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BIBLIOGRAPHY ON POWER BOAT DESIGN

by Joseph G. Koelbel, Jr.

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13. ABSTRACT

A partially annotated bibliography on the design and construction of commercial and military power boats. The prediction of performance and the structural design of planing hulls are emphasized, with some material on small displacement craft such as fishing vessels and coasters. References are arranged in subject categories useful to the design naval architect. Over 1000 references are listed.

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There is no limitation on the length of the abstract. However, the suggested length is from 150 to 225 words.

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ACKNOWLEDGEMENT

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CONTENTS

ABSTRACT

A partially annotated bibliography on the design and construction of commercial and military power boats. The prediction of performance and the structural design of planing hulls are emphasized, with some material on small displacement craft such as fishing vessels and coasters. References are arranged in subject categories useful to the design naval architect. Over 1000 references are listed.

I. PROJECT HISTORY

The concept of a small craft bibliography originated in the early 1960's with Panel H-12 (Planing Boats) of the Society of Naval Architects and Marine Engineers. Each of the Panel members submitted a list of references which had been found useful. The work of compiling these, eliminating duplication, adding new references, etc., was carried out on a voluntary, part-time basis over a period of years. It became apparent that completion of the bibliography would require a greater expenditure of man-hours than was possible on a voluntary basis. Because the bibliography and a companion document summarizing the present state-of-the-art would be of benefit to the Naval Ship Systems Command and to the Naval Ship Engineering Center in dealing with civilian designers, funds for this work were made available through the Office of Naval Research. The original project was intended to cover only the hydrodynamics of planing hulls. The present contract allowed for a broader coverage of material related to power boat design.

II. SUBJECT MATERIAL

A. Intent

The purpose of this bibliography is to provide the small craft naval architect with a current listing of reference material related to the design and prediction of performance of power boats. In accomplishing this objective within the limited resources allotted, certain overall guidelines have been followed.

1. Project funds have been directed primarily towards the collection and listing of references, with secondary consideration given to data retrieval techniques and editorial presentation.
2. In cases where objective decisions were borderline, a subjective decision has been made quickly to expedite completion of the work. This applies to assignment of subject categories and to groupings of material into Essential, Useful, and Background categories.
3. In anticipation that the above restrictions on project effort would eventually require revising the bibliography layout, the original material has been mechanically assembled in a way that allows easy revision.

B. Emphasis

The bibliography emphasizes the design and construction of planing and semi-planing craft, with special attention being given to the prediction of performance. At the suggestion of a number of contributors, a significant body of historical works on planing phenomena has been included. Some of this material is still applicable to the design of fast hulls. Most of the early work on impact loadings was accomplished by the seaplane designers and this contribution is adequately represented. The remaining material is of interest in tracing the development of the art. While emphasis is on planing craft, there is an ample listing of recent valuable work on the design of displacement craft such as trawlers and other small coastal vessels.

C. Limitations

The collection does not cover the entire field of small craft design as practiced today. Certain areas which were specifically excluded are:

1. Classified references
2. Sailboats
3. Hydrofoil craft, except for hull design
4. Air cushion or surface effect craft
5. Foreign sources, with some exceptions

The most difficult limitation to accept is that volume of material which was located and is not included for various reasons of the originators or repository agencies. Three reasons were given, the first and most frustrating being the lack of both secretarial and reproduction facilities to handle requests for data. The second concerns data which had not been reviewed satisfactorily for technical quality or which was not in a form for outside use. The third category is information which was propietary or had restricted distribution limitations. Some of the latter material has been included

anyhow for those users who are able to justify access. Most documents in these three categories have very limited use to the designer, but a few were of such value that they should be made available to the design community. Perhaps a worthwhile future effort would be to liberate them for general use.

D. Abstracts and Comments

The bibliography is partially annotated. Where abstracts of articles were given in the source documents or in reviews, they have been included verbatim. If the document's contents were known and no abstract given, appropiate comments have been added where they would augment the understanding provided by the title alone. Not all of the entries have been reviewed and therefore the user must use his own judgement and the Value Index as a guide for selecting documents for acquisition.

E. Revisions

Mechanically, the original copy is prepared in strips the same height as a 35mm film negative. These strips are inserted in pages of plastic sleeves used for storage of photographic negatives. This system allows for easy revision of the original and for rearrangement of material without massive retyping. Retyping of this kind of material leads to an accumulation of errors and eventual loss of utility. The number of entries does not at present justify a computerized method of retrieval but as the document is revised the point may be reached where this method becomes economically justifiable.

III DOCUMENT SOURCES

A. Abbreviations and Source Addresses

Many of the sources are self explanatory, but there are a number of sources which are indicated by abbreviations or acronyms. These are identified below, as are the addresses of sources appearing frequently enough to merit their listing. The user will find some of the documents difficult to obtain. It is the purpose of the bibliography to make their existence known. The tracing of their various supply histories is beyond the scope of the project. In particular there is the problem of the constant change in government organization, and specifically in the Department of Defense, which may make the securing of a limited distribution document of older vintage a difficult chore. While agencies change names, fortunately key people do not, and the best route to securing a document is to contact someone who is involved in the original work. It is hoped that users of this bibliography will exercise discretion in requesting the documents listed herein and that by so doing, the continued cooperation of key contributors will be maintained.

AEW	Admiralty Experiment Works Haslar, Gosport, Hampshire England
AIAA	American Institute of Aeronautics and Astronautics 1290 Avenue of the Americas New York, N.Y. 10019
ARC	Aeronautical Research Commitee Advisory Committee for Aeronautics England
ASME	American Society of Mechanical Engineers 345 East 47 Street New York, N.Y. 10017
ASNE	American Society of Naval Engineers Suite 507, Continental Building 1012 14 Street N.W. Washington, D.C. 20005

BuAer NavAir	Naval Air Systems Command Washington, D.C. 20360
BuShips NavShips	Naval Ship Systems Command Washington, D.C. 20360
EMB, TMB DTMB NSRDC	Naval Ship Research and Development Center Washington, D.C. 20034
IAS	Institute of the Aeronautical Sciences (now AIAA)
ISP	International Shipbuilding Progress International Periodical Press 194 Heenraadssingle Rotterdam, The Netherlands
IME	Institute of Marine Engineers 85, Minories London, E.C. 3, England
JAS	Journal of the Aeronautical Sciences (Formerly a publication of IAS, now the AIAA Journal)
NACA NASA	National Aeronautics and Space Administration 400 Maryland Avenue S.W. Washington, D.C. 20360
NECI	North-East Coast Institution of Engineers and Shipbuilders Bolbec Hall Newcastle-upon-Tyne, England
NSMB	Netherlands Ship Model Basin Haagsteeg 2 Wageningen, The Netherlands
SAE	Society of Automotive Engineers 2 Pennsylvania Plaza New York, N.Y. 10001
SBSR	Shipbuilding and Shipping Record 33, Tothill Street Westminster, London S.W. 1, England
SIT ETT DL	Davidson Laboratory Stevens Institute of Technology 711 Hudson Avenue Hoboken, New Jersey 07030
SNAME	The Society of Naval Architects and Marine Engineers 74 Trinity Place New York, N.Y. 10006

B. DDC and Clearinghouse Documents

Many publications of the government agencies are distributed through the Defense Documentation Center and The Clearinghouse for Federal Scientific and Technical Information. Documents handled by these agencies are identified by code numbers, of the form "AD-000 000". Wherever such a number is shown after an entry, the document may be obtained from one of these agencies. Normally, unclassified documents are supplied from the Clearinghouse by direct sale to the public. Defense Contractors or others eligible to receive AD documents at no charge order their documents through the DDC system. Requests for unclassified material received from these users are then passed on to the Clearinghouse. Classified material is supplied directly from DDC. An AD number suffixed with the letter "L" indicates a document having a limited distribution and will require the permission of the cognizant agency before it can be obtained from DDC or the Clearinghouse. Requests for AD documents should be forwarded to:

Clearinghouse for Federal Scientific and Technical Information
Sills Building
5285 Port Royal Road
Springfield, Virginia 22171

or, if applicable,

Defense Documentation Center
Cameron Station
Arlington, Virginia 22314

These agencies have special procedures and request forms which greatly expedite delivery of documents to users making regular requests.

IV USER'S GUIDE

A. Arrangement

The bibliography is separated into 28 subject categories. Within each subject, documents are arranged in four groups according to their judged value to the working designer, with the most essential material in the first group. The groups are identified by a Value Index. The Value Indices are defined as follows:

Essential - Document contains information essential to the understanding of the subject. It is considered that the user must be familiar with the material in order to remain abreast of the state of art. In some cases the document may not be the sole authority, but is considered one of the best.

Useful - Contains information of frequent value in design.

Background - Information which may be of occasional use to the designer or researcher, or may have historic value.

An entry which carries no Value Index is in a fourth category, which is one of indecision. It is important to note that articles in this category might be considered in any of the three above if its contents were known to the reviewer.

The assignment of a Value Index is not a measure of the technical quality of the document. It is simply an opinionated judgement of its "frequency of usefulness" to the naval architect engaged in the design of small craft and is given as an aid to the acqusition of library material. Therefore some of the basic works which established planing theory may appear as background papers simply because more recent investigators have expanded the concepts in later work.

Within each Value Index Group, the articles are arranged by alphabetical order according to the first listed author.

The procedure in locating material is then first to locate the applicable subject category. The first group of articles will be the Essential material; the second, Useful; and the third, Background. The undesignated articles will appear in the fourth group. Within each group the user can quickly scan the page if he is doing a general search, or may go immediately to the articles written by a specific author. If there is some doubt as to the subject category, the user will find that it is seldom possible for material to be located under more than two categories with the subject headings that have been selected. A listing is made only once in this bibliography. There is no multiple listing of articles. If there was doubt as to the original subject category which should be assigned, the most likely one was selected and the entry appears nowhere else.

B. Entry Format

Listings follow the following format:

Author's Last Name, First Initial,--"TITLE OF ARTICLE IN CAPS" -- Date of Publication and Source. AD Number if Applicable.
SUBJECT CATEGORY,Value Index

C. Subject Categories

Subject categories were selected to minimize redundancy in assigning articles to a particular group. Categories are to be interpreted literally as defined in the listing which follows. The full name of the category is followed by the short form identifier which accompanies each entry.

SUBJECT CATEGORIES

Codes, Standards, and Regulations	REGS
General References and Basic Texts	GENERAL
Vessel Descriptions and Full Scale Performance Data	VESSELS
Hydrostatics and Weights	STATICS
Resistance (Includes all multi-purpose model test data)	RES
Propulsion	PROP
Steering (Including directional stability and maneuvering)	STEER
Seakeeping and Motions	MOTIONS
Applied Loads (Including impact and hull vibration)	LOADS
Strength Calculations (Stress, strain, deflection, buckling)	STRESS
General Construction Methods (Includes drafting and lofting)	CONST
Aluminum	ALUM
Ferro-Cement	CEMENT
Fiberglass	GLASS
Steel	STEEL
Wood	WOOD
Composite and Miscellaneous	COMP
Engine Selection and Rating	ENGINE
Engine Installation and Control (Including engine vibration)	ENG INST
Shafting, Gears, and Propellers (Mechanical considerations)	DRIVES
Diesel Engines	DIESEL
Gasoline Engines	GAS ENG
Gas Turbines	GAS TURB
Steam Propulsion	STEAM
Firefighting and Lifesaving	SAFETY
Electrical and Electronics	ELECT
Piping and Hydraulics	PIPING
Outfit and Rigging	OUTFIT

Anonymous, "SAFETY STANDARDS FOR SMALL CRAFT," American Boat and Yacht Council, 420 Lexington Ave., New York, N.Y. 10017. 1968.

REGS, Useful

Anonymous, "FIRE PROTECTION STANDARD FOR MOTOR CRAFT (Pleasure and Commercial)" NFPA 302, National Fire Protection Association, 60 Batterymarch Street, Boston, Mass. o2110 (Issued periodically)

REGS, Useful

Anonymous, "RULES FOR BUILDING AND CLASSING STEEL VESSELS," American Bureau of Shipping, Issued periodically.

REGS, Useful

Anonymous, "RULES FOR BUILDING AND CLASSING STEEL VESSELS FOR SERVICE ON RIVERS AND INTERCOASTAL WATERWAYS," American Bureau of Shipping, 45 Broad St., New York.

REGS, Useful

Anonymous, "RULES FOR BUILDING AND CLASSIFICATION OF WOODEN VESSELS," Det Norske Veritas, Norway.

REGS, Useful

Anonymous, "RULES AND REGULATIONS FOR THE CONSTRUCTION AND CLASSIFICATION OF WOODEN FISHING VESSELS," Bureau Veritas.

REGS, Useful

Anonymous, "RULES FOR THE CONSTRUCTION AND CLASSIFICATION OF WOOD AND COMPOSITE YACHTS," Lloyds Register of Shipping, 17 Battery Place, New York, $10.00.

REGS, Useful

Anonymous, "RULES FOR THE CONSTRUCTION OF REINFORCED PLASTIC YACHTS," Lloyds Register of Shipping, 17 Battery Place, New York, $10.00.

REGS, Useful

Anonymous, "RULES FOR THE CONSTRUCTION AND CLASSIFICATION OF STEEL YACHTS," Lloyds Register of Shipping, 17 Battery Place, New York. $10.00.

REGS, Useful

Anonymous, "STEEL TRAWLERS, RULES AND REGULATIONS," Lloyds Register of Shipping, London.

REGS, Useful

Anonymous, "RULES AND REGULATIONS FOR UNINSPECTED VESSELS," U.S.Coast Guard, CG 258, Issued periodically.

REGS, Useful

Anonymous, "RULES OF THE ROAD INTERNATIONAL-INLAND," U.S. Coast Guard, CG-169, Issued periodically.

REGS.Useful

Anonymous, "RULES AND REGULATIONS FOR SMALL PASSENGER VESSELS (SUBCHAPTER T)," CG-323 U.S. Coast Guard, Issued Periodically.

REGS,Useful

Anonymous, "SIMPLIFIED SUBDIVISION AND STABILITY PROCEDURES" Coast Guard Hq., MMT Letters dated 25 November 1959, Navigation and Vessel Inspection Circular No. 5-59.

REGS, Useful

Anonymous, "VENTILATION SYSTEMS FOR SMALL CRAFT," U.S. Coast Guard Bulletin CG 395.

REGS, Useful

Price, R.I., "STABILITY OF FISHING VESSELS," SNAME, Marine Technology, October 1968.

Reviews latest recommendations of the Intergovernmental Maritime Organization of U.N. Safety Committee regarding intact stability. Will be printed as USCG guide.

REGS, Useful

Anonymous, "PROVISIONAL RULES FOR THE CONSTRUCTION OF REINFORCED PLASTIC YACHTS," LLoyds Register of Shipping, 10 Church St, London, E.C.3.

REGS. Background

Anonymous, "PROVISIONAL RULES FOR THE APPLICATION OF GLASS REINFORCED PLASTICS TO FISHING CRAFT," LLoyds Register of Shipping, Ten Church Street, London, E.C.3.

REGS, Background

Anonymous, "ENGINE TEST CODE FOR NON-TURBOCHARGED SPARK-IGNITION AND DIESEL ENGINES", SAE Standards J816a, SAE Handbook, Society of Automotive Engineers.

