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UNIVERSITI TEKNOLOGI MALAYSIA



IGCES 2008

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PROGRAMME OF IGCES2008

International Graduate Conference on Engineering and Science, 2008

23-24 December 2008, Universiti Teknologi Malaysia, Skudai - Johor

Tuesday - 23 December 2008, venue: Theater Hall and Lecture Room, N24 Building - UTM

8.00 am	Registration
9.30 am	Welcoming Speech by Chairman of the Organizing Committee of IGCES2008,
9.45 am	Keynote Address by Prof. Dato' Ir. Dr. Zaini bin Ujang Vice-Chancellor of Universiti Teknologi Malaysia (UTM) Malaysia <i>Theme: Innovative Technology Development Toward Better Life in Research University</i>
10.15 am	Opening of the Conference by Vice-Chancellor of UTM
10.30 am	<i>Tea Break</i>
11.00 am	<u>PLENARY SESSION</u> <i>Session Chair: Prof. Dr. Rose Alinda Alias</i>
11.00 am	Plenary paper I by Prof. Dr. Ir. I Nyoman Sutantra Head of Research Centre of Institut Teknologi Sepuluh Nopember (ITS) Surabaya - Indonesia <i>Theme: Developing Technology toward Better Human Life</i>
11.30 am	Plenary Paper II by Prof. Dr. Ir. Djoko Santoso, M.Sc. Rector of Institut Teknologi Bandung (ITB) Indonesia <i>Theme: Developing Innovative Technology in Higher Education Toward Asia Economic Rise.</i>
12.00 pm	<i>Lunch Break</i>
1.30 pm	<u>PAPER PRESENTATION - PARALLEL SESSION 1</u>
	ROOM 1 Venue: Theater Hall 7 (Dewan Kuliah) 7 of N24 <i>Subjects: Energy, Electrical and Communication</i>
	ROOM 2 Venue: Theater Hall (Dewan Kuliah) 8 of N24 <i>Subjects: Mechanical Engineering</i>
	ROOM 3 Venue: Theater Hall (Dewan Kuliah) 9 of N24 <i>Subjects: Computing and Information Technology</i>
	ROOM 4 Venue: Lecture Room (Bilik Kuliah) 1 of N24 <i>Subjects: Civil Engineering and Architecture</i>
	ROOM 5 Venue: Lecture Room (Bilik Kuliah) 2 of N24 <i>Subjects: Fundamental Science, Chemical engineering, & Petroleum Engineering</i>
	ROOM 6 Venue: Lecture Room (Bilik Kuliah) 3 of N24 <i>Subjects: Biomedical and bio-technology</i>
3.30 pm	<i>Tea Break (POSTER SESSION)</i>
4.00 pm	<u>PAPER PRESENTATION - PARALLEL SESSION 2</u>
	ROOM 1 Venue: Theater Hall 7 (Dewan Kuliah) 7 of N24 <i>Subjects: Energy, Electrical and Communication</i>
	ROOM 2 Venue: Theater Hall (Dewan Kuliah) 8 of N24 <i>Subjects: Mechanical Engineering</i>
	ROOM 3 Venue: Theater Hall (Dewan Kuliah) 9 of N24 <i>Subjects: Computing and Information Technology</i>
	ROOM 4 Venue: Lecture Room (Bilik Kuliah) 1 of N24 <i>Subjects: Civil Engineering and Architecture</i>
	ROOM 5 Venue: Lecture Room (Bilik Kuliah) 2 of N24 <i>Subjects: Fundamental Science, Chemical engineering, & Petroleum Engineering</i>
	ROOM 6 Venue: Lecture Room (Bilik Kuliah) 3 of N24 <i>Subjects: Computing and Information Technology</i>
5.45 pm	End of day 1 programme.
7.15 pm	Welcoming party: Participants to be ready at Senate Building foyer (near Masjid Sultan Ismail,UTM)
7.30 pm	All participants go to DANGA BAY by bus (provided by Committee)
8.30 pm	Dinner Party in Asiana Restaurant - DANGA BAY

