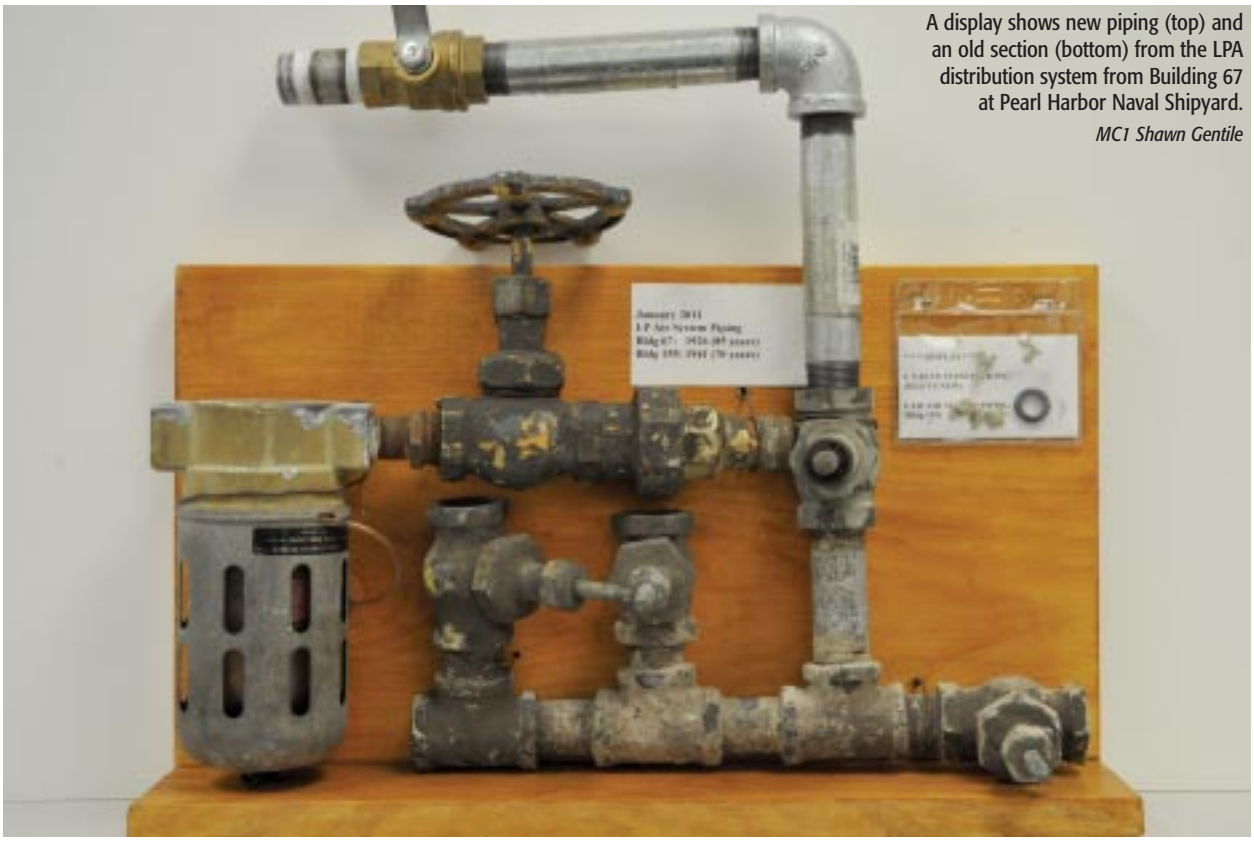
# Beating Fleet Leaks

## Expenses Down, Efficiency Up After Air Pressure Review at Pearl Harbor

**LOW-PRESSURE AIR** (LPA) is used for ventilation, sandblasting, painting and a host of other vital functions navy shipyards perform when they repair ships. At Pearl Harbor in Hawaii, the Commander, U.S. Pacific Fleet (COMPACFLT) pays the full cost of supplying LPA to the Pearl Harbor Naval Shipyard and Intermediate Maintenance Facility and other users.

"In addition to reducing operating costs, we are always looking for ways to meet the Secretary of the Navy's goals for reducing energy consumption," says Capt. Daniel A. McNair, Pacific Fleet deputy civil engineer. "Pearl Harbor's LPA system presents many cost saving opportunities without impacting the fleet's mission."

The Pearl Harbor LPA system includes 17 miles of distribution system piping outside of buildings and an equivalent amount inside buildings. Some of it is above ground, some of it is buried and some of the pipes are in close contact with the waterfront.



A display shows new piping (top) and an old section (bottom) from the LPA distribution system from Building 67 at Pearl Harbor Naval Shipyard.

*MC1 Shawn Gentile*

An 85-year-old portion of the LPA distribution system from the Pearl Harbor Naval Shipyard's Inside Machine Shop that was replaced earlier this year.

