Title	The improvement of single-braced shear wall system
Author(s)	Murakami, Satoru
Citation	Sustainable humanosphere : bulletin of Research Institute for Sustainable Humanosphere Kyoto University (2008), 4: 55-55
Issue Date	2008-09-01
URL	http://hdl.handle.net/2433/182087
Right	
Type	Departmental Bulletin Paper
Textversion	publisher

The improvement of single-braced shear wall system

Satoru Murakami

In Japanese conventional wooden residential houses, braced shear wall is one of the most popular shear walls. However, the strength of single-braced shear wall is different when the brace is subjected to compression and when subjected to tension. Therefore, two different directions of single-braced share walls have to be arranged in series, which has been one of the restrictions for structural designing of houses. The main reason of difference in strength between compression and tension was poor performance of brace connection, which tends to be composed of insufficient quantity and quality of fasteners in many cases. On the other hand, when compression is applied to the brace between sill and beams, single-braced shear wall could show higher strength performance, with a support by supplemental columns. In consequent, the strength of the braced shear wall when the brace member was subjected to compression was about twice as much as the case of tension.

The objective of this research is to develop a single-braced shear wall system, which has same performance both in tension and compression, and simultaneously has a shear resistance factor (SRF) of 3.0. For this aim, it is considered that the end connection of brace has to be progressed in tensile strength. In this research, two kinds of improvements were introduced on the end joint of brace.

First, a new LVL was introduced to make the variation of the strength of the brace joint lower. This LVL product is made of alternately laminating two different species of tropical wood; rubber wood *(Hevea brasiliensis)* and falcata (*Paraserianthes falcataria*). Secondly, the screw, which is used on the hardware to fasten the brace, was improved so as to have optimum diameter and material character to carry the load. Then the shear wall tests were performed to verify the performance of improved brace system.

LVL made of rubber wood and falcata can make the variation of the strength of the brace joint lower, and it made it possible to improve the tensile property of that. The developed screw showed high shearing strength and deformation performance. The shear wall evaluation test was done based on these results. In consequent, performances higher than a share resistant factor of 3.0 in tension and compression could be obtained in LVL types as shown in Table1.

Table 1. Evaluation test results

	Compression				Tension			
	Douglas fir		LVL		Douglas fir		LVL	
	Ave	Lower limt	Ave	Lower limit	Ave	Lower limit	Ave	Lower limit
Pmax	18.6	17.4	18.0	16.4	11.2	11.1	13.3	13.1
Py	11.5	10.8	10.5	9.8	6.2	6.0	7.6	7.0
(0.2/Ds)· Pu	8.9	8.6	6.6	5.9	5.5	4.4	7.5	7.2
2/3Pmas	12.4	11.6	12.0	10.9	7.5	7.4	8.9	8.7
P1/120	9.1	8.6	7.1	6.9	8.6	8.4	8.0	7.7
SRF	4.8		3.3		2.4		3.9	