Note: For details of papers to be presented (Title, Name of the Author(s)/ Presenter) please see the Presentation Schedule

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Wednesday - 24 December 2008, venue Theater Hall and Lecture Room, N24 Building of UTM

08.30 am

PAPER PRESENTATION - PARALLEL SESSION 3

- ROOM 1 Venue: Theater Hall 7 (Dewan Kuliah) 7of N24
Subjects: Energy, Electrical and Communication
- ROOM 2 Venue: Theater Hall (Dewan Kuliah) 8 of N24
Subjects: Mechanical Engineering
- ROOM 3 Venue: Theater Hall (Dewan Kuliah) 9 of N24
Subjects: Computing and Information Technology
- ROOM 4 Venue: Lecture Room (Bilik Kuliah) 1of N24
Subjects: Civil Engineering and Architecture
- ROOM 5 Venue: Lecture Room (Bilik Kuliah) 2 of N24
Subjects: Chemical engineering, Petroleum, Applied Science and Nanotechnology
- ROOM 6 Venue: Lecture Room (Bilik Kuliah) 3 of N24
IT, Business, Management, and Education Technology

10.30 am

11.00 am

PAPER PRESENTATION - PARALLEL SESSION 4

- ROOM 1 Venue: Theater Hall (Dewan Kuliah) 7of N24
Subjects: Energy, Electrical and Communication
- ROOM 2 Venue: Theater Hall (Dewan Kuliah) 8 of N24
Subjects: Mechanical Engineering
- ROOM 3 Venue: Theater Hall (Dewan Kuliah) 9 of N24
Subjects: Computing and Information Technology
- ROOM 4 Venue: Lecture Room (Bilik Kuliah) 1of N24
Subjects: Civil Engineering and Architecture
- ROOM 5 Venue: Lecture Room (Bilik Kuliah) 2 of N24
Subjects: Chemical engineering, Petroleum, Applied Science and Nanotechnology
- ROOM 6 Venue: Lecture Room (Bilik Kuliah) 3 of N24
IT, Business, Management, and Education Technology

12.45 pm

Lunch Break

1.45 pm

PAPER PRESENTATION - PARALLEL SESSION5

- ROOM 1 Venue: Theater Hall 7 (Dewan Kuliah) 7of N24
Subjects: Energy, Electrical and Communication
- ROOM 2 Venue: Theater Hall (Dewan Kuliah) 8 of N24
Subjects: Mechanical Engineering
- ROOM 3 Venue: Theater Hall (Dewan Kuliah) 9 of N24
Subjects: Computing and Information Technology
- ROOM 4 Venue: Lecture Room (Bilik Kuliah) 1of N24
Subjects: Civil Engineering and Architecture
- ROOM 5 Venue: Lecture Room (Bilik Kuliah) 2 of N24
Subjects: Chemical engineering, Petroleum, Applied Science and Nanotechnology
- ROOM 6 Venue: Lecture Room (Bilik Kuliah) 3 of N24
There are no more papers to be presented in room 6

3.45 pm

Closing Ceremony

4.15 pm

Tea Break and Certificate for Presenter and Participant Taking Over

5.00 pm

End of 2nd day programme and end of IGCES2008.

