



FROM DAVE'S DESK

## Happy Holidays

**THE STAFF AT CDIM-SDD TAKE THIS OPPORTUNITY TO WISH ALL OF OUR CLIENTS AND FRIENDS, AT HOME AND ABROAD, THE VERY BEST FOR THE HOLIDAY SEASON AND FOR A HAPPY, HEALTHY AND PROSPEROUS NEW YEAR.**

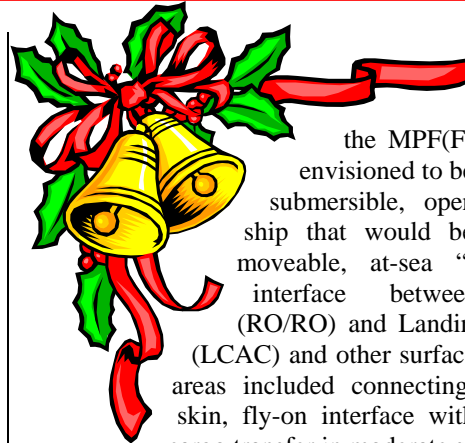
This 31<sup>st</sup> volume of our Quarterly Digest describes some of the interesting projects in which we have recently been engaged and is also our holiday greeting for the year. We have had a busy year and have grown our scientific staff by over 30%. Those that have joined us in 2005 include Dr. Bob Johnson, our Manager of Engineering Development, Capt. Robert Percival, USN Ret., our Manager of Ship Systems Integration, and recent graduates Chris Clayson, Chris Batzold, Tim Quarrick, Mike Stanbro, Jeff Hood and Sergey Setlonok, and we were very happy to welcome back Barbara Obenchain. We are very fortunate to have such highly talented additions to our staff and we are sure that their contributions to our team will be significant as we tackle the exciting work we have lined up for next year.

*Continued on page 2*

### MOBILE LANDING PLATFORM

*By Dan Wilkins, Director of Engineering*

CDI Marine Systems Development Division participated in a large-scale test support of the Maritime Prepositioning Force (Future) (MPF(F)) R&D program. The goal of the demonstration was to provide baseline data to reduce the risk of future proof-of-concept demonstrations and to support the



design process for a Mobile Landing Platform (MLP) for the MPF(F) ships. The MLP is envisioned to be a variation of a semi-submersible, open-deck, self-propelled ship that would be used to provide a moveable, at-sea "beach" to aid the interface between Roll-On/Roll-Off (RO/RO) and Landing Craft, Air Cushion (LCAC) and other surface lighterage. Key risk areas included connecting the vessels skin-to-skin, fly-on interface with LCAC and RO/RO cargo transfer in moderate sea states.

CDIM-SDD created the LCAC flyway design and conducted the prerequisite testing as well as teamed with other Government and civilian partners in the overall test plan development and execution. The final test phase took place over a one-month period and included full-scale operational interface tests between ships, vehicles and LCAC's. They were conducted in increasing wave conditions off the shores of Seattle, Washington and San Diego, California.



**MPF(F) Mobile Landing Platform (MLP)**

#### In This Issue . . .

- **MOBILE LANDING PLATFORM – by Dan Wilkins**
- **CCDoTT ON THE QUEEN MARY, LONG BEACH – by John Purnell and Manish Gupta**
- **SHIP SLAMMING LOADS – by Jeff Cullina**
- **CDIM-SDD SUPPORTS BALTIMORE CITY FIREBOAT / CBRN RESPONSE VESSEL ACQUISITION – by Drew Eisele and Dan Bagnell**

*A Tradition of Excellence in Advanced Marine Technology*

**FROM DAVE'S DESK, continued from page 1**

Articles contributed to this issue include the design and testing of a Mobile Landing Platform (MLP) for LCAC RO/RO operations by Dan Wilkins, our Director of Engineering; an article by John Purnell, our chief waterjet pump designer, and Manish Gupta, our Manager of Engineering, describing a recent conference held aboard the *Queen Mary* in Long Beach, California; one by Dan Bagnell, our Director of Naval Architecture, and Drew Eisele, his deputy, concerning the acquisition of the new Baltimore City Fire Boat; and one by Jeff Cullina on his research into providing a better understanding of ship slamming loads as part of his doctoral program at Johns Hopkins University in Baltimore.

