MARITIME RESEARCH AND DESIGN

MORSTROYTECHNOLOGY

IF YOU IMPLEMENT A PROJECT IN THE RUSSIAN MARKET

Morstroytechnology is a reliable partner in design of complex transport facilities.

If you implement a project in the Russian market:

- We have a reach experience in designing and providing support for construction of different port terminals. Among these are the following facilities:
  - Olympic terminals (cargo and cruise) in Sochi;
  - 4 terminals in the new port of Ust-Luga;
  - Large export coal and gas terminals (Lavna, Sakhatrans, Sukhodol and others);
  - Container terminals (Novorossiisk, St. Petersburg, Vostochny, land terminals)
  - Gas terminals in the Baltics and the Far East
  - Terminals and infrastructure facilities designated for field development in the Far North.

- We know everything about Russian ports, both about existing terminals and prospects of their development. We are well-versed in all logistics nuances, cargo base prospects, and land transport behavior.

- We obtained all self-regulatory organization certificates and authorization documents necessary to design facilities with any degree of complexity in the Russian Federation;

- We have a good knowledge of specific features of the Russian legal framework and state expert reviews;

- We are able to improve logistics of large companies and plan a road pattern for development of remote fields;

- We have an accredited test center in order to carry out surveys and provide authorization documents for operation of existing piers and perform support during construction.

If you implement a project somewhere in the world:

- We are able to design hydro-technical facilities with any degree of complexity;

- We are capable to design port terminals in full, including technology, general plan and structures, from an idea to its implementation in construction;

- We can act as a partner of EPC-contractor and ensure solving all engineering issues.

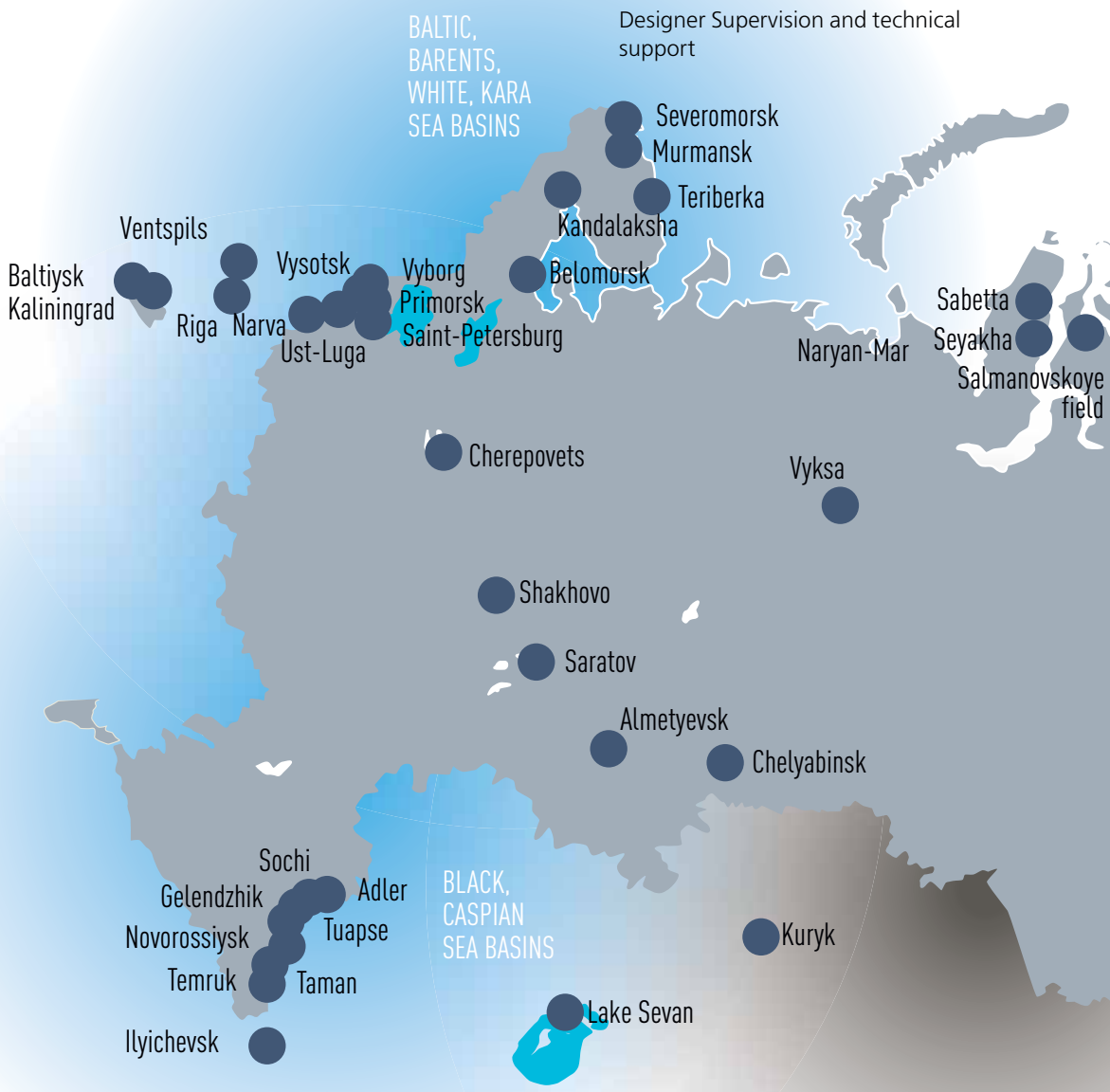
CONTENT

Predesign studies in various degrees of detail and complexity: Researches in the Field of Transport, Business-Plans, Concepts, Financial Feasibility Studies

Detailed Design Documentation (Feasibility Study) and Detailed Engineering

Tender Documentation for contractors

Designer Supervision and technical support



Morstroytechnology was established in 1991 spearheaded by the academician A.F. Parfenov, General Director of Lenmorniiproekt, to consolidate the scientific, design and construction potential of the companies specialized in marine construction to solve complex nonstandard problems and implement advanced technologies in their projects.

Receipt of accreditation certificate enabling performance as an expert organization to be engaged for inspection activities in the scope of the governmental inspection.

Receipt of certificate confirming the compliance of quality management system of the company to ISO 9001:2008 international standards, approved by Lloyd's register Quality Assurance.

Receipt of certificate for registration of "Morstroytechnology" trademark.

1991

FOUNDATION

2010

RECENT HISTORY

Consultancy, Engineering Management (including optimization of hydraulic engineering facilities construction, technical and economic calculations; research of the transport market and economy of transportations, substantiations of design technologies of container terminals in a simulative modeling method a.o.)

Structural survey (including diver's works)

Engineering survey in land and water area

Receipt of Diploma for the contribution in Russian Architectural Excellence 2012.

Governor of St. Petersburg Georgiy Sergeevich Poltavchenko expressed appreciation of the Company's activity. The Company was commended for its contribution in St. Petersburg marine industry development.

2012

Morstroytechnology was accredited as a testing laboratory in the Integrated National Accreditation System. President of Russia Vladimir Putin awarded the Company employees with commemorative medals for valuable contribution in the preparation and holding of the 2014 Winter Olympic Games in Sochi.

2014

Morstroytechnology received accreditation in Sberbank of Russia PJSC and Gazprombank JSC for execution of technical expertise.

2015

TOP-MANAGEMENT

Mikhail Yu. NIKOLAEVSKY
PhD (Engineering), General Director

Roman Yu. GORGUTSA
PhD (Engineering), Chief Engineer

Vladimir A. POGODIN
PhD (Engineering), Technical Director

PERMITS, CERTIFICATES, LICENSES

Morstroytechnology is permitted to perform the following types of work impacting safety at capital construction project sites, including extremely hazardous, technically sophisticated and unique sites, particularly the sea ports:

– design documentation preparation;

– engineering surveying;

– construction, reconstruction, overhaul of capital construction sites.

Morstroytechnology is licensed by FSB to perform work using national classified information.

Since 2010, Morstroytechnology possesses a certificate of Lloyd's Register in Europe, Middle East and Africa for conformity of the quality management system to ISO 9001:2008 and GOST R ISO 9001–2008 standards. The Morstroytechnology testing center is accredited as a testing laboratory in the Integrated National Accreditation System.

A Certificate of permission to a particular type or types of activities having an impact on the safety of capital construction facilities No 0531.05-2010-7802132406-C-071. issued on 23 October 2014 by self-regulatory organization (SRO), based on membership of persons carrying out construction, non-commercial partnership "Petersburg Construction Companies Department", Registration number in state register: СРО-С-071-17112009

A Certificate of permission to a particular type or types of activities having an impact on the safety of capital construction facilities No П – 044 -024.5. issued on 6 January 2016 by self-regulatory organization (SRO) on design documentation preparation, non-commercial partnership «Design organizations of NorthWest»

A Certificate of permission to a particular type or types of activities having an impact on the safety of capital construction facilities No И – 011 -049.5 issued 14 January 2016 by self-regulatory organization (SRO) on engineering surveys , non-commercial partnership «Survey organizations of NorthWest»

Certificate of Accreditation No РОСС RU.0001.21СВ01; issued 2 March 2016 by the Integrated National Accreditation System , № 0005261and certifies that a Testing laboratory of "Morstroytechnology" ,LLC meets the requirements of GOST ISO/IEC 17025:2005 and is accredited as Testing laboratory according to the accreditation field.

License to operate activities with the use of information constituting a State secret Registration number is 8827, issued 21June 2016 by St. Petersburg and Leningrad Oblast Directorate of Federal Security Service

Certificate of Approval certifies that the Management System of "Morstroytechnology" Co.Ltd. has been approved by Lloyd's Register Quality Assurance to the following Management System Standards: BS EN ISO 9001:2008 EN ISO 9001:2008 ISO 9001:2008. Approval Certificate: No SPB6009563, issued by Lloyd's Register EMEA Saint-Petersburg for and behalf of Lloyd's Register Quality Assurance Limited Original Approval: 26 July 2010, Current Certificate 26 July 2016.

STAFF

Sergey A. SEMENOV
PhD (Economics), Corporate Development Director

>100 persons

1 Academician

1 Doctor of Sciences

5 Masters of Sciences

45 various institutes of higher learning the Company employees graduated from

23 Company employees graduated with honours diploma

5 employees have state awards

PERFORMANCE

3
Utility model patents obtained

30
Reviews for design works received

38
Scientific papers published

68
Favorable opinions received

7–10
Favorable opinions annually


РОССИЙСКАЯ ФЕДЕРАЦИЯ

ПАТЕНТ

НА ПОЛЕЗНУЮ МОДЕЛЬ

№ 103367

ВОЛНОЗАЩИТНОЕ СООРУЖЕНИЕ


ПОЛОЖИТЕЛЬНОЕ ЗАКЛЮЧЕНИЕ
ГОСУДАРСТВЕННОЙ ЭКСПЕРТИЗЫ


Федеральное государственное унитарное предприятие «РОСМОРПОРТ» (ФГУП «РОСМОРПОРТ»)

Отзыв

CARGO TERMINAL AT THE MOUTH OF RIVER MZYMTA

The Port of Sochi cargo terminal at the mouth of river Mzymta built under the project of Morstroytechnology was successfully commissioned in the summer of 2012.

Along with the sophisticated hydraulic engineering installations, port infrastructure facilities were designed and successfully implemented.

The versatile technology of sea vessels processing provides for handling of an entire range of cargo classes.

The office building combines utility and austerity characteristic of the ever busy port. It received a diploma for the contribution in Russian Architectural Excellence in 2012.

BERTH INSTALLATION FOR HOLDING ANCHORAGE OF AUXILIARY SHIPS

The berth is located on the inner side of the Southwest pier in the protected harbor area of the Sochi cargo terminal.

The berth length is 80 m with pier level 2.05 m and seabed level minus 9.2 m per Baltic elevation system.

Berth design is gravity type with use of large diameter steel metal envelopes filled with sand and gravel mix.

The design solution using quick mounting elements – large diameter steel envelopes – allowed to execute the project schedule under time pressure with minimum capital expenditure from Federal budget.

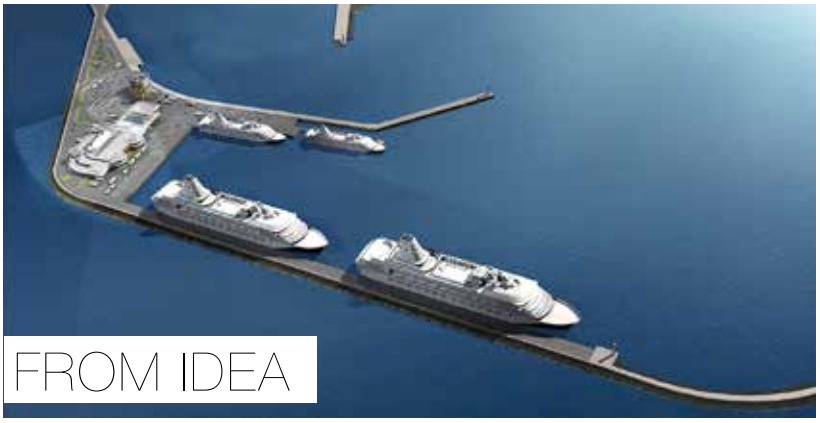
INTERNATIONAL CENTER FOR PASSENGER AND CRUISE SHIPPING IN THE CITY OF SOCHI

Morstroytechnology provided:
- Economical substantiation,
- Basic design documentation,
- Detailed design documentation,
- Designer supervision.

Port of Sochi is converted into a large international center for passenger and cruise shipping.

The newly developed area accommodates a border crossing check point for cruise and ferry passengers.

Under the project, part of the harbor basin is converted to a yacht marina and is used to receive local passenger ferries.



FROM IDEA

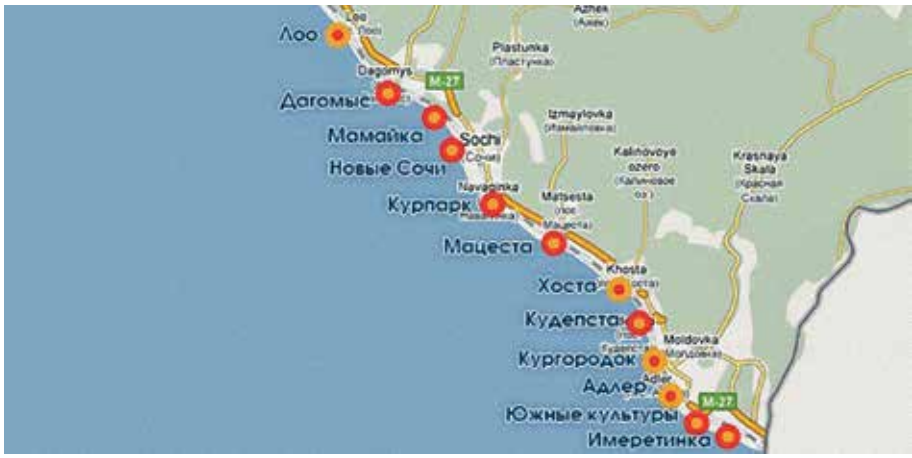
TO REALITY

In the winter of 2014, Port of Sochi welcomed guests of the Olympics; in May for the first time in history it hosted a regatta of the world's most beautiful sailboats – SCF Black Sea Tall Ships Regatta 2014.

New cruise harbor is designed to receive 2 passenger liners and 2 ferries.

CONCEPT OF DEVELOPMENT OF THE SEA PASSENGER TRANSPORTATIONS

Alternative design of passenger ferry terminal



Morstroytechnology elaborated substantiations for the Concept of development of the sea passenger transportations with reconstruction and construction of the berths for local lines, located in the ports of the Black Sea (Krasnodar region).

Restoration and construction of local passenger ferry terminals along the coast of Greater Sochi facilitates the renewal of passenger transportation on the Black Sea coast of Krasnodar region and Black Sea region as a whole, and enhances the region's attraction for tourists.

DEEPWATER BERTH 1A FOR TUAPSE REFINERY

Reconstruction of the damaged Pervomaysk Breakwater and reshaping the structure up to EL plus 4.30 m substantially improves protection against SW-SSE storm wave conditions not only at berth 1A but also in the inner harbor.

The modern technology of offshore pier construction using onshore cranes provided by the project and developed jointly with Sochimorstroy LLC, allowed to complete construction of the terminal to a tight schedule.

On June 15, 2012, the oil products terminal started to dispatch cargos. President of Russia Vladimir Putin visited the berth opening ceremony.

PIERS AND BERTHS OF THE GRAIN TERMINAL

Tuapse grain terminal is a special transshipment complex equipped with up-to-date technical facilities in accordance with international ecological and security requirements.

Commissioned in February 2010, Tuapse grain terminal handled 525,000 tons of grain. Piers and berths were designed by Morstroytechnology.

In 2011, after the embargo had been revoked, the grain terminal cargo turnover reached the mark of 1 million tons by September, including wheat (940 thousand tons) and barley (50 thousand tons).

The estimated cargo turnover in the project is over 2 million tons of grain annually.

TUAPSE BULK TERMINAL

Tuapse Bulk Terminal is built on the territory of the Tuapse Ship Repair Yard. Morstroytechnology carried out the design and designer supervision over construction.

Morstroytechnology specialists designed the approach jetty and berth structure based on steel piles with in-situ steel formwork for reinforced concrete pile caps.

This technology enables:

- construction without using floating rigs;
- increased durability of the structure due to use of permanent formwork which provides additional protection for the reinforced concrete pile caps against corrosion in the aggressive marine environment.

NUTEP CONTAINER TERMINAL

Electric powered RTG cranes

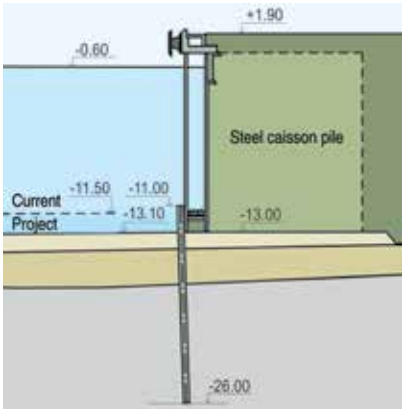
Design solutions provide for capacity growth up to 600,000 TEU per year by increasing the water depth at the berths, introduction of new technology using RTG cranes, development of motorways and railroad connections.

Principal characteristics of the project are:

- High land utilization;
- Reduced costs and environmental impact due to the use of electric powered RTG cranes.

Installation of new ship-to-shore crane

BERTH 39 AND DREDGING



Morstroytechnology experts provided basic and detailed design documentation for the reconstruction of the Federal Property Facilities in the port of Novorossiysk, including berth #39, bank stabilization, dredging of the operational water areas, navigation facilities.

Engineering solutions proposed by Morstroytechnology experts allowed to increase the gravity type container berths depth by 2.6 m.

All constructions were commissioned at the end of 2009. Reconstruction increased quay capacity up to 350,000 TEU per year and allowed to receive container vessels with a capacity over 4,000 TEU.

NEW CONTAINER TERMINAL IN THE PORT OF NOVOROSSIYSK

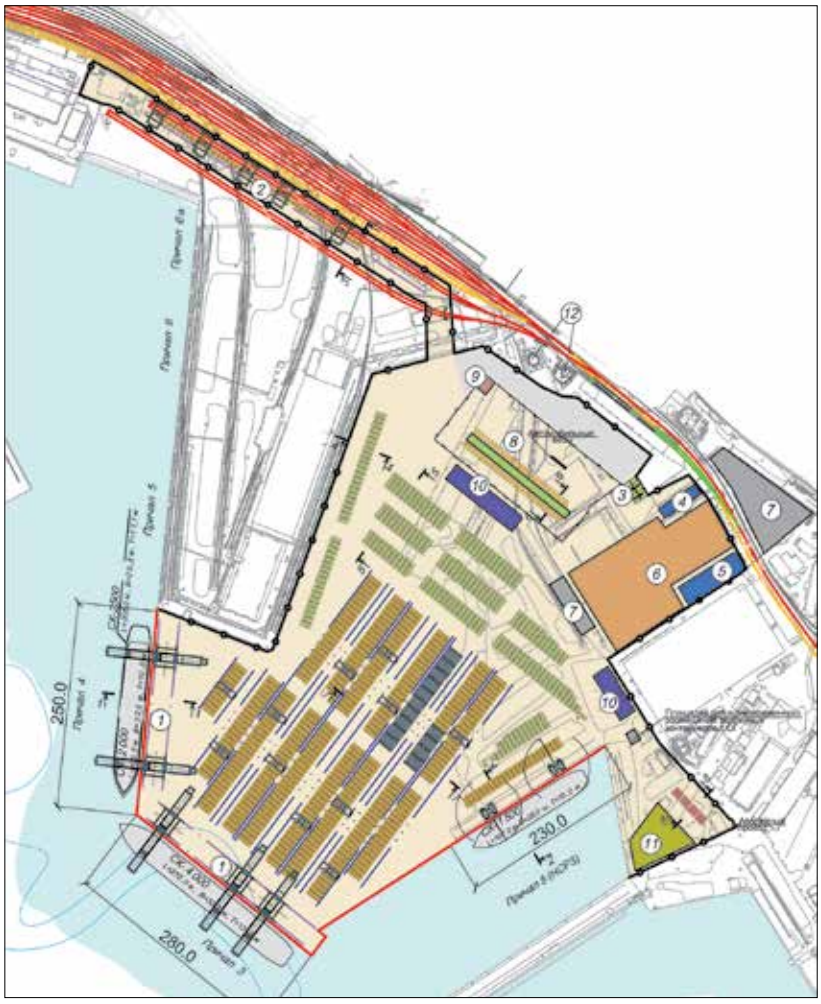
Phase: Front end engineering design, Declaration of Intent (DOI).

Customer: Novorossiysk Commercial Sea Port OJSC.

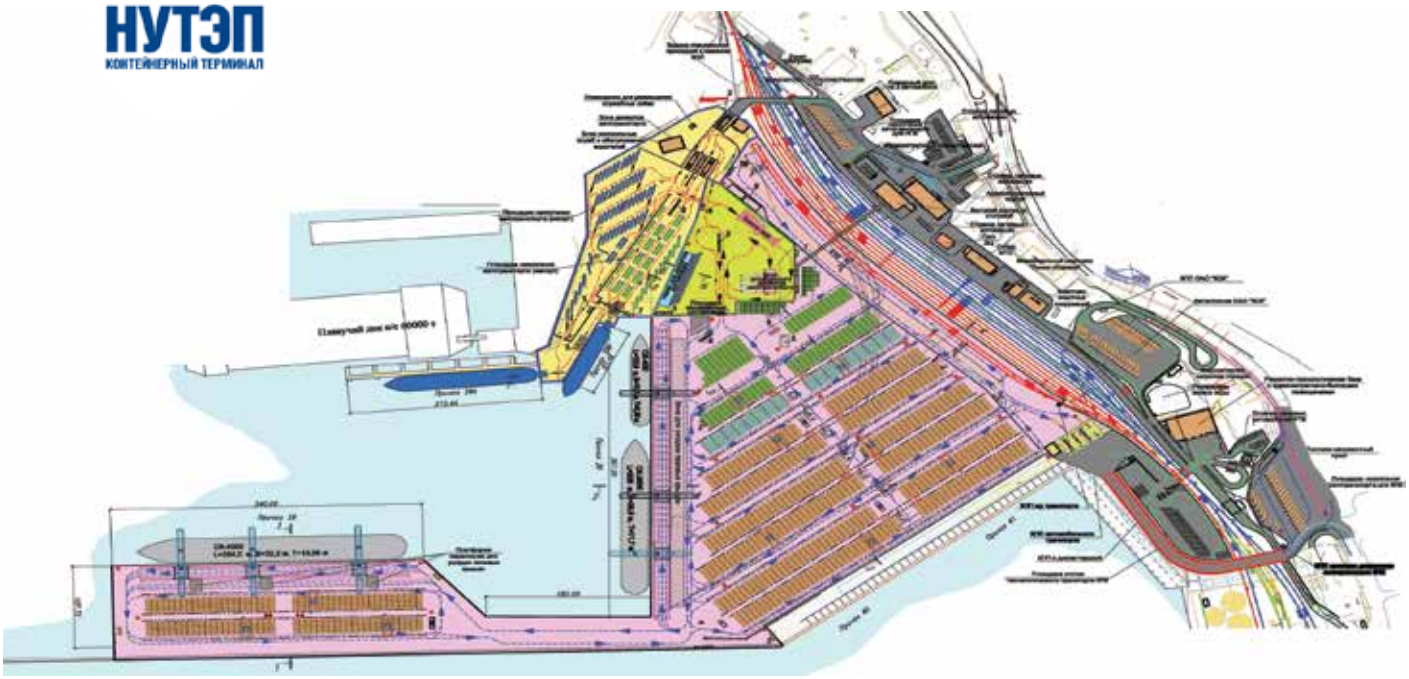
Capacity: 1,200–2,000 thousand TEU per year.

