A Concept Design Tool for Small Planing Craft

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Abstract
The past 50 years of planing craft design experience has yielded a wealth of information that can be used by today’s ship designers to match the correct craft to a given set of requirements. Unfortunately, employing all of this information during the concept design phase is a difficult task because the information has not been neatly compiled either in a publication or a software tool. Rather, the design methods and information are spread across academic and government literature, where just finding them can often be a challenge. Once located, the methods themselves are generally empirical and many questions arise as to their accuracy and range of applicability. Finally, applying the methods to a particular craft design in a consistent way that gives that designer a framework for making a decision is no easy task. The collecting of design methods, self-consistent application of methods in a particular craft design, and construction of a decision-making framework was the goal of the software tool that has been created. How each of these three objectives has been achieved is presented here for the scrutiny of the ship design community.

Introduction
Absent from the concept design of small craft is a methodology for comprehensively evaluating potential designs against a set of owner’s requirements. The ability to capture more of the craft’s capabilities or limitations in the early stages of design would allow the designer to foresee problems and either correct them or seek the owner’s wishes for trading-off capabilities. The design methods that are available in the literature offer the designer this ability. However, these methods are not easily utilized because the calculations require quite a bit of specific information, mainly about the hull geometry and loading. Therefore any variation in the geometry or loading necessitates a repetition of the entire set of calculations. This quickly becomes an unattractive prospect for a designer, especially when weighed against the accuracy of a particular method and considering that the calculation in itself is probably not enough information upon which to base a decision.

Ideally the designer would like to have the ability to see how changes in craft dimensions would change a number of characteristics that are quite easy to calculate. These would be things like draft, max beam, length overall (including outboard machinery), etc. Though simple, these calculations can be computationally involved and care must be taken that a design change is consistent in the sense that the new variant still meets the design requirements and is feasible. It is often these calculations that influence the effectiveness of a design. For example, if a craft exceeds a certain length overall, then it may be very difficult to transport and therefore not very effective even though it is only a few inches longer than another craft of similar capabilities.

1 Presented at the New England Section of The Society of Naval Architechts and Marine Engineers “Student Papers Night,” 8 February 2007.
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