Note: For detail papers to be presented (Title, Name of the Author(s), and Presenter see the Presentation Schedule

E.27 Utilization of Compressed Sugi Dowels to affect the performance of Wood Floor System

Author: 1. Yakni Idris 2. Anis Saggaff 3. Kohei Komatsu

E.28 Beam to Column Partial Strength Composite Connections Using Trapezoid Web Profiled (TWP) Sections

Author: 1. Anis Saggaff 2. Mahmood Md. Tahir 3. Shahrin Muhammad 4. Arizu Sulaiman

E.29 Tsunami Run-Up on a Vegetated Coastal Slope - A Literature Review and Future Study

Author: 1. Nor Eliza binti Alias

F. Business and Management

F.1 Factors, Advantages and Disadvantages of Internet Financial Reporting: An Exploratory Study

Author: 1. Mohd Noor Azli Ali Khan 2. Noor Azizi Ismail

F.2 Component Commonality for Quality and Lead Time Uncertainties in Manufacturing

Author: 1. Md. Abdul Wazed 2. Shamsuddin Ahmed 3. Nukman Yusoff

F.3 A Proposed Manufacturing Performance Measures for Malaysian Automotive Small and Medium-sized Enterprises (SMEs)

Author: 1. Elita Amrina 2. Sha'ri Mohd. Yusof

F.4 INFLUENCE OF ADVERTISING PROGRAM IMPLICATION VIA INTERNET AND MARKETING VIA E-MAIL AGAINST ADVERTISING INFORMATION PROCESSING AND ALSO ITS IMPLICATION AGAINST PURCHASING DECISION TO SAN MIGUEL INDONESIA Ltd., (Studi cases IN DEPOK - BEKASI REGIONS)

Author: 1. Lina Andriani 2. Mohammad Abdul Mukhyi 3. Mujiyana Mujiyana

F.5 ANALYSE DISGRUNTLED OF CUTOMER : APPROACH OF BALANCED SCORECARD (case study in PT. HYUNDAI of CAR INDONESIA)

Author: 1. Nurul Fadillah 2. Mohammad Abdul Mukhyi

F.6 IMPACT OF FOOD INDUSTRY APPLICATION ADVERTASING AT INTERNET AND MARKETING BY E-MAIL TOWARD PROCESSING INFOARMATION AND BUYING DECITION

Author: 1. Mujiyana Mujiyana 2. Mohammad Abdul Mukhyi

F.7 A Review of the Relationship between Drivers of Organizational Innovation and Innovativeness in Malaysian House-building industry

Author: 1. Mohammed kamaruddeen Ahmed 2. Nor Aini Yusof 3. ILias Said

F.8 Telecommunications privatization in developing countries towards jointing the WTO

Author: 1. Hoda Ghaffari

F.9 The role of knowledge management in innovation

Author: 1. Iraj Imani 2. Farhad Shirani

F.10 Virtual Environments Innovation and R&D Activities: Management Challenges

Author: 1. Nader Ale Ebrahim 2. Shamsuddin Ahmed 3. Zahari Taha

G. Fundamental Science

G.1 Surface Morphology and Lateral Distribution of Self-assembled In_{0.5}Ga_{0.5}As Nanostructures Grown on GaAs (100) Substrates

Author: 1. Didik Aryanto 2. Zulkafli Othaman 3. Abd Khamim Ismail 4. Shahrizar Roslan 5. Rosnita Muhammad

G.2 Capacitated Arc Routing Problem With Time Window in Solid Waste Operation

Author: 1. Mohammad Fadzli Ramli 2. Assoc. Prof. Dr. Zuhaimy Ismail

G.3 Effect of excess MgO molar ratio in Crystallization and Phase Evolution of cordierite synthesized by crystallization of glass method using talc and kaolin

Utilization of Compressed Sugi Dowels to affect the performance of Wood Floor System

Yakni Idris¹, Anis Saggaff¹, Kohei Komatsu²

1. Civil Engineering Department, Sriwijaya University, Palembang, Indonesia

2. Research Institute of Sustainable Humanosphere, Kyoto University, Gokashu, Uji Kyoto 611-0011 Japan

An experimental study of the lateral shear performance of wood floor system sheathed with thick sugi plywood using compressed sugi dowels is described. The objective of this investigation are 1) to study the in-plane shear resistance of wood floor system sheathed with sugi timber dowels, 2) to determine the effects of the number of compressed sugi dowels on the performance of wood floor system.

