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Message from the Chairman

Firstly I would like to record our appreciation of the valuable contributions made by Mr. Lillian Descotte of Bassin des Carenes, France to the work of the Propulsion Committee. I would also like to welcome Mr. Erwan Jacquin of Bassin des Carenes as the new Southern Europe representative on the Propulsion Committee.

ITTC's application for consultative status with the International Maritime Organisation (IMO) is currently being considered by Mr. E.E. Mitropoulos, Secretary-General of the IMO. Recent correspondence between Mr Mitropoulos and Dr. David Clarke, Secretary of the 24th ITTC Executive Committee confirmed that the IMO council will make the decision on our application in June 2005.

It gives me great pleasure to announce that the Executive Committee has supported the application from Professor Takeshi Kinoshita, member of the 24th ITTC Executive Committee to hold the 25th ITTC in Japan. The 25th ITTC will be held in September 2008 in Fukuoka, Japan.

With the Season's Greetings and all good wishes for a Prosperous New Year.

Atila Incecik, Chairman
24th ITTC Executive Committee

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News from the Executive Committee

The Executive Committee met on Tuesday 10th August 2004 in St. John's Newfoundland, Canada, during the 25th ONR Symposium on Naval Hydrodynamics. During that meeting a paper was discussed concerning the introduction of ITTC Membership Fees, which had been prepared by the Vice Chairman of the Advisory Council together with the Secretaries of the Executive Committee and the Advisory Council. The Executive Committee have agreed in principle to the introduction of membership fees but the details of the proposal are still under discussion. Following this discussion period, it is hoped that a final proposal could be submitted for approval to the Membership, at the full Conference at Edinburgh in September 2005. Following this discussion the final proposal will be submitted for approval to the Membership, at the full Conference at Edinburgh in September 2005.

It has been agreed by the Executive Committee, that Discussion Groups will be held during the Edinburgh Conference. Several topics were suggested and the Executive Committee have decided upon three topics as follows:-

- Full-scale sea trials.
- The use and application of the ITTC Recommended Procedures.
- New facilities.

Those members who would be interested in chairing or championing any of the above Discussion Group sessions should make themselves known by contacting the Secretary of the Executive Committee before the 31st March 2005.

The next meeting of the Executive Committee will take place Newcastle upon Tyne, United Kingdom, on Wednesday 6th April 2005.

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News from the Advisory Council

The AC met in St. John's Newfoundland, Canada in August 2004. 27 out of 33 members attended.

The Council reviewed reports from the technical committees. Generally committees were on track with their work and there were no significant issues brought forward which required actions by the AC at this time.

The formulation of the tasks for the future work of technical committees is a core assignment for the Council. The Council felt that the clarity and quality of the terms of reference for the technical committees needed improvement.

The AC concluded that more time needs to be spent on reviewing requirements and drafting the terms of reference. To ensure this, four working groups have been formed to draft recommendations for consideration by the full Council at its meeting in April 2005. The groups work through the fall and winter 2004/05. They will remain in place until after the Edinburgh Conference to support the new committees by answering any questions concerning the interpretation of their tasks.

The groups cover the following areas:

- 1 Resistance, Propulsion and Powering Performance
- 2 Waterjets, Cavitation Erosion, Podded Propulsion
- 3 Manoeuvring, Seakeeping, Stability in Waves
- 4 Ocean Engineering, Ocean Environmental Issues, Ice.

Each has about 6 members, all of whom have interest in the field covered by the group.

The groups will also review and make recommendations on proposed or revised ITTC procedures.

The next meeting of the AC will be held in Newcastle, UK, on April 4 and 5, 2005.

News from the Technical Committees

Resistance Committee

As it was informed in ITTC News #49, the RC The 3rd meeting of the ITTC Resistance Committee was held on August 16, 17 2004 at Helsinki University of Technology, Helsinki, Finland, hosted by Dr.J. Schweighofer. Eight of the nine members attended.

The task "Trends in Experimental Fluid Dynamics" includes results of a questionnaire on new test facilities and model manufacturing machines since June 2001 was distributed to all the ITTC organizations. 30 replies have been obtained so far. The results are 4 new model basins, 1 new circulating water channel, 7 major upgrades to model basins or circulating water channels, 3 new model manufacturing machines, and 2 major upgrades to existing model manufacturing machines.

