DISCUSSION

VIRTUAL ARRIVAL: A REAL OPTION FOR ENERGY SAVING

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COMMENT

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Here is timely guidance for the ship operator when considering a strategy to avoid port delays. The case study also offers a commendably comprehensive template for those examining a specific ship and route.

A less specific, but potentially large benefit, from the avoidance of static periods awaiting a berth, is a reduction in fouling infestation and growth. There is a growing awareness of port congestion problems. A typical recent comment is in BIMCO (Baltic and International Maritime Council) Special Circular No3, June 2013:

"……transfer hull cleaning obligations to charterers where, as a result of their trading requirements and employment orders, a vessel is subject to a prolonged period of idling in port or at anchorage that results in fouling of the hull and underwater parts to an extent that may affect vessel performance,…..".

I am pleased that Ref 10 was of some help: it was designed for just this type of study. The Authors may find Reference [12] more accurate and more general but not more difficult to apply.

AUTHOR'S RESPONSE

We are grateful to **Dr RL Townsin** specifically for his comment about fouling infestation and in general for his helpful contribution to the estimation of weather effect on ship performances. One expression in his paper [12] i.e. "overriding need for a more rational method for estimating optimal service power margins at the preliminary and final stages" sounds very contemporary for 2013 and it is dated 1993!

For years, some traditional topics relevant to ship resistance like added resistance and hull/propeller fouling have been considered of negligible importance or sufficiently dealt with. Nowadays, such issues are gaining increasing interest for the implications they might have on the very hot topics of fuel consumption reduction and environmental impact evaluation of ships.
It is recognized that some margins of improvement are possible and the best results can be obtained with a combined action between decisions during the design process and the operational life of the ship.

The issue of fouling, definitely significant for a better efficiency, actually was far beyond our considerations in the paper, we didn't realized this particular aspect; we agree nevertheless that the slow speed might be preferable to the complete stop of the ship in the perspective of reducing hull and propeller fouling. The phenomenon of course may be more or less important in relation with the time of exposure, the geographical area, the sea water temperature and many other parameters. This issue may be taken into account in parallel with the major driving matters on fouling i.e. the suitable hull cleaning policy and the proper selection of the hull surface treatment in order to find out the best rationally based approach.

REFERENCES

12. R.L. TOWNSIN, Y. J. KWON, M.S. BAREE, D.Y. KIM "Estimating The Influence of Weather on Ship Performance" *The Royal Institution of Naval Architects* 1993 (originally published for written discussion but also presented to the North East Coast Joint Branch RINA/IMarE on 29 April 1993).