In this study, 3 specimens of wooden floor system were tested. Each of wooden frame floor system consists of 2 horizontal beams, 3 vertical beams, 4 horizontal supporting beams. All beams were made of solid wood of Japanese pine (Sugi). Each specimen consists of 6 floor panels which are nailed to the wood frame floor system by sugi timber dowels. Each specimen use different number of compressed sugi dowels on the edge of each floor panels, that is, 3, 4, and 5 sugi dowels. From this study, results indicate that the number of compressed sugi dowels will significantly affect lateral shear performance of wood floor system.

Keywords: lateral shear performance, floor system, sugi plywood, compressed sugi dowels.

1. Introduction

While seemingly ordinary in construction, the wood floor system is a very complex structural system that includes various types of load bearing members and connections. In the connection of the wood-members in wooden houses, the nail, bolt, and steel connector which are superior in strength reliability and workability are often used. However, the removal of the nail, bolt, and steel connector is needed when these wood-members are recycled or reused. Considering cost for these works, a substitution method of these connections using timber dowel is thought.

Research has been conducted in the past to study in-plane shear resistance of wall panels in residential buildings. Shipp, Castle, et.al (1999) conducted cyclic load testing on plywood sheathed shear walls on wood framing, using code required bolted or nailed hold-down devices installed at the inside of the end post. Komatsu, Hwang and Itou (2002) performed static cyclic lateral loading tests on nailed plywood shear walls, and proposed a simplified calculation method for predicting shear deformation of semi-rigid glulam portal frame with nailed plywood shear wall panel. Komatsu, Idris, et.al (2004) performed the experimental in-plane shear resistance of LVB floor panels

which were made from Larch, Radiata Pine, and Falcata .

An experimental investigation has been conducted at RISH, Kyoto University, to study lateral shear performance of wood floor system sheathed with thick sugi plywood using compressed sugi dowels.

2. Materials and Methods

The dimension of floor panels was 35 mm in thickness, 850 mm in width and 850 mm in length. Each frame floor system consists of 4 horizontal beams (1810mm in length, with cross section of 120 mm in width by 180 mm in height), 3 vertical main beams (2580mm in length each), 2 vertical main beams (2730mm in length, with cross section of 150 mm in width by 240 mm in height), and 1 vertical supporting beam (2730mm in length, with cross section of 120 mm in width by 180 mm in height). Each specimen consists of 6 floor panels of thick sugi plywoods. These sugi plywoods are embedded into the floor beams by handpressing and then nailed to the wood frame floor system by sugi dowels of 12mm in diameter and 100mm in length. Each specimen use 3 different number of sugi dowels as shown in Figure 1, 2, 3, and 4.

