遷に関する研究

A Study on the Transition of Dozo (Storehouses) in Edo and Tokyo

森下雄治

Since the Great Fire of Meireki (1657), riversides were the only place where the construction of *dozo* (storehouse with mud walls) were allowed in Edo. In the late 17th century, people started to reform and convert the riverside storehouses as commercial facilities and residences, which was eventually established as *dozo-zukuri* (house with thick mortar walls), a fireproof architecture, in the early 18th century. While the fireproof function of *dozo-zukuri* comes from the closed nature of *dozo*, the commercial need for openness contradicted its feature. From mid-19th century till Meiji era, there was a trend to solve the problem by adding *sodegura* (attached storehouse), dedicated to preventing fire, to the main *dozo-zukuri* building converted as a *nuriya* (stucco house).

16. 「災害碑」という概念と分類方法の検討

Examination of the concept of “disaster monument” and classification method

大邑潤三

The word “disaster monument” is often used to describe a variety of objects that convey the memory of a disaster. However, stone monuments are not the only objects that convey memory of disasters. Calling all objects “disaster monuments” is wrong and can be confusing. Therefore, in this research, in order to analyze the object, a higher level concept including a stele was set. Furthermore, we decided to classify objects by content, purpose, and form. With this classification method, it has become possible to understand the character of the object in more detail. Analysis of the objects by form revealed that they were classified into those that used characters and those that did not. Among objects that do not use letters, there are potential objects that have not been found to have a relationship with disasters. By evolving this classification method, it will be possible to systematically organize various objects that convey disaster memories.

17. 地域課題に直面する奥尻島青苗言代主神社例祭とその対応

Regional issues confronting the Aonae Kotoshironushi Shrine Festival and their countermeasures

蟬塚咲衣・稲垣森太・手塚薫

It has already been twenty-six years since the 1993 southwest-off Hokkaido earthquake and tsunami disrupted the annual Aonae Kotoshironushi Shrine Festival on the island of Okushiri. Several years after the disaster, the existing parishioner representative organization was restructured to reduce the management business of the festival, and two groups, specializing in their own *Mikoshi* (portable shrine) and *dashi* (decorated float), were newly established. This organization reform was initially effective in restoring the festival which continued to be performed for 26 years. It is especially notable that all the magnificent parades during the festival, consisting of *Sarutahiko* (an earthly deity), *Mikoshi*, and *dashi*, were suddenly canceled in 2019. This cancellation was partly due to a dwindling birthrate, an aging population, and depopulation, combined with a shift in industrial structure of the island. However, one of the most important reasons was the sudden dysfunction of the parishioner

representatives in charge of the annual festival. This study describes these regional issues and the countermeasures that residents are taking.

18. インドネシア・スンバ島における民家の現状と住人の防火意識

Current Situation of Dwellings and Fire Safety Awareness of Residents in Sumba Island, Indonesia

藤木庸介・横田祥子・セバスチャン ヴィンセント

At this point in time, the studies on the composition of customary dwellings and its utilization by the residents in West Sumba, Sumba Island, Indonesia are limited, with its discourses differing from each other. Furthermore, frequent fires are causing the changes and disappearances of these dwellings. The purpose of this study is to clarify the following points regarding the maintenance and conservation of the customary dwellings in West Sumba. (1) Current composition of the customary dwellings. (2) The utilization of the customary dwellings by the residents. (3) Fire safety awareness of the residents in the customary dwellings.

19. 中央アジア・ザラフシャン川流域における土地利用変化と考古遺跡

－ Landsat 衛星データを用いた分析から －

Monitoring Land Use Change and Archaeological Sites in Zarafshan Valley of Central Asia Using Multi-temporal Landsat Satellite Imagery

宇佐美智之

This paper focuses on the monitoring of the archaeological sites and cultural resources in a changing modern landscape of Zarafshan valley, an agricultural heartland in Central Asia, employing GIS (Geographical Information Systems), Landsat satellite imagery (Landsat-5 TM, Landsat-7 ETM+, Landsat-8 OLI) and Google Earth. In Oases of Central Asia, a rapid and huge land use change occurred due to the agricultural intensification and other human activities for the last several decades, and it has led to the massive destruction of archaeological sites and cultural resources. As a case study, the paper presents a preliminary assessment of modern land use/ cover change and its impact on them, using image processing techniques with GIS for Landsat data classification, and images of Google Earth for the detection of site environment changes.

