

From METEOR 1988 to ANONYMA 2013 *and further*

30th ATTC 2017

**From METEOR 1988 to ANONYMA 2013 *and further*
Trustworthy ship powering trials and monitoring *now!***

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Status: August 18, 2017

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Tales, parables, fables, satires

Grandfathers are expected to tell 'stories'. And that I shall do, taking advantage of the fact, that tales, parables, metaphors, fables, jokes, satires, persiflages have evolved as the most efficient ways to communicate and highlight intricate situations and strategies of 'survival'. Usually the name of a tale etc is sufficient to invoke the whole context for the initiated and trained.

Most famous are emperor Sun Tsu's ('Sunzi') collection of stratagems, about 500 BC, the animal fables of Aesop, of the 6th century BC, and the Arab collection 'Kalila and Dimna', collected about 750 AD for the same educational purpose as Sunzi's stratagems.

Repeated claims, that stories do not 'apply' in ship theory, ignore the 'power' of vivid conceptions, of Goethe's 'Anschauung'.

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The race of tortoise and hare

In talking about forty years of my intense research on trials and monitoring off the beaten track at VWS, the Berlin Model Basin, and since my retirement, my 'stories' and anecdotes are not plucked out of the air, but are based on my long experience and also serve the educational purpose mentioned.

They concern the future, the future of my young colleagues, who could be my grand-children. Most appropriate for this presentation is Aesop's fable about the race of the tortoise and the hare:

'While the tortoise slowly approached the common goal, carefully watching the way and considering every single step, the hare raced ahead and, waiting for the tortoise to arrive, fell asleep and lost the race.'

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Anniversaries 'celebrated'

Two anniversaries in 2013 have inspired me, to wind up my work on ship powering trials and monitoring and publish the results:

The 25th anniversary of my tests with the German research vessel METEOR in the Greenland Sea, November 1988, has triggered the publication of three volumes of a 'Festschrift' in 2013, 2014 and 2015, respectively, and two related brochures, and

the 15th anniversary of my proposal for a rational procedure to identify the prevailing currents and to evaluate traditional steady trials of 1998, 'filed' by JISC/JMSA under ISO/TC8/SC9/WG2/N28 dated 1998-06-23: 'Prof. Schmiechen's comments to ISO/TC8/SC9/WG2/N20, Informative', which has been the basis of all my work since.

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Usage of inverted commas

Instead of starting with a list of symbols, to be treated further down, I explain the usage of inverted commas and italics, in line with the usage recommended in the 'Current English Usage' (Wood, 1970): "(iv) **Inverted commas may also denote, that a word is used in irony or sarcasm, [or] in a sense which is not its generally accepted one;** ... however, they should be employed only, if it is felt necessary to apologise for the use of such words. ..."

and in the literature:

"Our author's italics warn us to look for special importance."

John T. Williams: Pooh and the philosophers (1996/152).

"This and several other words in the passage were italicised ... in order, apparently, to help the reader appreciate Swift's irony."

Jonathan Swift: Gulliver's Travels. Notes (2003/279).

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Scope of paper and presentation

In the given limits I cannot possibly write and talk about any details in this contribution to the 30th ATTC. The details, documented and discussed in every detail, are readily accessible together with many extended explanatory notes on my website.

I shall rather try to explain in plain terms the origin and the development of my ideas, theories and procedures. I shall talk about 'philosophy', i. e. 'meta-physics', meta-principles and meta-models, as well as basic principles and models concerning the subject stated in the title.

The repeated advise to forget about the 'philosophy' indicates, that neither the problem, nor its solution has been understood. **The solution is impossible in the traditional framework, which is the root of the problems to be solved.**

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Problems: resolution of conflicts

Traditionally educated and/or numerically trained, not to say 'indocinated' colleagues still have a problem to admit, that trials and monitoring are basically *not* physical, *not* hydro-mechanical problems, *but* conceptual and, not to be forgotten, (their) psychological (!) problems, arising in resolving conflicts between the parties concerned, typically ship owners and ship builders. And how these can be reached *rationally*, I have described, demonstrated and published easily accessible on my website many times over the past decades.

