SHIP VISCOUS FLOW

PROCEEDINGS OF
1990 SSPA-CTH-IIHR WORKSHOP

Lars Larsson
Virendra C. Patel
Gilbert Dyne
(editors)

FLOWTECH
INTERNATIONAL AB

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PREFACE

The planning for the Workshop described in this report started in September 1988, when the three editors met and decided to carry out the project as a cooperative effort between SSPA Maritime Consulting AB (Larsson), Chalmers University of Technology (Dyne) and Iowa Institute of Hydraulic Research (Patel). Using the initials of the three organizations the Workshop was named the "1990 SSPA-CTH-IIHR Workshop on Ship Viscous Flow". In November 1989 Larsson left SSPA for its new subsidary FLOWTECH International AB, a company specializing in Computational Fluid Dynamics. A considerable organizational burden was thereafter carried by FLOWTECH, which also accepted the responsiblity of publishing these Proceedings.

ABSTRACT

To assess the state of the art in ship visocus flow computation, a Workshop was organized in 1990 by the three organizations SSPA Maritime Consulting AB, Chalmers University of Technology and Iowa Institute of Hydraulic Research. Two test cases were specified by the organizers and sent out to the 19 participating research groups, which were asked to submit results in a prescribed format.

In September 1990 a meeting was held at Chalmers University of Technology. All results had then been collected and presented in a digestable format, and the theories behind the methods compiled in a table based on responses to a questionnaire sent out earlier.

During the meeting, each research group was first given the possibility to briefly introduce their method and results. Thereafter, a considerable time was spent on general discussions on the results obtained by the different methods, considering the differences in the underlying theories. Specific items that were adressed were grid generation, governing equations, boundary conditions, turbulence modelling and numerical method. Practical aspects on the results, for instance from the point of view of propeller design, were also discussed.

The present Proceedings contain a description of the two test cases, a general assessment of the results obtained and summaries of the discussions, including the propeller design aspects. The table summarizing the theories is included, as well as the plots of all results received. There is also a major part containing the individual contributions by the participants.

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8. References

Table I: Summary of Computation Methods. Information from Response to Questionnaire

Appendix: Computed results

PART II

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5. Gorski, J.J., Coleman, R.M., Haussling, H.J. and Miller, R.W., "Computation of Incompressible Fluid Flow About Two Tanker Sterns"
6. Hoekstra, M., "Some Remarks on a Stern Flow Computation for Two Tanker Hull Forms"
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8. Ikehata, M.and Liu, H., "Calculation of Boundary Layer and Wake around Ship Model by an Integral Method"
9. Kang, S.-H. and Oh, K.-J., "Fully Elliptic Viscous Flow Calculations for Two Ship Models"
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13. Masuko, A., Shirose, Y. and Abe, A., "Numerical Simulation of Viscous Flow for the Two Ship Models"

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17. Tzabiras, G., "Stern Flow Calculations for two Double Ship Models"

18. Zhou, L.-D. and Gao, Q.,"Calculations of Stern Flows for Two Ship Models Assinged by SSPA-CTH-IIHR Workshop on Ship Viscous Flow"

19. Zhu, M. and Miyata, H., "Simulation of Longitudinal Vortices about HSVA Tankers by a Finite-Volume Method"