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US Army Corps of Engineers MARINE DESIGN CENTER

US Army Corps of Engineers® Marine Design Center

Marine & Floating Plant Newsletter

Floating Plant Highlights

Inside this issue:

SPILL BARGE

The Army Corps of Engineers St. Louis District christened a new spill barge, the Thomas N. George. The vessel honors its late namesake, the captain of the Corps Dredge Potter, for his vision and years of work to develop an innovative practice for dredging on the Mississippi River.

The spill barge uses a flexible pipeline with a dustpan dredge, to keep the Mississippi River open for barge traffic. Typical dustpan operations use an 800 foot steel pontoon pipeline, which only allows placement of the dredged material, left or right of the dredging area. With 2400 feet of flexible floating hose, a 91-foot reach and diffuser plate at the end, the spill barge allows beneficial use of dredged material by a dustpan dredge to create islands or shallow areas, increasing habitat for many species. The longer pipeline and spill barge help balance the needs of the environment with the need to operate the Mississippi (Con't on pg 6)

CEMVS Spill Barge THOMAS N. GEORGE

MDC Retirement

Vint Bossert Retires After 33 Years with MDC

After a wonderful 33 year career at the Marine Design Center I have decided to retire to a new life of surfing, hunting, firefighting, consulting, and being a better husband. Relationships are everything, the rest is just the details. I have been extremely fortunate to know and work with the most excellent people at MDC and the USACE Floating Plant community. I have been blessed to call many of you friends. It has been the greatest honor, pleasure, and joy to work alongside you all designing and building new boats, and repairing, rehabbing, and renewing life into your old boats, especially the Corps' dredges. I have enjoyed some excellent adventures in Sudan, New Orleans, the Netherlands, Portland, and Houma to name a few. It has been a great ride. You have all added meaning to my life, and though I will miss you I also hope to stay in touch with many of you. Ryan Immel ryan.w.immel@usace.army.mil from MDC will be taking over as editor of this Marine & Floating Plant Newsletter. I can be reached at the following email address and phone number. Fair winds and following seas to you and yours…

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Environmental Update — EPA sVGP Moratorium Extended

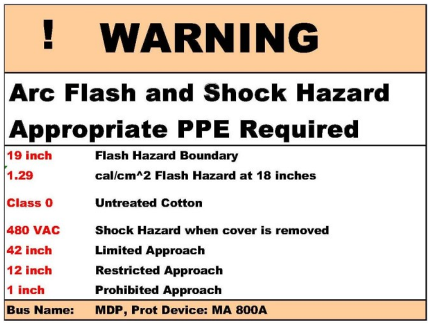
US EPA's Vessel General Permit

Annual Reports for the US EPA's 2013 Vessel General Permit were due by 28 February 2015. The Annual Report is required for each vessel operating in US waters that filed a Notice of Intent (NOI). Vessels operating within 3 nm of the US coastline between 19 December 2013 and 31 December 2014 must submit the Annual Report for that period by 28 February 2015. Permittees can prepare and submit those annual reports using EPA's 2013 VGP eNOI System (including a batch upload spreadsheet option) beginning in late 2014. http://water.epa.gov/polwaste/npdes/vessels/VGP-Monitoring-and-Reporting.cfm

US EPA's Small Vessel General Permit

On December 18, 2014, President Obama signed into law the Howard Coble Coast Guard and Maritime Transportation Act of 2014, S.2444 (PDF), which extended that moratorium on the Small Vessel General Permit (sVGP) for an additional three years, until December 18, 2017. Ballast water discharges from vessels less than 79 feet in length are not affected by the moratorium (i.e., still require permit coverage), but are now able to obtain coverage under either the Vessel General Permit (VGP) or the sVGP as of the sVGP effective date (December 19, 2014). The bottom line is that operators do not have to take direct (Con't on pg 6)

