

Seismic Performance Evaluation of Diagrid Components

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Abstract : Recently, there have been various high-rise building projects which reflect unique inspiration from architects to their feature. And it is frequently found that some of these buildings have diagrid structural system. Diagrid system provides engineers many options for structural plan, since it has triangular module so it can form a number of complex shapes. Unlike braced frame systems, diagonal members in diagrid system resist gravity and horizontal loads simultaneously. Correspondingly, diagrid members take roles of both beams and columns, and it is expected that their ductile capacity may depend on the amount of gravity loads. However, not enough studies have been made for this issue so far, which means that there is demand of examination on the seismic behavior of diagrid members under large gravity loads. Therefore, in this study, the ductile capacity of diagrid members was evaluated through analytical and experimental method. Several cases that have different vertical load condition were set up for both approaches to consider the effect of initial compression force due to gravity load. Regarding the result, it was found that buckling in a diagonal member occurs at smaller drift angle when larger gravity load acts on the specimen, which also reduces the amount of energy dissipation. It means that axial stress in a diagonal member reaches critical buckling force early due to the combined axial force from not only horizontal load but also gravity load.

Keywords : buckling, diagrid, ductility, seismic performance

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