Self-elevating platforms for civil engineering

IHC

IHC Holland

CONTENTS

ENGINEERING

IHC Holland designed all the self-elevating platforms described in this brochure.
Some of them were built at IHC yards, others elsewhere, e.g. in Japan, Brazil and Italy. In the latter cases IHC Holland acted as engineering consultants. On this basis units can be built at the most suitable location from both the technical and economic points of view.

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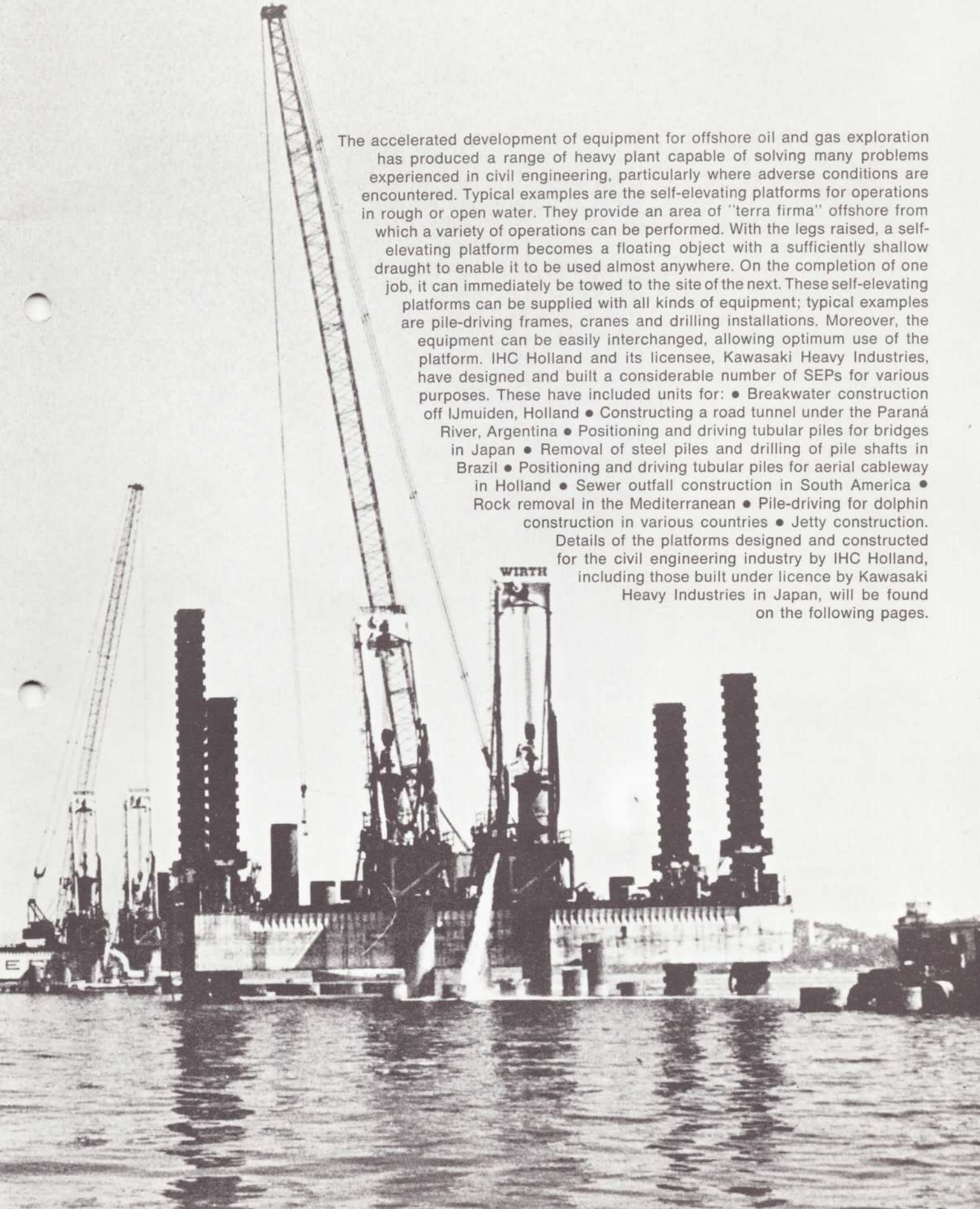
Introduction

The accelerated development of equipment for offshore oil and gas exploration has produced a range of heavy plant capable of solving many problems experienced in civil engineering, particularly where adverse conditions are encountered. Typical examples are the self-elevating platforms for operations in rough or open water. They provide an area of "terra firma" offshore from which a variety of operations can be performed. With the legs raised, a self-elevating platform becomes a floating object with a sufficiently shallow draught to enable it to be used almost anywhere. On the completion of one job, it can immediately be towed to the site of the next. These self-elevating platforms can be supplied with all kinds of equipment; typical examples are pile-driving frames, cranes and drilling installations. Moreover, the equipment can be easily interchanged, allowing optimum use of the platform. IHC Holland and its licensee, Kawasaki Heavy Industries, have designed and built a considerable number of SEPs for various purposes. These have included units for: • Breakwater construction off IJmuiden, Holland • Constructing a road tunnel under the Paraná River, Argentina • Positioning and driving tubular piles for bridges in Japan • Removal of steel piles and drilling of pile shafts in Brazil • Positioning and driving tubular piles for aerial cableway in Holland • Sewer outfall construction in South America • Rock removal in the Mediterranean • Pile-driving for dolphin construction in various countries • Jetty construction. Details of the platforms designed and constructed for the civil engineering industry by IHC Holland, including those built under licence by Kawasaki Heavy Industries in Japan, will be found on the following pages.



General

IHC SEPs are of the 4-leg type. The legs, which possess more than adequate mechanical strength, are situated at the corners of the pontoon and are actuated by positively engaging hydraulic jacks of patented IHC design.

The pontoon is sufficiently rigid to be supported on two diagonally opposed legs. Each leg and jacking unit is designed to absorb half the total pontoon weight. As the normal load per leg is only one-fourth of the elevated weight, a safety margin of 100% exists.

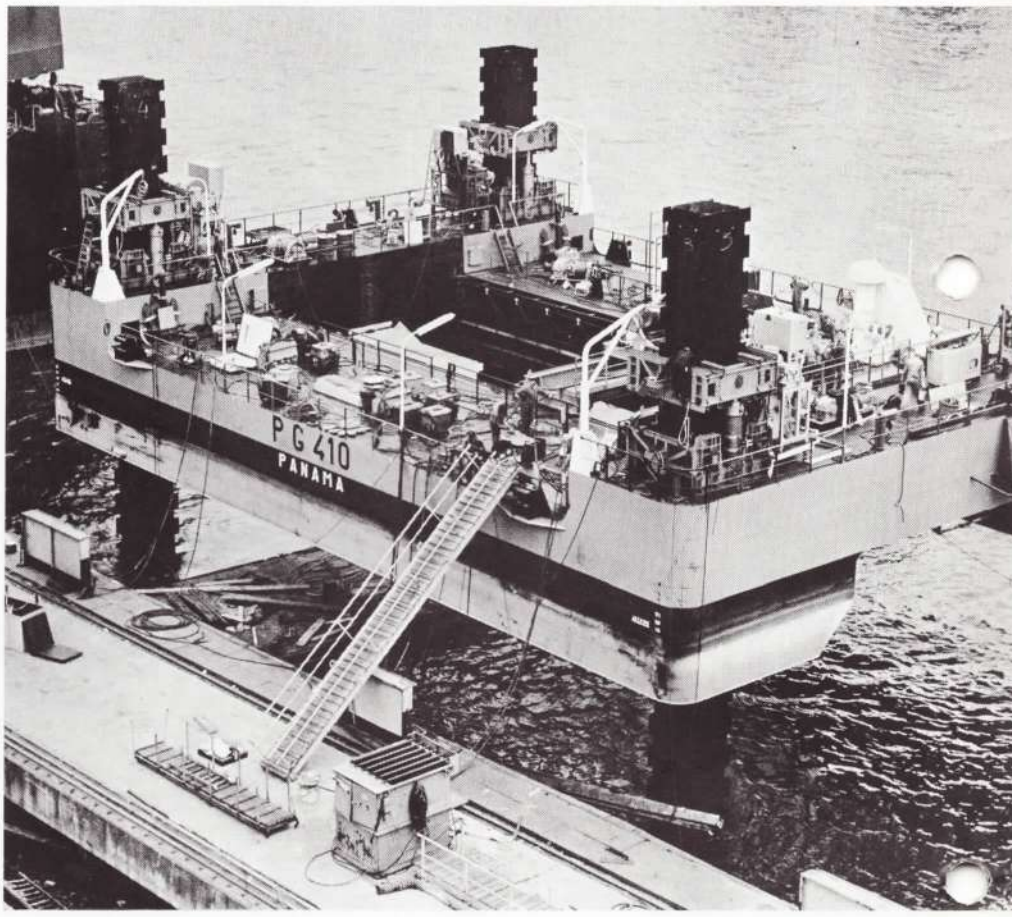
The arrangement of the legs and their mechanical features combine to produce an excellent working area, stability and a very high degree of safety. The jacks can be operated under varying load and work conditions, in all weathers and temperatures, and cannot slip.

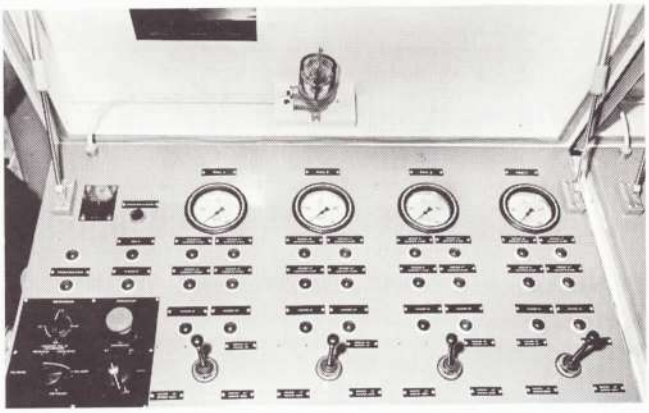
The jacking units can be operated simultaneously by one man from a central console.

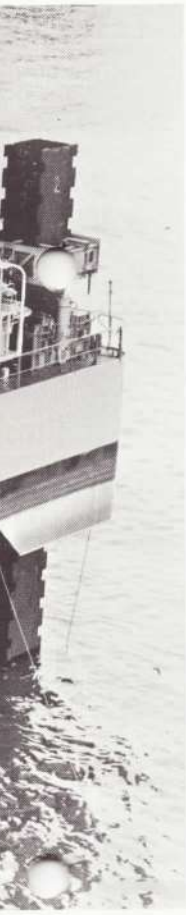
The pontoon elevation rate varies from 10 to 15 metres per hour, depending on the size and nature of the pontoon. With the pontoon afloat, the legs can be raised or lowered at 20-30 m/hr. Higher leg actuating speeds can be provided if required.

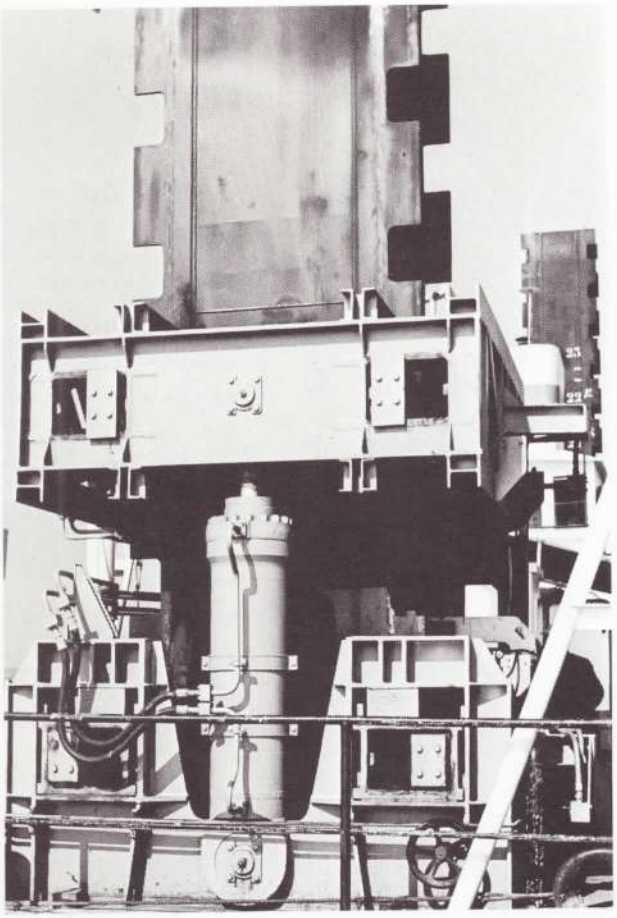
The legs have a square cross-section. The use of patented IHC adjusted leg guides enables the leg clearance in the elevated or floating positions to be reduced to nil.

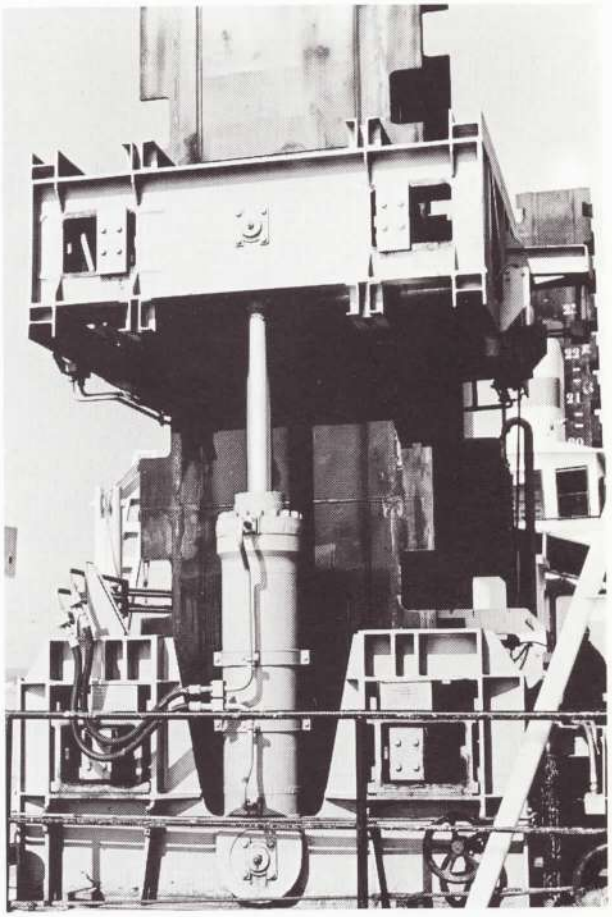
The immense strength of the legs enables the platform to be lowered and moved to a new location under adverse wave and swell conditions.

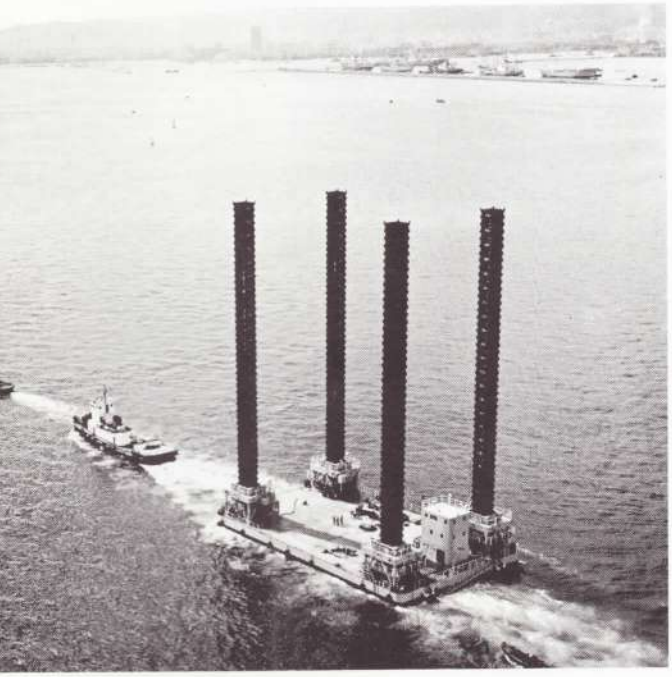




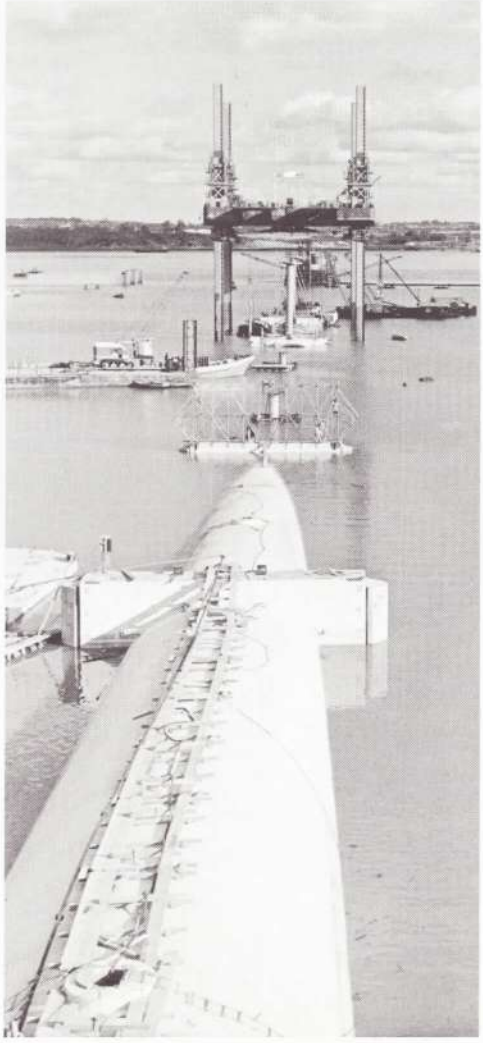








Rio Paraná



Name : Rio Paraná
Built : 1966
Owner: Comisión Interprovincial del Túnel Subfluvial Paraná – Santa Fé.

Main dimensions

Pontoon -	length	38.60 m
	width	30.00 m
	depth	3.00 m
Leg length		64 m
Jacking capacity per leg		600 tons

Capable of working in water depths of up to 30 m.
No crew accommodation.