Arc Flash Hazard Analysis



Detailed Incident Energy AFH Analysis Procedure

Arc Flash Hazard (AFH) regulations, ER 385-1-100 and EP 385-1-100, require all Corp facilities, including floating plant, to have a Detailed Incident Energy (IE) Analysis performed by a qualified engineer. The detailed IE analysis should identify incident energy levels, Arc Flash Boundary (AFB) and PPE requirements for each location within a plant's electrical system. Incident energy is the amount of energy impressed on a surface, a certain distance from the source, generated during an electrical arc event measured in calories per centimeter squared (cal/cm^2).
A Detailed IE Analysis uses the available three phase short circuit current, protective device clearing times, typical bus gap, working distance and system voltage at each location to determine the IE exposure to the worker, the AFB, hazard/risk category, and required PPE. The process for performing a Detailed IE AFH Analysis is as follows:

Step-1: Data Collection
The greatest single effort in completing a detailed IE AFH analysis is the data collection of the electrical system. This task involves obtaining up to date one-line diagrams, short circuit studies, protective device coordination studies and manufacturer datasheets. In the absence of these documents, it is necessary to validate the one-line diagram and collect all necessary data from the field needed to complete the analysis. Step-2: Identify Plant's Various Operating Scenarios
Depending on the specific mission of the facility, the electrical system may be set up to function in various modes of operation to maximize efficiency and reduce operating costs. Each possible scenario must be identified in order to determine the worst-case condition.

Step-3: System Modeling
Once steps 1 and 2 are complete, the electrical system model is the next step in performing the detailed IE AFH analysis. MDC uses the EasyPower software package to perform detailed IE AFH analyses. Using EasyPower, the model is generated inputting the specific equipment and plant configuration information from steps 1 and 2 above. Creating an accurate model is vital to ensure that the most realistic results are obtained. The results of the analysis are only as good as the model.
Using accurate short circuit currents and modeling exact (Con't on pg 7)

Corrosion Protection—Anodes

Historically, there are three anode materials that are used to prevent corrosion on vessel. For steel hull vessels, zinc anodes are most effective in salt water, magnesium anodes are most effective in fresh water, and aluminum anodes are effective in salt, fresh and brackish water. The selection of anode material should carefully consider the vessel material, water type, and how long you want the anodes to last. In addition, the EPA's Vessel General Permit (VGP) contains a section on anodes. This section includes recommendations for anode material, along with a justification requirement regarding the material that is selected.

The US Navy recommends Mil-Spec 24779 Aluminum Alloy Anodes for steel vessels operating in fresh or brackish water. There are reports that if aluminum anodes are placed in fresh water for an extended period of time, they form a "white crust" that renders them ineffective. The chemistry of the Mil-Spec Aluminum Alloy prevents the formation of the "white crust" and therefore is recommended for fresh water use. It should also be noted that Magnesium anodes deplete at a much higher rate than aluminum, therefore more anodes are required for the same level of protection (hull wetted surface and intended life/duration).

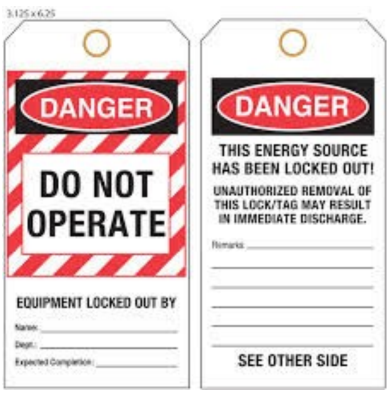
To determine how much weight of anodes to install, follow this simple calculation found at the following website.
http://www.boatzincs.com/anode_weight_calculation.html

NASA Rocket Barge — PEGASUS

NASA's new Space Launch System (SLS) will take astronauts beyond Earth orbit, but not without a one of a kind barge.
NASA's rocket transport barge Pegasus is 260 feet long, 50 feet wide and 15 feet high. It has been housed at NASA's Stennis Space Center near Bay St. Louis, Mississippi, since 2011, when it completed its final space shuttle-related operation: delivering shuttle main engine ground support equipment to Stennis from NASA's Kennedy Space Center in Florida.
Previously, the barge sailed between NASA's Michoud Assembly Facility in New Orleans, where the space shuttle external tanks were manufactured, and Kennedy, home to space shuttle launch operations for 30 years and the launch site for the Space Launch System's missions to future destinations including an asteroid and Mars.
Pegasus was specially designed and built for that 900-mile sea journey from the Louisiana shore to the eastern Florida coast, which includes both inland and open-ocean waterways. It made the trip 41 times between 1999 and 2011, delivering 31 space shuttle external tanks.
NASA collaborated with the Marine Design Center, which made the contract award May 14. NASA's Marshall Space Flight Center in Huntsville, Alabama, maintains the barge for the agency.
"Pegasus made it possible for NASA to deliver numerous groundbreaking science missions to orbit and complete construction of the International Space Station," said Robert Rutherford, group lead for the Transportation and Logistics Engineering Office at Marshall.
"It's incredibly rewarding to know Pegasus will carry on its long tradition of service, supporting the nation's missions in space," Rutherford added.
Built to replace NASA's aging Poseidon and Orion barges -- both built in the 1940s to serve in World War II and converted in the 1960s for NASA's Apollo program -- Pegasus in 2002 became the sole means of transport for the shuttle external tanks. Today, it's the only barge of its kind in NASA's inventory.
(Con't on pg 6)

