



JANUARY 2005— NEWSLETTER

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Special points of interest:

- Wind tunnel tests on CSO Deep Blue
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Update and Latest News

Since the last newsletter issued June 2004, MMC have undertaken a broad variety of interesting and challenging projects.

Within this issue we have included two brief case studies outlining some of the larger projects undertaken. The first of these is the engineering and movement of large **Type 45 Hull Sections** from Govan to Scotstoun on the Clyde.

We were also contracted to carry out a mooring study for Technip on their large pipe-laying vessel, **CSO Deep Blue**. Both of

these projects outline the variety of work we have undertaken and demonstrate the wide remit of skills we have in house.

We have also progressed towards ISO 9001 accreditation and this is reported below.

We would very much appreciate your feedback on the attached and if you have any queries or would like more information, please do not hesitate to contact us:

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Wind Tunnel Model of CSO Deep Blue

Preparing for ISO 9001

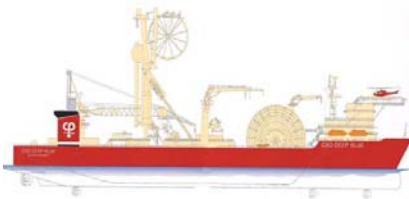
As was reported in the last newsletter a contract has been placed with DNV for our audit and accreditation to ISO 9001. We can report that the initial audit was carried out in January 2005 and we are aiming for our full accreditation audit in April 2005.

We will report on the outcome of this in a later issue of our newsletter.

We are very excited about taking this step and feel that this process will externally validate the successful and controlled working practices we employ internally at MMC.

CSO Deep Blue Mooring Study for Technip Offshore UK Ltd

Malin Marine Consultants (MMC) were approached by Technip Offshore to review an existing 10 point mooring spread proposed for use by the pipe laying vessel, CSO Deep Blue, for a visit to one of their pipe spooling bases.



Side Elevation on CSO Deep Blue



CSO Deep Blue

The CSO Deep Blue is the world's largest purpose-built ultra deepwater pipelay and subsea construction vessel. It can lay flowlines and umbilicals, and support developments in water depths ranging from 75m to 2,500m.

The CSO Deep Blue has an overall length of 206.5m and a moulded breadth of 32m. It has a moulded depth of 17.8m and an operating draught of from 7.5-8.95m, with a 10m maximum of draught. It has a 55,234t displacement and is 33,791gt. The upper deck aft of moonpool can withstand loading of 14lb/in². Loading for the moonpool covers is 4lb/in² and the rest of the upper deck is 7lb/in². It has a free deck area (aft of the moonpool) of approximately 7,400ft²

As part of their brief, MMC performed a complete review of

the existing documentation supporting the 10 point system and thereafter began work on a validation of this system. This validation involved working with a number of further subcontractors and resulted in a series of wind tunnel tests being carried out at BMT's Boundary Layer Wind Tunnel at Teddington.

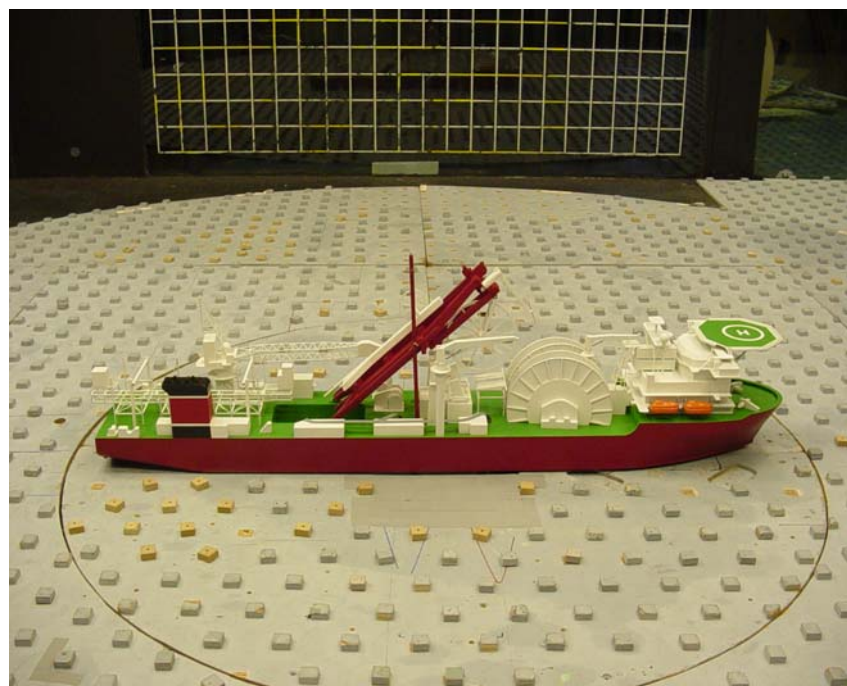
The data was obtained using a 1:150 scale model and the tests were carried out in accordance with the general procedure specified by the Norwegian Maritime Directorate.