Equipment

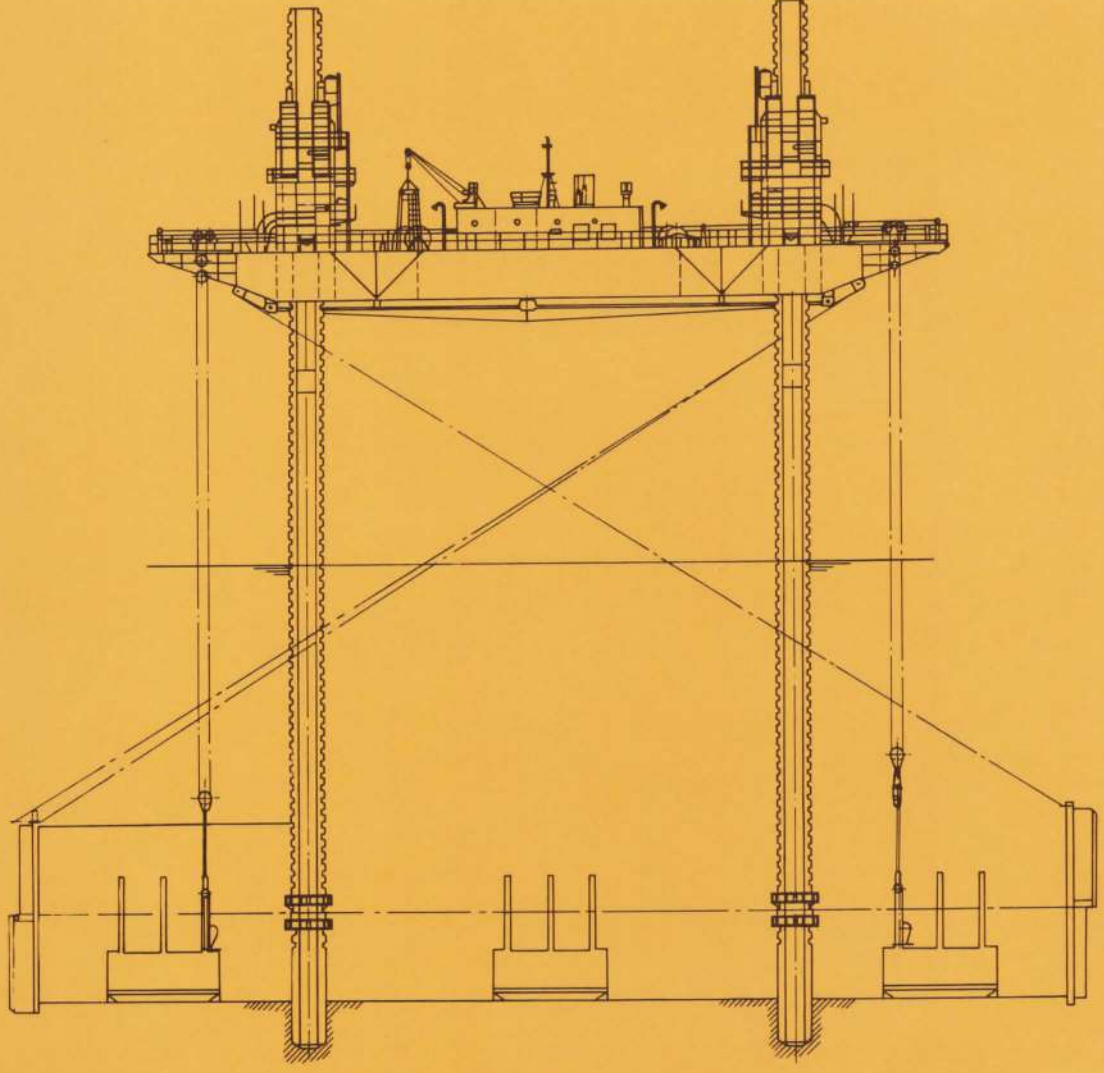
Ten electrically-operated winches.

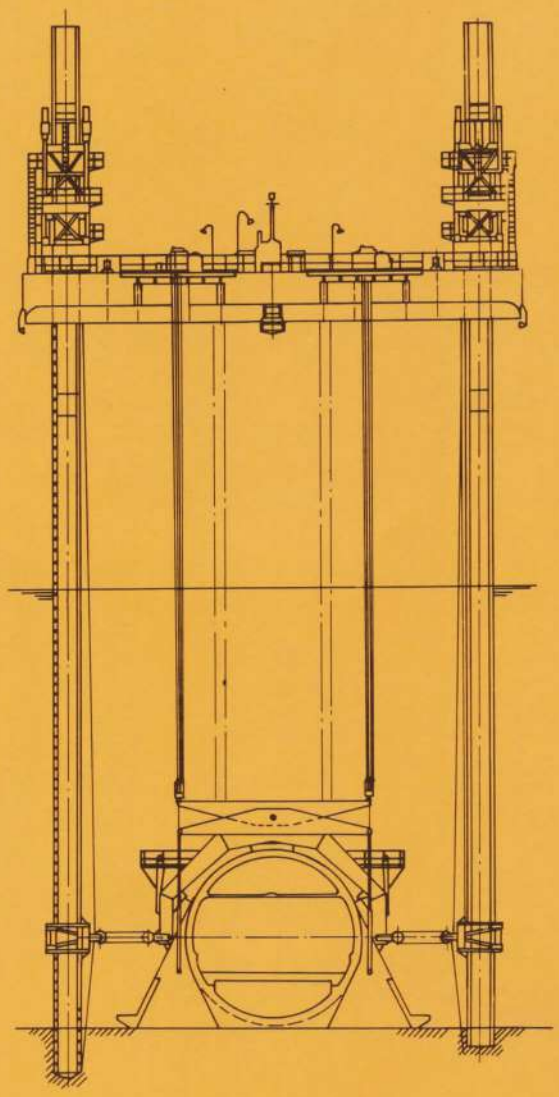
Particulars

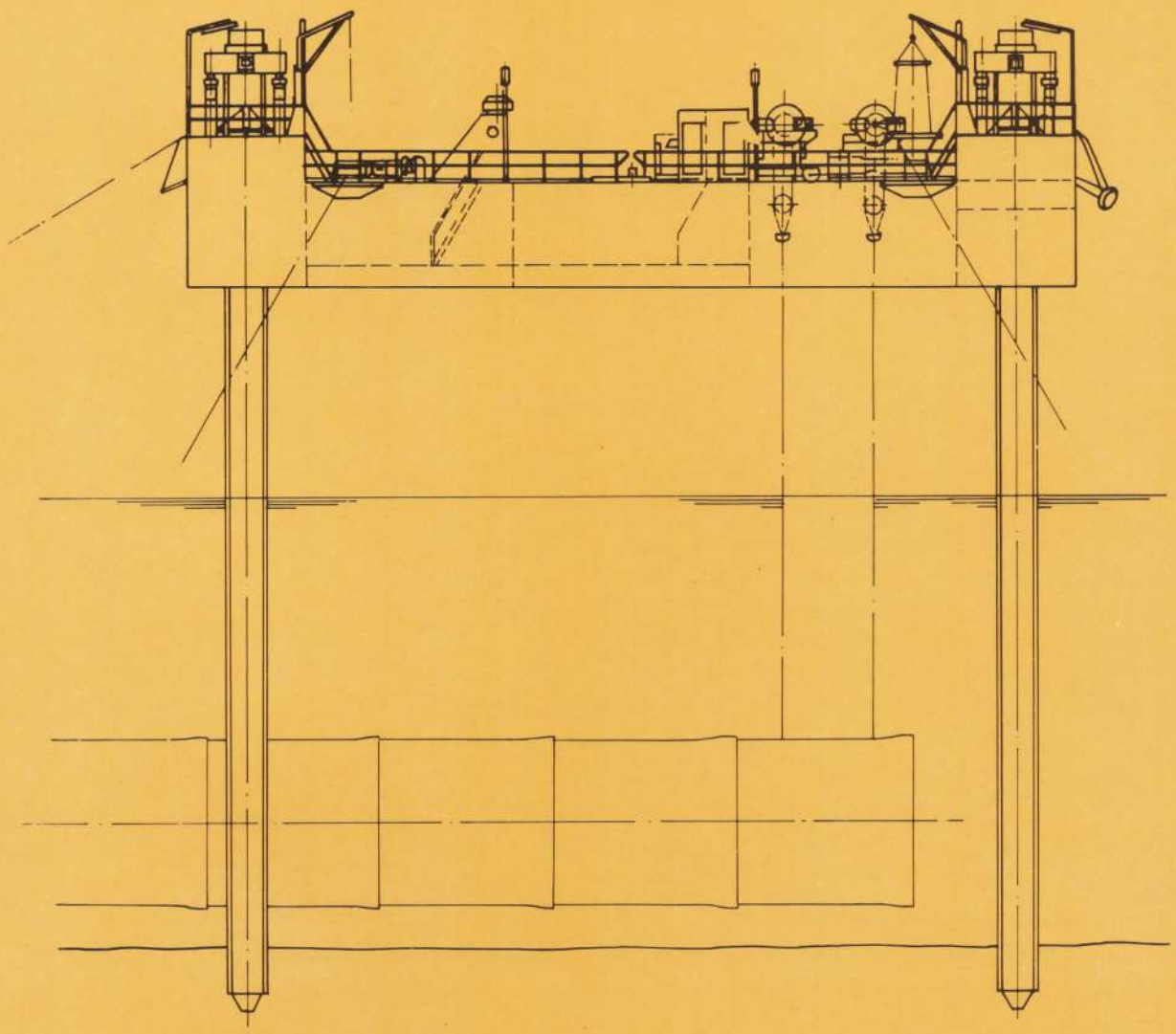
The *Rio Paraná* is fully equipped to place 65-metre long tunnel sections with a high degree of accuracy.

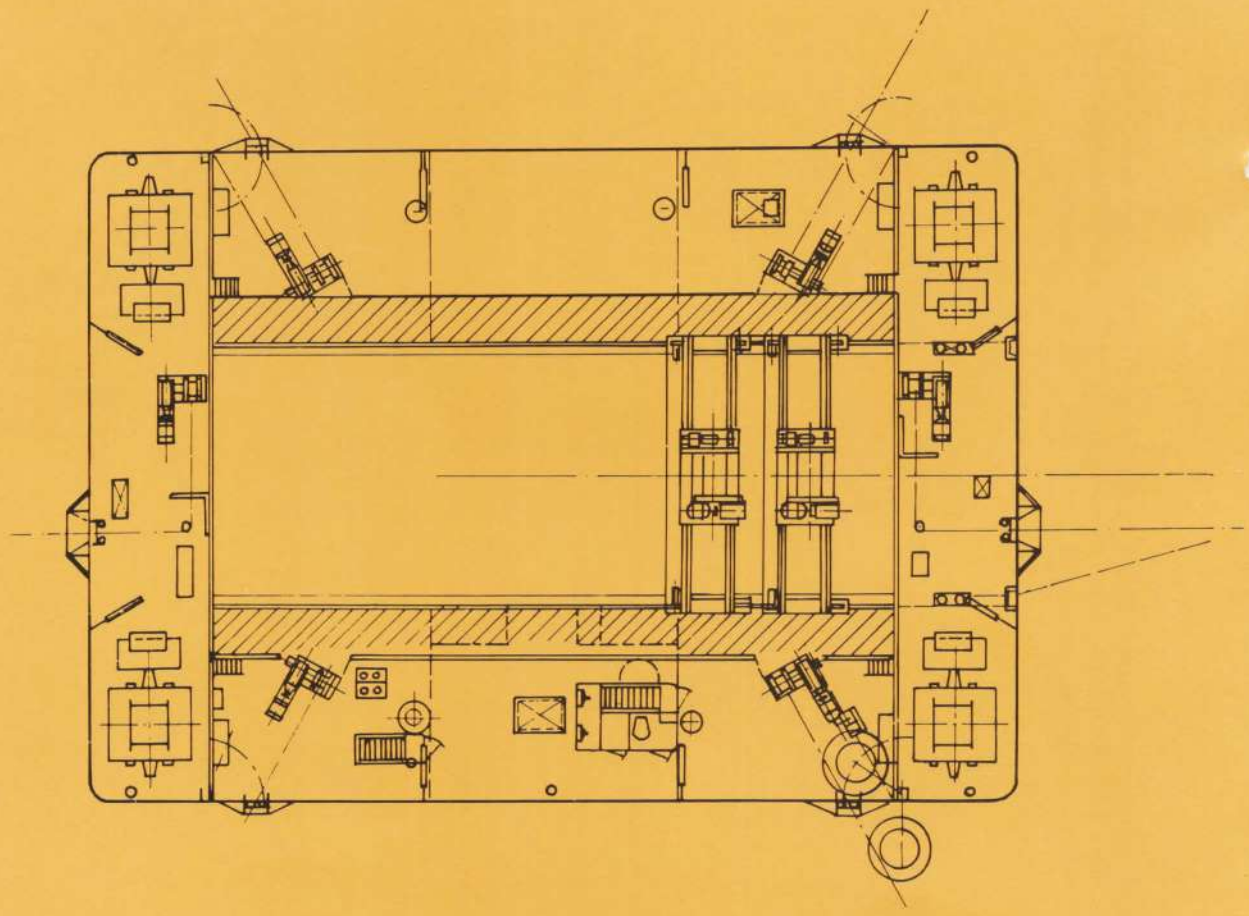
First job

The laying of a 2500 m long road tunnel under the Rio Paraná in Argentina.









PG 410

Name : PG 410
Built : 1968
Owner: Compañía de Obras Edilicias Marítimas Portuarias, Panama

Main dimensions

Pontoon -	length	30.00 m
	width	21.00 m
	depth	3.50 m
Leg length		38 m
Jacking capacity per leg		300 tons

Capable of working in water depths of up to 21 m.
Day accommodation with messing only.

Equipment

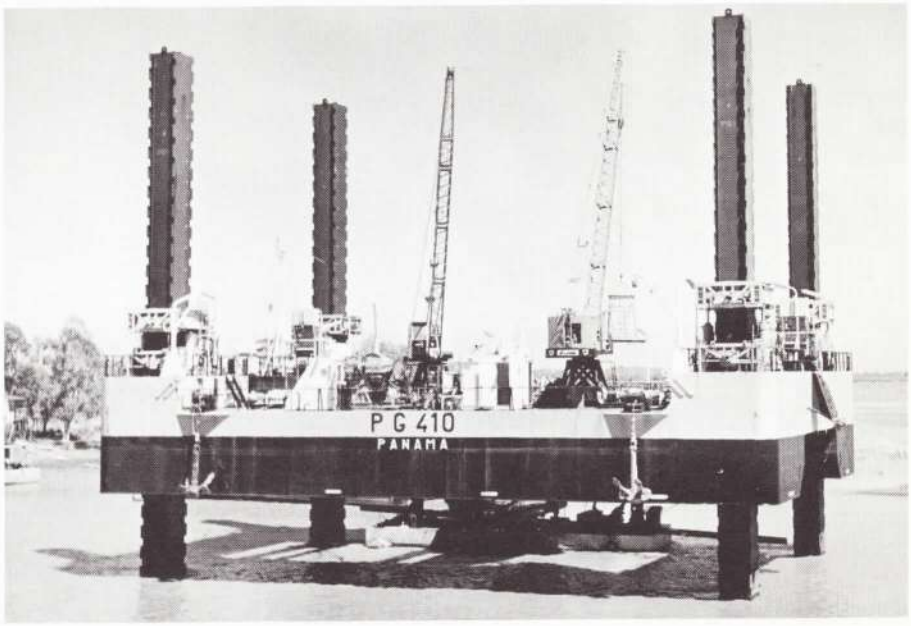
Two travelling gantry cranes with 40 ton crabs.

Particulars

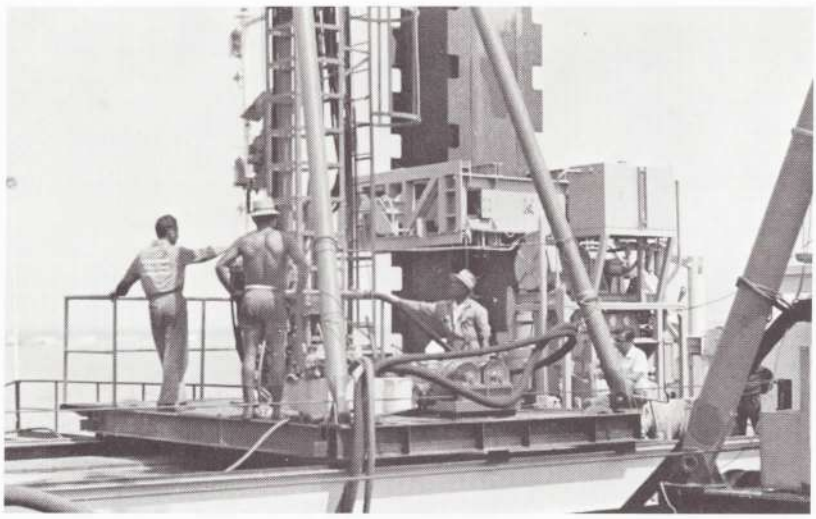
The pontoon is designed on the catamaran principle, giving an 8.5 m wide centre well.
The pontoon can be divided longitudinally to permit transport by sea.

First job

Positioning sewer outfalls in a river in Argentina.



PR 007 Teredo



Name : PR 007 Teredo
Built : 1969
Owner: Compagnia Construzioni Generali, Italy

Main dimensions

Pontoon -	length	30.00 m
	width	21.00 m
	depth	5.00 m
Leg length		42 m
Jacking capacity per leg		325 tons

Capable of working in water depths of up to 32 m.
Day accommodation with messing only.

Equipment

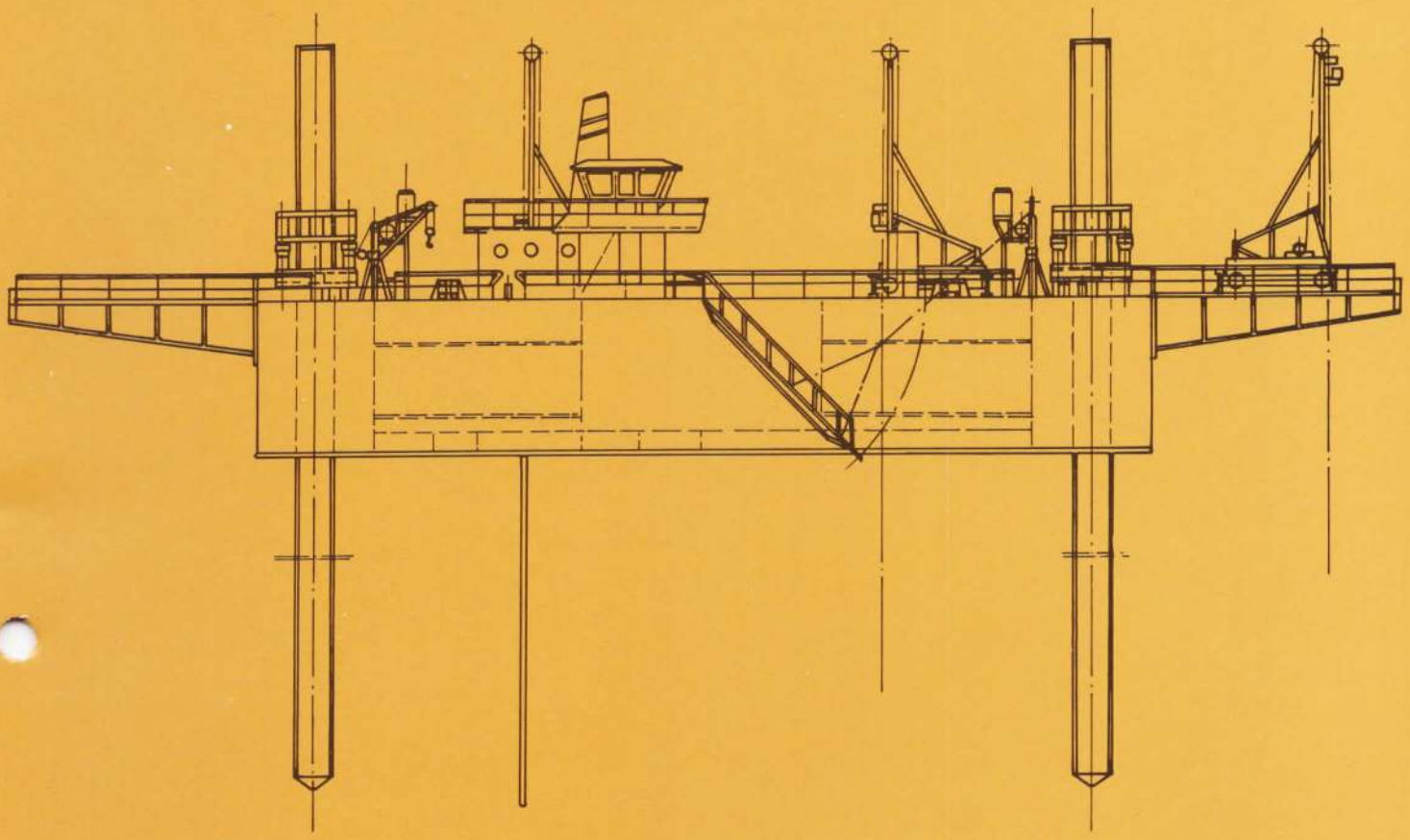
Three rock-drilling machines. These are mounted on carriages and can be moved along the pontoon.

