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ASME-HAWAII SECTION 2004 OUTSTANDING ACHIEVEMENT AWARD

This is the ninth year for the ASME-Hawaii Section annual Outstanding Project/Design Competition. The award was created in 1996 to give recognition to deserving mechanical engineering-type projects or designs in Hawaii, Guam, and American Samoa that have been completed within the past five years. A panel of independent judges base their selection on which project or design provides greatest benefits to owner and customer in economics, social, and environmental aspects and shows outstanding use of mechanical engineering principles.

For 2004 the award is made to the Pacific Biodiesel Plant on Sand Island. The Hawaii Fuel Cell Test Facility on Cooke Street is awarded the Meritorious Award. Both projects received high marks for design concept. One makes better commercial use of existing technology and is providing a major impact today while the other is cutting edge technology in alternate energy and may provide greater impact on society in the future. Both help or will help the environment in one way or another, and they deserve our recognition as outstanding mechanical engineering related projects in Hawaii.

Pacific Biodiesel Plant

Their website opens with "Renewable energy for a cleaner tomorrow." Biodiesel is made from renewable fats and oils, such as vegetables oils, through a simple refining process. Actually Pacific Biodiesel produces biodiesel from used restaurant fryer oil. The process involves removing the glycerol molecule from vegetable oil in the form of glycerin (soap). Once the glycerin is removed from the oil, the remaining molecules are, to a diesel engine, similar to petroleum diesel fuel.

Biodiesel offers fleet operators a safe, cleaner alternative to regular old petroleum diesel fuel. It requires no engine modifications, and it delivers similar torque, horsepower and miles per gallon. In addition, biodiesel cuts down on targeted emissions. With a 20 percent blend with petroleum diesel and a catalytic converter, particulate matter is reduced 31 percent, carbon monoxide by 21 percent and total hydrocarbons by 47 percent. In addition, a blend reduces sulfur emissions and aromatics. In its neat form and in blends of 20 percent or more with petroleum diesel, the US Department of Energy has acknowledged biodiesel as an alternative fuel and can be used for vehicle credits under the Energy Policy Act.

The Sand Island plant was built in 2000. With its various tanks, pumps and other mechanical equipment, it has a capacity of 25,000 gallons per day of grease trap waste and 1500 gallons per day of biodiesel. The first Pacific Biodiesel Plant was built on Maui in 1996 as the answer to grave concerns over potential environmental and health problems resulting from restaurant grease clogging the Central Maui Landfill. Robert King, owner of King Diesel on Maui, who was contracted to maintain the generators at the Landfill, decided to do something about it. Searching the Internet, he hooked up with Daryl Reece, Agricultural Engineer, who had helped devel-

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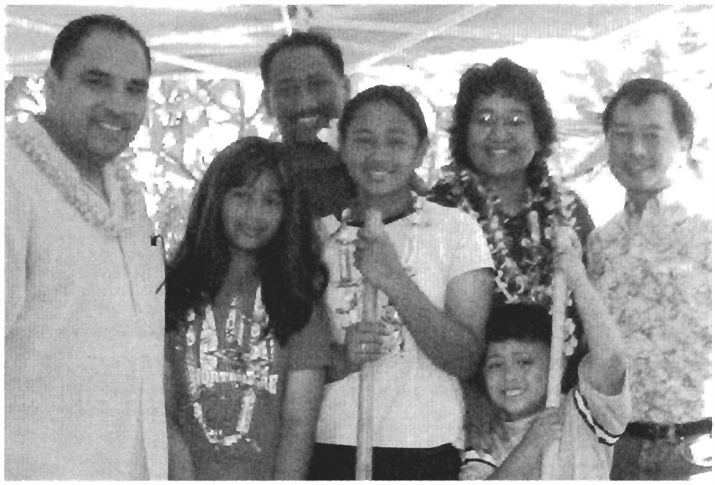
ASME-HI members_at the biodiesel plant. L-R: Robert King, Chester Kaitoku, Ed Chang, Jim Grogan, and Norm Giem.



Barry Nakamoto, P.E., (right) poses with the Ka'aihue family at the ground breaking of their new house in Nanakuli

ENGINEERS BREAK GROUND ON NEW HABITAT HOME

The Hawaii Society of Professional Engineers participated in the groundbreaking ceremony for John and Michelle Ka'aihue's new Habitat home in Nanakuli on Saturday, May 27, 2004.

Funding from local sources is being provided through donations from the Hawaii engineering and construction community. A major portion of the local funding is pledged by the Hawaiian Electric Company.

The HSPE is sponsoring the home in conjunction with the National Society of Professional Engineers whose national convention will be held in Waikiki July 8-10. As part of their annual convention, the NSPE leaves a Legacy Project (major contribution to a local charity) to the host city they visit that year Legacy Projects are nominated by the local chapters and are supported nationally in their effort to raise the necessary funds.

Honolulu Habitat for Humanity was selected, according to Ken Rappolt, P.E., chair of the HSPE host committee, because of the wonderful impact Habitat brings to our local families, and because engineers are pretty good at swinging a hammer! Engineers from around the country will be invited to spend a day working on-site alongside the Ka'aihue family as part of their convention weekend activities.

