

## NAVFAC ELIMINATES FALL HAZARDS IN SEWAGE PUMPING STATIONS AT NAS MERIDIAN, MISSISSIPPI

Naval Air Station (NAS) Meridian, Mississippi has six underground pumping stations. The stations pump sewage up to an elevation where it



*Before: Unanchored rescue system for hoisting injured worker out of underground pumping station.*

then flows downhill by gravity to an off-site sewage treatment facility. Workers enter the pumping stations to perform inspections, repairs, and maintenance and to read gauges and meters that measure sewage levels. In order to perform these tasks, maintenance crews must work at heights on ladders and platforms. Working at heights can be a fall hazard. Falls from elevated locations are one of the

most common causes of serious occupational injuries. Such falls are the second most common cause of work-related fatalities in the United States, after motor vehicle accidents.

During a safety inspection, the NAS Meridian Safety Office identified four fall hazards in its underground pumping stations. Fall hazards identified in the pumping stations included corroded ladders and incomplete guardrail systems on work platforms. A corroded ladder presents a fall hazard due to the risk of its sudden failure under a worker's weight, resulting in the worker



*Before: No self-closure on swing gates on platform. No vertical handrails on ladder.*

falling onto the pumping station's concrete floor or into the sewage stream. Falling from height is also the most serious safety hazard of an incomplete guardrail system. The inspection team noted that pumping station guardrail systems did not include self-closing swing gates or handrails on ladders. A third fall hazard was insufficient anchoring for the rescue system needed to hoist an injured worker out of a pumping station. In addition, the gauges and meters, which measure sewage levels in each pumping station were located more than eight feet above

the floor. This layout created a fall hazard when maintenance workers had to climb onto machinery and piping to read meters or reset gauges.

NAS Meridian requested assistance from the Naval Facilities Engineering Command (NAVFAC) to eliminate or minimize the risk of falls in sewage pumping stations. The Chief of Naval Operations' Hazard Abatement Program is managed by NAVFAC to resolve high-risk occupational safety and health hazards that are beyond the funding capabilities of the affected Commands. NAVFAC approved the request from NAS Meridian to modify ladders, guardrails, work platforms, and anchorages for rescue systems and to relocate gauges and meters in the sewage pumping stations to floor



Installation of self-closing swing gate.

level to reduce the risk of maintenance workers falling from elevated locations. NAVFAC sent a team of design engineers to oversee the remediation project.

The NAS Meridian sewage pumping stations are considered to be *confined spaces*. A confined space is a room or enclosure that is not designed for continuous occupancy and is suitable for only temporary work such as inspections, maintenance, or repairs. *Confined spaces* are typically difficult to enter and exit, especially in an emergency. They may also be hazardous due to oxygen deficiency; fire, explosion or toxicity hazards; liquids; sludge; or other hazards that could cause serious physical injury or death. The U. S. Navy requires that its ships and shore facilities control their confined spaces by requiring special precautions, including training and specific approval, before authorizing any person or persons to enter these spaces.



After: Self-closing swing gate on platform and vertical handrails on ladder.

As they do before workers enter an underground pumping station for any task, NAS Meridian work supervisors ensured that the pumping stations

were safe for entry before allowing Hazard Abatement Program project engineers and installers to enter or work in those confined spaces. Again following usual protocols for working in NAS Meridian confined spaces, the NAS Meridian Safety Office trained and specifically authorized project workers for *Confined Spaces Entry* before allowing them to enter any of the underground pumping stations. Machinery and equipment in the pumping station were de-energized; sewage was then pumped out, and the pumping stations were decontaminated. Fresh air was continuously pumped in, and the pumping stations were monitored for development of any potentially hazardous condition while anyone was inside them.



*After: Stable rescue system anchorage.*

Project workers replaced corroded ladders and guardrails, and strengthened anchorages for rescue systems to reduce the risk of maintenance workers falling from elevated locations. The work platforms in NAS Meridian's underground sewage pumping stations are now protected by guardrails with self-closing swing gates that prevent falls from the platforms onto machinery, the concrete floor, or into sewage. The strengthened anchor points prevent the collapse of fall protection equipment under the weight of a falling worker and comply with regulatory agency requirements as well as the Navy's safety requirements for protecting workers from falls from heights. The installation team also relocated piping systems so that pumping station maintenance crews can now read the gauges and meters from floor level.

The Hazard Abatement Program's funding and management of the design and installation of fall protection for guardrails, ladders, worker rescue systems, and improved access to gauges and meters reduced the risk of falls from elevated locations in each of NAS Meridian's six underground sewage pumping stations. The fall prevention measures have increased worker efficiency and productivity, and greatly enhance job satisfaction. In addition, the fall protection improvements installed at NAS Meridian may be duplicated at other pumping stations through NAVFAC and the Chief of Naval Operations' Hazard Abatement Program.

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