BUILDING THE FUTURE

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LUNAR CONCRETE

PACIFIC INTERNATIONAL SPACE CENTER FOR EXPLORATION SYSTEMS (PISCES)

PISCES is a Hawaii State Government Aerospace Agency located in Hilo, Hawaii that conducts environmentally-safe field tests on Hawaii's volcanic terrain to test and validate advanced space technologies. These space technologies include robotics, advanced manufacturing, and advanced communications - all with dual purposes: for use in space as well as here on Earth.

PISCES Projects

- **Lunar Concrete**
- Women's STARS Program
- 3-D Laser Printing Project
- Moon RIDERS
- PISCES Planetary Analogue Test Sites
- NASA Laser Communication Ground Station
- PISCES Robotic Village
- PRISM (PISCES Robotic International Space Mining) Competition

PISCES
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Image Credit: Benahz Farahi & Connor Wingfield

LUNAR CONCRETE

Sustainable building materials for use on Earth and in Space.

What is lunar concrete?

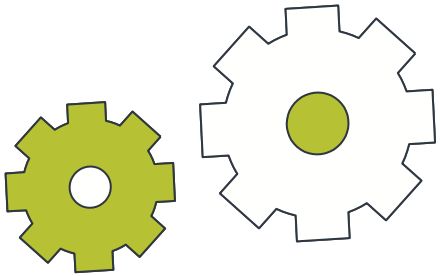
Lunar Concrete, also known as 'basaltic concrete,' is an alternative to traditional construction materials made from volcanic basalt. The term 'lunar' comes from volcanic basalt's striking similarity to the loose layer of dust and rock found on the surface of the Moon (called regolith).

How is it different from traditional concrete?

Traditional concrete uses a mixture of gravel, sand, and dirt, bound together by cement. Lunar Concrete uses volcanic basalt fines – a waste product of quarries - mixed with alternative binding agents.

What advantages does it have?

Lunar Concrete is sustainable! Using basalt fines as an alternative to cement could enable places with limited access to resources to create construction materials without importing them. In space, this means construction materials could be made *in-situ* (or on-site) on another planet, sparing the costly efforts of transporting them from Earth.



Where will it be used?

Lunar concrete is intended to be used here on Earth and in space. Because volcanic basalt is so similar to the regolith found on Mars and the moon, the same method of creating construction material could be used on the surface of other planets to build infrastructure for human habitation.

Who is making lunar concrete?

PISCES is currently working with the County of Hawaii Department of Research and Development, as well as leading researchers from NASA's Kennedy Space Center and the University of Hawaii at Manoa, to develop effective binding agents to mature lunar concrete.

Above: A cube-shaped sample of lunar concrete made from basalt fines and polymer-based binding agents.

When will it first be used in Hawaii?

PISCES and the County of Hawaii are slated to lay slabs of the first 'lunar sidewalk' on the Big Island in downtown Hilo in the Fall of 2014.

Below: Plans for the anticipated 'lunar sidewalk' near Lincoln Park on Kinoole Street in Downtown Hilo.

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