At my age I am of course not so naïve, to believe, that everybody is 'interested' in the rational resolution of conflicts, quite to the contrary. But like the little child in Hans Christian Anderson's tale of 'The Emperor's New Clothes' I have raised my voice, whenever I felt 'necessary'.

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Solutions: formal languages

Conflicts can be solved rationally by formal models and their coherent interpretations, 'subscribed' by the parties concerned. Formal models are dedicated, appropriate, rule driven languages, unmistakably to talk about and to solve the intricate problems at hand. Thus formal languages are inherently perfect systems of conventions, in terms of logics they are axiomatic systems.

Interpretations of the concepts introduced are meaningful only in the context of their languages. 'Independent' interpretations are creating an infinite regress of research, an irresponsible waste of research resources.

This reminds me of the old lady, who 'knew' our Earth to be based on turtles, 'all the way down'. But whom are astronomers and naval architects laughing at?

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'All the way down'

It is standard scientific practice to 'support' established theories, which are no longer adequate and/or acceptable, as long as possible by additional 'turtles'. The most famous example the Almagest dating back to Claudius Ptolemy (ca. 100 to 170 AD).

Kuhn's paradigm of disruptive changes of paradigms of 1962 vividly describes what happens, when these fragile foundations can 'no longer' be repaired and new, 'stronger' turtles need to take over and 'support' the 'worlds'. More than hundred years earlier Ernst Mach has already expressed similar ideas concerning the evolution of science.

Currently many cosmologists believe the universe to be based on the turtles 'dark energy' and 'dark matter'.

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Structure of languages

The structure of the grammar sketched, not only of formal languages, is so simple, that it could and should (!) be taught to children at school. It shows, that any language consists of two 'corresponding' calculi, the fundamentally different definitions and deductions often confused.

'Consequently' the usual lists of symbols are only degenerate languages, lacking the essential 'halves'. The calculi of conventions are tacitly substituted by shared prejudices or instinctive beliefs. This practice is closely related to the children's game of 'silent post service'.

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Grammar of formal languages

Calulus of concepts	... propositions
Rules of conception	... proposition
Basic concepts: 'Elements'	... propositions: Axioms
Rules of definition	... deduction
Derived concepts: 'Compounds'	... propositions: Theorems

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Representation 'spaces'

Axiomatic models with only very few basic concepts and basic propositions are already unfolding extremely rich, intricate conceptual 'spaces'.

To explore them without getting lost, requires at least 'paper and pencil', preferably a corresponding, intuitive computational environment. Since decades I have used and promoted Mathcad as a particularly adequate, efficient and powerful tool.

Such models are used to represent systems under investigation, their parameters being the 'coordinates' to be identified.

Evidently everybody digesting my proposals 'needs' to re-program my routines in his own environment, a 'necessity' *not* subject of my paper and presentation.

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Mush-rooming bureaucracy

But this is evidently only half the story. The results of tests are trustworthy 'if and only if' the conventions agreed upon demonstrably (!) meet certain requirements, specifically those of coherency and of transparency. Everything else is blind confidence, that can be and is (!) manipulated and misused.

Thus, if naval architects, ship builders and ship owners do not want to be 'cheated', they should primarily *not* care to meet the mush-rooming bureaucratic conventions, proposed and even standardised, but to prove their coherency and transparency.

Even if the requirements are understood 'in principle', it is not easy to meet them in practice, certainly not by traditionally trained naval architects. Right after having described mistakes to be avoided, I myself repeatedly fell victim to exactly those mistakes.

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Terminology and symbols

In order not to get lost I have developed a rule driven (!) language adequate for the purpose at hand.

"Presence of synonymy, intuitive appeal, agreement with customary modes of speech, far from being *the* philosophical virtue, indicate, that not much progress has been made and that the business of investigating, what is commonly accepted, has not even started."

Paul Feyerabend: How to be a good empiricist (1999).

While for ready communication I am using the traditional names for many concepts, it is important to note, that their conception and their operational interpretations are more or less different from the traditional. Accordingly it is mandatory (!), *not* my hobby as has been suspected, to use symbols differing from the traditional symbols, in order to avoid very costly (!) confusions.

