

Annual Report 2002

## Simulations that combine new technology with accumulated knowledge



Petroleum production at ever greater depths and navigation in critical waters are activities that challenge our ability to deal with risks and to take care of valuable assets. Good planning is essential for optimal design and operation. The verification of structures and operations has been an aspect of the “art” of engineering for many years. The more complex the structures and operations involved, the more essential become thorough planning and verification processes.

Model trials used to be one of the methods used to verify designs. In shipbuilding, we know of ship models being

tested in Britain as far back as the late 1700s. Such trials are still an important element of studies of physical phenomena, but nowadays they are used just as often to calibrate and verify theoretical models. Nowadays, these models are run on computers, and modern graphical interfaces make it a simple task to extract relevant information from mathematical models.

Recent developments in communications and computing technology have also made it easier to integrate numerical programs that each describe individual physical phenomena. When this ability is combined with the latest methods of visualisation, we have an integrated system capable of modelling a complex world in real time, i.e. one that has the ability to simulate large, complex systems built up of networks of numerical motors, which are often the result of many years of development and verification of each individual sub-system. The point of such networks is to enable us to study the global effects of changes in a single sub-system.

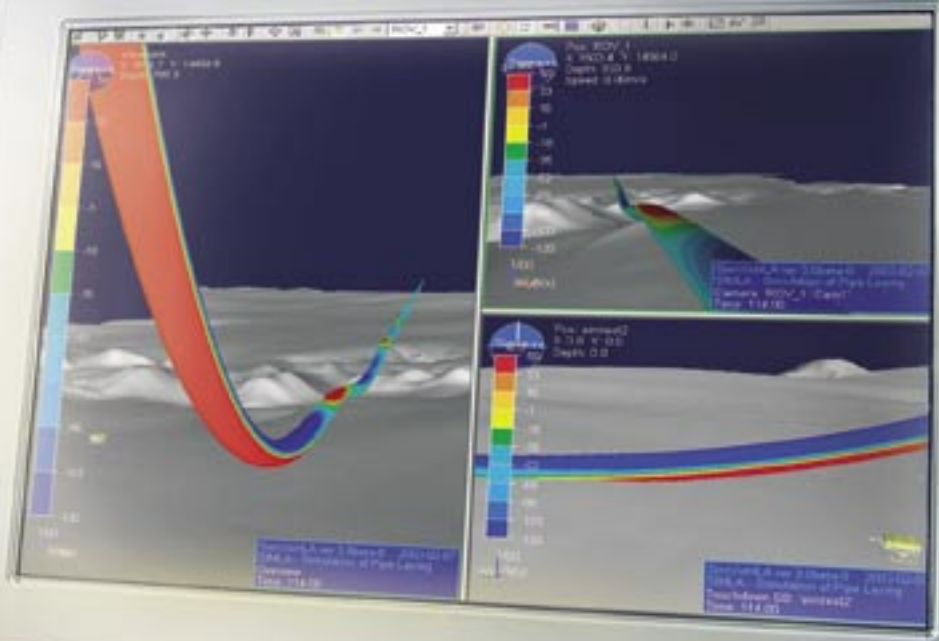
The results of such simulations can be utilised to study the consequences of special occurrences in the course of an operation, or to optimise a particular component that is being integrated into a wider context. They can also be used to train the personnel who will be performing such complex operations, so that they will be prepared for any consequences of wrong actions.

MARINTEK is capable of launching systems for marine and offshore applications, in which simulation methods of this sort will be of great benefit for our clients and users of our technology.

Follow us into a future based on new technology combined with sub-systems that have been thoroughly verified in our laboratories.

A handwritten signature in black ink that reads "Oddvar Aam". The signature is written in a cursive style.

Oddvar Aam  
President





## Simulation of offshore marine operations and pipelaying

In 2002, MARINTEK developed real-time simulators for complex marine operations. This has been done in cooperation with Norsk Hydro, which has financed the project, and the computer graphics companies Ceetron AS and Systems in Motion.

### Stricter demands for safe subsea operations

The number of marine operations being carried out all over the world is growing. This is specially true of petroleum-related operations, where exploration and recovery at great

depths offer the greatest challenges, first and foremost because of changing current and wind conditions. Since many deepwater discoveries are both technically and economically marginal, very stringent safety standards requirements at all stages of these activities are set. There is no room for trial and error during such operations.

The ecosystem in northern waters, off Northern Norway and in the Barents Sea has less capacity for regeneration after damage than more southerly environments. Opening up these areas to petroleum activities could be dependent on stricter requirements

for documented protection against emissions and accidents in general.

Maintenance and tail-end production of existing fields at moderate water depths will also require a high level of marine operations. Basic requirements regarding higher safety standards, short down-times and reduced costs are leading operators to seek new methods and improved equipment that will enable them to perform operations using smaller, less expensive vessels.

Aquaculture, marine mineral exploitation and offshore energy generation are also experiencing a growing need for advanced, safe marine operations.

### Operation planning

Subsea equipment installation is extremely weather-sensitive, due to the effects of major wave forces. At great depths, currents are another limiting factor. Important savings can therefore be made by developing methods and equipment that will reduce dependence on the weather and make it possible to document that an operation can be carried out safely. This will involve being able to predict accurately what extreme loads are acceptable, while the order in which actions are performed must be robust, so that any expected or unexpected problems that occur in the course of the operation can be corrected for.

To date, the methods that have been employed in preparations for demanding operations include carrying out model tests of selected situations which are regarded as potentially critical, with the aim of documenting dynamic behaviour and associated loads on equipment and structures. As an alternative, or even in addition, numerical analyses are performed using recognised software packages. These methods are combined with a Safe Job Analysis to reveal potential problems that are not covered by the model tests or the numerical analyses themselves.

