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# SHIP BUILDING, SHIP REPAIR AND MAINTENANCE, SHIP CONVERSION AND STEEL STRUCTURE FABRICATION

*Kaya YASAR, Sales Manager (New building and Special Projects), Gemak*

## INTRODUCTION

Since 1969, Gemak Group has been maintaining its reliable position, and is noted in Turkey and around the world for its wide range of skills and technical expertise.

In 50 years of experience in engineering solutions, Gemak is proud of being of service to its clients.

Gemak has the vision to be the best in class and preferred partner on a worldwide basis for demanding projects in the steel fabrication industry, marine and offshore vessel building, marine conversion projects, marine vessel repair and maintenance.

Gemak's standard is well-proven and known to its clients.

It is based on innovation, excellent use of technology and engineering capability.

Among its strengths are: experience in managing complex and sophisticated ship building, ability to provide solutions with well experienced, multi-disciplinary engineering capacity and well organized & automated large scale fabrication facilities.

Gemak Group activities are spread over the Gemak Tuzla Shipyard, Gemak TGE Shipyard, Neta Steel & Pipe Fabrication and Gemak Altinova Shipyard with a total of 336,000m<sup>2</sup> of fabrication space.

## RECENT SHIPBUILDING & INDUSTRIAL PROJECTS

With its advanced manufacturing infrastructure, the company is positioned as a leading company in shipbuilding and high quality large steel constructions.

Having built up a new client portfolio of foreign ship owners together with good experience in building customized and sophisticated ships to a high quality standard, Gemak is confident of meeting the most demanding requests and requirements in ship building.

Moreover, 50 years of vast experience in various fields related mainly to the shipping industry has positioned Gemak Group as a major player in the region for large scale steel construction projects.

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*Figures 1- 3: Ship Building Activities*

- ↑ M/T Trans Fjell, a 2.900DWT chemical tanker with teflon coated cargo tanks and cargo lines, carrying aggressive cargo such as Methanol and Hydrochloric Acid
- ↗ M/V Tenace, a 14.400DWT general cargo vessel with two cargo holds and a moveable grain bulkhead in each hold
- M/T Maria Laura, a 17.000DWT chemical tanker with coated cargo tanks

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## THE YAVUZ SULTAN SELIM BRIDGE – FABRICATION AND TRANSPORTATION OF STEEL DECK SEGMENTS

In 2013 Gemak were actively trying to expand their business in the industrial market.

In the same year the Group won a contract for fabrication of steel decks for the 3<sup>rd</sup> Bosphorus Bridge, lately officially named The Yavuz Sultan Selim Bridge, for the Hyundai Engineering and Construction Company.

The bridge has a highly sophisticated and complex structure due to its hybrid design comprising both cable stayed and suspension parts.

Gemak fabricated and transported to the erection site about 50,000 tons of steel decks in a record breaking time for such a large structure.

All fabrication works were executed according to EN 1090-2 standard Execution Class 4 as the most stringent and demanding classification for such complex structures.



*Figures 4 - 6: Industrial Projects*

*Yavuz Sultan Selim Bridge*

↶ *Deck Segment Fabrication*

↑ *Deck Segment Transport and Lifting*

← *Official website of the bridge – click on the image to visit it*

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## THE OSMANGAZI BRIDGE – STEEL SHAFTS

Construction of steel shafts for Osman Gazi Bridge was executed for IHI Corporation.

It consisted of four units of steel shafts each about 550 tons carrying the weight of the bridge under the towers.



*Figures 7 - 10: Industrial Projects  
Steel Shafts for Osmangazi Bridge*



*March 2020*

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## VESSEL LENGTHENING

The Group has recently lengthened four RORO vessels for UN RORO / DFDS Group; UN Akdeniz, UN Cuneyt Solakoglu, UN Karadeniz and UN Cemil Bayulgen. Two vessels were delivered in 2017, one in 2018 and the last in 2019.

The vessels were lengthened in the cargo area by a mid-ship section of 30m; increasing the length overall from 193m to 223m.

The new 1,150tonnes mid-ship section was outfitted in advance.

After the cutting operation the skidding system, designed and developed by the Gemak R&D Team, was used for moving forward part of the vessel weighing more than 4,000tonnes.

The Gemak designed and developed high precision positioners was also used.

The time available for the conversion works was considerably limited.

Ship lengthening projects require a high level of engineering, technical expertise and advanced planning skills.

By executing multiple lengthening projects within a very short period, Gemak Group ensures its customers that such sophisticated & high-engineering projects are delivered on time and are properly handled at Gemak.



