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A Study on the Planning and the Evaluation of Talented People Raising Program from Viewpoint of PDCA Cycle at the Environmental Education and Information Center [in Japanese], Hiroki OGAWA and Masuro URAYAMA: Papers on Environmental Information Science, No.17, pp.213-218, 2003

In environmental learning, talented people training programs are important to assure an action to treat environmental problems, and the follow-up programs are too. The Mie Environmental Education Seminar is planned and evaluates program from viewpoint of PDCA cycle as an example. We compared the achievement degree of this seminar's aim by investigation of students who attended this program, and let follow-up programs reflect it. As a result, it led to improvement of environmental consciousness and action of students. Learning continues by giving an opportunity of follow-up programs. And a change more was seen in environmental consciousness and action of students. To stimulate such a change, the follow-up programs to become a leader or to utilize knowledge or skill that they learned was effective.

Study on Amendment and Current Status of Preservation System for Historic Environments after Shu-shu Earthquake in Taiwan-Focusing on the Related Laws on Cultural Property Preservation [in Japanese], Meiyin LIN, Satoshi ASANO and Masuro URAYAMA: Journal of Architecture and Planning, No.573, pp.125-131, 2003

The purpose of this paper is to analyze the characteristics and issues of the preservation system for historic environments after Shu-Shu earthquake happened in Taiwan in 1999, by inspecting the amendment of the related laws on Cultural property Preservation. It explains by the following aspects: (1) The transition of preservation system for historic environments before Shu-shu earthquake, (2) The response to the survey and renovation of damaged historic buildings and streets after the earthquake, (3) The amendments of the cultural property related laws, (4) The characteristics and issues of the cultural property related laws after Shu-Shu earthquake, (5) The current status. It could be said that the preservation system of historic environment is facing the following issues after earthquake:(1) Urgent and uncompleted amendments, (2) Introduction of historic building registration system, (3) The separated government departments in charge, etc. Consequently, it will remain to be discussed until the accomplishment of the latest amendment of cultural property law.

A Study on the Successive Change Condition of Common Spaces and Facilities in Condominiums including Many Units |Research on Projects in Tokai Area | [in Japanese], Hiroyuki TAKAI: Urban Housing Sciences No.43, pp.114-119, 2003

The aim of this research is to make clear the actual condition on successive change of common spaces and facilities in condominiums including many units. The research was made for 10 housing estates in Tokai area by the way of hearing to the chief of homeowners association or the management staff. So big change is no occurred yet, but we can find many symptoms. For example, re-design for barrier-free, new parking problem for home-helpers, the abolition of the expensive facilities, and new volitional volunteer groups in a housing estate.

A Study on a Method of Architectural Education on Steel Desining Techniques [in Japanese], Yoshito TOMIOKA, Shinsuke KAWAI, Takuya KITAGAWA: Journal of Constructional Steel, Vol.11,pp.359-366, JSSC, Nov. 2003

The paper is to inquire the educational method in design studios to enhance student's design ability in using steel, based on the duality of material-spatial compositions in architectural form. Through the approaches of formal analysis on students' diploma works, and of the theoretical attempt to expand the design process model proposed by Kawasaki in 1990, the possible construction of a textbook for latter half of the bachelor studios was proposed.

Study on Random Sound Absorption Property and Performance of Porous Concrete, Takane TERASHIMA, Shigemitsu HATANAKA, Naoki MISHIMA and Takeshi NAKAGAWA*: Proc. of the JCI Symposium on Design, Construction and Recent Applications of Porous Concrete,pp.146-148, 2003

Purpose of this study is to make clear the sound absorption characteristics of porous concrete under random incidence. Three types of the porous concrete panels with variation of the thickness (specimens) are prepared, and tested for the sound absorption characteristic in the echo chamber. As results, the porous concrete panels have reasonable sound absorption of middle and high frequency. And the maximum and minimum points of sound absorption coefficient tend to transfer to low frequency as the panel is more thick. The lesser sound absorption is recognized at the side end of the panel, and the sound absorption characteristic of the porous concrete panel is affected by the condition of placing, the surface condition and the air void distribution of the panel.