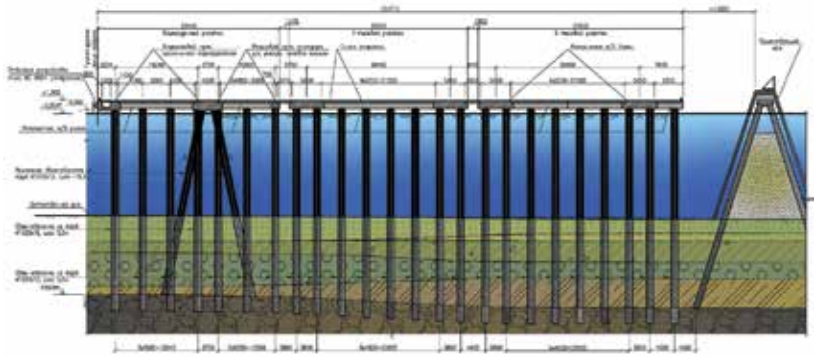
Maximum vessel size: 8,000 TEU –10,000 TEU

Over 15 various concepts and technological arrangements for the new container terminal within the limited operational area of the Novorossiysk Commercial Sea Port were developed and assessed. Declaration of Intent to invest in construction of the terminal was prepared.



MASTER PLAN RO-RO AND CONTAINER TERMINAL





The following factors which influence the construction of the deep-water berth # 38 were examined:

- availability and cost of the specified natural stone;
- duration and cost of construction;
- technological features and ecological compatibility of construction.

Project of Development of the South East Cargo Handling Area was carried out that would increase cargo turnover up to 600 thousand TEU per year.

The pile pier design was approved for construction. Berth length 340 m, width 110 m. The favorable opinion of the State Expertise (Glavgosexpertiza Rossii) was received (N 268-10/ГГЭ-6521/04).

The review from NUTEP LLC was received, saying: "Morstroytechnology is a long-standing and reliable partner of NUTEP LLC. The Company has provided an extensive scope of design works concerning the construction in the South-East Cargo Handling Area of the port of Novorossiysk".

In the scope of the terminal development Master Plan implementation, NUTEP LLC commenced construction of the berth No.38. Morstroytechnology is performing designer supervision over the process of construction.

NOVOROSSIYSK – SOCHI (ADLER) FERRY CONNECTION

Arrangement of temporary entrance into the harbor basin

Between the winter and the summer of 2011, a lot of land sliding occurred in the area of M-27 Jubga – Adler highway. The only artery leading to the heart of the Olympic construction sites was closed for repair.

The alternative option for cargos delivery to the Olympic facilities was sea transit. It was decided at the governmental level to arrange the ferry crossing between Novorossiysk and Sochi (Adler).

The Port of Sochi cargo terminal is located in the immediate proximity of the Olympic construction sites. Due to a short shipment distance on just-in-time basis, the environmental impact is targeted, with a favorable outcome for the preserved Imereti lowland.

Bank stabilization before retrofitting

Bank stabilization after retrofitting

Designing the ferry crossing between Novorossiysk and Sochi (Adler)
Solution algorithm

The Port of Novorossiysk, South-East cargo handling area, NUTEP LLC

Performing calculation check for vertical type bank stabilization (VTBS), L = 180 m, fenders and mooring arrangements

Engineering opinion on the possibility of design vessels mooring and handling

VTBS retrofitting, L = 180 m, commissioning

The Port of Sochi Cargo terminal, mouth of the river Mzymta

Berth #.4,5 and VTBS retrofitting, L = 150 m, for RO-RO vessels mooring and handling

Arrangement of the port harbor basin (placement of temporary navigation aid signs, substantiation of temporary port entrance, etc.) for safe maneuvering of the design vessels

Sequential commissioning of the berths

NLE CONTAINER TERMINAL

Due for completion: 2012–2014

Project target:

The project implies reconstruction of berths #. 28A, 28, 29 and 30, along with the existing warehouse areas for containers' storage, in order to ensure the container terminal throughput of 500,000 TEU/year.

Morstroytechnology has performed the entire design and survey scope of work and received favorable opinions from the governmental expert bodies.

To enable the receipt of design vessels with cargo lifting capacity up to 7,000 TEU, the Lesnoy pier has to be extended by 50 m.

To provide for the safety of mooring and towing operations for berthing of the design vessels to berths # 28A and 28, it is necessary to perform dredging down to the design depth of 13.6 m.

Berths # 29, 30 require reconstructive excavation with a target to maintain the design depth of 14.5 m.

The berth reconstruction is performed in the scope of NMTP Group of Companies' participation in the federal programs for development of transportation industry and comprehensive projects such as Reconstruction and upgrading of Novorossiysk Commercial Sea Port and Development of Novorossiysk transport hub.

The Berth reconstruction will enable handling of more sizeable vessels (up to 200 m long and 32.2 m wide). Installation of additional cargo handling equipment will help increase the port throughput and reduce total cargo handling time.

In 2014–2015, construction and installation works in the scope of Phase 1 of the birth reconstruction were finalized. Portgidrostroy LLC was the Prime Contractor of the construction project.

Specialists of Morstroytechnology have performed the designer supervision over the progress of construction and provided technical support for the project.

NAVAL BASE

Naval Base construction under protection of rock-fill breakwater

In-situ steel beam formwork

Construction of hydraulic structures was completed in 2011.

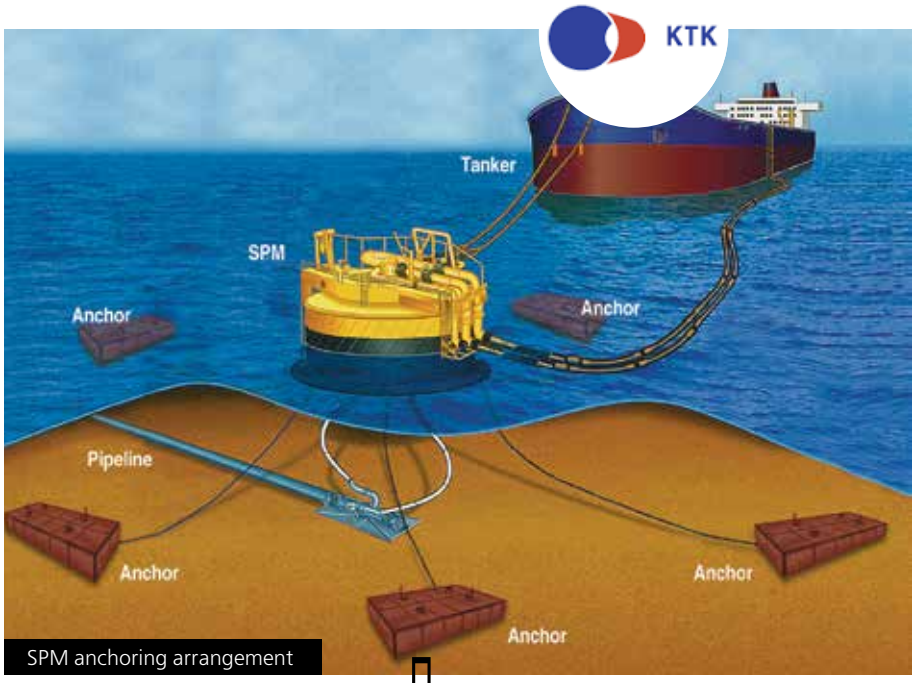
Berth design with in-situ steel beam formwork allows to perform construction without use of floating craft, which reduces construction time.

Pile pier construction

Construction in process. Tetrapods piling on the wave absorber

Rock-fill slope fortification with molded blocks

CASPIAN PIPELINE CONSORTIUM OIL TERMINAL

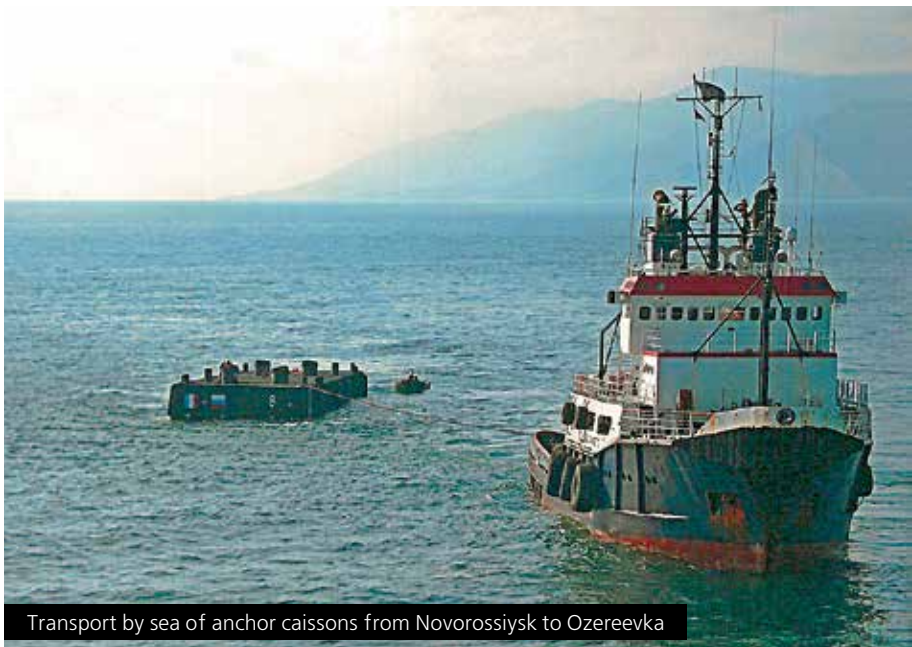


SPM anchoring arrangement

The fixed mooring anchors design developed by Morstroytechnology specialists allowed to perform transport and underwater assembly at a depth of 70 m of the Single Point Mooring (SPM) within a short time.

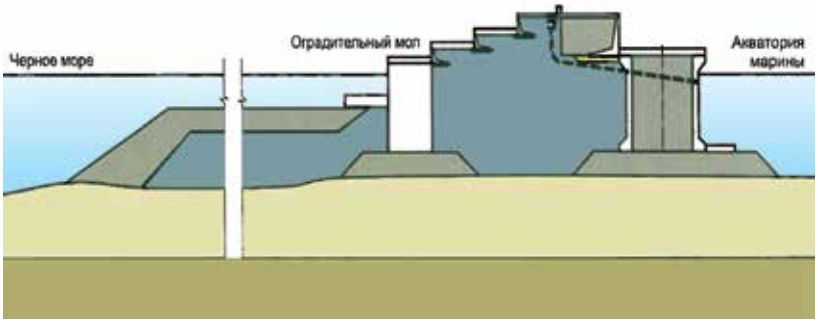
The mooring anchors weighing 350 tons have reserve buoyancy and are floated to the installation site without additional buoyancy.

Anchor



Transport by sea of anchor caissons from Novorossiysk to Ozereevka

CONCEPTS OF MARINAS IN THE BLACK SEA

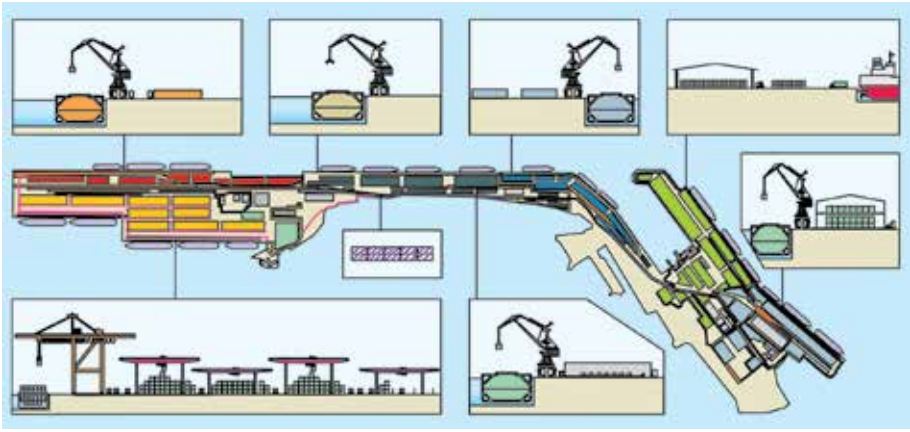


Project for hydraulic structures for "Homar" marina for 500 yachts in Khostinsky district of the City of Sochi was carried out for MRK-Project LLC (Sochi).

Proposals were developed jointly with "MRK Project".

The artificial island will allow to create a modern recreational zone with residential buildings, hotels, shops, restaurants, yacht berths, parking spaces, beach zone and other health resort and entertainment facilities.

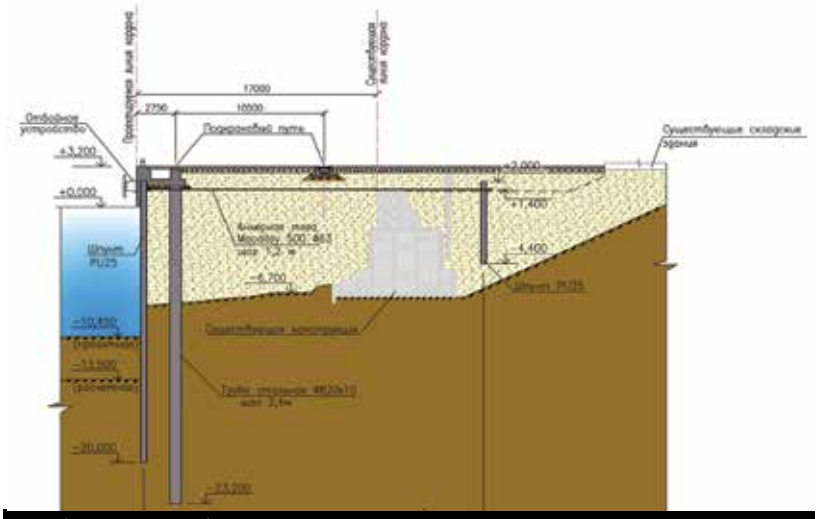
MASTER PLAN AND DEVELOPMENT PROGRAM FOR THE PORT 1ST AND 2ND CARGO HANDLING AREAS



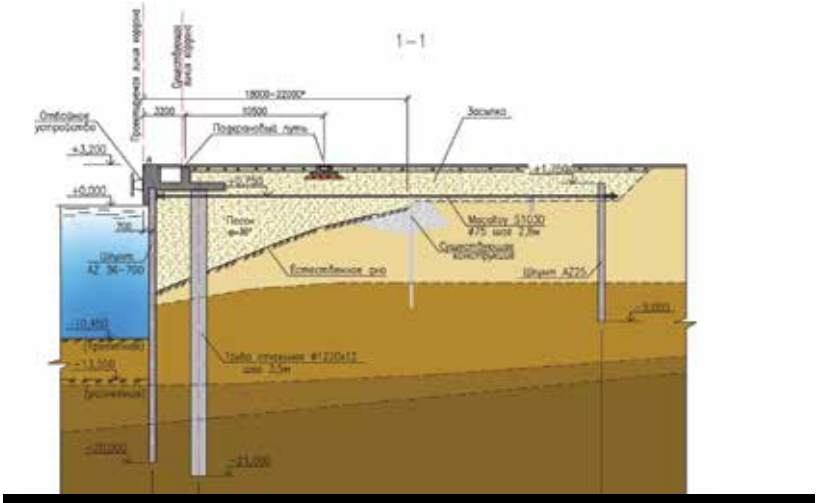
The Master Plan enabled:

- evaluation of the possibility of attracting new cargo types and cargo turnover;
- distribution of production facilities by efficient use of areas and berths;
- preparation of an area development program indicating time schedule, sequence and cost.

BERTH #12-14, 25, 26, 28



Berths # 12-14. Berth section



Berths # 25, 26, 28. Berth section

Berth reconstruction was in accordance with the framework of the Federal Target Program "Modernization of Transport System of the RF till 2015". The project was implemented in accordance with the Development strategy of St.Petersburg transport complex.

DRY DOCK BERTH, ELLING

The site is located at the address: 6, Korabelnaya St., Saint Petersburg, Severnaya Verf shipyard.

Customer – Open joint stock company Ship-building plant Severnaya Verf (SZ Severnaya Verf OJSC)

Prime Designer – KB ViPS OJSC

Scope of work of Morstroytechnology includes the development of hydraulic engineering installations.

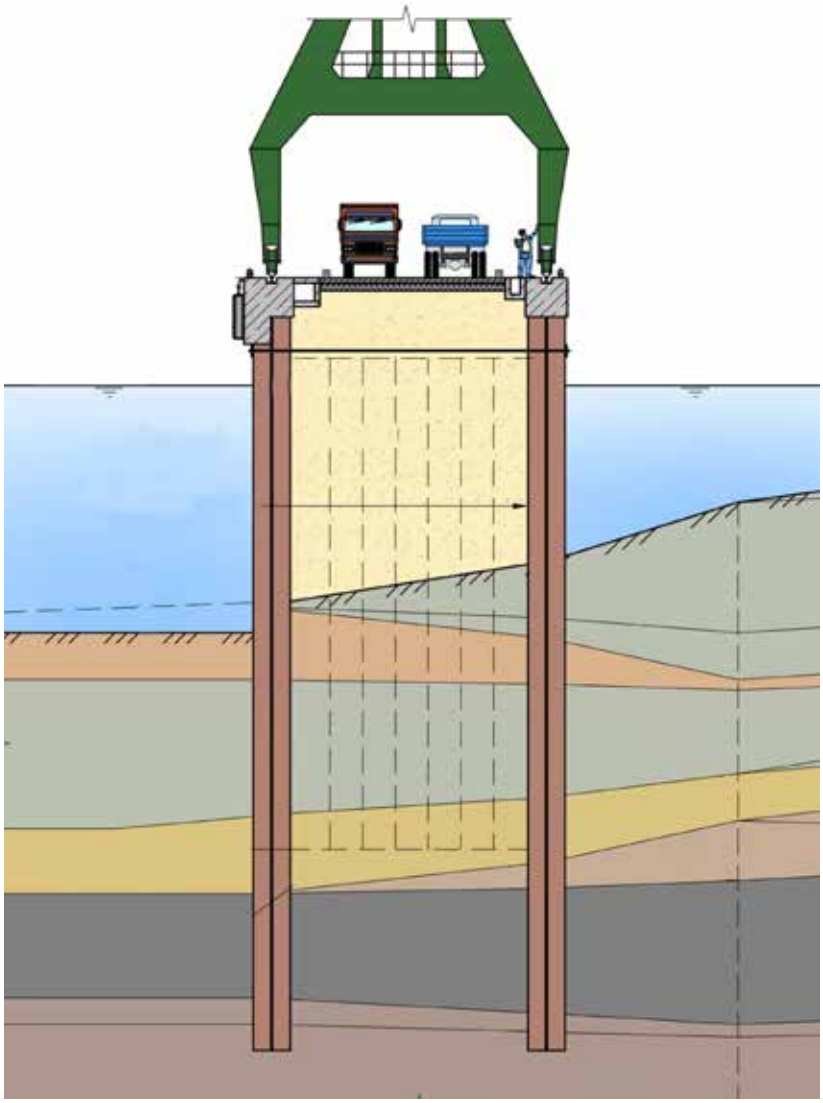
The Western berth functions differently depending on the stage of the project, whether construction or operation.

Upon completion of erection of the designed berth, it will become a part of the dam intended for drying of the unwatering of foundation of the well dock construction site.

Erection of the permanent part of the facility belongs to the project implementation phase 1.

Phase 2 will include construction of a temporary (dismountable) part, well dock and connection section to the Northern berth.

Basic design documentation prepared, favorable expert opinions received for Phase 1 of the project.



SV-11 berth facade (views from the central part)

SV-11 berth side (abutting the SV-12 berth)

Current state

For unwatering of foundation, the perimeter wall should be executed in a closed loop. Upon well dock construction completion the space behind walls will be filled with earth, while the temporary part of the berth will be dismantled.

To provide for the possibility of design vessels release from the dock, dredging is performed next to the berth wall.

The berth is intended for anchorage of towboats with the following features: length – 17.37 m; width – 3.8 m; draft – 1.36 m.

MGS-TERMINAL LLC BERTHS #1,2,3 REPAIR

MGS-TERMINAL LLC ZhB-1, ZhB-2, ZhB-3 BERTHS are located in the Big Turukhtan Harbor, Sea Port of Saint Petersburg.

The berths are designed for transshipment of containers and general cargoes.

Project target : Enabling the berth to receive increased operational load taking into account the shift of the design seabed level alongside of the berth border down to -9.0 m BES from the existing -7.8 m BES.

To this end, an integrated scope of scientific research works and feasibility studies was implemented. Subsequently, the decision was made to perform repair using soil-cement piles for reinforcement of the berth filling.

The project role of Morstroytechnology was not only that of the designer, but also one of the Prime Contractor. The repair works were executed by the efforts of MOL-MORSTROY CJSC, while the scientific and technical support was provided by Morstroytechnology.

In the course of repair, the berths were pre-loaded; the strain-stress distribution of the structure was monitored; durability and shape of the soil-cement piles were inspected.

The learnings from the process were evidential of the efficiency of knowledge intensive design and construction. For instance, the construction cost was reduced by 2.5–3 times versus the conventional solutions (sheet pile wall, pipe fence screening, ground anchorage).