REGS, Background

Anonymous, "RULES AND REGULATIONS FOR THE NUMBERING OF UNDOCUMENTED VESSELS AND THE REPORTING OF BOATING ACCIDENTS," U.S.Coast Guard, CG 267, Issued periodically.

REGS, Background

Anonymous, "RULES FOR BUILDING AND CLASSING WOOD VESSELS," American Bureau of Shipping.

Unserviced since 1921, limited applicability to construction today.

REGS, Background

Anonymous, "STANDARD SPECIFICATIONS FOR THE CONSTRUCTION OF SCOTTISH FISHING VESSELS," White Fish Authority, (U.K.).

REGS, Background

Anonymous, "TENTATIVE CODE FOR THE SELECTION OF WROUGHT ALUMINUM ALLOYS FOR SHIP STRUCTURES," SNAME T & R Bulletin 2-5.

REGS, Background

Hopkins, G. C., "MODERN TRENDS IN SHIP'S RADIO COMMUNICATIONS," SNAME, Marine Technology, October 1968.

An excellent guide to rules and regulations covering marine communications.

REGS, Background

Robertson, J.B.,Jr., "SOME OBSERVATIONS ON THE SAFETY OF LIFE AT SEA CONVENTION 1960. SNAME Southern California, January 12, 1961.

REGS, Background

Anonymous, "GAS TURBINE POWER PLANTS", Power test Codes, ASME PTC 22-1966.

REGS,

Barnaby, K.C., BASIC NAVAL ARCHITECTURE, John de Graff, Inc. New York, N.Y.

GENERAL, Essential

Comstock, J.P., Editor, PRINCIPLES OF NAVAL ARCHITECTURE, SNAME, 1967.

Probably the foremost textbook on the subject.

GENERAL, Essential

Hoerner, S.F., FLUID DYNAMIC DRAG, Book available only from author, 148 Busteed Dr. Midland Park, N.J.

The best single source of data for appendage drag estimates.

GENERAL, Essential

Saunders, Capt. H.E., "HYDRODYNAMICS IN SHIP DESIGN", 3 Volumes, Society of Naval Architects and Marine Engineers.

GENERAL, Essential

Taylor, D.W., THE SPEED AND POWER OF SHIPS, U.S. Government Printing Office, Third Edition, 1943.

GENERAL, Essential

Timoshenko, S., STRENGTH OF MATERIALS, Second Edition D.Van Nostrand, 1940.

GENERAL, Essential

Abbott, I.H. and Von Doenhoff, AE ., THEORY OF WING SECTIONS, INCLUDING A SUMMARY OF AIRFOIL DATA, Dover Publications Inc., New York, 1959.

GENERAL, Useful

Anonymous, "INDEX OF TECHNICAL PUBLICATIONS," National Aeronautics and Space Administration, Washington 20025.

GENERAL, Useful

Anonymous, "SYMPOSIUM: SMALL CRAFT HYDRODYNAMICS," Southeast Section of SNAME, Miami, Florida, May 27, 1966.

GENERAL, Useful

Anonymous, "WHEELED AMPHIBIAN ENGINEERING DESIGN HANDBOOK - FINAL DRAFT," July 1969, Hydronautics, Inc.,

GENERAL, Useful

Baader, J., CRUCEROS Y LANCHAS VELOCES; SU DINAMICA, PROPULSION Y NAVEGACION (CRUISERS AND FAST LAUNCHES; THEIR HYDRODYNAMICS, PROPULSION AND OPERATION), Buenos Aires, 1951 (in Spanish, English translation available.)

GENERAL, Useful

Baumeister, T., Editor, MECHANICAL ENGINEERS' HANDBOOK, McGraw-Hill Book Company, Inc. New York, N.Y.

Excellent reference.

GENERAL, Useful

Benford, H., "ECONOMIC CRITERIA IN FISH BOAT DESIGN", Presented at the Conference on Fishing Vessel Construction Materials, Montreal, October 1968, also Univ. of Michigan Department of Naval Architecture and Marine Engineering, Report No. 009.

GENERAL, Useful

Burke, I., "ANTHROPOMETRIC MEASUREMENT", SSCD Paper, The Planimeter, Nov.,1959.

GENERAL, Useful

Chapelle, H.I., YACHT DESIGNING AND PLANNING, (1936) W.W. Norton & Co., Inc., New York.

Practical approach to yacht design with good discussion of traditional wood construction, much detail and practical information with sketches.

GENERAL, Useful

DuCane, P., HIGH SPEED SMALL CRAFT, (1951, 1956 - 1964), Temple Press Books, London.

An excellent basic reference for the planing boat designer.

GENERAL, Useful

Gladding, P,R., "AN APPRECIATION OF A SMALL SHIPYARD", SNAME, New England Section, January 18, 1962.

GENERAL, Useful

Meese, G., "SMALL BOATS, DESIGN AND CONSTRUCTION," SNAME, Hampton Roads Section, April 1966.

GENERAL, Useful

Phillips-Birt, D., MOTOR YACHT AND BOAT DESIGN, W.&J. McKay and Co. Ltd., Chatham, England, 1953. American distributor, Sailing Book Service, 34 Oak Ave., Tuckahoe, N.Y. 10707.

GENERAL, Useful

Phillips-Birt, D., "NAVAL ARCHITECTURE OF SMALL CRAFT," Philosophical Library 1957 15 E. 40th St. N.Y., N.Y. 10016.

GENERAL, Useful

Simpson, D.S., "SMALL CRAFT, CONSTRUCTION AND DESIGN," (1951) Transaction, SNAME, New York, Vol. 59, p. 554.

GENERAL, Useful

Skene, N.L., ELEMENTS OF YACHT DESIGN , (updated by F.S. Kinney) (1962), Dodd, Mead & Company, New York,

One of the more useful texts. Contains scantling rules for wood construction.

GENERAL, Useful

Stoltz, J., "FUNDAMENTAL DESIGN OF STEPLESS PLANING HULLS", Motor Boating, N.Y, Feb., March, April, May, June, 1956.

Paper is reproduced totally in "How to Design Planing Hulls" Stoltz, Koelbel, Beinert, Motor Boating Ideal Series, Vol. 49, New York.

GENERAL. Useful

Tomalin, P.G., "MARINE ENGINEERING AS APPLIED TO SMALL VESSELS," SNAME, 1953, Transactions.

"This paper gives a number of nomograms and other data useful for the designer of small craft." Saunders.

GENERAL, Useful

Traung, Jan-Olof, Editor, FISHING BOATS OF THE WORLD, Vol. I, 1955, Vol. II, 1960 Vol. III, 1967, Food and Agriculture Organization of the United Nations, Published by Fishing News (Books) Ltd, London.

A valuable collection of papers containing a wealth of information on applied naval architecture.

GENERAL. Useful

Van Lammeren, W.P.A., et. al., "THE RESISTANCE, PROPULSION, AND STEERING OF SHIPS," The Technical Publishing Co., H. Stam-Haarlem-Holland.

GENERAL, Useful

(Various) "SMALL CRAFT DESIGN, AN INTENSIVE SHORT COURSE," 2 Volumes, University of Michigan, October 6-10, 1969, (Limited availability).

A comprehensive review of the state of the art of small craft design. A series of lecture notes by prominent authorities covering the engineering fundamentals involved in the hydrodynamic machinery and structural aspects of the design of small commercial, pleasure and government vessels. Hydrodynamics and structural sections emphasize planing craft while the machinery section is more generally applicable to all small craft.

GENERAL, Useful

Anonymous, "LANDING CRAFT AND THEIR EMPLOYMENT," USN Amphibious Schools 5ND GEN P-5, April 1963.

GENERAL, Background

Anonymous, "MARINE AND TERMINAL SERVICE EQUIPMENT," U.S. Army Transportation Board ST 55-178, June 1966.

GENERAL, Background

Anonymous, THE MOTOR BOAT YACHTING MANUAL, London, Temple Press, 1955.

GENERAL, Background

Anonymous, "OFFICIAL U.S. COAST GUARD RECREATIONAL BOATING GUIDE," CG-340, June 1966. Superintendent of Documents U.S. Government Printing Office, Washington, D.C. 20402. Price 45cents.

GENERAL, Background

Anonymous, "INTERIM DOCTRINE FOR RIVERINE OPERATIONS," HQ, Marine Corps, FMFM-8-1, April 1966, AD 481 135.

GENERAL, Background

Anonymous, "PROCEEDINGS OF THE ANNUAL MEETING OF THE AMERICAN TOWING TANK CONFERENCE," Issued annually.

GENERAL, Background

Ball, P.C., "PERFORMANCE TESTING," Symposium on Small Craft Hydrodynamics, SNAME, Southeast Section, May 1966.

GENERAL, Background

Bender, E.K. and Collins, A.M., "EFFECT OF VIBRATIONS ON HUMAN PERFORMANCE: A LITERATURE REVIEW", Bolt, Beranek and Newman, Inc. Report No. 1767, 15 February 1969. DDC-AD 854-136.

GENERAL, Background

Benford, H., "FUNDAMENTALS OF SHIP DESIGN ECONOMICS", University of Michigan, Department of Naval Architecture and Marine Engineering, 1965 Report B13.

GENERAL, Background

Benford, H., "MEASURES OF MERIT FOR SHIP DESIGN," University of Michigan, Dept. of Naval Architecture and Marine Engineering, 1965, Report B13.

GENERAL, Background

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RES, Useful

Ashton, R., "EFFECT OF SPRAY STRIPS ON VARIOUS POWER BOAT DESIGNS", Technical Memorandum No.99 of Experimental Towing Tank, February 1949, Stevens Institute of Technology.

"This report is generously illustrated with excellent photographs of both models and full-scale motorboats, showing the spray formation very clearly. The appendix contains useful design comments, with sketches-a rather unusual feature for a report of this kind." - Saunders.

RES,Useful

Beys, P.M., "SERIES 63 ROUND BOTTOM BOATS," Davidson Lab. S.I.T., Report No. 949, April 1963, AD 412-788.

RES,Useful

Blount, D., "RESISTANCE AND PROPULSION CHARACTERISTICS OF A ROUND-BOTTOM BOAT (PARENT FORM OF TMB SERIES 63)," DTMB Report 2000, March 1965, AD 614 565.

This report gives the resistance and propulsion characteristics of the TMB Series 63 parent form. The data cover the effects of displacement, initial trim, and appendages. An example of the procedure to be followed in making a horsepower estimate using these data is included.

RES, Useful

Chey, Y., "MODEL TESTS OF A SERIES OF SIX PATROL BOATS IN SMOOTH AND ROUGH WATER," Davidson Laboratory Report 985, October 1963, revised August 1964, BuShips, DTMB Contract NObs 78349, Task Order 14 DL Project 2648(223), AD 605-309.

Three round-bottom models and three hard-chine models with length-beam ratios of 3, 4, and 5 in each group and with constant displacement, were tested in smooth water and in irregular waves of Sea States 3 and 5. The Hard-chine model and the round-bottom model of length-beam ratio 4 were used to evaluate relative broaching tendencies in regular following waves.

The resistance data in smooth and rough water were expanded to boat weights of 55,000 pounds. The measured values of accelerations at the forward quarter point and LCG position and of heave, are presented. In the evaluation of relative broaching tendencies in regular following waves, experimental results were combined with theoretical results to derive indices of broaching.

RES, Useful

Clement, E.P., "EFFECTS OF LONGITUDINAL BOTTOM SPRAY STRIPS ON PLANING BOAT RESISTANCE", DTMB Report 1818, February 1964, AD 434-132.

Experiments were made to determine the effects on planing boat resistance of several configurations of longitudinal bottom spray strips. It was found that such strips extending aft from the bow about 70 percent of the hull length decreased the resistance somewhat at high speed but increased the resistance at low speed. The performance was noticeably improved by sharpening the edges of the spray strips. An experiment was also made with bottom spray strips extending only forward of the high-speed stagnation line. This arrangement gave a 6-percent reduction in resistance at high speed with no increase in resistance at low speed.

RES, Useful

Clement, E.P., "A CRITICAL REVIEW OF SEVERAL REPORTS ON ROUND BOTTOM BOATS", DTMB, Technical Note 40, 1963.

A previous report by H.F. Nordstrom gives comprehensive information about the hull forms and resistances of a considerable number of round-bottom boats. This report also shows that the resistance of these craft is determined mainly by the value of the hull form parameter, $L/\nabla^{1/3}$. Data on round-bottom boats from a number of other sources were examined to see if they could be correlated with the Nordstrom data. It was hoped thereby to produce graphs which would be useful for design and for the prediction of boat performance for a wider range of speeds. A report by Marwood and Silverleaf was found to contain data which could be used to prepare a series of graphs useful for predicting the resistances of boats of a wide range of sizes up to quite high speeds. The data from the other sources examined was found to be of little value for the present purpose. Generally this was either because of the evident presence of laminar flow on the models, or because the models were fitted with skegs of unknown size and of unknown influence on the resistance.

RES, Useful

Clement, E.P., "THE ANALYSIS OF STEPLESS PLANING HULLS", SNAME Ches. Section, Apr. 1951, abstracted in SNAME Members Bulletin, October, 1951.

RES, Useful

Clement, E.P. and Tate, C.W., "SMOOTH WATER RESISTANCE OF A NUMBER OF PLANING BOAT DESIGNS," DTMB Report 1378, October 1959.

Models of a number of different planing boat designs were towed in smooth water to provide data for guidance in designing aircraft rescue boats and similar high-speed craft. Resistance, trim, rise, and wetted surface were determined for each design for either standard or comparable conditions of hull loading and center of gravity location.

The test data, lines, and hull form characteristics for each design are presented in a design data sheet. Resistance of the different designs are compared, and reasons given for significant differences.

RES, Useful

Clement, E.P., and Pope, J.D., "GRAPHS FOR PREDICTING THE RESISTANCE OF LARGE STEPLESS PLANING HULLS AT HIGH SPEEDS", DTMB Report 1318, April 1959, AD 224-687.

Graphs are presented for predicting the resistance of stepless planing hulls at high speeds. These graphs were developed from semiempirical equations derived by the National Aeronautics and Space Administration for the pure planing lift and center-of-pressure on flat and V-bottom planing surfaces. The development of the graphs is explained, and an

example is presented to show the process of estimating the resistance of a typical large planing boat. A comparison of the resistance curves determined from model tests with the values of high-speed resistance obtained from these graphs shows good agreement.

RES, Useful

Clement, E.P. and Pope, J.D., STEPLESS AND STEPPED PLANING HULLS-GRAPHS FOR PERFORMANCE PREDICTION AND DESIGN," DTMB Report 1490, January 1961, AD 254-006.

This report presents graphs by means of which the high-speed resistance and trim of conventional and stepped planing boats of a wide range of sizes and proportions can be determined. Graphs which give guidance in selecting parameters which will result in optimum planing performance are also presented. Values for the graphs were obtained from

equations for the lift, center of pressure, and resistance of prismatic planing bottoms which were previously developed by the National Aeronautics and Space Administration and the David Taylor Model Basin.

RES, Useful

Clement, E.P. and Blount, D.L., "RESISTANCE TESTS OF A SYSTEMATIC SERIES OF PLANING HULL FORMS," SNAME Transactions 1963, Vol. 71.