The HSPE Legacy sponsorship of $20,000 will be matched with a $40,000 grant from the Case Foundation. Anne Marie Beck, executive director of Honolulu Habitat, says that this time-limited matching grant has made it especially attractive for corporations and associations to partner with Habitat because their contribution goes such a long way.

The Ka'aihue family has worked hard for three years to qualify for a Habitat home, which requires them to provide 500 hours of "sweat equity" building another family's home as a down payment. All Habitat partner families also must meet Habitat's strict guidelines for eligibility (income 25- 50% below area median) and must reduce their credit load sufficiently to assure they can repay the no-interest, 20- year mortgage. The home will be built for $65,000 with labor provided solely by volunteers. Sponsorship donations to Habitat are recycled over and over again as families re- pay their mortgages.

ASME Award, *(continued from page 1)*

op a method to process discarded cooking oil into clean-burning fuel for diesel engines. With no outside financial assistance, King and Reece formed Pacific Biodiesel, Inc. and built the first biodiesel plant in the Pacific Rim.

Hawaii Fuel Cell Test Facility

Fuel cells along with thermal, ocean, wind and solar power are the hopes for the future to help Hawaii reduce its dependency on fossil fuel. A fuel cell produces electricity through the electrochemical reaction of hydrogen and oxygen, without combustion. It operates like a battery, but does not rundown or require recharging. Its only byproduct is water.

The Hawaii Fuel Cell Test Facility, a state-of-the-art research facility opened for business in April 2003 to study ways to make fuel cell technology more commercially practical. This facility is a partnership of the Hawaii Natural Energy Institute (HNEI) of the University of Hawaii, Office of Naval Research ONR), UTC Fuel Cells, and Hawaiian Electric Co., Inc.

The test facility has three full size single cell test stands with space for up to eight test stands. The test stands enable researchers to see what fuel cells can do under a variety of operating conditions. At the test facility, they scrutinize how fuel cells stand up to long-term operation, investigate the cells' sensitivity to impurities in the fuel source, delve into the lifetime of components, examine the optimum water management requirements, and run the cells through a host of tests to determine how dependable they can be. The test stands were purchased from the UTC Fuel Cells.

The Hawaii Fuel Test Facility is part of the HNEI fuel cell program under the direction of Rick Rocheleau, Director of HNEI. The current testing activities focus on Proton Exchange Membrane (PEM) fuel cells which have a lower operating temperature than other types of cells and are therefore of interest for automotive and consumer applications. Other activities under this ONR funded program include development of biocatalysts for fuel cells, use of biocarbons for fuel cell and fuel cell components, and the exploration and characterization of methane hydrates as a future fuel.

In June 2003, HNEI hosted a tour of the test facility for a group of ASME Fluids Engineering Conference attendees. The ASME members commented on how impressed they were with the state-of- the-art fuel cell test facility.

On August 3, 2004 ASME-HI will present the attractive award plaques to the representatives of Pacific Biodiesel and HNEI, who will be giving a presentation of their facilities. ASME-HI members and others who may be interested can attend by contacting Ray Liu or Sam Gillie. Please refer to the ASME-HI meeting notice in the Wiliki.

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ASCE History, *(continued from page 8)*

Incidentally, Hackfeld's Dry Goods was established in 1849, renamed H. Hackfeld & Co. in 1898, became Liberty House in 1918 and, under the ownership of the Federated Department Stores Inc. of Cincinnati since 2001, is now known as Macy's.

As for the so called "oriental cement" I am all but convinced that it was actually produced in Macau (or Macao) and transshipped via Hong Kong to Hawai`i. A cement plant was founded in 1887 on Green Island (Ilha Verde in Portuguese, Tsing Chau or Qingzhou in Chinese). At the time, Green Island was connected to the Macau peninsula by a causeway but, due to land reclamation, was absorbed into the peninsula by the early 1920s.

Next: the first production of portland cement in Hawai`i.

Do you know of a civil engineering accomplishment or event that your fellow ASCE members might find interesting? Please send a brief description to C.S. Papacostas (fax 956-5014, email *csp@wiliki.eng.hawaii.edu*). Previous articles in the series may be found at the Section's web site. Just point your browser to *http://www.ascehawaii.org*.

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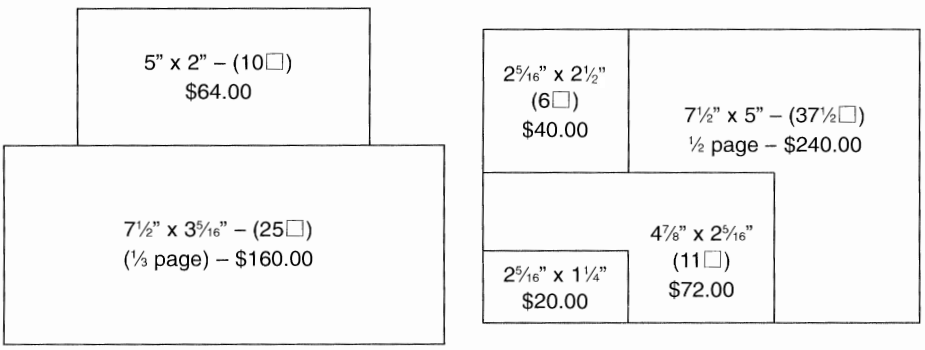

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