As it was reported in detail in ITTC News #50, a series of comparative tests for identifying facility biases has started as a part of Task 4: "Uncertainty analysis for towing tank measurements". Two geosims of DTMB 5415 Combatant, with 5.720 and 3.038 meters length respectively are used. The larger model as been already tested at CEHIPAR (El Pardo Model Basin) and at INSEAN (Italy) and it is right now at Helsinki University of Technology (Finland) where tests just started. The small model starting its tests at CEHINAV (Spain).

For these circulation tests the committee has proposed a new technical procedure "ITTC Worldwide Test Series for Identifying Facility Biases", whose provisional version can be downloaded from the ITTC Resistance Committee web site:

http://www.nmri.go.jp/turbulence/group/ITTC_RC_top.html

In answering a comment by the AC, the Resistance Committee discussed with the Powering Performance Prediction Committee to solve a possible overlap in the tasks related to the uncertainty analysis for form factors, and the two committees have agreed to keep contact and, in the end, will decide in which of the reports it should be included.

The CFD Workshop Tokyo 2005 (CFDWS05), which will be held in March 9-11, is now in the final stage of data and paper submissions, with deadlines of December 31 for the common grid case and December 3 for all the other cases. There have been 28 entries so far. The Resistance Committee works in close collaboration with the secretariat of the workshop, and the results will be utilized in the three tasks of the committee.

The next meeting will be held in Madrid (Spain), on 13-14 December 2004

Propulsion Committee

The fourth meeting of the 24th ITTC Propulsion Committee was held during November 3 - 5, 2004 at the David Taylor Model Basin in W. Bethesda, Maryland, hosted by Dr. Ki-Han Kim. Seven of the nine members of the Committee were present. Mr.

Lilian Descotte from Bassin d'Essais des Carenes (BEC, France) has resigned from the Committee due to change of employment. The ITTC Executive Committee approved Mr. Erwan Jacquin, also from BEC, to replace Mr. Descotte.

The focus of this meeting was on the review of the draft write-up of the final report from each member addressing the two Recommendations and six Tasks given by the 23rd ITTC. In-depth discussions were held on each draft report and action items were identified that need to be addressed in the final revision.

A review was made of recent propulsion developments that include surface piercing propellers, tip plate propellers, tip-driven (or rim-driven) propulsors, transavitating propellers and composite propellers, whilst an overview was presented on waterjets and podded propulsors, since these two topics are being dealt with by the relevant specialist committees. New experimental methods include developments in PIV and high-speed camera techniques. Three new procedures were discussed for future work; hybrid propulsion combinations of conventional propellers and pods, conventional propellers and waterjets and multiple propellers. The six tasks have progressed well, entailing a procedure for model propeller accuracy and reviews of the numerical design of propellers, secondary thrusters, propulsion issues in shallow water, numerical predictions of effective wake, cavitation and induced hull pressures and issues relating to large propellers for mega container ships. A draft New Procedure for Propeller Model Accuracy was submitted to the AC Secretary in November. Continued interactions will be maintained with other related Committees including the Powering Performance Committee, Cavitation Erosion Committee, Azimuthing Podded Propulsor Committee, and Waterjet Committee to avoid duplicative efforts.

The Chairman and Secretary of the Committee will coordinate the final report in order to meet the major milestones. Progress is well underway and no problems are anticipated in meeting the deadlines.

Manoeuvring Committee

Dr. Pierre Perdon hosted the fourth meeting of the Maneuvering Committee (MC) on 4-5 November 2004 at Basin d'Essais des Carenes, Val de Reuil, France. Eight of the nine members attended.

First drafts and progress on all sections of MC Report and Quality Manual (QM) Procedures as given in ittc-news No. 50 discussed through presentations by Section and QM Procedure leaders. Progress on procedures for Certification or

Estimating Biases of Facilities and Uncertainty Analysis (UA) for Static and Dynamic Captive Model Test is delayed such that status will be reported in MC Report with recommendation that the work be completed by the 25th MC. Work was initiated on UA for free model tests and status will be reported in MC Report with recommendation that work be completed by 25th MC. Preliminary Conclusions and Recommendations were updated and nearly finalized.