This paper presents the results of resistance tests of five planing boat models of different length-bean ratio. Each model was tested at a number of loads and LCG locations. The results are presented as curves of angle of attack and resistance-weight ratio versus Froude number. The resistance data have been corrected to boat weights of 10,000 and 100,000lb. The measured values of wetted lengths, wetted surface, and rise of CG are also presented in tabular form. The conditions at which the models porpoised at high speed were determined and a graph defining the stable and unstable regions is included. A method was ascertained of collapsing the high-speed resistance data from the tests of the series into a single graph. A simplified prediction method was then developed which can be used to determine the high-speed resistance of planing hulls of a wide range of proportions, and of any gross weight from 1,000 to 100,000 lb.

RES, Useful

Clement, E.P., "GRAPHS FOR PREDICTING THE IDEAL HIGH-SPEED RESISTANCE OF PLANING CATAMARANS", DTMB Report 1573, November 1961, AD 269-762.

This report presents graphs by means of which the high-speed resistance and trim of catamaran planing hulls of a wide range of sizes and proportions can be determined. Graphs which give guidance in selecting parameters which will result in optimum planing performance are also presented. Values for the graphs were obtained from equations for the lift, center of pressure, and resistance of prismatic planing bottoms which were previously developed by the National Aeronautics and Space Administration and the David Taylor Model Basin.

RES, Useful

Clement, E.P., "THE DESIGN OF CAMBERED PLANING SURFACES FOR SMALL MOTORBOATS", NSRDC Report 3011, March 1969, AD 686-690.

The procedure is given for designing cambered and swept planing surfaces for small stepped motorboats of the dynaplane type. A design example is included in the report.

RES, Useful

Clement, E.P., "GRAPHS FOR DESIGNING CAMBERED PLANING SURFACES HAVING THE JOHNSON THREE-TERM CAMBER SECTION RECTANGULAR PLANFORM AND ZERO DEADRISE", NSRDC Report 3147, Oct. 1969.

The theory of Johnson was used to calculate the performance characteristics of cambered planing surfaces having a three-term camber section, rectangular planform, and zero deadrise. These characteristics are presented in a series of graphs which are suitable for design purposes.

RES. Useful

Clement, E.P., and Pope, J.D., "GRAPHS FOR PERFORMANCE PREDICTION AND DESIGN OF STEPPED AND STEPLESS PLANING HULLS. DTMB Report 1490, January, 1961. AD 254-006.

RES, Useful

Clement. E.P., "MERIT COMPARISONS OF THE SERIES 64 HIGH SPEED DISPLACEMENT HULL FORMS," DTMB Report 2129, November 1965. AD 624-688

Values of residuary resistance from model tests were previously presented for a methodical series of slender displacement hull forms which had been tested up to high speeds. The present report gives values of total resistance for the hull forms of the series so that their relative merits can be readily seen. The value of total resistance were calculated for boats of 200-ton displacement to facilitate comparison with resistance data for U.S. Navy hydrofoil boats. The Form of the data presentation is such as to provide guidance for the design of high-speed displacement and catamaran hull forms.

RES, Useful

Clement, E.P., "REDUCTION OF PLANING BOAT RESISTANCE BY DEFLECTION OF THE WHISKER SPRAY," DTMB Report 1929, November 1964. AD 454-407.

Additional experimental verification is presented of the reduction of planing boat drag which can be achieved by using longitudinal strips foward of the stagnation line to deflect the whisker spray from the hull surface. In addition, graphs for determining the high-speed positions of the spray boundary and stagnation lines are given, to assist designers in locating spray deflectors on planing boats in the most effective positions.

RES, Useful

Clement, E.P., "SCALE EFFECT ON THE DRAG OF A TYPICAL SET OF PLANING BOAT APPENDAGES," DTMB Report 1165, August 1957. AD 144-986.

Geometrically similar models of a set of planing boat appendages were manufactured in four different sizes, and tested to determine the scale effect error involved in predicting appendage drag. Data from the test of the smallest appendage set when mounted on a hull model were fairly consistant with data from the three larger appendage sets when mounted on a friction plane. The results indicate that use of an extrapolator which is appreciably steeper than Schoenherr's line at Reynolds numbers below about 10^6 would give more nearly correct predictions of full scale appendage resistance.

RES, Useful

Clement, E.P., "HOW TO USE THE SNAME SMALL CRAFT DATA SHEETS FOR DESIGN AND FOR RESISTANCE PREDICTION", T & R Bulletin 1-23, SNAME, 1963.

RES, Useful

Clement, E.P., "GRAPHS FOR PREDICTING THE RESISTANCE OF ROUND BOTTOM BOATS", ISP Vol. 11 No. 114, February 1964.

RES, Useful

Fridsma, G., "MODEL TESTS OF A ROUND BOTTOM PATROL BOAT IN SMOOTH AND ROUGH WATER," Davidson Laboratory Report LR-1074, June 1965, David Taylor Model Basin Contract N600(167)(61303)(x), J.O.4, DL Project 2993/236, AD 616-634.

Performance characteristics in smooth and rough water are presented for a round bottom patrol boat, based on tests conducted on a 1/16 scale model (No. 5016). Comparison is made with another model of smaller length/beam ratio (Model No. 4927).

RES, Useful

Gertler, M., A REANALYSIS OF THE ORIGINAL TEST DATA FOR THE TAYLOR STANDARD SERIES, DTMB Report 806, March 1954. May be obtained from the U.S. Government Printing Office for $3.50. Catalog D211.9:806.

RES, Useful

Graff, W., Kracht, A. and Weinblum, G., "SOME EXTENSIONS OF D.W. TAYLOR'S STANDARD SERIES", SNAME 1964.

RES Useful

Kafali, K., "THE POWERING OF ROUND BOTTOM MOTORBOATS," ISP, February 1959.

RES, Useful

Koelbel, J.G., "A COMPARISON OF SEVERAL POWERING METHODS", The Planimeter, December, 1961, Society of Small Craft Designers.

Comparison of several power prediction formulas with results of model and full scale tests of a number of craft.

RES, Useful

Marwood, W.J. and Bailey, D., "DESIGN DATA FOR HIGH SPEED DISPLACEMENT HULLS OF ROUND-BILGE FORM", Ship Report No. 99, February 1969, National Physical Laboratory.

RES, Useful

Nordstrom, H.F., "SOME TESTS WITH MODELS OF SMALL VESSELS," 1951 (in English) Publication No 19 of the Swedish State Shipbuilding Experimental Tank, Goteborg, Sweden.

"Data are given with body plans and graphs embodying test results on 27 different models of round bottom and V-bottom boats (with chines). On pages 15 and 16 the report gives data as to the resistance of appendages and the probable values of propulsive coefficients."-Saunders.

RES, Useful

Ridgely-Nevitt, C., "THE DEVELOPMENT OF PARENT HULLS FOR A HIGH DISPLACEMENT-LENGTH SERIES OF TRAWLER FORMS", SNAME, 1963.

RES, Useful

Ridgely-Nevitt, C., "THE RESISTANCE OF A HIGH DISPLACEMENT-LENGTH RATIO TRAWLER SERIES," SNAME 1967.

RES, Useful

Savitsky, D., and Neidinger, J., "WETTED AREA AND CENTER OF PRESSURE OF PLANING SURFACES AT VERY LOW SPEED COEFFICIENTS," Davidson Laboratory Report 493, Sherman M. Fairchild Publication Fund Paper FF-11, Institute of Aeronautical Sciences, New York, N.Y..

RES, Useful

Stoltz, J.; Koelbel, J.G.; Beinert, J., "HOW TO DESIGN PLANING HULLS", Vol. 49 Ideal Series, Motor Boating, 959 Eighth Ave. New York, N.Y. 10019.

RES, Useful

Takagi, A., et. al., "GRAPHICAL METHODS FOR POWER ESTIMATION OF FISHING BOATS", 1950, Fisheries Agency, Japan.

RES, Useful

Todd, F. H., "TABLES OF COEFFICIENTS FOR A.T.T.C. MODEL-SHIP CORRELATION AND KINEMATIC VISCOSITY AND DENSITY OF FRESH AND SALT WATER," SNAME T & R BULLETIN 1-25.

RES, Useful

Toro, A.I., "SHALLOW-WATER PERFORMANCE OF A PLANING BOAT," Southeastern Section, SNAME, April 1969. Also University of Michigan, Department of Naval Architecture and Marine Engineering Report No. 019, April 1969.

RES, Useful

Traung, Jan-Olof, Compiler, "FISHING BOAT TANK TESTS", Technology Branch FAO Fisheries Division.

RES, Useful

Van Mater, P.R. Jr., "BEHAVIOR OF THREE PLANING BOAT DESIGNS IN CALM AND ROUGH WATER", August 1963, Davidson Laboratory Report No. 854, AD 422 495.

RES, Useful

Yeh, H.Y.H., "SERIES 64, RESISTANCE EXPERIMENTS ON HIGH-SPEED DISPLACEMENT FORMS," SNAME, Chesapeake Section, 9 December 1964. Also Marine Technology, July 1965, SNAME.

RES, Useful

Andreoni, A., "COMPARATIVE TESTS OF THREE SIMILAR MODELS OF RIVER BOAT", ISP, Vol. 11, March 1964, No. 115.

RES, Background

Angeli, J.C., "EVALUATION OF THE QUALITY OF PLANING BOAT DESIGN", SNAME Southeast Section, February 18, 1971.

The purpose of the present paper is to provide Planing Boat Designers with a straightforward method for the comparison of boat performance whatever the displacement and speed might be, and similarly, to evaluate the probable merit of a project at an early stage of the design.

RES, Background

Anonymous, "LARGE CONVERTIBLE M.T.B./M.G.B. 1947/48 PROGRAMME. HARD CHINE FORM (P 5701) FINAL EHP CURVES, WAVE FORMATION AND RUNNING ATTITUDE," AEW Haslar, September 1952, Report No. 34/52.

Model Test of 116' X 24' Boat.

RES, Background

Anonymous, "FAST PATROL BOAT. SHORT M.T.B./M.G.B. CONVERTIBLE 1950-51 PROGRAMME PRELIMINARY EHP OF MODIFIED FORM. MODEL C.J.R.", AEW, Haslar, November 1951, Report No. 41/51.

Model Test of 66 ft. X 18 ft. Boat.

RES, Background

Anonymous, "FAST PATROL BOAT, SHORT MTB/MGB CONVERTIBLE, TYPE B, 1951-52 PROGRAMME PRELIMINARY EHP", Admiralty Experiment Works, Haslar.

RES, Background

Anonymous, "FAST PATROL BOAT (SHORT M.T.B./M.G.B. CONVERTIBLE) TYPE B., 1951-1952 PROGRAMME PRELIMINARY EHP", AEW, Haslar, February 1952, Report No. 6/52.

Model Test -71ft. X 16ft. Boat.

RES, Background

Anonymous, "FAST PATROL BOATS TYPE 'A' DARK CLASS. STERN WEDGES AND FLAPS", Admiralty Experiment Works, Report No. 70/54.

RES, Background

Anonymous, "LONG FAST PATROL BOAT. 1952-53 PROGRAMME MODIFIED FORM PRELIMINARY EHP," AEW, HASLAR, July 1952, Report No. 24/52.

RES, Background

Anonymous, "METHODICAL SERIES - SCALE EFFECT, FAST PATROL BOATS," Admiralty Experiment Works Report No 24/58.

RES, Background

Anonymous, "SEA SLED AND MEDIUM FAST PATROL BOAT-COMPARATIVE BEHAVIOR IN WAVES AND RESISTANCE IN STILL WATER," Report No. 9/56, Admiralty Experiment Works, Haslar, Gosport, Hampshire, England, U.K.

RES, Background

Anonymous, "TESTS OF TRANSOM STERNS ON DESTROYERS," DTMB Report 339, November 1932.

RES, Background

Anonymous, "REPORTS ON HYDRODYNAMIC MODEL TESTS OF HIGH SPEED WHEELED AMPHIBIAN CONCEPTS, PART II," Davidson Lab. Report 726, November 1956.

RES, Background

Anonymous, "MODEL NO. 3324 - ADDITIONAL TEST - LONGITUDINAL STEPS (BASIN DESIGN)," DTMB Report No. 435, June 1937.

RES, Background

Anonymous, "TS SEAPLANE - EXPERIMENTS WITH MODEL OF MK II TWIN FLOATS (EMB MODEL NO. 2494)," DTMB Report No. 88, December 1923.

RES, Background

Anonymous, "THEORETISCHE UND EXPERIMENTELLE UNTERSUCHUNG DER STROMUNG HINTER GLEITFLACHEN UND WASSERTRAGFLUGELN I," Bericht Nr 223/62, Versuchsanstalt Fur Wasserbau Und Schiffbau, Berlin, 1962

RES, Background

Anonymous, "MODELLVERSUCHE FUR EIN 9M - AUTOBOOT," Bericht NR. 322/65, Versuchsanstalt Fur Wasserbau Und Schiffbau, Berlin, 1965.

Model test of 29 foot planing boat.

RES, Background

Anonymous, "MODELLVERSUCHE FUR EINE 30-KN-MOTORYACHT," Bericht NR 314/65, Versuchsanstalt fur Wasserbau und Schiffbau, Berlin, 1965.

Model Tests of a 97.5 Foot V-Bottom Boat.

RES, Background

Bailey, D., "SOME MODEL EXPERIMENTS WITH TRANSOM FLAPS FITTED TO ROUND BOTTOM CRAFT," National Physical Laboratory Ships Division (England) Report 102.

RES, Background

Baker, G.S. and Millar, G.H., "SOME EXPERIMENTS IN CONNECTION WITH THE DESIGN OF FLOATS FOR HYDROAEROPLANES", Advisory Committee for Aeronautics (England) Aeronautical Research Committee, Reports and Memoranda No. 70, November 1912.

RES, Background

Baker, G. S., and Millar, G.H., "EXPERIMENTS WITH MODELS OF HYDROAEROPLANE FLOATS, 2ND AND 3RD SERIES", Advisory Committee for Aeronautics (England), Aeronautical Research Committee Reports and Memoranda No. 98, November 1913.

RES, Background

Baker, G.S., and Millar, G.H., "EXPERIMENTS WITH MODELS OF HYDROAEROPLANE FLOATS, 4TH SERIES", Advisory Committee for Aeronautics, (England), Aeronautical Research Committee Reports and Memoranda No. 99, March 1914.

RES, Background

Baker, G.S.. and Millar, G.H., "EXPERIMENTS WITH MODELS OF HYDROAEROPLANE FLOATS, 5TH SERIES", Advisory Committee for Aeronautics, (England) Aeronautical Research Committee Reports and Memoranda No. 113, July 1914.

RES, Background

Baker, G.S., "EXPERIMENTS WITH MODELS OF SEAPLANE FLOATS, 6TH SERIES", Advisory Committee for Aeronautics (England) Aeronautical Research Committee Reports and Memoranda No. 165, March 1915.

RES, Background

Baker, G.S., "EXPERIMENTS WITH MODELS OF SEAPLANE FLOATS, 7TH SERIES", Advisory Committee for Aeronautics (England) Aeronautical Research Committee Reports and Memoranda No. 166, June 1915.

RES, Background

Baker, G.S. and Bottomley, A.M., "EXPERIMENTS WITH MODELS OF SEAPLANE FLOATS, 8TH SERIES" Advisory Committee For Aeronautics (England), Aeronautical Research Committee Reports and Memoranda, No. 187, November 1915.