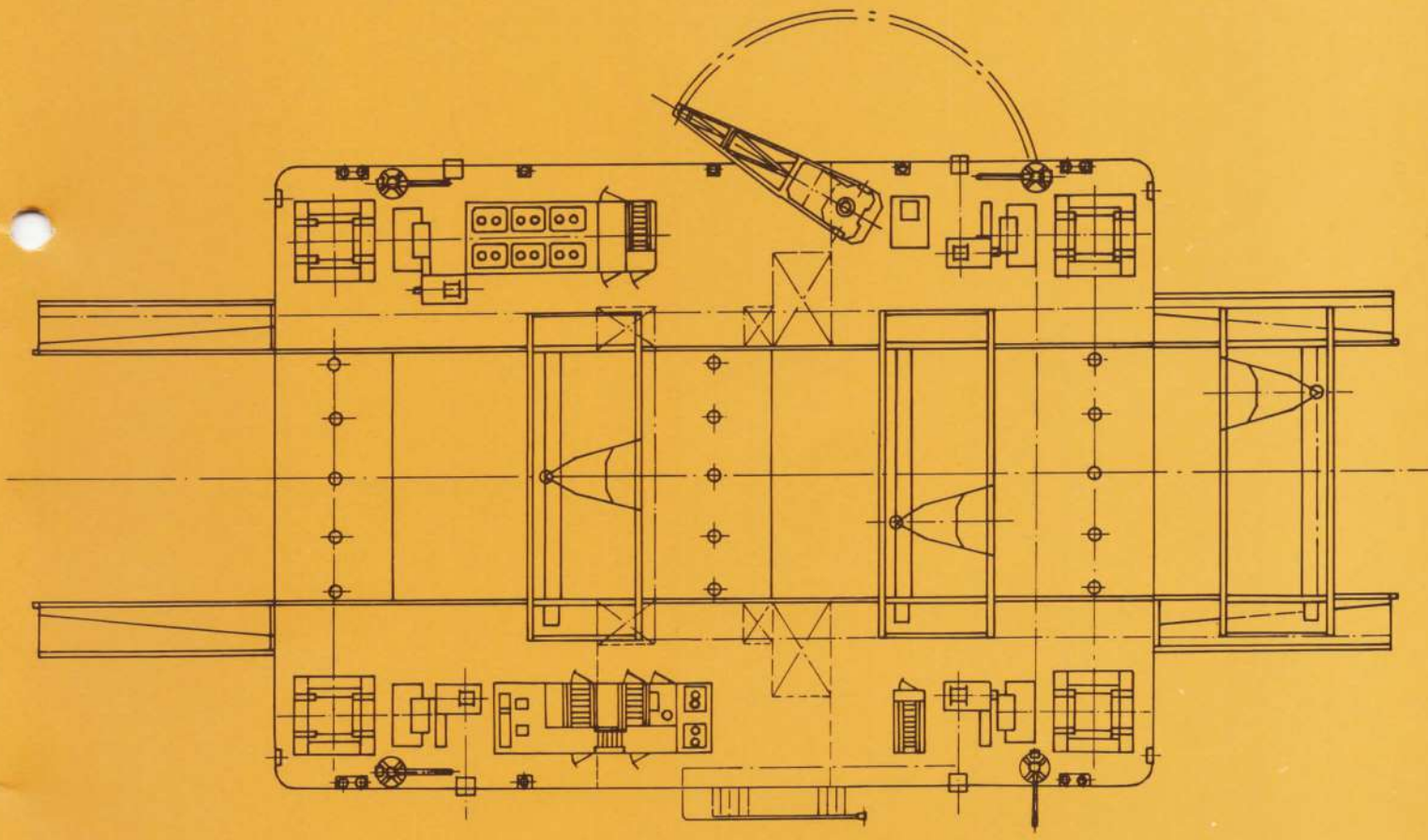
Particulars

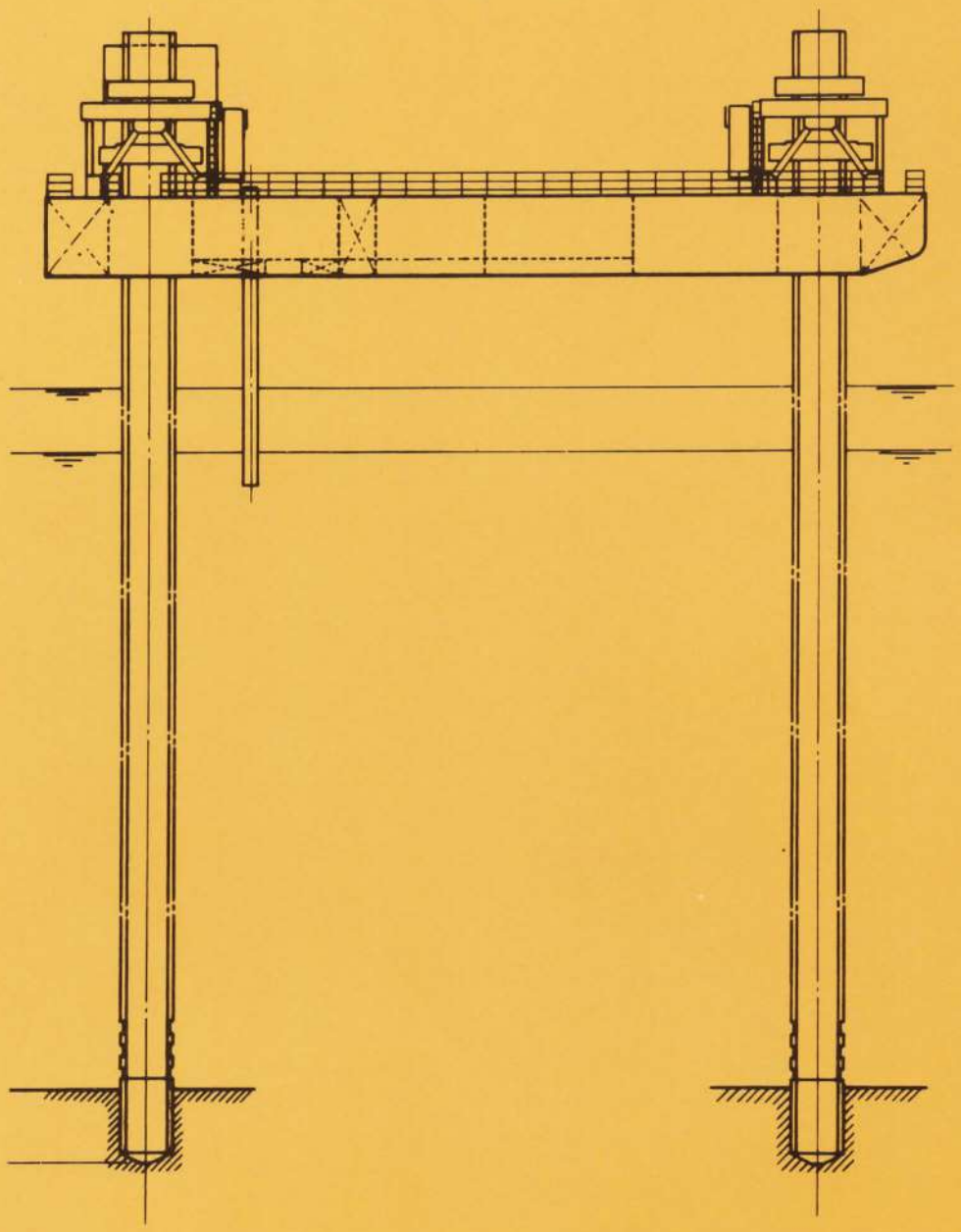
The pontoon embodies a centre well and fore and aft cantilevers.

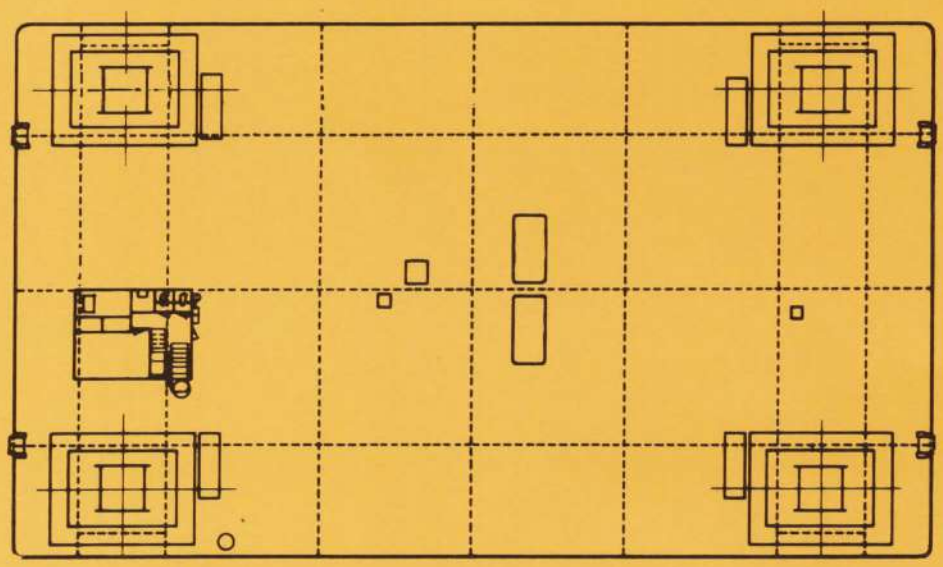
First job

Rock excavation for port development project on the island of Sicily.









Kaiyo

KAWASAKI HEAVY INDUSTRIES, LTD.

Name : Kaiyo
Built : 1969
Owner: Nihon Kaiko Company Limited
Built by Kawasaki Heavy Industries, Japan

Main dimensions

Pontoon -	length	42.00 m
	width	24.00 m
	depth	3.75 m
Leg length		53 m
Jacking capacity per leg		750 tons

Capable of working in water depths of up to 33 m.
Accommodation for 16 men.

Equipment

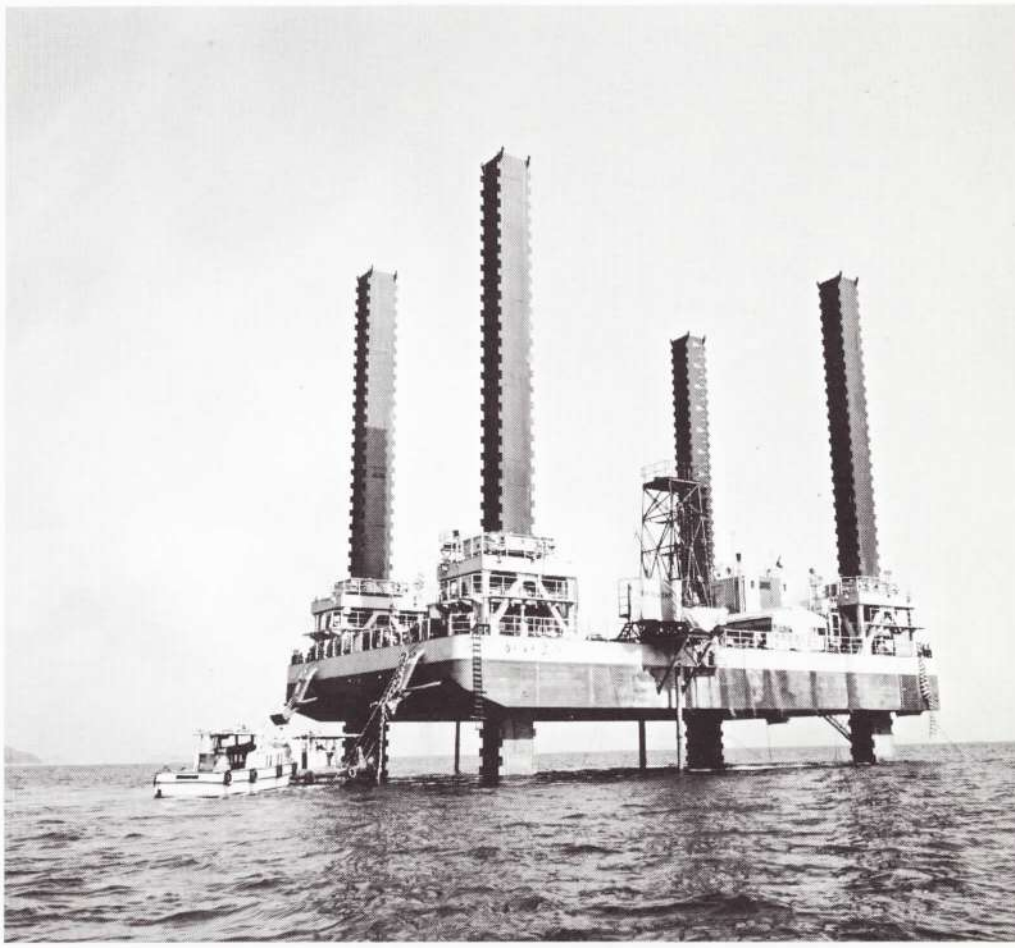
Can be fitted with a 200-ton crane.

Particulars

The *Kaiyo* is designed to withstand 8-knot currents.

First job

Exploratory drilling in Japanese waters.



Cowrie One

Name : Cowrie One
Built : 1970
Owner: Royal Dutch Shell

Main dimensions

Pontoon -	length	30.00 m
	width	23.00 m
	depth	3.90 m
Leg length		30 m
Jacking capacity per leg		900 tons

Capable of working in water depths of up to 16 m.
Day accommodation.

Equipment

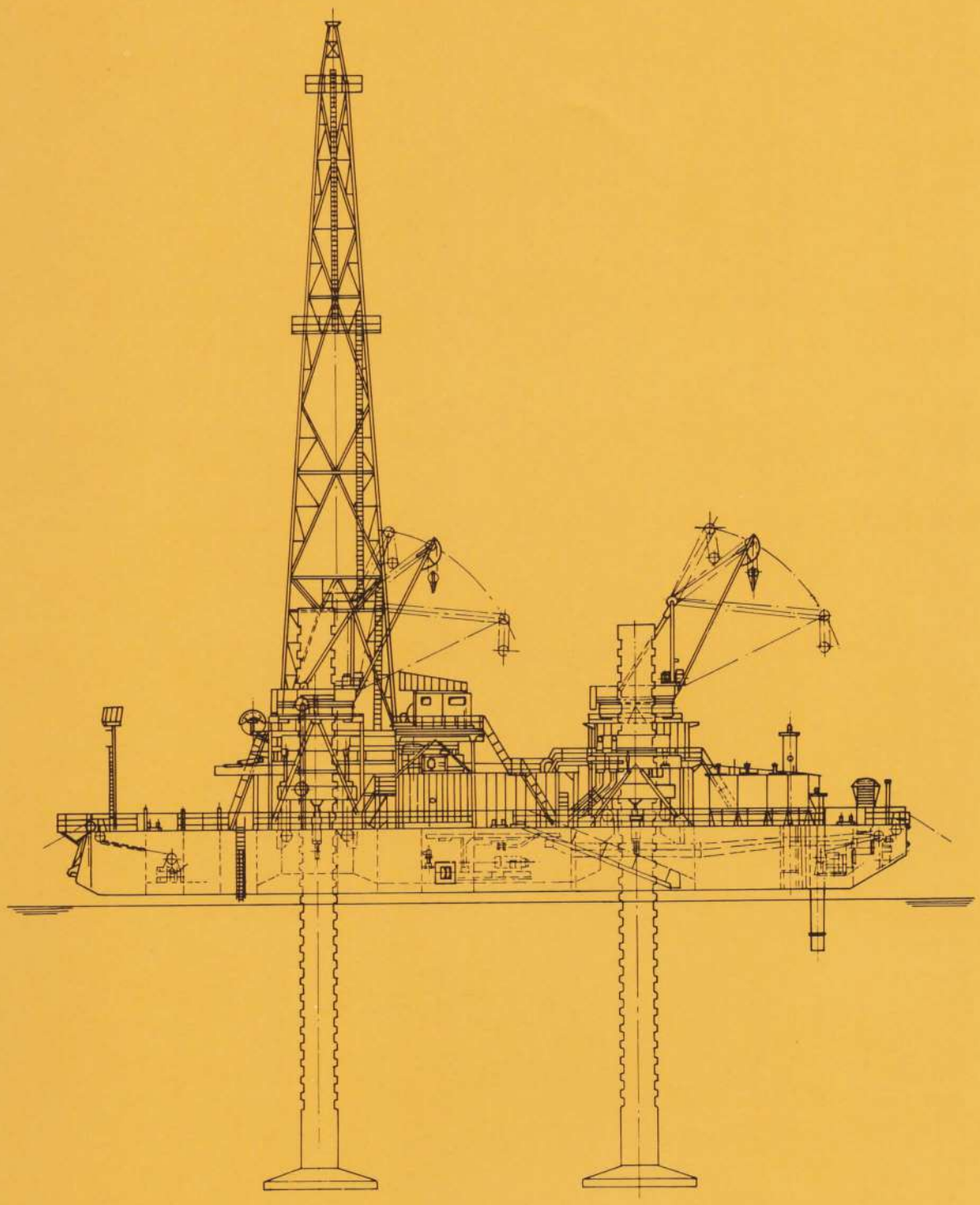
Work-over drilling rig for operations in marshy areas.
Two 12½-ton cranes, mounted on frame built around the legs.

