The Marine Technology Centre

Department of marine technology
Department of marine technology: History in brief

- 1910  NTH: Norwegian Institute of Technology
- 1913  First professor in Naval Architecture  (1-4 students)
- 1939  Ship towing tank completed  (10-30 students)
- 1972  Faculty of Naval Architecture  (60 students)
  - But: Shipbuilding in Norway dramatically reduced
  - Oil activity in the North Sea growing
- 1978  Faculty of Marine Technology  (60-80 students)
  - Marine technology Centre
  - Machinery laboratory; marine structure laboratory
- 1996  NTNU started  (100 students)
- 2002  From "Faculty" to "Department of marine technology"
Key figures 2005
(Sentre of Excellence not included)

- Academic (full positions) 27
- Staff incl. laboratories 21
- PhD students 36
- Post.doctorates. etc 4
- Ordinary MSc students (each year) 70-80
  International MSc students 4
- Nautical students 2

Largest marine technology department in Europe/USA
MSc candidates

- 2003: 71
- 2004: 78
- 2005: 82
International MSc programs (two-year programs)

- Marine Structures and Hydrodynamics
- Marine Systems Engineering
- Marine Control Systems
- Nautical Science
Continuing education

Courses given 2003-2005:

- Maintenance management, systems and methods (2003) 8 students
- Maintenance management, systems and methods (2004) 7 students
- Leak stability of vessels (2004) 9 students
- Analysis and design of marine risers (2005) 14 students
PhD studies
(Excluding Centre of Excellence)

• PhD students 2005: 36

• PhD candidates:
  • 2003: 6
  • 2004: 3
  • 2005: 4
Two divisions

- Marine structures
  - Marine structural engineering
  - Marine cybernetics
  - Marine hydrodynamics
- Marine systems
  - Marine engineering
  - Shipbuilding
  - Design
  - Operation technology
Laboratories

- Ocean laboratory (50x80x10 m)
- Towing tank (230 m)
- Student towing tank
- Cavitation loop
- Structural laboratory
- Machinery laboratory
- Marine Cybernetics laboratory
The Ocean Laboratory
The Towing tank
The Marine Structures Laboratory
The Machinery Laboratory
The Student tank
Marine Cybernetics Laboratory
Division: Marine structures

- Marine structural engineering
- Marine hydrodynamics
- Marine cybernetics
Ship structures
Global model of a container ship

The Finite Element Method

Local model for detailed stress analysis
Loads under extreme conditions
Testing of a catamaran in ocean laboratory, hydroelasticity
Dynamic testing of flexible riser
Offshore oil and gas activity
Marin cybernetics

Marine technology
Control theory
Computer science
Department: Marine systems

- Marine engineering
- Shipbuilding
- Design
- Operation technology
- Fishing and aquaculture technology
Marine engineering

- Gas and diesel engines
- System engineering
- Operation
- Maintenance
Combustion engines
Shipbuilding; students visiting a shipyard
Marine archaeology
International relationships

- Agreements with universities in USA
  - MIT
  - University of Michigan
  - UCAL - Berkeley
  - New Orleans

- Cooperation with universities in other countries
  - European network for student exchange
  - The WEGEMT network
  - Singapore National University

Our students can have up to one year stay
Sabbatical year for professors
International relationships (cont.)

- **National University of Singapore** - annual courses:
  - Design of Offshore Structures
  - Ultimate Strength of Marine Structures
  - Marine Control Theory
  - Fatigue and Fracture of Marine Structures

- **Technical University of Delft** - integrated programs 4th year:
  - Naval Architecture
  - Shipbuilding
  - Marine Engineering
Strong relationships with SINTEF group

- Joint operation of laboratories (MARINTEK)
- Most professors are scientific advisors to MARINTEK and take part in project activities
- Co-operation on PhD programs, thesis work, etc.

GEMINI centra:
- Marine Structures
- Fishing and Aquaculture
Strategic University Programs (NFR and industry)

- Scenario-based risk assessment of ship collisions and groundings (Prof. Jørgen Amdahl)

- Computational Fluid Dynamics (Prof. Bjørnar Pettersen)

- All-Electric Ships (Prof. Harald Valland)
Centra

- Centre of Excellence: Ships and Ocean Structures (Prof. Torgeir Moan)

- University Technical Centre - Performance in a Seaway: Rolls Royce - MARINTEK - NTNU (Prof. Sverre Steen)

- Gemini Centra:
  - Marine Structures (Prof. Stig Berge)
  - Fisheries and Aquaculture Technology (Prof. Anders Endal)
Centre of Excellence: Ships and Ocean Structures

Located at the Department
Key personnel: 8 professors from three departments
• 50 scientists
  - 35 PhD students

• Four professors from Dept. of Marine Technology
  - A majority of the PhD students work with Marine Technology
Norwegian Research Consil; Centre of Excellence: Ships and Ocean Structures

Relevance to Norwegian Industry

Principle Research Areas

Integration of Disciplines and Research Tools

Sea Transport
Fisheries and Aquaculture
Oil and Gas

Ships

Ocean Structures

Structural Mechanics

Theory
Automatic Control
Hydrodynamics

Experiments
Department of Marine Technology

Offshore oil and gas

Fisheries and aquaculture

Ships

Thank you!