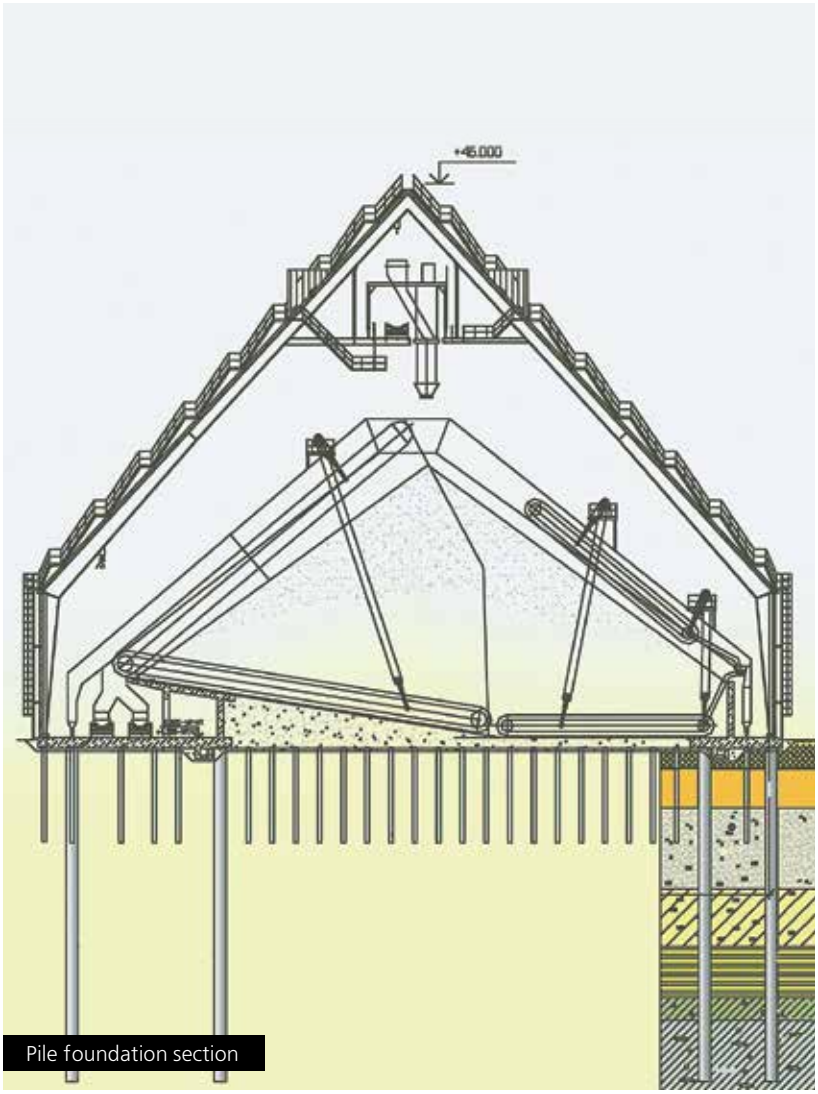
BALTIC BULK TERMINAL

Within the project Morstroytechnology designed warehouse #2 for mineral fertilizers.

The company provided scientific rationale, design and supervision of construction for the piled foundations.

Customer: Baltic Bulk Terminal, Public JSC.

Use of short length piled foundations increases the carrying capacity of the upper sand layer which overlays soft soil. This solution enabled a significant reduction in the capital cost of construction of the warehouse foundations.



Pile foundation section

BERTHS # 1-4 AND CHANNEL DREDGING

Reconstruction of berths, breakwater, harbor and approach channel was made within the framework of the Federal Target Program "Modernization of Transport System of the RF till 2015".

Morstroytechnology specialists were in charge of:

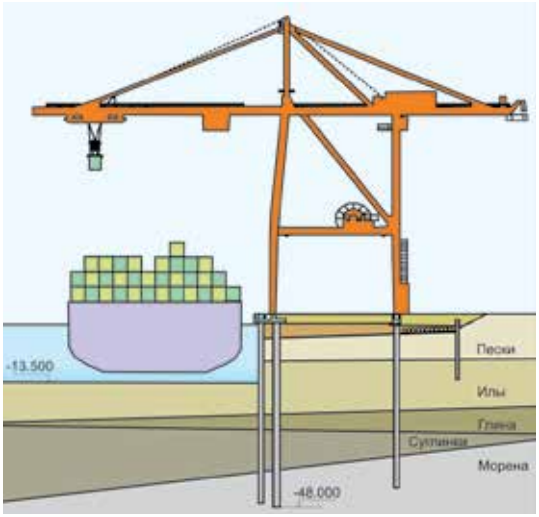
- Basic and detailed design documentation;
- designer supervision and technical support of the construction.

Project target: Increasing the port coal export capacity. After reconstruction, the port of Vysotsk receives vessels with 11.5 m draft and 70,000 tons DWT.

The project is characterized by:

- Reconstruction without interruption of berths' operation;
- Dredging of solid rock of VI-VII categories in adverse physical conditions.

BERTHS # 3-4
IN THE PORT OF UST-LUGA



Detailed design documentation and construction technology prepared jointly with Sochimorstroy LLC allowed to perform construction of the berths within the shortest time possible.

Container Terminal berths # 3-4 in the Port of Ust-Luga are designed as a sheetpile bulkhead wall comprising 1.22 m pipes driven at 1.5 m spacing.

Pipe spacing and diameter was calculated based on construction of soil impermeable sheet pile wall.

Berth length - 440 m.

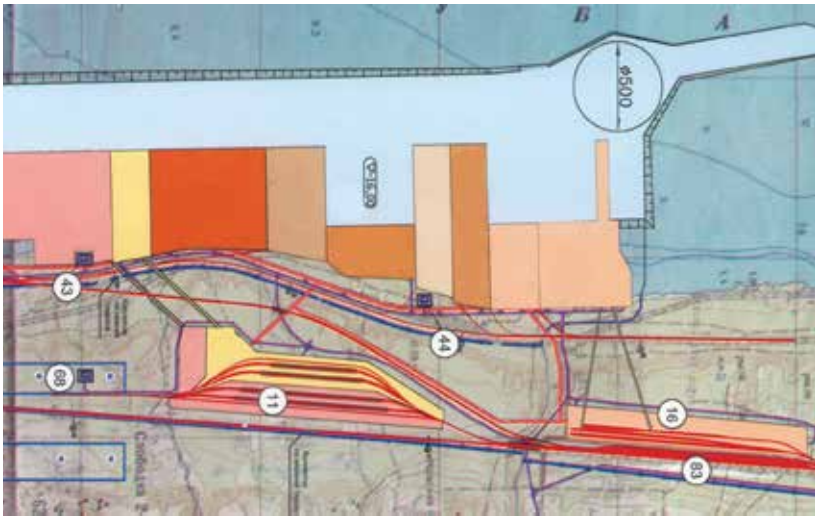
Berth depth - 13.5 m.

Crane gauge - 30.0 m.

The combi-wall structure works well in hard soil conditions, is easy-to-fabricate, and allows to reduce costs and construction time.

Use of land-based equipment during berth construction allows to avoid weather downtime.

METAL CARGO TERMINAL OF BALTIC METALLURGICAL TERMINAL, LLC



Design Phase:
- Front end engineering design ;
- Basic and detailed design documentation.

One of the largest Russian producer of metal products – United Metallurgical Company (UMC) Group – develops logistic schemes to deliver its products to customers.

The terminal designed by Morstroytechnology in the Port of Ust-Luga is a link in the supply chain. It was designed to increase competitiveness of UMC products (Customer: Baltic Metallurgical Terminal, LLC).

RO-RO MARINE TERMINAL IN VISTINO

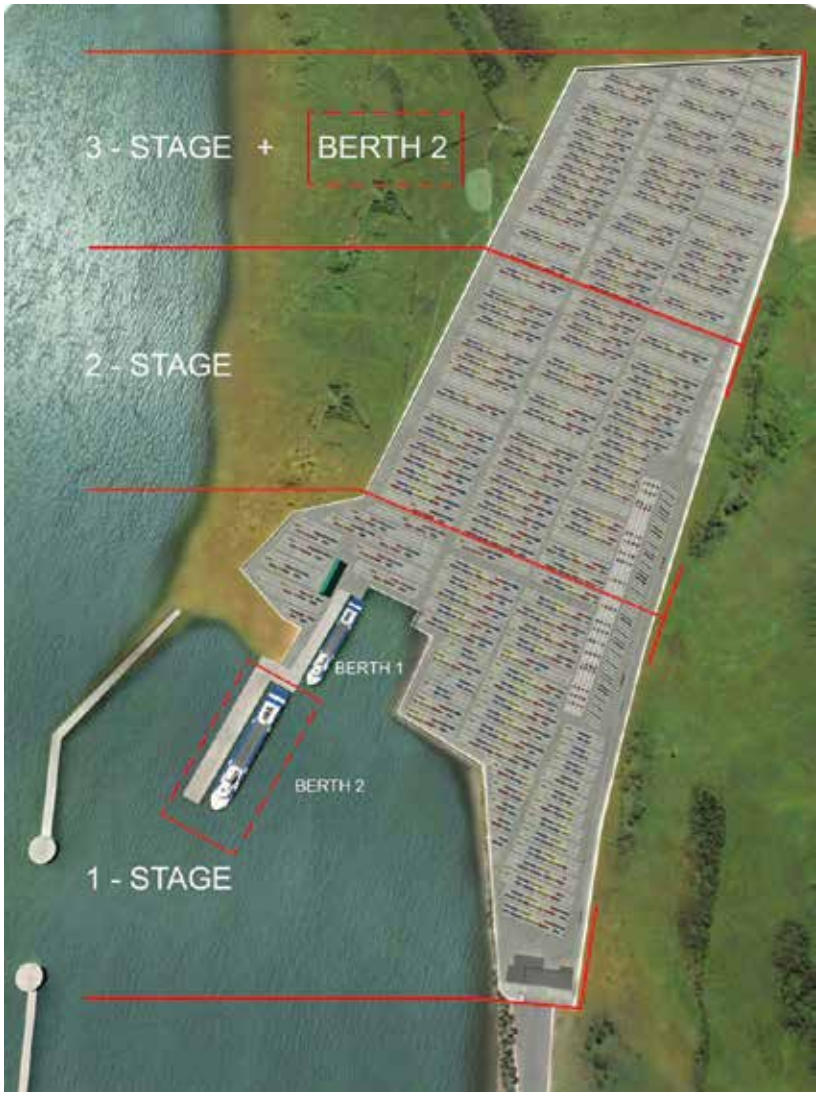
On November 1, 2011, RTL Group of Companies opened the Novaya Gavan sea terminal in the port of Ust-Luga, based upon the design by Morstroytechnology.

The capacity of the terminal Phase 1 amounted to nearly 250 thousand cars per year. The possibility of transshipment of both new passenger cars and other kinds of Ro-Ro cargos is being considered.

As early as 2012, part of the cars received by the RTL GC in the port of Saint Petersburg has been assigned to the Novaya Gavan terminal.

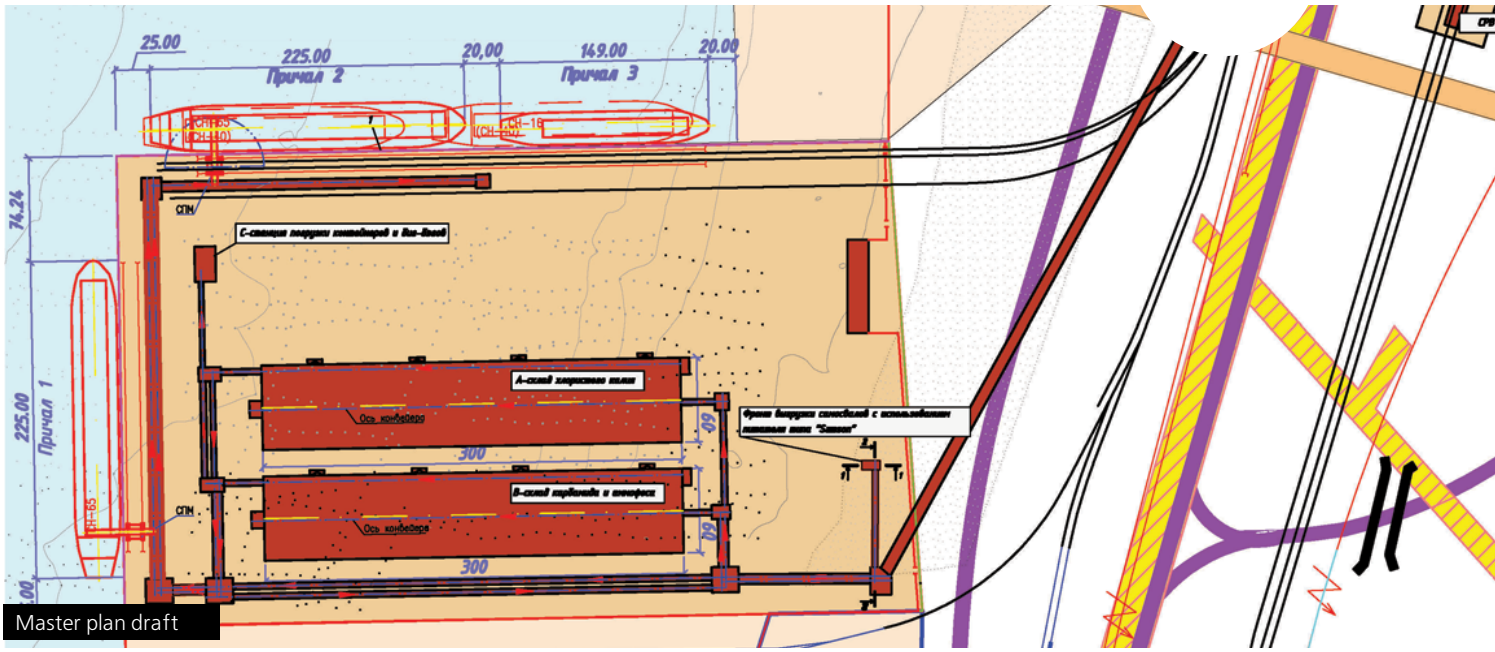
Design phase:
- Front end engineering design;
- Basic design documentation;
- Detailed design documentation.

The reconstructed as well as the newly-built berths have ramps for stern, side and quarter ramps for handling modern car ferries.

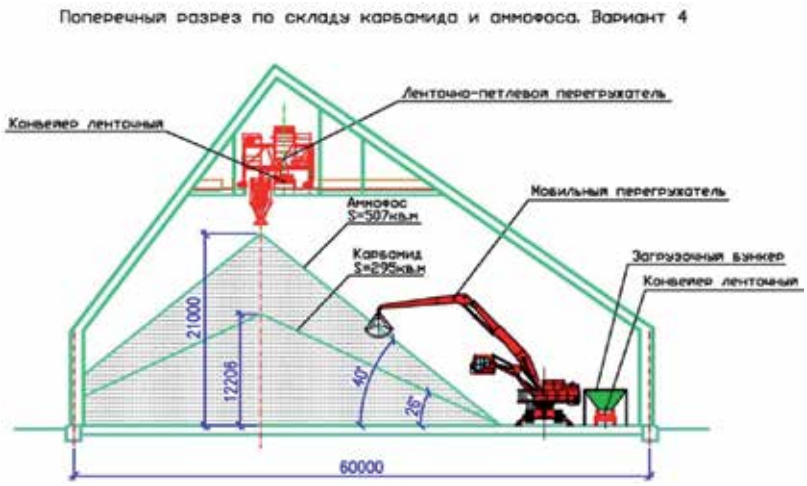


MINERAL FERTILIZERS TERMINAL

EuroChem



Master plan draft



Cargoes:
- muriate (KCl);
- nitro-phosphates;
- phosphates;
- other fertilizer.

Cargo traffic: export/import.

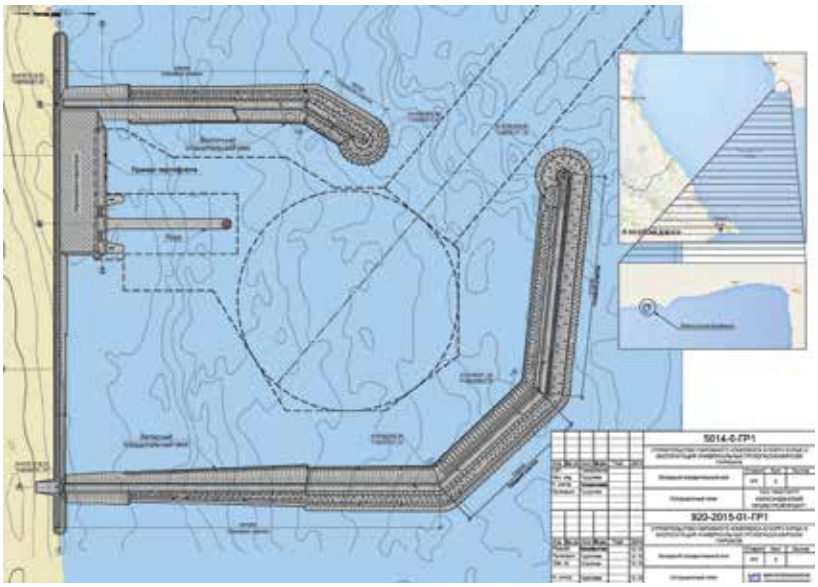
Transport: rail, road, sea.

Design depth at berth: 16 m.

Design cargo turnover: 5 mln tons per year up to 7.7 mln tons in development.

Following comparative technical and economic calculations were included in the basic design documentation by the Customer's request:
- logistics of raw materials and product deliveries by the route Ust-Luga – Kingisepp;
- internal warehouse mechanization layouts of the terminal;
- elaboration of terminal master plan and technological layout.

FERRY TERMINAL IN THE PORT OF KURYK



Project location: Mangistau region, coastline in 17 km to the west of Kuryk village (the Republic of Kazakhstan, Aleksander Bekovish-Cherkassky Bay, to the west of the cape of Sarzha).

Project location: Mangistau region, coastline in 17 km to the west of Kuryk village (the Republic of Kazakhstan, Aleksander Bekovish-Cherkassky Bay, to the west of the cape of Sarzha).

Project target: Construction of facilities enabling rendering of oil and/or oil products, liquefied gases, dry cargos, grain and mineral fertilizers transportation services in hopper railcars, ferry transportation operations, facilitation of development of international commercial shipping.

Ferry terminal specifics:
- enables handling of railway ferries;
- design vessel – Makhachkala ferry;
- nature of shipment – export and import.

The project feasibility study received a favorable opinion of the Republic of Kazakhstan State Expertise.

PROJECT CARGO TERMINAL

Prime Contractor:
SPETSGIDROSTROY LLC

Project deadline: 2014–2015

Project target: Construction of berth for unloading of oversized heavyweight equipment (OHE) is related to the necessity to ship pre-assembled modules from the port of Rotterdam by water for construction of a new ammonia production plant at the premises of FosAgro-Cherepovets JSC.

Project specifics: Design and construction of a berth capable of receiving the loads from simultaneous operation of two Liebherr LR 1750 cranes unloading the OHE up to 650 tons per piece.

Result

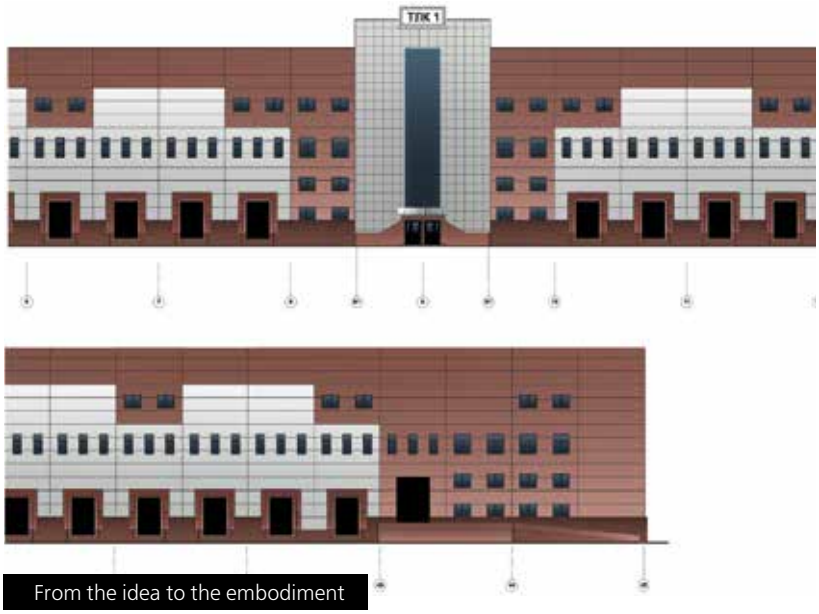
- Engineering survey and basic design documentation were prepared, favorable opinion from non-state expertise body was received
- Detailed design documentation was prepared
- The berth is constructed and commissioned; Morstroytechnology specialists performed designer supervision
- The project was implemented at a record pace – less than 12 months have passed from start of design to completion and startup.

TRANSPORT AND LOGISTICS HUB (TLH) – "YUZHNOURALSKIY"

Project target: Construction of a transport and logistics hub for handling of container cargos delivered by rail from China and Kazakhstan. The project provides for the flexible step-by-step capacity increase.

The hub will allow to significantly decrease the time and cost of container transportation. Cargo transit by sea from China to Russia (23 thousand km) takes about 50 days, and by Trans-Siberian Road (12 thousand km) – over one month.

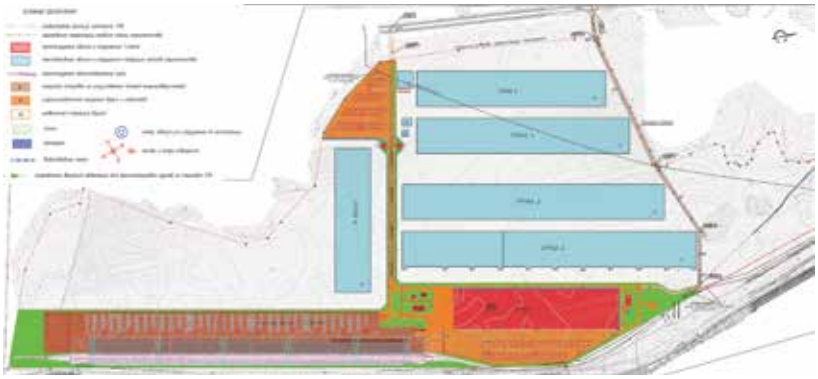
New itinerary from Urumchi (China) to UZHNOURALSKIY TLH via Kazakhstan takes 10 days and 3 thousand kilometers.