Figure 11: UN Akdeniz after lengthening during operation



Figure 12: UN Cuneyt Solakoglu after lengthening during operation

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← Figure 13: UN Akdeniz during lengthening at shipyard



→ Figure 14: UN Cemil Bayulgen during lengthening at shipyard



Figures 15 and 16: Industrial Projects / RoRo Ship Lengthening

← UN Akdeniz being lengthened by inserting new midship section after cutting the vessel in two

→ The vessel in operation after lengthening



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## POWERSHIP CONVERSION

Another major and recent project executed within the industrial projects segment is Powership Conversion. Two cape size bulk carriers have been converted to powerships for Karadeniz Holding within 2018 and 2019.

Each cape size bulk carrier has been converted to a giant powership having 420 MWe of electric power production capacity by executing a comprehensive engineering and fabrication scheme.

Within the conversion scope of 'KPS Orka Sultan' and 'KPS Ela Sultan', the following range of works a total of 7,250 tonnes of steel work have been

executed in accordance with the EN 1090-2 EXC3 standard:

- To modify the ship's hull for the purpose of creating holds to accommodate 21 new dual fuel gen-sets as the main source of power and their supplementary systems and equipment;
- To develop new fuel tanks to extend ship's fuel carrying capacity;
- To install exhaust towers and platforms and a switchboard structure to accommodate the transfer of the generated electricity to the onshore grid.

A total of 1,600 tonnes of piping work for powership systems and equipment were fabricated, installed and tested as per Bureau Veritas Rules and Regulations for such sophisticated power ship.

Due to the excessive size of the vessel and the high complexity of the project, in-house developed designs and solutions by Gemak Engineering and R&D Team were implemented during the execution phase to achieve the performance demands of the project.



Figures 17 and 18: 'KPS Orka Sultan' before and after conversion

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## CO<sub>2</sub> TANKER CONVERSION

The world's largest food grade CO<sub>2</sub> tankers were converted from 3 sister General Cargo vessels, all delivered to Owners in a row.

Each vessel was fitted with a CO<sub>2</sub> tank having Ø7m x L50m dimensions, 470 tons of weight and operating at 19 bar pressure and -40°C.

The tanks, with 45mm thick shell of P355LN2 low temp steel, were fully fabricated in-house by Gemak Group.

The tanks were then placed and secured on the fabricated bed plates inside the box shaped cargo holds, with DBWBT (Double Bottom Water Ballast Tanks) structures strengthened to sustain the loads, with additional buoyancy tanks fitted for stability purposes.

The hatch covers were sealed permanently for the purpose of serving as a cargo deck equipped with a high end cargo pump room and auxiliaries.



Figure 19: Typical cargo hold with power generators after conversion



Figure 20: CO<sub>2</sub> Tank installation in drydock by using 2x150t, 2x125t and 2x110t overhead cranes



Figure 21: CO<sub>2</sub> Carrier after tank installation into the hold and hatch covers' permanently fixed on the main deck

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## OFFSHORE

The Group has also currently been executing panel and block fabrication for a module of the DOLWIN 6 Offshore Connector Platform.

The platform will operate in the North Sea to transform incoming power from the wind turbines as 155 kV AC to 320 kV DC and export it to the converter station onshore.

Gemak Group's work scope includes the development of workshop drawings, steel structure fabrication works, steel outfitting works and final coating works.



Figure 22: DOLWIN 6 Offshore Platform overview

A total of about 2,500 tons of steel blocks are fabricated in accordance with DNVGL Offshore Standards and coated in accordance with NORSOK Standards.

The Group now plans to increase its ship building activities commencing from 2020 in addition to current industrial and conversion projects.

The state of the art Gemak Altinova Shipyard in Yalova will be the center of activity with its extended capacity and capability which ensures high quality standards for sophisticated new building projects.



## SHIP REPAIR AND MAINTENANCE

In its three yards, the company handled over 165 repair projects in 2019, covering various ship types and sizes, including gas carriers, bulkers, containerships, ro-ro vessels and car carriers.

Its customer base is from a wide geographical range, with owners from Singapore, the Netherlands, Cyprus, Germany, Greece and Italy.

← Figure 23: Typical topside block for the platform, during loading to the transportation vessel after completion of fabrication and coating

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One of the biggest projects for Gemak in 2019 was the undertaking of extensive docking and repair work for the ro-pax vessel, 'Stena Europe', which spent around three months in Turkey earlier 2019 for an almost complete refurbishment and life-extension program.

One of the most significant elements of the upgrade was modifications to the deck head levels

on the main vehicle deck to allow for the carriage of full-height trailers across the whole of the main vehicle deck.

Prior to arrival at the Turkish shipyard, 'Stena Europe' was restricted to carrying full-height trailers on its port side only.

Other works included the renewal of the majority of the ship's windows, engine and hull overhauls, including blasting of the whole hull to remove all the existing old paint work to improve fuel efficiency and the ship's appearance.

A series of internal improvements were also made while the vessel was in Gemak's Shipyard.



Figures 24 – 26: 'Stena Europe'; complete refurbishment and life extension project

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Another significant Ro-Pax project undertaken by Gemak last year involved the DFDS-owned *Cemil Bayulgen*, which was retrofitted with exhaust gas scrubbers.

