

Accuracy Control Risk Management for Modular Submarine Hull Construction

by

William J. Brougham

Submitted to the Department of Ocean Engineering
in Partial Fulfillment of the Requirements for the Degrees of Naval Engineer and
Master of Science in Mechanical Engineering

June 1999

Abstract:

Modern submarine production, specifically hull fabrication, consists of numerous processes with inherent variations. These variations stem from such areas as: manufacturing methods, alignment techniques and datum control, material properties, measurement methods, cutting and forming practices, and others. Each process adds a level of complexity and variation to the end product. The current method of production uses lessons and knowledge from past experience to arrive at an acceptable finished hull section, ring cylinder, or related subsection. This practice requires significant resources (labor, time, and material) and may not be an optimal methodology. A better understanding of the existing process, via a systematic critical understanding of current practices and the identification of those Key Characteristics (KC) proven to be essential to high quality, may enable process improvement efforts and a favorable return on investment (ROI). These positive results can only result after gaining a thorough understanding of in-place practices and comparison with industry experience and “best practices.”

The ultimate use of this effort is founded in the KC methodology presented. This technique can be readily applied to other manufacturing processes within the submarine fabrication setting as well as other ship and industrial settings.

Thesis Supervisor: Anna Thornton
Title: Assistant Professor of Mechanical Engineering