



## **Study in salt weathering on concrete: field observation and experiment**

C. T. Oguchi (1) and T. Yamada (2)

1. Geosphere Research Institute, Saitama University, Saitama, Japan
2. Undergraduate Student, Department of Civil Engineering, Saitama University, Saitama, Japan

(1) (ogchiaki@mail.saitama-u.ac.jp / Fax: +81 48 855 1378)

Concrete of the pedestrian deck in Saitama University made in 1968 exfoliates and some salts are observed on the surface of the concrete. To clarify the salts weathering process in a concrete structure, field investigations and a laboratory experiment were performed. Seasonal salt distribution was investigated using photographs. Much salt efflorescence appeared in dried winter, whereas little efflorescence observed in summer. The salts were sampled and analyzed using the X-ray diffraction method and SEM-EDS. Trona ( $\text{Na}_3\text{H}(\text{CO}_3)_2 \cdot 2\text{H}_2\text{O}$ ) is detected only at a dry season. Calcite ( $\text{CaCO}_3$ ) is found from concrete icicle. To investigate the reason of concrete decay a laboratory experiment was also carried out. The starting materials are porous and massive commercial concretes. They are cut into cubic with a size of  $5 \times 5 \times 5$  cm. The cubes were immersed three kinds of salt solutions in the room temperature for 24 hours, and then, dried them in the oven of controlled at  $40^\circ\text{C}$  for 24 hours. The solutions are trona ( $\text{Na}_3\text{H}(\text{CO}_3)_2 \cdot 2\text{H}_2\text{O}$ ), sodium bicarbonate ( $\text{NaHCO}_3$ ) and sodium carbonate ( $\text{Na}_2\text{CO}_3$ ). This wetting and drying experimental cycle is conducted by 21 cycles and the massive concretes immersed in trona and in sodium carbonate were break down. They have large solubilities and weathering susceptibility index (WSI) is calculated based on this data.