

## Dynamics of the Moving Ship at Complex and Sudden Impact of External Forces

**Authors :** Bo Liu, Liangtian Gao, Idrees Qasim

**Abstract :** The impact of the storm leads to accidents even in the case of vessels that meet the computed safety criteria for stability. That is why, in order to clarify the causes of the accident and shipwreck, it is necessary to study the dynamics of the ship under the complex sudden impact of external forces. The task is to determine the movement and landing of the ship in the complex and sudden impact of external forces, i.e. when the ship's load changes over a relatively short period of time. For the solution, a technique was used to study the ship's dynamics, which is based on the compilation of a system of differential equations of motion. A coordinate system was adopted for the equation of motion of the hull and the determination of external forces. As a numerical method of integration, the 4<sup>th</sup> order Runge-Kutta method was chosen. The results of the calculation show that dynamic deviations were lower for high-altitude vessels. The study of the movement of the hull under a difficult situation is performed: receiving of cargo, impact of a flurry of wind and subsequent displacement of the cargo. The risk of overturning and flooding was assessed.

**Keywords :** dynamics, statics, roll, trim, vertical displacement, dynamic load, tilt

**Conference Title :** ICNH 2018 : International Conference on Naval Hydrodynamics

**Conference Location :** Paris, France

**Conference Dates :** August 27-28, 2018