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Limits of peer reviews

According to my repeated personal experience I do not 'believe' in peer reviews of papers and research proposals. 'Peers' [and 'specialists'] are tacitly defined as people talking in terms of the current professional jargon.

For reasons to be explained I am purposely talking in a different jargon, as required (!) by the problem to be solved,

"[but I] always remember, that it is impossible to speak in such a way, that you cannot be misunderstood: ... If greater precision is needed, it is needed because the problem to be solved demands it."

Karl Popper: Unended Quest. 1974.

The 'organisation' of research today is 'in fact' still very much the same as at Swift's time. I urge the audience to read his persiflage in 'Gulliver's travels', *not* contained in picture book versions.

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Journey to the Houyhnhnms

'On his fourth, last journey, to the rational horses, Gulliver has been asked, from which part of the country he came and how he was taught to simulate a rational creature. His claim, that he came with other sailors over the sea in a ship built of wooden logs, was found not at all plausible by the Houyhnhnms, not only in view of the obscure building of ships, but more so in view of the fact, that there were no countries beyond the sea.'

This sarcasm is of course pin-pointing the situation of anybody exercising lateral thinking.

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Task of empiricists

The 'only' task of empiricists is to identify the values of the 'physical' parameters, coherently defined by an axiomatic ship theory, that deserves the name. The emotional reactions to this statement do not change the situation, but support my argument.

Identification is essentially a matter of professionally designed and conducted experiments, physical and/or computational, and their professional evaluation. For my taste there are too many traditionally trained naval architects employed at model basins.

All techniques necessary and routines developed for successful application of my procedures are described in great detail in worked examples, papers, lectures and letters documented on my website.

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Expertise required

To be specific, the expertise required includes the capabilities

- to solve ill-conditioned systems of linear equations using singular value decomposition,
- to analyse the remaining residua using advanced methods, statistical in particular,
- to estimate spectra from truncated records using auto-regressive models,
- to identify systems in noisy feed-back loops using correlation with test signals independent of the noise, to avoid systematic errors due to feed back of noise,
- and, last but not least, to understand the implications and the use of the conventional approach.

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Developments so far

Systems of the type outlined have been developed since 1980 among others:

- as 'late' as 1998 for the evaluation of traditional steady speed trials without any reference to ship theory, to model test results and to any other prior information, triggered by the 'incredible' standardisation of the error prone ISO 15016,
- and, based on that work, for the evaluation of quasi-steady trials permitting to identify all parameters of powering performance on model scale and on full scale at any service condition in the same way.

Revisions of the 'model' trial of 1986 are still in progress, routine applications on model and full scale still to be developed.

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Naïve 'philosophy' aversion

My mentioning and taking advantage of formal systems of conventions since 1980 has shielded naval architects away, instead of inspiring them, immediately to try the power tool themselves and solve problems impossible to be solved before.

'Philosophy' aversion, openly expressed even by professors, ignores the fact, that it is based on a 'philosophy' itself, but on a very poor one, not meeting the current requirements and standards, widely established in other fields of research. Thus, when I started to reconstruct ship theory for the difficult problems of trials I did *not* ask naval architects, but rather 'architects' of theories.

The simple reason is, that there is no chance to pull yourself out of the morass, as the Anglo-Saxons try by their bootstraps and as the Germans try by their braids, following Baron von Münchhausen.

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Management of change

A 'disadvantage' of conventions is, that they tend to live longer than 'reasonable'. Thus it often takes two or three generations, even centuries before changes take place. But for competitive reasons that pace is often no longer acceptable. Needs for change identified 'every where' have resulted in a vast literature concerning the management of change.

Two pertinent, instructive animal fables, published in slim volumes, have found wide distribution, the first one by Johnson, author of the 'One Minute Manager': 'Who Moved My Cheese', describing and promoting the random search strategy of mice, and the later by Kotter 'Our Iceberg is Melting', describes the 'penguin principle'.