## Simulator development

Simulator technology is a well-proven resource in military contexts, ship-handling and aviation. It has now been developed for and adapted to marine operations, including demanding surface applications that involve heavy loads and extreme accuracy demands, as well as underwater operations.

A simulator may consist of a number of PCs in a network. The numerical calculations are performed by standard versions of MARINTEK's state-of-the-art analytical software. An advantage of this is that all future functional upgrades of the software will be available to the simulator. The system generates real-time graphical displays, in 3-D and with the potential for stereo vision. The simulator also includes user interaction software as well as a logging function for documentation and debriefing purposes.

So far, the simulator has been developed for three operational scenarios; lifting operations, flexible riser replacement and pipelaying.

## Lifting operations

The first lifting operation to be simulated was the installation of a process module on the deck of a floating production platform. The module is so heavy that the platform lists when the weight of the module is transferred from the crane to the deck. This means that the transfer takes much more time than it would have done if it was being transferred to a fixed platform, and the ship motions in the waves produce heavy impacts against guide beams and foundations. The objective of the simulation in this case was to familiarise the platform crew with the operation and the abnormal listing movement, as well as to test the effects of various winch manoeuvres on impact forces and listing.

When complex subsea production systems are being installed at great



A heavy lift operation being tested by means of models and simulator.

depths, the simulator will be capable of being used to select the best of a number of potential installation sequences, to identify the operational limitations of the equipment and to train operators in accurate positioning procedures under difficult current conditions.

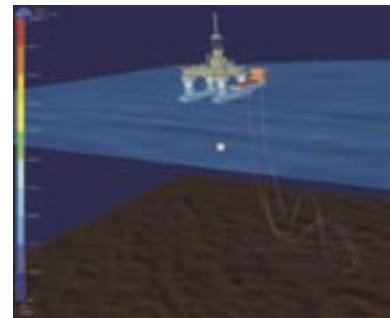
The simulator provides quality-assured analyses of all stages of the operation, including vessel dynamics and loads. Both heavy lifts in air and installation on the seabed can be simulated. Forces in lifting cables and all the contact forces on guide piles, bumpers and docking elements can be estimated.

## Flexible riser replacement

Floating platforms are connected to the production units on the seabed by flexible risers, which are installed very close to one another. It has turned out to be necessary to replace a number of risers on certain fields. The major challenge is to avoid damage due to contact with neighbour risers or with the platform's mooring lines during the operation. This demands very precise manoeuvring of the work vessel, with continuous monitoring of the riser and the lines. Certain phases have to be carried out by means of stepwise movements of the platform and the vessel.

Both the need for great accuracy and uncertainty as to how the operation can best be performed and monitored by ROV indicated a need for preliminary studies and simulator training.

The simulator is capable of going through all critical stages of the operation, including the motions of the vessels involved, the risers themselves and the mooring lines. The best positioning of the ROV can be determined during the training process.

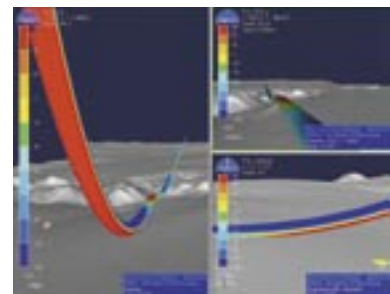


Replacing flexible risers, as shown by simulator.