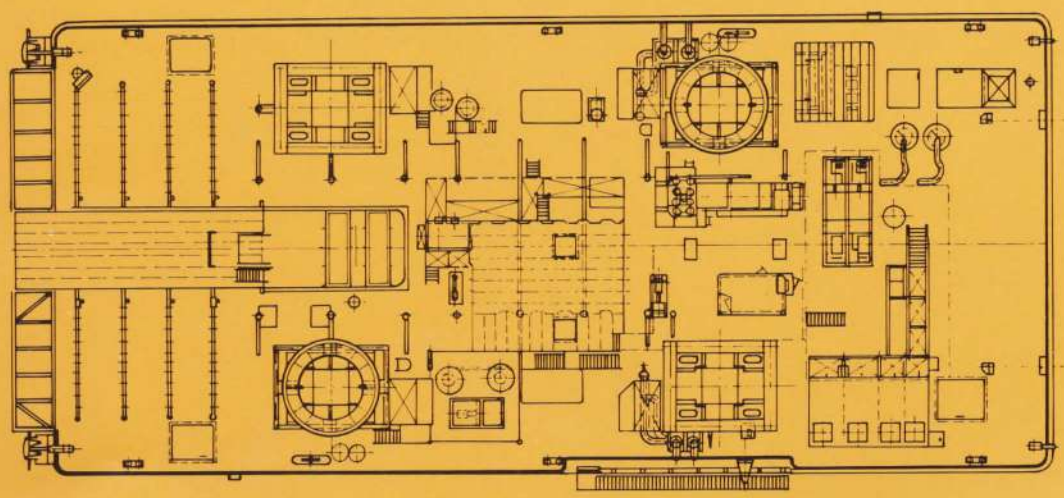
Particulars

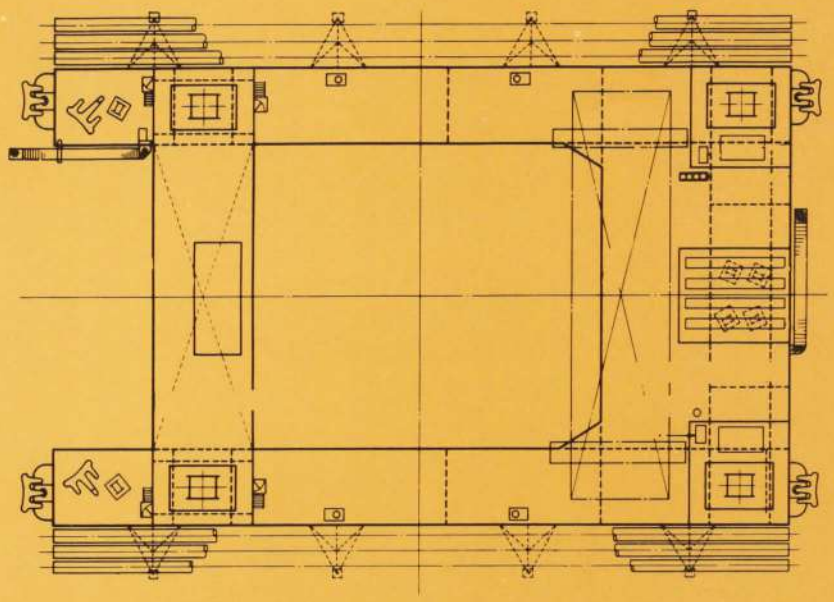
The very low surface pressure permitted by the nature of the bed necessitated fitting each of the legs with a large flat base. The legs can be raised sufficiently to permit the base to be brought flush with the keel of the pontoon, thus keeping the draught to a minimum.

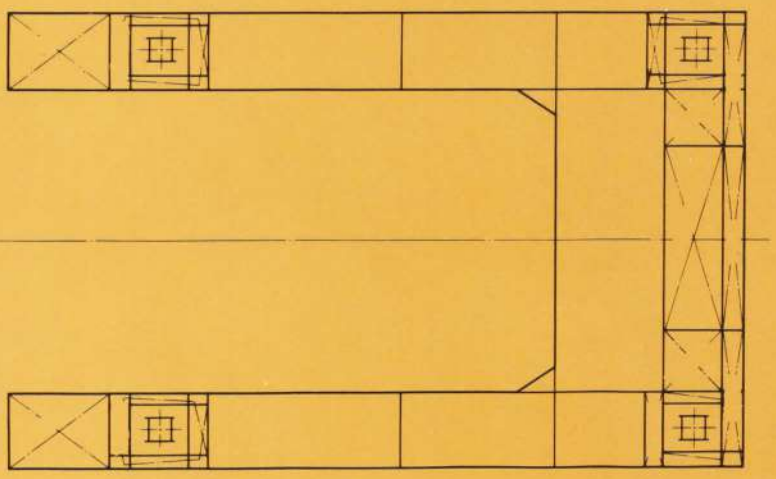
Continuous job

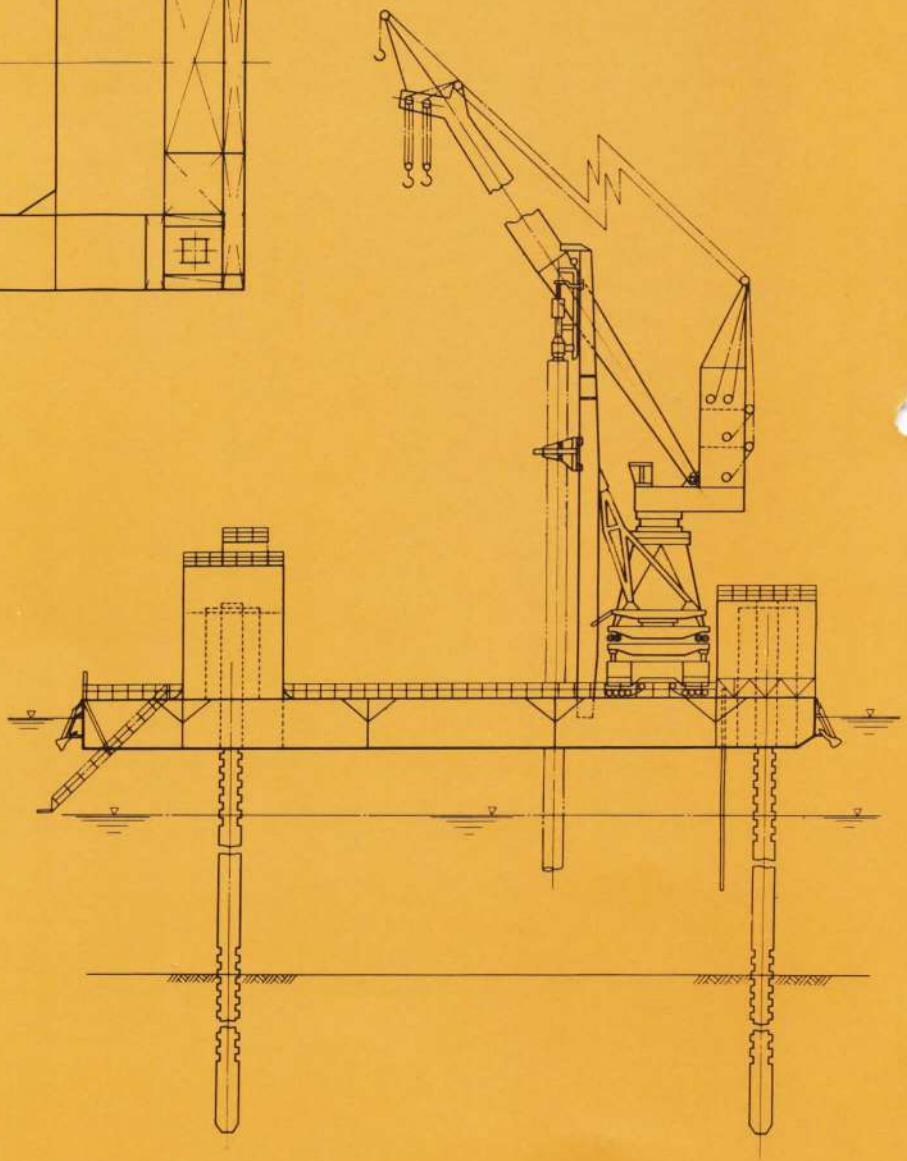
Work-over drilling and well-completion in Nigeria.











Kajima

Name : Kajima
Built : 1972
Owner: Kajima Corporation, Japan
Built by Kawasaki Heavy Industries, Japan

Main dimensions

Pontoon -	length	74.00 m
	width	45.00 m
	depth	5.00 m
Leg length		80 m
Jacking capacity per leg		2,000 tons

Capable of working in water depths of up to 55 m.
Accommodation for 40 men.

Equipment

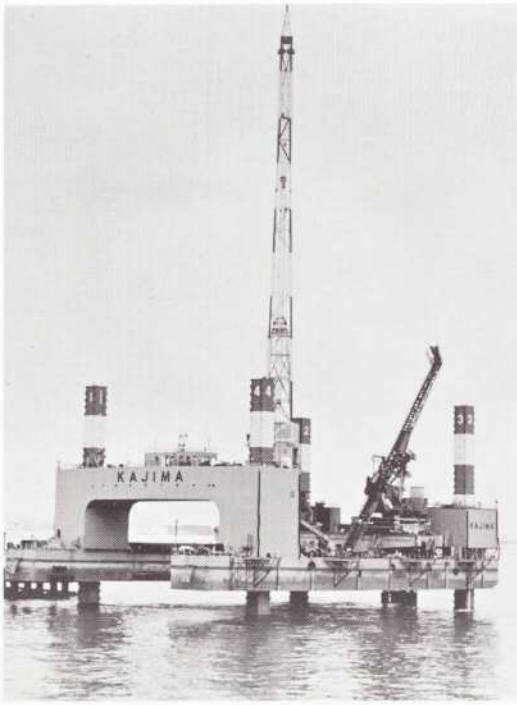
Revolving crane of 100 tons hoisting capacity.
Heavy duty installation for inclined pile-driving.

Particulars

Large U-shaped opening in the stern of the platform. This is bridged for reinforcement purposes, the linking structure housing the living quarters.

First job

Jetty construction for oil refinery off Tomakomai, Japan.



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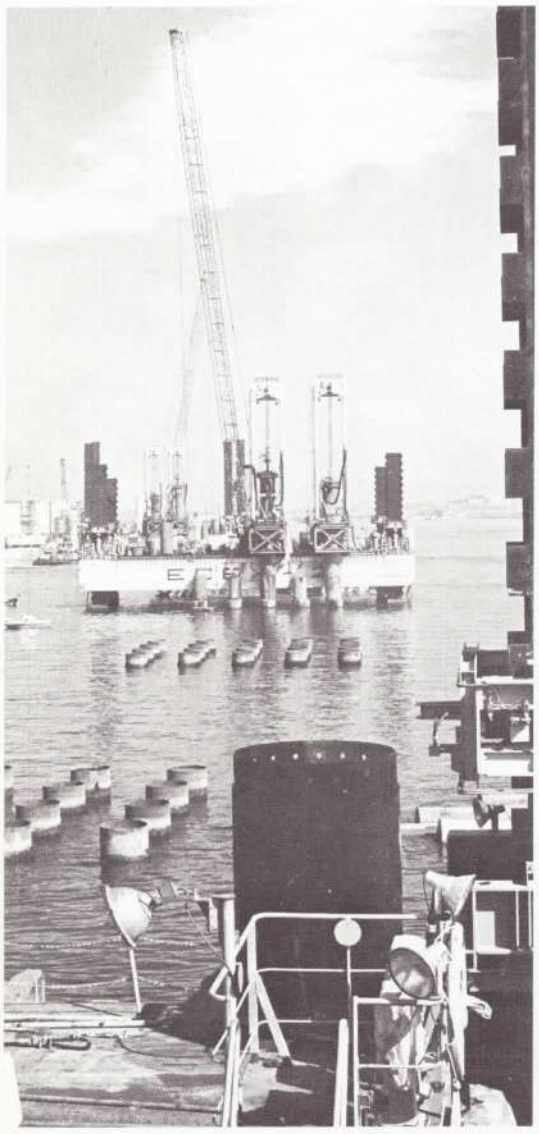
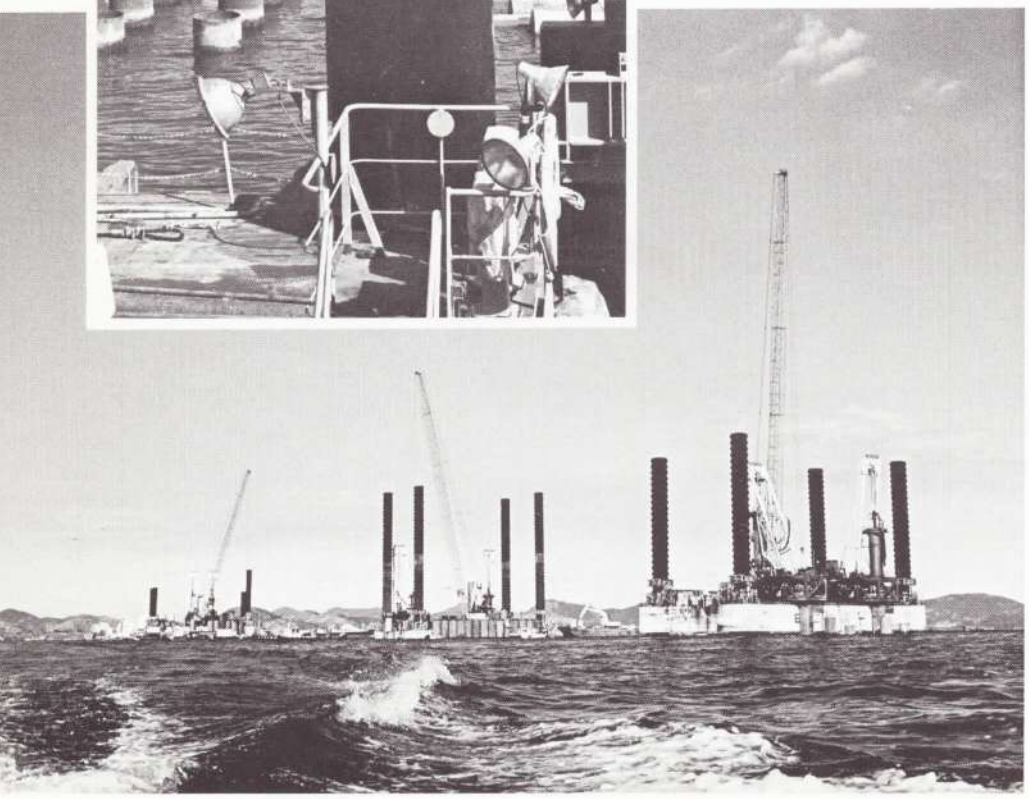
Ecex 1-2-3





Names: Ecex I, Ecex II, Ecex III
Built : 1972
Owner: S.A. Empresa de Construçâo e Exploraçâo da Ponte Presidente Costa e Silva (Ecex), Brazil

Main dimensions

Pontoon -	length	46.35 m
	width	24.10 m
	depth	4.20 m
Leg length		62 m
Jacking capacity per leg		960 tons

Capable of working in water depths of up to 25 m.
Day and night accommodation for 4 men; messing facilities for a crew of 16.

Equipment

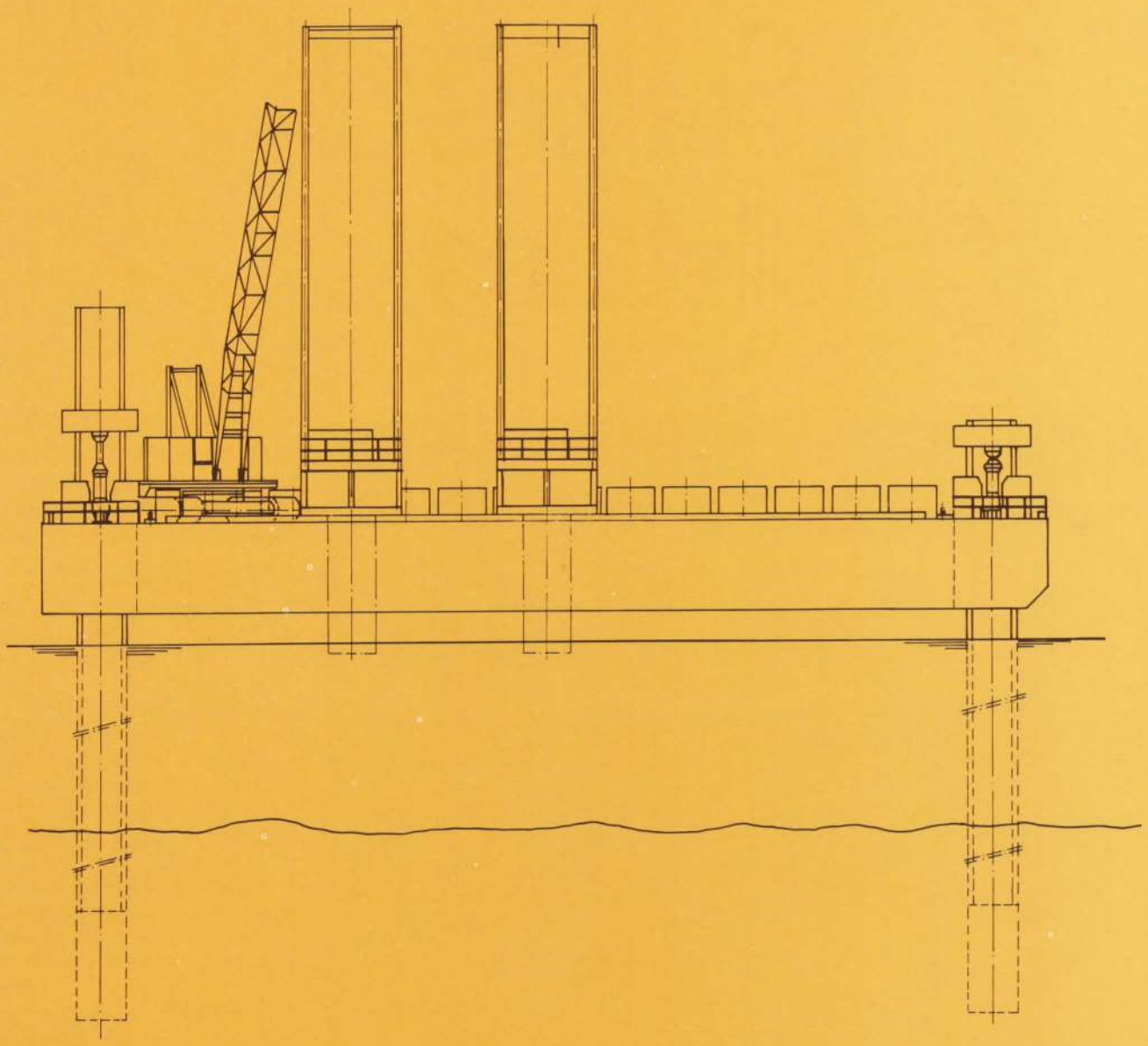
Two large-bore drilling installations, each complete with casing oscillator.
One 150-ton capacity revolving crane.

