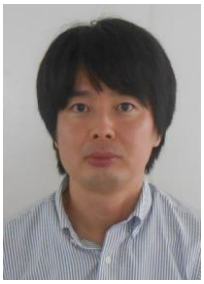

Seismic Performance Evaluation for Steel Structures

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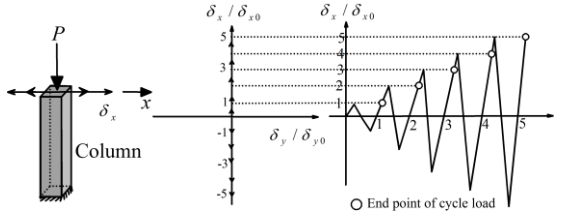
Research Fields structural engineering, earthquake engineering

Keywords steel bridge pier, anchorage , seismic design

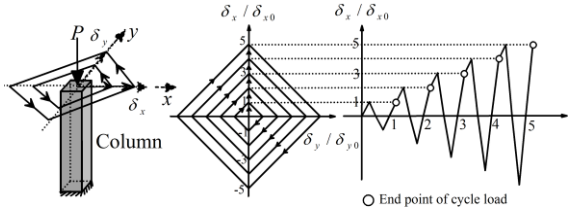
Research Outline

EFFECT OF DAMAGED ANCHORAGE ON ULTIMATE BEHAVIOR OF STEEL BRIDGE PIERS UNDER BI-DIRECTIONAL CYCLIC LOADS

In order to prevent serious damages of anchorages that are hard to be repaired, the seismic design code after the Kobe earthquake adopts a new capacity design concept that strengths of anchorages must exceed those of pier cross sections at the base. In case when the anchorages constructed before the Kobe earthquake are upgraded after the Kobe earthquake, a similar capacity design concept is adopted. However, more damages are allowed in these anchorages for the ease of upgrading. In the modeling of the above two types of anchorages in the seismic analysis, however, pier bases are equally assumed to be rigidly connected to concrete footings in spite of the difference of the damage level allowed to the anchorages. Herein the validity of the assumptions of rigid connection for two types of anchorages is examined under more realistic bi-directional cyclic load as well as unidirectional cyclic load. In addition, the effect of the pier-base restraint is investigated on the ultimate behavior of steel bridge piers.



(a)Unidirectional cycle load



(b)Bi-directional cycle load

Fig.2 Cycle loading program

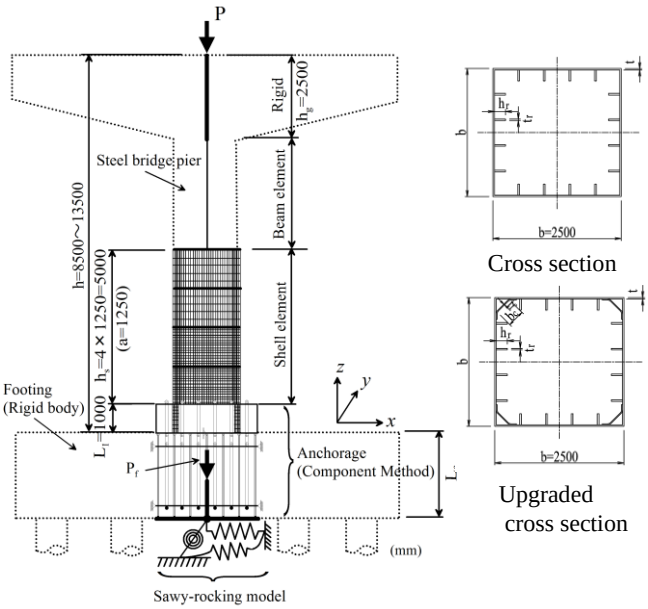
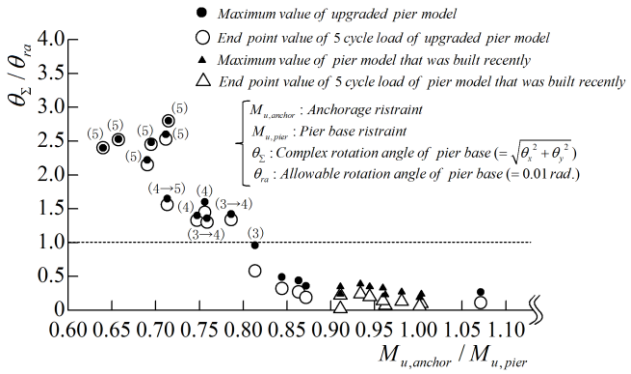
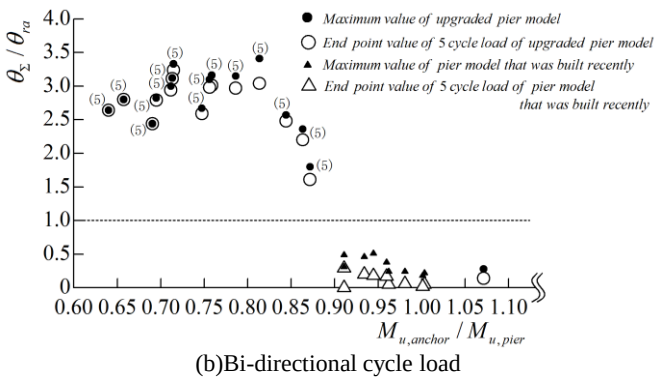


Fig.1 Steel bridge pier for numerical analysis



(a)Unidirectional cycle load



(b)Bi-directional cycle load

Fig.3 Transition of complex rotation angle of pier base