

Activity report in April 2003 - May 2004

COERA Kohei NAGAI

Research activities

Theme of research

Numerical simulation of failure of concrete on meso scale

1. Development of 3D analytical system

System of 3D analysis for meso-scopic simulation of concrete by Rigid Body Spring Model (RBSM) was developed in 2003. It had been developed since 2002. The analysis can simulate the behavior of mortar and concrete reasonably.

2. Improvement of accuracy of 2D analysis of concrete on meso scale

The 2D RBSM analytical system developed in 2000-2002 is modified to be able to present the strength of mortar and concrete well.

3. Research committee

Attend the research committee of Japan Concrete Institute on "Numerical analyses of meso-structure of concrete" in 2002-2004.

Other activities

English program - EGPSEE

1. Student Union

Member of 2003-2004 EGPSEE Student Union – Public Relation Officer

2. EGPSEE Open Forum

Organizer of 1st EGPSEE Open Forum, "How to mutually benefit each other" on 16 May 2003

3. Sapporo Snow Festival 2004

Leader of EGPSEE snow statue for citizen in Sapporo Snow Festival 2004

Part-time lecturer

Part-time lecturer of Hokkai Gakuen University

April 2003 – September 2003

Published papers

- [1] Hidetoshi OKUYAMA, **Kohei NAGAI** and Yasuhiko SATO, “Analytical Evaluation of Influence of Old Mortar to Mechanical Characteristics of Recycled Concrete”, *Proc. of the Japan Concrete Institute*, Vol. 25, No. 1, July 2003, pp.1235-1240 (in Japanese)
- [2] **Kohei NAGAI**, Yasuhiko SATO and Tamon UEDA, “Numerical Simulation of Compression and Tension Failure of Mortar by 3D Rigid Body Spring Analysis”, *Proc. of the Ninth East Asia-Pacific Conference on Structural Engineering and Construction (EASEC9)*, Computational Mechanics, December 2003, pp.63-68.
- [3] **Kohei NAGAI**, Yasuhiko SATO and Tamon UEDA, “Three-dimensional Numerical Simulation of Mortar and Concrete Model Failure in Meso Level by Rigid Body Spring Model”, *Journal of Structural and Engineering*, JSCE, Vol.50A, Mar. 2004, pp.167-178.

Papers submitted in April 2003 - May 2004

- [1] **Kohei NAGAI**, Yasuhiko SATO and Tamon UEDA, “Three-dimensional Meso-scopic Analyses of Mortar and Concrete Model by Rigid Body Spring Model”, *Proc. of Fifth International Conference on Fracture Mechanics of Concrete and Concrete Structure (FraMCoS-5)*, April 2004. (now in press)
- [2] Tamon UEDA, Muttaqin Hasan, **Kohei NAGAI** and Yasuhiko SATO, “Stress-Strain Relationships of Concrete Damaged by Freezing and Thawing Cycles”, *Proc. of Fifth International Conference on Fracture Mechanics of Concrete and Concrete Structure (FraMCoS-5)*, April 2004. (now in press)
- [3] **Kohei NAGAI**, Yasuhiko SATO and Tamon UEDA, “Analytical Study on Influence of Mortar-aggregate Interface Character on Concrete Strength by RBSM”, *Proc. of the Japan Concrete Institute*, July 2004. (now in press)
- [4] **Kohei NAGAI**, Yasuhiko SATO and Tamon UEDA, “Mesoscopic simulation of failure of mortar and concrete by 2D RBSM”, *Advanced Concrete Technology*, Japan Concrete Institute. (now in review)

Presentations

- [1] “Numerical Simulation of Failure of Mortar and Concrete by Rigid Body Spring Model (3D)”, *AIT- CU Workshop on Nano, Continuum, Material and Computational Mechanics*, Bangkok, Thailand, December 2003.
- [2] “Numerical Simulation of Compression and Tension Failure of Mortar by 3D Rigid Body Spring Analysis”, *The Ninth East Asia-Pacific Conference on Structural Engineering and Construction (EASEC9)*, Bali, Indonesia, December 2003.