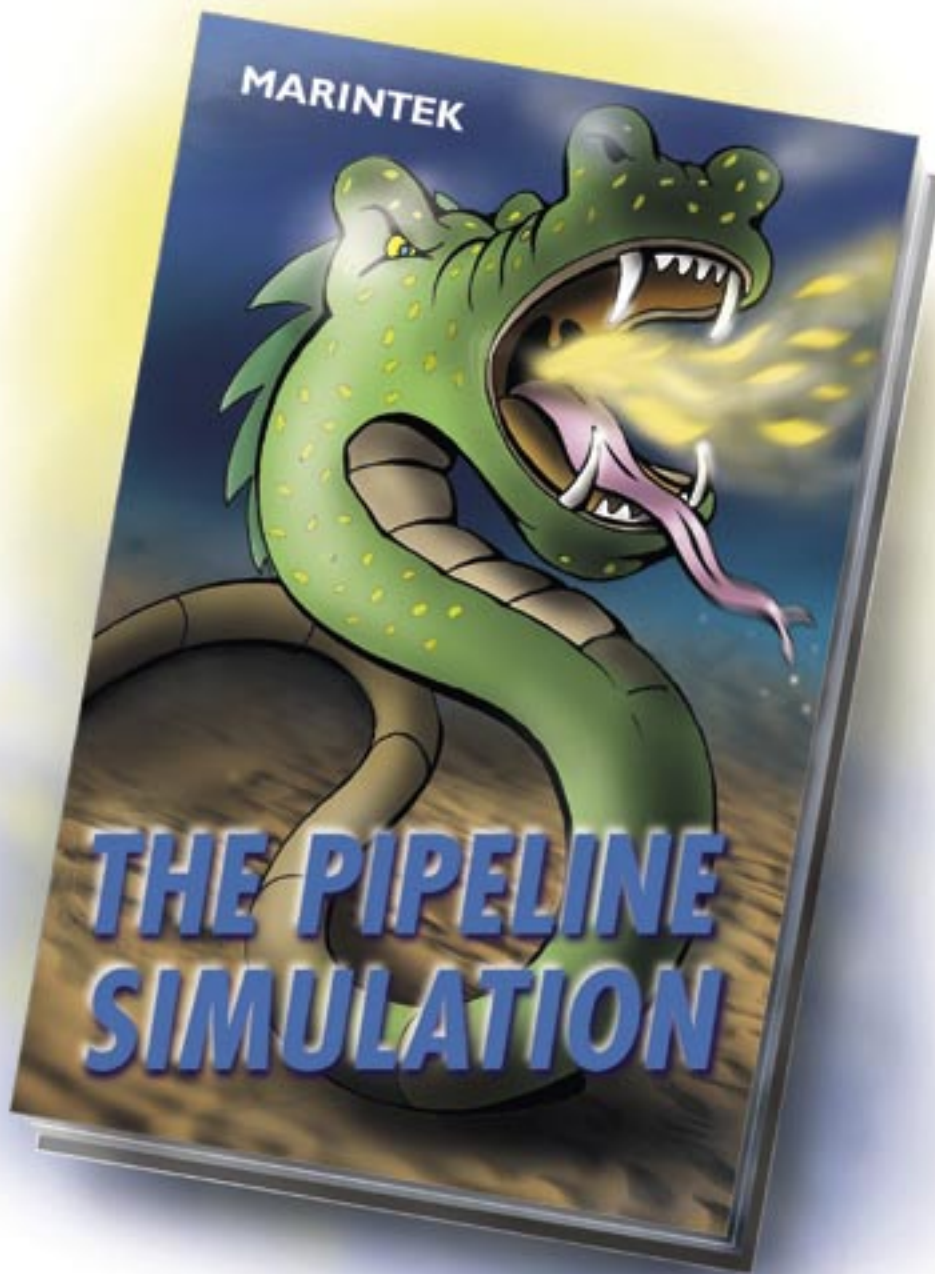
## Pipelaying

In recent years, more and more pipelines have been installed on uneven seabeds, both in deepwater fields and in the inshore zone, while production temperatures in the reservoirs have also been increasing. This trend is continuing in new field developments.

Constructing cost-effective pipeline systems for transporting well flow in regions where the seabed is uneven and production temperatures are high requires new work procedures. The use of more advanced analytical methods in combination with a revised regulatory framework



Simulation of pipelaying operation over uneven seabed. The colour coding shows local stresses in the pipewall produced by stretching and bending forces and external pressures.



would offer significant savings. The probability of failure as a result of temperature or pressure gradients could be evaluated more accurately if such methods were adopted, and this in turn would reduce the need for seabed intervention.

Because of the high degree of uncertainty regarding loads and limiting conditions (currents, and interactions between pipeline and seabed), and because new pipeline concepts are being planned for new fields, new methods and tools will probably be required when new field developments are being planned. Tools of this sort will be essential for selecting the optimal pipeline route, while they will deal with the regulations and take environmental considerations into

account in a safe and professional manner.

SIMLA is MARINTEK's new analytical tool for deepwater pipelaying on uneven seabeds. The idea behind the development of SIMLA was to create a tool that would be capable of estimating the structural response of a pipeline during its installation along a planned route, and to study the installation process by means of 3-D visualisation of the pipeline during installation on a "digitalised seabed".

If desired, the results of the laying analysis can be presented in the form of colour coding on the pipe surface, and the visualisation module also offers users the possibility of inspecting free spans and measuring distances.

## Subsea intervention

More and more fields on the Norwegian and foreign continental shelves are being developed using subsea process technology. Although this produces definite advantages, it also has its limitations and causes a number of challenges. Some of these are related to the limited possibilities of performing efficient subsea interventions.

Subsea intervention demands the close integration of maintenance procedures and marine operations. The service vessels that are used in such maintenance operations are affected by environmental factors that limit the performance of interventions to clearly defined weather windows. An ability to analyse interactions between marine operations and planned maintenance activities is therefore essential for good overall economic performance.



Subsea interventions present operational challenges.

MARINTEK is continuously active in the development of solutions for dealing with such problems. This work involves, among others, the knowhow and experience that we have gained in the course of planning the operation of the Columbus module of the International Space Station for the European Space Agency (ESA).

## Simulations of marine vehicle operations, control and monitoring systems

MARINTEK has been systematically building up a centre of expertise in the field of system integration and simulation technology, combined with top-level competence in cybernetics, hydrodynamics and marine vehicle operations.

Our experience and databases, derived from the development and testing of all types of vehicles for many years, both as models and at full scale, are important aspects of these efforts.

The Research Council of Norway supports the competence development process via a Strategic Institute Programme called "MS Nautilus", to which the maritime industry also contributes.

### Simulating complex operations at sea

Monitoring our marine resources, offshore installations and rescue operations at sea will be high-priority areas in the future.

In 2002, we worked on several different types of operations at sea:

- Rescue operations, lifeboat testing, operation of rescue boats for the US Coastguard, Norwegian operating companies and shipyards.
- Operations in narrow, shallow waters and strong currents, underwater topography, underwater reefs, etc.
- Several vehicles in close mutual vicinity, lightering, load transfer at relatively high speeds, etc.
- Extreme sea and weather situations, including damaged ships.

The above scenarios are highly relevant for both the civilian sectors and the Norwegian navy.