20. 京都市嵐山地区の事前復興計画に向けた建築物の類型化 及び印象評価に基づく浸水被害を想定した復興モデルの提案

Typology of buildings assuming pre-reconstruction plan in Arashiyama area of Kyoto, its impression evaluation and proposal of flood disaster prevention type model

内貴美侑・平尾和洋

This paper covers Arashiyama area of Kyoto where there are many beautiful landscapes and buildings different from the city centers, quantitative grasping and typing of the appearance elements of the building towards the preliminary recovery plan, type examination of reconstruction level by another impression evaluation, and comparison of a method for quantitative grasping and typing of the appearance elements.

21. 京都市下京雅学区の事前復興計画に向けた建築物の類型化 及びその評価に基づく復興モデルの提案と延焼危険性の分析

Typology of buildings assuming pre-reconstruction plan of Simogyomiyabi Kyoto city school district, its evaluation and proposal of disaster prevention type model, and analysis of fire spread risk

平尾和洋・田中勇氣

This paper covers Kyoto-Simogyo-ku where there are many traditional buildings with a large estimated damage scale due to the earthquake, quantitative grasping and typing of the appearance elements of the building towards the preliminary recovery plan, type examination of reconstruction level by another impression evaluation, and proposal of a reconstruction housing model with certain disaster prevention capability.

22. 防災街区整備事業を活用した密集市街地整備に関する研究

A study on the development of concentrated urban areas performed by Disaster Prevention Block Improvement Projects

山際大貴・岡井有佳

The improvement of disaster prevention functions in densely build-up areas is urgent issue. However, it has not been progressed the reconstructions of these areas. Therefore, this study aims to clarify the effects and challenges of The Disaster Prevention Block Improvement Projects in such areas by case analysis. As a result, it is proved the following two advantages: there is no necessary to increase floor-area ratio in the areas; besides, its flexibility about setting the planning area makes consensus smoothly. On the other hand, the possibility to be adopted this project is restricted, without government intervention or combination of other projects because of difficulty of getting profitability.

23. 建築基準法第43条第2項第二号許可制度の運用実態に関する研究—京都市を事例として—

A study on building permission systems based on Building Standards Act 43.2.2

—a case study of Kyoto City—

岡野遼太郎・岡井有佳

The narrow streets in densely built-up areas have disaster prevention problems. It is necessary to improve disaster prevention capabilities in the area by rebuildings. The site for the building must be connected to a street with a width of 4 meters or more. Therefore, buildings connected to narrow street by utilizing the building permission system based on Building Standards Act 43.2.2. This study aims to clarify the actual condition of building permission systems based on Building Standards Act 43.2.2 in the case of Kyoto City and give suggestions to the operation of the building permission system.

24. 歴史的街区に備わる減災手法の防火性能評価

～伝統的緑地による延焼抑止効果に着目して～

An Effectiveness of the Fire Spread Mitigation by the Traditional Knowledge: Group of Trees in Japanese Historic Districts

大窪健之・砂田陸・金度源

In the historic districts in Japan, trees are not only preserved as an important historic scenery. The purpose of this paper is to evaluate fire spread mitigation effect by the group of trees using the Urban Fire Spread Model. For the extraction of the challenge on the site for trees preservation, the research carried out the interview to the stakeholder of the management and future preservation. As the result of fire simulation, it reveals the group of trees can reduce the numbers of burnt buildings and delay the speed of fire spread. And the result of interview reveals that aging of inhabitants and increase of the vacant house affect tree preservation.

25. 災害情報を即時共有する地域防災情報ネットワークシステムの導入効果に関する検証

～京都市先斗町での避難シミュレーションを通して～

Inspection about the introduction effect of the local disaster prevention information network system to share disaster information immediately~Through refuge simulation in Ponto-cho~

山根雅也・大窪健之・金度源

It is said that there will be a major earthquakes within 30 years according to Cabinet Office. It has great risks of the road confinement by the building collapse in the wooden crowd city area. People may perform a refuge action more safely if get disaster information beforehand. Attention to the use at the time of the earthquake of the system which can share disaster information. This study inspects the effect of the system through refuge simulation.

