

ASME-HAWAII SECTION 2002 OUTSTANDING ACHIEVEMENT AWARD

In its seventh year, the Hawaii Section of the American Society of Mechanical Engineers (ASME) 2002 Outstanding Project Achievement Award goes to the Matson Terminal Revamp Project. In very close voting the Hawaii Pride Fruit Disinfestation Facility located in Keaau, Hawaii is the runner-up project. These are two mechanical engineering type projects that deserve recognition for their outstanding contributions to Hawaii.

ASME-HI Section presents this annual award to projects or designs relating to mechanical engineering within the Hawaii Section area. The Hawaii Section covers a large Pacific area, which includes Hawaii, Guam, and American Samoa. A panel of independent judges selects the annual awardees based on which project or design provides the greatest benefits to owner and customer in economics, social, and environmental aspects and shows outstanding use of mechanical engineering principles. The descriptions of the ASME-HI 2002 outstanding projects are as follows.

Matson Terminal Revamp Project

The winner, the Matson terminal project was performed in two phases in order to minimize disruptions to its operation. The first phase added new equipment to increase efficiency by implementing a new operating mode called the "partial-wheeled" system. Gone are 33 "straddle carriers" that were one of the mainstays of the terminal operation. They were replaced by the "partial-wheeled" system that includes 6 new "top picks" capable of 75,000 lbs lifts and able to stack the containers 4-high, and by 4 "side picks" for the empty containers that can stack empties up to 8-high. "Straddle carriers" could only stack containers 3-high when empty and only 2-high loaded. The "top picks" can make about 18-22 moves per hour compared to the slower straddle process.

With this project, containers are now unloaded from the ship directly onto wheeled chassis that can be hooked up to a truck and driven away quickly and with less effort. Before with the "straddle carriers" truck drivers picking up loads had to wait for the containers to be picked up and set on the trailers. The changes are intended to deliver more efficiency, reduce crowding and increase capacity at the container yard.

The revamp also includes a GPS tracking

system for tracking location of containers within the yard. Each container has a sensor that helps incoming truck drivers find their containers. Gone are the "chalk board" system, manual records keeping, and "walkie-talkie" communication.

The improvements are meant to accommodate projected growth through the year 2020. J. Keahi Birch, Matson Manager of Safety and Environmental Affairs, conducted a tour of the terminal for ASME-HI members in March.

Hawaii Pride Fruit Disinfestation Facility

A primary goal of the runner-up facility is to improve the quality of product for shipment to the mainland. This opens the market for Hawaii grown produce, which benefits local growers.

The disinfestation facility uses linear accelerator technology to treat papayas and other tropical fruits for shipment to the mainland. This is an alternative to the use of vapor heat treatment or methyl bromide. The system is designed to treat 30,000,000 pounds per year at full capacity.

The linear accelerator is an electrically powered machine that produces a stream of high energy (5 MeV) electrons. These electrons strike a converter plate, which emits x-rays. The x-rays are used to irradiate the fruit and disinfest it of fruit flies and other agricultural pests. Other irradiation technologies use radioactive sources to produce gamma rays. Since the x-rays at the Hawaii Pride facility are machine generated there is no transportation, use, storage, or disposal of radioactive materials. Although high levels of radiation are generated, there is no residual radioactivity once the accelerator is shut off.

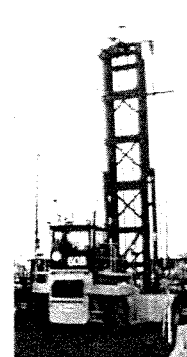
A sophisticated conveyor system carries boxes of fruit past the x-ray beam. Since the x-ray penetrate the packaging material, the product is treated in its final, USDA APHIS approved, sealed box with no need for additional handling of the fruit and no potential for reinfestation. The conveyor system carries the product into a concrete shield. A closing conveyor ensures tight packing of the carriers for maximum use of the x-ray beam. A process conveyor is used to very closely control the speed at which the product is exposed to the beam. This ensures of a very accurate control over the irradiation dose that fruit receives.

Due to the high levels of radiation that are produced, an elaborate safety system is incorporated that prevents entrance into the shield during operation of the equipment. This includes the use of safety doors, pressure mats, and light curtains that are interlocked to the equipment such that any intentional or unintentional attempt to enter the shield during operation will immediately trip the system.

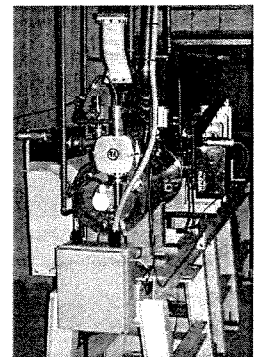
Another mechanical system of interest is the chilled water loop that cools specific heat loads on the linear accelerator. One critical load is at the converter plate. A relatively low rate of conversion from e-beams to x-rays results in a large heat load at the plate.

Kurt Maack, Mechanical Engineer with SureBeam Corporation, Omaha, NE, submitted this project for John Clark, President and CEO of Hawaii Pride.

ASME-HI's Project or Design Outstanding Achievement Award is made annually. Deadline for nominations is April 30. The nomination process is made very simple so that the busy engineers and executives are not overburdened with additional tasks in their already overwhelming workloads. Everyone is welcome and is strongly encouraged to submit an entry. You do not have to be a mechanical engineer. The first place and runner-up receive attractive plaques to proudly display on their office walls. Contact Ed Chang of ASME-HI for more information.



Matson's new "side pick" equipment for lifting and stacking empty containers.



Hawaii Pride's Linac Accelerator for the x-ray equipment.