Progress was made on organization of "Workshop on Verification and Validation of Ship Maneuvering Simulation Methods" with recommendation that the 25th MC help with final organization. The purpose is to benchmark the capabilities of systems and CFD based maneuvering simulation methods through comparisons of simulation results with validation PMM and free model test data for tanker, container, and surface combatant hull form test cases. Workshop will be held at FORCE/DMI in late 2007 or early 2008. Co-organizers include: IIHR; FORCE/DMI; KRISO; HSVA; INSEAN; SVA; and BEC. Test data is available or committed for all test cases, except container PMM and surface combatant free model test with discussions underway with NMRI and DTMB, respectively.

Schedule was agreed upon for completion of MC Report and QM Procedures. A non-mandatory, informal final editorial meeting will be held on 31 March – 1 April 2005 at SVA, Potsdam, Germany

Ocean Engineering Committee

The Ocean Engineering Committee is currently working on the update and recommendations of Procedures, as follows:

- Review and update "Validation of Sea Keeping Computer Codes in the Frequency Domain" (7.5-02-07-02.4).
- Update of the Procedure on "Floating Offshore Platform Experiments" (7.5-02-07-03.3) (into which we propose to also incorporate the present Procedure on "Turret Moored Tankers")
- Update of the Procedure on "Hybrid Model Testing" (7.5-02-07-03.4), which we suggest to rename "Truncation of Test Models and Integration with Numerical Simulations".
- In addition, the OEC is preparing a new Procedure: "Laboratory Modelling of Multidirectional Irregular Spectra".

The third Committee Meeting was held during 4-5 November, 2004 at LabOceano in Rio de Janeiro, Brazil, which was attended by all members.

Committee on Stability in Waves

The Committee had its final meeting in Shanghai, China on 4 November 2004. The meeting was hosted by Prof. S. Fang from MARIC. Progress reports and actions were tabled from the committee members. Progress on the various committee tasks has been as follows.

- (1) Prediction of extreme motions and capsizing of intact ships: coordinated by Dr. N. Umeda and Prof. K.J.Spyrou

For improving numerical modelling technique of intact stability, the benchmark testing study is now under way. Currently 4 submissions from the Member Organisations were received. These calculations were executed without the experimental data to be compared. As the next step, the Committee is ready to publish the experimental data for the participants and then the participants will have opportunities to revise their own numerical modelling. These revisions of the numerical modelling could indicate guidelines for future improvement of numerical modelling. An interim report was submitted to the 7th International Ship Stability Workshop hosted by Shanghai Jiao Tong University in China on 1-3 November 2004.

For updating the recommended procedures for model tests on intact stability, a detailed questionnaire on the existing procedures has been completed with 6 replies from experienced organisations. Based on this outcome, the revised draft procedures were prepared and then were sent to AC and QSG for their review. The new draft was developed to include more distinct guidance on superstructure, bilge keels, autopilot, ballasting, wave quality, roll decay, calibration, uncertainty and non-ergodicity due to strong non-linearities and so.

For supplementing efforts from the seakeeping committee, a new draft of recommended procedures of parametric rolling was prepared and discussed. The agreed procedures were sent to AC and QSG for their review and to the seakeeping committee for reference. This includes analytical formulae to predict the occurrence and amplitude of parametric rolling with a single degree of freedom model.

- (2) Prediction of dynamics of damaged ships: coordinated by Prof. A. Papanikolaou and Mr. T. C. Smith

The benchmark testing study of numerical modelling on damage stability is also under way. Currently 5 submissions from the Member Organisations were received and were compared with parts of experimental data. The outcome suggests that modelling floodwater with moving free surfaces is a key element of accurate modelling for certain damage scenarios. An interim report was discussed at the 7th International Ship Stability Workshop like that for intact stability.