RES, Background

Baker, G.S., and Keary, E.M., "EXPERIMENTS WITH MODELS OF SEAPLANE FLOATS, 10TH SERIES", Advisory Committee for Aeronautics (England), Aeronautical Research Committee Reports and Memoranda No. 189, January 1916.

RES, Background

Baker, G.S., and Keary, E.M., "EXPERIMENTS WITH MODELS OF SEAPLANE FLOATS, 11TH SERIES," Advisory Committee for Aeronautics (England), Aeronautical Research Committee Reports and Memoranda No. 365, November 1917.

RES, Background

Baker, G.S. and Keary, E.M., "EXPERIMENTS WITH MODELS OF SEAPLANE FLOATS, 12TH SERIES", Advisory Committee for Aeronautics (England), Aeronautical Research Committee Reports and Memoranda No. 412, April 1918.

RES, Background

Baker, G.S. and Keary, E.M., "EXPERIMENTS WITH MODELS OF SEAPLANE FLOATS, 13TH SERIES", Advisory Committee for Aeronautics (England), Aeronautical Research Committee Reports and Memoranda No. 410, March 1918.

RES, Background

Baker, G.S. and Keary, E.M., "SOME NOTES ON FLOATS FOR SEAPLANES OF THE SINGLE FLOAT TYPE, 14TH SERIES," Advisory Committee For Aeronautics (England) Aeronautical Research Committee Reports and Memoranda No. 437, May 1918.

RES, Background

Baker,G.S.and Keary, E.M., "EXPERIMENTS WITH MODELS OF FLYING BOAT HULLS, 16TH SERIES", Advisory Committee for Aeronautics (England), Aeronautical Research Committee, Reports and Memoranda No. 472, September, 1918.

RES, Background

Baker, G.S. and Keary, E.M., "EXPERIMENTS WITH MODELS OF SEAPLANE FLOATS, 17TH SERIES", Advisory Committee for Aeronautics (England) Aeronautical Research Committee Reports and Memoranda No. 483, December 1918.

RES, Background

Baker, G.S., and Keary, E.M., "EXPERIMENTS WITH MODELS OF FLYING BOAT HULLS AND SEAPLANE FLOATS (POSSIBILITY OF LOADING A FLYING BOAT HULL, THE BEAM AND ANGLE OF FOREBODY BEING VARIED), 19TH SERIES," Advisory Committee for Aeronautics (England), Aeronautical Research Committee Reports and Memoranda No. 655, January 1919.

RES, Background

Baker, G.S. and Keary, E.M., "EXPERIMENTS WITH MODELS OF FLYING BOAT HULLS, 24TH SERIES. COMPARISON OF LONGITUDINAL WITH TRANSVERSE STEPS", Advisory Committee for Aeronautics, Aeronautical Research Committee Reports and Memoranda No. 893, August 1923.

RES, Background

Baker, G.S., "TEN YEARS TESTING OF MODEL SEAPLANES," Journal of Royal Aeronautical Society, May 1923.

RES, Background

Baker, G.S., et. al. "SEAPLANE FLOATS AND FLYING BOAT HULLS; EXPERIMENTS WITH FULL SIZE MACHINES-1ST SERIES," Advisory Committee for Aeronautics(England), Aeornautical Research Committee Reports and Memoranda No. 473, September 1918.

RES, Background

Baker, G.S. and Keary, E.M., "SEAPLANE FLOATS AND FLYING BOAT HULLS; EXPERIMENTS WITH FULL SIZED MACHINES, 2ND SERIES," Advisory Committee for Aeronautics, Aeronautical Research Committee Reports and Memoranda No. 683, September 1920.

RES, Background

Baker, G.S., "FLYING BOATS", Engineering, March 5, 1920, and Flight, March 4, 11 and 18, 1920.

RES, Background

Beal, A.L. and Hinterthan, W.B., "RESISTANCE AND PROPULSION CHARACTERISTICS FOR LCU 1466 AS REPRESENTED BY MODEL 4545," NSRDC Report 1037, March 1961. DDC AD 254-123.

RES, Background

Benen, L., "SMOOTH-WATER TESTS OF MODEL 4990 REPRESENTING A 36-FOOT RIVER PATROL CRAFT," DTMB Report 1914, October 1964. AD 607-692.

Tests, using TMB Model 4990, were made in Langley Tank No. 1 to determine the performance characteristics of a 36-Foot River Patrol Craft Model 4990 is a revision of Model 4974 which had a deep tunnel forward. This tunnel was instrumental in collecting air under the hull, lowering the effectiveness of the propulsion screws. Model 4990 had the forward tunnel removed and replaced by a convex section terminating in a blunt bow. The tests indicate that no air was entrained under the bow of the modified model, but that EHP at the design operating conditions was increased. Spray over the bow and side of the model was eliminated by use of spray strips. Test results for two displacements with and without spray strips are presented.

RES, Background

Benen,L., "SMOOTH WATER TESTS OF FOIL-MARAN MODEL 4836-2 REPRESENTING A 43-FOOT PATROL CRAFT," NSRDC Report No. 1852, August 1964. Distributed only upon authorization of the Bureau of Ships.

RES, Background

Benen, L., GENERAL RESISTANCE TEST OF A STEPLESS PLANING HULL WITH APPLICATION TO A HYDROFOIL CONFIGURATION", DTMB 2006. July 1965, AD 619 646.

RES, Background

Benen, L., "RESISTANCE AND EHP OF A "FOIL-MARAN" CONFIGURATION AS PREDICTED FROM SMOOTH WATER TESTS OF MODEL 4836-3," NSRDC Report 2118, December 1965. AD 628-555.

RES, Background

Benen, L., "GENERAL RESISTANCE TEST OF A SHALLOW STEP PLANING HULL WITH APPLICATION TO A HYDROFOIL CONFIGURATION", NSRDC Report No. 2169, May 1966, AD 634-560.

RES, Background

Benen. L., "GENERAL RESISTANCE TEST OF A STEPPED PLANING HULL WITH APPLICATION TO A HYDROFOIL CONFIGURATION", (Model No. 4776) NSRDC 2320, May 1967, AD 654-900.

RES, Background

Blanchard, U., "THE PLANING CHARACTERISTICS OF A SURFACE HAVING A BASIC ANGLE OF DEAD RISE OF 40° AND HORIZONTAL CHINE FLARE " NACA TN 2842, December 1952.

The principal planing characteristics of a surface having an angle of dead rise of 40° and horizontal chine flare are presented. The data indicate that at a given trim the important planing characteristics depend mainly on lift coefficient. The effects of increasing the basic angle of dead rise from 20° (NACA TN 2804) to 40° are to decrease the ratio of the center-of-pressure location to the mean wetted length, to decrease the extent of pile-up of water at the keel, and to increase the friction drag.

RES, Background

Blount, D.L., "RESISTANCE CHARACTERISTICS FOR LCM-A AS REPRESENTED BY MODEL 4746", David Taylor Model Basin Report 1334, August 1959.

Resistance characteristics of the LCM-A vehicle were determined by tests conducted at the David Taylor Model Basin with Model 4746. This report describes the special procedures employed and gives the results of the tests.

RES, Background

Boericke, H., and Troiani, F., "RESISTANCES OF SOME HIGH SPEED CATAMARAN FORMS", Report No. 25, Advanced Studies Section, Bureau of Ships, Dec. 1, 1960.

Model tests conducted at the Naval Academy towing tank with 2 ft. models.

RES, Background

Brown, P.W. and Van Dyke, R.L., "AN EXPERIMENTAL INVESTIGATION OF DEADRISE PLANING SURFACES WITH RE-ENTRANT VEE-STEPS. Davidson Laboratory Letter Report No. 664, December 1964.

RES, Background

Brown, P.W., "AN ANALYSIS OF THE FORCES AND MOMENTS ON RE-ENTRANT VEE-STEP PLANING SURFACES", Hoboken, May, 66 Davidson Lab. No 1142, AD 486-674.

RES, Background

Brown, P.W., "AN EMPIRICAL ANALYSIS OF THE PLANING CHARACTERISTICS OF RECTANGULAR FLAT PLATES AND WEDGES", Short Brothers and Harland Ltd., Hydro Note No. 47, September 1954.

RES, Background

Carter, A.W., et. al., "AN INVESTIGATION OF EFFECTS OF REVERSED-TYPE LONGITUDINAL STEPS ON RESISTANCE AND SPRAY CHARACTERISTICS OF A FLYING-BOAT HULL", NACA TN 1356, July 1947.

RES, Background

Carter, A.W. and Weinstein, I., "EFFECT OF FOREBODY WARP ON THE HYDRODYNAMIC QUALITIES OF A HYPOTHETICAL FLYING BOAT HAVING A HULL LENGTH-BEAM RATIO OF 15", Tech. Note No. 1828 NACA.

RES, Background

Cavanaugh, M.G., "EFFECT OF TRANSOM WEDGES ON TRIM AND POWERING FOR 83 AND 95 FOOT COAST GUARD PATROL BOATS REPRESENTED BY MODEL 4429", DTMB Report No. 1471, September 1960. Requires Coast Guard approval for distribution.

RES, Background

Chambliss, D.B. and Boyd, G.M., "THE PLANING CHARACTERISTICS OF TWO V-SHAPED PRISMATIC SURFACES HAVING ANGLES OF DEAD RISE OF 20° AND 40°. NACA TN 2876, January 1953.

An investigation was conducted to determine the principal characteristics of two V-shaped surfaces having angles of dead rise of 20° and 40°. The data indicate that, for a given condition of load, speed, and trim, the wetted length, distance of center of pressure from trailing edge, and drag increase with an increase in the angle of dead rise.

RES, Background

Cheng, H.M., "PERFORMANCE COMPARISONS OF MARINE VEHICLES", September 12, 1958, New York Metropolitan Section SNAME.

RES, Background

Christopher, K.W., "INVESTIGATION OF THE PLANING LIFT OF A FLAT PLATE AT SPEEDS UP TO 170 FEET PER SECOND," NACA TN 3951, March 1957.

An experimental investigation was made in the Langley high-speed hydrodynamics facility to determine whether the planing lift coefficient of a flat-bottom planing surface remains constant with increasing speed at the high towing speeds of this facility. No effect of speed was noted for the range of speeds tested. In addition, the data agreed well with that recently obtained in lower speed towing tanks. A brief description of the facility is included.

RES, Background

Christopher, K.W., "EFFECT OF SHALLOW WATER IN THE HYDRODYNAMIC CHARACTERISTICS OF A FLAT-BOTTOM PLANING SURFACE," NACA TN 3642, April 1956.

The effects on the planing characteristics of the clearance between a flat-bottom planing surface and the tank bottom are presented. The range of trims investigated was from 4° to 20° for wetted-length-beam ratios of 0.4 to 6.4. Each condition was investigated over a range of clearance of from 0.2 to 1.6 beams. All the measured values increased with decreasing clearance. A description of the monorail and its associated apparatus is included.

RES.Background

Clement, E.P., "EXPERIMENTAL BOAT-HULL FORM TEST PROGRAM, BASIC FORM, MODEL 4300, RESISTANCE CHARACTERISTICS", NSRDC Report No. 740, November 1950. Distribution only upon authorization of Bureau of Ships Codes 452, 422.

RES,Background

Clement, E.P., "MODEL TEST RESULTS AND PREDICTED EHP FOR SCHEME I, EXPERIMENTAL BOAT-HULL FORM TEST PROGRAM, FROM TESTS OF MODEL 4309," NSRDC Report No 764, April 1951. Distributed only upon authorization of BuSHIPS, Codel 452,422.

RES, Background

Clement, E.P., "MODEL TEST RESULTS AND PREDICTED EHP FOR HACKER FORM, EXPERIMENTAL BOAT-HULL FORM TEST PROGRAM, FROM TESTS OF MODEL 43115," NSRDC Report No. 776, June 1951. Distributed only upon authoridation of Bureau of Ships.

RES,Background

Clement, E.P., "MODEL TEST RESULTS AND PREDICTED EHP FOR THE HURON-EDDY COMPANY 85 FOOT AND 94 FOOT AIRCRAFT RESCUE BOAT DESIGNS," NSRDC Report No. 798, October 1951. Distributed only upon authorization of the Bureau of Ships.

RES, Background

Clement, E.P., "MODEL TEST RESULTS AND PREDICTED EHP FOR THE HURON-EDDY COMPANY REVISED 94 FOOT CRASH-RESCUE BOAT DESIGN," NSRDC Report No. 820, March 1952. Distribution only upon authorization of Bureau of Ships.

RES, Background

Clement, E.P., "HULL FORM OF STEPLESS PLANING BOATS", SNAME Chesapeake Section 12 Jan. 1955.

RES, Background

Clement, E.P., and Pournaras, V.A., "EFFECTS ON THE PERFORMANCE OF THE U.S. NAVY LCVP OF ADDING RETRACTABLE BOW AND STERN EXTENSIONS", NSRDC Report No. 1085, Sept. 1956, AD-145-071 or AD-458-047L.

RES, Background

Clement, E.P. and Kimon, P.M., " COMPARATIVE RESISTANCE DATA FOR FOUR PLANING BOAT DESIGNS", DTMB Report 1113, January, 1957, AD-145-074L.

Four existing models of planing craft were retested at "standard conditions" for planing boat models. The test results for each model are presented in a design data sheet. The data are compared to show the effects of differences in hull form. These comparisons are independent of differences in hull loading, in LCG location, or in size of boat. Auxiliary graphs are included to assist in making estimates of speed and power for new designs.

RES, Background

Clement, E.P. and Tate, C.W., "MODEL TEST RESULTS AND PREDICTED EHP FOR AN 86 FT. PERSONNEL BOAT, FROM TESTS OF MODEL 4675," DTMB Report 1288, December 1958, AD 610-137.

Smooth-water model tests were made of an 86 ft. personnel boat designed for "all-weather" operation. The model was tested for ehp at full-scale displacements of 130,000 lb., 140,000 lb., and 150,000 lb. In addition, at one speed and displacement, the lines of flow were determined by the acid-trace method, in order to find the appropiate location for the bilge keels.

RES, Background

Clement, E.P., "DEVELOPMENT AND MODEL TESTS OF AN EFFICIENT PLANING HULL DESIGN", DTMB, Report 1314, April 1959, AD 430-230.

A hull form for a stepless planing boat was designed, based upon an analysis of the results of resistance tests of a number of previous designs, and also taking into consideration the features desirable for good steering qualities and good rough-water performance. A model was built and tested, and the results were compared with the resistance data from designs which had been previously tested at the Model Basin. This comparison showed that the new design has appreciably less resistance than the earlier designs at all except very low speeds. The new design was also tested at a wide range of hull loading and LCG locations, and these results are presented.

RES, Background

Clement, E., "CALCULATED PERFORMANCE OF PLANING CATAMARANS", Society of Small Craft Designers, The Planimeter, June, 1962.

RES,Background

Clement, E.P., "A LIFTING SURFACE APPROACH TO PLANING BOAT DESIGN," DTMB report 1902, September 1964, AD 606-835.

The utilization of a design approach for a planing boat similar to that followed in the design of a hydrofoil boat or an airplane leads to a new, more efficient type of planing boat configuration. The lift-drag ratio of the new configuration is approximately 50 percent greater than that of the conventional stepless planing boat.

RES,Background

Clement, E.P., "RESISTANCE TESTS OF A MODEL OF THE GERMAN E-BOAT," NSRDC Report No. 1703, January 1963, AD 298-131.