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Deficient trials 'codes'

Triggers for me to demand change have been the error prone procedure ISO 15016: 2002-06 and its recent revision and the related, 'incredible' STAimo method of MARIN, based on a joker to be pulled out of the sleeve, its rash integration into the 'ITTC 2012 Guidelines', the *contra legem* approval of the latter by the Executive Committee of the 27th ITTC and its passing on to the MEPC of IMO, without any critical response by the community.

All traditional trial 'guides' and 'codes', including those mentioned and the recent update of the SNAME Technical and Research Bulletin 3-47 'Guide for Sea Trials' of August 2015, suffer from fact, that the procedures are error prone and hence the results are not reliable, not trustworthy, but open for manipulation due to lack of coherency and transparency.

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Facts are based on theories ...

We describe the world in terms of currently, widely accepted conventions. This fundamental observation applies of course to all human 'research'.

Goethe already explicitly referred to this fact (!), noting in his 'Maximen und Reflektionen', posthumously published 1833:

"The utmost would be: to understand, that all facts are already theory."

Now it is a platitude in the philosophical literature to refer to this fact (Faye, 2000/171):

"It is part of the folklore of today's philosophy of knowledge that perception is theory-laden."

But the naïve belief in 'solid' facts is still widely entertained, not to mention the fashionable belief in 'alternative' facts.

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... and theories are based on principles

"In principio erat verbum ...,
In the beginning was the Word ..."
Gospel of St. John 1. 1

Marc Twain also knew this in 1900, when he pin-pointed this fact in his speech on 'The Disappearance of Literature':
**"You cannot have a theory without principles.
 'Principles' is another name for 'prejudices'."**

And Bertrand Russell in 1912 has even more precisely stated, that principles are 'nothing more' than instinctive beliefs, and described some consequences to be drawn.

One evident fact is, that scientists adhere to different prejudices and beliefs and (even worse) depend on different sponsors. So the wide-spread 'doubts' in science are not at all surprising.

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Another use of 'principle'

All attempts to reduce my approach to parameter identification indicate, that its essence has not been understood. To identify parameters is 'only' a secondary, though necessary tool.

Talking in terms of incoherently defined parameters, identified with smartly invented instruments, that cannot even be calibrated, but have passed peer review, comes next to plain nonsense and is irresponsible waste of research resources.

Typical examples are speed logs and thrust meters.

When somebody tells me, that he has solved a problem 'in principle', I am always responding by my favourite Radio Erivan joke:
'Question: Is it true, that Iwan in Moscow has won a car in a lottery? Answer: 'In principle yes, but' it was *not* Iwan in Moscow, but Igor in St. Petersburg, and it was *not* a car, but a bicycle, and he did *not* win it, but it was stolen from him.'

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Standards: 'shared prejudices'

According to the rules of ISO and other organisations 'standards' are not necessarily based on the state of research, if any, but on the consensus of institutions eligible to take part in the development and in the vote.

'Consequently' the traditional conventions of powering trials have been perpetuated by ITTC, ISO und IMO, following the aggressively 'marketed' proposal of MARIN without any critical reactions of the community.

After retiring from VWS, I was no longer 'eligible' to take part, unless paying a 'fortune', just to be treated as 'minority'. I preferred to save my money and inform members of pertinent groups about my discoveries and my mistakes by e-mails, also published:
Thus 'nobody' can claim to be 'ignorant'!

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Three commandments ...

Since my Schiffstechnik paper of 1980 I have described and demonstrated with increasing clarity and precision, how the basic problems of trials can be solved, if one adheres to the 'Commandments' of rationality, of inter-subjectivity, alias 'objectivity', and, last but not least, of efficiency:

'Thou shalt not talk in terms of informal, incoherent languages and incoherently interpreted concepts.'

'Thou shalt not introduce aggregate models with more parameters than thou can reliably identify without any prior data, as necessary for trustworthy results.'

'Thou shalt no longer adhere to traditional model testing and trials and monitoring, much more efficient and reliable quasi-steady trials, being necessary on full scale anyway.'

Moses: Pentateuch, 2, 20, 1 – 17. Paraphrases: MS.