PEGASUS transporting the external tank for a shuttle launch

Safety—Lockout/Tagout (LOTO)



Lockout Responsibility - Primary responsibility for lockout of equipment and machinery belongs to the authorized employee. However, this does not alleviate other employees and supervisors from insuring that proper lockout/tagout (LOTO) procedures are followed at all times.

Preventing Machine Surprises - Simply unplugging the machine that you are working on is not enough. Before maintenance, repairs or machine setup, proper "LOTO" guarantees all energy sources are controlled. Many serious accidents have happened when someone thought the energy source was turned off.

Authorized employees must be certain which switch, circuit breaker, valve, or other energy isolating devices applies to the equipment to be locked out. Properly documenting and enforcing the use of machine specific LOTO procedures will ensure the safety of employees.

Correct LOTO procedures ensure that a machine's energy source(s) remain off and that there will not be unexpected movement of parts. Not properly locking out energy sources such as electrical, hydraulic or pneumatic can caused serious accidents. Identifying all the machine's power sources is critical. Sources can include electrical current, stored electricity (such as in a capacitor), stored pressure (such as compressed air or hydraulic pressure), stored mechanical energy (such as in a coiled spring) or gravity.

Steps of Lockout/Tagout:

Think, plan and check - Think through the entire procedure. Identify all parts of your systems that need to be shut down. Determine what switches, equipment and people will be involved. Carefully plan to ensure safe maintenance operations.

Communicate - Notify all those who need to know that a lockout/tagout procedure is taking place.

Identify the energy source(s) - Ensure all employees involved know the energy sources associated with the machine. Include electrical circuits, hydraulic and pneumatic systems, spring energy, gravity systems, or any other.

Neutralize all energy source(s) - Disconnect electricity. Block movable parts. Release or block spring energy. Drain or bleed hydraulic and pneumatic lines. Lower suspended parts to rest positions.

Lockout devices - Use only locks, hasps, and covers identified for lockout purposes. Each authorized worker must have a singularly identified lock.

Tagout power sources - Tag machine controls, pressure lines, starter switches and suspended parts. Tags should include your name, department, how to reach you, the date and time of tagging and the reason for the lockout.

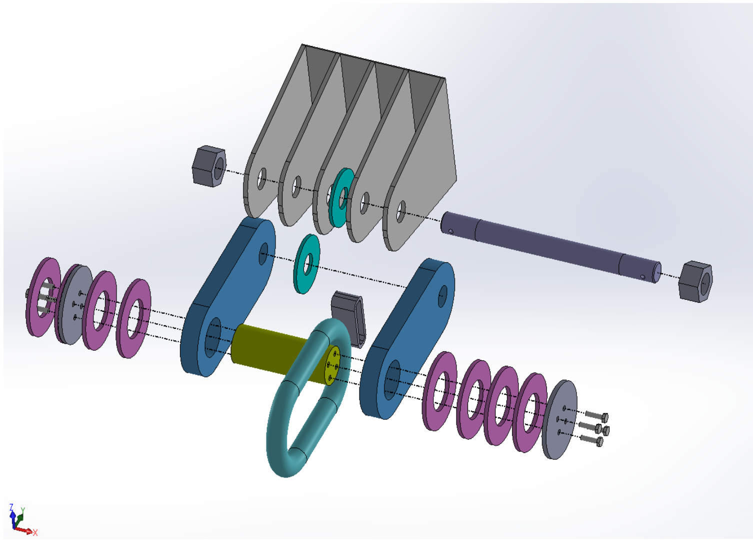
Lockout/Tags Log - A log of all lockouts and tags should be kept that identifies; location and type of machinery, equipment, or system identified for services; name of the authorized employee applying the lockout/tagout; date the authorized employee applied the lockout/tagout; name of the authorized employee removing the lockout/tagout; and date the authorized employee removed the lockout/tagout.