RES,Background

Clement,E.P., "THE DEVELOPMENT OF EFFICIENT HULL FORMS FOR HYDROFOIL BOATS", NSRDC Report No. 2160, March 1966, AD 481-307.

RES, Background

Clement, E.P., "PERFORMANCE LIMITS OF THE STEPLESS PLANING BOAT AND THE POTENTIALITIES OF THE STEPPED BOAT," Symposium on Smallcraft Hydrodynamic, 1966 Southeast Section, SNAME.

RES, Background

Clement, E.P., "THE PLANING CHARACTERISTICS OF A 15-DEGREE DEADRISE SURFACE WITH CIRCULAR-ARC CAMBER," DTMB Report 2298, September 1966. AD 813-032.

A planing surface with 15-deg deadrise, circular-arc camber, and a moderate amount of trailing edge sweep was designed as the main lifting surface for an existing experimental stepped planing boat. A model of the planing surface was then built and tested in the towing basin. The tests results indicate that the lift/drag ratio of the main planing surface of the boat will be increased 10 percent by utilization of this design. Also, the performance in head seas should be significantly improved since the cambered surface will develop the necessary lift at approximately one-half the forebody angle of attack at which the boat now operates.

RES,Background

Clement, E.P., "MODEL TESTS OF A STEPPED PLANING BOAT WITH AN ADJUSTABLE STERN STABILIZER" NSRDC Report 2414, May 1967. AD 661-792.

The Naval Ship Research and Development Center is developing a stepped hull having an adjustable planing stabilizer at the stern for balance, stability, and control of trim. At high speed, this craft planes on a small area forward of the step (which is located approximately at midlength), with the stern supported by the adjustable stabilizer. Since the afterbody wetted area is eliminated at high speed, the frictional resistance, and accordingly the total drag also are considerably lower than for the conventional planing boat. Furthermore, at high speed the trim angle of the main forebody planing surface can be adjusted to the value for minimum drag by adjusting the vertical position of the stabilizer. This report gives the results of tests of several variations of the first model of this type of craft which was designed and extensively tested at the Center. The effects on performance are shown of changes in the following: spray strip configuration, LCG location, weight, step depth, and afterbody shape. RES, Background

Clement, E.P., "EFFECT OF LENGTH-BEAM RATIO ON THE PERFORMANCE OF A STEPPED PLANING BOAT WITH AN ADJUSTABLE STERN STABILIZER", NSRDC Report 2552, August 1967, AD825 -515.

Two models of stepped planing boats were tested to determine the effect of change in length-beam ratio. The models were tested with the same adjustable stern stabilizer at several loads and LCG locations. The model with the lower length beam ratio (L_P/B_{PX} = 3.4) had considerably more resistance than the other stepped model (L_P/B_{PX} = 4.7) at low speed and slightly less resistance at high speed. The resistance of both stepped designs at high speed was considerably less than that of a representative unstepped planing boat design.

RES, Background

Coombes, L.P., "SCALE EFFECT IN TANK TESTS OF SEAPLANE MODELS," Proc. Fifth Int. Cong. Appl. Mech., 1939, pp. 513-519.

RES, Background

Corlett, E.C.B., "TRENDS IN VERY HIGH-SPEED CRAFT, PART 1," The Motor Boat and Yachting September and October 1954.

RES, Background

Crowley, J.W. & Ronan, K.M., "CHARACTERISTICS OF THE BOAT-TYPE SEAPLANE DURING TAKEOFF", NACA Report 226, 1925.

RES, Background

Mechanics, Vol 4, 1958.

RES, Background

Cumming, R., "RESISTANCE AND EHP OF A PLANING CATAMARAN AS PREDICTED FROM TESTS OF MODEL 4836," DTMB Report 1478, November 1960. AD 248-148.

Model tests were made to determine the powering characteristics for a catamaran-type hull. Wetted lengths, running trims, and resistances were measured on the model for a number of speeds, displacements, and initial trims. In addition, the effect on performance of changes in hull spacing, planing area, and spray rails was determined. A test was also made with a step on the roof of the tunnel. The results are presented in dimensionless form and also in the form of ehp curves for 70 ft, 105,400-lb. boat.

The data obtained from the tests indicated that for this hull a wide spacing is of no advantage from a resistance point of view. The spray rails on the final configuration increased the drag sightly on the full-sized boat. The best configuration was not as good as a good conventional planing hull, and this is thought to be primarily due to a large amount of air drag.

RES, Background

Curry, J.H., "EXPERIMENTAL BOAT-HULL FORM TEST PROGRAM, SCHEME J., MODEL 4310, RESISTANCE CHARACTERISTICS", NSRDC Report No. 738, October 1950. Distributed only upon authorization of BUSHIPS, Codes 452, 422.

RES, Background

Curry, J.H., "MODEL TEST RESULTS AND PREDICTED EHP FOR SCHEME "L" EXPERIMENTAL BOAT-HULL FORM TEST PROGRAM, FROM TESTS OF MODEL 4312," NSRDC Report No. 757, March 1951. Distributed only upon authorization of Bureau of Ships, Codes 452,422.

RES, Background

Curry, J.H., "MODEL TEST RESULTS AND PREDICTED EHP FOR BUREAU OF SHIPS DESIGN 52 FOOT AIRCRAFT RESCUE BOAT FROM TESTS OF MODEL 4377," NSRDC Report No. 769, June 1951. Distributed only upon authorization of BuSHIPS.

RES, Background

Curry, J.H., "MODEL TEST RESULTS AND PREDICTED EHP FOR BUREAU OF SHIPS DESIGN 90 FT. AIRCRAFT RESCUE BOAT FROM TEST OF MODEL 4375", NSRDC Report No. 782, July 1951. Distributed only upon authorization of Bureau of Ships.

RES, Background

Curry, J.H., "STUDIES TO DEVELOP A HIGH SPEED LANDING CRAFT HAVING THE SAME PROPORTIONS AS THE WORLD WAR II LCVP," NSRDC Report No. C-498, May 1962.

Model test results for heavily loaded inverted-vee hull forms at moderate speeds.

RES, Background

Davidson, K. and Suarez, A., "TESTS OF 20 RELATED MODELS OF VEE-BOTTOM MOTOR BOATS, E.M.B. SERIES 50," DTMB Report R-47, March 1949, AD 224-761.

"Unfortunately the parent form for this series has a chine that is considered too low forward, by modern standards. There are indications that the observed resistances are too low, because of laminar flow on many of the models. The data are plotted as contours of Rt/W, as contours of running trim angle in deg. of model wetted surface, and of other factors." - Saunders.

RES, Background

Dawson, J., "RESISTANCE OF SINGLE-SCREW COASTERS, PART I," IESS 1952-1953.

RES, Background

Dawson, J., "RESISTANCE OF SINGLE-SCREW COASTERS, PART II," IESS, 1954-1955.

RES, Background

Dawson, J., "RESISTANCE OF SINGLE-SCREW COASTERS, PART III," IESS, 1955-1956.

RES, Background

Dawson, J., "RESISTANCE OF SINGLE-SCREW COASTERS, PART IV," IESS, 1959-1960.

RES, Background

Dawson, J.R., "TANK TESTS OF THREE MODELS OF FLYING BOAT HULLS OF THE POINTED-STEP TYPE WITH DIFFERENT ANGLES OF DEAD RISE - NACA MODEL 35 SERIES," NACA TN No. 551, Jan. 1936.

RES, Background

Dawson, J.R. and Wadlin, K.L., "PRELIMINARY TANK TESTS WITH PLANING-TAIL SEAPLANE HULLS," NACA ARR 3F15, 1943.

RES, Background

Dawson, J.R., and Walter, R.C., "TANK TESTS TO DETERMINE THE EFFECT OF VARYING DESIGN PARAMETERS OF PLANING TAIL HULLS," NACA TN 1062, May 1946.

RES, Background

Dawson, J.R., et al., "TANK TESTS TO DETERMINE THE EFFECT OF VARYING DESIGN PARAMETERS OF PLANING - TAIL HULLS. II-EFFECT OF VARYING DEPTH OF STEP, ANGLE OF AFTERBODY KEEL, LENGTH OF AFTERBODY CHINE, AND GROSS LOAD," NACA TN 1101, 1946.

RES, Background

Dawson, J.R. and Wadlin, K.L., "PRELIMINARY TANK TEST OF NACA HYDRO-SKIS FOR HIGH-SPEED AIRPLANES," NACA RM No. L7104, November 1947.

Contains results from tank landing and take-off tests with a dynamic model of a hypothetical jet-propelled airplane equipped with NACA hydro-skis. These results show stable take-offs and landings for the model, although the resistance is high. The high resistance, which is not considered necessarily inherent, appears to be acceptable for airplanes equipped with rocket motors. It is concluded that hydro-skis suitable for flush retraction into streamline fuselages offer a practicable means for taking off and landing high-speed airplanes on the water.

RES, Background

DeSaix, P., "PREDICTED E.H.P. AND TRIM CHARACTERISTICS FOR HIGH SPEED LCM-8 SCHEME B", DL Report No. 680, January 1958.

RES, Background

Desaix, P., "PREDICTED EHP AND TRIM CHARACTERISTICS FOR 54 FOOT BOMB TARGET BOAT-SCHEME B", ETT Report No 692, April 1958.

RES, Background

DeSaix, P., "PREDICTED EHP AND TRIM CHARACTERISTICS FOR 45' STEEL UTILITY BOAT", DL Report No. 709, September 1958.

RES, Background

DeSaix, P., "MODEL TESTS OF A 26-FOOT PERSONNEL BOAT IN SMOOTH WATER AND WAVES," Davidson Laboratory Report No. 763, October 1959.

RES, Background

Dickerson, M.C., "RESISTANCE CHARACTERISTICS OBTAINED WITH VERTICAL AXIS PROPELLERS FOR LCU(A), REPRESENTED BY MODEL 4952," NSRDC Report 1753, February 1964, AD 434-703.

RES, Background

Diehl, W.S., "TESTS ON AERONAUTICAL FUSELAGES AND HULLS," NACA Report 236, 1926

"This paper gives drag and moment data on a great variety of airplane fuselages, seaplane and flying-boat hulls, airship cabins, nacelles, and the like." - Saunders.

RES, Background

Diehl, W.S., "THE ESTABLISHMENT OF MAXIMUM LOAD CAPACITY OF SEAPLANES AND FLYING BOATS", NACA Report 453, September 1932.

RES, Background

Diehl, W.S., "A DISCUSSION OF CERTAIN PROBLEMS CONNECTED WITH THE DESIGN OF HULLS OF FLYING BOATS AND THE USE OF GENERAL TEST DATA", NACA Report 625, November, 1937; 1938 reports, Pgs. 253-260, Page 260 lists 24 references.

RES, Background

Diehl, W.S., "THE APPLICATION OF BASIC DATA ON PLANING SURFACES TO THE DESIGN OF FLYING BOAT HULLS", NACA Report No. 694, 16 December 1939, 1940 reports, pp 287-293.

RES, Background

Doust, D.J. and O'Brien, T.P., "RESISTANCE AND PROPULSION OF TRAWLERS," NECI, 1958-59.

RES, Background

Doust, D.J., "OPTIMIZED TRAWLER FORMS," NECI 1962-63, Chapter 2.

RES, Background

Doust, D.J., "SHIP DESIGN AND POWER ESTIMATING USING STATISTICAL METHODS", December, 1962, Publication No. 70. Norwegian Ship Model Experiment Tank, The Technical University of Norway.

RES, Background

Doust, D.J., et.al., "A STATISTICAL ANALYSIS OF FAO RESISTANCE DATA FOR FISHING CRAFT," Third FAO Technical Meeting on Fishing Boats, Goteborg, October 1965. Ship Report 93, February 1967, National Physical Laboratory.

RES, Background

Drisko, J.B., "RESISTANCE OF V-BOTTOM HULLS AT SPEED-LENGTH RATIOS UP TO 5," Davidson Lab. Report 264, December 1944.

RES, Background

DuCane, P., "A CONSIDERATION OF SOME OF THE PRINCIPLES UNDERLYING THE PERFORMANCE OF PLANING CRAFT IN THEORY AND PRACTICE", Swedish Institute MENA, 1954.

RES, Background

Edstrand, H. and Bratt, H., "THE TRANSVERSE STABILITY AND RESISTANCE OF SINGLE-STEP BOATS WHEN PLANING," Publication No 25. of the Swedish State Shipbuilding Experimental Tank, 1953.

RES, Background

Eleftheriades, P.K., "MODEL TEST RESULTS AND PREDICTED EHP FOR THE WORLD WAR II AND THE MK 2 LCP (L)'S FROM TESTS OF MODELS 4388-1, 4553 AND 4555," DTMB Report 968, June 1955.

RES, Background

Eleftheriades, P.K., "MODEL TEST RESULTS AND PREDICTED EHP FOR TWO DESIGNS FOR THE MK2 40 - FT. AVR FROM TESTS OF MODEL 4520 AND 4543," NSRDC Report No. 971, August 1955. Distributed only upon authorization from the Bureau of Ships. AD 416-163.

RES, Background

Everest, J.T., "SOME RESEARCH ON THE HYDRODYNAMICS OF CATAMARANS AND MULTI-HULLED VESSELS IN CALM WATER", NEGI, March 18, 1968.

RES, Background

Falkemo, C. and Adlercreutz, J., "MODEL TESTS ON SINGLE-STEP PLANING SURFACES," STHLM, 19 3, Transactions of the Royal Institute of Technology, Stockholm, Sweden, No.24 (publication No. 1/1947 of the Ship Testing Laboratory).

RES, Background

Fridsma, G., "COMPARATIVE TESTS ON MODEL 2387 WITH AND WITHOUT BOTTOM CAMBER IN SMOOTH AND ROUGH WATER", Davidson Laboratory LR-1153, June 1966, for DTMB, AD 639-093.
Performance characteristics in smooth and rough water are presented for a 52 ft., 55,000 lb. displacement, hard chine patrol boat, with and without bottom camber; based on tests conducted on a 1/16 scale model.

RES, Background

Fried, W., "THE NUMBER 3 TANK FOE MODEL SEAPLANE TESTS," SIT, ETT, Report 289, October 1945.

RES, Background

Gilmer, T.C., "MODEL TESTS OF SOME FISHING LAUNCHES," Fishing Boats of the World, Vol. II.

RES, Background

Goodwin, "SEAPLANES TAKING OFF AND ALIGHTING," Advisory Committee for Aeronautics, Aeronautical Research Committee Reports and Memoranda No. 784, December 1921.

RES, Background

Grafton, F.R., "RESISTANCE TESTS OF A PLANING LCVP (MODEL 5074)", January 1967, NSRDC T&E Report No. HML P-199-H-01.

RES, Background

Grigg, A.D., "EXPERIMENTS WITH MODELS OF SEAPLANE FLOATS, 9th SERIES", Advisory Committee for Aeronautics (England), Aeronautical Research Committee Reports and Memoranda No.188, December 1915.

RES, Background

Guidoni, A., "SEAPLANES, FIFTEEN YEARS OF NAVAL AVIATION," Journal of the Royal Aeronautical Society, January 1928.

RES, Background

Hankley, D.W., and West, E.E., "EFFECTIVE HORSEPOWER PREDICTIONS FOR A LANDING CRAFT (LCVP) FITTED WITH SPRAY RAILS AND FLAPS DERIVED FROM TESTS WITH MODELS 4031 AND 4031-2", DTMB Report 1865, January, 1965, AD 610-806.