Wind forces and moments were collated for the above waterline component of the vessel for draughts of 7.5 m and 8.5 m and with the pipe lay tower in the vertical and inclined positions.

These results were then compared with the drag coefficients obtained previously by generic methods and several key amendments to the analysis were made.

Following this initial validation of the mooring system, MMC then went on to review and assess options for a mooring system which employed two permanent mooring dolphins coupled with a less onerous mooring spread with a view to effecting significant savings in the level of preparatory work required to the vessel before arrival.

With this completed to the client's satisfaction, MMC then went to perform a full cost analysis of the two systems to assess the implications of offsetting the initial capital cost of permanent mooring dolphins against the recurring cost impact of the temporary 10 point system. All results were presented in a comprehensive series of reports and technical memos including external quotes and studies from civil, marine and land plant contractors, all directly managed by MMC.



CSO Deep Blue Wind Tunnel Model

Type 45 Destroyer Hull Block Moves

Early in 2004 Malin Marine Consultants were contracted to engineer the transportation of hull blocks for the new Type 45 destroyer between Govan and Scotstoun on the River Clyde.

These consisted of two moves of sections making up the Lower Bridge Block at a transported weight of approx. 400 Te and the Stern Block at a transported weight of approx. 1200 Te.

Lower Bridge Block was moved to temporary supports at Scotstoun and the Stern Block was delivered directly to keel blocks on the final build line.

MMC were presented with the preferred support locations on the blocks by the client, passed details of the build location and delivery set down point and thereafter had to review and engineer all aspects of the move including:

- Assessment of loadings from both hydraulic trailer and barge grillages into the block supports allowing client to review suitability of the hull loadings.

- Engineering suitable securing system for river move including effects of damage scenarios, heeling, impulse loadings and wind forces.
- Detail design and fabrication drawings for all steelwork required.
- Liaison with Port Authorities and writing all supporting documentation for approving authority review covering method statements, detailed ballasting calculations for loadout/loadin, mooring analysis, risk assessments and swept paths checking "pinch points" along the route.
- Assessing and detailing supporting services required such as workboats and craneage.
- Procurement of material including wire penants, specification of deck pumps for ballasting, mooring winches and linkspan boards.
- Detailed assessment of supporting grillage and deck loads, allowing justification and approval of barge deck loads while minimising client steelwork costs.

The transportation went smoothly with MMC staff on site throughout, supervising the operation.



Lower Bridge Block Discharge



Lower Bridge Block Discharge



Stern Block Exiting Build Hall



Stern Block Rolling onto Barge

Transportation Engineering—Motion Response Analysis Research—Update

The research project with the Universities of Glasgow and Strathclyde is now in its 17th month. The procedure for the motion analysis has been finalised. This procedure includes methods for 2D and 3D analysis, as well as long-term prediction.