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... and a basic rule

'If thou cannot reliably identify the prevailing currents during fluid mechanics testing, at trials in particular, thou shalt forget any further analysis!'

As I have shown 1998, in case of trials the current can be identified simply by solving a set of linear equations based on the data of the usually very few (!) runs up and down wind, without any expensive and delicate instruments, providing incoherent interpretations, impossible (!) to be calibrated anyway!

In the limited range of variation the propeller power performance in the behind condition can safely be considered as linear and consequently that performance and the current can jointly and coherently be identified. According to my knowledge some colleagues are already using my simple and reliable procedure.

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ISO example 1998: Propeller 'behind'

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ISO example 1998: Current identified

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Systematic errors ignored

Although I have informed all bodies 'concerned' in time about the evident systematic errors in the example and told them how to circumvent the problems, nobody felt 'concerned'.

And despite the errors in the example provided with the standard ISO 15016: 2002-6 the latter has with small changes and reference to the 'direct power method', but to my knowledge without example, again (!) been approved by most national Standards Groups and published as ISO 15016: 2015(en).

My related correspondences with the Conveners and with colleagues concerning the obscure 'direct power method' are published and/or available on request.

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Traditional steady trials

Much later two series of traditional trials with ANONYMA took place off the coast of Morocco to establish the influence of the trim on the powering performance and I was asked to re-analyse the data. **And to my surprise my very sensitive, reliable analysis of the data acquired at the smaller trim, with the smaller nominal submergence of the propeller failed! It took me a while to realise, that at the runs up wind the propeller at the smaller nominal trim 'happened' to ventilate at the sea state prevailing!**

Consequently the few data of the remaining runs up and down wind were not sufficient to identify the mean and the tidal components of the current at the second, the smaller trim. The only way to 'save' the project and arrive at reliable results has been to extrapolate the current identified at the larger trim, as shown in the second slide.

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ANONYMA: Power ratios compared

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ANONYMA: Current identified, extrapolated

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The lesson learned

The lesson to be learned from this exercise is evident. Any routine evaluation according to ISO 15016 and STAimo is doomed to fail in such cases and has (!), *unnoticed at a renowned institute.*

In principle, any references to the performance of deeply submerged (!) model (!) propellers in open water (!), as usual in most trials codes is unacceptable, as they require data to be sucked from the thumb or a joker to be pulled out of the sleeve, as 'required'.

For my taste the way the STA procedure has been sold and followed as 'industry standard' is a particularly drastic example of Andersen's archetypal tale of 'The Emperor's New Clothes'. I have published the plot in the second volume of the METEOR Festschrift, as colleagues even at Copenhagen claimed *not* to know it.

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Need for new conventions

Not all problems are as simple as the evaluation of speed trials, getting along without any ship theory.

Froude's interpretations of the basic concepts of resistance and propeller advance speed suffer from the fact, that they are not only incoherent, but worst of all, are not applicable on full scale under service conditions.

Consequently Horn at Berlin already in the 1930s proposed a convention to identify the propeller advance speed from data of propulsion tests, and thus to get rid of the 'disturbing' rotative efficiency.

But Horn's tests and Troost's at Wageningen, reported at the 4th ITTC 1937 at Berlin, suffered from the inadequate conceptual, instrumental and computational tools at that time and further developments were disrupted by the war.

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Equivalent propellers

While logicians are teaching us, that axiomatic models may be pulled out of the hat, useful axiomatic systems are arrived at intuitively and efficiently by adopting adequate, 'sufficiently rich' hydro-mechanical models.

Instead of looking at the effect of the propeller at the stern of the ship, Horn at Berlin turned around and looked at the effects behind the propeller. He exploited the model of an ideal propeller in uniform energy and displacement wakes and of an equivalent (!) ideal propeller 'far behind', 'outside' the displacement wake, already proposed by Fresenius in 1924.