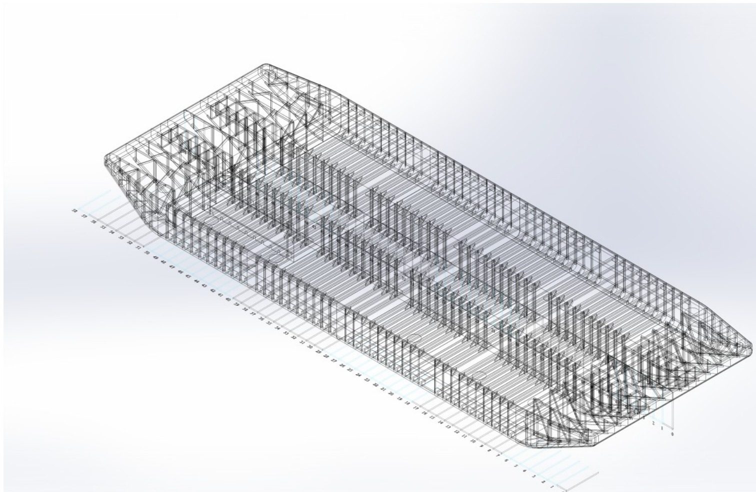
Verify equipment isolation - Check that all workers are clear. Ensure locking devices are securely placed. Attempt normal start-up procedures. Return controls to the off or neutral position.

Releasing machinery from LOTO - Inspect the area and equipment. Replace machine guards. Account for all tools and place them back into toolbox. Inform affected employees of machine start-up. Restore system connections. Remove tags and locks. Restore machinery to original configuration. Conduct normal start-up.

SolidWorks 3D Capability

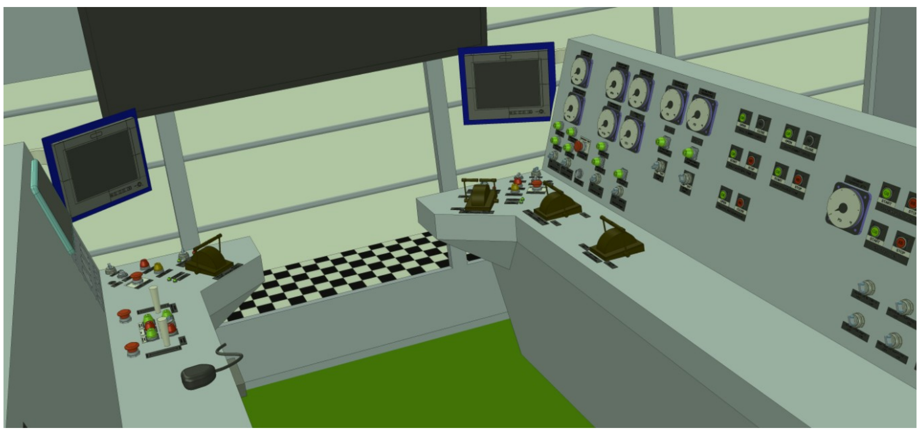
The Marine Design Center has acquired SolidWorks 3D CAD software to enhance our ability to design, model and develop drawings for projects. Solid-Works' capabilities include improving design clarity though showing complex builds in 3D, decreasing design time by allowing interferences and problems between parts to be detected visually in a model, producing accurate weight estimates by knowing the weight of every component used in a model, locating a vessels center of gravity, and performing stress testing and fluid dynamic testing.





Models produced in Solidworks can show the motion of a design through animation, simulation and videos, they can provide a virtual walkthrough of a project, deliver bill of materials and production drawings, and produce photo realistic renders. The additional possible uses are for 3D mapping of environments, early optimization of design and detecting safety issues better.