A Ventilated Courtyard as a Passive Cooling Strategy in Warm Humid Tropics, Indrika RAJAPAKSHA*, Hisaya NAGAI and Masaya OKUMIYA*: Journal of Renewable Energy, Vol.28,Issue11, pp.1755-1778, 2003

This paper aimed at investigating the potential of a courtyard for passive cooling in a single story high mass building in warm humid climates. The inclusion of courtyard in building design is attributed to the optimization of natural ventilation in order to minimize indoor overheating conditions within the building. However the efficiency of the strategy greatly depends on the design details of building composition in providing appropriate airflow pattern to the courtyard. From a computational analysis, several air flow patterns are identified. Thus a relatively a better indoor thermal modification is seen when the courtyard acts as an air funnel discharging indoor air into the sky, than the courtyard acting as a suction zone to induce air from its sky opening. The earlier pattern is promoted when the courtyard is ventilated through openings found in the building envelope.

A Quantitative Analysis on Heat Loss around the Basement of Insulated House [in Japanese], Atsushi IWAMAE*, Hisaya NAGAI, Hirotaka SUZUKI* and Yukie KITATANI*: Journal of Architecture, Planning and Environmental Engineering (Transactions of AIJ), No.567,pp.37-42, 2003

The foundation insulated house has thermal effectiveness from the point of the high-airtightness and so on. However, there are many kinds of insulated foundation and these thermal performances are not clarified so far. Therefore, in this research, it examined the insulated

performance of the foundation insulated house by the computational simulation. In addition, it presented the simple prediction model for evaluation of the heat loss around the basement of insulated foundation house and its validity.

Study on Modified Mixing Model of Temperature-stratified Thermal Storage Tank under Variable Input Condition, Hiroaki KITANO, Takeshi IWATA, Kazunobu SAGARA*: Proceedings of 9th international conference on thermal energy storage, Volume 1, pp.15-20, 2003

A mixing model for temperature-stratified thermal storage tank under steady conditions of input temperature and flow rate had been presented. This model is known as the R-value model and has been used for a basic performance estimation of the thermal storage tank. In this model, the tank is divided into two regions; a perfect mixing region and a piston flow region with one-dimensional diffusion. And the depth of the perfect mixing region has relation to Archimedes number, the inlet geometric conditions and the non-dimensional time. However, this model is not applied to simulation under unsteady input conditions in actual HVAC systems. In this paper, a mixing model, which can be applied to temperature-stratified thermal storage tank under variable input conditions, is presented, and the temperature profile in tank calculated by using this model is compared with a series of experimental results under variable input conditions.

Development of Shallow and Multiple Stratification Type Thermal Storage Tanks, Yoshimi IWATA*, Fukashi MORI*, Hiroaki KITANO, Kazunobu SAGARA*: Proceedings of 9th international conference on thermal energy storage, Volume 2, pp.537-542, 2003

The purpose of this paper is to present the development of a temperature stratified type of thermal storage tank with a high thermal storage performance composed of parallel-connected tanks with a shallow water depth of 1.5 to 2 meters, which can be installed in the inflow/outflow port which enables the flow rate of port to be almost equal with one another was developed, and the effect of connecting hole through tank partition on canceling stored heat imbalance which is attribute to parallel connection of tanks was studied.

Mixing Model for Parallel Type of Temperature-Stratified Water Thermal Storage Tank, Takeshi IWATA, Hiroaki KITANO, Kazunobu SAGARA*: Proceedings of The 4th International Symposium on Heating, Ventilating and Air Conditioning, Vol. II, pp.785-791, 2003

Recently, in order to improve the water thermal storage performance, it is trying to replace the conventional type in which tanks are connected in series into the parallel type of temperature-stratified thermal storage tank having its own inlet and outlet. Though it is difficult to keep the balance of input/output water flow rate and stored heat in each tank, the connecting holes through partition between tanks are useful to keep the balance of stored heat. In this paper, a mixing model which allows to study the effect of connecting holes through tank partition in the parallel type of temperature-stratified water thermal storage tank is presented. The mixing model consists of several sub-models; a complete mixing model, a one-dimensional diffusion model, a plume model and a connecting hole model. The accuracy of the mixing model was verified by comparing with experimental data, and the size and position of connecting holes were studied with simulation using this mixing model.