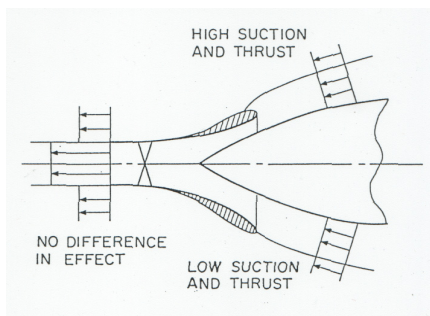
In the context of the rational theory this model permits to derive a thrust deduction theorem and, as an approximation, a very robust thrust deduction convention, explicitly on my website.

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Horn's Copernican turn applied 1961/1968



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Comparing apples and pears

Equivalent ideal propellers are intuitively conceived as pumps with the same flow rate and the same head. To my surprise a professor at St. Petersburg claimed, that he and his colleagues adhere to another, less intuitive concept.

Depending on the different pressure levels prevailing in the ideal wakes they are operating in, equivalent ideal propellers have different disk areas.

Thus, if in model testing a given propeller is located more or less aft, the propulsive efficiency changes due to the fact, that the 'propellers' at the different positions are not equivalent. Comparing their performances is similar to comparing apples and pears.

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Objective followed since 1980

In my ' paper of 1980 and the subsequent STG paper I restarted the development, aiming to derive the powering performance solely from data acquired during propulsion tests, not only on model scale, but on full scale in the same way.

Thus the problem to be solved was, to develop conventions replacing the incoherent hull towing and propeller open water tests, impossible to be performed on full scale at service conditions anyway.

The 'considerable' potential gains in time, costs and reliability at the same time, offered by quasi-steady trials I have since promoted may sooner than expected result in requests by clients and require major revisions of existing model test and trial procedures and codes. 'Our iceberg is melting!' It is high time to study the strategy of penguins.

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Quasi-steady trials full scale

Quasi-steady propulsion tests have been performed with the German research vessel METEOR in November 1988 in the Greenland Sea. **And the results of these tests have been compared with results of corresponding model tests, thus providing scale effects in wake and thrust deduction fractions, for the first time worldwide. These scale effects are the corner stones of reliable powering performance predictions.**

Please do not only refer to this fundamental, now historical work, but notice the various developments in the past thirty years documented in every detail on my website.

Quasi-steady tests have also been performed on model and full scale with the experimental air-cushion vehicle CORSAIR/MEKAT of B+V fitted with partially submerged propellers.

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'Incredible' practice


While earlier there has necessarily been a strong feed back between trials and predictions, at present the latter appear to be more or less 'self-contained'.

And as long as it is accepted practice, that the same 'people', who have produced the predictions, are procuring the standards and evaluate the data of trials based on the results of their own predictions, nothing will be changed.

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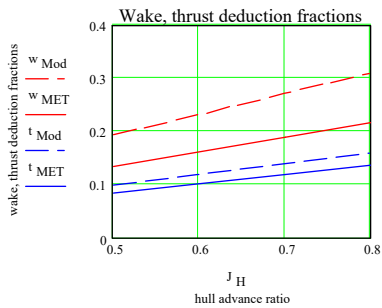
METEOR: Greenland Sea, November 1988



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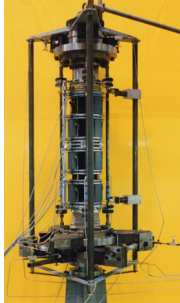
METEOR: Scale effects identified 1990



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METEOR: Shaft section calibrated



The 'new', hollow shaft section instrumented as 6-D balance and calibrated using hydraulically applied **joint (!) random loads in the range of full scale loads**, properly accounting for the deflections, the whole set-up designed and produced at VWS.

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2nd INTERACTION Berlin '93

Details of the measurement system and checks of its stability on board are to be found in the METEOR Report, which is included in the Proceedings of my 2nd INTERACTION Berlin '93', an international workshop dedicated to the METEOR project.

According to my latest insights based on the results of the 'model' trial of 1986 thrust measurements, full scale routinely impossible anyway, are not necessary for the detailed analysis of the powering performance.

Currently I try to find out, if the published METEOR results, based on the (to my knowledge) only reliable thrust measurements ever, are sufficient for the full scale validation of my procedure.

