Navy Vacuum Collection, Holding and Transfer (VCHT) System

At a Glance

What is it?

The Vacuum Collection, Holding, and Transfer (VCHT) system is installed on several Navy ship classes, and serves to collect shipboard sewage by means of vacuum or other reduced flush technology, and to hold sewage while transiting navigable water (0-3 nm).

How does it work?

The VCHT system uses a vacuum to collect and transfer sewage from urinals and water closets to a holding tank. This vacuum is generated by sewage powered ejectors, where pumps circulate sewage from the holding tank through a venturi-type nozzle. The VCHT design uses reduced volume freshwater for flushing, and requires a smaller diameter collection piping network than conventional higher volume, gravity collected seawater flush collection systems, resulting in lower acquisition costs, smaller holding tanks, and reduced waste offload costs. A number of system improvements have been developed by the Navy in response to problems experienced on ships. Modifications have been identified, tested and integrated into the fleet in areas such as tank level sensors, pressure gauge isolators, pump seals, and pipe scale removal.

What will it accomplish?

The VCHT system improvements enable Navy ships to operate anywhere in the world in accordance with environmental laws for overboard discharge of sewage, and reduce shipboard manpower requirements and waste offload costs.

Applications:

- DDG 51 class, LDP 17 class, CVN 77, LCS class, DDG 1000 class, T-AKE, and others

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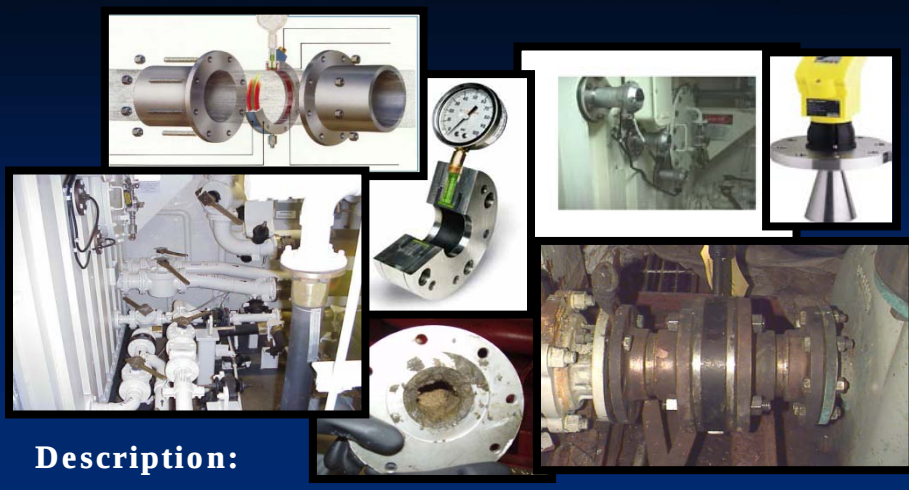

Description:

Sewage on Navy ships is collected, held, and transferred using one of two different system designs:

- Reduced-volume, freshwater flush, vacuum collection, holding and transfer (VCHT), OR
- Higher-volume, seawater flush, gravity collection, holding and transfer (CHT).

Both system designs incorporate complex subsystems and components requiring engineering support. The Navy has improved the VCHT system design and performance through several changes to system hardware and maintenance processes.

Other areas of support provided include technical support to the Fleet and naval shore activities, Integrated Logistics Support (ILS), Planned Maintenance System, Technical Manuals, and Allowance Parts Lists oversight, system/subsystem/component level design and operation management, evaluation of commercial alternatives, development of standards and specifications, acquisition planning, ship systems integration, development of production engineering solutions, verification and certification of installations, T&E for improvements to in-service systems, and improvement of system reliability, maintainability, and readiness.

Challenges and Opportunities:

- Acquisition risks and life cycle costs of sanitary flush valves
- Safety issues related to H_2S formation in piping systems and tanks and potential release in confined spaces
- Integration of Type II Marine Sanitation Devices (MSDs) in new ship design
- Alternate material performance standards for piping systems and components