From the idea to the embodiment

Accomplished works:
- Development of basic design documentation
- Project expertise facilitation
- Development of special purpose specification
- Detailed design documentation
- Designer supervision

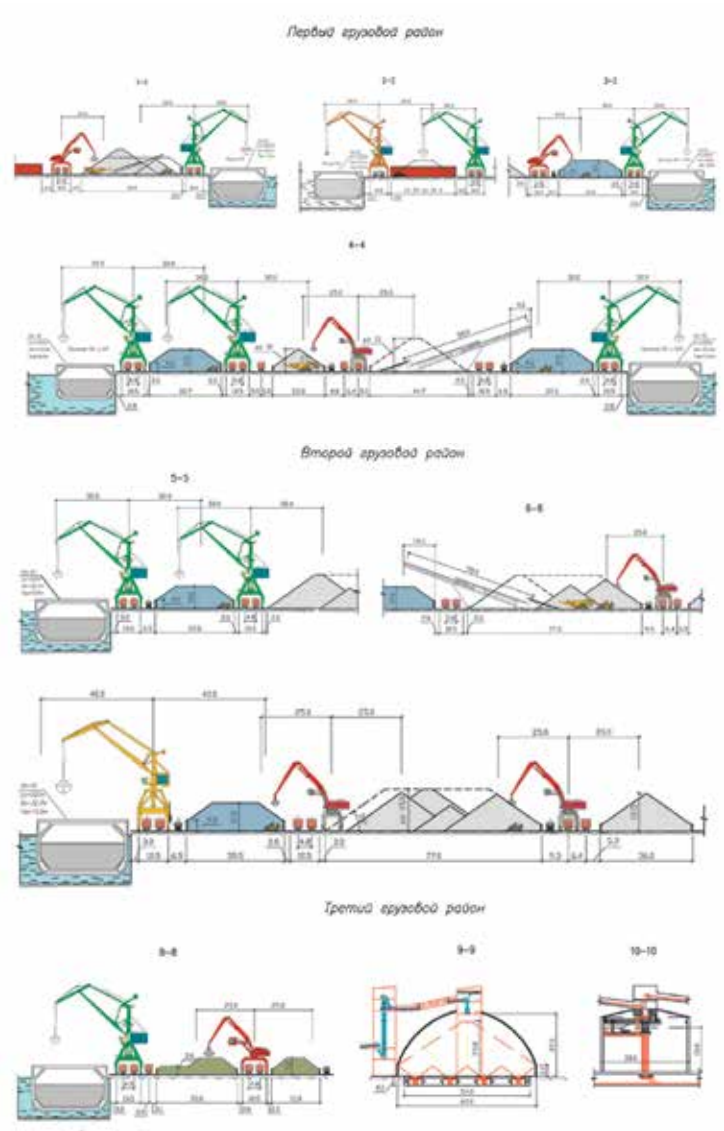
Main features of the TLH, First startup complex:
- Cargo turnover – 2,500 thousand tons/year, 307 thousand TEU/year
- Area – 45.1 hectares
- Total length of railway track – 7,829 m
- Total indoor warehouse area – 60,381.0 m2
- Container terminal – 14.02 hectares



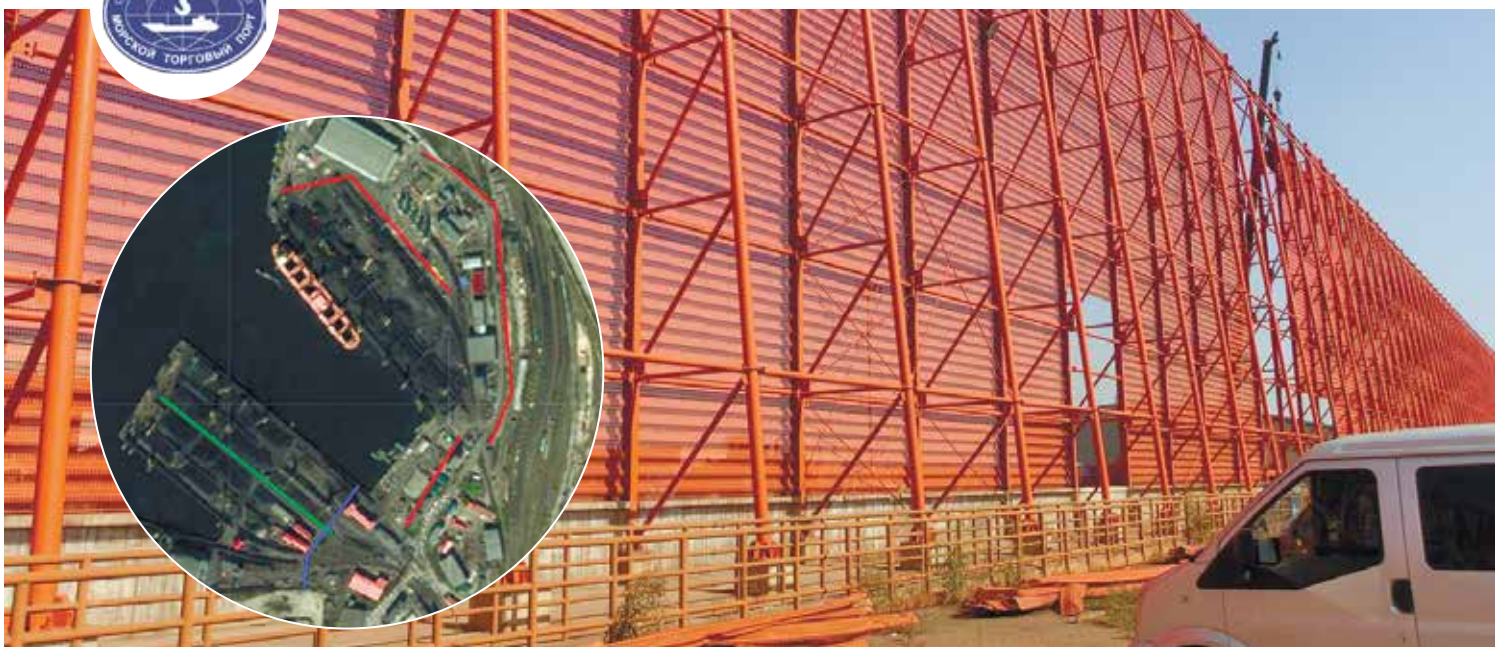
MASTER PLAN OF PJSC MURMANSK COMMERCIAL SEA PORT

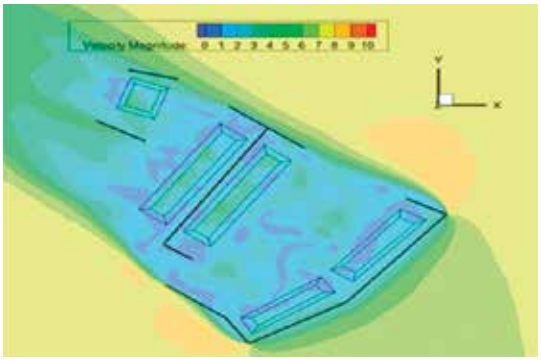
Project target: Preparation of Front end engineering design for selection of the most efficient ways of the Port cargo terminals development in short and medium-term perspective.

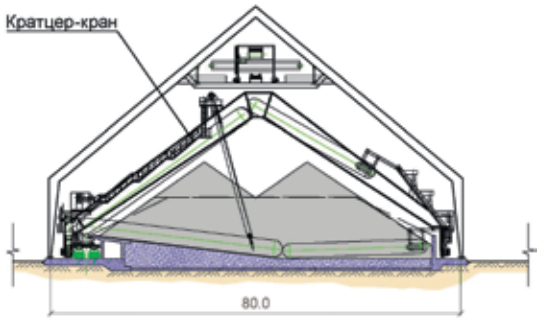
In the course of the study of the three cargo terminals development possibilities, over 18 process solutions and layouts were examined.

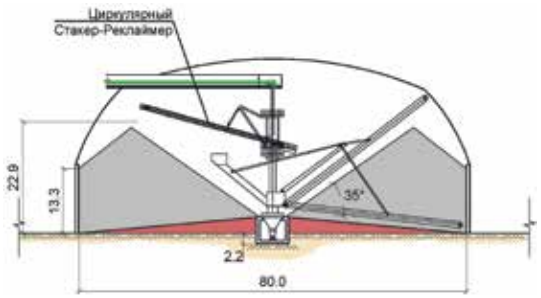


DUST PROTECTION FACILITIES IN THE PORT OF MURMANSK









Morstroytechnology under the assignment from Murmansk Sea Trade Port PJSC is performing research and design works with the target to prove feasibility of engineering operations directed at mitigation of coal dust impact over the environment.

The technical possibility for construction of covered dome shaped or vaulted warehouses was studied.

Dust and wind protection screens construction options for cargo terminals 1 and 2 were considered.

Morstroytechnology in collaboration with the Academy of Water Transport and Engineering Sciences of Tianjin (China) is finalizing the research of optimal parameters of dust and wind protection screens.

PASSENGER LINES' PIERS

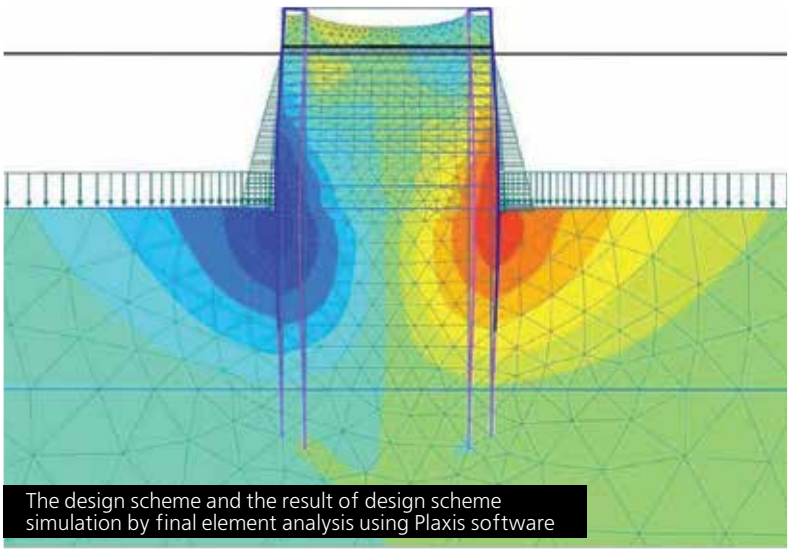
Design Solutions

The port of Murmansk is a port of strategic importance for Russia, handling large volumes of cargo, but the only passenger berth of the port is in a poor condition.

Project target: Restoration of the passenger berth to connect the City of Murmansk with the neighboring regions and recreational zone for the inhabitants.

The peculiarities of natural conditions caused the necessity to apply non-trivial solutions, both on the part of Morstroytechnology and the contractor company performing construction and installation works for the pier installation.

In January 2015 the long distance pier was successfully commissioned.

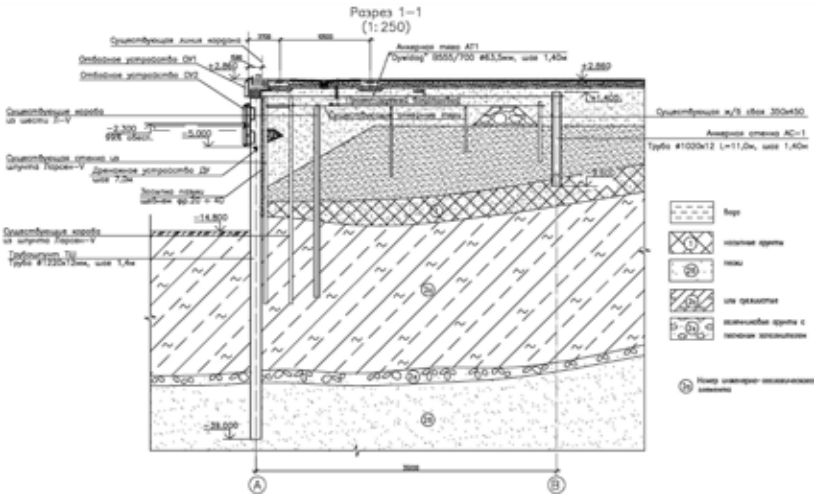

The design scheme and the result of design scheme simulation by final element analysis using Plaxis software

The face wall fabricated from ArcelorMittal AZ 36-700 pile sheeting with auxiliary temporary debonding behind the screening row.

It has been over 5 years since the departure of bark Sedov from the Port of Murmansk. All these years the world's largest sailing ship stayed away from the Kola Bay. Murmansk citizens and guest were able to see the legendary vessel and visit it during the celebration of 70-year anniversary of the World War Two Victory Day.

BERTH # 2

Current State



Design Solution

The target of the reconstruction is to switch the cargo flow of the Murmansk Commercial Sea Port from berth # 4 to berth # 2 to enable further reconstruction of the berth # 4. The berth was designed for receipt of bulk carrier vessels and coal handling and storage.

The layout of the designed structure was defined with regard to the position of the existing facilities of the Port and the Terms of Reference for the design, as well as dictated by the possibility of efficient use of the adjacent territory.

The designed facility consists of a waterfront 195 m long and two wing walls 14.3 and 6.5 m long, respectively. The design width of the berth is 40 m.

The pier level is assumed equal to plus 2.86 m BES.

The seabed level near the berth is minus 14.80 m BES.

Basic and detailed design documentation are performed; the favorable opinions of expert bodies are received.

COAL TERMINAL "LAVNA" IN MURMANSK

Coal Transshipment Terminal "Lavna" is located on the Western Coast of the Kola Bay.

Morstroytechnology provided detailed design documentation, engineering survey, and technical assessment of tender proposals for supply of machinery and technical equipment.

Detailed design documentation includes optimal design solutions to increase fire security, reduce the amount of works, and facilitate access for equipment maintenance.

After the construction is completed, the Coal Transshipment Terminal "Lavna" in the Murmansk Sea Port will increase its turnover up to 18 million tons per year and will be able to receive vessels with DWT up to 150 thousand tons.

INTEGRATED BASE FOR OPERATIONAL SUPPORT OF EXPLORATORY DRILLING IN THE KARA SEA

Project target: Design of the base for centered preparation of drilling fluids intended for wells drilling in the Kara Sea using the installations operated by ExxonMobil.

The Base includes Halliburton salt solution preparation plant, rack platforms for storage of drilling pipes, office building and reservoirs for process water.

The innovative finishing rigmat cover was designed and implemented at the site.

The coordinated effort of Morstroytechnology and Sakhalin-Shelf-Service LLC enabled prompt commissioning of the base.

BERTH CONSTRUCTION FOR AUXILIARY SHIPS

The berth is intended for:

- anchorage and mooring of ships with the following characteristics:
  - displacement – up to 25,000 tons,
  - length – up to 160 m,
  - draft – up to 12 m;
- cargo handling operations by means of wheel mounted crane.

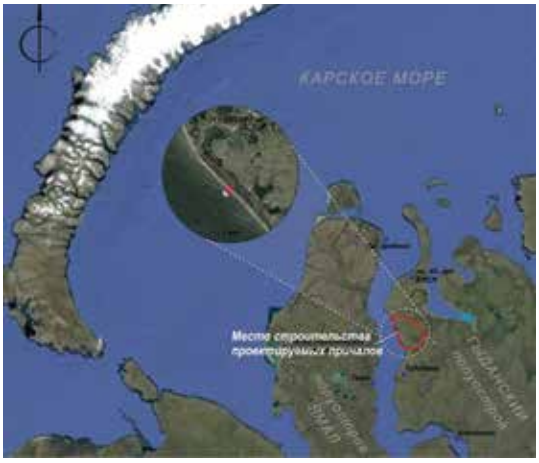
The cast-in-place and precast upper structure was developed, combining the advantages of both precast and cast-in-place reinforced concrete structures.

To ensure reliable anchorage to the bedrock, rock anchors with an additional pipe were designed.

The reinforcing cage of the piles includes junction rings developed for the purpose, providing for the cage extension using cranes with limited handling radius.

SALMANOVSKOYE (UTRENNEE) OIL AND GAS CONDENSATE FIELD BERTH OUTFITTING

Construction in harsh climatic conditions over a distance of 70 km from the nearest urban area



FROM IDEA

The subsoil plot of federal importance that includes Salmanovskoye (Utrennee) oil and gas condensate field located in the territory of Yamalo-Nenets Autonomous District and the Gulf of Ob in the Kara Sea, for exploration and production of crude hydrocarbons (Russian Government's decree of 16.02.2011 # 235-p)

Function of berths and period of operation:
- construction cargos receipt – two berths, diesel fuel / kerosene receipt – one berth;
- period of operation – annually during navigation, from the second half of July to September, about 70 days / year;
- total life cycle of the berths in the scope of the project – 25 years.

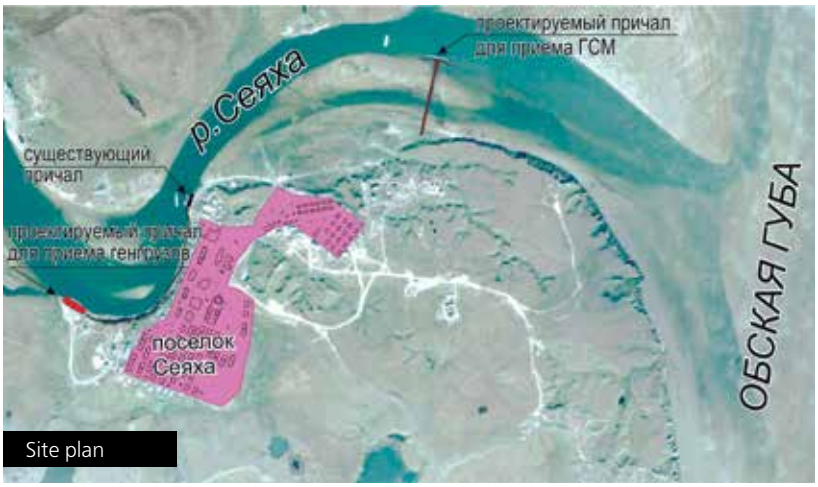
Main parameters of the berths:
- Berths' total length – 339 lin. m
- Seabed level near the berths – 9.5 m (BES)
- Number of berths – three

TO REALITY

DEVELOPMENT OF YAMAL AGRICULTURAL TERRITORIES

Seyakha village


Quay design

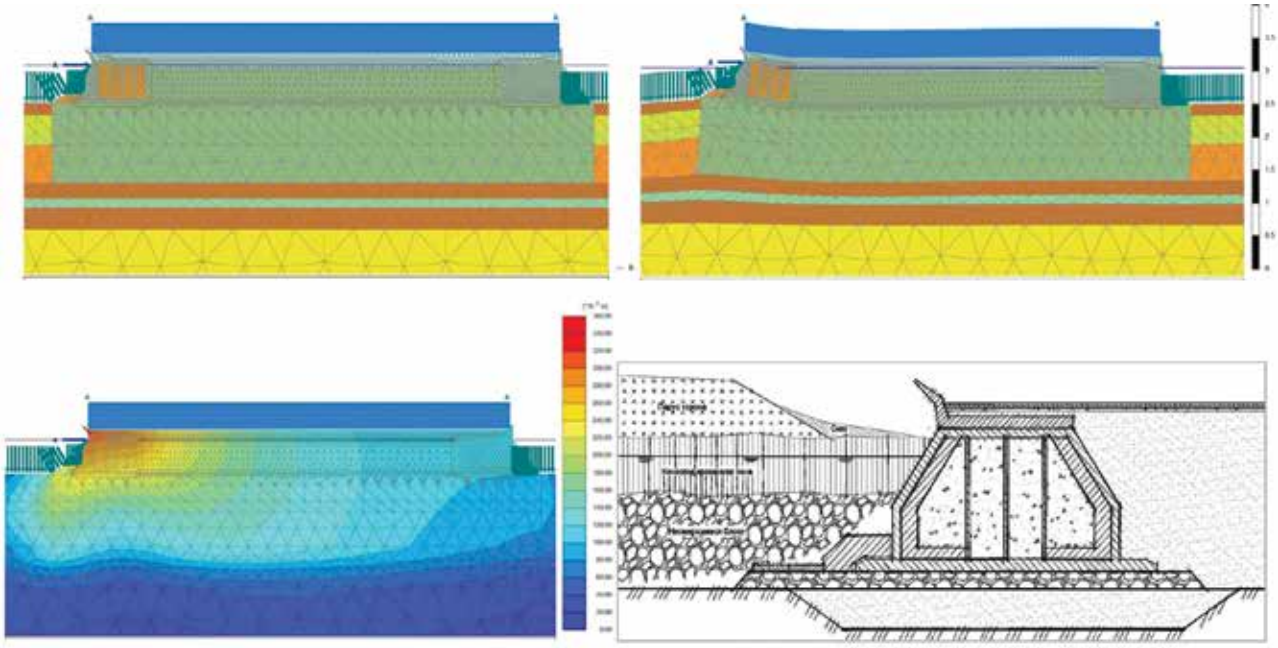


Site plan

Morstroytechnology has developed the basic and detailed design documentation:

- for stabilization of 890 m of the Seyakha river bank for protection and prevention of erosion of its permafrost soils in the territory of Seyakha village;
- for construction of berths to receive general cargos and petroleum products, providing for the uninterrupted delivery of cargoes to Northern Russia.

ARTIFICIAL ISLANDS

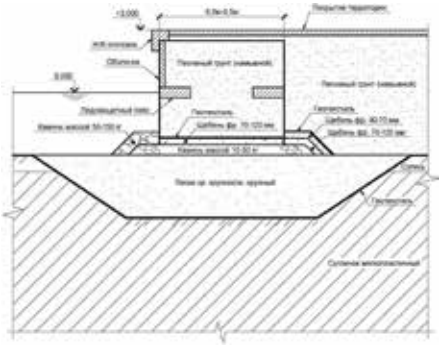


Artificial islands are a reliable ground in the open water for arrangement of exploratory wells drilling and construction of production plants for pumping and dispatching of crude hydrocarbons.

Morstroytechnology possesses the required resources to design artificial islands, even in the severe environmental conditions of the High North.

Scheme of interaction between the gravity type enclosure structure and hummock.

The scale of ice image corresponds to the scale of the structure (consolidated layer thickness is 4.5 m)



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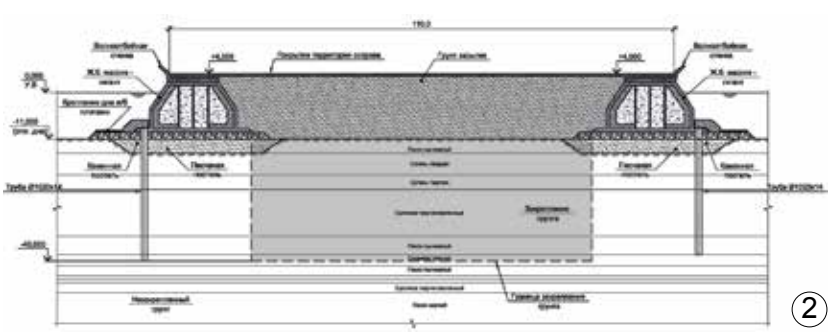

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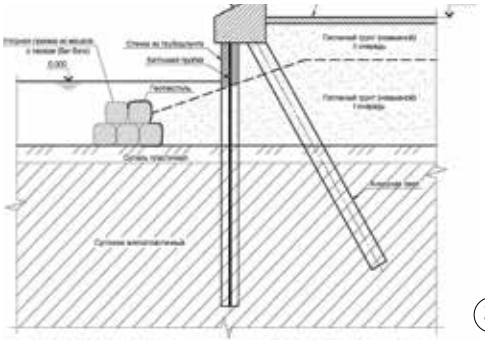

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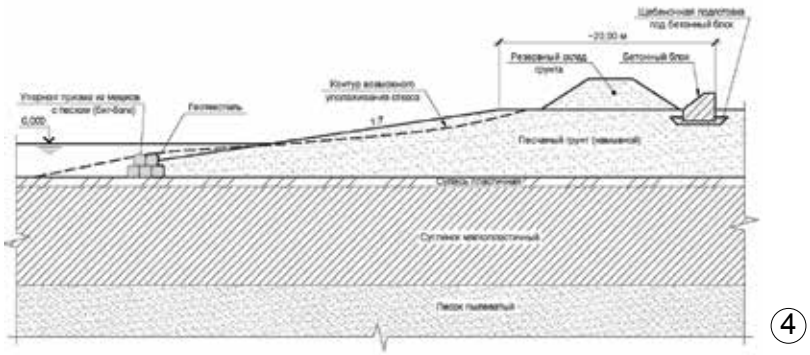

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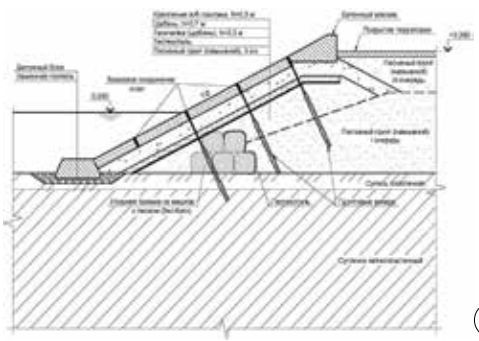


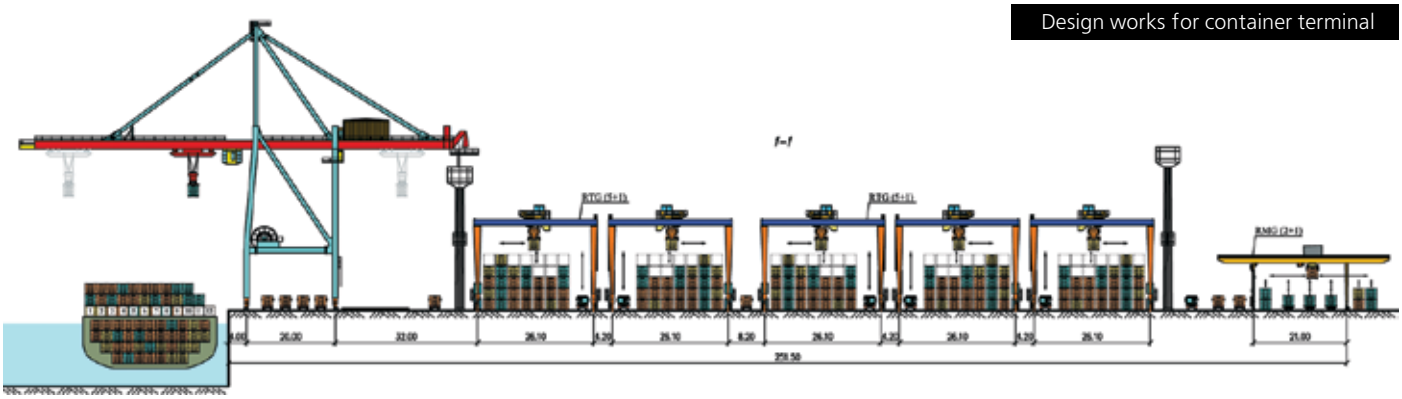
5

Based on the engineering, geological and hydrometeorological conditions of the construction site, the following perimeter enclosure options can be applied:

- large diameter steel casing (1);
- concrete caissons (2);
- pile sheeting or pipe-and-pile walls (3);
- low angle sand slopes (4);
- reinforced concrete slab protection of the slopes (5).