A detailed questionnaire on the existing recommended procedures for model tests on damage stability like that for intact stability has been completed with replies from experienced organisations. Based on this outcome, the revised draft procedures were prepared and then sent to AC and QSG for their review. A major proposed revision is an increase in the number of realisations in irregular waves.

- (3) Stability safety assessment: coordinated by Prof. A. Francescutto

A review on stability assessment methodologies was updated, and covers prescriptive assessment, probabilistic or risk-based one and performance-based or simulation-based assessment.

- (4) IMO matters: coordinated by Prof. D. Vassalos

The IMO interim guidelines of high-speed craft model tests without an inner bow door were examined paragraph by paragraph. Then the Committee finalised the revised draft. The only remaining item is the effect of water collection, which will be resolved soon.

- (5) Evacuation in waves: coordinated by Prof. J. Matusiak

The literature review on evacuation in waves was further updated.

- (6) ITTC Member survey: coordinated by Prof. S. Fan

A general questionnaire on stability in waves was completed with replied from 46 ITTC Member Organisations as well as a questionnaire on numerical codes with 16 replies. These outcomes provide useful statistics and information on stability-related activities of the Member Organisations.

The Committee will concentrate its effort on writing the final report and recommendations to the 24th ITTC. For facilitating the above activities, the web site of this committee is provided with the following web address.

<http://www.naoe.eng.osaka-u.ac.jp/ittc-stability/>

Committee on Assessment of Ocean Environmental Issues

The Specialist Committee on Assessment of Ocean Environmental Issues has drafted its report for the ITTC. A brief summary of some of the main points is presented here, and comments from the wider ITTC community are solicited.

Oil

Pollutant characteristics: The anthropogenic sources of oil in the ocean amount to an estimated average of about 600,000 tonnes per year (based on 1990s estimates), although the inputs are variable. Most comes from vessels, with the remainder from land-based sources and production. Of the oil from vessels, about 1/3 is from accidental spills and 2/3 from operational discharges. Oil in the ocean environment can have immediate and long-term impacts on marine species, habitat, and the ecosystem.

Technology for management, control, and recovery: There are two main types of method for responding to oil spills. One is recovery equipment, such as booms and skimmers; the other is dispersion, using chemical dispersants. Other methods include *in-situ* burning and enhanced biodegradation.

Numerical and experimental modelling: There are many versions of numerical models for predicting trajectories of oil spills. Some of these are coupled to real-time meteorological information and databases of valued marine resources.

Equipment for detection and measurement: Instruments and sensors for detecting and measuring spilled oil are in routine use by research and environmental laboratories, but they are costly. Standards exist for calibration and for analytical procedures.

Testing and certifying procedures: ASTM has established recovery equipment standards. OHMSETT is a leading testing facility.

Marine debris and seabed litter

Pollutant characteristics: Marine debris and seabed litter are widespread in the world's oceans and coastal regions. This pollutant is comprised of persistent manufactured or processed solid material,

of which plastics and fishing nets are most notorious. Debris derives from several land-based sources, (such as sewer overflows, storm drains, landfills, and industrial activities) and ocean-based sources (such as commercial and recreational fishing and boating, operational wastes from shipping, illegal dumping, and simple littering by humans). Impacts on the marine environment include entanglement, ingestion (e.g. birds, turtles, marine mammals), and aesthetic degradation. Very little is known about the prevalence or impact of micro-debris in the oceans.

Technology for management, control, and recovery: Surveys to determine the extent of the pollution problem have been carried out on beaches and in the deep ocean using submersibles. An R&D project in the Republic of Korea is currently developing equipment to prevent land-based debris from reaching the ocean, (e.g. trash-booms), clean-up equipment for recovering debris and litter in-situ, and survey equipment.

Numerical and experimental modelling: Some modeling has been done to predict the fate of debris and litter. Field surveys have also been done.

Equipment for detection and measurement: For marine debris and seabed litter there are serious problems providing quantitative unbiased observations. Cost is a major issue in obtaining information on the distribution and abundance of seabed litter in the deep oceans.

Testing and certifying procedures: There are none.

CO₂

Pollutant characteristics: Massive quantities of CO₂ are discharged into the atmosphere as a consequence of human activities. Impacts include the potential for climate change, desertification, sea level change, and alterations to ocean circulation.