Distortional buckling of thin-walled lipped channel partially restrained with attached sheathing subjected to bending [in Japanese], Koji HANYA*, Ryoichi KANNO* and Shosuke MORINO: Journal of Structural and Construction Engineering, Transactions of Architectural Institute of Japan, No. 567, p.157-164, 2003.5

Cold-formed thin-walled steel members with thickness of around 1mm are relatively new structural members in Japan. It is because such a thin steel member had not been long allowed to use as a structural member under the Japanese Building Standard Law. This situation has been changed in recent years through the development of steel-framed houses. Although the use of such a thin steel member is currently possible, there are still some design issues to be clarified for realizing the broader applications, mainly related to its complex buckling behavior. The complex buckling is called distortional buckling and is often seen in the floor and roof panels in steel-framed houses. To study the behavior of distortional buckling in detail therefore, negative bending tests were conducted for panels consisting of two lipped-channels and structural plywood fastened together with screws. Twelve bending tests provided behavioral information on distortional buckling and the possible strength evaluation methods for improving the design of thin-walled steel members.

Strength and Stiffness of CFT Semi-Embedded Type Column Base, Shosuke MORINO, Jun KAWAGUCHI, Akiyoshi TSUJI* and Haruyoshi KADOYA: Proc. International Conference on Advances in Structures, ASSCCA'03, Sydney, Vol. 1, pp. 3-14, 2003.6

Monotonic and cyclic loading tests were carried out, in order to clarify strength and stiffness of a CFT semi-embedded column base, which was newly developed to improve the performance of a conventional bare type column base. The test parameter was an embedded length. The paper first presents test results, and shows methods to evaluate strength and stiffness. The strength was evaluated, considering three kinds of resisting action; anchor bolt-base plate action, prying action of the embedded portion of the CFT column, and tension of vertical reinforcing bars in the foundation. The stiffness was evaluated, considering the deformations of anchor bolts, base plate, and concrete compressed by the base plate and the column tube. It is shown that the maximum strength and the initial stiffness of each specimen were fairly well estimated by the proposed evaluation method.

Bending Behavior of SRC Beams with High-Strength Steel, Yasuhiro UCHIDA* and Shosuke MORINO: Journal of Structural and Construction Engineering, Transactions of Architectural Institute of Japan, No. 571, pp. 177-185, 2003.9

As to the use of high-strength steel in composite steel and reinforced concrete (SRC) structures, it remains to be clarified whether the ductile behavior can be ensured, especially when the high-strength steel is used in combination with normal-strength concrete. This paper describes the test results on the elasto-plastic behavior of SRC beams using high-strength steel, and discusses the maximum strength and the deformation capacity, with the investigation on the applicability of the concept of superposed strength. Test and analysis revealed that the behavior of SRC beams with high-strength steel was stable and of the ideal elastic-perfectly plastic type; the maximum strength of SRC beams was well predicted by the ultimate strength theory; the deformation capacity was sufficiently large; and the crack width under the short-term loading was within the limit.

Distortional Buckling of Light-Gauge Lipped Channel Short Columns, Shosuke MORINO, Jun

KAWAGUCHI, Yasunori MIZUNO* and Koji HANYA*: International Journal of Steel Structures, Vol. 3, No. 3, pp. 203-217, 2003.9

Compression tests of light-gauge lipped channel short columns with plate thickness equal to about 1.0 mm has been carried out to clarify the fundamental behavior of ultra-thin-walled compression members failing in the local and distortional buckling. A total of 18 specimens with 3 different web width and 3 different web-flange width ratio have been tested. The lip width of some specimens did not satisfy the requirement specified by the design manual. The paper first introduces the test results, and then the method of numerical analysis based on the yield line theory is thoroughly explained. Finally, stiffness, strength, failure modes are discussed, comparing the results of tests and analysis.

Design and Construction of Concrete-Filled Steel Tube Column System in Japan, Shosuke MORINO and Keigo TSUDA*: International Journal of Earthquake Engineering and Engineering Seismology, Vol. 4, No. 1, pp. 51-73, 2003.9

Concrete-filled steel tube (CFT) column system has many advantages compared with ordinary steel or reinforced concrete system. One of the main advantages is the interaction between steel tube and concrete: occurrence of the local buckling of steel tube is delayed by the restraint of concrete, the strength of concrete is increased by the confining effect provided from the steel tube. Extensive research work has been done in Japan last 15 years, including "New Urban Housing Project" and "US-Japan Cooperative Earthquake Research Program", in addition to the work done by individual universities and industries, which has been presented at the annual meeting of Architectural Institute of Japan (AIJ). This paper introduces structural system, advantages, research findings, and recent construction trends of CFT column system in Japan, and describes design recommendations for the design of compression members, beam-columns, and beam-to-column connections in the CFT column system.