CONTAINER TERMINAL IN ZARUBINO PORT

Functioning port Zarubino

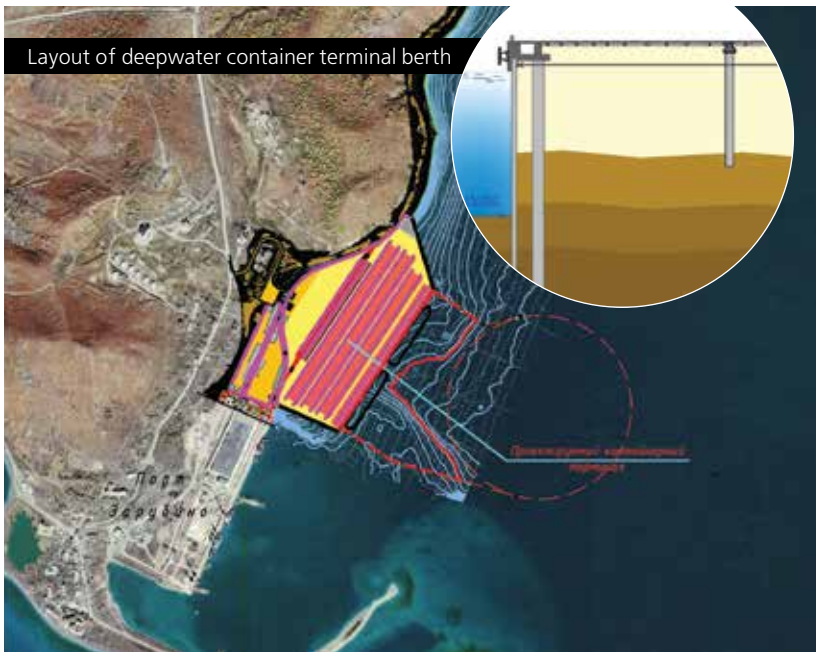


Design works for container terminal

Benefi cial location, transport accessibility and favorable natural conditions create prerequisites for development of the existing port of Zarubino in the south Primorye region. Predesign studies and investigations for the Container Terminal project were completed.

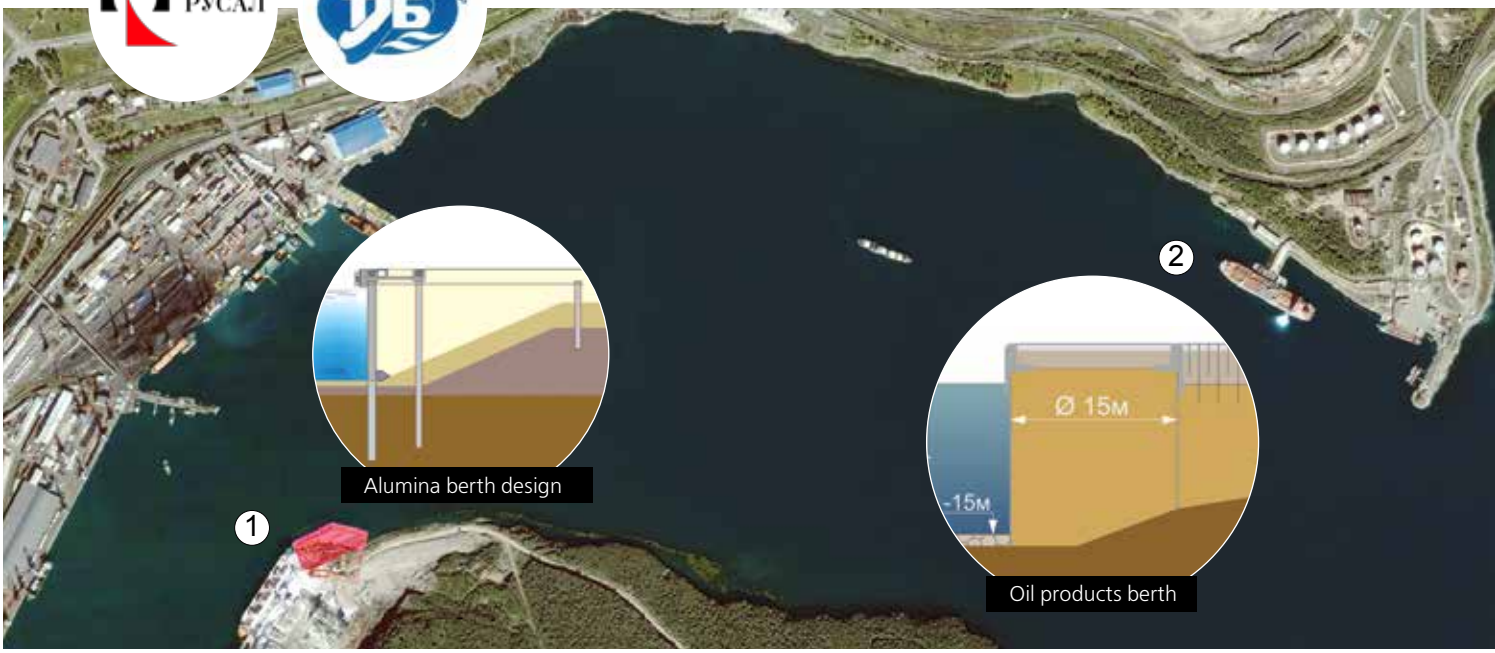
Investors:

- TransContainer, Public JSC;
- TransGroup AS, LLC.
- Customer (General Designer):
- Haskoning Consultants,
- Architects and Engineers, LLC.



Layout of deepwater container terminal berth

BERTHS




Existing grab unloading of alumina

Design and construction supervision of a berth for 80,000 DWT tankers and a berth for fuel vessels was carried out by Morstroytechnology in 1993-1994 for Transbunker, Public JSC.

It is planned to replace the existing crane and grab equipment for unloading alumina by special ship unloaders increasing the terminal capacity. Morstroytechnology carried out the design and investigations for the port structures of the terminal.

CONSTRUCTION OF COAL TRANSSHIPMENT PORT ON NORTHERN COAST OF MUCHKE BAY

Coal irrigation to prevent dusting


The best layout decisions were chosen on the basis of hydraulic simulation in the wave pool.

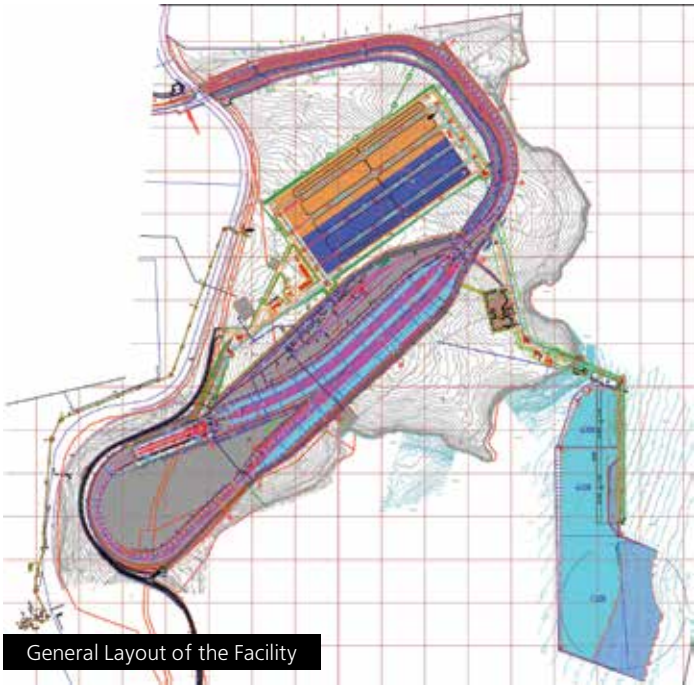
The transshipment hub under construction is intended for:

- Coal transshipment from railway transport to sea transport;
- Short-term storage of coal in open storage facilities;
- Vessel maintenance services (power supply from the berth, water bunkering);
- Customs control;
- Compilation of receiving-and-departure and shipping documents;
- Performance of other operations specific to the seaport (ensuring navigation safety, security services at the facilities, etc.).

Construction of the facility is planned in two stages.

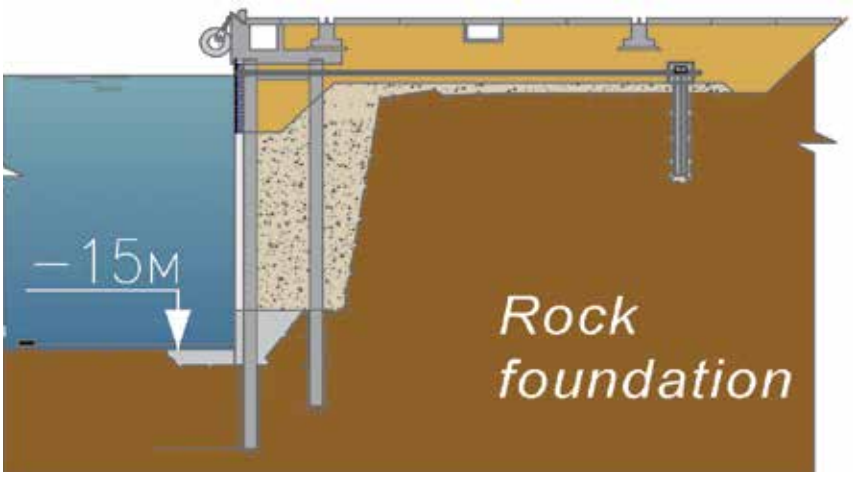
Planned cargo turnover volume at various stages of the project shall be as follows:

- Stage 1 – 12 million tons per year;
- Stage 2 (maximum cargo turnover) – 24 million tons per year.


General Layout of the Facility

BERTH REPAIR IN KHOLMSK FISHERY PORT

Berth repair in Kholmsk Fishery Port (Sakhalin island) was carried out based on the project and with the technical support of Morstroytechnology.



COAL PORT IN SUKHODOL BAY

The goal of the project is the construction of a specialized coal port in the area of Sukhodol Bay, Primorsky Krai, with the capacity of 20 million tons per year, consisting of:

- a marine cargo front;
- a railway cargo front;
- a storage facility;
- systems of public utilities, security systems, communication systems, etc.;
- an approach channel, vessel traffic control system, ground support equipment;
- state border control checkpoint, administrative buildings.

The main objective of the port is to facilitate access of small and medium-sized coal mining enterprises to the port infrastructure.

Basis for project implementation:

- Social and Economic Development Strategy of Primorsky Krai through 2025 approved by the Law of Primorsky Krai of 20.10.2008 No. 324-KZ.
- Paragraph 35 of the Minutes of the meeting with Prime Minister V.V. Putin on 24.01.2012 No. VP-P9-1pr.

3D model: A general view of the coal port of Sukhodol

Specialized equipment at main loading facilities in the port

Coal transshipment volume:
- 1st phase 2017 – 6 million tons
- 2nd phase 2019 – 12 million tons
- 3d phase 2021 – 20 million tons (full capacity)

Complex area – 170.0 hectares

Coal storage volume – at least 1.2 million tons

Operational water area – 18.9 hectares

Cargo terminals – 2

Maximum estimated vessel capacity – 120 thousand tons

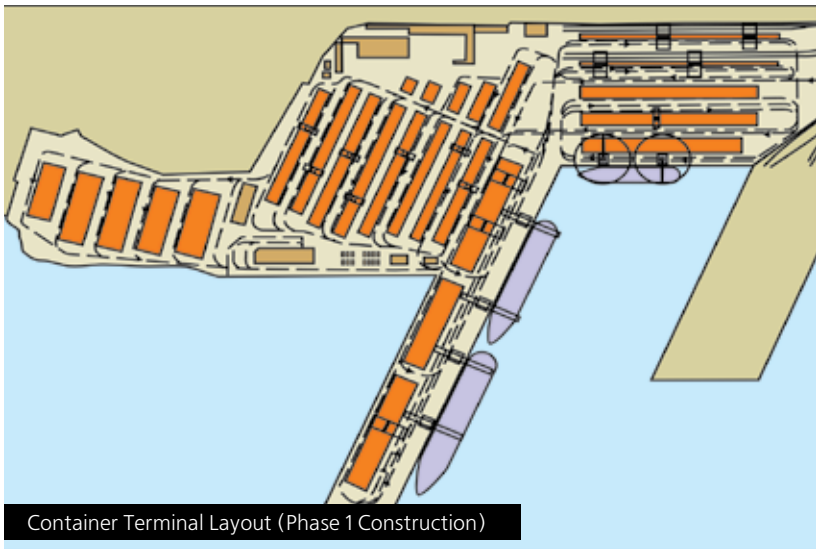
Equipment performance – 3,500 t/h

Main technological and technical solutions that help protect the environment
- Layout solutions for port facilities: distance from the water area – 500 m, distance from settlements – 6 km, natural protection by relief (hills)
- Use of closed conveyor galleries
- Coal irrigation in all places of its transshipment and transportation
- Use of aspiration, additional technological devices that reduce dusting
- Application of dustproof barriers
- Cleaning of the port territory and gondola cars with mobile pneumatic machines
- Collection of rainwater from the port territory
- and its treatment at modern local wastewater treatment plant

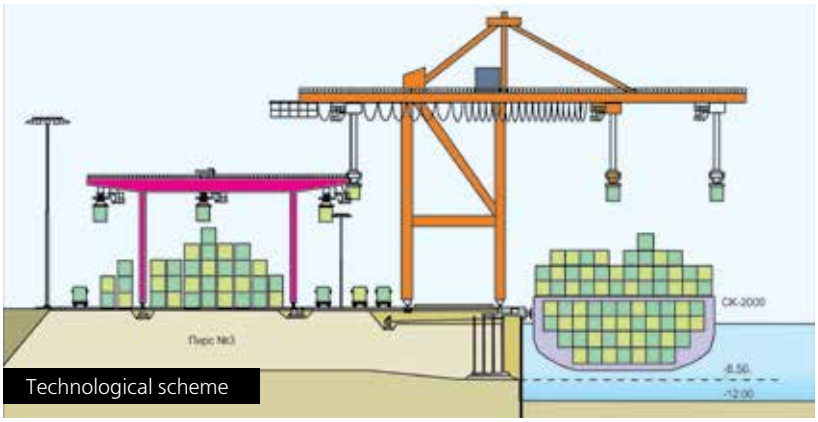
CONTAINER TERMINAL IN THE PORT OF RAJIN

Perspective Development Plan of the Container Terminal

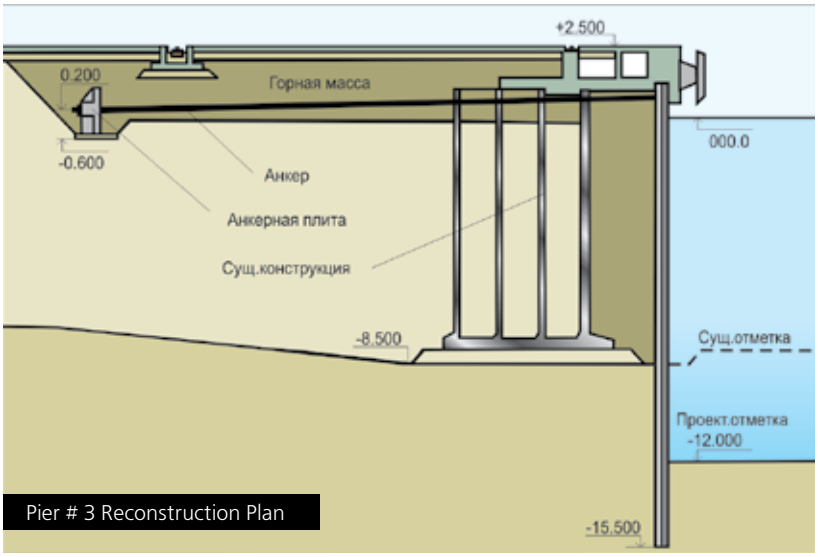
The project for the new container terminal construction in Rajin port (DPRK, Northern Korea) is a part of the reconstruction of Khasan-Rajin segment of Trans-Korean railway. The project will provide the Russian Railways direct access to the port terminal.



Container Terminal Layout (Phase 1 Construction)



Technological scheme



Pier # 3 Reconstruction Plan

Morstroytechnology carried out underwater exploration, engineering survey, design work and the approval process.

The design solutions for reconstruction of existing pier #3 will allow the installation of specialized container equipment and dredging to receive modern container vessels.

COAL TERMINAL IN THE PORT OF RAJIN

Construction site panorama

At the construction stage of the terminal in Rajin, the Customer (JV RasonConTrans) decided to re-focus the purpose of the terminal to bulk coal processing. Detailed design documentation was issued practically simultaneously with the construction.

The port terminal in Rajin was considered as a logical completion stage of the railway section between Khasan Station (Russia) – Rajin Station (DPRK). The project is a pilot part of a grandiose project for construction of the Trans-Korean Railway which will link South Korea's railway network with the Russian Trans-Siberian Railway. The grand opening of the Khasan-Rajin section of the railway after reconstruction was held in September 2013.

Reconstruction of terminal port facilities in the port of Rajin (DPRK) were completed in 2013.

Of particular interest in this project is a comprehensive approach to the task of building the terminal, Customer support and handling of all issues (from tender documentation to author supervision), technological solutions that allow the terminal to be flexible and allow for changing the structure of the cargo flow; cooperation with foreign control and expert bodies (Expert assessment in DPRK).

Director General of Morstroytechnology M.Yu. Nikolaevsky and Project Manager of Morstroytechnology A.I. Bogun in Rajin

Vityaz delivery to Rajin


Unloading of the first cars with coal which arrived at Rajin

Completed works include:

- Reconstruction of hydraulic structures with the total length of 480 m;
- Construction of open storage facilities;
- Construction of an autonomous diesel power plant for own needs with the capacity of 4.5 MW with a fuel depot and a petrol station;
- Rail cargo fronts;
- Administrative building;
- Repair shop;
- Terminal fencing and checkpoints;
- Laying of water supply, drainage, power supply, fire extinguishing supply lines,
- communication networks;
- Dredging of the operating water area to the level of
- -12 m, which allows receiving and handling ships with the deadweight up to 40 thousand tons;
- Construction of wastewater treatment plants for storm water and sewage lines.

As part of the project, the terminal was equipped with four modern Vityaz port cranes. For unloading coal from railway cars and warehouse operations, five Mantsinen 120 cranes and two Mantsinen 70 manipulators have been delivered.

In April 2014, the terminal of the port of Rajin received the first shipment of Russian coal.

ADMINISTRATIVE BUILDING IN THE SEAPORT OF SOCHI

FROM IDEA

TO REALITY

ADMINISTRATIVE AND OFFICE BUILDINGS

Administrative and Office building in the seaport Sukhodol

Sea ports and transport infrastructures are big civil objects of an extremely practical usage. In spite of this there is a great field for architectural creative work. The architectors of "Morstroytechnology" are always inspired by interesting projects and the possibility for creative execution of the difficult task

Administrative and Office building in the Coal Transshipment Terminal "Lavna" in the seaport of Murmansk

PORTS AND TERMINALS

1. Assessing market position:
   a. Analyzing cargo flows in the region and competitor ports. Assessing trends and tendency of changes in cargo flows. Forecasting cargo flows
   b. Bench-marking for cargo and cargo flows of interest. Assessing freight owner's requirements to level of service
   c. Assessing competitive position of a port (terminal) with respect to the following key criteria:
      i. Technological capabilities
      ii. Level of service
      iii. Motorway and railway access roads and bottlenecks
      iv. Rates
      v. Comparing logistic chains (full logistics costs) using the terminal and on competing routes
      vi. Environmental risks
   d. Developing proposals regarding improvement of competitiveness

2. Assessing technical condition:
   a. Hydro-technical facilities
   b. Process equipment
   c. Condition of railway and automobile transport infrastructure

3. Designing a program for port (terminal) development. Proposing technical solutions and comparing possible options, estimating costs, time schedule, risks:
   a. Implementing new technology
   b. Re-orienting to new types of cargo
   c. Upgrading the terminal to enable it to accept larger vessels
   d. Refurbishment and reconstruction of hydro-technical facilities
   e. Organizing liaison with the railway

4. Structuring the financial model of a project:
   a. Assessing investment needs
   b. Estimating the level of operating costs (taking into account regional specifics)
   c. Assessing efficiency of the project. Analysis of project sensitivity.

LOGISTICS STRATEGY. DEVELOPING LOGISTICS SUPPORT OF NEW PRODUCTION OPERATION, DEVELOPMENT OF A FIELD

1. Analyzing existing cargo flows:
   a. directions, routes and volumes of transport operations
   b. technologies used for transportation and trans-shipment, containers, type of rolling stock
   c. key consignors and consignees, tendencies of changes in cargo flows

2. Assessing existing technologies of transportation and trans-shipment. Analyzing alternative technologies, their advantages and disadvantages. Selecting the best transport technology taking into account special features of the situation

3. Determining requirements to the level of service necessary for competitiveness of the transport scheme on the whole and on element-by-element basis

4. Infrastructure analysis:
   a. Analyzing the infrastructure used for transportation. Identifying bottlenecks and constraints:
      i. Intra-plant logistics infrastructure
      ii. Ports and Terminals
      iii. Motorway and railway access roads
      iv. Warehouse facilities
   b. Assessing needs in infrastructure for cargo pick-up (deliver)
   c. Assessing sufficiency of existing infrastructure taking into account prospective cargo flows in a region
   d. Developing proposals on creation or reconstruction of infrastructure
   e. Estimating capital expenditures based on the proposed steps

5. Carrying out pre-project studies with respect to construction or reconstruction of the infrastructure, port or land terminals:
   a. Determining key parameters
   b. Developing preliminary layout plan
   c. Identifying needs in production equipment
   d. Assessing capital and operating expenditures
   e. Developing financial model

6. Analyzing full logistics costs:
   a. Identifying capital and operating expenditures with regard to own infrastructure.
   b. Analyzing costs for railway transportation, vessel charter, warehouse operations, etc.
   c. Assessing the need for rolling stock or fleet to be purchased and corresponding costs
   d. Estimating costs for transportation on proposed and alternative routes
   e. Assessing relative competitiveness of transportation schemes

7. Providing grounds for outsourcing solution or for logistics functions to be set up in the company's structure:
   a. Choosing between construction of own terminal, its rent, acquisition, partial reconstruction of infrastructure at an existing port, selecting the format of relationship with a logistics operator
   b. Determining whether it would be practical to construct own fleet or rolling stock

8. Formulating a program for development of transport assets (terminals, fleet, railway stock):
   a. Elaborating action plans, identifying phases
   b. Assessing the budget
   c. Assessing their efficiency

INVESTMENTS IN TRANSPORT PROJECTS. AUDIT OF PORT OR LAND TERMINAL PROJECT

Assessing justification for investment.