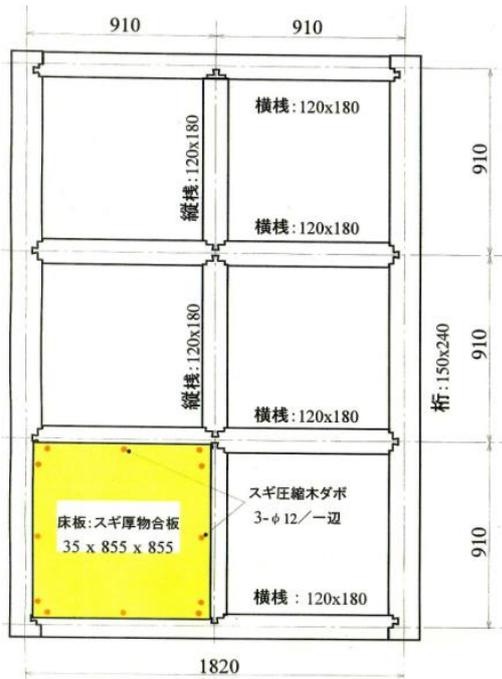


Figure 1. Specimen Model

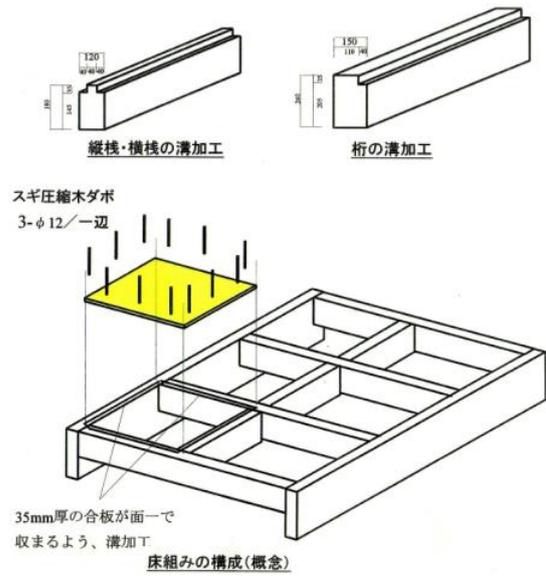


Figure 2. Specimen #1 with 3 dowels on each edge

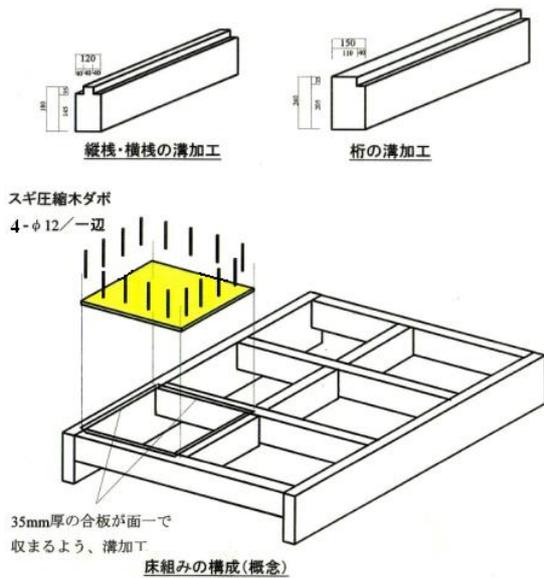


Figure 3. Specimen #1 with 4 dowels on each edge

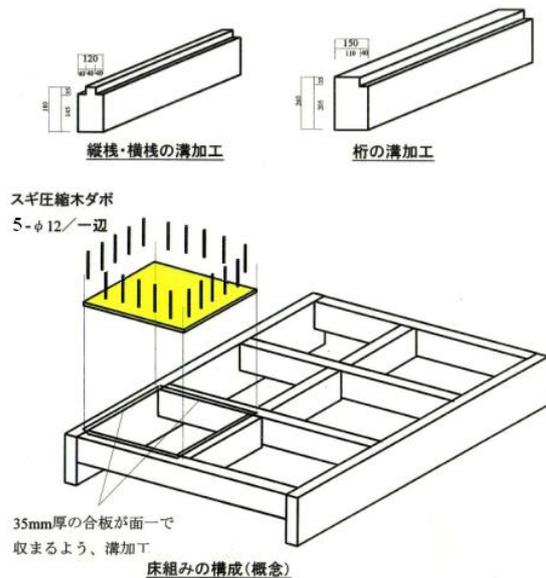


Figure 4. Specimen #1 with 5 dowels on each edge

Test panels specimens were attached at the sill plate to a rigid steel I beams, bolted to the steel I beams. The test panel was vertically braced against out-of-plane movement with steel tie rods, but was allowed to rotate and displace in the plane of the panel (cantilever wall condition). The loading ram was operated cyclically by a computer under displacement control at a frequency and magnitude of displacement in conformance with the testing protocol. No superimposed vertical load on the

panel other than the self-weight and the weight of the loading channel was present during the test. The weight of these elements was considered to be negligible (See Figure 5, 6, 7, 8 and 9).