Another DFDS vessel, *UN Akdeniz*, returned to the yard for a scrubber retrofit this year, having also been lengthened by 30m by Gemak in 2017.

In addition, Gemak is extremely busy with environmental retrofits, to make vessels compliant with forthcoming IMO regulations. Over 2019 the yard carried out nineteen ballast water treatment system retrofits.

Since it undertook its first ballast water retrofit in 2012, Gemak has completed 50 projects of this

type, making it one of the most experienced in the Mediterranean region.

Demand for scrubber system installation is similarly gathering pace.

Fifteen projects have been delivered and three more have been in progress.

The company has recently signed a number of further contracts with ship owners for scrubber work.

A new team for scrubber retrofit projects has been established. This team is focusing purely on the planning, purchasing, fabrication and installation aspects of this type of work, to ensure the company always meets clients' requirements.

In another important initiative, Gemak has recently upgraded the capacity of its handy-sized floating dock in Tuzla from 9,000 tons to 14,000 tonnes, extending its length and breadth from 170m x 26.3m to 200m x 32m.

This investment has been made to enable Gemak to accommodate a wider range of vessels in the future.

The company is also taking steps to improve infrastructure and berth facilities at Gemak Altinova Shipyard, which is used for industrial projects and new building projects as well as major ship conversions.



Figures 27 and 28: ↶ DFDS vessels UN Akdeniz and ↷ Cemil Bayulgen being retrofitted with exhaust gas scrubbers

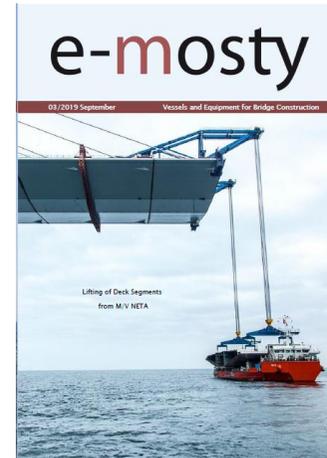
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*50 years of Excellence - In 2020, Gemak Group celebrates its 50th year in its business*

*In 50 years of experience, Gemak is proud of being of service to over 2,800 clients. The Group continues to provide services for ship building, ship repair and conversion, the offshore oil & gas industry and industrial market as one of the most competitive shipyards in the Mediterranean.*

*With approximately 2,500 employees, 180 of whom are engineers specialized in their fields, Gemak will continue creating progress for the company, supporting change and foresight as in the past.*



Read about FABRICATION AND TRANSPORTATION OF THE ORTHOTROPIC DECK SEGMENTS FOR YAVUZ SULTAN SELIM BRIDGE (THIRD BOSPHORUS BRIDGE)

Transport and Positioning of Deck Segments were executed by DP Vessel "M/V Neta"

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Read about DESIGN AND CONSTRUCTION OF THE YAVUZ SULTAN SELIM BRIDGE and OSMANGAZI BRIDGE

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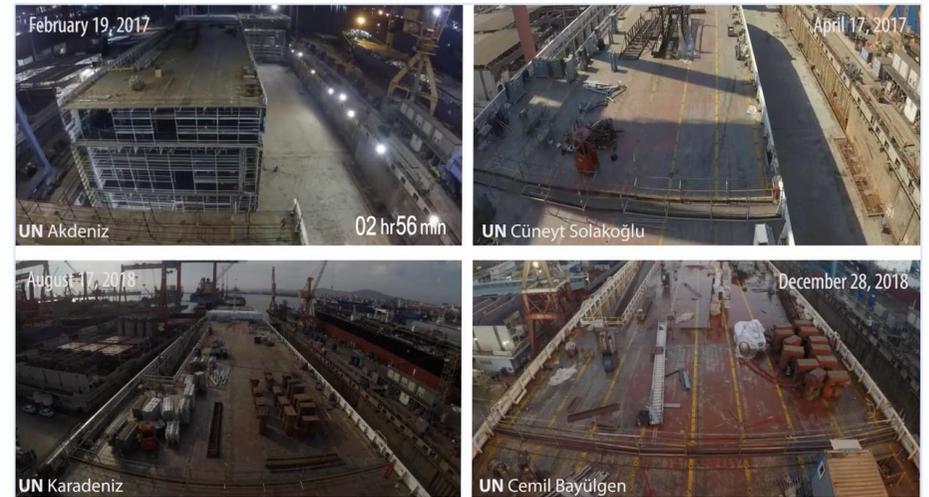
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## VIDEOS

Click on the image to play the video



Video 1: Block Fabrication for Topside Module of the DolWin6 Offshore Platform



Video 2: Lengthening operations carried out by Gemak Group for four sister Ro-Ro Vessels of UN Ro-Ro (DFDS)



Video 3: "Stena Europe Life Extension Project"



Video 4: Gemak Shipyard