The article on the *Queen Mary* is of particular interest to me as this was the luxury liner that my family and I traveled aboard when we emigrated from the UK to the USA in January of 1967. I say luxury since my wife and two kids and I traveled in first class accommodation with three full-time crew dedicated exclusively to looking after us for the whole voyage. We were treated with service beyond our wildest dreams. The ratio of crew to passengers for that winter voyage, we were told, was about three to one. Unfortunately, the ship encountered the worst storm it had seen in nine years. With waves reported to be in excess of 80 feet at times, our passage duration increased by more than one day. The ship suffered some minor damage, but the ride was spectacular, if not a little frightening at times. Bow slamming in the storm was frequent, loud and caused much whipping of the hull, which played interesting but disturbing noises on the extensive wood paneling in our stateroom that fortunately was close to amidships. That voyage was the ship's penultimate trip west bound, no doubt a result of unacceptably high operating cost and low utilization. After her next west-bound trip, she never returned to the UK. Some of the photos in this issue brought back fond memories of that trip 38 years ago. My regret was not being able to join John and Manish last month for a stroll down memory lane.

This coming year promises to be another exciting adventure, with a continuation of, and the start of more, fast ship and craft design work. Our reputation as a high quality company continues to grow and this fact serves to ensure for us a steady growth of business for the future.

The whole staff at CDIM-SDD joins me in wishing you all the very best for the holidays and for the coming year.



**CCDoTT ON THE QUEEN MARY, LONG BEACH**

**By John Purnell, Senior Engineer,  
and Manish Gupta, Manager of Engineering**

The Center for the Commercial Deployment of Transportation Technologies (CCDoTT) is a California State University, Long Beach sponsored, government approved and supported R&D center dealing with maritime-related transportation issues on behalf of both commercial and military interests. It was established in 1995 to address dual-use issues relating to emerging High-Speed Ships and their related Agile Port Systems. CDI Marine Systems Development Division has been associated with CCDoTT for many years and has been involved in both new and continuing program efforts for CCDoTT. As part of our involvement, CDIM-SDD participated with two presentations on our CCDoTT efforts at their latest conference "Innovative Maritime Partnerships Advancing Cargo Transport – IMPACT 2005" on 9-10 November 2005. The conference was held in the most impressive of circumstances for people involved in the maritime field, being held on the *Queen Mary*, which is now permanently docked in Long Beach, California. The conference room was the Queen's Salon, which was the original first class lounge for the ship.



**The Queen Mary**



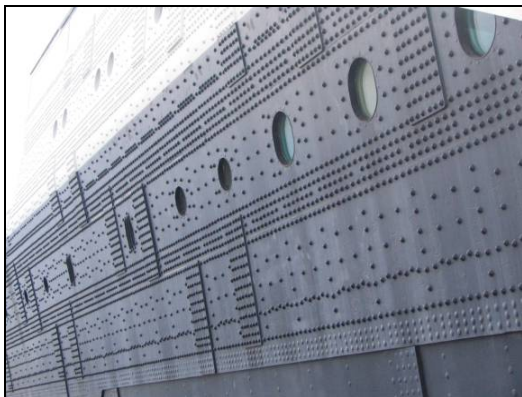
**Queen Mary Port Side View Looking Forward**

John Purnell presented "Waterjet Self-Propulsion Model Test for Application to a High-Speed Sealift Ship". CDIM-SDD is presently starting the fourth phase of a multi-year effort on developing high-power, compact, axial-flow

waterjets for commercial and military fast ships. This effort has developed and water-tunnel tested a model of an advanced axial-flow waterjet, which will be of major benefit to the narrow hulls of high-speed ship designs. The present phase of work will help establish the actual performance of the advanced axial-flow waterjet in a high-speed ship through waterjet self-propulsion model tests.

Manish Gupta presented “Development of a Route/Mission Dependant Program for the Prediction of Rational Structural Dynamic Loads for High-Speed Ship Application”. This multi-year research effort for CCDoTT is examining structural strength and, therefore, structural loads of high-speed hulls under various sea conditions and load parameters essential to the feasibility of high-speed ships. This will provide a new way that is cost-effective and efficient to predict how revolutionary ship designs will perform under actual usage conditions and will apply to both monohulls and multi-hulls, such as catamarans and trimarans.

The *Queen Mary*, which was retired to Long Beach in 1967 as a hotel, conference center, and tourist attraction, made its maiden voyage on 27 May 1936. Today, one can visit most parts of the ship and observe many contrasts between the most modern and luxurious ship of 1936 and today’s ship technology. At an overall length of 1019.5 feet and 81,237 design gross tons, the ship is still impressive, with its history only enhancing that awe. During its service life, it made 1,001 transatlantic crossings and had a passenger capacity of 1,957 on its 12 decks, but during its six and a half years of WWII service, it would carry up to as many as 15,740 troops plus 943 crew at one time. The ship had a total of 27 installed boilers that contributed 160,000 propulsion horsepower for a cruise speed of 28.5 knots. The familiar triple smoke stacks rise to 142 feet above the waterline with a ship draft of 39 feet. On boarding the *Queen Mary*, one is struck by the extensive riveted construction of the hull where over 10 million rivets were used. A visit to the ship’s bridge immediately shows how the electronic age has changed and revolutionized today’s ships. The massive 6-foot plus long, 2,205-pound steam whistles still sound every day. A visit to the *Queen Mary* with its teak decks, human-powered lifeboats, and ornate salons is a recommended and unforgettable experience for anyone.