For more details on MDC projects using SolidWorks, contact Omar Brown, omar.n.brown@usace.army.mil



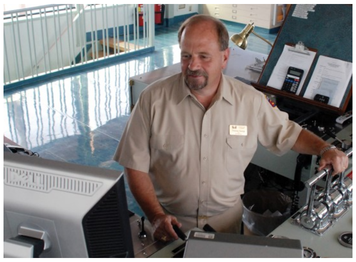
Floating Plant Highlights (Con't from pg 1)

Spill Barge
THOMAS N GEORGE

River for navigation and commerce.

The spill barge was designed and constructed by a team at the Corps of Engineers Marine Design Center, Ensley Engineer Yard in Memphis, the St. Louis District Service Base team, and their contracting assets.

Thomas N. George served the Corps for more than two decades, including in the Memphis District aboard the Dredge Burgess, Dredge Hurley and Motor Vessel Mississippi, as well as in St. Louis as master of the Dredge Potter. Before coming to the Corps he worked in the river towing industry beginning in 1974 for Brent Towing Company. He became part of river history by serving as navigator on three Mississippi River Challenge speedboat races from New Orleans to St. Louis. George passed away in his sleep April 5, 2014, aboard the Dredge Potter at Ensley Engineer Yard in Memphis, close to the river he loved.



Captain Thomas George

Environmental Update (Con't from pg 2)

action (i.e. paper work, filing, etc.) until December 18, 2017. Operators are still encouraged to be familiar with the sVGP and to implement best management practices to utilize environmentally acceptable fluids, minimize and track discharges.

For additional information, contact Tim Keyser, timothy.j.keyser@usace.army.mil

NASA Rocket Barge — PEGASUS (Con't from pg 3)

What's ahead for Pegasus

To manage SLS hardware and components, dramatically larger than space shuttle propulsion elements, Conrad Shipyard is tasked with lengthening the barge from 260 feet to 310 feet. This will be done by removing the center section and inserting a longer section that was designed to support the increased size and weight of the new SLS hardware. The company also will perform all necessary maintenance and refurbishment to ensure the restored vessel meets American Bureau of Shipping standards, including load line certification, or verification of the barge's legal loading limit to safely maintain buoyancy during water travel. The American Bureau of Shipping is a leading marine and offshore classification society which performs technical reviews, audits and surveys for seagoing vessel certification.

Bristol Harbor Group of Bristol, Rhode Island, who was contracted through an A-E IDIQ with the Marine Design Center, will perform some of the architecture and engineering work for the barge modification. Conrad will tow Pegasus from Stennis to the company's shipyard facilities in Amelia, Louisiana, where it will be drydocked during repair/refit operations. Work is expected to be completed in mid 2015, readying Pegasus to set sail once more.

New section of the PEGASUS

For additional information, contact Nick Hirannet, nick.n.hirannet@usace.army.mil

Arc Flash Hazard Analysis (Con't from pg 2)

protective device clearing times is extremely important in obtaining reliable AFH results. Using conservative (high) short circuit current values could yield faster protective device clearing times, depending on the protective device specific time current curve, making the IE and AFH less than a longer clearing time and lower magnitude short circuit event.

Step-4: Setting User-Defined Arc Flash Parameters

Prior to running the calculations for the AFH analysis, the user must determine the calculation standard and other parameters that the study will be based on. The user defined parameters include calculation standard, working distance, units of measure and threshold incident energy.

Step-5: Evaluating AF Calculations

EasyPower has a built-in feature that allows the user to evaluate multiple operating scenarios simultaneously to identify the plant's worst-case hazard. The user must create and store the various operating scenarios a plant may have prior to running an AF worst-case comparison report. Once the scenario comparison report is complete and the results are validated, the user may choose to print AF labels directly from the software.

MDC is currently working on AFH analysis' for the Dredge POTTER and M/V PATHFINDER for the St. Louis District.

For additional information, contact Isaac Smith,

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US Army Corps of Engineers Marine Design Center

The Marine Design Center is the Corps of Engineers center of expertise and experience for the development and application of innovative strategies and technologies for naval architecture and marine engineering. We provide total project management including planning, engineering, and shipbuilding contract management in support of Corps, Army, and national water resource projects in peacetime, and augments the military construction capacity in time of national emergency or mobilization.

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- Design & Construction of Floating Plant
- Arc Flash Hazard (AFH) Analysis