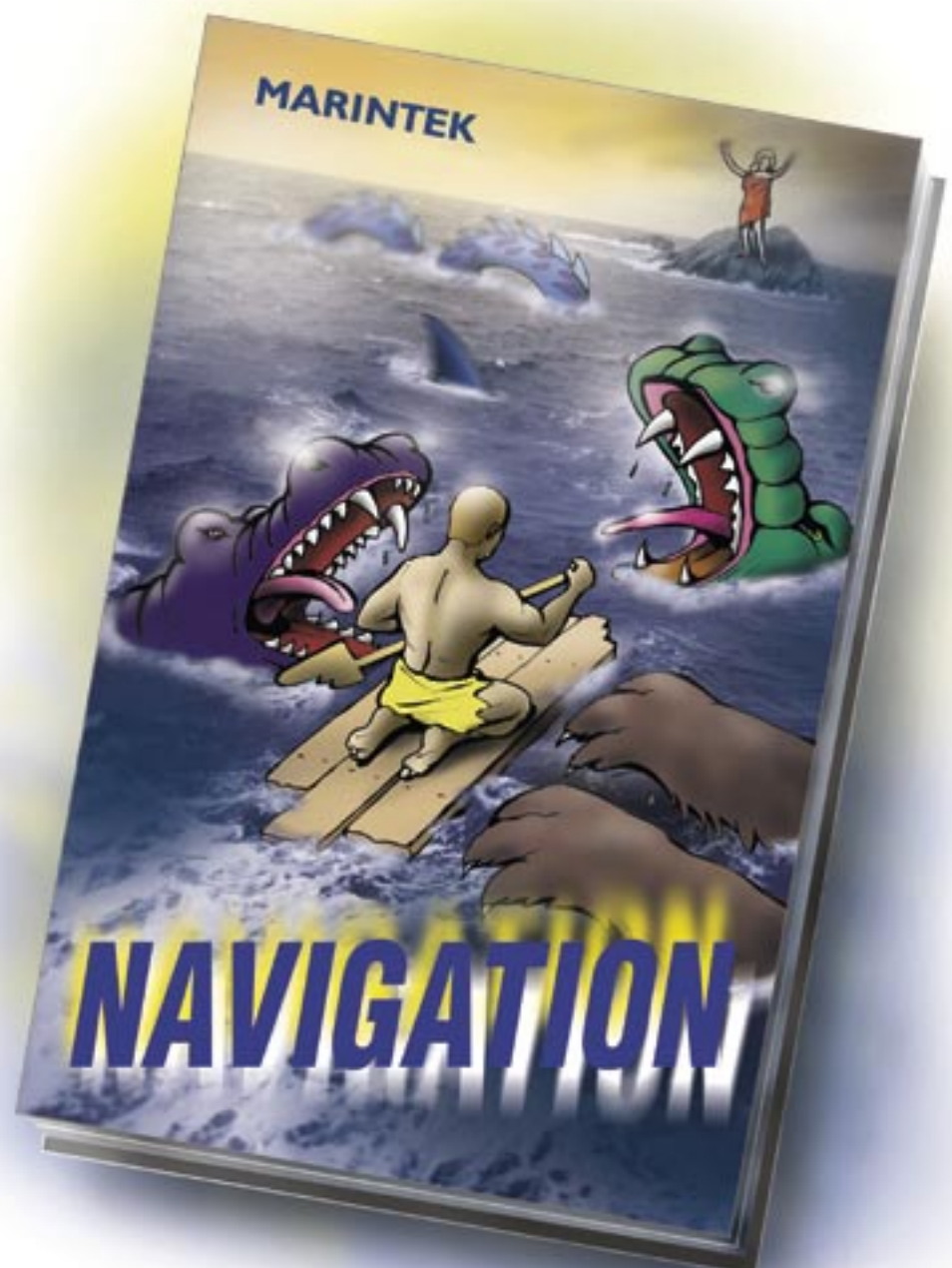
Cooperation with the Royal Norwegian Navy, among other clients, has given us the opportunity to learn technologies that deal with simulator architecture and infrastructure, in which we link our theoretical methods and physical models to other available visualisation and user interface products.

MARINTEK has taken part in a major project in which several large-scale multinational simulation tasks are run in a network, such as landing a helicopter on the deck of a ship. This



Model tests in the Ocean Basin for the US Coast Guard, showing rescue boat entering and leaving the stern port.

project employs simulation technology in combination with a number of other disciplines in order to create a common arena for the design, development and joint understanding of a complex operation at sea.



## Simulation techniques employed in the design of on-board decision-support systems for reducing motions and loads

MARINTEK employs simulation techniques in the development of on-board decision-support systems. Vehicle motions and manoeuvrability under all operating conditions, including possible handling errors, must be modelled correctly. In our laboratories we perform tests using models of the relevant ships, in which the data are combined with theoretical models before we enter the simulation models themselves.



A long series of tests has been carried out with "Sea Orbiter" in the Ocean Basin, with the aim of reducing and controlling platform motions.

These are then used to develop and test active decision-support systems for installation on board, i.e. systems that offer the captain advice about how to avoid excessive motions and accelerations such as altering course or speed, or from taking other measures. In collaboration with UECC we are in the process of developing systems for integrating steering and control systems on board ship with the aim of reducing ship motions and thus increasing operability.

In 2002, MARINTEK also developed a simulation program with six degrees of freedom, which SMSC will use

in their full-scale simulator. The program takes wave-drift forces, currents and waves and motions into account, so that the operator during training is presented with as realistic an experience as possible of the ship's movements under all conditions, such as during dynamic positioning operations, approaching and leaving buoys, etc.

## Simulation of vehicle operations with various propulsion and steering systems

In collaboration with SINTEF Fisheries and Aquaculture, MARINTEK has developed a simulator that maps the manoeuvrability of a trawler both with and without an azimuth thruster installed in its bow. This is an example of an interdisciplinary project



In collaboration with Rolls Royce Marine, we have developed new propulsion and steering systems for more efficient ferry operation.

involving several SINTEF research groups, in which simulator technology is the common arena for the problem-solving process. The simulator will also be capable of being used as an aid in the reconstruction of accidents or operational limitations, and it will be capable of suggesting improvements in existing solutions in systems or on board ships.

## Business development, logistics and environment - mathematical modelling as an aid to problem-solving

MARINTEK makes extensive use of mathematical modelling in the course of its projects. This has become an essential element of the process of performing R & D in our core areas of activity. Numerical and mathematical modelling are central elements of our knowhow in e.g. the following areas:

- Vessel route planning
- Optimisation of logistics chains
- Logistics simulators
- Simulation of VOC emissions.