1. Assessing technical condition and market position of an existing port/ transport asset in relation to the following parameters:
   a. technical condition of hydro-technical facilities, sites, buildings, other infrastructure of a terminal;
   b. capabilities of the technology used and sufficiency of trans-shipment equipment;
   c. sufficiency of the terminal territory for day-to-day operations and possible ramp-up of capacity;
   d. constraints on railway and motorway access roads;
   e. existing facilities for cargo trans-shipment and potential for ramp-up of capacity or re-purposing;
   f. efficiency of capacity utilization with reference to benchmarks;
   g. existing cargo base and prospective cargo flows;
   h. SWOT-analysis and competitiveness in the market.
2. Assessing a terminal project based on the following parameters:
   a. specific features and potential of the terminal's location;
   b. sufficiency of external infrastructure (motorway and railway access roads, utility networks);
   c. sufficiency of the territory and storage locations as well as cargo handling locations;
   d. whether the process solutions of the project are feasible and optimal;
   e. sufficiency of planned bottom dredging operations;
   f. whether the hydro-technical solutions are feasible and optimal;
   g. justification and sufficiency of investment costs;
   h. conformity of the assumed parameters to the market requirements (bench-marking)
   i. justification for the cargo base and demand for the services provided by the terminal;
   j. anticipated level of operating costs;
   k. commercial efficiency of the project.

l. rationale for the project implementation schedule;
m. project Implementation risks;
n. sufficiency of title establishing and initial licensing documentation.

At the stage of project Implementation:

1. Analyzing the initial licensing documentation and design documentation:
   a. availability of the documents package necessary for this phase of work;
   b. assessing sufficiency of and the need for updating/extending/obtaining the initial licensing documentation;
   c. identifying the risks relating to change in construction completion date caused by delay in receipt of the initial licensing documentation;
   d. checking for conformity of the planned works to the requirements of the technical rules, State Standards (GOST), Construction Rules and Regulations (SNiP), existing law of the Russian Federation.

2. Analyzing the specifications for connection to external engineering networks. Existence, validity, compliance with the requirements of the Specifications in the project.

3. Assessing the schedule for performance of works taking into account the volume of actually completed works and works to be completed with reference to the project budget items.

4. Assessing correlation between the planned and actual project implementation expenditures (in relation to the project budget items and target dates). Ascertain factors and risks relating to project budget cost over-runs.

5. Assessing degree of construction readiness of the construction project as a whole and on facility-by-facility basis (under the design documentation developed) taking into account receipt of permits and licenses for use of the installed equipment and the documents confirming compliance with the specifications, etc.

6. Assessing potential dates for construction completion, receipt of permits for commissioning and executing title ownership deeds.

SCENARIOS FOR DEVELOPMENT OF THE TRANSPORTATION SYSTEM

Background

Within this project, it was necessary to propose transport infrastructure development that would avoid redundancy and allow for rational planning of investments in modernization while taking into consideration technical and environmental limitations.

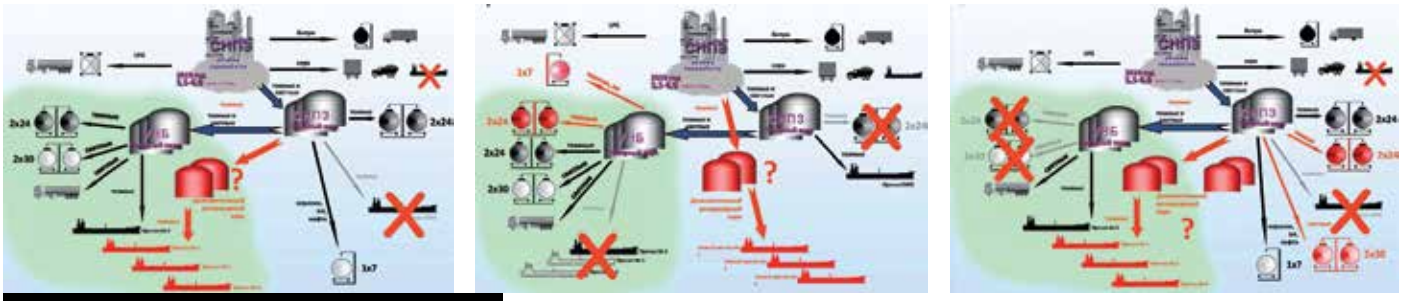
Result

In the end, 12 detailed development scenarios were presented, two of them (main and backup) were recommended to the Customer.

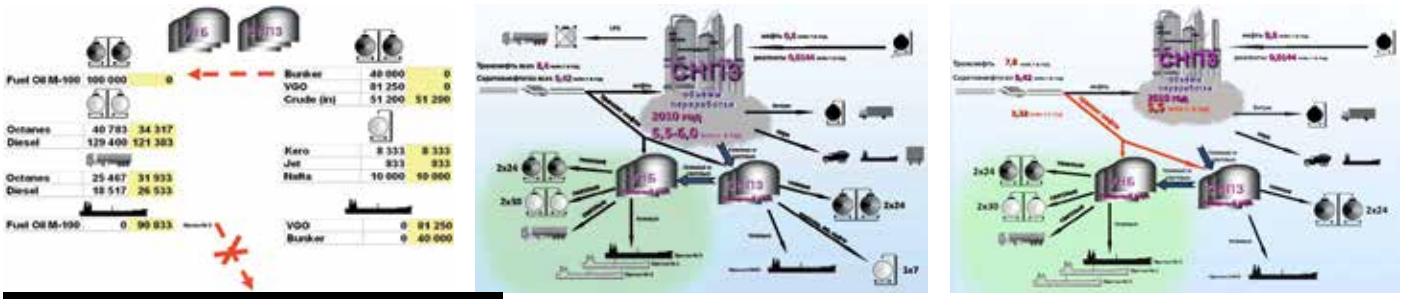
The main suggested development scenario was approved by the General Customer.

General Customer: TNK-BP Management

FOR THE SARATOV OIL REFINERY (SOR) AND UVEK TANK FARM (UTF)

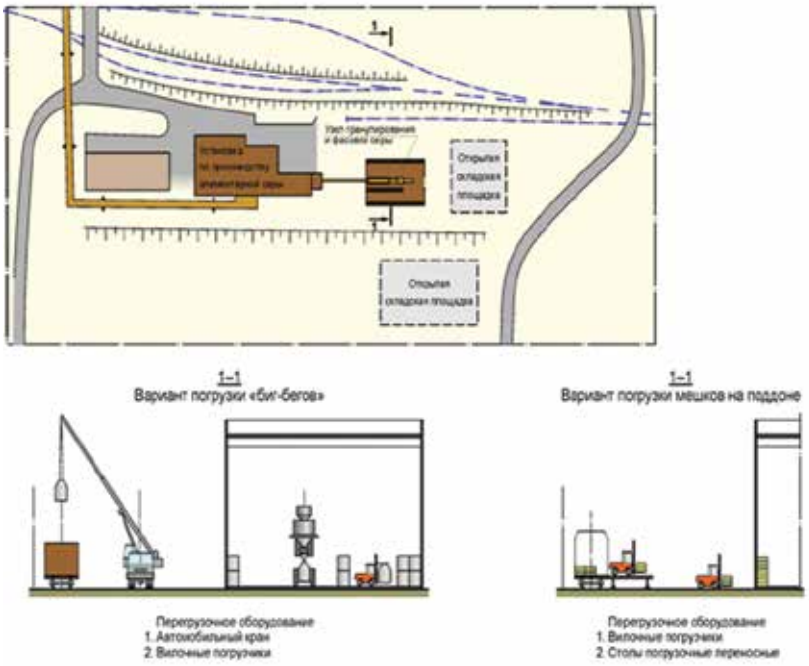


Transport system: possible ways of development



Various logistic and technological schemes

Assessment of variants according to a set of criteria



One of the analyzed variants of the Sulphur discharge scheme

For the Customer, the project resulted in an optimum development scenario and a 5-year follow-up program which permitted:

- a reduction in the reconstruction costs by 10 million dollars;
- implementation of the reconstruction without interrupting trade and reducing throughput;
- mitigation of environmental impacts;
- retention of the ability to load refined products onto river tankers.

TESTING OF EXPERIMENTAL PILES ON THE QUAY PIER IN THE PORT OF NOVOROSSIYSK

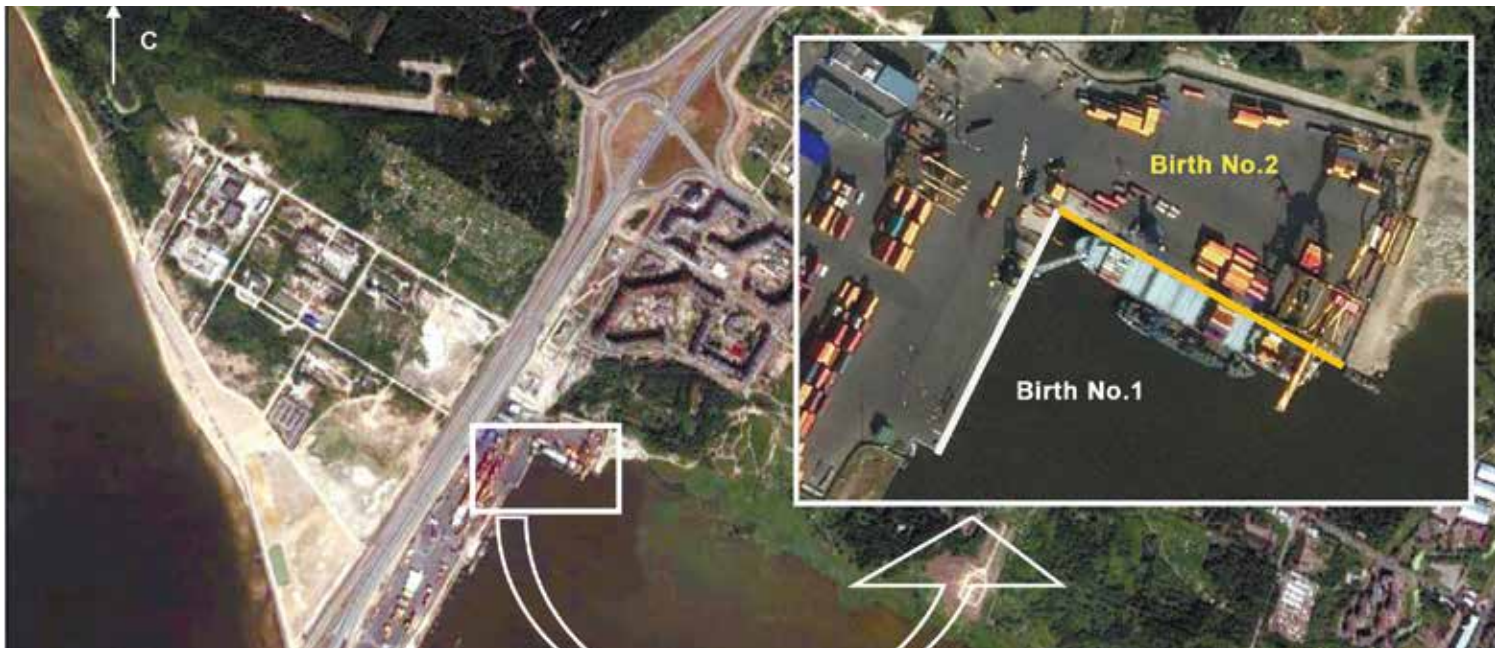
Experts of Morstroytechnology performed tests of axial indenting and pulling loads of experimental piles at the quay pier in the port of Novorossiysk.

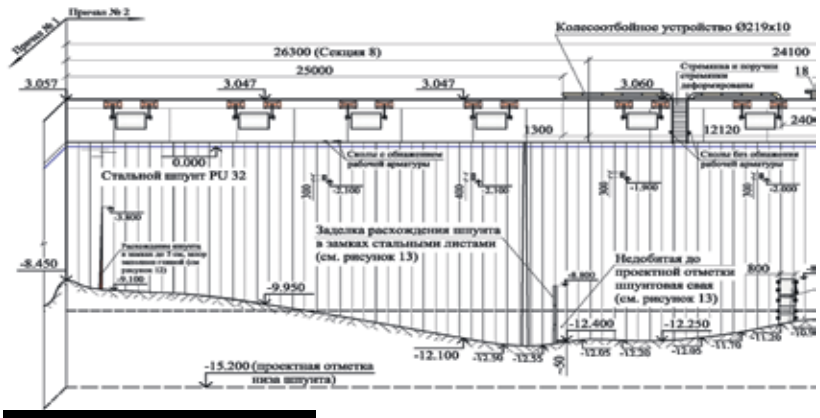
The tests were carried out for the maximum test load of 1,200 tons per dent and 1,100 tons per pulling, which is a unique case for an open water area.

A system of metal welded beams for transferring a given load to piles being tested has been designed and a scheme for the installation of hydraulic jacks has been developed.

Experts of Morstroytechnology conducted ongoing monitoring of tested piles and the system as a whole, which allowed controlling their performance at each stage of loading and ensuring a reliable test result.

COMPREHENSIVE INSPECTION OF BERTHS #1, 2

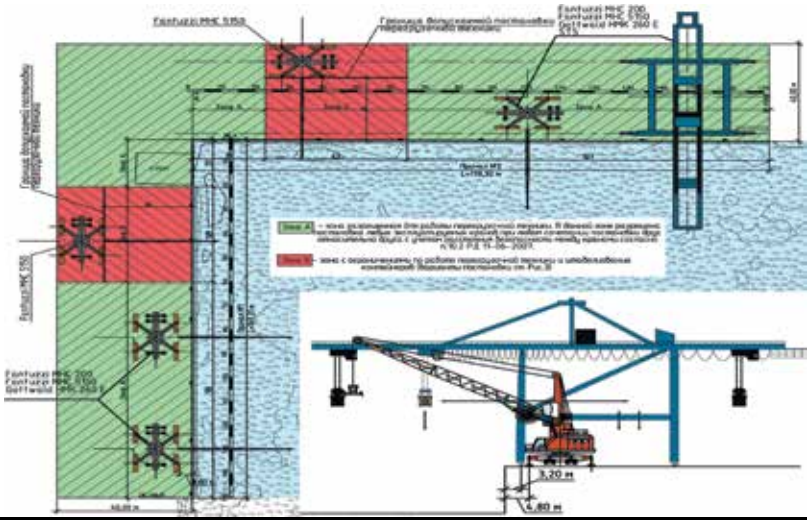




Facade of berth No. 1

Employees of Morstroytechnology carried out a detailed survey of berths Nos. 1 and 2 of Mobi Dick LLC, as well as the survey of the bottom of the water area near the structures.

Experts of Morstroytechnology performed a variety of calculations for berthing facilities to determine perception of design loads from mobile cranes. The company issued recommendations on arrangement of crane equipment at berths Nos. 1 and 2, which allowed increasing the terminal's capacity to 400 thousand TEU/year.



Plan for arranging mobile cranes at berths Nos. 1 and 2 taking into account the actual condition of the berths

GEOTECHNICAL TERRITORY MONITORING

Alluviated territory of the cargo area of the port of Sochi at the mouth of the river Mzymta

- Area of the territory: 4.7 hectares
- Customer: Sochi Imeretinsky Port LLC
- Project schedule: 02.2009-07.2009

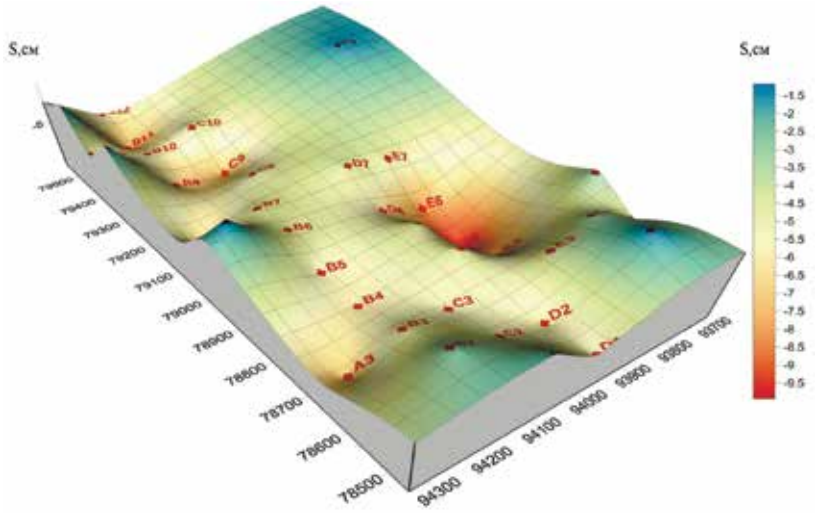
Bronka Multifunctional Sea Trans-shipment Port

- Area of the territory: 70 hectares
- Customer: Feniks LLC
- Project schedule: 09.2013-04.2014

Performed works

Field works
- Visual and instrumental control over the process of land reclamation
- Geodetic control over precipitation on the territory and depth marking
- Static probing
- Rotational cut test

Laboratory tests
- Engineering and geological surveys
- Drill probing



Substantiation of calculations
- Calculation of stripped layer thickness
- Calculation of base sediment
- Calculation of consolidation time

TESTING CENTER

LLC Testing Center has been accredited by Rosakkreditatsiya Federal Service for Accreditation (certificate ROSS RU.0001.21SV01, accreditation scope – buildings and structures of water transport enterprises and their structural elements).

Experts of the Testing Center with many years of experience in the survey of hydraulic structures (including diving survey) carried out surveys and certification of hydraulic structures at many major Russian maritime and river transport facilities, including transshipment facilities for petroleum products.

Being a certified controlling body for monitoring the technical condition of hydraulic structures, Morstroytechnology can quickly and independently perform:

- A comprehensive survey and examination of the operated and newly constructed port hydraulic structures with the subsequent issue of Certificates on suitability of structures for operation and Export opinion on the technical condition of structures, with the issuance (if necessary) of Notices regarding the necessary repair work and/or change in operating conditions;
- Compilation of passports and handbooks for permissible loads of port hydraulic structures, as well as their editing as necessary.

Morstroytechnology performs surveys of hydraulic structures to determine:

- Compliance with the project and the requirements of existing regulatory documents;
- Operational reliability and durability;
- Possibility of changing operating modes and increasing efficiency of use;
- Need, scope and methods of repair or reconstruction;
- Quality of repair or reconstruction;
- Possibility of changing the purpose of the facility.

Experts of Morstroytechnology have considerable experience in performing soil tests with piles and stamps based on standard and non-standard methods.

STRATEGIC PLANNING

Morstroytechnology is experienced in strategic planning not only for individual companies but also for regions and industries.

Among such projects are:

- Development Strategy for the Greater Port of St.Petersburg to provide effi cient economic development of the city (see diagram 1);
- Section "Sea and Inland Water Transport" in the "Development Program for the St.Petersburg Transport and Logistic Complex for the Period up to 2025";
- Conceptual Design of Water Passenger Transport System ("Water Taxi") in St.Petersburg;
- Section "Inland Water Transport" in the "Development Program for the Amur Region Transport-Road Complex for the Period up to 2015".

Morstroytechnology conducts the following types of research:

- Analysis of current situation: company's position in the market, benchmarking, SWOT-analysis;
- Forecast of cargo and passenger traffic with regard to market conditions, development of related markets, national measures (see diagram 2);
- Assessment of commercial, budget efficiency, social and economic impact of the project;
- Complex analysis of transportation chains which allows assessment of the project competitiveness considering interactions with other modes of transport.

