Fig. 7 shows the rebar strains. In the pilotis and transfer zone, rebar strains were less than the yield strain [Figs. 7(a) to (c)]. In the upper wall, however, rebar strains exceeded the yield strain as the load increases. This is because the damage is concentrated and the rebar buckling occurred in the upper wall.

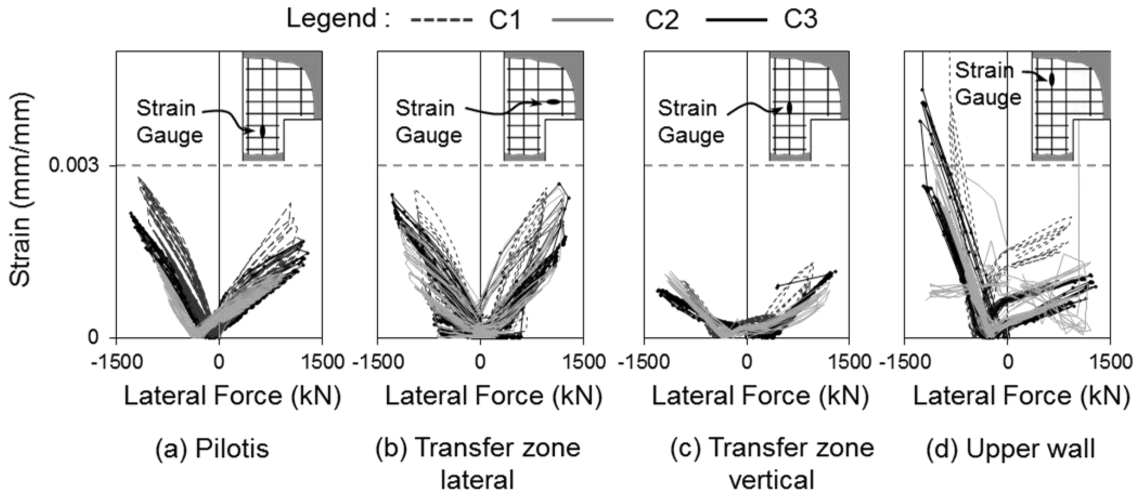


Fig. 7 Rebar strains of the specimens under cyclic loading

*3.2. Compression Test*

Fig. 8 shows axial load – strain relationship. The axial strain was calculated from the average axial deformation at the four corners and net height of the specimen (=2700 mm). The peak strength $P_u$ was 5414 kN which was 1.44 times the nominal strength $P_n$ = 3748 kN. Concrete crushing occurred at $P_{cr}$ = 5342 kN in the compression region.

Fig. 9 shows damages in the specimen. Concrete crushing occurred at the height of 300mm from the bottom face of the wall. Furthermore, buckling of the longitudinal bars was observed. The damage in the pilotis and transfer zone were limited.