### Strategic/tactical analysis and route planning

What type of supply vessel should be used to supply an offshore field? Which of a fleet of vessels should be used to lift particular loads in a given market? How should our own fleet of vessels be strategically developed in order to be best equipped to meet

the future, in the light of current market trends? How can new types of vessel and new technology be brought into use to improve market competitiveness? These are all relevant questions that shipping and freight companies often have to ask themselves.

Operations research techniques offer a powerful tool for answering questions of this sort. MARINTEK has developed operations research tools which have already demonstrated



Operational analysis makes for better logistics solutions.

their potential in use by shipping companies and industry. Among other things, the models enable the consequences of adopting new technology to be studied and the greatest potential for improvements to be localised. This offers good insight into where the payoffs of investing in new technology are greatest, which in turn improves company competitiveness.

## Logistics simulators



Simulators for complex logistics chains.

When they are submitting tenders, transport and shipping companies often find themselves faced with the question of what the “optimal” logistics chain should look like. Logistics chains are complex value chains which, in practice, are impossible to model accurately in exact mathematical terms. The relationships between the elements in such chains simply become too abstract. In such situations, simulation techniques become particularly useful. For many years, MARINTEK has been developing dedicated strategic simulators which act as decision-support aids in the process of optimising logistics chains. Examples of simulators of this sort that we have developed for industrial clients include:

- A simulator for an intermodal logistics chain for a bulk product from mine to final customer on the Continent, when the rail transport element was the critical bottleneck in the chain.

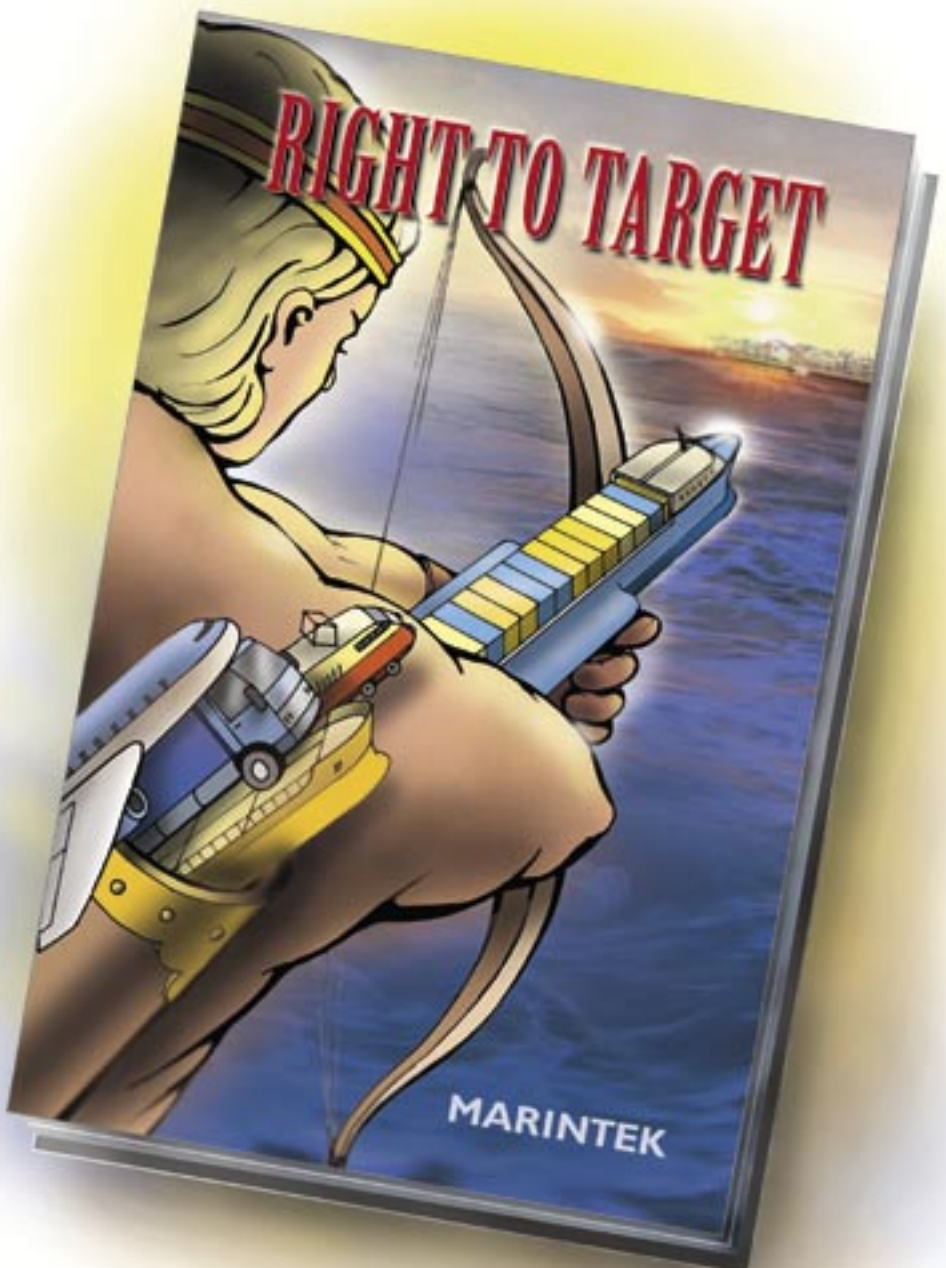
- A simulator for LNG transport - from production site to final customer, focusing on capacity and frequency in the logistics chain.
- A simulator for the transport of fresh water in the Mediterranean region: number of vessels required, service frequency, capacity of loading and discharging terminals.

## Estimating emissions during buoy-loading operations

The process of loading and storing crude oil on vessels on the Norwegian continental shelf produces significant emissions of volatile organic compounds (VOCs), which make up approximately half of Norway's total

VOC emissions. The authorities have introduced guidelines and procedures that will enable emissions from individual fields to be identified and verified more accurately than has been possible until now.

