



## **An Alternative To Shipping Tonnes of Concrete To Mars**

With NASA predicting that humans will set foot on Mars for the first time by the year 2030, it comes as no surprise that the next step would be to initiate colonization on the red planet. And with the prospects of colonization comes the need for construction materials to build our Martian headquarters.

But not so fast... *how on earth* do we plan on providing the time and resources required to ship the thousands of tonnes of concrete material necessary to build a sustainable Martian economy? And how do we plan on accounting for the showers of micrometeorites that constantly bombard the surface of Mars which would quickly punch holes into any ordinary structure we find on Earth?

As it is logistically impossible for us to ship tons of concrete from our home planet to Mars, the only alternative is to make it in space itself, and so Stanford and NASA scientists went ahead and created a new form of concrete that we can produce on Mars.

### **How it's made**

David Loftus at NASA's Ames Research Center and Micheal Lepech, an associate professor of civil and environmental engineering at Stanford School of Engineering turned to the idea of using Martian soil that is bound together by animal proteins which make up things such as shells, bones and teeth. To replicate the conditions found on Mars, the researchers combined bovine blood protein with simulated extraterrestrial soils that are similar to what is found on Mars. What resulted in their first bio-concrete batch was concrete that was as

strong as that used for sidewalks and patios. It also held strong to micrometeorites which was replicated by blasting the concrete with high-speed gas particles.

The idea is that we will be able to make concrete on Mars, by first utilizing Martian soil, and also, by creating biological factories of organisms which are genetically engineered to produce the necessary protein binder. This would be done the same way that biotech companies use genetically engineered bacteria in making synthetic hormones.

Not only does this plan - if executed properly - ensure our ability to create strong building materials from resources on Mars, by using bio-based concrete, the binding proteins can actually be recycled and re-used over time.

Source:

<http://www.thehindu.com/sci-tech/science/converting-martian-soil-into-concrete/article18404584.ece>

Photo credit: Twentieth Century Fox