Rear Adm. Dixon Smith, Commander, Navy Region Hawaii, ordered Naval Facilities Engineering Command Hawaii to conduct a business case analysis to study LPA production, distribution and consumption at Pearl Harbor with two goals—reduce energy consumption used to generate low-pressure air to facilities now and identify a plan to improve condition, operation and maintenance costs in the future.

In order to provide actionable information that can provide consumption data in real time, COMPACFLT funded the installation of about 100 LPA flow meters on individual buildings and at key points within the distribution system that can be displayed on a web-based dashboard.

In addition, COMPACFLT funded a program to identify and correct leaks

## U.S. Pacific Fleet's Integrated Energy Strategy

**LPA IMPROVEMENTS ARE** one of many initiatives that make up the Pacific Fleet's Integrated Energy Strategy, which was developed under the leadership of RDML Kate Gregory, commander, Naval Facilities Engineering Command Pacific and the COMPACFLT civil engineer, and RDML Richard D. Berkey, COMPACFLT deputy chief of staff for fleet maintenance.

"The strategy combines shore and tactical energy targets that are based on Chief of Naval Operations (CNO) and Secretary of the Navy (SECNAV) energy goals and objectives, putting all of us on the same page," says Capt. Daniel A. McNair, deputy civil engineer.

The integrated sea/shore strategy combines ongoing and future energy conservation and alternative energy initiatives on the shore with energy initiatives being implemented aboard ships and aircraft into an integrated picture, aligned to achieve CNO and SECNAV energy goals.

The strategy includes more than 25 separate sea/shore initiatives being implemented across shore commands, aboard ships, and aircraft and all of them have been integrated to move the Navy toward achieving energy security goals.

The COMPACFLT energy strategy is supported by Commander, Naval Installations Command, Naval Facilities Engineering Command, Naval Sea Systems Command and Naval Air Systems Command.

in the LPA distribution piping within the largest buildings at Pearl Harbor Shipyard and Intermediate Maintenance Facility. The exhaustive and ongoing examination exposed hundreds of leaky valves, deteriorated couplings and aging outlets throughout the system that were immediately corrected.

The process of identifying and repairing the leaks is often laborious. Some leaks are detected by simply walking through buildings and listening for the sound of air escaping from exposed pipes. In more advanced cases, ultrasonic acoustic detection devices are designed to identify leakage sounds at decibel levels exceeding the human audible range. Once the location and cause of a leak is determined, engineers consider multiple options for repair, ranging from the simple exchanging of faulty connections to the removal and replacement of large portions of piping.

Even more challenging are the distribution pipelines situated outside, often buried underground or attached to the underside of docks. The ultrasonic detectors are useful in surveying buried pipes, which can be excavated and repaired. But engineers seeking leaks underneath the docks must negotiate limited clearance to gain access to the pipelines. Confined to a floating dinghy, engineers sometimes lie flat on their backs to meticulously examine pipes with their bare hands.

"The leak detection and correction program reduced the system's average consumption by more than 1,000 cubic feet per minute, which translates to more than $1 million a year in savings for the fleet," said McNair.

COMPACFLT also funded the installation of optimization controls to reduce waste at the central plant production compressors. For example, the two existing 2,500-cubic-foot-per-minute centrifugal compressors in one building were blowing excess air to the atmosphere whenever the system pressure achieved its target setting. COMPACFLT-funded upgrades eliminated that wasteful practice. COMPACFLT also is installing flow control devices at the entrance to 12 buildings for the purposes of lowering pressure to no more than is required for production machinery and to reduce losses at night.

In addition, COMPACFLT took steps to cut off service to unauthorized users of the low-pressure system and encouraged intermittent users to seek alternate sources such as portable generators to optimize LPA system efficiencies and save costs.

COMPACFLT energy managers say there's progress to be made in aligning parameters for future maintenance to prevent recurrence of the problems that have plagued LPA delivery. "In the meantime, we will continue with leak detection, flow monitoring and system upgrades before a final maintenance program is established and future improvements are identified and resourced," says McNair.

While all naval bases have their own unique operations for delivering LPA, the advances made at Pearl Harbor will likely prove helpful in addressing similar air pressure challenges at shipyards throughout the country and abroad. ⚓

*Photos by MC1 Shawn Gentile*

## For More Information

**FOR MORE INSIGHTS** into COMPACFLT's other energy-efficiency initiatives, read our cover story entitled, "Pacific Fleet Targets Shipboard Power Use with Meter Technology: Continuous Monitoring Maximizes Energy Efficiency" in the fall 2011 issue of *Currents*.

To the browse the magazine's archives, visit *Currents*' home on the Internet–the Department of the Navy's new Energy, Environment and Climate Change web site–at http://greenfleet.dodlive.mil/currents-magazine.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