MARINTEK uses VOCSim, a simulation programme that we have developed ourselves, to determine emission levels during the loading of buoy-loading tankers. VOCSim is based on advanced mathematical models of the processes that take place during buoy-loading, and offers decision support for evaluating the effects of alternative technologies aimed at reducing emissions. MARINTEK also verifies the results of VOCSim by measuring emissions directly on board buoy-loaders.





## Report of the Board (summary)

### Market and operation

After a couple of good years for MARINTEK, our market in the shipping and shipbuilding sector became seriously weaker, resulting in a fall in turnover in these sectors of some MNOK 15. At the same time, our financial allocations from the Research Council of Norway also fell by MNOK 15. Both the Marine Vehicles Department and the Machinery and Technical Operations Department have been affected by this situation.

The Offshore Structures Department, which operates the Ocean Basin, has enjoyed a generally good year, although new contracts have tended to come in somewhat irregularly.

The positive exception was the order-book in the field of offshore risers and pipelines. The Ormen Lange project and other major offshore contracts, both national and international, ensure that this is a profitable market segment, as in previous years.

The high rate of exchange of the Norwegian krone and the way that costs are rising in Norway mean that we are experiencing both pressure on our prices and a loss of competitiveness.

As a result of the above factors, MARINTEK presents a negative operating result of MNOK 9.076 for 2002.

### Profit and loss accounts and balance sheet

A gross turnover of MNOK 186.2 (207.3) and net operating income of MNOK 146.3 (158.8) produced an operating profit of MNOK -9.1 (20.2). A positive financial result of MNOK 1.3 (3.5) left a profit after financial items of MNOK -7.8 (23.8), which the Board proposes to cover from the company's equity capital.

Of a total capital of MNOK 182.6, our equity capital comes to MNOK 92.0, equivalent to an equity capital ratio of 50.0. Working capital is MNOK 49.9, which represents a fall of MNOK 13.6. The most liquid assets come to MNOK 55.8, a reduction of MNOK 15.9.

All in all, the Board regards the liquidity situation as satisfactory, and equity is quite adequate for continued operation, given the planned activities of the company.

The Board is not aware of any factors arising since balance day that are of significance for evaluation of the company's financial position.

### Cooperation with NTNU and other SINTEF institutes

NTNU's Department of Marine Technology and MARINTEK are actively coordinating their strategic programmes in such a way as to produce an interaction between the special efforts of NTNU's Centre of Excellence in Research in the Marine Technology Centre at Tyholt and MARINTEK's strategic programmes.

Collaboration concentrates on areas such as marine cybernetics, sea loads and marine structures. The two institutions are co-ordinating their efforts vis-à-vis both industrial clients and the Research Council of Norway, thus making MARINTEK and NTNU among the most powerful combinations of maritime R&D in the western world. We also co-operate extensively with other SINTEF units.

### Work environment

The physical work environment of our laboratories has been improved by the acquisition of a new milling machine for models, a new work platform in the Ocean Basin, rehabilitation of the workshop, remote

### Activities

MARINTEK consists of four departments that perform R&D for those parts of industry and the public sector involved in marine activities. MARINTEK operates in an international market, developing new technologies in the following sectors: floating petroleum production, vessel development, the shipbuilding and marine equipment industries, shipping and logistics.

The company's headquarters are in Trondheim, and it has a subsidiary in Houston - MARINTEK (USA), Inc. This company was set up as an element of our strategy of focusing on the international market, in collaboration with other Norwegian companies that wish to export Norwegian petroleum technology.

An important part of our activities is the operation of the marine technology laboratories at Tyholt in Trondheim, where the Ocean Laboratory, the Ship Model Tank and the Marine Structures Laboratory are the largest units. The laboratories are also used by NTNU's Department of Marine Technology, in an environment of productive cooperation with our company.

MARINTEK had 176 employees at the end of 2002.

control of the traversing crane, and a course for crane operators. A new office building alongside the Towing Tank has improved office conditions and diverted through traffic of personnel away from the tank. Office ventilation has been improved by upgrading the ventilation control system. A desire to focus on teamwork has led to a reorganisation of personnel into small working groups.

There has been a rise in the number of personal injuries registered during the past two years. We are taking this trend seriously and have inaugurated an improvement project in order to reverse it. Management, the work safety delegate and external consultants will be involved in the process.

Sick leave was 2.4% in 2002, which is the same as in 2001. Although this rate is low, we will continue to keep an eye on possible trends.

## External environment

Our activities contaminate the external environment to only an insignificant degree. Some emissions are produced by diesel and gas engines when they are being tested in the Machinery Laboratory, but these are at extremely modest levels.

## Prospects for the future

Our order reserves stand at MNOK 29.9, compared with MNOK 33.3 at this time a year ago. In large areas of our range of activities, these reserves are very short-term, a situation that presents us with a major challenge insofar as immediate measures need to be taken to deal with it.

MARINTEK is in the midst of a difficult phase of reorganisation, as we restructure our laboratory-based

services and shift our focus to new areas of operation. In collaboration with major industrial companies, we have invested significant amounts of money and effort in the development of methods and equipment for simulating marine operations in the shipping sector and for offshore applications.

This puts us in a position to profile MARINTEK vis-à-vis important key clients that are participating in the development of deepwater petroleum fields, as well as major shipping companies which perform critical operations that demand major elements of planning and training.

The level of petroleum activity on the Norwegian continental shelf is in danger of tailing off dramatically unless new discoveries are made. However, MARINTEK is ready to increase its involvement in international R&D by developing its direct contacts both with major operating companies and with the large contractors that dominate development projects in the Gulf of Mexico, West Africa and Brazil. Closer collaboration with Norwegian companies which are currently taking up positions in the international petroleum arena will be an important element on this process.

