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Title: The Benefits and Cost Impact of Aluminum Naval Ship Structure

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Abstract: Due to a growing diversity of mission requirements and budget pressures, the US Navy is in need of affordable and re-configurable small ships. This paper presents an acquisition and total-life cycle cost comparison of steel and aluminum ships. A common perception is that aluminum ships cost significantly more than steel ships. This paper illustrates that even though the cost of the aluminum structure is over 40% more than the steel structure, an "equivalent" aluminum naval ship can be built within 7.5% of the acquisition price of a steel ship. This is possible because of the cascading benefits of the aluminum ship's significantly lighter weight. Aluminum ships also have a life-cycle cost advantage over steel ships because of reduced maintenance and fuel cost savings. Advances in aluminum materials, design approaches, and manufacturing technologies as well as new facilities in the shipyards for aluminum production are improving the cost of aluminum ships.

Keywords: Aluminum, structure, welding, naval ships, small frigate, design, weights, cost.