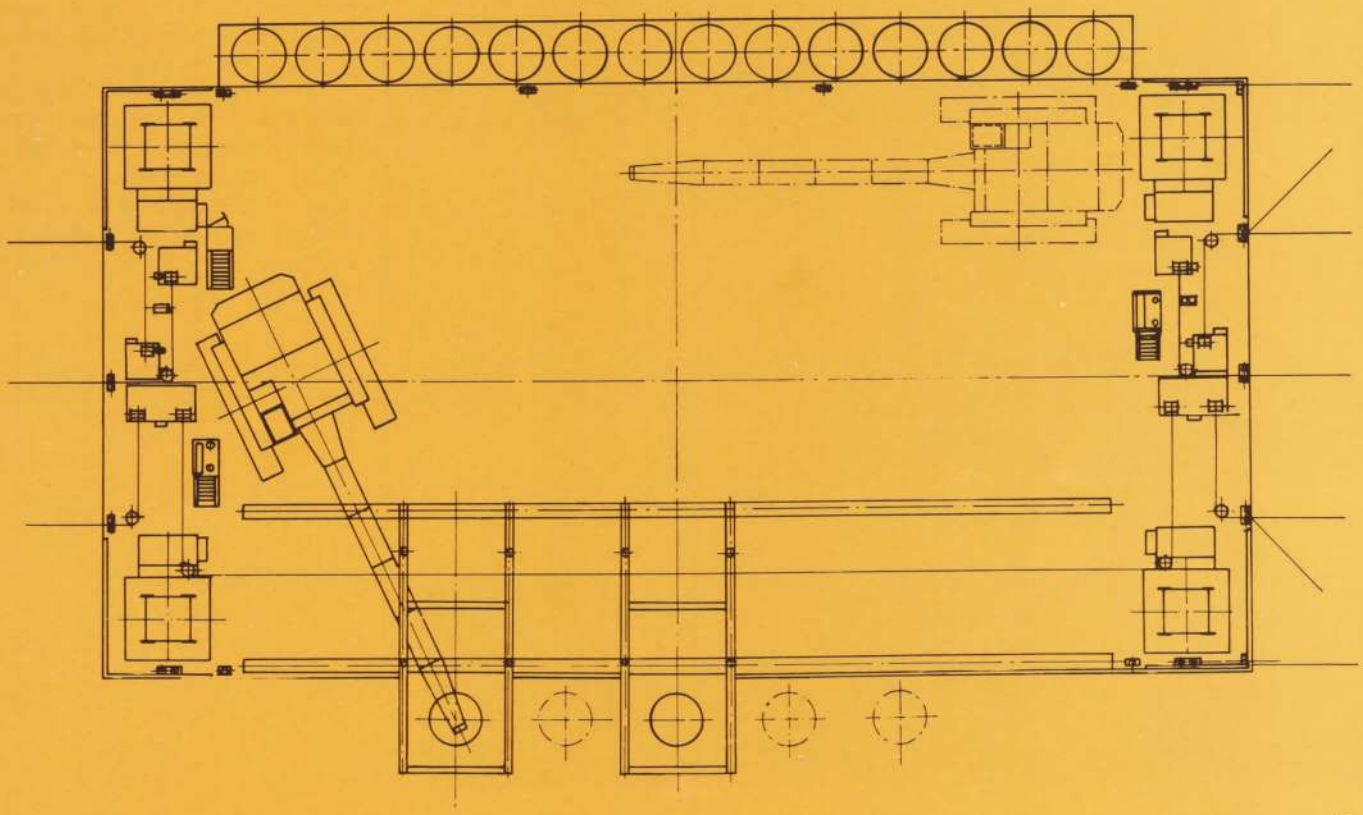
Particulars

The legs are designed for penetrations up to 25 m; provided with jetting system for easy withdrawal of the legs.

First job

Construction of foundations for Guanabara Bay Bridge in Brazil.





Stevin 73

Name : Stevin 73
Built : 1973
Owner: Van Splunder's Aannemingsmaatschappij, Holland

Main dimensions

Pontoon -	length	38.50 m
	width	23.50 m
	depth	4.20 m
Leg length		60 m
Jacking capacity per leg		800 tons

Capable of working in water depths of up to 40 m.
Temporary accommodation has been installed on deck for a crew of 40.
Provision has been made for the addition of permanent living quarters beneath the deck for a crew of 16 at a later date.

Equipment

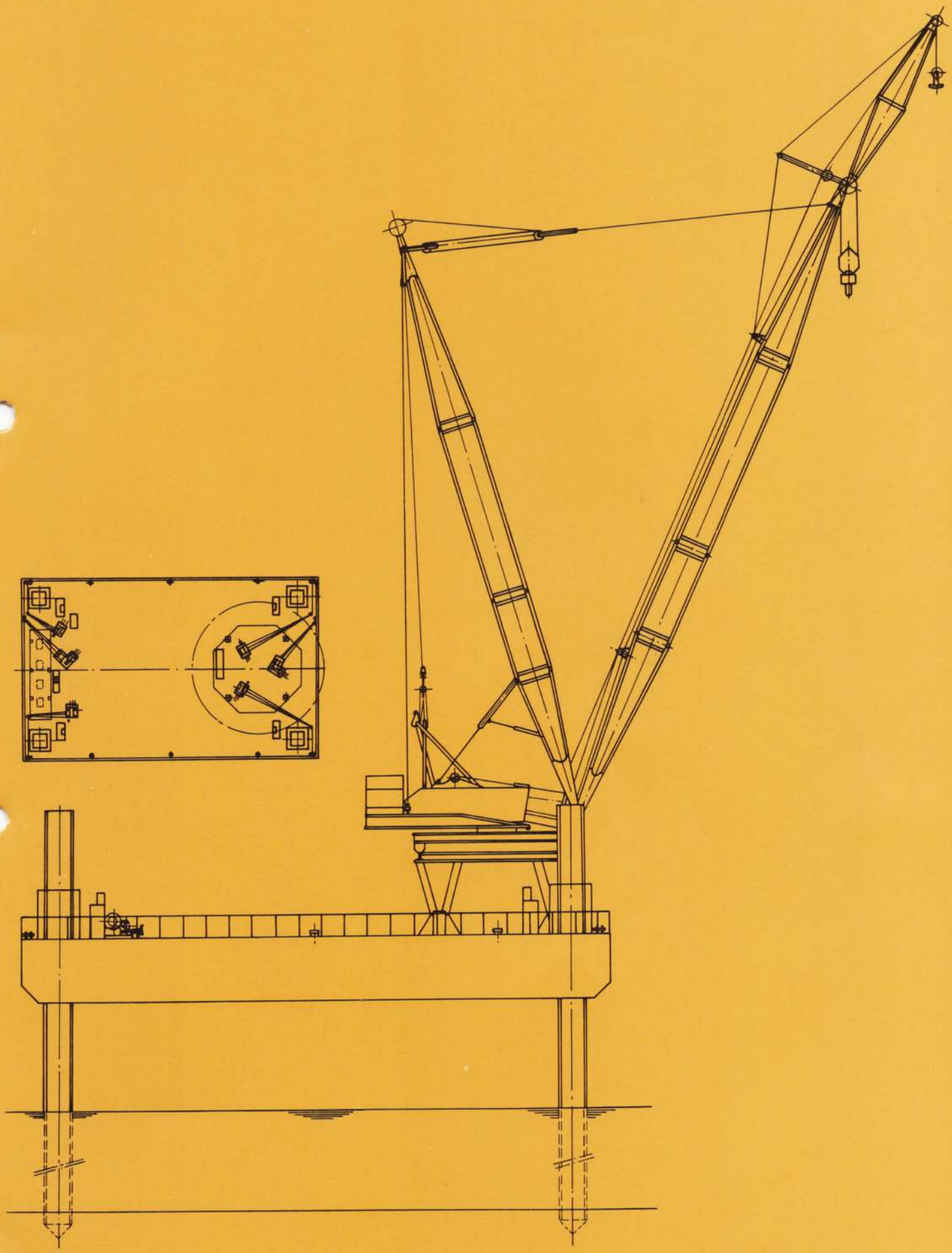
Revolving crane of 320 tons hoisting capacity.
Heavy pile-driver.

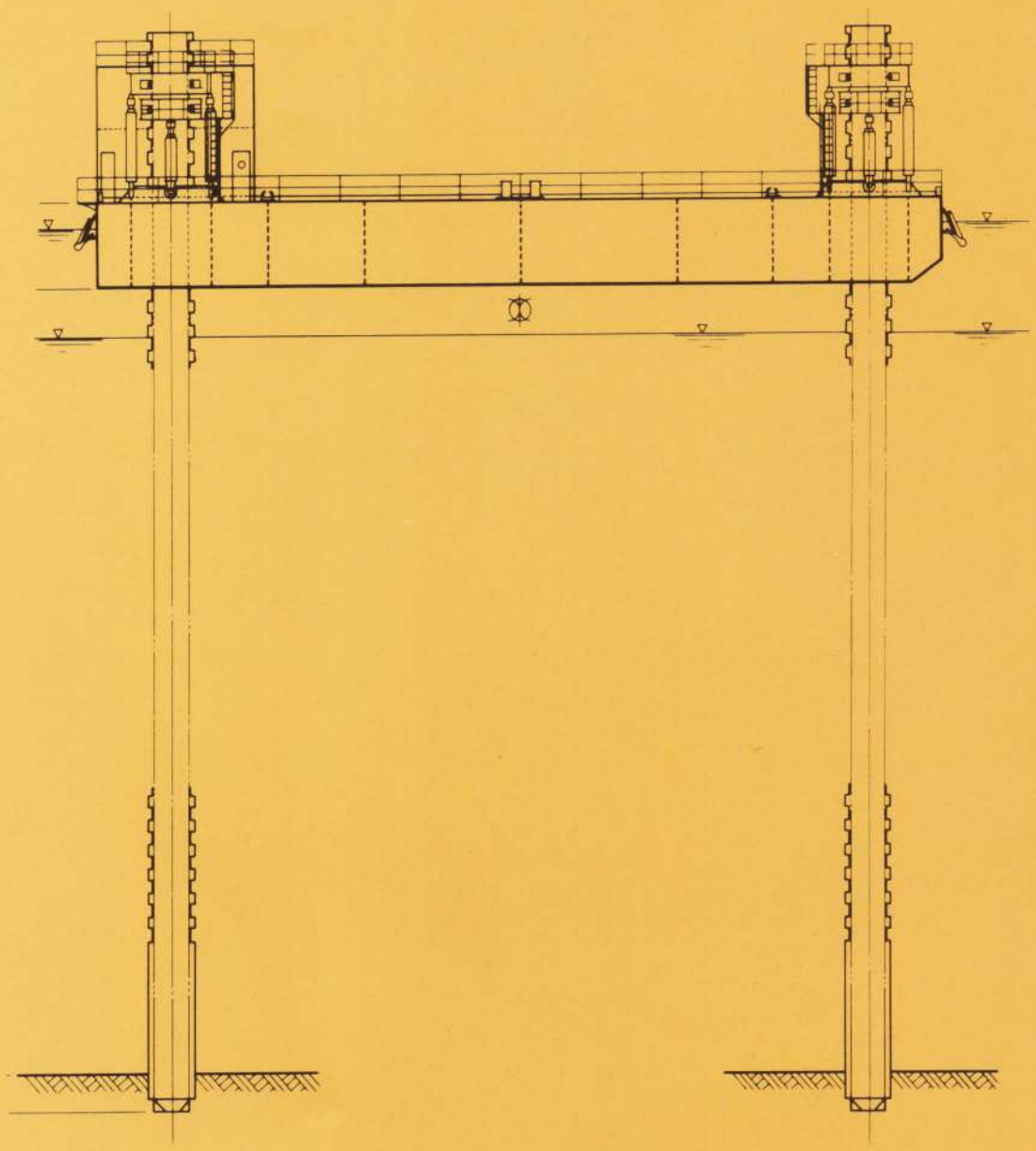
Particulars

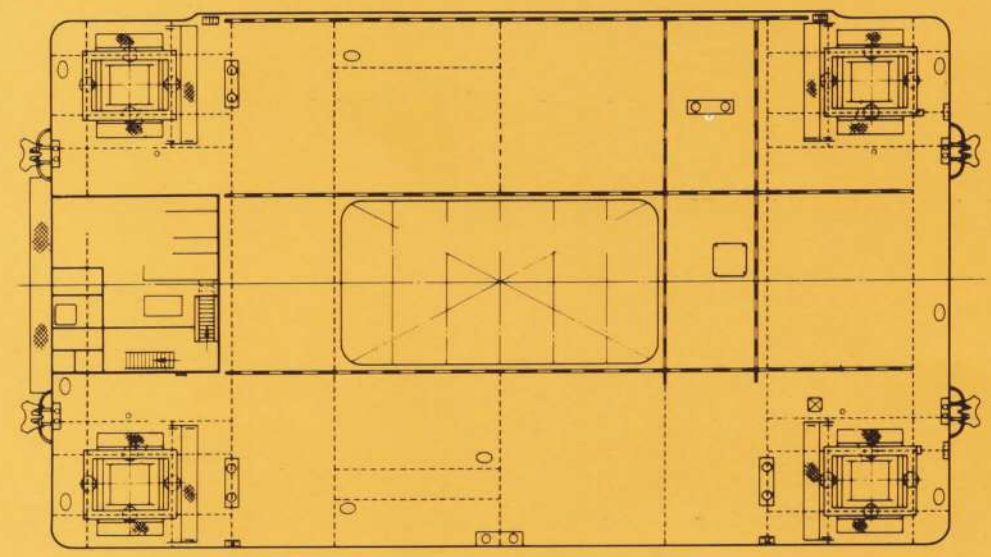
The crane has been installed on a 6-metre high gantry.

First job

Driving foundation piles for an aerial ropeway which will be used in the closing of a major estuary in the Delta region of Holland.







Kaiko SEP-A

Name : Kaiko SEP-A
Built : 1973
Owner: Offshore Equipment Ltd., Japan
Built by Kawasaki Heavy Industries, Japan

Main dimensions

Pontoon -	length	35.00 m
	width	20.00 m
	depth	3.65 m
Leg length		43.50 m
Jacking capacity per leg		530 tons

Capable of working in water depths of up to 30 m.
Accommodation for a crew of 10 is provided.

Equipment

No special fixed equipment installed.

Particulars

The *Kaiko SEP-A* has been designed to be used up to 30 miles offshore.

First job

Exploratory drilling in Japanese waters.

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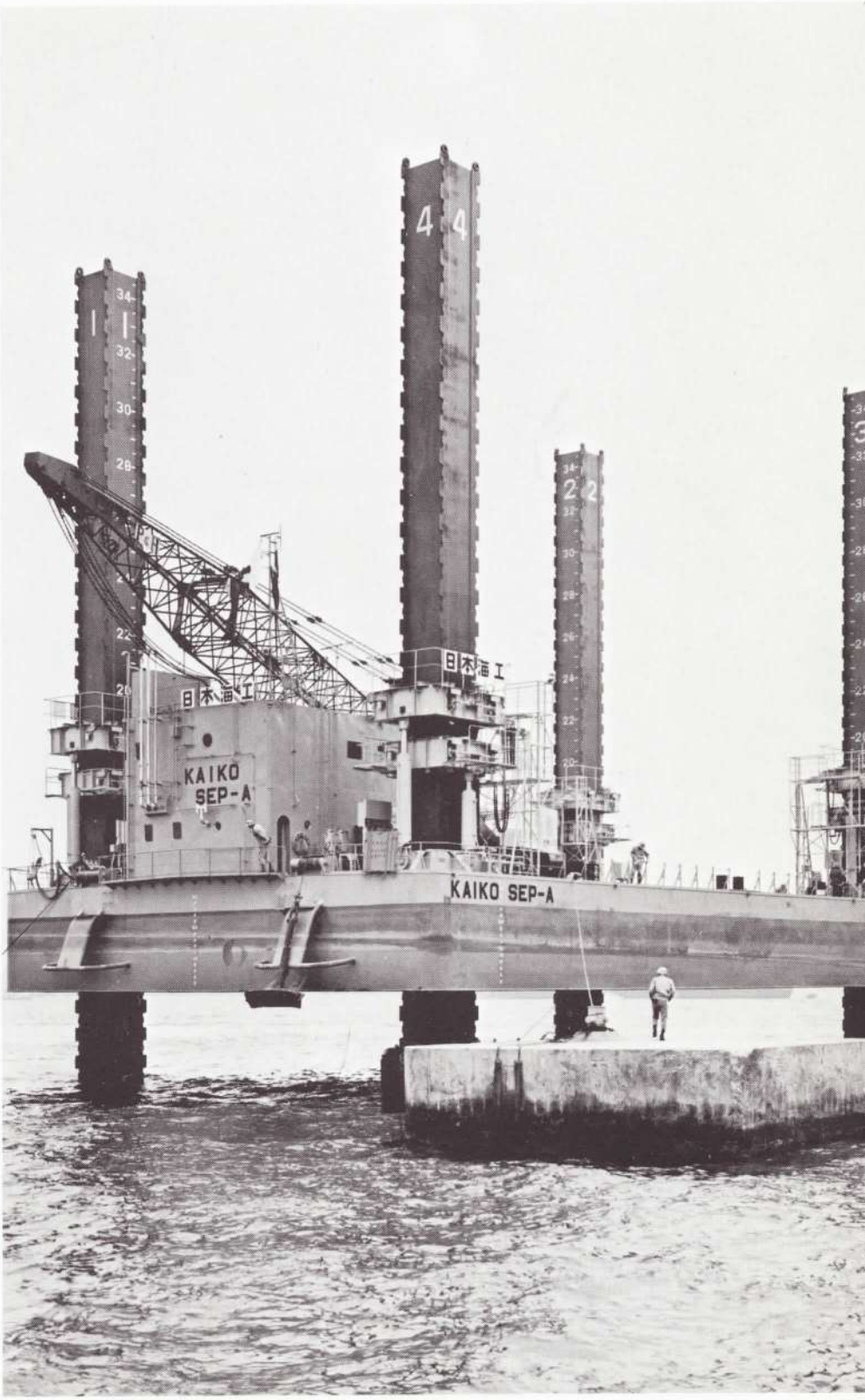
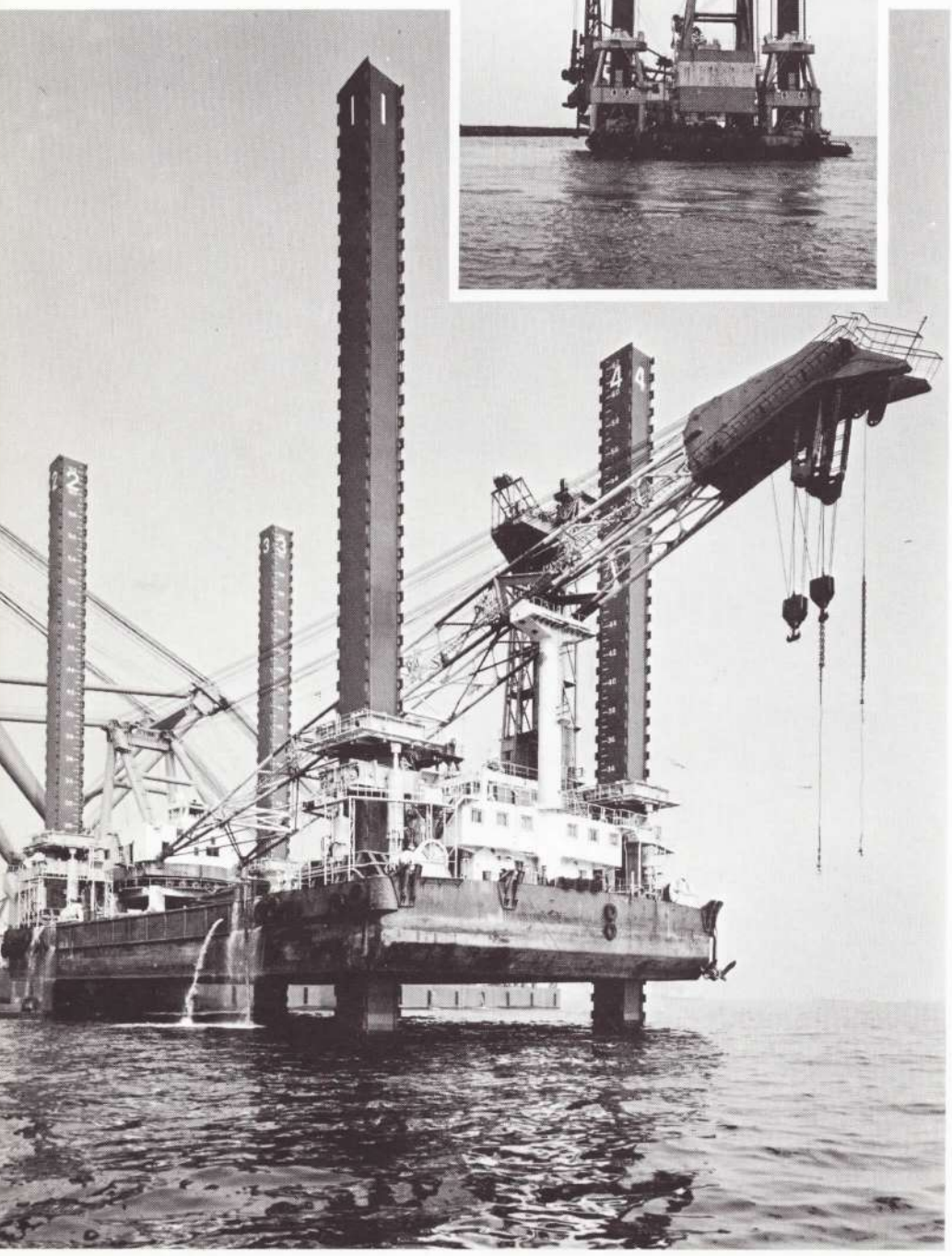


Ukishima

KAWASAKI
HEAVY INDUSTRIES, LTD.