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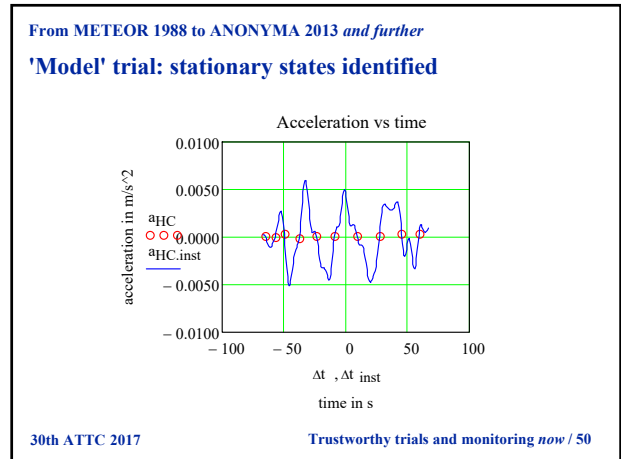
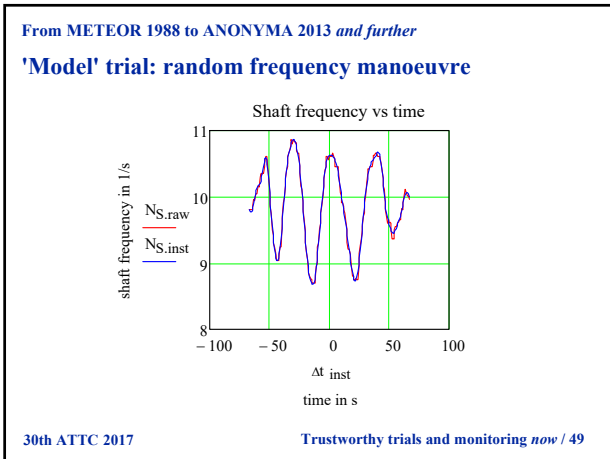
Quasi-steady 'model' trial 1986

The runs of my quasi-steady 'model' trial of 1986, performed prior to the METEOR tests to demonstrate the feasibility of quasi-steady testing, have been manually controlled, keeping the self-propelled model free of collisions under the towing carriage.

The raw data of shaft frequency, torque and thrust, of carriage speed and of model surge and frictional deduction acquired during a run of only two (!) minutes duration and documented in a report have been again and again been subject of my continued analysis, the 'last' revision published only recently.

Evidently such tests can be performed at any model basin requiring no extra instrumentation, time and costs. I wonder, who will be the first to take advantage.

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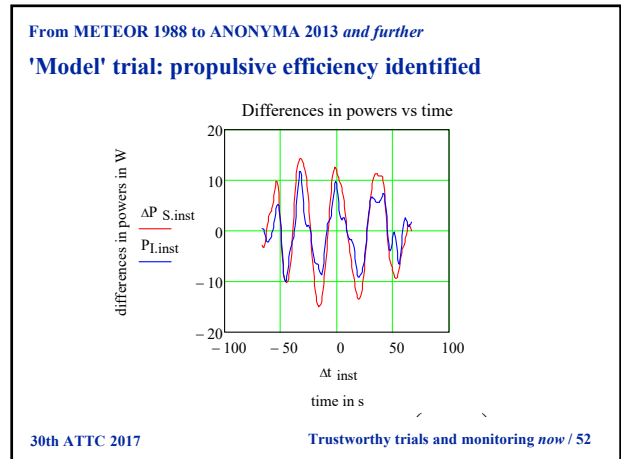
Quasi-stationary states identified

For the analysis of the raw data the application of the advanced numerical methods developed during the past decades and published in every detail is absolutely mandatory.

The example shows, that during the trial of only two minutes duration ten quasi-stationary states have been identified. Subsequently the data of hull speed through the water and shaft frequency, torque and thrust at these states have been analysed using the procedures developed for the analysis of traditional trials.

It turned out, that the identification of the small, though not always negligible current in the tank was much more difficult than at full scale tests, as the tidal period had to be identified.