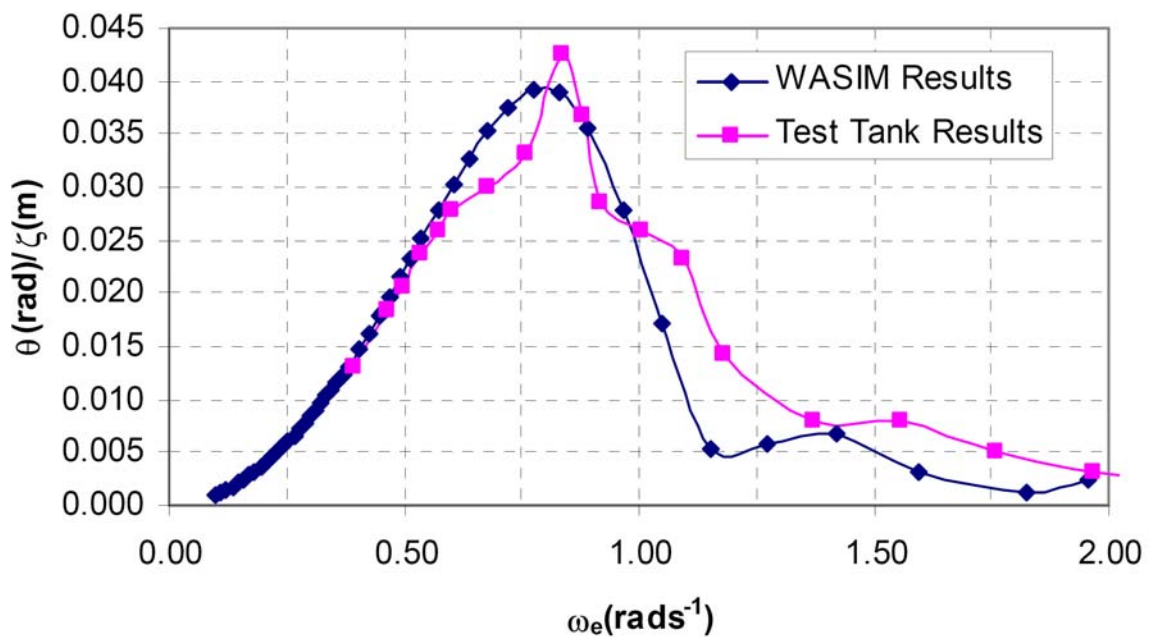
The software has also been calibrated and validated. This was possible due to the company's involvement with a model test on a barge in the database. We were able to compare the experimental results with the software results. After close analysis it was seen that the software and the experimental results compared favourably.

Extensive literature searches have demon-

strated that there is a lack of technical publications on the subject of complex hydrodynamic motions of rectangular barges.

As such and in conjunction with the Universities, a technical paper has been produced by MMC staff based on the findings of the project. This paper is due to be presented at the ISOPE conference in Seoul this summer by one of our Naval Architects.

Pitch RAO - 180 degrees



Comparison curves for Numerical and Physical Tank Test Runs on a 90x23m Barge

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**NAVAL
ARCHITECTS
AND HEAVY
LIFT
SPECIALISTS**

Malin Marine Consultants comprise a core team of professional, multi-disciplinary engineers providing an extremely diverse and flexible set of specialised skills which in turn are built upon a wealth of practical experience from visiting and working with ships and their crew. It is this unique combination of a deep rooted, practical approach to our way of working combined with an openness to new technology and techniques which places us in a strong position to tackle the many unusual and diverse challenges which come our way.

At our core is a work philosophy of professionalism and excellent time management skills allowing us to quickly turn around a client's contract requirements wherever necessary.

Please feel free to contact us with any technical enquiry you may have and be assured of a prompt and professional response.

Next Issue...

In the next issue we hope to continue to report on a number of exciting projects presently underway including:

- Detailed Finite Element Analysis of a 1000 Te hull section. This was raised in our last newsletter however this is still an ongoing project and we hope to be able to report more in our next issue.
- Design, Fabrication and Testing of a pair of Lifting Beams
- Tank test of custom built transportation barge

In addition, we will report on our ongoing application of our Quality System and our progress towards achieving full accreditation status.

Finally, we will update on our research programme underway with the Universities of Glasgow and Strathclyde.

If you have any further questions on any projects or services mentioned in this brochure, please do not hesitate to contact us at the address detailed above where one of our staff will be only too delighted to assist and provide more information.