Under cyclical displacement control, the net force at the top of the test panels was recorded using a load transducer installed in-line with the hydraulic loading ram, and net displacement at the top of the test panels was also recorded using a displacement transducer.



Figure 5. Floor beams system



Figure 6. Sheathing floor beams with sugi plywood



Figure 7. Sugi dowels



Figure 8. Nailing sugi dowels to panels



Figure 9. Testing the specimen

In addition, at the bottom of the test panels, 3 linear variable displacement transducers (LVDTs) for recording relative displacement vs. time and net force were wired for input into a computer workstation.

During the cyclical testing, relative displacement between the following components was electronically measured and recorded, as a function of time and the racking shear force at the top of the panel:

- Horizontal displacement at the top panel
- Horizontal and vertical displacement at the bottom of the test panels, relative to the rigid base .

3. Results and Discussions

Load (P) – Deformation angle (γ) relationship from 3 specimens are shown in Figure 10, 11, and 12.

At present in Japan, it is widely acceptable to estimate shear wall performance by using so called 'perfect bi-linear approximation' method.

Figure 13 shows definitions and schematic explanation of the perfect bi-linear method. The Japan Housing and Wood Technology Center proposed this method, and the calculation is performed as follows. Firstly, an envelope curve of P - γ relationship should be drawn at least for the data in the quadrant in which last loading was performed. Secondly, by using $0.1P_{max}$, $0.4P_{max}$, and $0.9P_{max}$, a yield load P_y and initial stiffness K are determined. At last, P_u is determined so as to equalize the trapezoid area enclosed by line V, VI and γ_u to the S area enclosed by the envelope curve.

Experimental data was analysed by using enveloped data and perfect bi-linear value, and Load (P) – Deformation angle (γ) relationships are shown in Figure 14, 15 and 16.

Observed and calculated quantities using perfect bi-linear plot for the specimen are tabulated in Table 1.

Using observed and calculated quantities from perfect bi-linear plot, Floor Strength Index is approximated and calculated by equation (1) and (2) as follows:

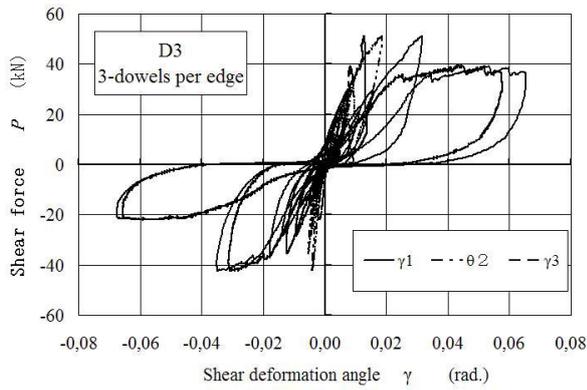


Figure 10. Shear force vs shear angle of Spec#1 with 3 dowels

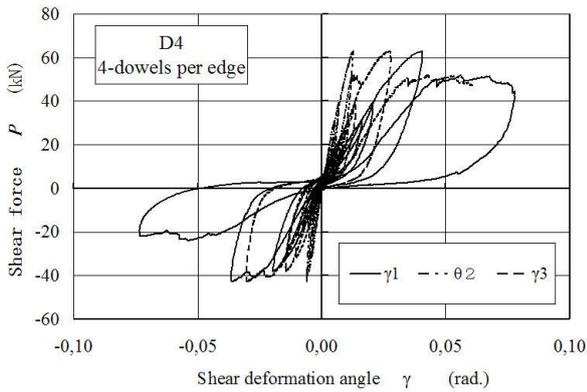


Figure 11. Shear force vs shear angle of Spec#2 with 4 dowels

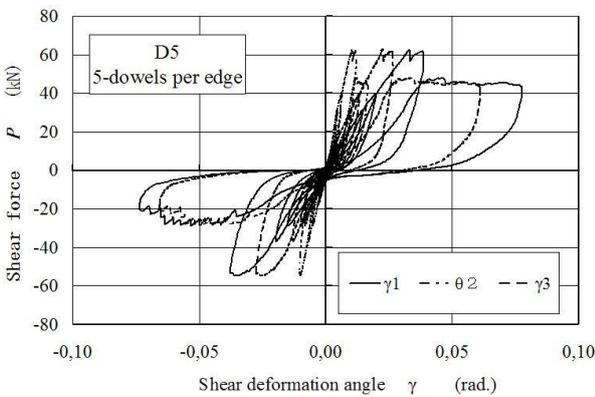


Figure 12. Shear force vs shear angle of Spec#3 with 5 dowels

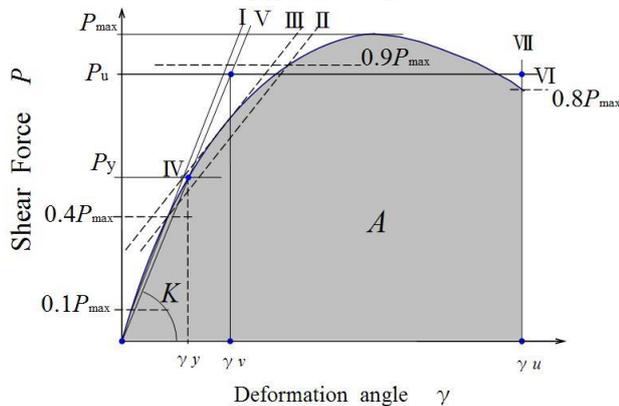


Figure 13. Perfect bi-linear approximation

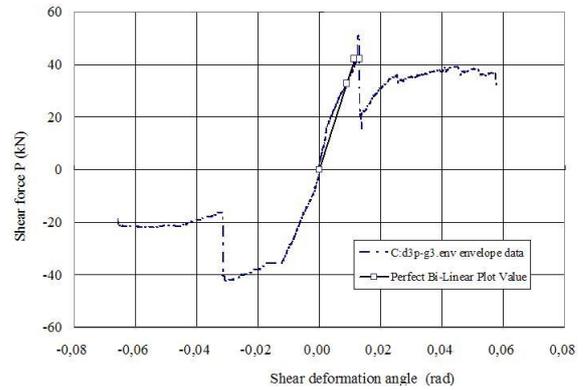


Figure 14. Shear force vs shear angle of Spec#1 by perfect bi-linear method

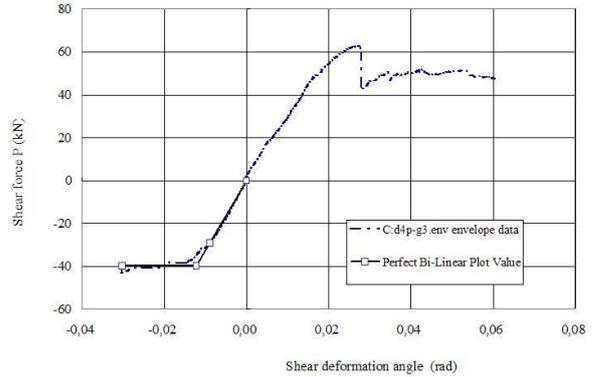


Figure 15. Shear force vs shear angle of Spec#2 by perfect bi-linear method

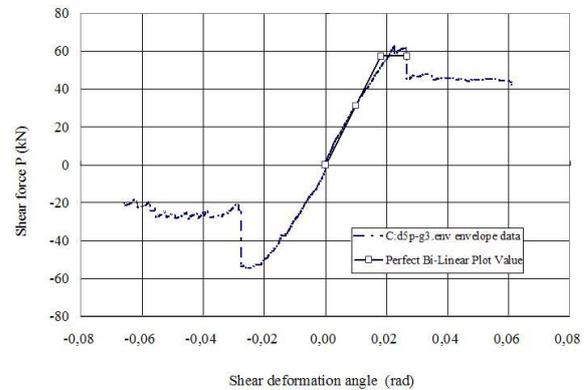


Figure 16. Shear force vs shear angle of Spec#3 by perfect bi-linear method

$$P_a = \text{Minimum} \left\{ \begin{matrix} P_{max} \\ P_{1/150} \\ P_y \\ 0.2 \frac{P_u}{D_s} \end{matrix} \right\} \quad (1)$$

where:

P_{max} = Observed maximum shear force

$P_{1/150}$ = Shear value observed at shear deformation angle of 1/150 radian

P_u = Ultimate shear value

$$D_s = \frac{1}{\sqrt{(2\mu - 1)}} \quad \text{and} \quad \mu = \frac{\gamma_u}{\gamma_v};$$

μ = ductility factor

Table 1. Observed and calculated quantities for the specimen

Specimen	Pmax(kN)	Py(kN)	Pu(kN)	γ_y (rad)	γ_v (rad)	γ_u (rad)	K(kN/rad)
3 dowels	51.0657	32.7073	42.174	0.00884709	0.0114077	0.013156	3696.95
4 dowels	42.8615	29.174	39.759	0.00889035	-0.012116	-0.030151	3281.51
5 dowels	62.7062	31.1871	57.332	0.00992375	0.0182431	0.0266615	3142.67

Table 2. Observed and calculated quantities for Floor Strength Index

Specimen	μ	Ds	L(m)
3 dowels	1.15325	0.874873563	1.82
4 dowels	2.48856	0.501436164	1.82
5 dowels	1.46146	0.721139678	1.82

Table 3. Calculated quantities for Floor Strength Index

Specimen	2/3Pmax(kN)	P1/150(kN)	Py(kN)	0.2Pu/Ds	Pa(kN)	Floor Strength Index
3 dowels	34.044	27.894	32.707	9.641	9.641	2.703
4 dowels	28.574	22.998	29.174	15.858	15.858	4.446
5 dowels	41.804	21.987	31.187	15.900	15.900	4.457

$$\text{FloorStrengthIndex} = \frac{Pa}{1.96L} \quad (2)$$

where:

L = floor length (m)

Calculated quantities for approximation of Floor Strength Index are shown in Table 2 and Tabel 3.

It should be noted from the calculation above that, Floor Strength Indexes are high and strong if compared with the Standard Floor Strength Index which is 3. The reason is that, in this experimental study, only one replicate of each specimen was used. Consequently, those numbers should be reduced to account for the coefficient of variations of the specimens. Other reason is partly because the size of the floor beams is very thick and the sugi plywood configuration is embedded into the floor beams. The shear deformations of embedded sugi plywood were mostly restrained by the floor beams. Floor Strength Indexes are all determined by ductility factors.

4. Conclusions

Experimental results of of the lateral shear performance of wooden floor system sheathed with thick sugi plywood using compressed sugi dowels were explained in this paper.

From Floor Strength Index in this investigation, it is found that wooden floor system sheathed with thick sugi plywood using 5 compressed sugi dowels per edge has the strongest lateral shear resistance. And wooden floor system sheathed with thick sugi plywood using 3 compressed sugi dowels per edge has the least strong lateral shear resistance.

In this study, results indicated that the number of compressed sugi dowels significantly affected lateral shear performance of wood floor system.

Acknowledgements

The authors would like to express their sincere thanks to the financial support from JSPS

References

- [1] Jonathan Shipp., Teresa Castle.,et.al (1999), Results of Cyclic Load Testing for shear resistance of wood framed plywood shear walls with USP lumber connector hold-downs, Technical Report EQE Project Number 200674.01, Montgomery, MN,p3-19.
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- [4] Oshiumi S (2000): Testing and evaluation method for the elements in post and beam structures, Kentiku Gijyutu 608:174-179.