26. 重要伝統的建造物群保存地区における公有建物と私有敷地の防災拠点化に関する調査研究—地域防災資源のデータベース構築と事例調査を通して—

A Study of the Potential Resources for Community Disaster Risk Preparedness in Preservation Districts for Groups of Traditional Buildings in Japan: To Develop the Database of Community Disaster Risk Management Practices from the Lessons of Historical District

金度源・中林秀光・大窪健之

To find the existing community disaster prevention resources and its development is one of the key factors to promote the formulation of community disaster management plan, because the local communities are capable to divert and transfer the previous practices and lessons of resources utilization. In this study, we extract the potential resources to be developed and utilized on the community disaster management plan on Preservation Districts for Groups of Traditional Buildings in Japan. For building the database of potential resources, we classified them as the human-caused, natural, informational, and structural resources. A study clarified the current community disaster prevention resources by the collective interview survey for the background, knowhow and process on the 48 Community Disaster Management Plans.

27. 非医療従事者の一次救命の不確実性をふまえた AED・サインの適正配置

－伏見稲荷大社を対象としたマルチエージェントシミュレーション－

Appropriate Placement of AEDs and Signs Considering the Uncertainty of Doing First Aid by Non-medical Workers -Multi-Agent Simulation of Fushimi-Inari Taisha -

山田悟史・中島昌暉

This paper presents a quantitative planning method for AEDs and signs, and presents the findings for a specific target area. Although primary lifesaving of non-medical personnel is important in sudden cardiopulmonary arrest, primary lifesaving of non-medical personnel involves “uncertainty”. However, there is no planning approach that takes into account the uncertainty. Therefore, we proposed a Multi-Agent Simulation with variables such as “number of people”, “route selection”, “primary lifesaving behavior”, “first responder presence”, and “placement of AEDs and signs”. In the analysis, the relationship between the above variables and the “life saving rate” was clarified, and the effect of increasing the “AED and sign” according to the assumption of “non-medical workers” was presented.

28. 石垣の見え方が丸亀城景観の印象評価に与える影響に関する研究

A Study on the Influence of the View of Stone Wall on the Impression Evaluation of Marugame Castle Landscape

藤井健史・寺口絢子

In this study, we conducted an impression evaluation experiment on the landscape of Marugame Castle, and examined the relationship between the experimental results and the physical quantity of the appearance of the stone wall, which is a landscape feature of Marugame Castle. As a result of the analysis, it was found that not only the castle tower but also the appearance of the stone wall influences the evaluation of the Marugame Castle landscape. In addition, it was pointed out that not only the size of appearance of the stone wall but also the morphological characteristics such as the outline length and the number of corners of the stone wall may influence the impression evaluation.

29. 文化遺産防災を対象とした CVM における「特定可能な犠牲者効果」に関する分析

An Analysis of the Identifiable Victim Effect on Contingent Valuation Method for Cultural Heritage Disaster Mitigation

小川圭一・志賀健生

It is necessary to make clear the necessity of cultural heritage disaster mitigation in disaster mitigation planning in historical cities, to make social consensus to protect urban cultural heritage from natural disasters. For this purpose, it is necessary to show the necessity of cultural heritage disaster mitigation in historical cities objectively and quantitatively. In this paper, willingness to pay for cultural heritage disaster mitigation in Kyoto City is surveyed by using contingent valuation method. Furthermore, the identifiable victim effect for willingness to pay on contingent valuation method for cultural heritage disaster mitigation is analyzed.

30. Risk Assessment and Disaster Preparedness of Museums in Ombilin Coal Mining Heritage of Sawahlunto, Indonesia

Roni Armis, Rahmat Gino Sea Games, Hidehiko Kanegae

Tourism has become a key option for many former mining cities in the post-mining period. The tangible and intangible value of mining heritage has often been treated as museums. Before the transformation, former mining infrastructures were frequently in obsolete and decay conditions. A disaster management plan becomes an important task for the destination manager to guarantee the visitor's safety. This study aims to assess potential risk and disaster preparedness of six museums at the Ombilin Coal Mining Heritage of Sawahlunto (OCMHS), a new UNESCO World Heritage site in Indonesia. The study revealed that an earthquake is a significant risk in all study objects. Fire, flood, and intrusion of groundwater also become a potential risk for some museums, ranging from moderate to significant level.

