

Headline	UniMAP turns volcanic mud into building material		
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# UniMAP turns volcanic mud into building material

**KUALA LUMPUR:** The mud and steaming hot water that squirted up from the belly of the earth in Sidoarjo, Indonesia on May 29, 2006, marked the birth of the world's most destructive mud volcano. The volcano, called Lusi (a contraction of the word "Lumpur", meaning mud, and Sidoarjo) has erupted daily since that fateful day and is still spewing mud to this very day.

It has flooded villages and buried factories, public facilities and farms under a thick blanket of mud, adversely affecting the economy in East Java.

Although Lusi has today "calmed down" to more episodic spewing, its ongoing activity has more than fascinated geologists.

Universiti Malaysia Perlis (UniMAP), for instance, is keen in employing its expertise in the geopolymer technology to study the properties and benefits of the hot mud purged by the volcano.

A group of researchers at UniMAP's Centre of Excellence for Geopolymer and Green Technology (CEGeoGTech) visited the site in 2011 and believed they would be able to help Indonesia benefit from the tragedy.

UniMAP vice-chancellor, Prof Datuk Dr Kamarudin Hussin who is also the CEGeoGTech chairman said the university had formed a cooperation with the Petra Christian University (PCU) in Indonesia to overcome to the ongoing problem.

The cooperation with PCU's Civil Engineering Department has helped UniMAP in developing a construction material using dried Lusi mud by employing geopolymer technology.

The research has succeeded in, among others, turning the mud into construction material for concrete bricks, artificial aggregate and lightweight construction material, similar in nature to conventional building materials.

Lusi is said to have been the result of the removal of a drill from an oil and gas exploration well at Kecamatan Porong, near Sidoarjo.

A day after that the eruption took place, just 650 feet away.

There are also geologists who believe it was the result of 6.3-magnitude earthquake that struck two days before Lusi started spurting mud and hot water to the surface.

Although volcanic eruptions are fairly common in Indonesia, Lusi has been described as the worst. The volume of mud spewed out has engulfed an area of over 770 hectares, leaving over 30,000 people displaced.

Indonesian authorities expect the volcanic activity to simmer down to a stop after 25 years. But until then, the volcano would be belching muck that would be spreading over a wider area.

In a preliminary measure, Surabayan authorities channeled the mud into the Porong River, but it was a move that has resulted in massive pollution of the river and the sea.

Kamarudin, who is also a geopolymer researcher, said that UniMAP's research on the Lusi mud was presented at an international seminar in Jakarta in November 2013 and attracted the attention of Indonesian leaders and industry players.

UniMAP suggested that the excessive volume of volcanic mud that had been threatening the environment and economy of East Java be turned into a useful artifact for construction.

Another environmental threat, which UniMAP saw has the potential to be turned

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into construction material, was fly ash. Fly ash is one of the residues generated in combustion at coal-based power plants.

Following the reveal, Indonesian company Aneka Teknik expressed its interest in employing the university's expertise in geopolymer technology to produce lightweight bricks and signed a memorandum of agreement with UniMAP in Bandung, Indonesia, in December last year.

The cooperation involved an RM80,000 grant in research and development of geopolymer-based lightweight bricks for a year before it was developed for commercial production.

CEGeoGTech is tasked with the huge responsibility of ensuring the research produces significant results in favour of the environment, including making use of items previously regarded as useless.

Kamarudin said since its inception in July 2010, CEGeoGtech has become the first Asean geopolymer research centre with various successes on the international front, winning some 50 research awards.

He said the centre was also the recipient of a RM2.2 million research grant from the Saudi Aramco Oil & King Abdul Aziz City for Science and Technology.

Kamarudin, who is also the Malaysian Geopolymer Association (MyGeopolymer) president, said that the grant was for the research on 'Nanocomposite to Expand Applications of Non-Metallic Materials'.

CEGeoGTech manager, Dr Mohd Mustafa Al-Bakri Abdullah said that to further boost geopolymer research, UniMAP together with Konsortium Riset Geopolimer Indonesia (Korigi) would be organising the Malaysia-Indonesia Geopolymer Symposium (MIGS) in Penang this May.

The symposium will see paper presentations from geopolymer experts across Asean including presenting itu from Kesetsart University and Khon Kaen University (Thailand), PCU and Institut Teknologi Sepuluh Nopember (Indonesia) and Ho Chi Minh City University of Technology (HCMUT), Vietnam.

Mohd Mustafa said MIGS would focus on channeling information on basic geopolymer knowledge to new researchers.

"We hope the symposium will help UniMAP assemble geopolymer experts and researcher across the Asean region to exchange information and share experiences, in addition to forging cooperation and building research networks", he said to Bernama.

Besides that, UniMAP and Korigi have also agreed to produce graduates of joint supervision and to boost the publication of geopolymer research journals.

UniMAP has previously formed cooperation with the Geopolymer Institute in France in 2011.

MyGeopolymer, which was set up in February, will be based in UniMAP.

The association will be promoting research activities and make geopolymer materials an alternative in the building industry.

Mohd Mustafa, who is also the MyGeopolymer Secretary said that the researchers hope that the government would give them full support and provide the market space for geopolymer products in the country, as was the practice in developed countries.

He said the technology has developed and expanded on a large scale in developed countries, with buildings constructed from geopolymer materials, as was the practice in Australi, U.S, and China.

Besides UniMAP, other members of MyGeopolymer are Universiti Sains Malaysia (USM), Universiti Teknologi Petronas (UTP),Universiti Teknologi Malaysia (UTM), Universiti Teknologi Mara (UiTM), Universiti Putra Malaysia (UPM) and Universiti Malaysia Pahang (UMP). – Bernama

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**Displaced residents immerse themselves in massive mud deposits from the mud volcano in Sidoarjo village, located on Indonesia's eastern Java island on May 29, 2013 to dramatise their sufferings.**