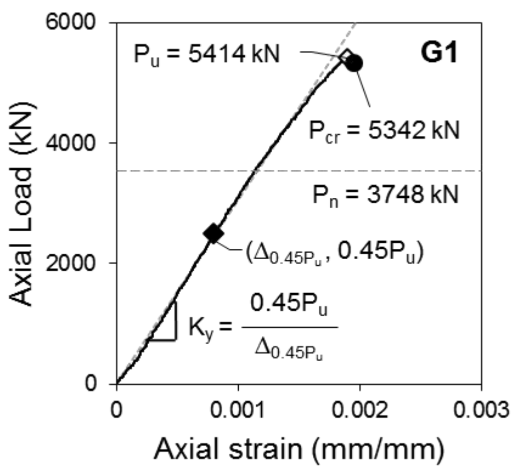


Fig. 8 Axial load – strain relationship

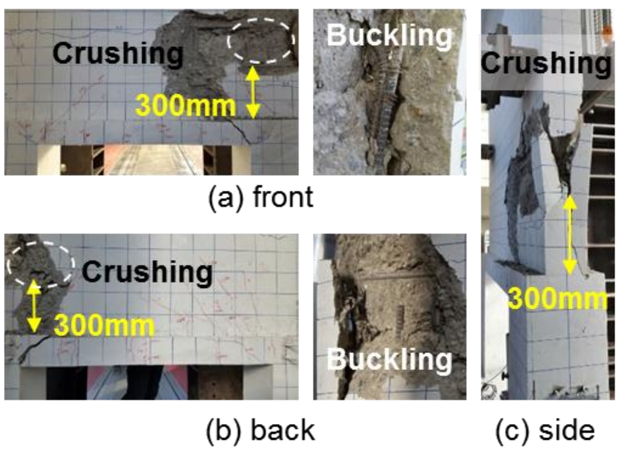


Fig. 9 Damages in specimen G1

Fig. 10 shows the strain variations of the re-bars according to the axial load. In the pilotis and transfer zone, rebar strains were less than the yield strain [Figs. 10(a) to (c)]. In the upper wall, however, rebar strains exceeded the yield strain as the load increases. This is because the damage is concentrated and the rebar buckling occurred in the upper wall.

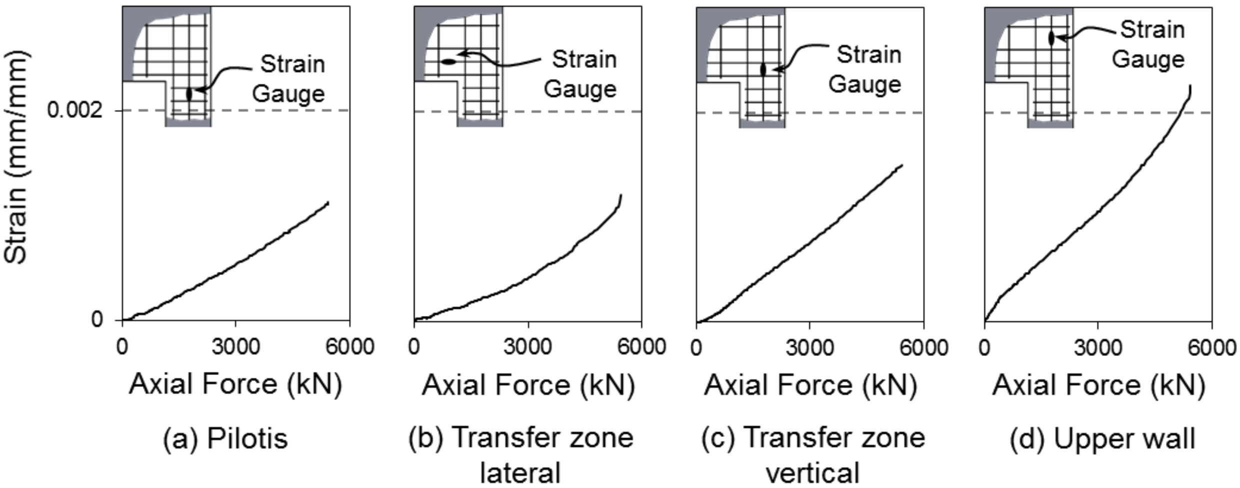


Fig. 10 Rebar strains of the specimens under compression

## 4. CONCLUSIONS

In the present study, in order to evaluate the structural performance of pilotis-wall frame system without transfer girder, cyclic lateral loading tests and compression test were performed. From the test results, the load carrying capacity, deformation capacity and failure mode of the specimens were investigated. The test results are summarized as follows:

1. In the specimens of the cyclic loading tests, the lateral load-carrying capacities were greater than the nominal strengths. All of the specimens showed ductile behavior after yielding and finally concrete crushing occurred at the height of 400 mm and 600 mm. The external damages in the transfer zone and pilotis were relatively limited. The ductility of the specimens was between 2.0 to 2.7. Rebar strains in the transfer zone and pilotis were less than the yield strain, while the maximum rebar strain in the upper wall was greater than the yield strain.
2. In the specimen of the compression test, the axial load capacity was greater than the nominal strength. Concrete crushing occurred in the compression region at the height of 300 mm from the bottom face of the wall. The external damages in the transfer zone and pilotis were relatively limited. Rebar strain in the transfer zone and pilotis was less than the yield strain, while the maximum rebar strain in the upper wall was greater than the yield strain.
3. These results indicate that, when the transfer zone is designed by the capacity design concept in the pilotis-wall system, brittle failure in the transfer zone and pilotis can be prevented.

## REFERENCES

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