Research and Construction of the Concrete-Filled Steel Tube Column System in Japan, Shosuke MORINO and Jun KAWAGUCHI: Research Reports of the Faculty of Engineering, Mie University, Vol. 28, pp. 25-60, 2003.12.

Concrete-filled steel tube (CFT) column system has many advantages compared with ordinary steel or reinforced concrete system. One of the main advantages is the interaction between steel tube and concrete: occurrence of the local buckling of steel tube is delayed by the restraint of concrete, the strength of concrete is increased by the confining effect provided from the steel tube. Extensive research work has been done in Japan last 15 years, including "New Urban Housing Project" and "US-Japan Cooperative Earthquake Research Program, in addition to the work done by individual universities and industries, which has been presented at the annual meeting of Architectural Institute of Japan (AIJ). Mie University have also been contributing to the development of the CFT column system in a great extent. This paper introduces the merits, design provisions and recent construction trends of CFT column system in Japan, and discusses the results of trial designs of CFT theme structures which have been carried out to look for the advantages in the performance and construction cost compared with other constructional system.

Experimental Study on Carbonation Resistance of Vacuum Processed Concrete [in Japanese] , Shigemitsu HATANAKA, Naoki MISHIMA, Eisuke SAKAMOTO and Hiroki HATTORI: Cement Science and Concrete Technology, No.57, pp.349-354, 2003

Construction of long life buildings is strongly desired from the viewpoint of environmental protection and recent decline of economy. The present study aims to grasp the performance of vacuum processed concrete against neutralization by carbonic acid gas, making use of accelerating carbonation test. Conclusions obtained from the test results are summarized as follows: 1) The improvement of performance concerning durability observed in the vacuum processed concrete is considered to be due to the fact that the micro structure of cement paste becomes fine as water cement ratio decreases. 2) The appropriate initial curing (water curing) has a great influence on the improvement of performance concerning durability of the vacuum processed concrete. 3) The carbonation rate ratio can be predicted by using reciprocal of compressive strength and total volume of pore with diameter of larger than 50nm, for vacuum processed concrete as well as non-vacuum processed concrete. 4) The relation between compressive strength and volume of pore with diameter of larger than 50nm in vacuum processed concrete is found to be almost the same as that of non-vacuum processed concrete.

FEM Analysis on Compressive Failure of Circular Confined Concrete Considering Effect of Interface Element [in Japanese], Yukio YOSHIDA, Eiji MIZUNO* and Shigemitsu HATANAKA, J. Struct. Constr. Eng. AIJ, No.563 Cpp.169-176 C2003.1

Two series of FEM analyses have been carried out. Firstly, the optimum values of internal friction angle and dilatancy angle, used in the Drucker-Prager type of plasticity model with the strain softening effect, have been discussed for a single concrete element subjected to uniformly distributed lateral pressure. As a result, following values have been obtained. Internal friction angle: 53 degrees, dilatancy angle: e.g. 40 degrees for uniform lateral pressure of 1 MPa, and 30 degrees for 2 MPa. Secondly, simulation analyses have been carried out for the compressive behavior of cylindrical concrete specimens confined by steel tubes or reinforcing bars, introducing interface element. As a result, it has been pointed out that the distribution of equivalent confining pressure along the longitudinal direction of a specimen and the progress of the degree of damage in horizontal sections differ by element types applied to the confining steel and interface elements.

Study on Applicability of Shear Strain Dependent Visco Plastic Model to Fresh Cement Paste [in Japanese], Gun-Cheol LEE*, Yasuo TANIGAWA*, Hiroshi MORI*, Yoshiyuki KUROKAWA* and Naoki NISHIMA: J. Struct. Constr. Eng. AIJ, No.568, pp.21-26, 2003.6

In this study, small sized shear box test of cement paste was carried out for the quantification of shear strain dependent visco-plastic model, in order to investigate the rheological properties of cement paste which is the most important fundamental material for mortar and concrete. And, rheological constants measured by the experiment were compared with the analytical results by visco-plastic finite element method (VFEM). As the results, it was confirmed that the rheological constants of cement paste are dependent on the shear strain, and this property is varied with the water-cement ratio and the dosage of high-range water-reducing AE agent and segregation control agent. Furthermore, according to the result of numerical analysis by VFEM, it was clarified that the degree of the shear strain variable in the shear dependent visco-plastic model should be determined as a liner model to have good agreement with measured values in high-fluidity material. However, in case of dry consistency, good agreement was attained with cubic model.

