Analyses of traditional powering trials
with the bulk carrier ANONYMA
in ballast at two trim settings

Michael Schmiechen, Berlin

apl. Prof. for hydro-mechanical Systems at ISM/TUB,
retired Deputy Direktor and Head of RaD at VWS

The complete analyses, the 'letter' and all related discussions etc are to be found
under 'News on ship powering trials' on the website www.m-schmiechen.de

Status: 2013-08-06/10-06

Schmiechen   **Future trials and monitoring now / 1**

From METEOR 1988 to ANONYMA 2013

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Further recent motivations

The 25th anniversary of my propulsion tests with METEOR in the Greenland Sea, November 1988,

the 15th anniversary of a proposed rational standard for the assessment of trials, April 1998,

the overdue revision ISO 15016: 2002-06,

the 'incredible' STA-method promoted by MARIN,

its premature integration into the 'ITTC 2012 Guidelines',

their *approval contra legem* by the Executive Committee,

and their submission to MEPC of IMO.

That *is missing!*

Conventional (axiomatic) theory of ship powering performance under service conditions

Powering predictions based on tests with physical and/or numerical models

Proof of the pudding solely based on full scale tests

Structure of 'my letter'

2 Conventional approaches
2.1 Basic principles and rules
2.3 Theory of theories
2.4 Coherent interpretations

3 Balance of forces rationalised
3.1 State of the theory
3.2 METEOR project
3.3 Model testing

4 Balance of powers promoted
4.1 State of the theory
4.2 ISO 15016: 2002-06
4.3 ANONYMA trials

2.1 Rational conventions

Conventions are agreements, are languages and their implications (to be) agreed upon.

- **Traditional conventions** are usually not explicit, often incoherent languages.
- **Rational conventions** are formal languages constructed *ad hoc* for the purposes at hand. In terms of logic they are axiomatic systems, a frightening name for most useful tools.

Lessons (to be) learned

The most fundamental task is to *set up rational conventions adequate for the purposes at hand and so simple and self-evident, that they and their consequences are acceptable for the all parties interested in the results*.

The interpretation of the concepts and parameters introduced to be completely separated from the construction of the axiomatic models, of the formal languages proper.

The concepts and parameters introduced to be identified only in the contexts of elementary mechanics and of the models or languages adopted.

From METEOR 1988 to ANONYMA 2013

Delivered power convention

As 'local' model of the ***powering performance of the propeller in the behind condition*** I have used from the beginning of the development the 'pump' function

$$P_S = p_0 N_S{}^3 + p_1 N_S{}^2 V_H$$

relating the supplied shaft power P_S, shaft frequency of revolutions N_S and hull speed through the water V_H.

Speed through the water

The hull speed over ground and through the water are related by the current velocity V_C prevailing at the time and location of the trials

$$V_H = V_G - V_C \, .$$

Thus the parameters of the propeller powering function in the behind condition cannot be identified trustworthy unless the current velocity is determined reliably as well.

Current convention

In many cases the current may be conceived as a mean constant current superimposed by a harmonic tidal current. And the simplest convention adequate in this case is the two parameter model
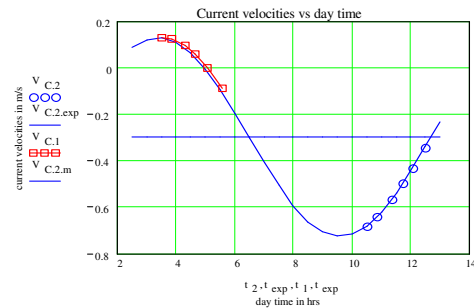
$$V_C = v_0 + v_1 \sin [\, \omega_T (t - t_T)]$$

with the 'universal' circular tidal frequency ω_T and the time of high tide t_T at the day and the location of the trials, known from the tidal tables.

Current identified, extrapolated

Powers identified, normalised
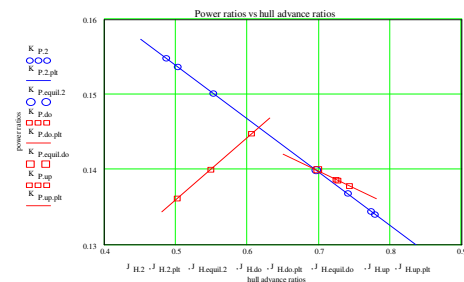
Required power convention

In case of the ANONYMA the two parameter 'required power convention'

$$P_R = q_0 V_H{}^3 + q_1 | V_{W.rel.x} | V_{W.rel.x} V_H \, ,$$

which I had used many times before, turned out to be 'perfectly' adequate to model the data in the confidence range.

The 'environmental parameters' of the partial powers unambiguously, 'objectively' identified have nothing, to stress: definitely nothing whatsoever, to do with the 'resistance coefficients' traditionally considered in this context.

From METEOR 1988 to ANONYMA 2013

Nominal no wind and waves condition

The required power convention permits further to define the nominal no wind and waves condition
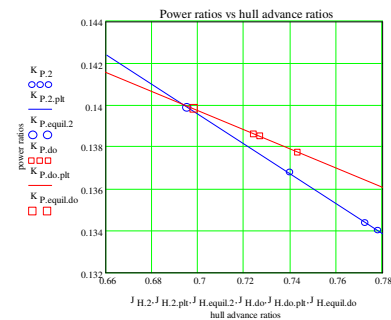
$$P_{R\,NoW} = (q_0 + q_1)\, V_H{}^3 \equiv C_{PV}\, V_H{}^3 .$$

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Nominal states compared

Power ratios vs hull advance ratios

Warning!

> ### Reading of my papers endangers Your principles!

"You cannot have a theory without principles.

'Principles' is another name for 'prejudices'."

Mark Twain: 'The Disappearance of Literature'

Speech, 20 November 1900.

Justice for Hedgehogs

In his fundamental book 'Justice for Hedgehogs' Ronald Dworkin has tried to outline how the conflicts mentioned may be solved rationally, if including scientific conflicts I just try to find out.

He refers to the 'insight' of Archilochos (680 – 654 BC):

"The fox knows many things,

but the hedgehog knows one big thing!"

The hedgehog knows, *that* all 'things' and *how and why* they are related to and depend on each other, mutually supporting each other.

DNV GL Merger, effective Sept. 12, 2013

"**Standards are improving, but there is a lack of international governance. The industry needs strong, independent players that promote greater openness, consistency and effectiveness in the profession and push the development of new adequate measures and standards.** For our part, DNV GL, must take an active stance and show that we have qualified opinions on technical, operational, environmental and risk management issues. **We aim to deliver technical solutions that are practical and in the best interests of our customers and other stakeholders**."

Henrik O. Madsen, CEO of the DNV GL Group.

Future trials and monitoring now!

Future ship powering trials and monitoring now