View of the Extensive Hull Riveting on *Queen Mary*



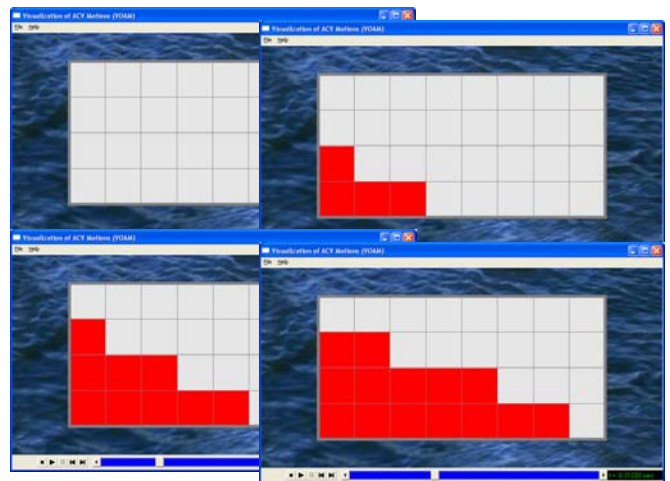
View of the *Queen Mary* Bridge

## SHIP SLAMMING LOADS

By Jeffrey Cullina, Ocean Engineer

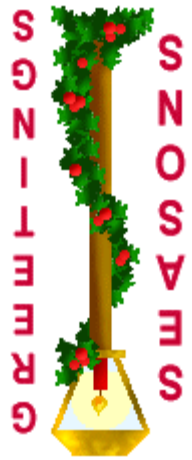
CDIM-SDD is currently involved in several projects related to ship hull bottom slamming. One such study is focused on quantifying the reduced lifetime loads given by the replacement of the conventional skirt on the U.S. Navy’s LCAC with the Deep Skirt designed by CDIM-SDD. In this project, we modified our time-domain air cushion vehicle (ACV) seakeeping code to incorporate algorithms that calculate the dynamic pressure on the hull related to wet deck contact. The algorithms were developed from semi-empirical relationships that have evolved from academics and engineers since the inception of sea planes. We also built a tool called VOAM (Visualization of ACV Motions) to visualize the simulation.

With the adaptation of the code complete, we will now turn our attention to computing lifetime loads via the seakeeping code for the design cases for LCAC outfitted with the conventional skirt. The process will be repeated to predict lifetime loads for the LCAC outfitted with the Deep Skirt. The results will show the extent to which the loads are reduced with the Deep Skirt.



Progression of Wet Contact Depicted in VOAM

ADDRESS CORRECTION REQUESTED



CDI Marine Company  
Systems Development Division  
900 Ritchie Highway, Suite 102  
Severna Park, MD 21146



## **THE QUARTERLY DIGEST**

of CDI Marine Systems Development Division

### ***CDIM-SDD SUPPORTS BALTIMORE CITY FIREBOAT / CBRN RESPONSE VESSEL ACQUISITION***

***By Drew Eisele, Naval Architect, and  
Dan Bagnell, Director of Naval Architecture***

CDIM-SDD has recently initiated a major effort to manage the acquisition of a highly capable multi-mission fireboat and Chemical, Biological, Radiological and Nuclear (CBRN) response vessel for the City of Baltimore. The vessel will replace the City's aging 85-foot fireboat *Mayor J. Harold Grady* and will service the Baltimore Harbor and the upper Chesapeake Bay.

The 87-foot vessel has been designed to National Fire Protection Association (NFPA) Class A standards and, in addition to providing substantial firefighting capabilities with a 7,000-gallon-per-minute pumping capacity and a 1,000-gallon firefighting foam capacity, it will also provide emergency medical treatment areas suitable for servicing multiple casualties simultaneously, an interior decontami-

nation station, and facilities for a mobile incident command post. The vessel will also be equipped to support diving and waterborne rescue/recovery operations.

Construction is currently scheduled to begin in the winter of 2006, and delivery of the boat to Baltimore's Inner Harbor will take place in the spring of 2007. CDIM-SDD has drafted the Performance Specifications for the fireboat, and will continue to oversee all aspects of the design, construction, testing and trials of the vessel throughout the acquisition.



**Artist's Rendition of the Baltimore City Fireboat /  
CBRN Response Vessel**

Voice: 410-544-2800 - Severna Park, MD  
301-261-1030 - Washington, DC

Fax: 410-647-3411  
e-mail: [david.lavis@cdicorp.com](mailto:david.lavis@cdicorp.com); web site: [www.cdi-gs.com](http://www.cdi-gs.com)