Without a recovery in the global economy, we can expect the shipping market to continue to be difficult in the coming year. However, we are working hard to establish major R&D programmes together with large industrial companies and the Norwegian Navy to compensate for the low level of shipbuilding and the reduced funding from the Research Council of Norway.

In the annual accounts for 2002, MNOK 4 has been allocated as a provision for future restructuring measures. The Board expects to see a modest result in 2003.

## Thanks to our staff

The Board wishes to express its thanks to the staff of MARINTEK and to NTNU staff employed on MARINTEK projects, as well as to our clients, for their cooperation in 2002.

Trondheim, December 31, 2002

February 13, 2003



Diderik Schmitler  
Chairman of the Board



## Income statement

Income statement for year ending December 31, 2002 (extract). (All figures in thousand NOK)

	MARINTEK		MARINTEK Concern	
	2002	2001	2002	2001
<b>Operating revenues and expenses</b>				
<b>Revenues</b>	186 170	207 347	186 809	207 881
- Direct project expenses	39 894	48 565	37 685	45 690
<b>Net operating revenue</b>	146 276	158 782	149 124	162 191
Salaries, social sec. and other social costs	107 230	94 463	108 565	96 345
Other operating expenses	48 121	44 102	49 645	45 659
<b>Net operating expenses</b>	155 351	138 565	158 210	142 004
<b>Operating result</b>	-9 076	20 217	-9 086	20 187
Financial income and expenses	1 303	3 562	1 313	3 592
<b>Annual result</b>	-7 773	23 779	-7 773	23 779

## Balance sheet

Balance sheet on December 31, 2002 (extract). (All figures in thousand NOK)

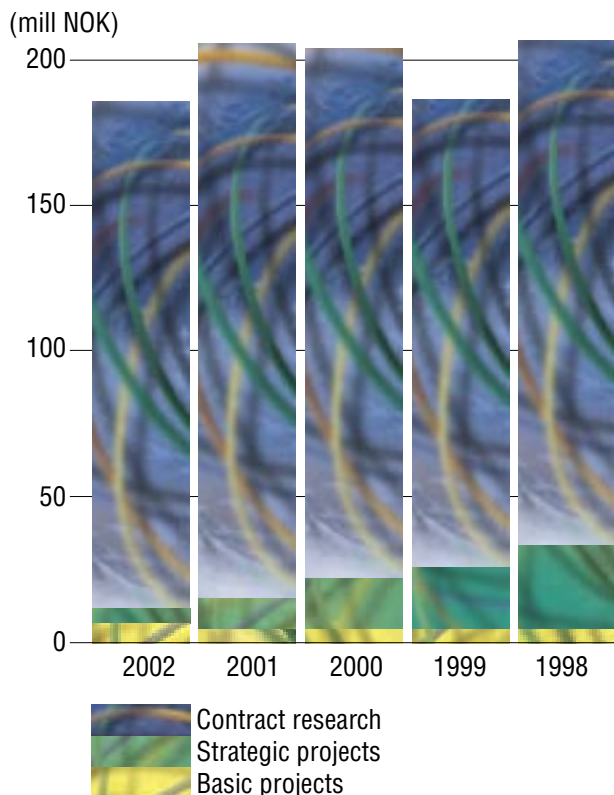
	MARINTEK		MARINTEK Concern	
	2002	2001	2002	2001
<b>Assets</b>	182 579	198 238	181 831	198 475
<b>Fixed assets</b>	42 047	36 201	40 222	35 819
Fixed operating assets	23 115	19 377	25 134	22 839
Financial long-term assets	18 932	16 824	15 088	12 980
<b>Current assets</b>	140 532	162 038	141 609	162 656
Other current assets	82 080	88 490	81 861	88 500
Cash, bank accounts	58 452	73 547	59 749	74 156
<b>Equity and liabilities</b>	182 579	198 238	181 831	198 475
<b>Equity</b>	91 954	99 726	91 954	99 726
Paid-up equity	11 600	11 600	11 600	11 600
Earned equity	80 354	88 126	80 354	88 126
<b>Liabilities</b>	90 625	98 512	89 878	98 749
<b>Long term liabilities</b>	-	-	-	-
<b>Current liabilities</b>	90 625	98 512	89 878	98 749

Auditors: Deloitte & Touche

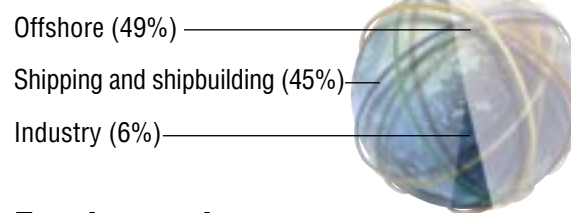
## Key data

	2002		2001		2000		1999		1998	
	NOK 1000	%	NOK 1000	%	NOK 1000	%	NOK 1000	%	NOK 1000	%
Revenues	186 170	100.0	207 347	100.0	212 083	100.0	186 927	100.0	207 539	100.0
incl. income res. council	11 763	6.3	15 051	7.3	21 985	10.4	25 576	13.7	33 713	16.2
Operating income	-9 076	-4.9	20 217	9.8	25 317	11.9	-16 303	-8.7	5 760	2.8
Net profit	-7 773	-4.2	23 779	11.5	27 638	13.0	-12 911	-6.9	6 833	3.3
Number of staff	176		173		175		218		234	
Salaries and soc. expenses	107 230	57.6	94 463	45.6	96 339	45.4	105 544	56.5	99 200	47.8
Profitability		-1.0		20		33		-34.0		4.2
Liquidity ratio		1.6		1.6		1.6		1.4		1.7
Changes in working capital	-13 619		8 989		20 781		-18 961		2 024	
Working capital 31 Dec.	49 906		63 907		54 918		34 137		53 098	
Change in liquidity	-5 210		15 521		10 957		-6 158		1 670	
Liquidity	34 231		73 547		58 026		47 069		53 227	
Equity	91 954	50	99 726	50	75 947	44	48 309	38	61 219	44

