REMARKS BY M. WAKABAYASHI*, CHAIRMAN OF THEME 11B

Presented in this session were the papers on the behavior of structural members, connections and overall structural systems under the statically or dynamically applied monotonic or repeated loads. Among twenty two of Type A and eleven of Type B papers originally programmed nineteen of Type A papers and some of Type B papers were orally presented, being followed by discussions. Two of Type A papers were fransferred to the Session 11A, and the author of a Type A paper was absent.

Nine of Type A papers were on the reinforced concrete structures, six on the steel structures, and seven on the masonly structures; they were nearly equally distributed into three categories. Four of nine papers on the reinforced concrete structures were from Japan, two each from U.S.A. and New Zealand, and one from Rumania. It seems remarkable that all papers on the steel structures came from Japan, while five of seven papers on the masonry structures were from U.S.A., two from Yugoslavia and none from Japan. This indicates that the steel structures are more frequently constructed in Japan than in other earthquake countries, and on the other hand, the construction of the masonry structures is very rare, and accordingly the investigation on this system is few in Japan. The masonry structures are still most popularly constructed in the earthquake area, and this is one of the reasons of the large scale human damage caused by the earthquake. Therefore, it is urgently needed for the international organizations such as United Nations and economically developed countries to support the investigations on the masonry structural system.

Four papers were presented concerning the shear strength of the reinforced concrete connection panel, on which investigations started recently. The failure mechanism of the panel is not yet clearly known, and thus the formula for the shear strength of the panel is still empirical. A rigorous design rule of the connection panel must be established; many of the design codes do not describe the shear strength of the panel at the present moment. Two philosophies may be considered for the design of the reinforced concrete connection panel; the one neglects the resistance of a part of the panel in which the concrete strength deteriorates due to the repeated loading in the large deformation range, and the other puts the design basis on the maximum resistance provided from concrete. Extensive discussions on this point may be needed. Another important problem is the slip of the main reinforcement in the panel. A participant pointed out in the session that the ratio of the diameter of the reinforcement to the column size is restricted by the code in New Zealand, in order to avoid the deterioration of the panel strength due to the slip of reinforcement. In usual cases, the slip of the beam-reinforcement is well considered, but however the effect of the slip of the column-reinforcement should be also investigated.

The simulation results by the computer-actuator on-line system were presented, that combined the dynamic test of a steel beam with the response analysis simultaneously conducted by the digital computer. This may be a

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good answer to the question as to what loading program should be adopted, which frequently arises in the experimental work on the structural behavior under the repeated loading. A few investigation on the behavior of braces have been reported since Fifth World Conference on Earthquake Engineering. Some of the presented papers in this session concerned the experimental and theoretical investigations on the braces with more realistic boundary conditions, and others concerned the formulation of the brace behavior in order to make the dynamic analysis of an overall braced frame possible. The experimental and theoretical work on the steel structures in the past has been limited to the range where the local buckling does not take place. A paper presented in this session dealt with the post-local buckling behavior of steel beam-columns, which will become a topic of great importance in the future.

As to the masonry structures, few research has been reported up to now. However, it is congratulable to find in this session several excellent fundamental investigations on the behavior of piers and walls under static loads and on the dynamic behavior of walls. More development is expected.