31. Assessing Awareness, Perception, and Usage Intention of a Disaster Information System: A Case of SIKK Magelang

Kartika Puspita Sari, Hidehiko Kanegae, Muflichah Roychani

SIKK Magelang (Sistem Informasi Kebencanaan Kabupaten Magelang) is a web map-based disaster information system built by a local disaster management agency in Magelang, Indonesia to serve as a disaster database and a one-way disaster risk communication tool. This article assesses awareness, perception, and usage intention of the information system with local risk managers, volunteers, and public audiences in a historical city in Indonesia, namely Magelang Regency. The study found that respondents were unfamiliar with the disaster information system but were willing to use SIKK Magelang as a source of disaster information after a usage trial.

【報告】

1. 観光客等の緊急避難場所としての社寺の能力評価に関する研究 ～京都市清水・祇園地域を対象として～

The capacity of temples and shrines in Kiyomizu Gion area, Kyoto, for evacuation of tourists in disaster

谷口有里香・大窪健之・金度源

This study aims to evaluate the capacity of temples and shrines at Kiyomizu Gion area in Kyoto at the time of disaster, in both aspects of function and management system. After investigating and comparing the amount of items such as food, drinking water, toilets, sheets, information equipment, pharmaceuticals and evacuation space, it was found that there was not enough food, drinking water, sheets and toilets in several temples and shrines. Interviews to the manager of temples and shrines and government of officials of Kyoto city revealed their preparation and management system at the time of disaster.

2. 保津川および沿岸地域における流域空間デザインの研究

A study on spatial design of watershed in Hozu River and coastal area

松田麗央・武田史朗

Since the Meiji era, flood control of rivers due to heavy rainfall has been prevented in Japan since the Meiji era by flood control plans incorporating modern technology centered on Western Europe. A characteristic of Japan's flood control measures is that "most of the population and property are concentrated in fragile flood plains." Furthermore, it is said that the current flood control measures in Japan cannot effectively and sustainably prevent flood damage caused by future climate change. In order for multiple actors, such as planners, decision makers and stakeholders, to achieve common goals, a cross-cutting approach to improving flood control and water resource management is needed. Therefore, the purpose of this study is to propose a complex solution method of flood control problem by the method of landscape design.

3. 大工仕事の力加減の可視化—Human Computer Interaction 技術を用いた伝統技術の保存継承— *Visualization of the carpenter's force -Preservation and 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 of the carpenter

population. One of the reasons of this problems is the style of present technology inheritance like learning by observation or listening. There are many researches to mechanize the handworks, but it is necessarily to take on technology development that one's handworks are inherited by others because carpentry need minionette and complicated technology that machines cannot reproduce. Moreover, human have superior structure, sensory nerve, and intellect; machines cannot imitate them more superior than human. Therefore, the aim of this research is to preserve caepentry with human computer interaction technology.

4. 中国木造歴史建築研究における BIM 技術の応用

Application of BIM Technology in Chinese wooden historical building research

荊松鋒

In this paper, the protection of the China's heritage, the importance of the record is neglected, and the preparation of the heritage basis is insufficient, and the record level is delayed. Obviously, the record plays an important role in the process of heritage protection. For example, management, exhibitions, academic research, and protection items are closely related to records. It also pointed out that the preservation of historical information and the credibility of records directly reflected the truth of the legacy. The purpose of this research is to discuss the suitability of BIM Technology to legacy records, and to explain the application value of BIM Technology.

