

February 6, 2017

New Molding Technology Using Inorganic Premix Developed for 3D Printers

Taiheiyo Cement Corporation ("Taiheiyo Cement") is proud to announce that it has developed an inorganic premix compound for material extrusion-based (ME) three-dimensional molding machines ("3D printers") and succeeded in molding models using this type of material for the first time in Japan, in collaboration with Dr. Gaku Minorikawa, who is a professor at Department of Mechanical Engineering, Faculty of Science and Engineering, Hosei University, and Nikola Design & Technologies, Inc.

Taiheiyo Cement has developed an innovative inorganic premix for ME 3D printing which is one of the most advanced technologies with high future potential, based on its technical expertise and experience in inorganic materials technology to control plasticity, rapid hardening and other properties of water-hardening compounds.

Organic resin materials with high thermoplasticity are popularly used for ME 3D printers. However, organic materials are not suitable for such applications that require long-term stability, because they are inherently subject to deformation under the effect of UV light or temperature changes. The new material has a thixotropic property with which the material easily flows when in motion and becomes solid at rest, keeping the shape. The material hardens properly during the additive manufacturing process and requires only a short time to develop high strength.

An original material feeding mechanism is also available for loading the new material in ME 3D printers. It is a cartridge-based device developed by a collaborative research with Dr. Minorikawa's laboratory to enable extrusion of the material through a small diameter nozzle (Photo 1). Taiheiyo Cement made a prototype 3D printer equipped with the material feeder and carried out trial manufacturing of some models, demonstrating that the system was capable of molding products in desired shapes and designs (Photo 2). It was the first in Japan to apply a water-hardening inorganic material to ME 3D printing.

The inorganic premix with high resistance to fire and weather, combined with 3D printers that provide excellent freedom of design, will find a wide variety of applications ranging from construction materials (architectural design elements, exterior elements, etc.) to automated repair of infrastructures at hard-to-access locations.

The system was on exhibition at 3D Printing 2017 which was held at Tokyo Big Sight (Tokyo International Exhibition Center) February 15 to 17, 2017. Taiheiyo Cement will continue to explore the user needs and supply samples in search of potential applications, pursuing the earliest release to the commercial market.

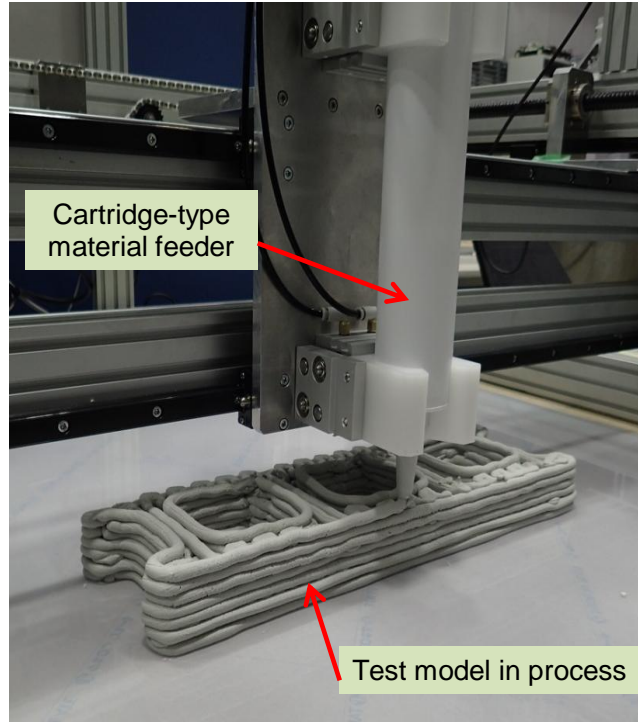


Photo 1 Molding using a 3D printer equipped with the cartridge-type material feeder

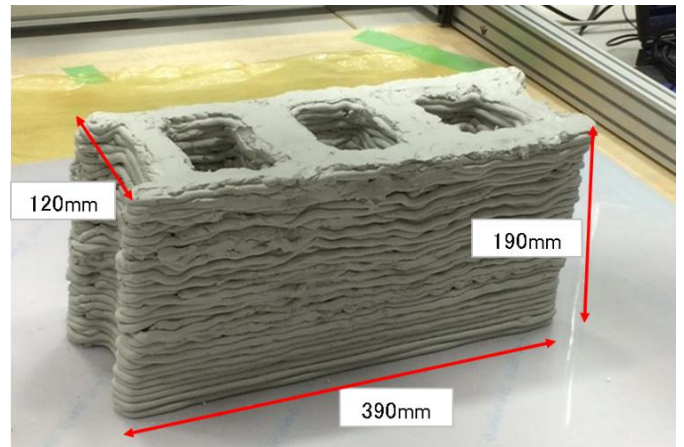


Photo 2 The first test models in Japan manufactured by the said technology