## Project-related specification of turnover

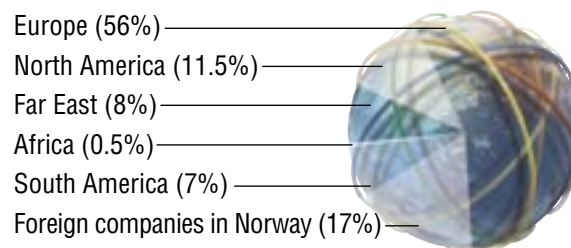


## Turnover by area of activity

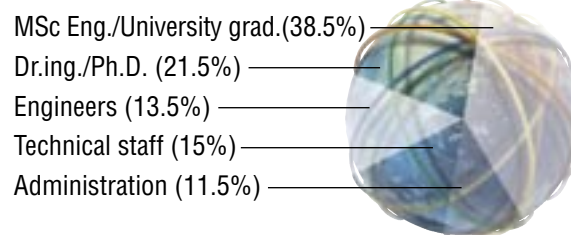


## Foreign trade

(28% of total turnover)



## Personnel (Total staff: 176)



## Ownership

MARINTEK's shareholders:

SINTEF	6.5 MNOK	56%
Norw. Shipowners' Association	3.0 MNOK	26%
Det Norske Veritas	1.0 MNOK	9%
Found. of Shipbuilders' Fund for Research and Education	0.5 MNOK	4%
Directorate of Shipping	0.5 MNOK	4%
Fed. of Norw. Coastal Shipping	0.1 MNOK	1%
<hr/> Total share capital	<hr/> 11.6 MNOK	<hr/> 100%

## Board

Director Diderik Schnitler, chairman  
Managing director Sigbjørn Akselvoll  
Division manager Per Marius Berrefjord  
Deputy director Anne Grethe Dalane  
Professor Anders Endal  
Deputy managing director Svein Sivertsen  
Sen. principal research engr. Carl Trygve Stansberg  
Senior research engineer Sverre Steen  
Senior research engineer Eivind Dale

## Management

Managing director Oddvar Aam  
Finance manager Birger Åldstedt  
Division manager Atle Minsaas  
Division manager Terje Nødrelid  
Division manager Kjell O. Holden  
Division manager Oddvar Eide

## MARINTEK - a certified institute

MARINTEK is the only unit of the SINTEF Group that has chosen to certify the whole company to the ISO-9001 standard. We have mapped out all of our work processes, including laboratory activities, theoretical studies and analytical work. This is intended to ensure that our customers enjoy quality in all the work that we do for them.

## University cooperation - the basis of our activities

The Norwegian authorities have put a significant effort into building up the marine environment at Tyholt in Trondheim, where there is a good atmosphere of close cooperation between NTNU's Department of Marine Technology and MARINTEK. The Department of Marine Technology is responsible for education and basic research, while MARINTEK's existence is based on contracts for industry, where the Research Council of Norway provides partial funding for certain contracts.

The centre operates advanced laboratories for verifying structures and theoretical models developed by industrial companies and scientists.

## Centre of Excellence in Research

In the same way as EU research is structured, the Research Council of Norway wishes to concentrate its efforts within those units that have the potential to be "Centres of Excellence in Research".

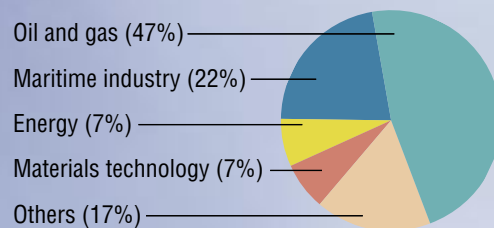
In 2002, the Research Council of Norway set up a Centre of Excellence in Research (SFF) at the Marine Technology Centre at Tyholt. The SFF is organised as a separate unit in NTNU and reports directly to the University Senate. MARINTEK is a partner in the SFF and contributes both research staff and funding. The Centre will focus on vessel and marine structures, with hydrodynamics, construction technology and marine cybernetics as important scientific elements (<http://www.ntnu.no/cesos/>).

## The SINTEF Group is large in Norway - and growing on the international front

The SINTEF Group performs contract research and development for industry and the public sector in technological areas, the natural and social sciences and medicine. With 1700 employees and a turnover of NOK 1.6 billion, the SINTEF Group is one of Europe's largest independent research organizations. Contracts for industry and the public sector account for 93 percent of operating revenues.

The SINTEF Group works closely with the Norwegian University of Science and Technology (NTNU). Experts in various disciplines collaborate on projects, sharing laboratories and equipment.

Increasing the proportion of the Group's research contracts from international clients will be one of our points of focus in the near future. Until now, the SINTEF Group's international work has been characterised by the way that it falls within the scientific and market areas in which Norway has an international reputation. The Group's revenues from international contracts amount to about NOK 250 million.



The SINTEF Group's International turnover by market segment.

MARINTEK is part of the SINTEF Group, and will be a key player in its growing international activities.

### MARINTEK (USA), Inc.

MARINTEK is dependent on being close to its key customers, some of whom operate in the offshore industry. Every day, Houston and Texas are becoming more and more obviously the global centre of gravity in offshore structure design, and these centres are active vis-à-vis deepwater field developers in Brazil and West Africa as well as field developments in the Mexico Gulf. MARINTEK also operates a subsidiary in Houston and is involved in studies aimed at taking up the challenges of ultra-deep water (more than 7500 feet). For example, we are involved in the American deepwater programme DeepStar.



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