

February 6, 2017

Testifier's Name & Affiliation: Rodrigo Romo, Program Manager, PISCES

Presenting to: Committee on Economic Development & Business.

Date & Time of Hearing: Wednesday, February 8th, 2017. 09:00AM.

Measure #: HB1326

Testimony in Support of HB1326: Relating Workforce Development.

To the members of the Committee on Economic Development and Business:

I am here to support the intent of House Bill 1326. The PISCES Board of Directors has not yet taken a position on this measure, so I am here to present my testimony as the Program Manager for PISCES.

PISCES is administratively attached to the Office of Aerospace Development within DBEDT. PISCES' purpose is to expand and diversify technology-based enterprises in Hawaii by leveraging our State's substantial assets and capabilities in space exploration.

PISCES has been involved in basalt research during the last four years. Research has been done to study different ways in which local basalt, which is similar in composition to lunar regolith, can be manipulated and used in different applications. One application that has created a significant amount of interest in the State is Basalt Rebar.

Basalt Rebar is a derivative product of Basalt fiber. Basalt fiber is produced in a continuous process similar to that used to make glass fibers. Quarried basalt rock is first crushed, then washed and loaded into a bin attached to feeders that move the material into melting furnaces. At this point, the process is actually simpler than glass fiber processing because basalt fiber's composition is less complex. Unlike glass, basalt fibers feature no secondary materials. The process requires only a single feed line to carry crushed basalt rock into the melt furnace.

Despite its ready availability from mines and open-air quarries around the world, only a few dozen locations contain basalt that has been analyzed and qualified as suitable for manufacturing continuous thin filaments. Samples taken from a quarry in Hilo have shown that the basalt composition falls within the necessary parameters required for basalt fiber manufacturing.

Basalt fibers are non toxic to water and air, will not react with any components in concrete and are highly chemical resistant. . Compared to other fibers such as S-glass, carbon or aramids used in concrete, basalt fibers are also considered to be inexpensive.

Today, basalt fiber research, production and most marketing efforts are based in countries once aligned with the Soviet bloc. Companies currently involved in production and marketing include Kamenny Vek

(Dubna, Russia), Technobasalt (Kyiv, Ukraine), Hengdian Group Shanghai Russia & Gold Basalt Fibre Co. (Shanghai, China), and OJSC Research Institute Glassplastics and Fiber (Bucha, Ukraine).

Most basalt rebar is made using the pultrusion process (a continuous manufacturing process of pulling composite materials with constant cross-sections through a die) to wet fibers using vinyl-ester or polyester resins.. In the process, basalt fibers are “wetted” with epoxy resin and then bars are shaped and compacted. The cost to produce FRP is highly dependent on the manufacturing process speed and the ability to increase output speeds will yield significant cost savings.

Advantages of Basalt Rebar:

- Lighter than steel rebar (can ship 7 times more product than steel rebar for the same cost)
- Easy to use
- Stronger than steel rebar
- Does not corrode (longer lifespan, eliminates replacement costs)

The purpose of this bill is to provide funding to conduct a market assessment study to validate the feasibility of starting a basalt fiber and a basalt rebar manufacturing industry in Hawai'i. Based on studies of a similar nature, we anticipate the cost of such a study will be approximately \$150,000.00.

The study would include:

- Turn-key cost to build a basalt fiber manufacturing facility in Hawai'i.
- Turn-key cost to build a basalt rebar manufacturing facility in Hawai'i.
- Operation costs for each facility.
- Estimated cost to manufacture basalt fiber and basalt rebar in Hawai'i compared with other manufacturing locations worldwide (adjusted for shipping costs) and compared with conventional steel rebar (adjusted for shipping and replacement costs).
- Estimate market size for basalt rebar in Hawai'i
- Estimate market size (nationwide and worldwide) for basalt fiber.

We ask your support for this bill which could lead to a unique industry opportunity and strong positive economic impact for the State.

A handwritten signature in black ink that reads "R. Romo".

Rodrigo Romo
Program Manager
PISCES