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Study on Conditions for Concrete Construction Using Lunar Simulant Sand



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Concrete is a material composed of natural resources. Cement, which is made of limestone and aggregates such as fine aggregate and coarse aggregate are in danger of being depleted, and there is a need to reduce the use of natural resources. In addition, lunar construction, especially in outer space, is an important research theme both domestically and internationally. The environment on the moon is very different from that on Earth. Construction on the moon requires consideration of various aspects of construction, such as the amount of water used, and the strength required for the structure. In addition, since the cost of transporting materials from the Earth is also an issue, it is necessary to produce a hardened specimen based on the materials obtained on the moon. Therefore, in this study, as a concrete that does not use natural resources that are in danger of being depleted, it investigated the preparation of a hardened specimen mainly using "hemicellulose," a type of plant cell, and used lunar simulant sand instead of sand used for ordinary concrete. In preparing of the hardened specimen, the mixture proportions were studied and experimented with from two viewpoints: the material design, which varied the moisture content and the ratio of moon sand to hemicellulose, and the preparation conditions, which varied the heating temperature, time, and pressure. As a result, higher compressive and bending strengths were obtained than ordinary concrete when the heating temperature and demolding time were set to 60°C and 60 minutes, respectively.

Biography:

I'm a first-year master's student at Ritsumeikan University in Japan. I majored in Concrete Structures in Materials Science.