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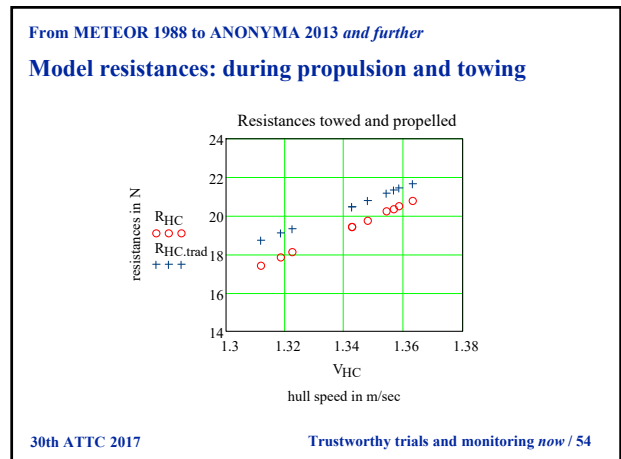
Propulsive efficiency identified ...

At the stationary conditions the supplied and required powers balance each other, but in general they differ and their difference differs from the inertial power of the ship and the surrounding water.

The ratio of the inertial power and of the difference of the powers supplied and required is nothing else but the propulsive efficiency. And with the values of that efficiency identified the values of the resistance of the model and of the thrust of the equivalent propeller outside the displacement wake at the quasi-stationary flow conditions can be derived.

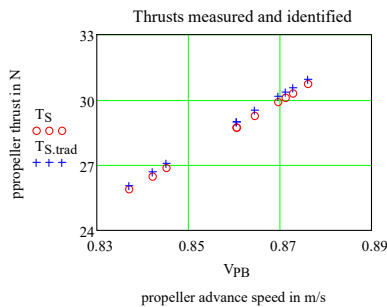
Further all details of the powering performance including the values of resistance and thrust, partial efficiencies and wake components have been derived after solving a nonlinear equation.

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Model thrusts: measured and identified



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Wake convention still under scrutiny

Following Horn I derived a thrust deduction theorem already in 1968 and later as an approximation a robust thrust deduction convention.

Lacking a wake theorem I pulled a corresponding, apparently reasonable, wake convention out of my hat, or rather out of my head, noticing only in hindsight, that I had evidently introduced a singularity.

Further, a student of mathematics noticed, that my 'engineering' ideas concerning the solution non-linear equations were much too naïve.

And at that stage I realised, that I tried to identify far too many parameters and returned to the favourite principle of engineers:

KISS: Keep it simple, stupid!

And I arrived at the solution published as the 'last' revision of 'model' analysis, still under scrutiny.

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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. ... 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.

Evidently leading persons are aware of the problems I have addressed, though here only in the very narrow, delicate field of trials. For the coverage concerning the fundamental field of 'Quantities', in German and French *not* less ambiguous 'Größen' and 'Magnitudes', respectively, I refer to my website.

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Repeated invitation to join forces

The 3rd, virtual INTERACTION opened on my website is a forum for the joint (!) discussion of and work on further developments and applications.

'Not invented here' is an extremely inefficient doctrine. In view of the related activities at various model basins I expect ITTC 'after all' to organise a Group Discussion on quasi-steady model tests and full scale trials and monitoring.

Of course anybody seriously interested in the solutions I have successfully developed to maturity and repeatedly applied in delicate cases, will have to try the solutions himself in his own environment. The large number of explanatory notes, I have published since 1980 for any taste, may be helpful, but:

The proof of the pudding is in eating it – yourself !

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Dare to think yourself!

Do not believe anybody, *not even me*, but stick to Kant's slogan of the 'age of enlightenment', less 'divine' in German 'Aufklärung' (1784): "*Sapere aude, dare to think yourself!*"

Reading my papers may endanger your 'principles', but it is never too late, to give up your prejudices!

"So when Pooh Bear experienced the burning pain of [removing] a bee sting, this symbolized the philosophical pain of discarding a cherished hypothesis. We note the unhesitating courage with which he performed this painful duty."

[Addition]: MS.

John T. Williams: Pooh and the Philosophers (1996/13).

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