Tests of a bare-hull model of a landing craft (LCVP) were conducted at the heavy and light conditions over a speed range from 0 to 36 knots. The results indicated that the resistance requirement at the heavy displacement was higher at 21 knots than at 28 knots. Attempts were then made to lower this "hump" in the resistance by equipping the model with stern flaps and spray rails. These minor hull changes definitely lowered the effective horsepower required at the 20 knot speed, but the 5-deg flaps were detrimental at speeds above 23 knots. Accordingly, it is recommended that stern flaps be adjustable in order to vary the angle to an optimum for a specified speed.

RES,Background

Hansen, H.B., "SYSTEMATIC EXPERIMENTS WITH MODELS OF FAST COASTERS," Norwegian Ship Model Experiment Tank Publications No. 44, December 1966.

RES, Background

Harbaugh, K., "SMOOTH-WATER TESTS OF MODEL 4943 REPRESENTING A 41-FOOT PERSONNEL BOAT," DTMB Report 1735, April 1963, AD 403-660.

Tests, using TMB Model 4943, were conducted in Langley Tank No.1 to determine the performance characteristics of a round bilge 41-foot Personnel Boat. Model resistance, trim, wetted length, and CG rise were measured throughout the speed range for a number of hull loadings, initial trim conditions, and appendage configurations. Comparisons are made with the design condition. Results are presented in dimensionless form. RES,Background

Harbaugh, K.H., "PERFORMANCE CHARACTERISTICS OF A MODEL 4958 REPRESENTING A PLANING TYPE 63-FOOT AIRCRAFT RESCUE BOAT," DTMB 1775, SEPTEMBER 1963.

Tests using TMB Model 4958 were made in Langley Tank No.1 to determine the performance characteristics of a V-bottom 63-foot Aircraft Rescue Boat. Model speed, resistance, trim, and wetted length were measured throughout the speed range for a number of hull loadings, initial trim conditions, and with all appendages. Tests with and without appendages were conducted for the DTMB standard condition for planing boats and test data for that condition are presented in nondimensional form. Change in trim and ehp are presented in terms of full-scale speed in knots.

RES,Background

Hatch, G.N., "PERFORMANCE AND HULL FORM OF FAST PLANING CRAFT," Articles 1,2,3,4,&5, Ship and Boat Builder, Feb. March, April, May and June 1963.

RES,Background

Helm, G.M., "SYSTEMATIC (MODEL) INVESTIGATIONS ON THE RESISTANCE OF BOATS AND SMALL SHIPS," (in German) Hansa,101, No.22, November 1964, P.2179. also Hsva Report No. 1300.

RES, Background

Helm, K. "SYSTEMATIC (MODEL) INVESTIGATIONS ON THE INFLUENCE OF (HULL) FORM UPON RESISTANCE AND POWER REQUIREMENTS, IN INLAND-WATERWAYS PASSENGER SHIPS," (in German) Schiff u Hagen, 15 February, 1963, P 98.

RES, Background

Henschke, W., "SYSTEMATIC RESISTANCE EXPERIMENTS WITH MODELS OF MOTOR FISHING VESSELS," Schiffstechnik, BD. 4,1957.

RES, Background

Hickman, A., "SEA SLED TECHNICAL ADVENTURE," Rudder, February 1946.

RES, Background

Hobbs, R., "FASTER BOATS", The Planimeter, July 1965, SSCD.

RES, Background

Hope, L., "NOTES ON FLYING BOAT HULLS," Flight May 27, 1920 and June 3, 1920; Aeronautical Journal, August 1920.

RES, Background

Hughes, G., "FRICTIONAL RESISTANCE OF SMOOTH PLANE SURFACES IN TURBULENT FLOW", INA, 1952.

RES, Background

Hughes, G., "FRICTION AND FORM RESISTANCE IN TURBULENT FLOW AND A PROPOSED FORMULATION FOR USE IN MODEL AND SHIP CORRELATION," INA, 1954.

RES, Background

Hunsaker, "NAVAL ARCHITECTURE IN AERONAUTICS," Aeronautical Journal, July 1920.

RES, Background

Hunt, R.P. and Lasky, M.P., "PREDICTIONS OF POWERING AND TRIM ANGLE OF AN LCM (8) ALUMINUM HULL, REPRESENTED BY MODEL 5152", NSRDC T&E Report No. 265-H-01, February 1968.

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RES, Background

Johnson, V., Jr., and Rasnick, T.A., "THE DRAG COEFFICIENT OF PARABOLIC BODIES OF REVOLUTION OPERATING AT ZERO CAVITATION NUMBER AND ZERO ANGLE OF YAW", NASA Technical Report R-86.

The form-drag coefficient of parabolic bodies of revolution with fineness ratios greater than 1 operating at zero angle of yaw and zero cavitation number is determined both theoretically and experimentally. Agreement between theory and experiment is very good. The theoretical form-drag coefficient of paraboloids is about half the form-drag coefficient of cones of comparable fineness ratio.

RES, Background

Kafali, K., "THE POWERING OF PLANING HULLS," ISP, Vol 7, No. 71, July 1960.

RES,Background

Kapryan, W.J. and Weinstein, I., "THE PLANING CHARACTERISTICS OF A SURFACE HAVING A BASIC ANGLE OF DEAD RISE OF 20° AND HORIZONTAL CHINE FLARE," NACA TN 2804, October 1952.

A high-speed investigation was conducted to determine the hydrodynamic characteristics of a planing surface having an angle of dead rise of 20° and horizontal chine flare. The data indicated that the planing characteristics at a given trim depend only on lift coefficient. The ratio of center-of-pressure location to the mean wetted length can be considered approximately equal to 0.67 up to 18° of trim. This ratio decreases with futher increase in trim. Pile-up of water at the keel of the model was substantial at trims above 12°. Friction drag is negligible at high trims. The resistance for trims of 18° and higher, therefore, may be assumed equal to the load times the tangent of the trim angle.

RES, Background

Kapryan,W.J., and Boyd, G.M. Jr., "THE EFFECT OF VERTICAL CHINE STRIPS ON THE PLANING CHARACTERISTICS OF V-SHAPED PRISMATIC SURFACES HAVING ANGLES OF DEAD RISE OF 20° AND 40°. NACA TN 3052, November 1953.

The effect of vertical chine strips on the planing characteristics of two prismatic surfaces having angles of dead rise of 20° and 40° has been determined as part of a general research investigation on planing surfaces. Wetted lengths, resistance, and center-of-pressure locations were determined at speed coefficients up to 25.0, load coefficients up to approximately 80.0, and trims up to 30°. In addition, comparisons of the more important planing characteristics are made with those for related surfaces having angles of dead rise of 0°, 20°, and 40°, and for surfaces having angles of dead rise of 20° and 40° with horizontal chine flare. These comparisons show that vertical chine strips are more effective means of increasing the lift of a given surface than horizontal chine flare is. This increase in lift, however, is accompanied by a substantial increase in drag so that the lifting efficiency of the vertically flared surface is comparable to one having horizontal chine flare.

RES,Background

Kent, J. and Cutland, R.S., "RESISTANCE EXPERIMENTS IN SMOOTH AND ROUGH WATER MADE WITH MODELS OF HIGH SPEED SHIPS," INA, Vol. 77, 1935.

RES, Background

Kikuhara, S., "PHOTOS OF SPRAY GENERATED BY SEAPLANE HULLS", NAVAER Report No. DR 1952, November 1958. Navy Department, Bureau of Aeronautics, Washington, D.C.

RES, Background

Kimon, P.M., "MODEL EHP TESTS OF TWO DESIGNS OF A 36 FT HYDROJET LCVP," DTMB Report 1046, August 1956, AD 124-291L. Distrubuted only on authorization of BUSHIPS.

RES, Background

Kimon. P.M., "THE PLANING CHARACTERISTICS OF AN INVERTED V PRISMATIC SURFACE WITH MINUS 10 DEGREE DEAD RISE," DTMB Report 1076, March 1957. AD 224-721.

This report is one of a series on the experimental investigation of the planing characteristics of a series of related prismatic surfaces.

The principal planing characteristics have been obtained for an inverted V prismatic surface having an angle of dead rise of -10 deg. Wetted lengths, resistance, and center-of-pressure location were determined at speed coefficients ranging up to 19.5, beam-loading coefficients from 0.87 to 71.5, and trims up to 30 deg. Keel-wetted length-beam ratios were extended to approximately 8.0 in all cases where excessive loads or excessive spray conditions were not encountered.

The data indicated that the important planing characteristics are independent of speed and load for a given trim and are dependent primarly upon lift coefficient. The difference between keel wetted length and chine wetted length is constant for a given trim angle. The ratio of the center-of-pressure location forward of the trailing edge to the mean wetted length is dependent on trim angle and on wetted length. The drag data indicate that the friction-drag component is a large percentage of the total drag at the low trims but decreases rapidly with increase in trim. At the high trim angles of 24 and 30 deg, the induced drag exceeds the total drag and indicates an apparent negative friction force.

RES, Background

Koelbel, J., "POWERING OF PLANING BOATS," The Planimeter, March, April, May, 1954, also in "HOW TO DESIGN PLANING HULLS," Vol. 49, Motor Boating Ideal Series under title "BETTER PERFORMANCE FOR STEPLESS PLANING HULLS".

RES, Background

Koelbel, J.G. Jr., "THE HYDRODYNAMICS OF STEPLESS PLANING HULLS", SSCD, The Planimeter October, November and December, 1958.

RES, Background

Koning, J.G., "EHP OF SMALL SEAGOING CARGO SHIPS", Pub. 37, NSMB, 1938.

RES, Background

Korvin-Kroukovsky, B.V. and Chabrow, F.R., "THE DISCONTINUOUS FLUID FLOW PAST AN IMMERSED WEDGE", October, 1948, S.I.T., E.T.T. Report 334.

RES, Background

Korvin-Kroukovsky, B.V., et. al., "WAVE CONTOURS IN THE WAKE OF A 20° DEADRISE PLANING SURFACE," Stevens Institute of Technology, Experimental Towing Tank Report 337, June 1948.

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Tests of prismatic Vee planing surfaces were made at the Experimental Towing Tank, Stevens Institute of Technology, in order to determine the wetted length under various conditions of trim, deadrise, speed, and loading. The data obtained were used to supplement the previously available test data of Sottorf, Sambraus, and Shoemaker in deriving empirical formulae which express the functional relation between these five variables. All the data needed for a quick and easy estimation of the wetted area and of the location of the center of pressure of Vee planing surfaces are presented on two summary charts.

This report carries a bibliography of related references.

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Locke, F.W.S., Jr., "AN EMPIRICAL STUDY OF LOW ASPECT RATIO LIFTING SURFACES WITH PARTICULAR REGARD TO PLANING CRAFT", Journal Aero Science, March 1949, Pgs 184-188, Vol. 16, No.3.

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Four types of planing surfaces were tested on a rectangular free-water jet 3 inches wide by 3/4 inch deep at speeds varying from 80 to 200 fps. No large effect of speed was obtained on any of the models tested but the lift coefficients for the flat plate and the longitudinally curved surface appeared to increase slightly with speed in the higher portion of the speed range. The lift data for the flat plate and the hydroski obtained on the free-water jet were less than those obtained for similar surfaces in comparatively unrestricted towing tanks. For the trims and length-beam ratios investigated, the ratio of tank lift data to jet lift data for the flat plate appeared to be a function of the ratio of the height of the trailing edge of the model above the lower jet boundary to the wetted length.

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Meyer, E.R., and Sherman, P., "MODEL TEST RESULTS AND PREDICTIED EHP FOR A 40-FT. HIGH SPEED LCVP FROM TESTS OF MODELS 4613, 4613-1 AND 4613-2", David Taylor Model Basin Report 1208, Prepared for the Bureau of Ships. Distributed only upon their specific authorization.

A model of a new design for a 40 ft. high speed LCVP was tested to determine effective horsepower requirements as displacement of 18,000, 26,000 and 30,000 lb. Modifications to the hull form and the addition of bow and side spray strips were required to obtain satisfactory performance. The final version of the model, with bow and side spray strips, was tested at the DTMB standard condition for landing craft, and also its performance was compared with that of the World War II LCVP.

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Very high lift/drag ratios are predicted by this method for cambered planing surfaces operating at practical trim angles.

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The effects of convexity were to increase the wetted length-beam ratio (for a given lift), to decrease the lift-drag ratio, to move the center of pressure forward, and to increase the trim for maximum lift-drag ratio as compared with values obtained for a flat surface. The effects were greatest at low trims and large drafts. The maximum negative lift coefficient based on the model beam obtainable with a ratio of the radius of curvature to the beam of 20 was -0.02. The effects of camber were greater in magnitude for convexity than for the same amount of concavity.

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An evaluation was made of the resistance of high-speed seaplane in waves of three heights. Various conditions were investigated for a seaplane having a dead-rise of 20°, a length-beam ratio of 15, and a wing loading of 120 pounds per square foot. The resistance was greater in waves than in smooth water and increased wave height. The increase was greatest between hump speed and take-off (in 6-foot waves the maximum increase was 65 percent at a speed equal to 70 percent of getaway speed). The increase in resistance was nearly the same with dead-rise angles of 40° and 60° as with the 20° dead-rise angle.

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Wetted length, resistance, and center-of-pressure location were determined for a radius of curvature of 20 beams, beam-load coefficient C_Δ from -3 to 37, Froude numbers from 6 to 25, and Reynolds numbers from 5×10^6 to 10^7. Compared with a 0°-dead-rise surface with the same curvature, the 20°-dead-rise surface had (for the same lift) greater wetted-length-beam ratio, lower lift-drag ratio, more forward center-of-pressure location, and had greater trim for maximum lift-drag ratio. Except for very low trims, the variation of the center-of-pressure location with wetted length was nearly the same for an angle of dead rise of 20° as for an angle of dead rise of 0°.

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Model 4525, a round bilge 40 ft. AVR design, was tested to determine the effective horsepower requirements for the full scale craft. The Model was tested at displacements corresponding to 20,000 25,000 and 30,000 lbs, full scale; all tests were zero initial trim. Different spray strip positions were tested in an effort to determine the most satisfactory location.

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Savitsky, D. and Dingee, D.A., "SOME INTERFERENCE EFFECTS BETWEEN TWO FLAT SURFACES PLANING PARALLEL TO EACH OTHER AT HIGH SPEED," S.I.T.,ETT Paper published in Readers Forum Section of the Journal of Aeronautical Sciences, June 1954.

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Savitsky, D., Prowse, R., and Lueders, D. Stevens Institute of Technology, "HIGH-SPEED HYDRODYNAMIC CHARACTERISTICS OF A FLAT PLATE AND 20° DEAD-RISE SURFACE IN UNSYMMETRICAL PLANING CONDITIONS", NACA TN 4187 June 1958 Also Davidson Lab. Report 550, March 1957.

The results of an investigation made to obtain the wetted areas, the three components of planing forces, and the three components of moments acting on a 0° and a 20° dead-rise surface in high-speed, unsymmetrical planing conditions are presented. Hydrodynamic data were obtained for trim angles between 6° and 30°, roll angles between -15° and 15°, yaw angles between 0° and 20°, mean wetted-length-beam ratios up to 7.7, load coefficients up to 49.0, and speed coefficients up to 18.0.

