論 文 の 内 容 の 要 旨

論文題目　Experimental investigation of mechanism at ultimate drift capacity in reinforced concrete beams subjected to reversed cyclic loading
（繰り返し載荷を受ける鉄筋コンクリート梁の終局変形限界機構に関する実験的研究）

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RC beams subjected to reverse cyclic loading in simulate earthquake response exhibit much lower deformation capacities as compared to beams in monotonic loading. In the strength-based design procedures, this phenomenon was not important as ultimate strength is not significantly affected by cyclic loading. With the advent of performance-based design, accurate and reliable assessment of deformation capacity has become increasingly important for economic and efficient design.

In this study, nineteen beam specimens designed with various parameters reported to influence deformation capacity were tested. An innovative measurement scheme using digital cameras and the principles of photogrammetry was implemented to record detailed deformation patterns.

Test results indicated minimal effect of shear strength related parameters such as concrete strength and transverse reinforcement strength on ultimate drift capacity. Transverse reinforcement content, however, was consistently found to affect ultimate state response. Bulging of hinge region and longitudinal reinforcement was observed to accompany loss of strength after cyclic loading at large deformations.

On the basis of these observations, a new mechanism determining the ultimate

state of response was proposed using the axial force-moment interaction model of plastic rebar sections deforming laterally. Photogrammetric observations were used to analytically verify the proposed mechanism. In the view of this mechanism, design recommendations are made to effectively improve drift capacity and plastic response of flexural members in seismically resistance moment frames.

In addition, experiment data was analyzed to review secondary aspects of ultimate state response. Estimation of ultimate strength and post-yield stiffness is discussed and compared with conventional calculations. Performance states defined in performance-based design standards are illustrated with the help of damage states recorded during the experiment.