Name : Ukishima
Built : 1973
Owner: Yorigami Maritime Construction Company
Built by Kawasaki Heavy Industries, Japan

Main dimensions

Pontoon - length	60.00	m
width	28.00	m
depth	4.50	m
Leg length	75	m
Jacking capacity per leg	1,850	tons

Capable of working in water depths of up to 45 m.
Accommodation provided for 40 men.

Equipment

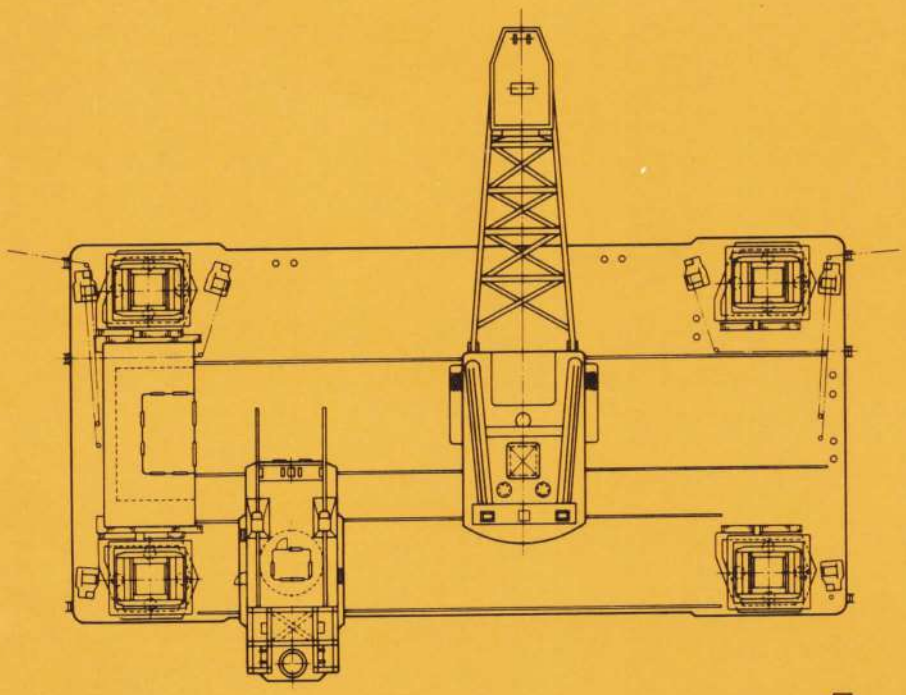
Revolving crane of 350 tons hoisting capacity.

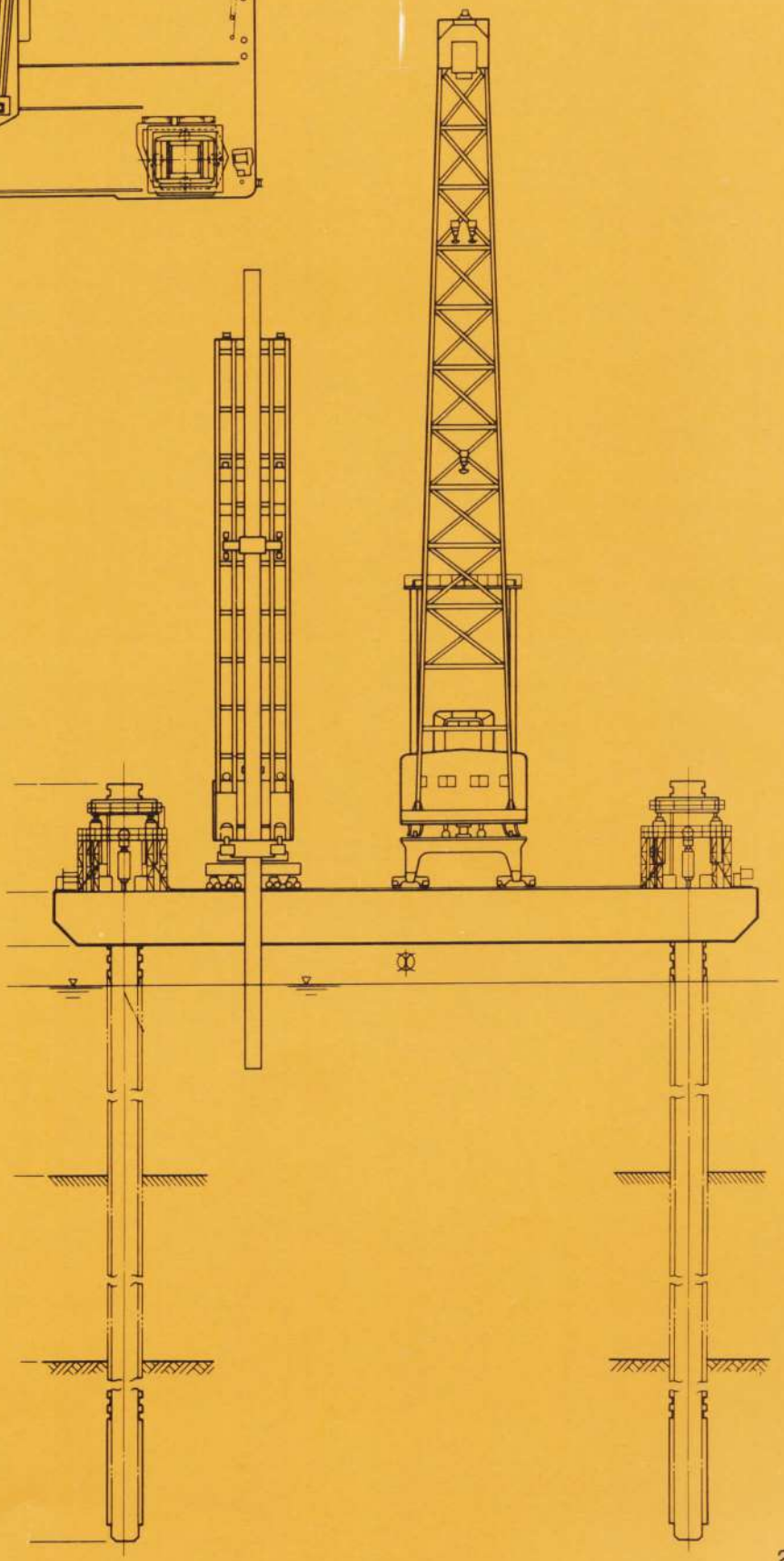
Particulars

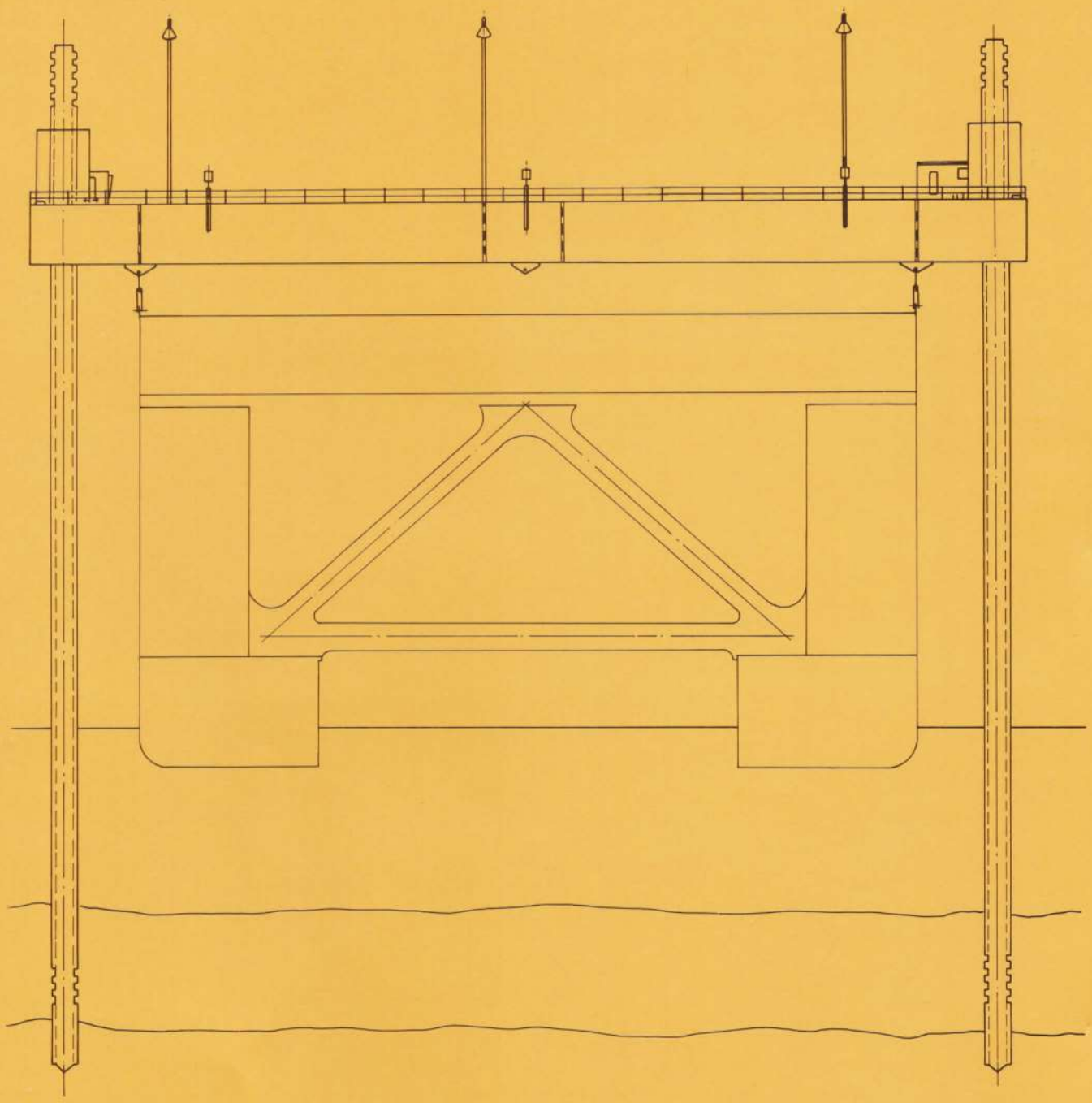
An existing barge was converted and provided with legs and a jacking system.

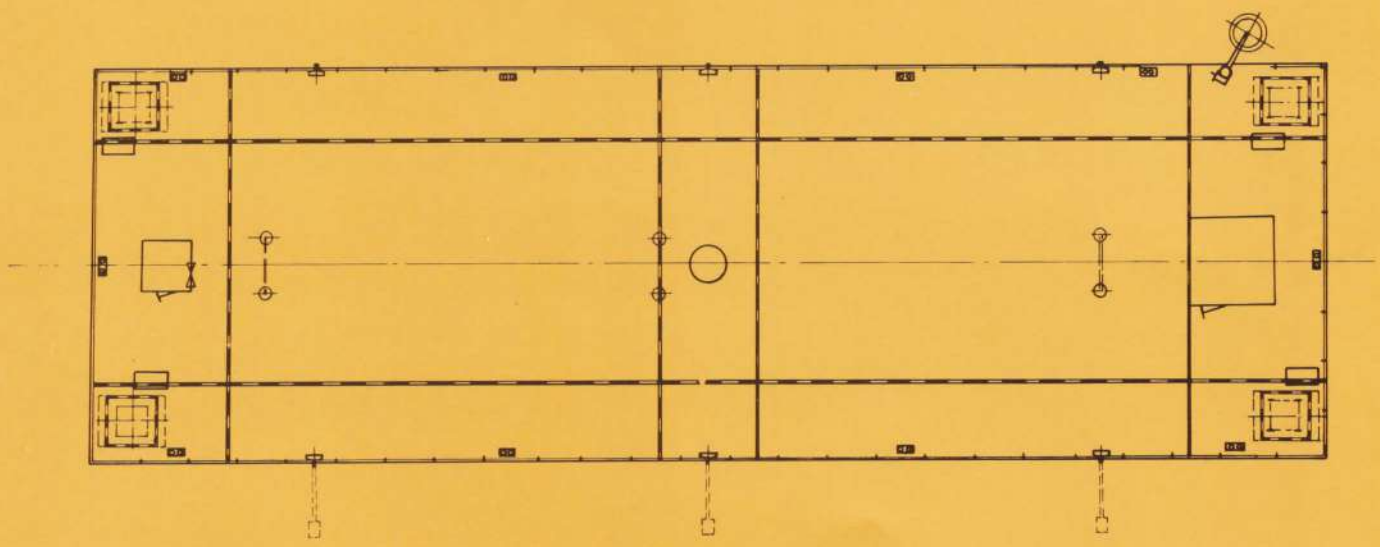
First job

The *Ukishima* started her career with a heavy construction job in Japanese waters.









Assembler I

Name : Assembler I
Built : 1974
Owner: IHC Gusto, Holland

Main dimensions

Pontoon -	length	75.00 m
	width	24.00 m
	depth	4.50 m
Leg length		68 m
Jacking capacity per leg		960 tons

Capable of working in water depths of up to 40 m.
No accommodation.

Equipment

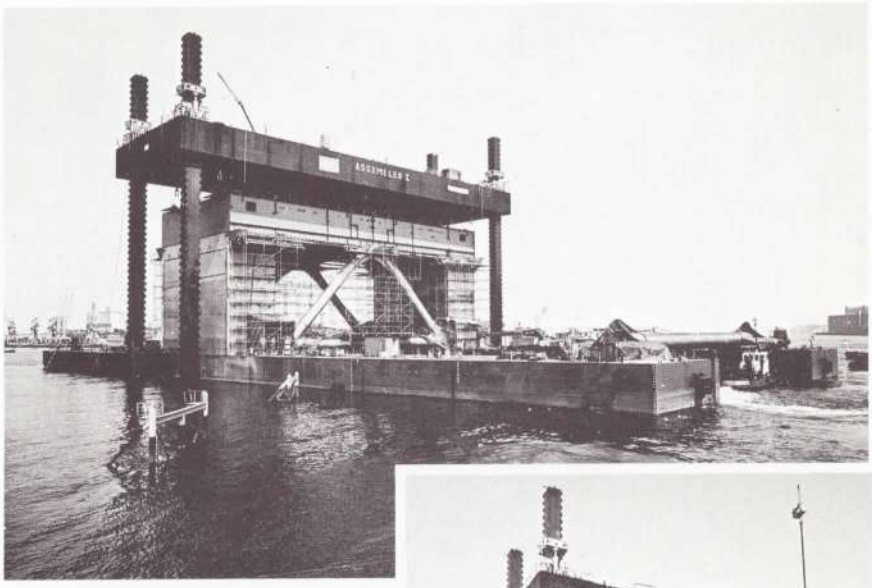
No special fixed equipment installed.

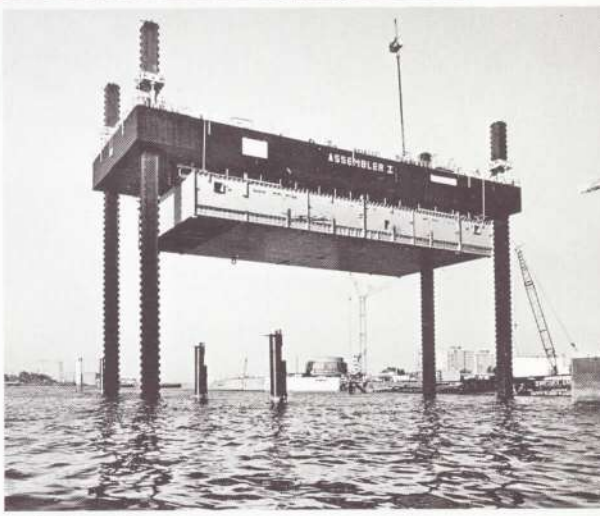
Particulars

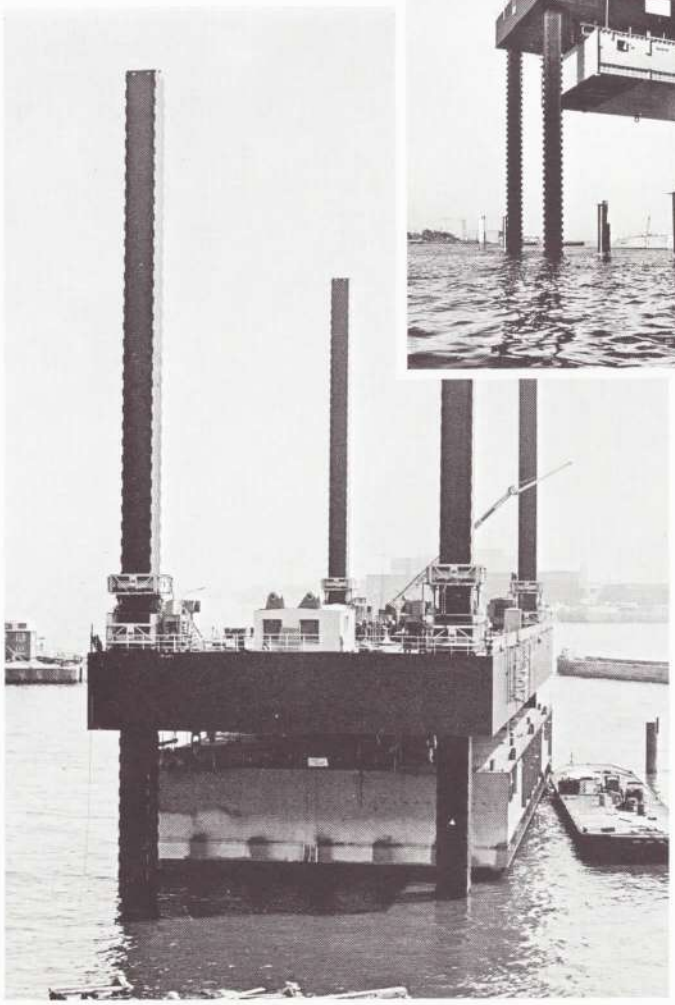
— Four lugs, which together are capable of sustaining a load of 2,000 tons, are incorporated at keel level.
— The *Assembler I* can be converted into two identical self-elevating platforms each 42 m in length.