Experimental Study on Compressive Strength of Porous Concrete with Recycled Aggregates [in

Japanese], Shigemitsu HATANAKA, Yukihiisa YUASA* and Naoki MISHIMA: J. Struct. Constr. Eng. AIJ, No.570, pp.31-36, 2003.8

A series of experiments has been carried out to examine the effect of the shape and strength of recycled aggregates on the compressive strength of porous concrete with them. As a result, followings have been pointed out. 1) Both of the variations of solid content of coarse aggregates and slight grinding to recycled aggregates cause little influence on the relationship between void ratio and compressive strength of porous concrete. Consequently, the relationship between them is represented by a unique curve. 2) The relationship, on the other hand, is affected by the strength of recycled aggregates; the curve shifts to the lower strength region when fracture of the aggregates is considered to occur. 3) The strength level where recycled aggregates in porous concrete may start to fracture is able to be easily predicted only by the compressive strength of original concrete for recycled aggregates and the void ratio of porous concrete with them.

Experimental Study on a Rapid Method for Detection of Low Quality Concrete [in Japanese], Shigemitsu HATANAKA, Hiroshi WATO and Yasuo TANIGAWA*: J. Struct. Constr. Eng. AIJ, No.573, pp.29-35, 2003.11

Strength of concrete in actual structures is often judged lower than that used for structural design. It is considered to occur due to the illegal addition of water during casting procedure, insufficient compaction during construction, deterioration due to aging and severe atmosphere, etc. Such low strength concrete does not make harmful effect to a performance of structure as long as it is subjected to only service loads. Performance of structures in severe condition e.g. in large earthquakes, however, is easily predicted to be greatly affected by the strength of concrete. In the present study, a series of non-destructive tests has been carried out for finding the low strength and therefore low quality concrete in site. Testing items include scratched width by a steel nail, rebound number by a test hammer, ultrasonic velocity, etc. As a result, low quality concrete in structure may be found out rather easily by using such non-destructive testing methods. It is also pointed out that the scratching test is quite effective and easily handled considering the work in site.

3D-FEM Compression Analysis of Cylindrical Concrete Constrained by End Friction [in Japanese], Takashi YOSHIDA, Yukio YOSIDA, Shigemitsu HATANAKA and Eiji MIZUNO*, Proceedings of the Japan Concrete Institute, Vol.25, No.1, pp.365-370, 2003.7

It is well known that the obtained compressive strength and failure mode differ greatly depending on the friction between a specimen and loading plate (end friction) in uniaxial compression test with concrete cylinder. In the present study, a series of elastic FEM analyses has been carried out to find the followings: 1)The distribution of averaged lateral strain is almost the same between the cylindrical and prismatic specimens. 2)The lateral strain distribution changes depending on the end friction. 3)The averaged lateral strain largely depends on the stress distribution of around central axis of a specimen

Experimental Study on Effect of Vacuum Processing Method on Initial Frost Damage of Concrete [in Japanese], Tetsuhiro MAEDA, Shigemitsu HATANAKA, Naoki MISHIMA and Toshitsugu INUKAI: Proceedings of the Japan Concrete Institute, Vol.25, No.1, pp.383-388, 2003.7

It has been pointed out by the authors that the strength development of concrete becomes quite rapid by using vacuum processing method. Purpose of the present study is to examine

experimentally the effect of vacuum processing on the initial frost damage of concrete. A series of experiments has been carried out to find the followings: 1) Large resistant capacity to frost can be obtained by vacuum processing. 2) Degradation of strength is very small during a first process of frost at the age of later than 12 hrs after the casting of concrete.