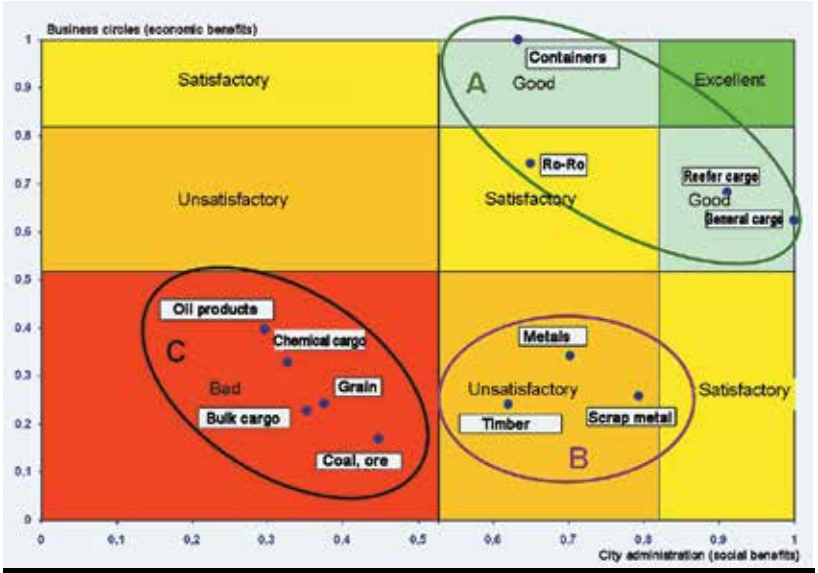


Diagram 1. Evaluation of benefits from various types of cargo handling in the Greater Port Saint-Petersburg for the city administration and business circles

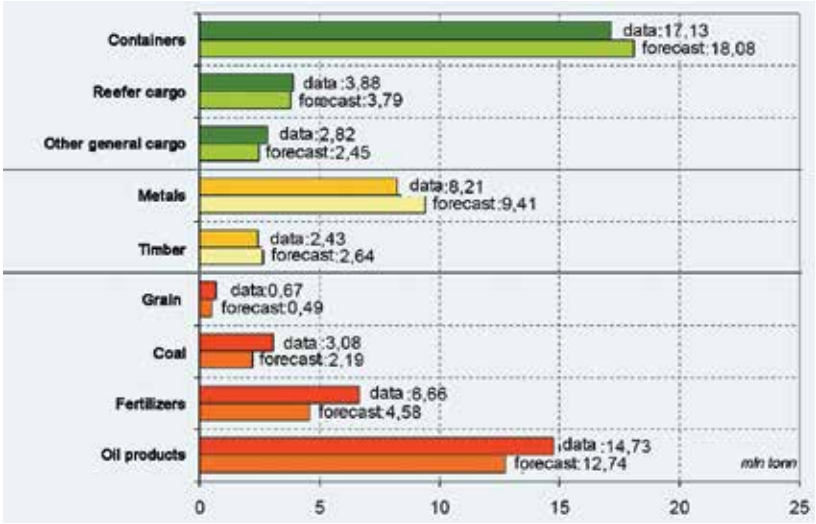
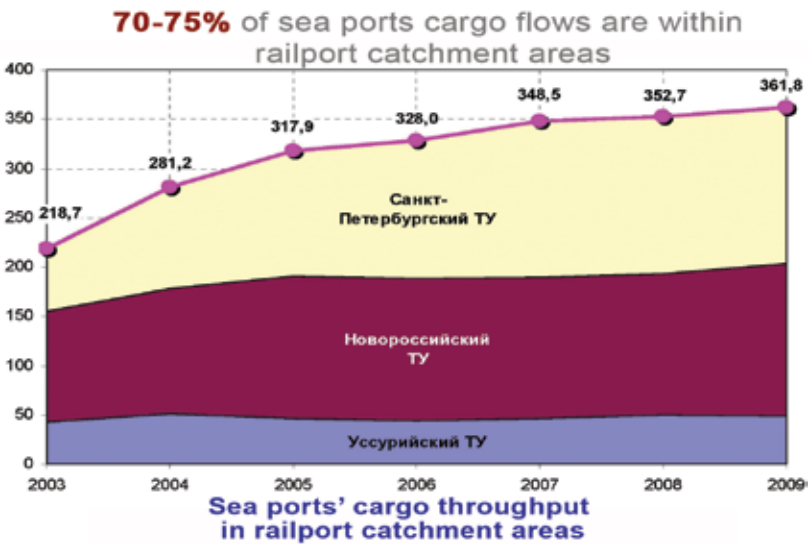
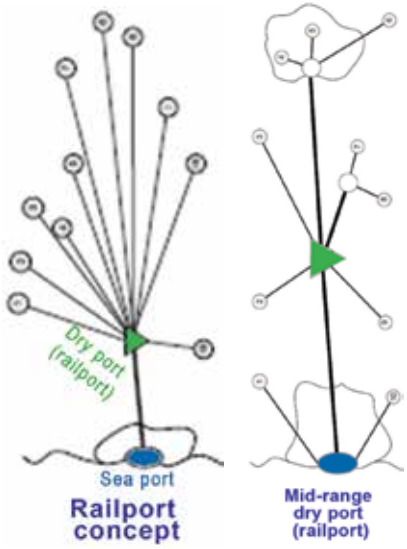
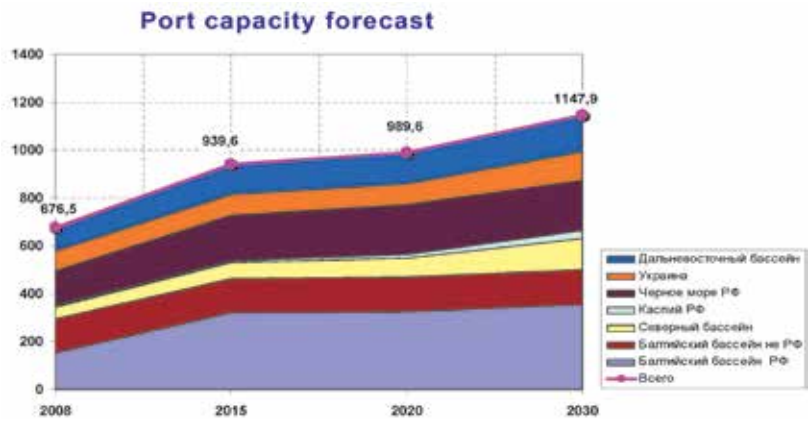


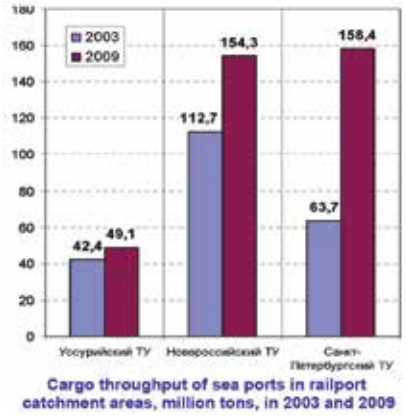
Diagram 2. Comparison of forecast cargo throughput of Saint-Petersburg Port with actual data

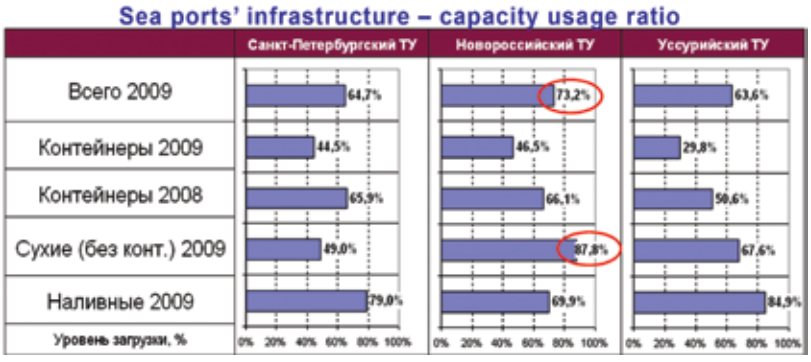
CONCEPT OF THE PRIMORSKY, BALTIYSKY, TAMANSKY RAILPORTS











Marketing analysis included:

- Analysis of potential capacities of river and sea transport in the presumed RailPorts' locations districts by main cargo types;
- Analysis of existing infrastructure in the presumed RailPorts' locations, description of surrounding economic regions;
- Defining major impediments of effective development of ports and terminals;
- Forecast for potential changes in traffic and development of cargo markets in the corresponding economic regions.

Objectives:

- Survey and analysis of cargoes currently transported by sea and rivers;
- Survey and analysis of the infrastructure of river and sea transport;
- Assessment of current ports' capacities with respect to potential cargo fl ows;
- Formulation of requirements for functional and technical characteristics of the railports, for each port separately and for the three ports together with respect to both sea and river transport.

Customer: DB International GmbH

DEVELOPMENT AND ANALYSIS OF COMMERCIAL ATTRACTIVENESS OF TRANSPORT SYSTEM

Customer: Baltic Metallurgical Terminal LLC

The purpose of the project: to determine the configuration of optimal transport schemes for delivery of raw materials and finished products to Vyksa Steel Works using river transport. At the same time, it was necessary to determine the possibilities for participating in these terminal schemes in the port of Ust-Luga.

The project covers the following tasks:

- Analysis of the technical condition of river berthing infrastructure in the region, assessment of the condition of roads and railway infrastructure;
- Analysis of the availability of a fleet suitable for transportation of VSW cargoes, the largest shipowners and availability of the fleet on the market;
- Analysis of price data of transport service providers in the region – "pre-marketing" to select a service provider;
- Calculation of the cost of transporting VSW cargo along various routes by river transport and alternative on-land routes;
- Identification of possible benefits from changing to transport schemes using river transport;
- Determining the permissible range of costs of transshipment in river ports at which transport schemes using river transport are optimal;
- An analysis of possible schemes of interaction with transshipment service providers: needs for investment, guarantees of cargo turnover.

Creation of a price model helped determine priority transshipment points for the Customer. Until now, VSW has been importing and exporting using the proposed routes.

Economic effect of optimization is $ 2.5 million a year.

Транспортная схема	Точки отправки					
	1	2	3	4	5	6
Автомобильный	2 266	1 420	1 814	1 304	1 569	607
Железнодорожный	1 706	1 647	1 588	1 369	1 479	790
Река НН-Бор, авто	2 092	2 207	1 977	1 862	2 322	1 517
Река Дзержинск, авто	1 927	2 115	1 927	1 832	2 210	1 549
Река Навашино, авто	1 263	1 452	1 263	1 169	1 547	886
Река Досчатое, авто	1 328	1 443	1 213	1 098	1 558	868
Река НН-Бор, ж/д	1 651	1 766	1 536	1 421	1 881	1 076
Река Дзержинск, ж/д	1 642	1 831	1 642	1 548	1 925	1 264

An example of comparing costs of various transport schemes, in rubles/t

Proposed scheme for the use of river berths

Состав	Грузоподъемность, тонн	Осадка в грузу, м	Стоимость фрахта, руб./сутки
Судно типа «Окский» (проект 559Б) «баржа-приставка (проект 942)	2000	2,31	105 000
2 баржи (проект 942) «буксир-толкач типа «Плотовод» (проект Р-33)	1800	1,50 (неполная загрузка)	85 000

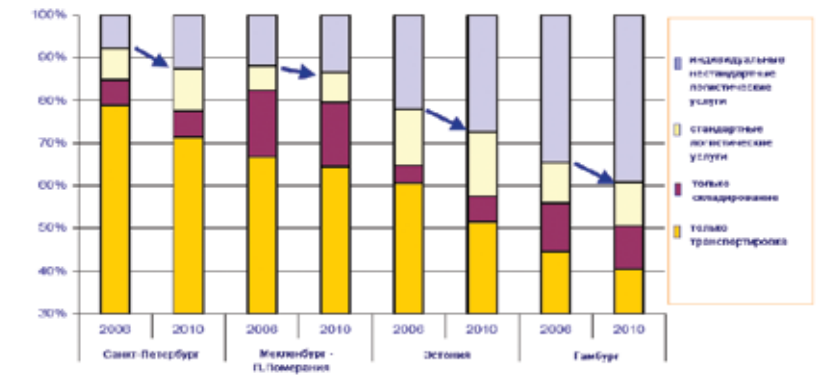
Баржа-площадка (проект 942)
53 судна в регионе
ОАО «Московское речное пароходство»,
ОАО «Нижегородский порт»,
ООО «Порт Коломна» и др.

Судно типа «Окский» (проект 559Б)
16 судов в регионе
ОАО «Московское речное пароходство» - 5

Options for navigation in the basin of the river Oka

RESEARCH AND PROJECTS IN THE SPHERE OF LOGISTIC SERVICES

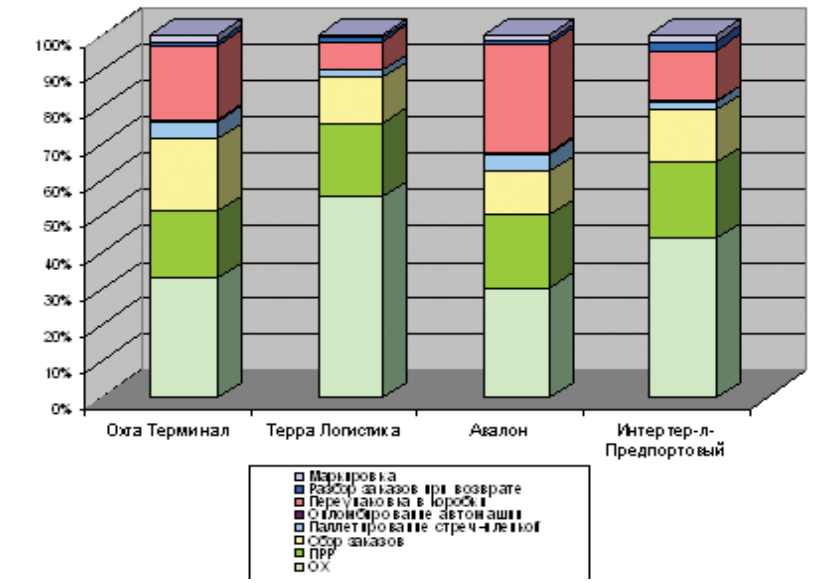
Concept of logistic terminal



Estimation of companies' turnover structure by segments of logistic services

Beside focusing on port terminals, the company also specializes in logistic center design.

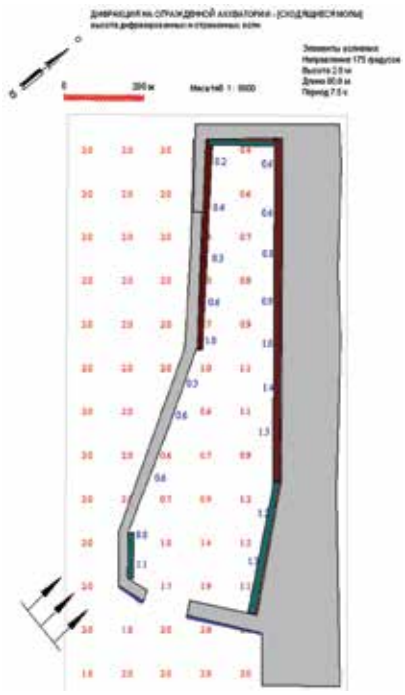
This business line comprises market analysis, optimal location selection, recommendations on optimum logistic centers parameters, and all stages of design process.



Analysis of warehouse complex income structure

MATHEMATICAL AND PHYSICAL SIMULATION MODELING OF HYDRAULIC DESIGN SOLUTIONS

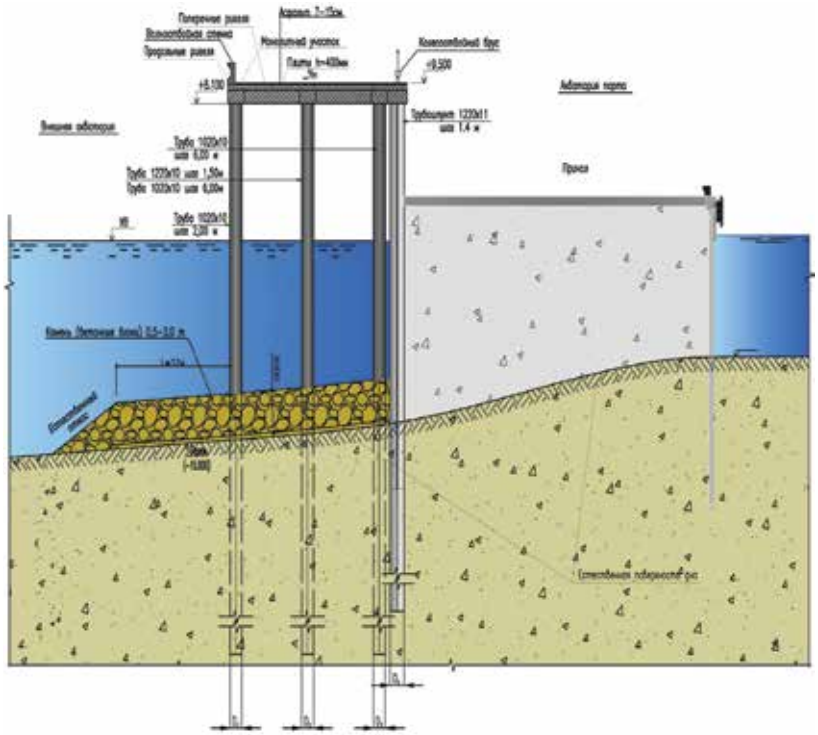
Physical modeling in a flume



Mathematical modeling

Physical modeling in a wave tank

A series of wave studies was carried out using physical and mathematical modeling in order to validate construction and arrangement decisions for hydraulic structures of the Port of Sochi cargo handling area at the mouth of River Mzymta.




РОССИЙСКАЯ ФЕДЕРАЦИЯ

ПАТЕНТ

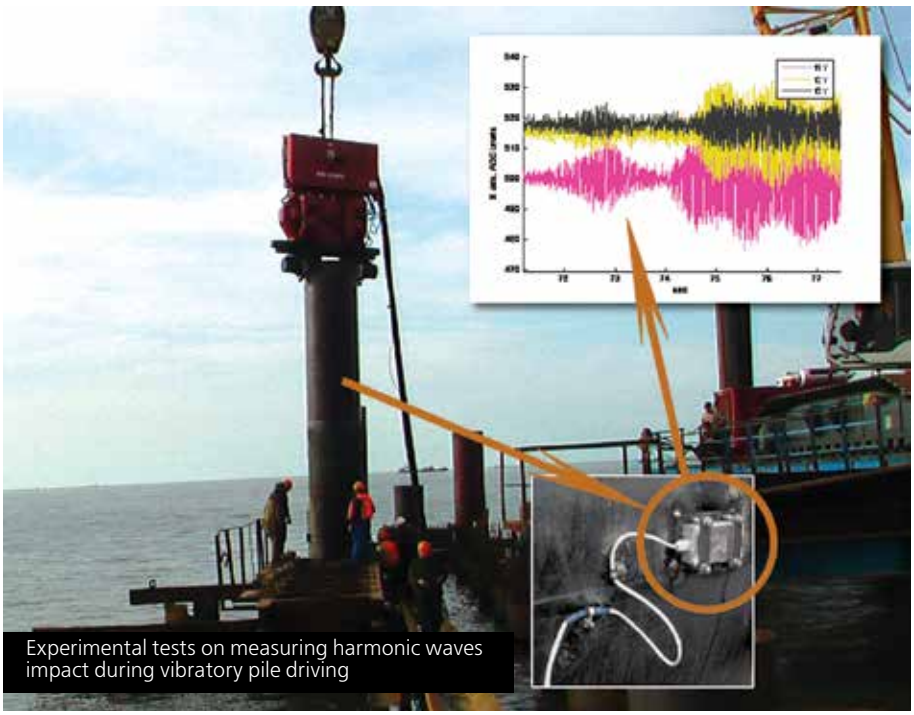
НА ПОЛЕЗНУЮ МОДЕЛЬ

№ 103367

ВОЛНОЗАЩИТНОЕ СООРУЖЕНИЕ

As a result, Morstroytechnology proposed a protection structure, which allows construction works to be performed within the shortest possible time using end dumping method, irrespective of adverse environmental conditions of the Black Sea open coast. Utility patent №E02B 3/06 (2006.01) “Wave Protection Structure”.

HYDRAULIC STRUCTURES

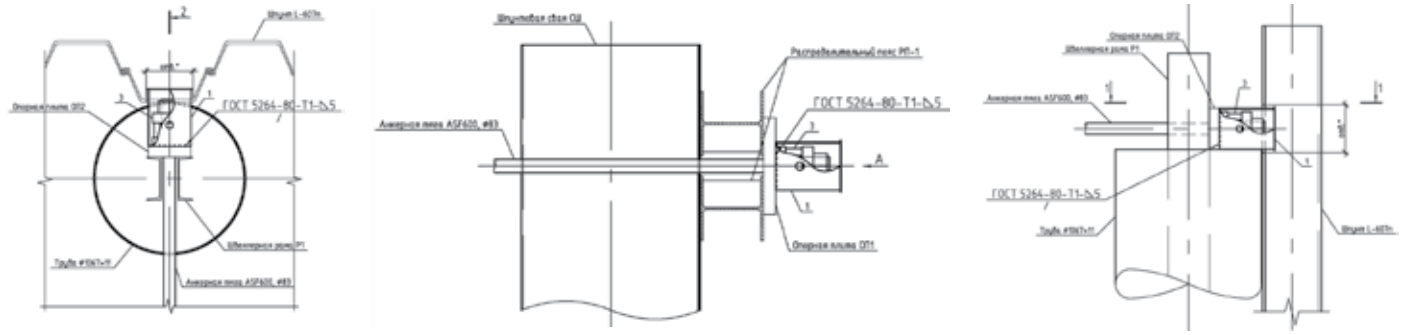


Experimental tests on measuring harmonic waves impact during vibratory pile driving

Success and economic efficiency of modern hydraulic engineering depends to a great extent on up-to-date technologies and advanced methods of analysis of construction. Morstroytechnology investigates and improves the most popular way of pile installation –vibratory pile driving. Theory of transmission of harmonic waves in elastic material combined with biphasic model of plasto-visco-elastic soil resistance developed by Morstroytechnology allows all the main problems of dynamical pile analysis to be solved:

- define stresses at the pile material of any
- section at any period of driving,
- calculate speed and duration of pile driving,
- choose optimal equipment to drive piles,
- shorten construction period.

MULTI-TOUCH MONITORING SYSTEM



Worldwide experience of hydrotechnical facilities operation shows that their reliability and safety, top effectiveness are impossible without modern tools of control and troubleshooting. Multi-touch monitoring system over the grooved pier sidewall anchors rod in tension.

A multi-sensor system for monitoring the stresses of anchor bars holding the frontal piling wall of the berths was designed for the berths of Baltic Metallurgical Terminal in the port of Ust-Luga

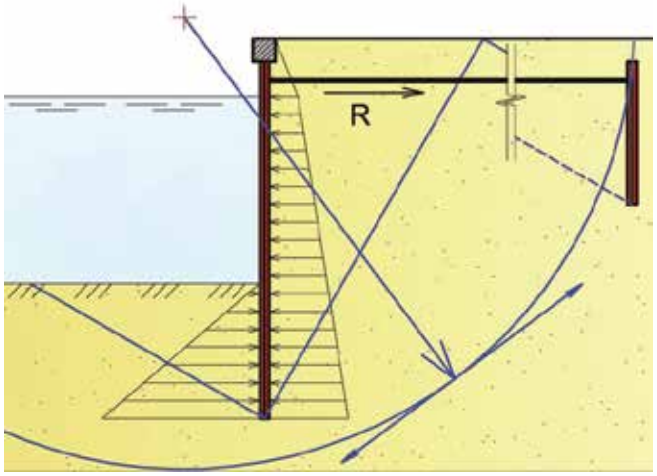
Monitoring is proceeded by the constant measurement of the tractions in the anchor rods during the operation with the measuring units located at the point of the rods fixing to the wall.

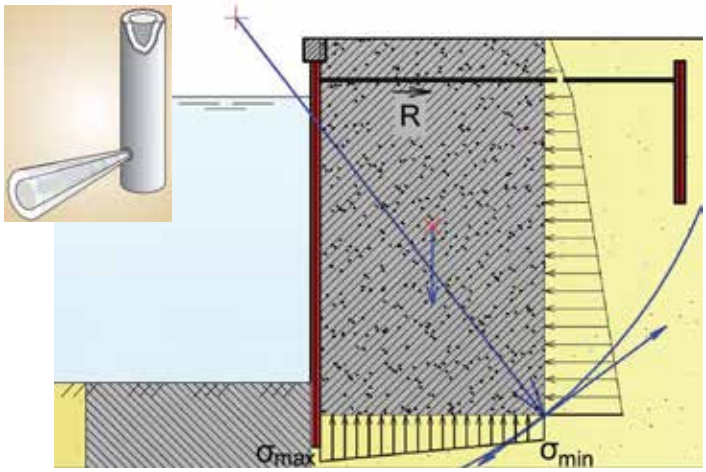
This method offers following advantages:

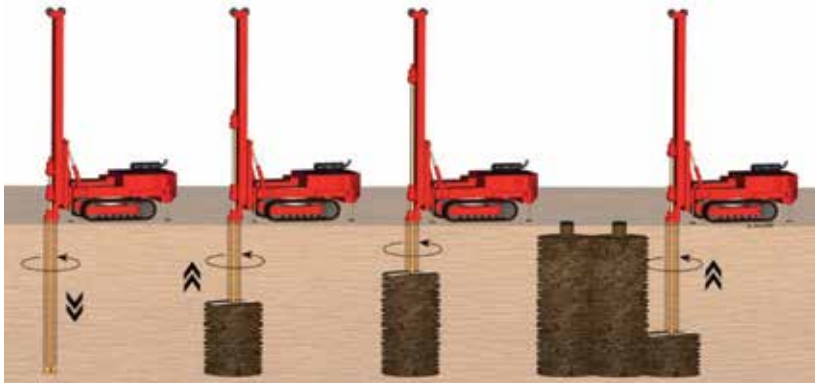
- Prompt troubleshooting;
- Automatic data handling and compression and timing of readings allow to detect destabilizing factors and analyze their effect on the facility;
- Option for the automatic co-operation with the port security system.

Monitoring results increase the effectiveness of the berths technical inspections and certification procedures.

