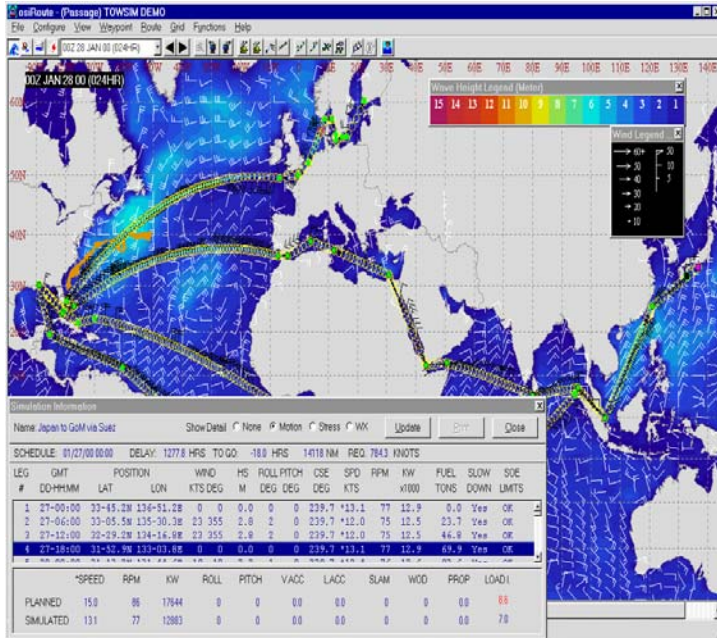


Tow Simulation System (TOWSIM)

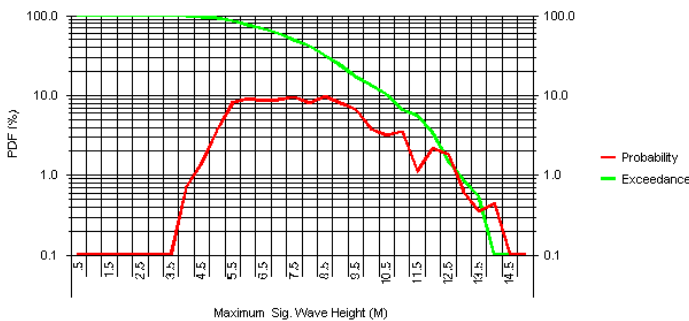


Trans-Ocean Tow Criteria

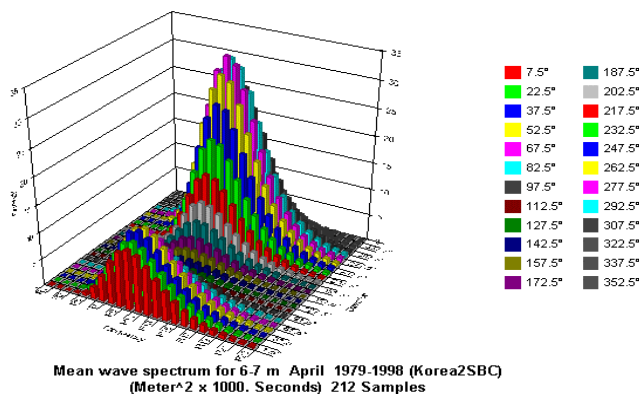
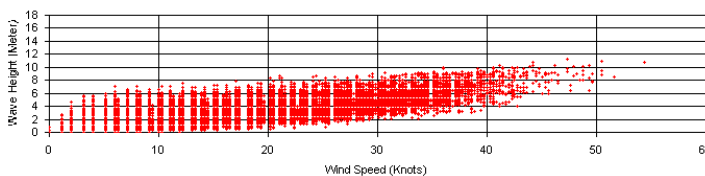
Based on Ocean System's proven Vessel Optimization and Safety System (VOSS) and Oceanweather's 30+ year global wind and wave hindcast (GROW 2000), TOWSIM is a tool to develop Trans-Ocean Criteria for transporting offshore structure on a barge, towing an FPSO, drill ship and other floating vessel.

- Custom tailored modeling of the barge or self propelled ship are used to predict vessel speed performance and motion responses in wind and waves.
- 30+ years of validated Global wind and wave hindcast database including tropical cyclones.
- Detailed wind, sea and swells information on a 0.625 by 1.25 degrees latitude and longitude grid.
- Simulates user specified route with departures every 6/12/24/48 hours. Monthly statistics are compiled up to 20 years.
- Applications include new ship/deployment design, METOCEAN criteria for tows, structural fatigue assessment of second-hand ships, voyage charter fuel/duration estimates, charter party speed claims and other insurance related investigations.

Passage MaxWaveHgt February 1979-1998 (Korea2SBC)



Hs vs Wspd October 1979-1998 (Korea2SBC)



Monthly Exceedance and PDF

Maximum Vessel motion responses, encountered environmental conditions, trip duration etc. for each simulated passage are saved and compiled to show statistics:

- Monthly Exceedance and Probability Densities are plotted on a log scale from 100% to 0.1%.
- Number of samples, probability density, cumulative and exceedance probabilities are presented in tabular format.
- Both plots and tables are saved on disk and can be printed or imported into other programs for further analysis.

Scatter Diagrams and Spectra

Enroute conditions such as wind speed, direction, sea, swells height period and direction, vessel pitch, roll angles, vertical, lateral accelerations on 6 hourly intervals for each simulated passage are also saved and compiled to show statistics:

- Monthly Wind Speed vs Wind Direction, Wind Speed vs Significant Wave Height (Hs), Roll vs Pitch angles, Vertical vs Lateral Accelerations, Hs vs Peak period are plotted as scatter diagrams.
- Joint probabilities and total number of samples are presented in tabular format.
- Unique mean directional wave spectra grouped within 1 meter interval of significant wave heights are compiled from sea and swell parameters and shown by 3-D plots as well as 2-D wave energy tables. This is particularly useful for fatigue and long term response predictions
- Both plots and tables are saved on disk and can be printed or imported into other programs for further analysis.

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