Technology for management, control, and recovery: The focus of the committee is on ocean storage of CO₂. There are several possible methods by which CO₂ might be sequestered in the ocean: direct injection, middle depth dissolution, and deep ocean storage. None are proven technologies.

Numerical and experimental modelling: Numerical models have been developed to predict CO₂ transfer in the ocean for a range of scales, from near field (meters) to ocean scale (thousands of kms). Many experiments have been done to investigate the potential of this approach for managing CO₂.

Equipment for detection and measurement: Instruments and sensors exist for CO₂, and are in

routine use by research and environmental laboratories but they are costly. Standards exist for calibration and for analytical procedures.

Testing and certifying procedures: The technology has not advanced this far.

Nutrients

Pollutant characteristics: Anthropogenic nutrients in the ocean derive primarily from industrial effluent and human waste waters. Degradation of sea water quality is the general result, particularly in coastal areas and bays near cities, where eutrophication and hypoxia, phytoplankton and algal blooms, and ecosystem change are some of the potential impacts.

Technology for management, control, and recovery: Coastal engineering work, such as measures taken to enhance tidal exchange, is one approach to manage this environmental concern. The use of sea plants for bioremediation has also been investigated.

Numerical and experimental modelling: Ecosystem models include the roles of phytoplankton, zooplankton, particulate organic matter, dissolved organic matter, phosphates, and inorganic nitrogen. There is considerable uncertainty associated with such models.

Equipment for detection and measurement: Instruments and sensors exist for the major nutrients (nitrate, phosphate, silicate) and are in routine use by research and environmental laboratories, but they are costly. Standards exist for calibration and for analytical procedures.

Testing and certifying procedures: None.

Ballast water

Pollutant characteristics: Discharge of ballast water and sediment has been recognized as an important mechanism for the transportation, introduction, and distribution of non-indigenous aquatic species and pathogens into new ecosystems, including fresh water lakes and estuaries. Newly introduced species and pathogens may pose hazards to human health and the health of the native ecosystem. There is also potential risk to infrastructure, interference with traditional resource use, and subsequent economic and social disruption. An estimated 3 to 5 billion tonnes of ballast water is transferred internationally annually, and about the same volume is transferred regionally within countries

Technology for management, control, and recovery: Regulations promulgated recently under the auspices of the IMO constitute an internationally recognized mechanism for managing the issues associated with ballast water and sediments (International

Convention for the Control and Management of Ship's Ballast Water and Sediment, 2004).

Numerical and experimental modelling: One of the measures for managing risks associated with produced water is reballasting at sea, which raises stability issues, which can be investigated both numerically and experimentally.

Equipment for detection and measurement: There exists a tremendous challenge for instruments and sensors that can measure and monitor the presence of biota in ships' ballast water on a routine basis. Aspects of the IMO's Globallast research programme are directed towards tackling this problem.

Testing and certifying procedures: IMO's Globallast program is the leading organization in this matter.

Produced water

Pollutant characteristics: Produced water is the most voluminous operational waste associated with the offshore petroleum industry. It includes formation water and injected water. Produced water can contain inorganic and organic compounds, naturally occurring radioactive materials, heavy metals, and hydrocarbons. The volume of hydrocarbons introduced to the ocean via discharges of produced water is relatively small compared to other anthropogenic sources.

Technology for management, control, and recovery: Produced water discharges are closely regulated in most jurisdictions and there is an array of technology for controlling the pollutants.

Numerical and experimental modelling: Models of produced water include hydrodynamic modeling of the fate of the discharge and the possible effects on ecological entities. There is a lot of uncertainty associated with such models, particularly in terms of effects.

Equipment for detection and measurement: Instruments and sensors exist for the detection of oil in water. Standards exist for calibration and for analytical procedures.

Testing and certifying procedures: This is a relatively mature operational issue and equipment is typically governed by standards embodied in regulations. meeting in St. John's in August 2004.