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Sherman, P., "MODEL TEST RESULTS AND PREDICTED EHP FOR A HARD CHINE 40 FT. LCP (L) FROM TESTS OF MODEL 4618," DTMB Report 1095, November 1956, prepared for the Bureau of Ships. Distributed only upon their specific authorization. AD 145-073L.

A model of a hard chine 40 ft. LCP(L) was tested to determine the EHP requirements at displacements of 17,500, 20,000, 22,500, and 25,000 lb. After these tests the concavity at the stern of the model was reduced and the model retested at the 20,000 lb. displacement. The modified model was also tested at the DTMB standard condition for planing hulls, both with and without the keel.

RES, Background

Sherman, P., "MODEL TEST RESULTS AND PREDICTED EHP FOR HIGH SPEED LCM 6 FROM TESTS OF MODEL 4629 AND 4649," NSRDC Report No. 1205, December 1957. AD 205-651L.

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Sherman, P. and Pope, J.D., "MODEL TEST RESULTS AND PREDICTED EHP FOR TWO DESIGNS OF A 36-FT. LCVP FROM TESTS OF MODELS 4654 AND 4664," NSRDC Report No. 1226, March 1958. Distributed only upon authorization of the Bureau of Ships. AD 206-308L.

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Sherman, P., "MODEL TEST RESULTS AND EHP FOR A HIGH SPEED LCM 8 FROM TESTS OF MODEL 4636," NSRDC Report No. 1218, February 1968. Distributed only upon authorization of BUSHIPS. AD 205-650L.

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Sherman, P., and Meyer, E.P., "MODEL TEST RESULTS AND PREDICTED EHP FOR A 40 FT. HIGH SPEED LCVP FROM TESTS OF MODELS 4613, 4613-1, AND 4613-2," NSRDC Report No. 1208, January 1958, AD 205-568L, Distributed only upon authorization of BUSHIPS.

RES, Background

Sherman, P., " TESTS OF A PLANING BOAT MODEL WITH PARTIAL HYDROFOIL SUPPORT," DTMB Report 1254, August 1958.

A model of a planing boat was equipped with two horizontal submerged hydrofoils which were designed to carry part of the weight of the craft. The foils were located forward of the center of gravity. Smooth-water resistance tests were made with foils at various fore-and-aft positions and various angles of attack to determine the optimum arrangement. Tests were also made of the foils alone. It was found that an appreciable scale effect on foil performance existed at Reynolds numbers below about 5×10^5.

The data from the tests of the hull with foils, when corrected for scale effect on foil performance, indicated that the resistance of a planing boat can be decreased when such foils are added by as much as 27 1/2 percent. The best result was attained with the foils located at 28 percent of the hull length aft of the bow, and with the foil chord line at an angle of -3.5 deg with respect to the hull baseline.

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Results of Tow Tank Tests of four full-sized eight oared shells are presented. A comparison is made of the four hulls over a range of speeds. Also the effect of other parameters on performance is investigated.

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Shubert, R. and THIEME, H., "KLARENDE DARSTELLUNG DER HYDRODYNAMISCHEN ERSCHEINUNGEN BEIM START VON SEEFLUZEUGEN (EXPLANATORY REPRESENTATION OF THE HYDRODYNAMIC PHENOMENA OCCURRING AT THE TAKEOFF OF SEAPLANES)," Bericht S110, Hamburg, 5 July 1946.

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Shuford, C.L., Jr., "A THEORETICAL AND EXPERIMENTAL STUDY OF PLANING SURFACES INCLUDING EFFECTS OF CROSS SECTION AND PLAN FORM," NACA Report 1355 Supersedes TN 3939, 1958.

A summary is given of the background and present status of pure-planing theory. Data for models having sharp chines have been obtained for a rectangular flat plate and two V-bottom surfaces having constant angles of deadrise of 20° and 40° and also for rectangular-flat-plate surfaces having very slightly rounded chines. The theory presented in NACA Technical Note 3233 for a rectangular flat plate is revised and extended to include triangular flat plates planing with base forward and V-shaped prismatic surfaces having a constant angle of dead rise, horizontal chine flare, or vertical chine strips. The agreement between the results calculated by the proposed theory and the experimental data is satisfactory for engineering calculations of lift and center-of-pressure location.

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Smith, D.W. and Walker, J.H., "SKIN-FRICTION MEASUREMENTS IN INCOMPRESSIBLE FLOW," TR R-26, 1959. NASA.

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Sokolof, N.A., "DATA FOR THE DESIGN OF HYDROGLIDERS AND FLYING BOATS", Bulletin No. 149 (1932) of the Central Aero-Hydrodynamic Institute (ZAGI) of Moscow. French translation available at the Library of Aero Club De France, Paris.

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Sottorf, W., "EXPERIMENTS WITH SKIMMING PLANES, PART I TO IV", May 1933. Translation by Miss S. Skan, Aeronautical Research Committee Seaplane Subcommittee.

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RES, Background

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RES,Background

Spooner, C.W., Jr. "SPEED AND POWER OF MOTORBOATS UP TO A SPEED-LENGTH RATIO OF THREE," "Unpublished manuscript dated October 1950; available in the TMB Library",-Saunders. University of Michigan Report.

RES, Background

Springston, G.B.Jr., "MODEL TEST RESULTS AND PREDICTED EHP FOR EXPERIMENTAL 65 FT. LANDING CRAFT (LCM) FROM TESTS OF MODEL 4416," NSRDC No. 850, July 1956. Distributed only upon specific Bureau of Ships authorization, (DDC AD 124-026L)

RES, Background

Springston, G.B., Jr., "RESISTANCE OF MODEL 4377 REPRESENTING A 52 FT. AIRCRAFT RESCUE BOAT EQUIPPED WITH PROPULSION UNIT UNDERWATER HOUSING," NSRDC Report No. 841. Distributed only upon authorization of Bureau of Ships.

RES, Background

Springston,G.B., and Sayre, C.L.,Jr., "THE PLANING CHARACTERISTICS OF A V-SHAPED PRISMATIC SURFACE WITH 50 DEGREES DEAD RISE," DTMB Report 920, February 1955. DDC-AD-056-661.

This report is one of a series on the experimental investigation of the planing characteristics of a series of related prismatic surfaces.

The principal planing characteristics have been obtained for a V-shaped prismatic surface having an angle of dead rise of 50 deg. Wetted lengths, resistance, and center of-pressure location were determined at speed coefficients up to approximately 20.0, beam-loading coefficients from 0.87 to 71.51, and trims up to 30 deg. Keel-wetted-length-beam ratios were extended to approximately 8.0 in all cases where excessive loads or excessive spray conditions were not encountered.

The data obtained indicate that the important planing characteristics are independent of speed and loan for a given trim and are dependent primarily upon lift coefficient. The difference between keel wetted length and chine wetted length is constant for a given trim angle and the variation of this difference with trim has the same general trend as indicated by theory. For practical purposes the ratio of center-of-pressure location foward of the trailing edge to the mean wetted length is a constant equal to 0.58 and is independent of teim angle. The drag data indicate that the friction-drag component is a large percentage of the total drag at the low trims, but decreases rapidly with increase in trim to a small percentage at the higher trim.

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Stoltz, J.F., "INITIAL APPROACH TO PLANING HULL DESIGN," The Planimeter, July and August 1967, SSCD.

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Stumpf, H., "LINEARIZATION OF THE GRAVITY-AFFECTED PLANING PROBLEM (LINEARISIERUNG DES SCHWEREBEHAFTETEN GLEITPROBLEMS'," NSRDC Translation 348, Translated by Keith Kerney, Zeitschrift fur angewandts Mat atik und Mechanik, Band 47, Heft 1, Seite 31-44, 1967, October 1969

The relations between bottom shapes, pressure distribution, and drag of a planing surface in steady motion over an undisturbed free surface are investigated by carrying out a separation of the velocity potential into a part independent of gravity and a part dependent on gravity. The gravity-free velocity potential, which describes planing at infinitely large Froude number and contains all the essential irregularities of the planing problem, furnishes the gravity-free shape of the planing surface as well.

RES, Background

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Tarbox, L.H., "REPORT ON RELATIVE RESISTANCES OF SIMILAR ROUND AND V BOTTOM MODELS," The Planimeter, August 1952, SSCD.

RES,Background

Tate, C.W., "MODEL TESTS OF A ROUND-BILGE BOAT WITH AND WITHOUT THE SNADECKI LONGITUDINAL STRAKES," DTMB Report 1281, October 1958.

A model of a round-bilge boat was tested for resistance, with and without Snadecki-type longitudinal strakes. In general, for the condition tested, the addition of the strakes caused an increase in resistance. However, at very high speeds and with the CG in an aft position, some reduction in resistance was obtained. Further effects of adding the strakes were to decrease the running trim and to increase the CG rise of the model.

RES, Background

Tate, C.W., "MODEL TESTS OF A TUNNEL-BOTTOM 36-FOOT RIVER PATROL CRAFT," DTMB Report No. 1846, May 1964. AD 600-690.

Model tests of a new and somewhat unconventional boat, the 36-foot River Patrol Craft, were made by the Model Basin. The bottom of this craft has a single deep tunnel forward which gradually decreases convexly in depth to a flat bottom of 60 percent of the hull length. There it bisects into two shallow tunnels which are symmetrical about their centerlines. The afterbody tunnels increase in depth to the transom.

During the tests it was discovered that the single tunnel forward collected an appreciable quantity of air which then migrated aft past the propeller positions in the tunnels of the afterbody and from there astern into the wake.

RES, Background

Tate, C.W., "RESULTS OF SMOOTH-WATER EHP TESTS OF A MODEL OF THE COVED-CHINE CALE PLANING BOAT", DTMB Report No. P-020-H-01, October 1964. Prepared for the Bureau of Ships. Distributed only upon their authorization.

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Todd, F.H., "FURTHER MODEL EXPERIMENTS ON THE RESISTANCE OF MERCANTILE SHIP FORMS COASTER VESSELS", INA 1931.

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Todd,F.H.,and Weedon, J., "EXPERIMENTS WITH MODELS OF CARGO-CARRYING TYPE COASTERS", IME 1940.

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Tulin, M.P., "THE THEORY OF SLENDER SURFACES PLANING AT HIGH SPEEDS," Schiffstechnic, Band 4 (1956-1957), Heft 21, pp. 125-133.

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RES, Background

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RES, Background

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The planing characteristics as determined by tank tests, are presented for three surfaces representative of hydro-ski forms. One surface was of rectangular plan form with a flat bottom; the second surface had a rectangular plan form with transversely curved bottom; and the third surface had a flat bottom but was triangular in plan form. The range of trims investigated was 4° to 20°. The data are presented in the form of plots of the total load, resistance, trimming moment, and draft against wetted area. Plots of wetted length, wetted area foward of the observed wetted length at the chine, and aerodynamic tare forces are included.

RES,Background

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The Planing characteristics are presented for six planing surfaces. The surfaces varied in plan form and transverse bottom curvature. The plan forms included rectangles, triangles, and their combinations. The bottom curvatures included flat, convex, and concave-convex transverse sections. The ranges of trims and speeds investigated were 4° to 20° and 15 to 35 feet per second. The data are presented in the form of plots of wetted length, load, resistance, trimming moment, and draft against wetted area. Plots of wetted area forward of the observed wetted length at the chine are included.

RES, Background

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The principal high-speed planing characteristics for a prismatic surface having an angle of dead rise of 0° (flat bottom) have been determined over a wide range of planing variables. Wetted length, resistance, center-of-pressure locations, and draft were determined at speed coefficients ranging up to 25.0, beam loadings up to 87.3, and trims up to 30°. Mean wetted lengths up to 7.0 beams were obtained whenever possible.

RES, Background

Wilson, C.J., "A COMPARISON OF THE EFFECTIVE HORSEPOWER OF TWO DESIGNS OF AN LCVP REPRESENTED BY MODELS 4031 AND 4032", NSRDC Report No. 619, December, 1947.

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RES, Background

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Anonymous, "GAY CLASS FAST PATROL BOAT. FINAL EHP AND RUNNING RISE AND TRIM CURVES", Admiralty Experiment Works.

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Clement, E.P., "EHP AND FLOW TESTS OF A TUNNEL-BOTTOM RECONNAISSANCE BOAT, MODELS 4389 AND 4389-1", NSRDC Report No. 1210, February, 1968, AD 205-643L Distributed only upon authorization of BUSHIPS.

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Takagi, A., Inui, T., and Nakamura, S., "GRAPHICAL METHODS FOR POWER ESTIMATION OF FISHING BOATS", Tokyo, Fisheries Agency, 1950.

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PROP, Useful

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PROP, Useful

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PROP, Useful

Gawn, R.W.L., and Burrill, L.C., "EFFECT OF CAVITATION ON THE PERFORMANCE OF A SERIES OF 16 IN. MODEL PROPELLERS", INA, 1957.

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PROP, Useful

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PROP,Useful

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PROP, Useful

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Van Manen, J.D., (NSMB), "OPEN WATER TEST SERIES WITH PROPELLERS IN NOZZLES," ISP, Vol. I, No. 2, 1954.

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By means of these diagrams the optimum "screw plus nozzle" combination for the nozzle form under consideration can immediately be determined, while it is also possible to compare the efficiency with that of the screw without nozzle.

A method is discussed for determining the translational velocity in the nozzle in the vicinity of the screw.

The influence of the various parameters, decisive for the open-water "screw plus nozzle" combination, are examined as regards their importance.

Finally, attention is devoted to the framing of a condition of minimum loss of energy for the "screw plus nozzle" combination, and at the same time directions are given for cavitation-free design of the screw in the nozzle according to the vortex theory.

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PROP. Background

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PROP, Background

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PROP, Background

Blount, D.L., "POWERING CHARACTERISTICS FOR LCM-A AS REPRESENTED BY MODEL 4746," DTMB Report 1334-2, December 1959.

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PROP,Background

Blount, D.L., "SMOOTH WATER POWERING CHARACTERISTICS OF AN EXPERIMENTAL LCVP(T)," DTMB Report 2283, September 1966.. AD 800-129L.

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PROP, Background

Blount, D.L., et al, "CORRELATION OF FULL-SCALE TRIALS AND MODEL TESTS FOR A SMALL PLANING BOAT", RINA Paper presented March 27, 1968.

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Boatwright, G.M., and Strandell, J.H., "CONTROLLABLE PITCH PROPELLERS", ASNE Journal, August 1967.

Excellent review of controllable pitch in the Navy from patrol craft to ships.
30 References.
See Also "Discussion of Controllable Pitch Propellers" in ASNE Journal, December,1967.

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PROP,Background

Brandan, J.H., Editor, "SYMPOSIUM ON PUMPING MACHINERY FOR MARINE PROPULSION", NSRDC, May 6, 1968. American Society of Mechanical Engineers, 345 East 47th St., N.Y.,N.Y. 10017.

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PROP, Background

Contractor, D., "CONCEPTUAL DESIGN STUDIES OF WATER JET PROPULSION SYSTEMS FOR CAB VEHICLES", Report No. 656-1, September 1966. Hydronautics, Inc. Pindell School Road, Laurel, Md.

PROP, Background

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PROP, Background

Cryder, L.E., "NOTES ON KORT NOZZLE SYSTEM OF PROPULSION," The Planimeter, March and April, 1966, SSCD.