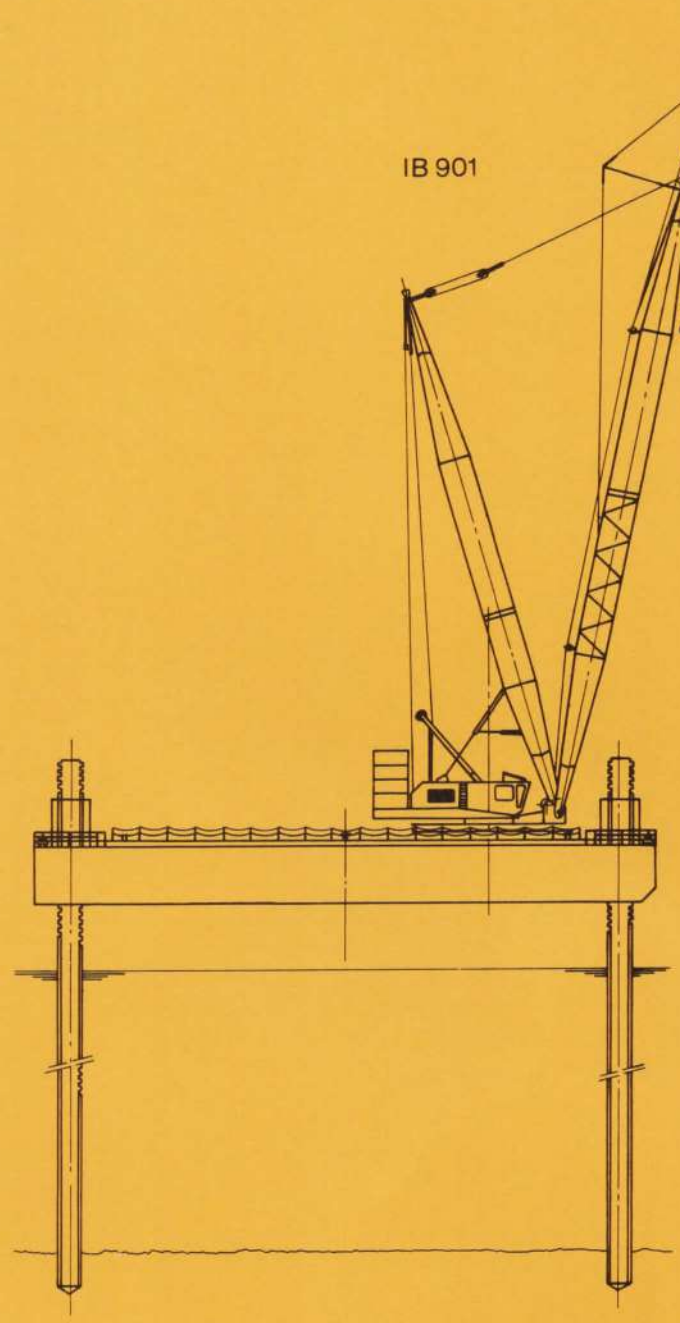
First job

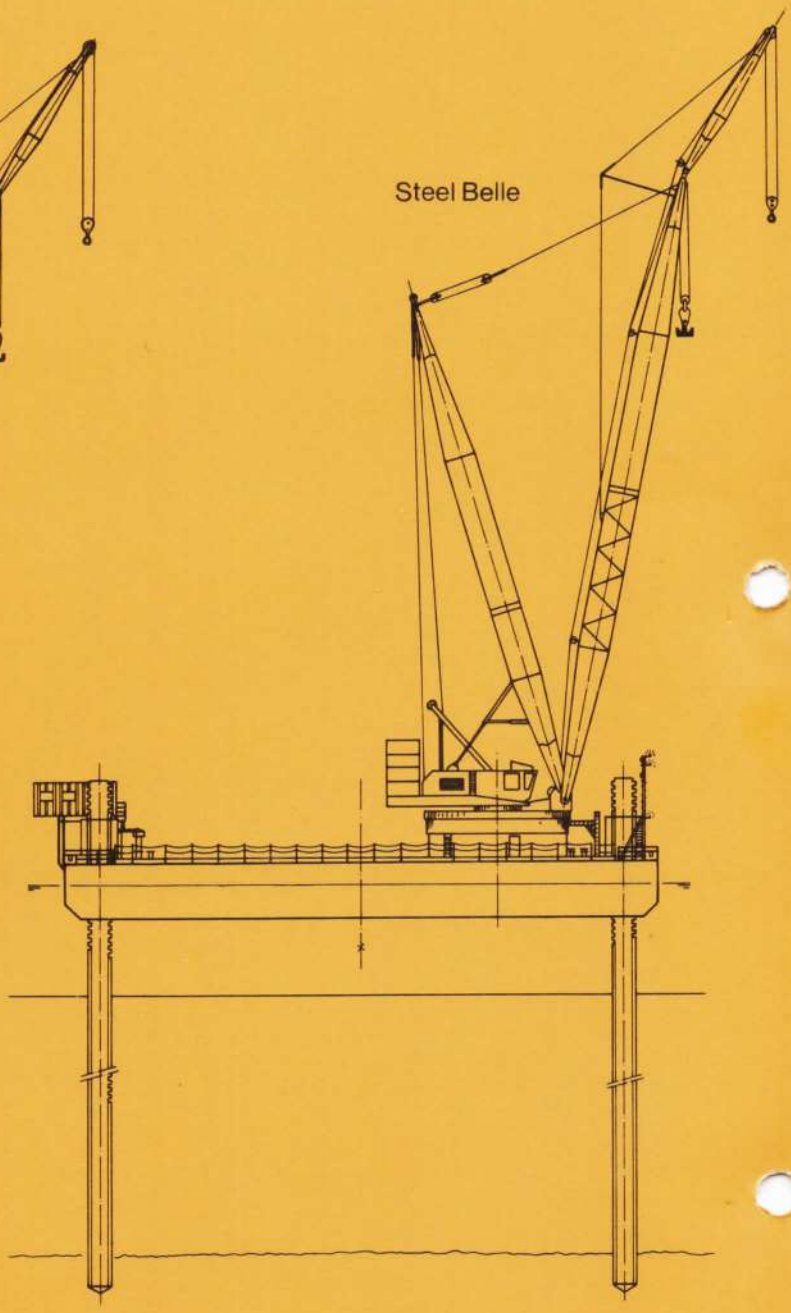
The *Assembler I* is capable of raising complete deck sections, weighing up to 2,000 tons, for a semi-submersible pipelaying barge. The sections are moved into position beneath the elevated platform and attached to the lugs, after which they are raised by the platform itself to a height of about 30 metres above the water. The laybarge substructure is then anchored beneath the platform and the deck section lowered into position.

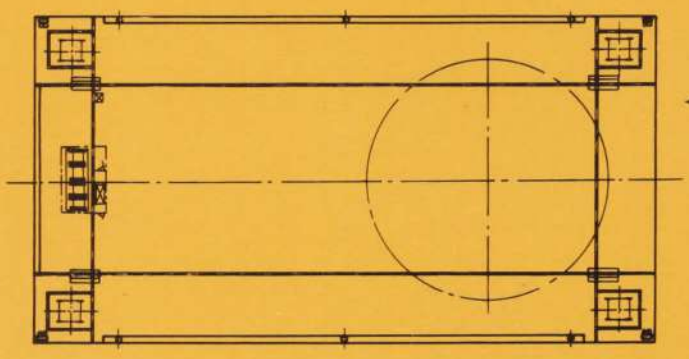


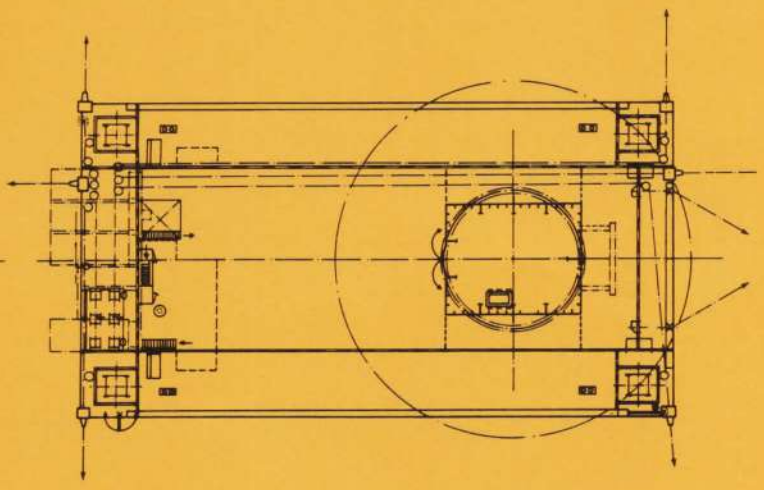





IB 901


Steel Belle





IB 901 Steel Belle

Names:	**IB 901**	**Steel Belle**
Built :	**1974**	**1976**
Owner:	**Hollandsche Beton Groep Rijswijk Holland**	**Joint venture Nuttall, HBM, Tarmac Hunterston Scotland**

Main dimensions

Pontoon:

length	45.00 m	45.00 m
width	23.00 m	23.00 m
depth	4.20 m	4.20 m
Leg length	60 m	68 m

Jacking capacity per leg 900 tons

Capable of working in water depths of up to 39 m.

Accommodation non-integrated.

Equipment

Revolving crane of 250 tons hoisting capacity.

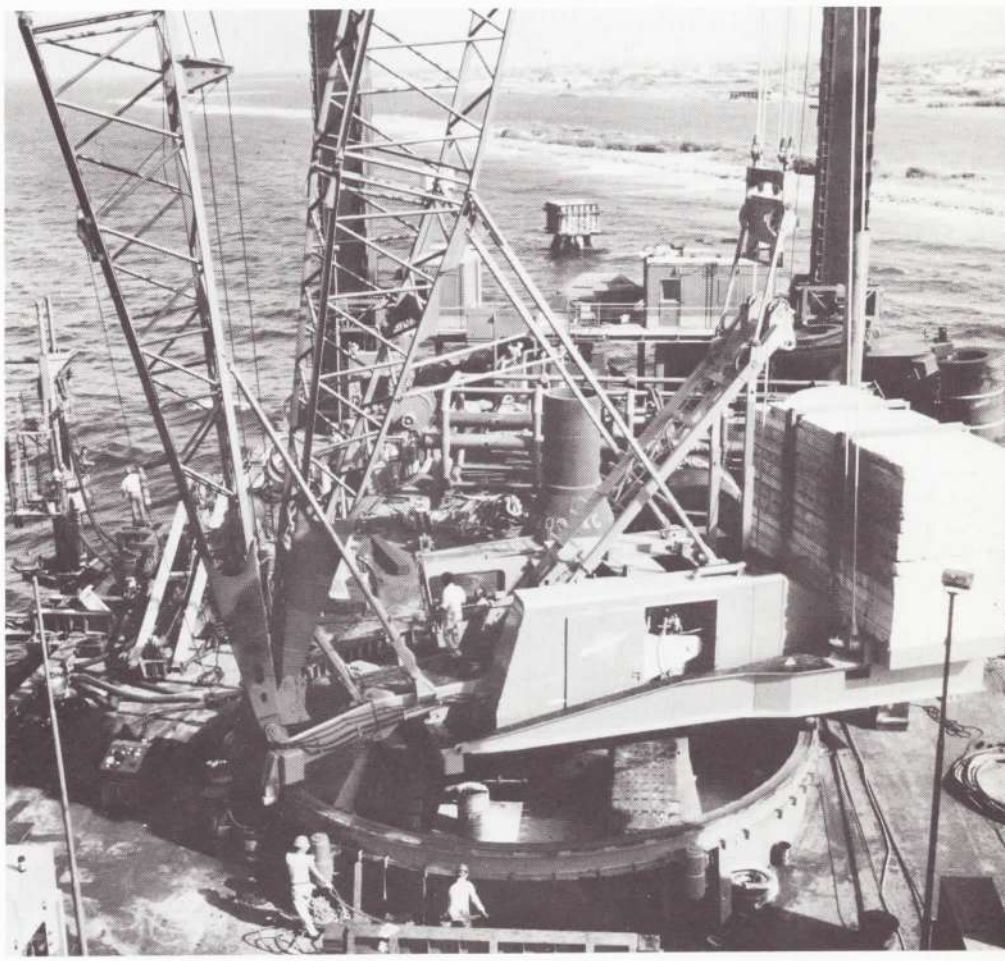
Heavy pile-driver.

Particulars

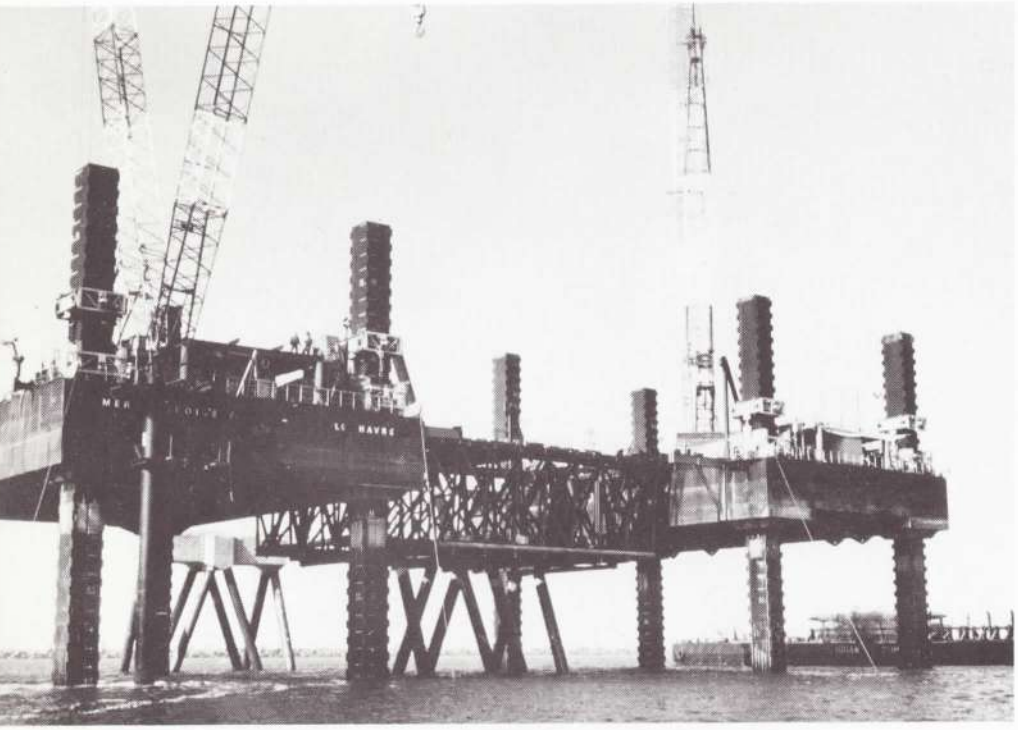
8-drum 25-ton mooring winch.	6-drum 25-ton mooring winch.

First job

Jetty-construction.	Ore terminal construction.



Mer d'Iroise 1
Mer d'Iroise 2



Names: Mer d'Iroise I and Mer d'Iroise II

Built : 1975

Owner: S. A. M. Postan
Le Havre
France

Main dimensions

Pontoon -	length	37.50 m
	width	24.00 m
	depth	4.50 m
Leg length		64 m
Jacking capacity per leg		900 tons

Capable of working in water depths of up to 40 m.

Equipment

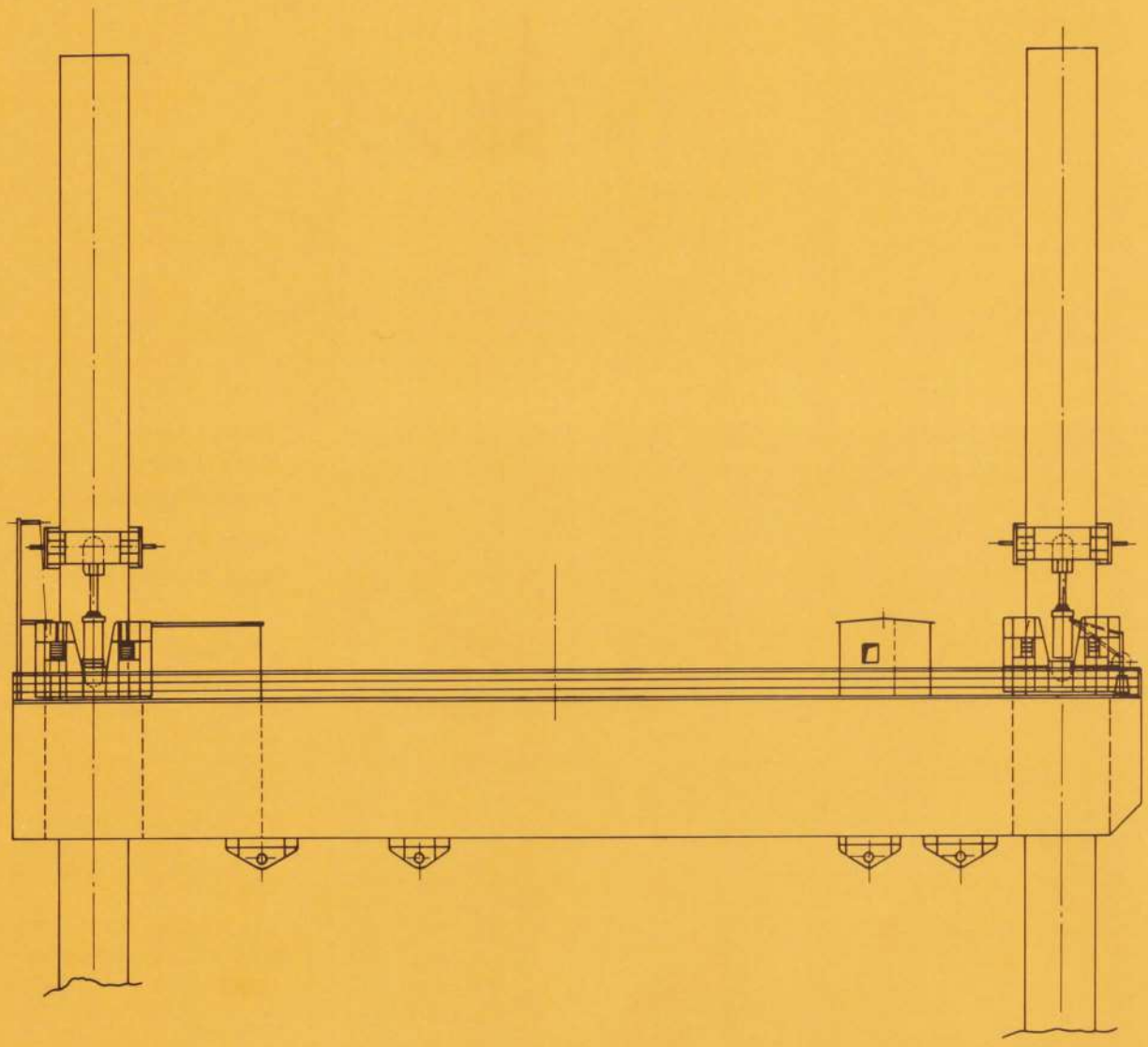
250 tons revolving crane (non-integrated).
Shaft boring equipment.
Pile driver.