Committee on Validation of Waterjet Test

The Committee for Validation of Waterjet Test Procedures (Waterjet Committee in short), is now entering its final and possibly most decisive phase. The

Committee was given the task to finalize the standardization tests and to develop procedures and nomenclature (where needed) for the performance prediction of waterjet driven vessels. The standardization tests should also be used to feed the uncertainty analysis.

The status of the standardization tests and its data reduction is nowadays regularly monitored through telephone conferences. Two sets of tests are set out; One being the Self Propulsion Test to determine the overall performance, including jet-hull interaction, the other being the Waterjet System and/or Pump test, to determine the Waterjet System characteristics. The results of both tests are in the end needed to arrive at an overall powering prediction.

The status of the Self Propulsion Tests is that of the 11 institutes that entered the world wide test circuit, seven institutes have finished testing. Testing at three other institutes is planned. Data reduction by the committee has started and all institutes that participated but did not yet send in their data are kindly but urgently requested to do so. The data are collected and made untraceable by dr. Roger Compton of Webb Institute, USA (e-mail address: rcompton@webb-institute.edu).

On the waterjet system/ pump tests the situation is that three institutes have finished testing, yielding the results of two waterjet system tests and three pump tests. Due to mechanical problems with the large waterjet model, and due to a few cancellations, no more data are expected. It is however envisaged that this limited amount of experimental experience will provide sufficient insight in the problems that are characteristic to this type of testing.

The draft Committee's Report is currently being written and the first drafts of three contributions to the Quality Manual have been submitted to the Advisory Council in November:

- A procedure for Waterjet Self Propulsion Tests
- A procedure for Waterjet System and Pump Tests
- An example Uncertainty Analysis for a Waterjet Propulsion Test

Committee on Azimuthing Podded Propulsion

The committee had its third meeting in St. John's, Newfoundland, Canada during August 13-14, 2004, after the 25th ONR conference. After that, the committee has closely worked for the final draft of the procedures, recommendations and committee report. These documents have been circulated for comments among the committee members in November, 2004. Committee members have been also circulating comments/suggestions and

discussing those via e-mail messages. Those recommendations and committee report will be finalized in the last committee meeting at Marin, Wageningen Netherlands, which is scheduled during January 31, 2005 and February 1, 2005.

Committee on Cavitation Erosion on Propellers and Appendages on High Powered/High Speed Ships

Since the previous committee meeting held at Bassin des Carenes in May alongside the workshop on cavitation erosion the committee members have been at work completing their contributions to the report. The first draft is currently being compiled and the detailed editing will take place during the final meeting. This will take place in Southampton, hosted by the School of Engineering Sciences, during the first week in February. A detailed new ITTC test procedure on the use of techniques such as paint erosion to identify cavitation erosion at model scale has been developed and has been sent for review.

Committee on Powering Performance Prediction

The fourth meeting of the specialist committee was held from the 1st to 3rd November, 2004 in St John's, hosted by Memorial University of Newfoundland. Five members of the committee attended.

The final draft versions for ITTC procedures for conduct of speed/power trials and for speed/power trial analysis have been finalised.

The ship trials database established by the specialist committee was evaluated. A substantial amount of data is to be utilised for the validation analysis of the extrapolation techniques. The Specialist committee has the view that this work may not be finished within the work period of 24th ITTC, and may have to be continued by the 25th ITTC.

Further ship model tests have been conducted in the Vienna model basin for a ship type with substantial amount of existing ship trial data. New data on load varying tests shall enable the specialist committee to validate extrapolation techniques using self propulsion tests only.

Use of Monte Carlo simulations for uncertainty analysis has been validated by the work of the specialist committee. Comparative studies on uncertainty between the ITTC 1978 extrapolation method and extrapolation by self propulsion test only have been conducted with very interesting results.

Member Organisations

In preparation of the full ITTC Conference next year in Edinburgh a complete and correct address list of the ITTC member organizations is required. We kindly ask you to check on the ITTC website <http://itc.sname.org> that the data on your organization are correct. If not please inform the AC secretary (willem.van.berlekom@sspa.se) of any corrections and/or updates.

Next issue of the ITTC News

The next issue of the ITTC News , No 52, is planned to be published on June 15, 2005. Deadlines for contributions is May 30, 2005.