PROP, Background

Dickerson, M.C., "POWERING CHARACTERISTICS OBTAINED WITH VERTICAL AXIS PROPELLERS FOR LCU(A) REPRESENTED BY MODEL 4952-1", David Taylor Model Basin Report 1753-3, Feb. 1964.

Powering tests, including investigation of bollard pull capabilities, were conducted on Model 4952-1, a modified version of Model 4952. This model represented the Utility Landing Craft, Assault LCU(A) Fy 1963. The stern lines of Model 4952 were altered by dropping the chine, making a flatter bottom, and moving the propeller 2 inches inboard.

The altered stern lines resulted in a 3 percent increase in ehp at 8 knots and a 15 percent increase in shp at 6 knots. The alterations also greatly improved the bollard pull astern capabilities.

PROP, Background

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Emerson, A. and Sinclair, L., "PROPELLER CAVITATION; SYSTEMATIC SERIES TESTS ON 5 AND 6 BLADED MODEL PROPELLERS," SNAME 1967, Transactions.

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Grant, J.W. and Altieri, D.M., "PREDICTIONS OF POWERING AND TRIM ANGLE CHARACTERISTICS FOR AN LCM-8 (ALUMINUM), REPRESENTED BY MODEL 5152 FITTED WITH WEDGE AND KORT NOZZLES," NSRDC T&E Report No. 265-H-02, November 1968.

PROP, Background

Gregory, D.L., "CORRELATION OF MODEL TESTS AND FULL-SCALE TRIALS FOR A TWIN-SCREW LCVP", January 1970, NSRDC T&E Report 199-H-02.

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PROP, Background

Harper, M.S., and Weaver, A.H., "MODEL FLOW STUDIES AROUND STERN OF U.S. NAVY FLEET TUG ATF 163, MODEL 3531," NSRDC Report # 810, January 1952. Distrubuted only upon authorization of Naval Ship Systems Command.

PROP, Background

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Six supercavitating propellers were tested to determine their backing characteristics. The propellers tested were TMB propellers 3671A, 3767, 3769, 3770 and 3820.

The tests were performed in open water and in the TMB 24-inch variable pressure water tunnel at several cavitation indices over a range of speed coefficients.

PROP, Background

Hecker, R., "POWERING PERFORMANCE OF A VENTILATED PROPELLER," NSRDC Report 1487, June 1961. AD 259-919.

In an effort to achieve supercavitating performance at relatively low speeds, ventilation of an SC propeller was investigated. Tests were run with a two-bladed SC propeller ventilated through holes in the propeller blades.

The results of the tests show that ventilated propellers operate with a fully developed cavity at speeds too low for supercavitating operation. Powering performance was found to be dependent upon the cavitation index based on cavity pressure.

PROP, Background

Hecker, R., "OPEN-WATER TEST RESULTS OF WEEDLESS ("RULE") PROPELLERS," DTMB REPORT 1747, May 1963. AD 410-806.

This report presents the open-water test results of four similar propellers varying only in pitch ratio. The propellers are two-bladed, commercially manufactured, and designed for weedless operation.

PROP, Background

Hecker, R. and Morgan, W.B., "SCALE EFFECT STUDIES ON PARTIALLY SUBMERGED PROPELLER 4281", NSRDC, T&E Report 249-H-06, December 1968.

"Each transmittal of this document outside the Department of Defence must have prior approval of the Head, Hydromechanics Laboratory, Naval Ship Research and Development Center."

PROP, Background

Hundemer, R.W., "CAVITATION PERFORMANCE OF PROPELLER 4169 FOR THE LCVP (K)", NSRDC, Hydromechanics Lab. Report No. 142-H-02, October 1966.

Full scale tests of Michigan Dyna-Jet three-bladed propeller in the 36 inch water tunnel.

PROP, Background

Hunt, R.R., et. al., "PERFORMANCE CHARACTERISTICS OF A JET FLAP PROPELLER", NSRDC Report 2936, December 1968.

The performance characteristics of a marine propeller with a jet flap was investigated. It was found that the jet flap effectively reduced propeller blade cavitation and that for a given advance coefficient the thrust was considerably increased by using the jet flap. The propeller efficiency decreased somewhat primarily because of the power required in delivering the jet.

PROP, Background

Hunt, R.R. and Lasky, M.P., "PREDICTIONS OF POWERING AND TRIM ANGLE OF AN LCM (8)-ALUMINUM HULL, REPRESENTED BY MODEL 5152," NSRDC T&E Report No. 265-H-01, February 1968.

PROP, Background

Johnson, V.E., "WATER JET PROPULSION FOR HIGH SPEED HYDROFOIL CRAFT", Paper presented at First Annual Meeting of AIAA, Washington, D.C., June 29-July 2, 1964.

PROP, Background

Kilgore, U., "PROPULSIVE COEFFICIENTS FOR JET SYSTEMS," The Planimeter 6/65, SSCD.

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Kilgore, U., "HYDRODYNAMIC ASPECTS OF TRACKED AMPHIBIANS", ASNEJournal, December 1969.

PROP, Background

Kopko, W., "PROPELLER INDUCED FLUCTUATION FORCES OF A PARTLY IMMERSED SES PROPELLER AS DETERMINED FROM MODEL EXPERIMENTS", T&E Report No. 255-H-01, February 1968.

"Each transmittal of this document outside the Department of Defense must have prior approval of the Head, Hydromechanics Laboratory, Naval Ship Research and Development Center."

PROP, Background

Kotik, J., "AMPHIBIOUS VEHICLE STUDIES", TRG Division, Control Data Corporation, Melville N.Y., June 1966 for ONR, Contract Nonr-4650 (00).

An attempt to improve the propulsive efficiency of tracked amphibians.

PROP, Background

Lindenmuth, W.T. and Barr, R.A., "STUDY OF THE PERFORMANCE OF A PARTIALLY SUBMERGED PROPELLER," July 1967, Technical Report 760-1 Hydronautics, Inc.

PROP, Background

Lorenz, E., "COMPARISON BETWEEN THE TWO METHODS OF MARINE PROPULSION", SSCD, The Planimeter, June 1963.

Waterjet versus conventional propeller. Results of full scale testing of 16 foot boat.

PROP, Background

Lorenz, E., "STERN DRIVE PROPELLERS AND PROPELLER CAVITATION PROBLEMS," SSCD Paper, The Planimeter, July 1963.

PROP, Background

Milam, A.B., and Morgan, W.B., "SECTION MODULI AND INCIPIENT CAVITATION DIAGRAMS FOR A NUMBER OF NACA SECTIONS," DTMB Report 1177, October 1957, AD 202-125.

The section moduli for the TMB EPH, NACA 16, 65A and 66 TBM modified sections are given in this report along with incipient cavitation curves for the NACA 16,65A,0000-1.10/1.575 section with a = 1.0 and 0.8 mean lines and the NACA 66 TMB modified section with an a= 0.8 mean line.

PROP, Background

Mitchell, A.R., "TUNNEL TYPE VESSELS," Transactions of Institution of Naval Architects, 1953.

PROP, Background

Moore, W.L., "WAKE SURVEYS BEHIND HYDROFOIL-STRUT-NACELLE CONFIGURATIONS-FOR APPLICATION TO THE AG(EH)," DTMB Report 1864, June 1964. AD 603-062

Wake surveys were conducted in the DTMB Subsonic Wind Tunnel on a model of the AG(EH) main strut-pod-foil configuration with and without a pod fairing, and on three related DTMB strut-pod-foil configurations.

This report presents the results of these wake surveys. One of the significant results is that each pod corner causes an additional stress reversal per cycle on the propeller blades, intensifying fatigue and vibration problems.

PROP, Background

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Morgan, W.B. and Caster, E.B., "PREDICTION OF THE AERODYNAMIC CHARACTERISTICS OF ANNULAR AIRFOILS," SNAME, Marine Technology, December 1966. AD 611-018.

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Munk, T. and Prohaska, C.W., "TESTS WITH INTERLOCKING AND OVERLAPPING PROPELLERS," Hydro-OG Aerodynamish Laboratorium Lyngby, Denmark, Report No. Hy 12, January 1969.

PROP, Background

Muntjewerf, J.J., "MODEL TESTS WITH NOZZLES AND STEERING NOZZLES FOR TRAWLERS", Publication No. 264, Netherlands Ship Model Basin.

PROP, Background

Ober, G.L., "CHARACTERISTIC CURVES AND BLADE MEASUREMENTS OF COMMERCIAL SMALL BOAT PROPELLER SERIES", NSRDC Report No. 966, May 1955. Distributed only upon authorization of Bureau of Ships.

PROP, Background

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Oosterveld, M.W.C., "SERIES OF MODEL TESTS ON DUCTED PROPELLERS", NSMB Report Prepared for DTMB under Contract N62558-3960, May 1965.

PROP, Background

Oosterveld, M.W.C., (NSMB), "MODEL TESTS WITH DECELERATING NOZZLES," Paper presented at ASME Florida Engineering Conference Symposium on Pumping Machinery for Marine Propulsion, May 1968, Philadelphia; Also in ISP, Issue unknown.

This paper presents the results of open-water tests and observation of the cavitation characteristics of systematic series of flow decelerating nozzels (or pumpjets). The tested nozzle shapes have been derived theoretically. The results of these theoretical calculations and of the experiments are presented in a nondimensional form in graphs. A discussion of the results is given.

PROP, Background

Peach, R.W., "A METHOD FOR DETERMINING ACCELERATIONS OF A SHIP", ISP Vol. 10 No. 106, June 1963.

PROP, Background

Peck, J.G., "CHARACTERISTIC CURVES OF THREE SMALL BOAT PROPELLERS WITH SYSTEMATIC DIAMETER REDUCTIONS", NSRDC Report No. 1217, Feb. 1958, AD-202-123. Distributed only upon authorization of BUSHIPS.

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Ruys, A.W., "A COMPARISON OF SOME PUBLISHED RESULTS OF TESTS ON VERTICAL AXIS PROPELLERS", ISP Vol. 13 No. 148, December 1966.

PROP, Background

Schab, H.W., "WATER JETS MAKE LESS NOISE," ASNE Journal, February 1964.

PROP, Background

Schuster, S.,et al., "ON CERTAIN PROBLEMS OF WATER JET PROPULSION (UBER PROBLEME DES WASSERSTRAHLANTRIEBS)", Jahrb. STG, Vol. 54, 1960, DTMB Translation No. 306, August, 1962 by E.N. Labouvie, Ph.D.

PROP, Background

Sherman, P.M. and Lincoln, F.W., "RAM INLET SYSTEMS FOR WATERJET PROPULSOPS," AIAA Paper No. 69-418, May 1969.

Ram inlets applicable to high speed (up to 100 knots) waterjet propelled ships are analyzed and shown to present exacting design requirements. Based on the analytical results, variable geometry appears to be a necessity to achieve the thrust capability for acceleration to design speed. The selection of the design inlet velocity ratio is shown to be very critical, making it necessary to adhere to the optimum value or suffer high power losses. At 100 knot speeds, base vented inlets appear definitely superior, with respect to drag over both subcavitating and supercavitating types. Methods are presented for selecting the optimum waterjet inlet system based on tradeoffs between external and internal performance losses. Cavitation free designs are generated and analyzed with the aid of the Neumann Problem solution. Accounting and calculation procedures for external drag and internal losses are established and applied to the inlet system of a 100 knot surface effect ship.

PROP, Background

Shields, C.E., "PERFORMANCE CHARACTERISTICS OF SEVERAL PARTIALLY SUBMERGED SUPERCAVITATING PROPELLERS," NSRDC Report 2723, July 1968. AD 840-701.

Experimental studies were conducted on four propellers in the partially submerged condition. Three were existing NSRDC supercavitating propellers, and one was an eight-bladed propeller specifically designed for partially submerged operation. Experimental results show that the thrust and torque are proportional to the submergence, and that efficiency is essentially independent of the submergence. Also, Froude effects are important for certain speed regimes.

PROP, Background

Shields, C.E., "OPEN WATER PROPELLER PERFORMANCE IN INCLINED FLOW," NSRDC, Hydromechanics Laboratory Report No. 110-H-01, November 1965.

PROP, Background

Shields, C.E., "PERFORMANCE CHARACTERISTICS OF SEVERAL PARTIALLY-SUBMERGED SUPERCAVITATING PROPELLERS", NSRDC T&E Report No. 249-H-0T.

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Venning, E. Jr.,and Haberman, W.L., "SUPERCAVITATING PROPELLER PERFORMANCE," SNAME 1962.

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West, E.E. and Crook, L.B., "A VELOCITY SURVEY AND WAKE ANALYSIS FOR AN ASSAULT SUPPORT PATROL BOAT (ASPB) REPRESENTED BY MODEL 5014," NSRDC T&E Report No. 149-H-05, September 1967.

PROP, Background

Wilson, W.E., "SQUEEGEE PUMP PERFORMANCE," Product Engineering, September 2, 1963.

PROP, Background

Witte, J.H., "PREDICTED PERFORMANCE OF LARGE WATER RAMJETS," AIAA Paper No. 69-406.

The water ramjet is a low weight contender for propelling the high speed Surface Effect Ships of the future. This propulsor which has no moving parts in contact with the water phase consists of a simple contoured duct. Compressed air is injected at a high pressure region in the duct, generating a two phase flow. The expanding gas phase accelerates the flow through a nozzle, thus producing forward thrust. The flow is described using the Euler and Rayleigh equations, the equation of movement of the bubbles relative to the water phase and the first law of thermodynamics. These equations are used in a computer program for predicting thrust and propulsive efficiency. The effects of scale, forward speed, compression cycle and nozzle length on propulsive efficiency is discussed and tabulated. The basic data and nozzle shape of a water ramjet which generates 40 tons thrust at 80 knots are given and a conceptual design is discussed. Propulsive efficiency is of the order of 50-60%.

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Wood, J., "THE EFFECT OF PROPULSION UNIT ON THE ACCELERATION OF TUGS", Ship and Boat International, March 1969.

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Delao, M., "SOME EXPERIMENTAL RESULTS OF TESTS OF A LOW-SPEED, WATERJET PROPULSION SYSTEM", AIAA Paper No. 66-718.

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Venning, E. Jr., "APPLICABILITY OF A SUPERCAVITATING PROPELLER TO A SMALL SPEEDBOAT". NSRDC Report No. 1459, November, 1960, AD 250-364.

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Verhagen, J., "METHOD TO CALCULATE THE OPTIMUM DIAMETER OF MARINE PROPELLERS", ISP Vol. 13 No. 145, September 1966.

PROP,

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MOTIONS,Background

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MOTIONS,Background

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MOTIONS, Background

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MOTIONS, Background

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in good agreement with experimental data for trims below 30° and for wetted-length-beam ratios at least up to 3.3. This development is based primarily on the assumption that the longitudinal distribution of pressure on a rectangular flat plate is substantially a function only of the normal-load coefficient so that this distribution may be computed from the existing theory for two-dimensional flow. The transverse distribution of pressure is obtained as a compromise between the available theoretical treatments for very small and very large wetted-length-beam ratios. For a V-bottom prismatic surface

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An experimental stress analysis of the high stress areas of a fiber glass boat hull was conducted during normal boat operation and while firing a 57-mm gun. The purpose of the test was to obtain data bearing on the integrity of the fiber glass hull from a shock-fatigue standpoint. The measurements indicated a range of shock loadings which could be tolerated before cracking of the outside fiber glass hull occurred. STRESS, Background

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