5. 災害記憶継承に向けた出版活動－2015年ネパール地震を事例として－

Book Publishing Activity Towards the Disaster Memory Inheritance -Case study of 2015 Nepal earthquake-

サキヤ ラタ・大窪健之・金度源

This paper describes the process of publishing “a disaster memory book” towards disaster memory inheritance and the lesson learning process from past disaster. Normally, people forget the happenings, their struggles of the disaster time, and the post-disaster recovery processes. Before the 2015 Nepal earthquake, Nepal has experienced many disasters including the biggest earthquake in 1934 but since there does not exist any kind of documentation explained detail the condition of evacuation sites, the victim's experience and their responses, the lessons from past disaster memories could not be included in disaster risk reduction strategy. Thus our team planned to compile a book as “the memory of the 2015 Nepal earthquake, experiences of local residents utilizing traditional resources”, which contents are based on field surveys conducted immediately after the earthquake.

6. Study on the Damage of Residential Buildings of Jiuzhaigou Tibetan Villages in World Heritage Sites

Hongtao Liu, Yibo Feng, Yue Fei, Hongyang Yang

Jiuzhaigou, one of the world natural heritage sites in China, was severely damaged by the earthquake in August 2017, and many traditional Tibetan residential buildings in its villages were seriously damaged. This paper takes the damaged Tibetan style residential buildings in Jiuzhaigou villages as research subject. The research methodologies of this paper include 1. the field investigation; 2. analyze the earthquake damage and post-earthquake restoration of the residential buildings; 3. Explore the correlation between local Tibetan traditional building structure, construction characteristics and earthquake damage. Finally, it is expected that the results of this study could be a valuable reference to the conservation and restoration of those vernacular residential buildings with local regional characteristics after earthquakes.

7. Research on the Disasters Monitoring and Early Warning in Tibetan Villages of the World Heritage Site Jiuzhaigou

Hongtao Liu, Shanshan Zhu, Wenjiang Zou

In August 2017, a 7.0-magnitude earthquake hit the World Heritage site of Jiuzhaigou County, causing massive casualties and damage to buildings and other properties near Jiuzhaigou County, a World Heritage Site. Located on the eastern edge of the Qinghai-Tibet Plateau earthquake fault zone, earthquakes and other natural disasters have occurred

frequently since ancient times, resulting in great security risks in the traditional Tibetan villages in the region. Therefore, this paper carries out dynamic monitoring on the risk source factors such as rainfall and slope change, which threaten the safety of traditional Tibetan villages and may cause local landslide and debris flow and other geological disasters, to understand and monitor the occurrence of disasters and risk changes around the village in real time.

8. Study on disaster adaptive site selection of Tibetan villages -Take the World Heritage Jiuzhaigou Valley as an example-

Hongtao Liu, Peijia Sun, Jianyu Yang, Hongyang Yang

This report takes Jiuzhaigou Valley as a case study to research the adaptive Site selection of traditional Tibetan villages. The methodologies mainly include on-site investigation and historical literature review. Overall, this paper finished 2 tasks: 1. the site selections of Jiuzhaigou Valley Tibetan Village was divided into 4 types based on the site terrain of the Tibetan Village in Jiuzhaigou Valley, namely mountain top aggregation type, platform type, hillside gentle slope type and valley riverbank type ; 2. depend on the 4 site selection types and the principle of site selections, the second task reveals the relationship between site selection and disasters (especially geological hazards and fire disasters). Through the comparative analysis of new Tibetan villages and early Tibetan villages, this paper's conclusion is that the early Tibetan villages adopted "disaster adaptability" and "disaster avoidance" principles, while the new Tibetan villages did not keep those principles any more. Therefore, currently, the new Tibetan villages suffered from the frequent disasters. Furthermore, It is hoped that this study can be used for reference in the researches of disaster adaptive sites selection for traditional villages in China.

9. Ambulance for Monuments – urgent intervention on heritage

Eugen Vaida

The "Ambulance for Monuments" project is targeting, in a desperate race against time, the salvation from collapse and degradation of hundreds of Romanian threatened historical buildings that are listed. It carries out emergency interventions done by volunteer experts, students, passionate/amateurs and trained craftsmen, always with the support of local communities and authorities. Most of the activities for the 32 finished interventions are related to the replacement of damaged roofs, propping walls, organizing proper water drainage and stabilizing wall paintings. The heart of the project in each region is an intervention kit: a lorry equipped with tools, construction equipment and materials.