Experimental Study on Drying Shrinkage of Vacuum Processed Mortar with Various Admixtures [in Japanese], Hiromi KOBAYASHI, Shigemitsu HATANAKA, Toshitsugu INUKAI and Naoki MISHIMA: Proceedings of the Japan Concrete Institute, Vol.25, No.1, pp.461-466, 2003.7

It is easily predicted that the vacuum processing or dewatering by atmospheric pressure is quite effective to reduce shrinkage of concrete due to drying. Also, it has been reported that the effect can be enhanced by the addition of a shrinkage reducing agent. In the present study, a series of experiments has been carried out to examine the change of length of a specimen due to shrinkage by using vacuum processed mortar with various kinds of admixtures. As a result, it has been found that the combination of the vacuum processing and shrinkage reducing agent is quite effective to control the shrinkage crack, so that the shrinkage has been reduced by 45%.

Fundamental Study on Bleeding Behavior in Mortar by Visible Evaluation Method [in Japanese], Toshitsugu INUKAI, Shigemitsu HATANAKA, Naoki MISHIMA and Rinji KANEKO*: Proceedings of the Japan Concrete Institute, Vol.25, No.1, pp.545-550, 2003.7

In the present study, a visible evaluation method has been proposed in order to make clear the behavior of bleeding water in mortar. In the proposed method, bleeding water has been regarded as free water, and the colored liquid as a substitute of the free water has been injected into mortar. A series of experiments has been conducted to examine the effect of various factors on the behavior of the free water e.g. location of injected water, casting method of mortar, and compacting method. As a result, it has been made clear that the behavior of free water in mortar can be recognized by the proposed method.

Fundamental Study on Compaction Mechanism of Mortar Based on the Consolidation Theory [in Japanese], Hiroki HATTORI, Shigemitsu HATANAKA, Naoki MISHIMA and Hiroshi WATO: Proceedings of the Japan Concrete Institute, Vol.25, No.1, pp.881-886, 2003.7

It has been already pointed out by the authors that the strength of concrete in slab members comes to be larger especially in the upper side, and also such internal distribution of strength is quite similar to the distribution of density. The purpose of the present study is to make clear the generation mechanism of such internal strength distribution due to the vacuum processing. In the present paper, as a fundamental stage, a one-degree consolidation theory has been applied to explain the effect of dewatering. Based on the experimental data with mortar, it has been pointed out that the application of the consolidation theory is reasonable.

Experimental Study on a Simple Evaluation Method for Starting Time of Vacuum Processing [in Japanese], Hiroshi WATO, Shigemitsu HATANAKA, Naoki MISHIMA and Akio MURAMATSU*: Proceedings of the Japan Concrete Institute, Vol.25, No.1, pp.1079-1084, 2003.7

It has been pointed out by the authors that the most appropriate opportunity for starting

the vacuum processing is just after the final stage of bleeding in concrete. The bleeding behavior is, however, greatly affected by various factors, so do the appropriate timing of vacuum processing. In the present study, a series of experiment has been carried out to examine the applicability of a proposed simple method for finding the timing. As a result, it has been confirmed that the proposed method is quite useful to judge the timing approximately.

Fundamental Study on Construction Method of Porous Concrete Using Large Size Recycled Aggregate [in Japanese], Naoki MISHIMA, Shigemitsu HATANAKA, Yukihiisa YUASA* and Shinya SUEKI: Proceedings of the Japan Concrete Institute, Vol.25, No.1, pp.1151-1156, 2003.7

The energy consumption and occurrence of fine dust at the crushing process of waste concrete for recycling may be reduced, when the large size concrete rubble from demolition work of concrete structures is used for construction works. In this paper, the manufacturing procedure for the large-size porous concrete using large concrete rubble is discussed to produce the porous concrete products for the retaining wall and fishing banks. In the manufacture of the large-size porous concrete structure, the binder is splayed on the upper site of the concrete rubbles stacked up. Then the concrete rubbles are combined by the binder slipping down the surface of the rubble. The appropriate fluid property and adhesion behavior of the binder are determined to produce the large-size porous concrete structure by such manufacture process.

An Estimation Method of Fresh Properties of Porous Concrete [in Japanese], Hiroya MATSUMOTO*, Toshihisa UCHIDA*, Yukihiisa YUASA* and Shigemitsu HATANAKA: Proceedings of the Japan Concrete Institute, Vol.25, No.1, pp.1211-1216, 2003.7

Porous concrete has been widely used in various application fields especially in Japan. Although a lot of study has been carried out on the performances of hardened porous concrete, few studies on fresh state. In the present study, a simple and time-saving method for evaluating the fluidity of cementing mortar between the time just after mixing and before casting. As a result, it has been found that the fluidity of mortar can be estimated by measuring the flow value of mortar slurried with some amount of additional water.

