The Hamburg Ship Model Basin (HSVA)  
Our Services for Your Business

Dr. Janou Hennig (Managing Director)
HSVA

- Research based services for the maritime industry
  - Model tests in calm water, waves and ice
    - Models up to 10 m length
  - Numerical calculations and simulations (CFD)
  - Design and analysis
  - Full scale investigations
HSVA in brief

- Private, self supporting company, founded in 1913
- 20 shareholders: shipyards, ship owners, supplying industry and a classification society
- 100 employees
- 10-13 million € turnover per year
- 85% commercial orders
- 15% research:
  - EU framework programs
  - National programs (D)
- Strong network with clients, universities and research institutes
Services

- Resistance & Propulsion
- Seakeeping, Manoeuvring & Offshore
- Propellers & Cavitation
- Computational Fluid Dynamics
Arctic Technology

- Ice breaking tests, ice forces on offshore structures (model/full scale)
- Brash ice tests
- Model tests of ships and offshore structures in ice and waves
- Environmental tests (marine biology & chemistry, oil spill scenarios)
- Know-how transfer (hydrodynamic, testing technique)
- Sea and ice trials, expert witness and expert opinion
- CFD-calculations for ice breaking resistance
- Simulation of operational procedures in ice, ice management tests, feasibility studies
- Development of ice protection structures
- Investigation of rescue vessels for vessels and offshore structures in ice
- Simulation of various ice conditions (level ice, rafted ice, ice ridges, ice rubble fields, brash ice)
Large Ice Tank
Proposals for Master Thesis
1 – Discrete Element Method in Ice

• Simulation of Ridge Breaking
1 – Discrete Element Method in Ice

- Tool under development at HSVA
  - ships and offshore structures
  - physical modelling of interactions
  - up to 2000 elements
1 – Discrete Element Method in Ice

- Simulation of Ridge Breaking
  - Video:
1 – Discrete Element Method in Ice

• Proposals for Master Thesis
  – Validation and calibration
    • Ice test results
    • Model enhancements

![Ship Velocity During Ridge Breaking](image)
1 – Discrete Element Method in Ice

• Proposals for Master Thesis
  – Validation and calibration
  – Ice breaking simulation
    • Breaking forces
    • Geometry of broken pieces
2 – Ship Performance in Brash Ice

- DEM for Brash Ice
  - Up to 100,000 elements
  - Simplified interactions (spheres)
2 – Ship Performance in Brash Ice

• Proposals for Master Thesis
  – Detailed evaluation + experimentally-based calibration
2 – Ship Performance in Brash Ice

• Proposals for Master Thesis
  – Detailed evaluation
  – Improvement of Brash Ice Model + Code Enhancement
    → Ice-ice interaction model, GPU Computing,...
Looking forward to talking to you soon!