SEISMIC RETROFIT OF RC FRAME WITH EXPANDED METAL

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1. INTRODUCTION

Past earthquake events reveal that small buildings located in the northern part of Thailand are at risk to be damage during ground shaking. Particularly, the columns of commercial buildings are likely to be failed due to soft story. In addition, the ground floor columns have lower stiffness and strength than the beams, the columns are susceptible to be damage due to flexural failure. Therefore, the retrofit of columns and beams is necessary to prevent the damage under the earthquake load.

2. METHODOLOGY

The experiment was conducted to for the existing frame and the retrofitted frame. The dimension of the reinforced concrete frame was 3.75x3.00 meters with the column section of 0.25x0.25 m and beam 0.20x0.40 m. The size of expanded metal was XS-63 according to JIS G3351-87 [1]. The specimens were subjected to lateral load using displacement control according to FEMA461 [2] up to failure.

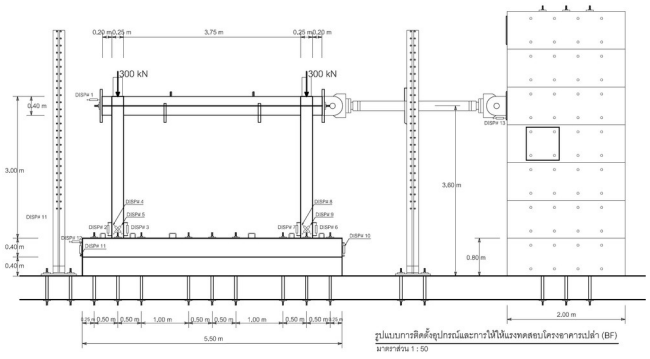

Figure 1. Test setup for the RC frame

3. RESULTS

The existing frame specimen (BF) was tested up to 3.5% drift. The yield strength and the maximum lateral strength were 60 kN and 70.25 kN, respectively. The retrofitted frame specimen (BFS) was tested up to 4.0% drift. The yield strength and the maximum lateral strength were 80 kN and 100 kN, respectively. The maximum strength of the retrofitted specimen (BFS) was 42% greater than the existing frame (BF).

Figure 2. The strengthened frame under lateral load test

Table 1. Maximum strength of the BF and BFS

Specimens	Maximum Strength	Strength Capacity
Existing Frame	70.25	1
Retrofit Frame	100.00	1.42

4. CONCLUSIONS

The maximum strength of the retrofitted specimen (BFS) was 42% greater than the existing frame (BF). The improvement is due to the effect of the expanded metal and ferrocement that enhance of the moment capacity of the retrofit frame.

5. REFERENCES

[1] Japanese Standards Association. Expanded Metal Standard by Japanese Industrial Standard. *JIS G3351, 1987.*

[2]Federal Emergency Management Agency. (2007). FEMA. Interim Testing Protocal for Determining the Seismic Performance Characteristics of Structural and Nonstructural Components. *Report no. FEMA 461*. Redwood City, 2007.

6.AUTHOR BIOGRAPHIES

Phaiboon Panyakapo received D. Eng. in Structural Engineering from Asian Institute of Technology (AIT), Thailand and is currently the Professor in Civil Engineering, School of Engineering, Sripatum University (SPU), Thailand. Prof. Panyakapo involved with seismic design of buildings, precast concrete design, performance based design and seismic retrofit of buildings. Currently, he is the Editor of the journal, Sripatum Review of Science and Technology.