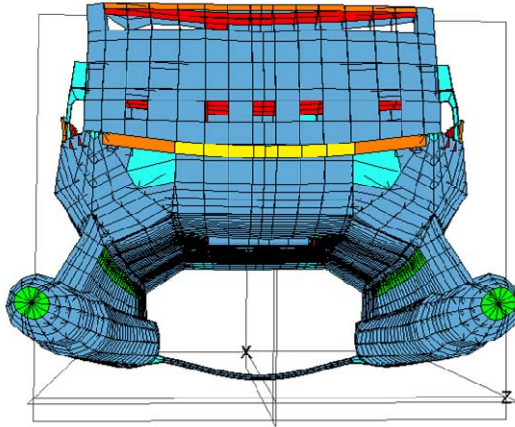




Structural Design and Analysis

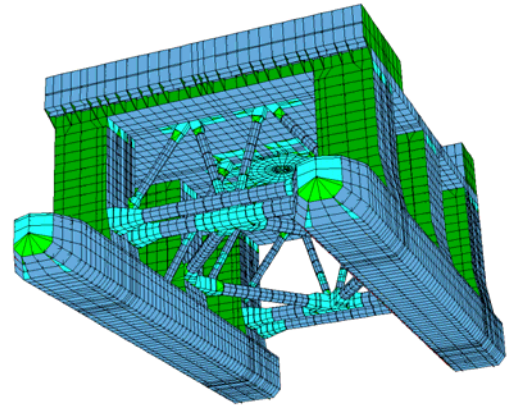
The Glostén Associates offer a full range of structural analysis services for marine applications. Analysis is performed to classification society rules (ABS, Lloyds, DnV, etc.) and also utilizes first principles methods.

Dynamic Loads Analysis (DLA)



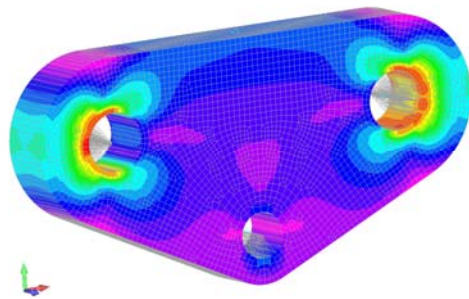
Global prying response of swath hull, as modified by the addition of an underwater strut. Our dynamic loads analyses use the equivalent regular wave method (ABS method) or equivalent irregular wave method (a Glostén development).

Finite Element Analysis (FEA)

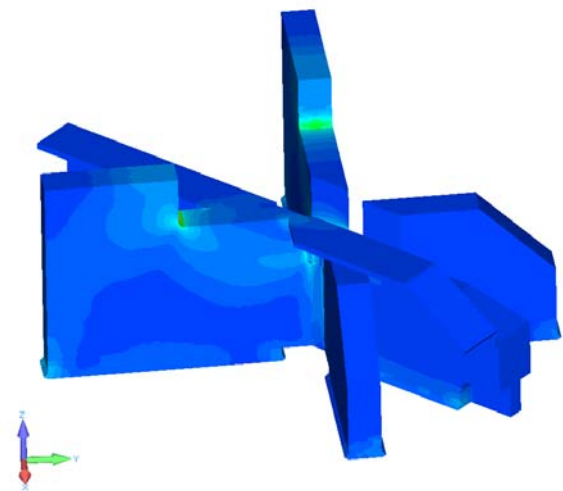


Model for a semisubmersible. Plate type structures are analyzed using MAESTRO and NASTRAN, with pre- and post-processing using FEMAP.

Fatigue Life Assessment of Mooring Elements



Stresses are shown in an anchor chain connector plate for fatigue life assessment. Classification societies require fatigue assessment of key elements in "permanent" mooring systems.



Model of stresses in an FPSO permanent mooring chain stopper.

Spectral Fatigue Life Analysis

Spectral fatigue life analysis is a more rigorous finite element stress analysis method which meets the growing need of evolving and unique designs. This approach is a rational analysis procedure for evaluating fatigue life related to local cracking of ship structures.

Crack Growth Analysis

Glosten conducts crack growth analysis using the Paris Law and generalized harmonic process loading.

Hydroelastic Structures

Glosten has developed unique in-house code for analyzing floating bridges and floating breakwaters, where the scale of the wave systems are small compared to the scale of the structures.



The first Hood Canal floating bridge failed in a storm in 1979. This led Washington DOT to seek new tools for analyzing the environmental loads on these structures, which Glosten first implemented in 1983 for the design of the third Lake Washington bridge. This work is ongoing today for proposed replacement structures.

Evaluation of Damaged Structures



*Ship Breakwater
Damaged by Boarding Seas*

Glosten has analyzed the dynamic response of Washington State's floating bridges for: condition appraisals, new design verification, refurbishments, maintenance planning, and operations guidance. For each of the State's bridges, the combined effects of steady wind, current, steady wave drift forces, and first order harmonic wave forces have been evaluated. Unsteady wind loads and slowly varying wave drift forces have also been applied.

Due to the slenderness of the bridge spans, the bridge responds as an elastic body. Glosten has developed highly efficient methods for the frequency domain analysis of hydroelastic problems of this type. The extensive analysis work we have accomplished for the State of Washington has contributed to cost effective improvements in safety, reliability, operations, and maintenance of the floating bridges.