RECONSTRUCTION OF BULWARK BERTHS BY CHANGING FROM SPACING TO GRAVITATIONAL







Расчетные параметры	Значения расчетных параметров		
	До закрепления	При незначительном повышении характеристик	После закрепления
Интенсивность равномерно-распределенной нагрузки (q), т/м²	2	2	2
Удельный вес грунта (γ), т/м³	1,8	2,2	2,2
Угол внутреннего трения грунта (φ), град.	30	40	40
Удельное сцепление грунта (C), кгс/см² (кПа)	0,00 (0)	0,1 (10)	0,2 (20)
Свободная высота стенки (h), м	13	13	13
Результирующее активное давление грунта (ΣPa), т/м п.	120	48	24,5

Reconstruction of bulwark type berth facilities is a pressing issue due to the growing number of berths that do not meet modern requirements. They are also often facilities with exceeded estimated service life, physical and moral depreciation. Typical methods for reconstruction of the bulwark facility include:

- Execution of the rim in front of the existing berth facility;
- Construction of additional screening elements;
- Construction of additional unloading elements;
- Soil stabilization.

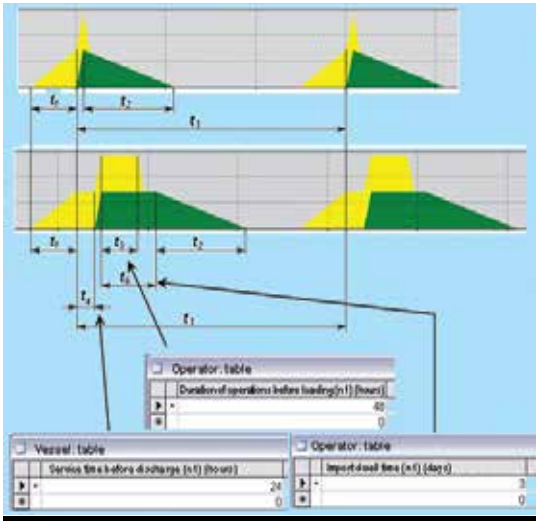
It has been established that until today the methods of reconstructing berth facilities by means of soil stabilization have not been widely used in the Russian construction practice. Nevertheless, this method is the only rational way of reconstructing the structure in some particular cases.

The advantages of this method are as follows:

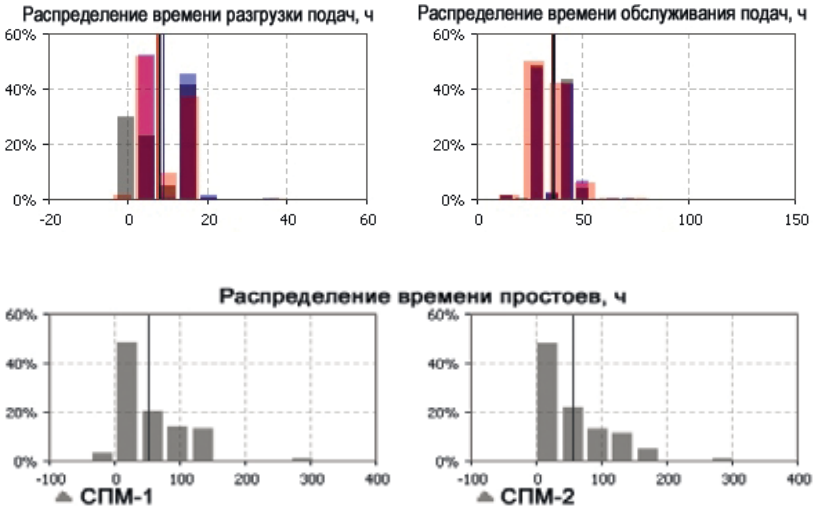
- Work is carried out without stopping the operation;
- The operating water area is not constrained;
- There are no works associated with relaying of crane and railway tracks, engineering networks or other berth equipment;
- It is not required to submerge structural components in the "body" of the berth;
- There is a significant or complete change in the stress-strain state (unloading of the main load-bearing elements, such as the front wall and anchor elements).

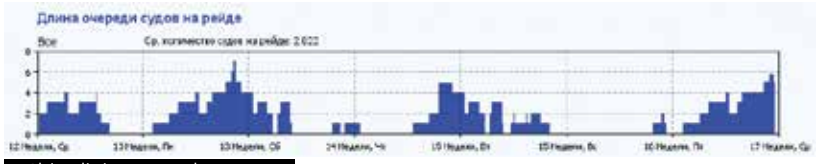
Morstroytechnology conducts work in the field of soil anchoring technologies first introduced in hydraulic construction in Russia.

SIMULATION MODELING OF PORT TERMINALS

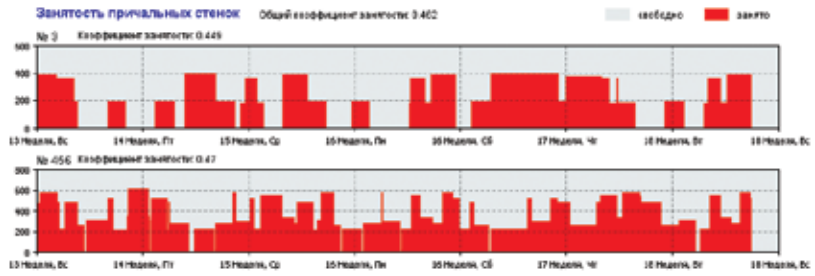


Parameters for formation and deconsolidation of the shipload lots

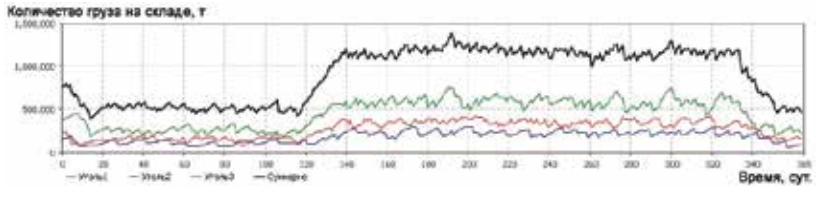




Ships lining at anchorage



Availability of quay walls



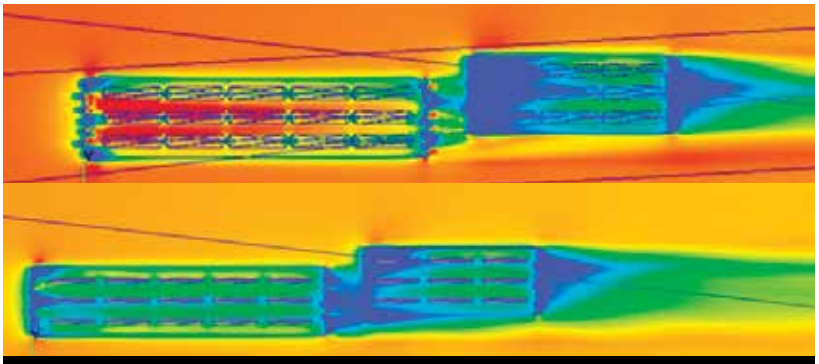
Growing investments in port terminals and their infrastructure imposes special requirements when it comes to the quality of technological design of port terminals.

Technologists of Morstroytechnology (Doctor of Sciences A.Kuznetsov, Master of Sciences V.Pogodin, I.Serova, Ya.Spassky) in cooperation with specialists of XJ Technologies LLC and Petersburg Polytechnic University created simulations models of specialized container and coal terminals.

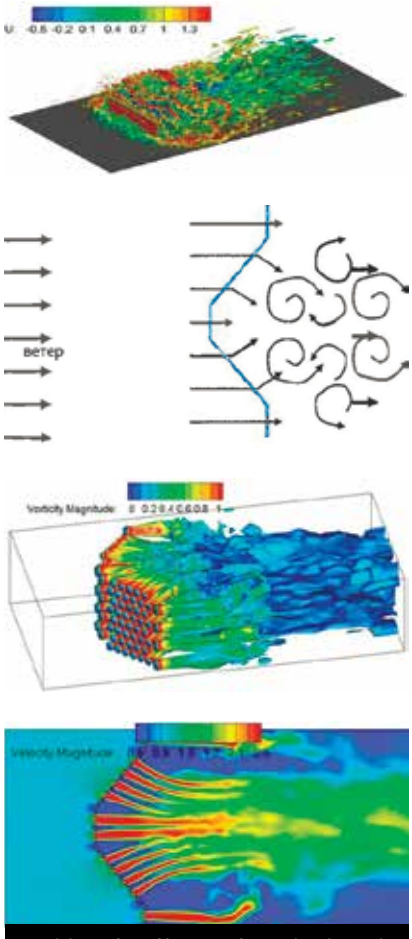
The purpose of simulation modeling was to carry out a dynamic analysis of relationships between the characteristics of cargo traffic, the warehouse and the main parameters of the sea cargo front (number and description of berths, number of berth cranes, distribution of vessels by type, etc.) affecting main operational and economic parameters of the terminal.

The terminal SM allows solving both direct and inverse problems of technological design. To address the direct task is to determine the design of the Terminal, designed to handle a certain type of cargo, which is typical for the design of new terminals from scratch. The purpose of the inverse problem – to determine the possible cargo traffic volume through the terminal, including the existing terminal, given the restrictions on technological resources.

STUDY OF ECOLOGY OF PORT TECHNOLOGY FOR COAL TRANSSHIPMENT



Study of effectiveness of protective screens for the coal terminal project in the Far Eastern port of Sukhodol according to the results of mathematical modeling



Modeling of coefficients of complex dust collection for the wind shield for Murmansk port

Morstroytechnology cooperated with PI Petrokhim-Tekhnologia LLC (St. Petersburg, Russia) and the Academy of Water Transport and Engineering Sciences (Tianjin City, China) on assessment of technologies to reduce the impact of coal dust on the environment. Specialists identify radical (capital) and partial (operational) technologies.

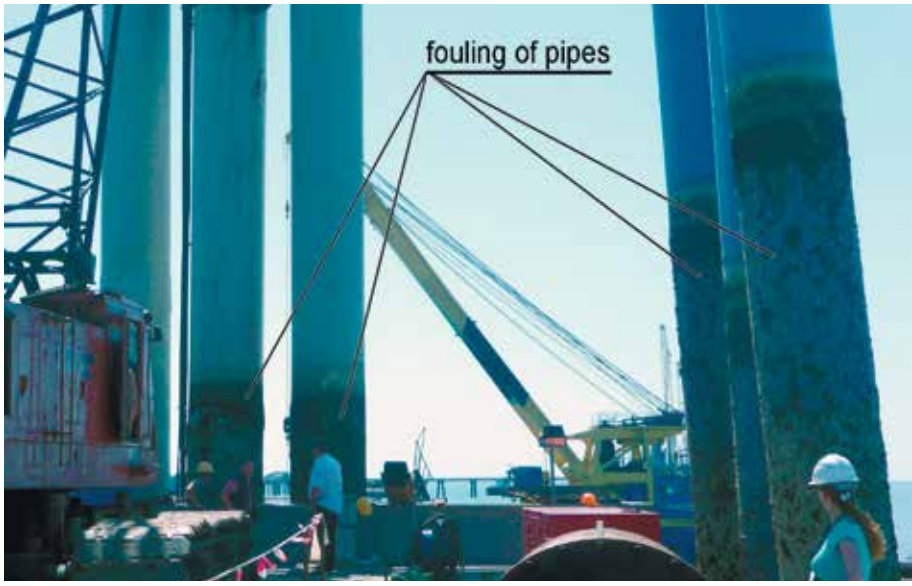
Radical (capital) technologies include:
- A container transport system for the end-to-end coal transportation to the ship's holds in closed containers;
- Specialized coal terminals with covered dome-shaped and arched warehouses;
- Dustproof screens.

Partial (operational) dust prevention methods include:
- Coal treatment with special solutions before shipping;
- Water irrigation of coal piles and dusty places of open coal transshipment,
- Regular dust removal from the territory and cleaning of workstations.

Dustproof screens are effective for high-power and large territory terminals.

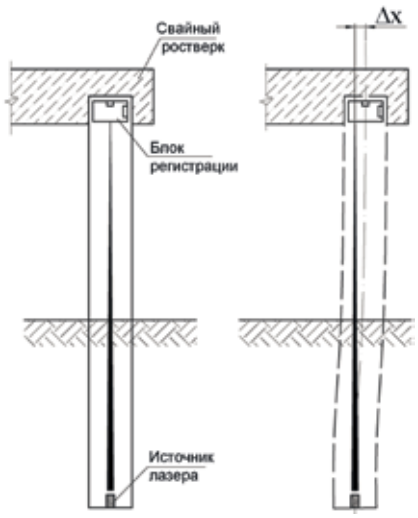
ENVIRONMENTAL MONITORING OF HYDRAULIC STRUCTURES

Экологическая оценка морских внешних оградительных сооружений



Environmental monitoring of the South-Western quay pier of the cargo area at the port of Sochi at the mouth of the Mzymta river has been underway since 2009. Based on monitoring results, experts of Morstroytechnology LLC found that the piles are being fouled with periphyton up to 2 cm per year, which is much higher than in the same kind areas of the Black Sea with classical protective structures.

MONITORING OF TECHNICAL CONDITION OF HYDRAULIC STRUCTURES



Installation of the registration unit

Experts of Morstroytechnology cooperated with staff of Admiral Makarov State University of Maritime and Inland Shipping to develop and implement a unique system for monitoring conditions of hydraulic structures of the rack type. The developed system captures movements of the foundation frame and axial deviations of the piles under dynamic and static loads. Monitoring data are transmitted via GPRS channels to the head office of the organization.

The system is completely autonomous.

MARKET RESEARCH

Morstroytechnology conducts marketing research of different transport markets, assesses transport systems' development scenarios and competitive environment, and provides information service according to individual plans.

Design experience and knowledge of transport industry were applied in a number of scientific and forecasting investigations such as:

- Analysis of marine passenger transport market for the Port of Sochi;
- Development of water passenger transport for St.Petersburg and the route Narva –Narva-Jesuu;
- Market and competitive environment analysis for the Terminal in Gorskaya settlement;
- Assessment of transport systems development scenarios for Saratov oil refinery and Uvek tank farm.

Container market was investigated for:

- assessment of competitive ability of the Port of Murmansk;
- development scenarios for South East Cargo Handling Area of the Port of Novorossiysk;
- development strategy of St.Petersburg Transport and Logistic Complex.

TRANSPORT MANAGEMENT AND ANALYSIS

Recommendations have been developed for Bashneft PJSC regarding selection of a model for management of rail transportation of Bashkirnefteprodukt OJSC in the medium and long term.

In the process of working on the project, some management processes optimization mechanisms that yielded fast and effective results were introduced, namely: a system for operational registration of cars and principles for train car tenders were changed; a new system of performance indicators for railway workshops of the enterprises was introduced.

The overall effect of "rapid" solutions alone is estimated at $ 6.0 million per year. As a result, the Steering Committee decided to create a separate BashNefteTrans transport company, which is now operating successfully.

A transport strategy has been developed for Sibur-Minudobreniya OJSC (in partnership with AT Kearney consulting company), covering all types of transport and sales markets, from production in Kemerovo and Perm to end customers in Central America and South-East Asia. Modeling of all supply chains was used to develop and evaluate a number of options.

The end result is a justifiable choice of a single seaport for transshipment of products of three production complexes located in different regions of the Russian Federation.

The economic effect is 5.0 million dollars a year.

TECHNOLOGICAL ANALYSIS IN THE FIELD OF RAILWAY TRANSPORT

UK EvrazFinans CJSC developed a technology for transportation of forestry sector cargoes from 9 loading stations of Krasnoyarsk Railway. Effect: 100% routing has been introduced, train car turnover has been reduced by 5 days.

RUSAL – developed technological schemes for traffic routing (three plants for aluminum production). 400 cars of the yard have been made available. Decrease in turnover from 3 to 1.5 days.

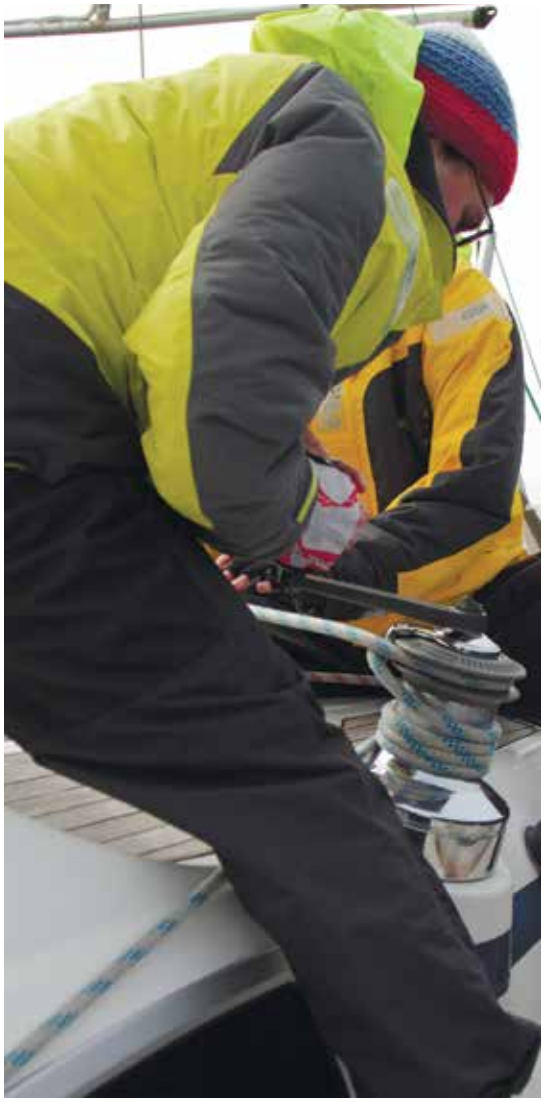
In different years, work on optimizing technologies in railway loading stations was carried out for TNC-BP OJSC:

- Optimization of the loading process at Ryazan refinery and the adjacent railway station;
- Dismissal of investment measures proposed by Donetsk Railway for the Lysychansk OPR (Ukraine);
- Study of the potential of railway infrastructure of the Korotchaevo-Voinovka section of Sverdlovsk Railway and railway links to Urengoy destination stations (ports);
- Assessment of possible transport restrictions for export of Rospan OJSC products.

The overall effect of all the activities carried out by the Customer according to these recommendations is about 1.0 billion rubles.

"Although our employees design ports, many of them, especially young people, can actually see the sea only when standing on our berths and when on the sunny beaches of sea resorts. A little salty wind and sea romance will not hurt."

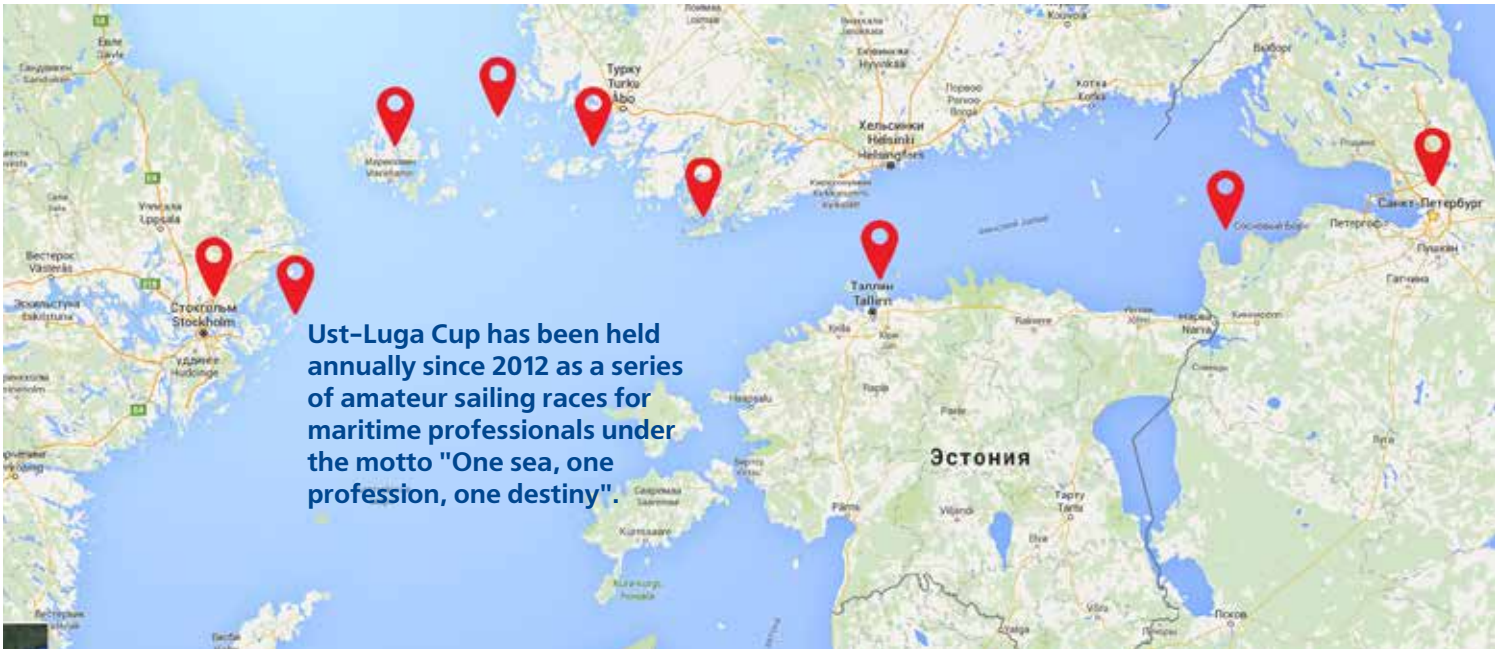
Mikhail Nikolayevsky,
Director General of Morstroytechnology



The team of Morstroytechnology participated in the competition twice and does not intend to stop.

Morstroytechnology Company is a team of like-minded people whose professional interests are closely connected to the sea, sea construction, and sea transportation logistics.

"ONE SEA, ONE PROFESSION, ONE DESTINY"



Ust-Luga Cup has been held annually since 2012 as a series of amateur sailing races for maritime professionals under the motto "One sea, one profession, one destiny".

These kinds of events bring the team together, create common interests, and help develop the corporate culture.

ORGANIZATIONAL STRUCTURE OF THE COMPANY

Director General
Mikhail Nikolayevsky

Deputy Director General for Economics and Planning
Aleksey Vorobjev

Corporate Development Director
Sergey Semenov

Human Resources
2 pers.

Chief
Galiya Vorobjeva

IT Group
5 pers.

Chief
Maksim Smirnov

Economics and Consulting
3 pers.

Director of Logistics and Analytical Research
Aleksander Goloviznin

Estimates and Construction Projects
5 pers.

Chief
Svetlana Karakhanova

Accounting Offi
2 pers.

Chief
Andrey Gubin

Office Managers
2 pers.

Planning and Contracts Block
3 pers.

Financial Director
Marina Milakova

Project Management Bureau
12 pers.

Deputy Principal Engineer
Anatoly Kuklin

Administration

Production units

Chief Engineer
Roman Gorgutsa

Technical Director
Vladimir Pogodin

Technology Department
7 pers.

Chief
Nikita Polushin

Adviser to Director General
Valeriy Puzankov

Trial Center
10 pers.

Chief
Sergey Ordin

Department of Buildings and Constructions
9 pers.

Chief
Stanislav Stankevitch

Hydraulic Engineering Department
17 pers.

Chief
Denis Kreknin

Master Plan Department
9 pers.

Chief
Andrey Romaschenko

Department of Engineering Networks
7 pers.

Chief
Anatoliy Shadrin

Projects Support Group
7 pers.

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