Size Effect FEM Analysis of Plain Concrete Cylinders with Bleeding Layers [in Japanese], Yukio YOSHIDA, Eiji MIZUNO* and Shigemitsu HATANAKA: Proceedings of the Japan Concrete Institute, Vol.25, No.2, pp.55-60, 2003.7

It is well known that the strength distribution inevitably occurs along the vertical direction in concrete, mainly due to the bleeding of concrete. In the present study, a series of 3-D FEM analysis has been carried out to simulate the compressive deformation and failure behavior of cylindrical concrete specimen. As a result, followings have been found. 1)A proposed analytical method is effective to simulate the post peak behavior of concrete up to a large strain level. 2)The damage of concrete can be quantitatively evaluated by introducing a proposed index of equivalent strain f .

3-D FEM Compression Analysis on Confining Effect inside Square RC Columns with Different Sizes [in Japanese], Makoto ITOU*, Eiji MIZUNO* and Shigemitsu HATANAKA: Proceedings of the Japan Concrete Institute, Vol.25, No.2, pp.73-78, 2003.7

A series of 3-D FEM analysis has been carried out to simulate the deformation and failure behavior of rectangular RC columns with various sizes subjected to axial load. In the present paper, discussion has been carried out on the confining effect of lateral reinforcement, concerning the ratio of lateral reinforcement, size ratio of RC columns, and concrete strength. The confining effect has been evaluated with two parameters of η (confining efficiency) and β (coefficient of confinement) by using proposed index of $\eta\beta$ (equivalent lateral pressure). As a result, followings have been found: 1) The confining efficiency decreases with the increase of ratio of lateral reinforcement. 2) The confining efficiency is dependent on the confining pressure and concrete strength. 3) The size effect of confining efficiency is different depending on the concrete strength.

On Failure Influence Zone of RC Columns subjected to Constant Axial Compression and Lateral Forces [in Japanese], Keigo MIZUTANI*, Eiji MIZUNO* and Shigemitsu HATANAKA: Proceedings of the Japan Concrete Institute, Vol.25, No.2, pp.79-84, 2003.7

It has been pointed out that the length of failure or severely damaged zone is dependent on the discrete element length in and around the lower portion of the RC columns. In the present study, a series of FEM analyses has been carried out by using finite element code (FEAP) for the laterally loaded RC columns with different element lengths and different concrete strengths. In the present paper discussion has been carried out on the effect of the above factors on the loading capacity and failure inducing zone of the RC columns.

Limit Analysis of Masonry Wall with Rectangular Openings by Equivalent Shear Panel Model, Toyofumi TAKADA, Takayoshi AOKI and Claudio GENOVESE: Proc. of the 8th Int. Conf. on Structural Studies, Repairs and Maintenance of Heritage Architecture, pp.297-306, 2003

The present study deals with the limit analysis of masonry walls with rectangular openings by an equivalent shear panel model. Based upon experimental results, in-plane failure patterns of single masonry walls with rectangular openings are categorized into 4 collapse mechanisms. The equivalent shear panel model can evaluate strength for typical in-plane failure patterns due to earthquake damages. By means of the present model the limit analysis of masonry walls can be formulated as a searching problem for a collapse mode with minimum failure load. In this study, the genetic algorithm (GA) is applied to the problem, and the application of both the GA and the present shear panel model is illustrated in a numerical example of a masonry wall with rectangular openings subjected to constant vertical and incremental horizontal loads.

Application of multiobjective optimization method to structural design of frame structures, Toyofumi TAKADA and Keigo MATSUSHIMA: Research Reports of the Faculty of Engineering Mie University, Vol.28, pp.61-71, 2003

The present paper deals with the application of the multiobjective genetic algorithm (MOGA) to elastic design of frame structures. This design problem is formulated as a multiobjective optimization problem, which is to find cross-sectional size of members, such that the total volume, the maximum stress of members and the maximum nodal displacement are minimized. The MOGA can provide a trade-off relationship between objective functions, which is useful for final decision making in practical design. The application of the MOGA is illustrated in numerical examples of truss and rigid frame structures with discussion on properties of both design

solutions and the trade-off relationship between the objective functions.