

# Tank Sloshing Optimization

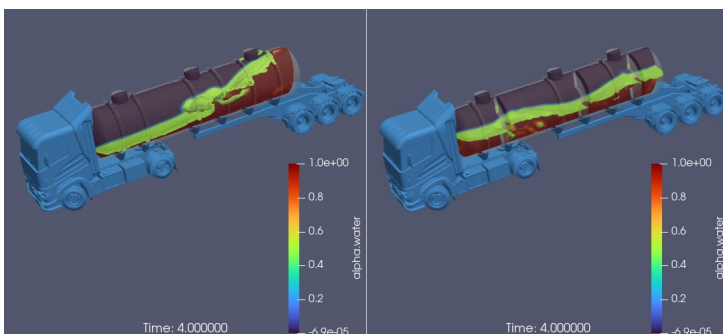
At SynergySim, we have demonstrated a proven expertise in designing and analyzing fluid motion and its effects on overall systems. Our team utilizes cutting-edge fluid flow simulation techniques to optimize designs for peak performance. With a comprehensive understanding of fluid dynamics, we tackle the unique challenges of fluid flow, providing solutions that are both innovative and reliable. Below is an example of our work in optimizing tank sloshing for transport truck.

## Project Overview

In this Project, Engineers at SynergySim Engineering Solutions optimized the design of liquid storage tanks in transport trucks to minimize the adverse effects of tank sloshing. By leveraging advanced fluid dynamic simulation, we improved stability safety and efficiency of the tank system during transit. Our goal was to reduce the impact of liquid movement, prevent necessary strain on the vehicle structure and enhance the overall performance of the transport truck. ®

## What can we expect?

- ⇒ Reduced Slosh amplitude
- ⇒ Reduced pressure fluctuations
- ⇒ Better stability with efficient fluid handling
- ⇒ Increased structural integrity
- ⇒ Enhanced safety



## Key Highlights

### Challenges

- Hydraulic instability: One of the primary challenges in tank design is mitigating excessive movement of liquid leading to unpredictable forces that can destabilize the system.
- Structural Integrity: The forces generated by sloshing can cause significant stress on the tank walls leading to damage and deformation causing safety hazards.

### Approach

- Fluid Flow Simulation: Utilization of a state-of-the-art CFD tools to simulate the liquid motion within the tank under various transportation conditions such as acceleration, deceleration and turns.
- Baffle Design and Optimization: We evaluated the structural integrity of the manifold, identifying and addressing potential points of stress concentration.

### Outcome

- Safety Risk Evaluation.
- Optimized Simulation driven Tank/Baffle design.
- Structural Impact Assessment.
- Prediction of Fluid movement.