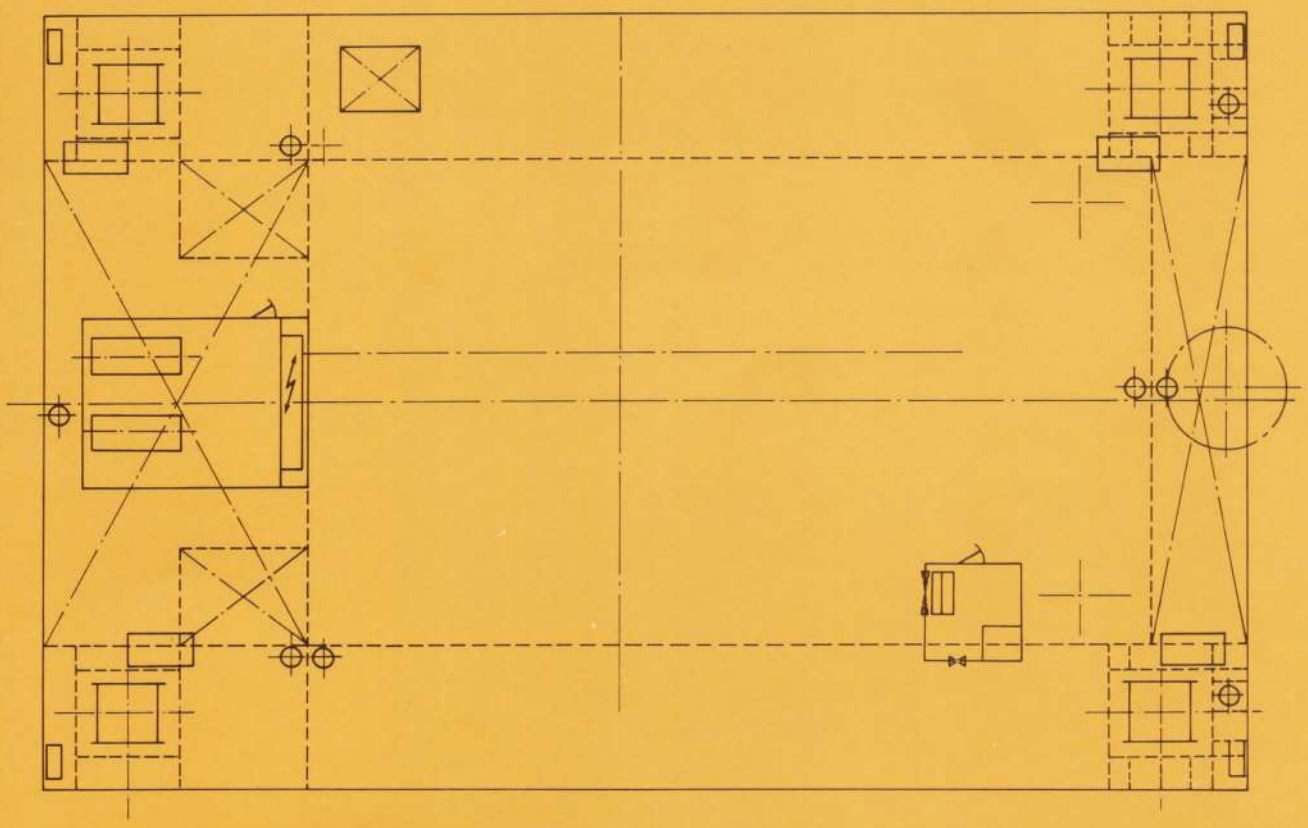
Particulars

Two platforms suspend large pile-guiding frame between them.

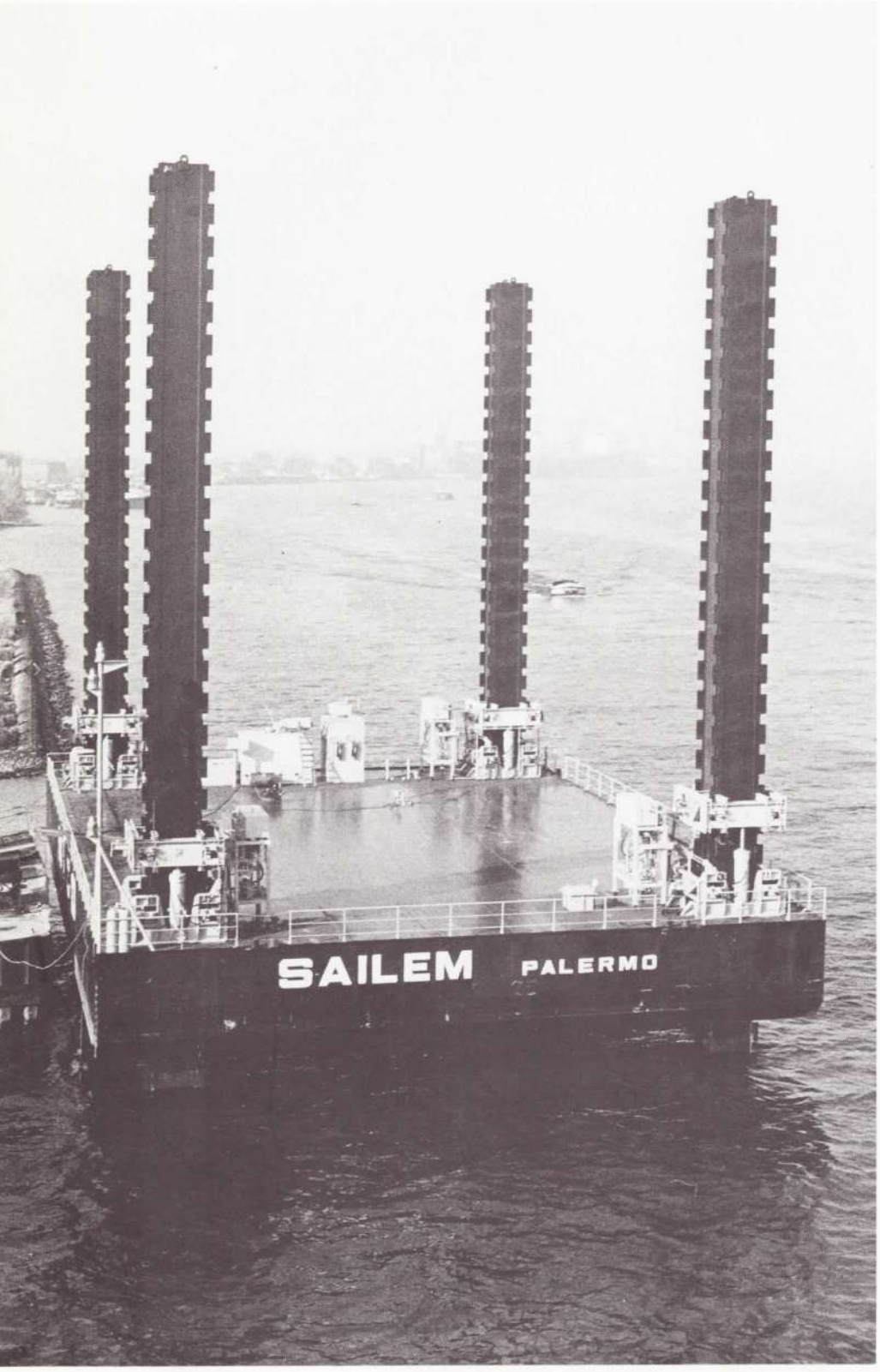
First job

Jetty-construction.





Nico



Name : Nico
Built : 1975
Owner: Sailem, Italy

Main dimensions

Pontoon -	length	30.00 m
	width	21.00 m
	depth	3.00 m
Leg length		30 m
Jacking capacity per leg		320 tons

Capable of working in water depths of up to 20 m.
Accommodation non-integrated.

Equipment

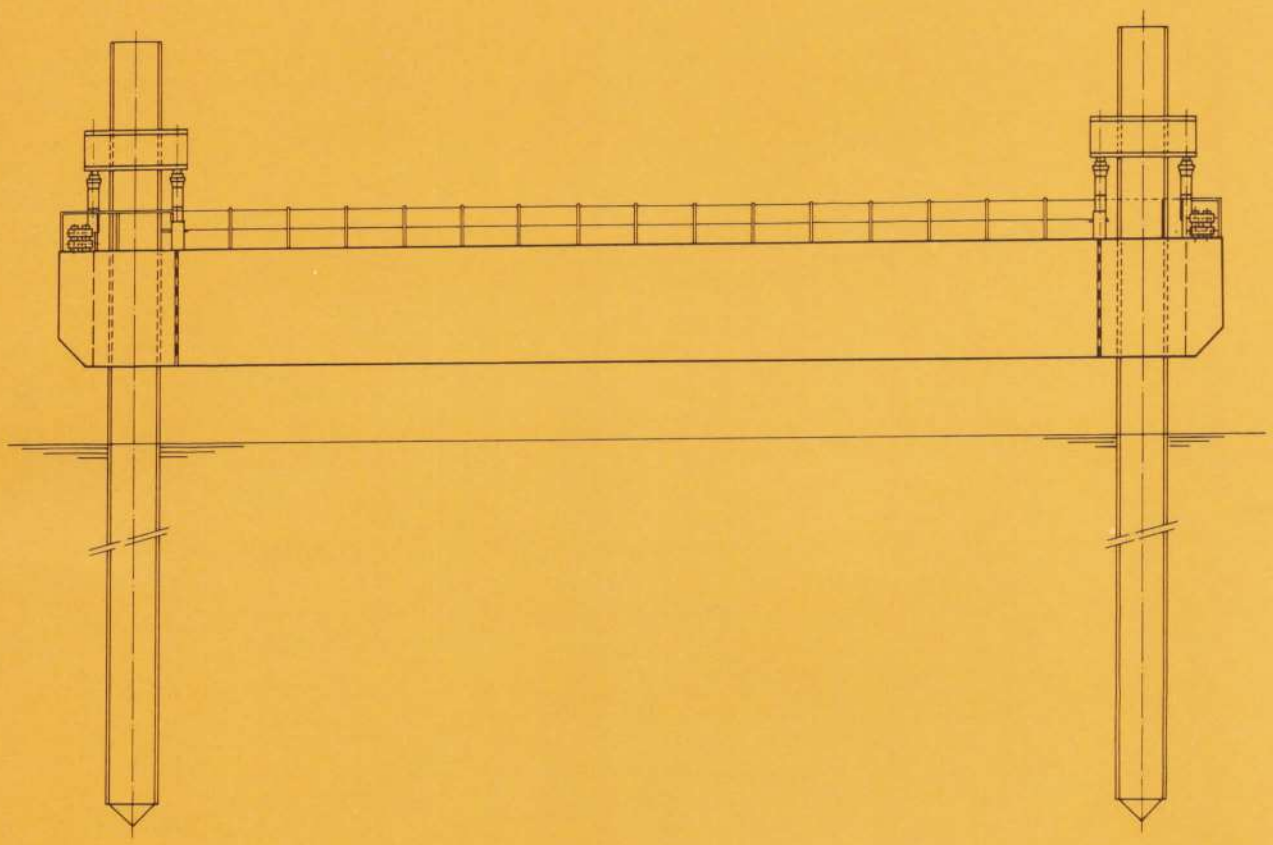
One crawler mounted crane 130 tons.

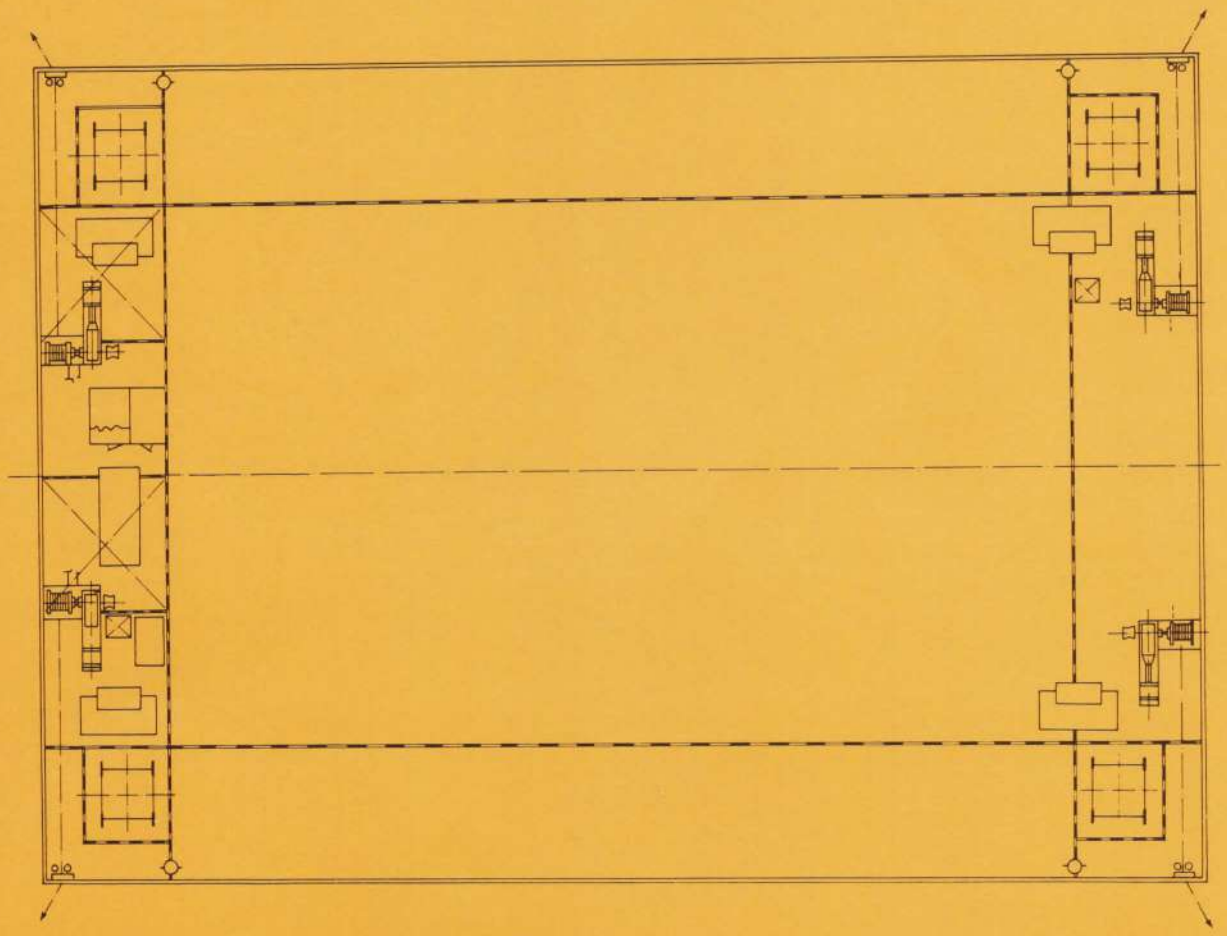
Particulars

May be operated in 32 m water-depth after extension of legs.

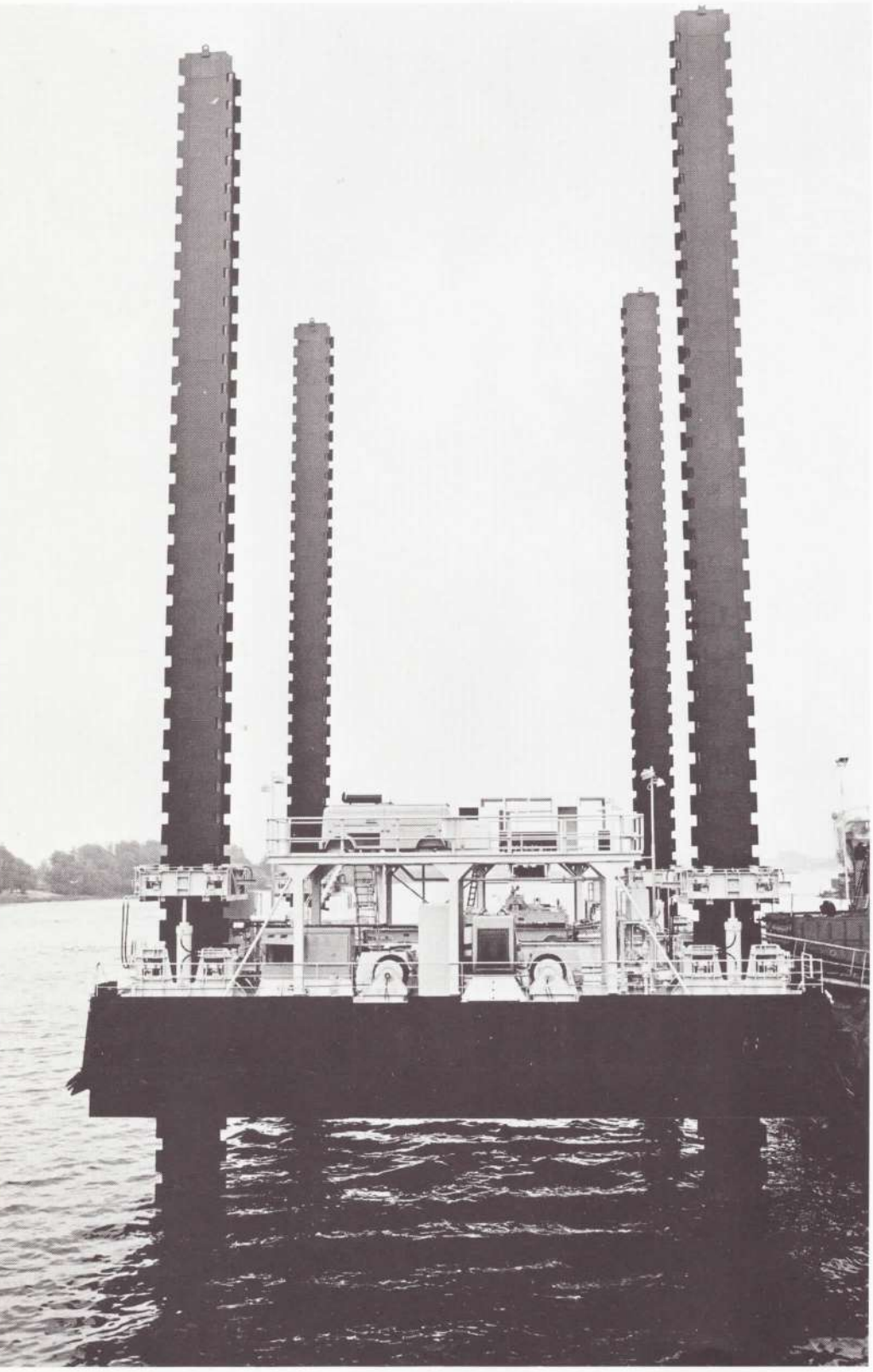
First job

Dry dock construction.





Mona



Name : Mona
Built : 1976
Owner : Groupement d'Arzew, Algeria

Main dimensions

Pontoon -	length	23.90 m
	width	19.60 m
	depth	3.00 m
Leg length		40 m
Jacking capacity per leg		320 tons

Capable of working in water depths of up to 25 m.
Accommodation prefabricated cabin with supporting frame.

Equipment

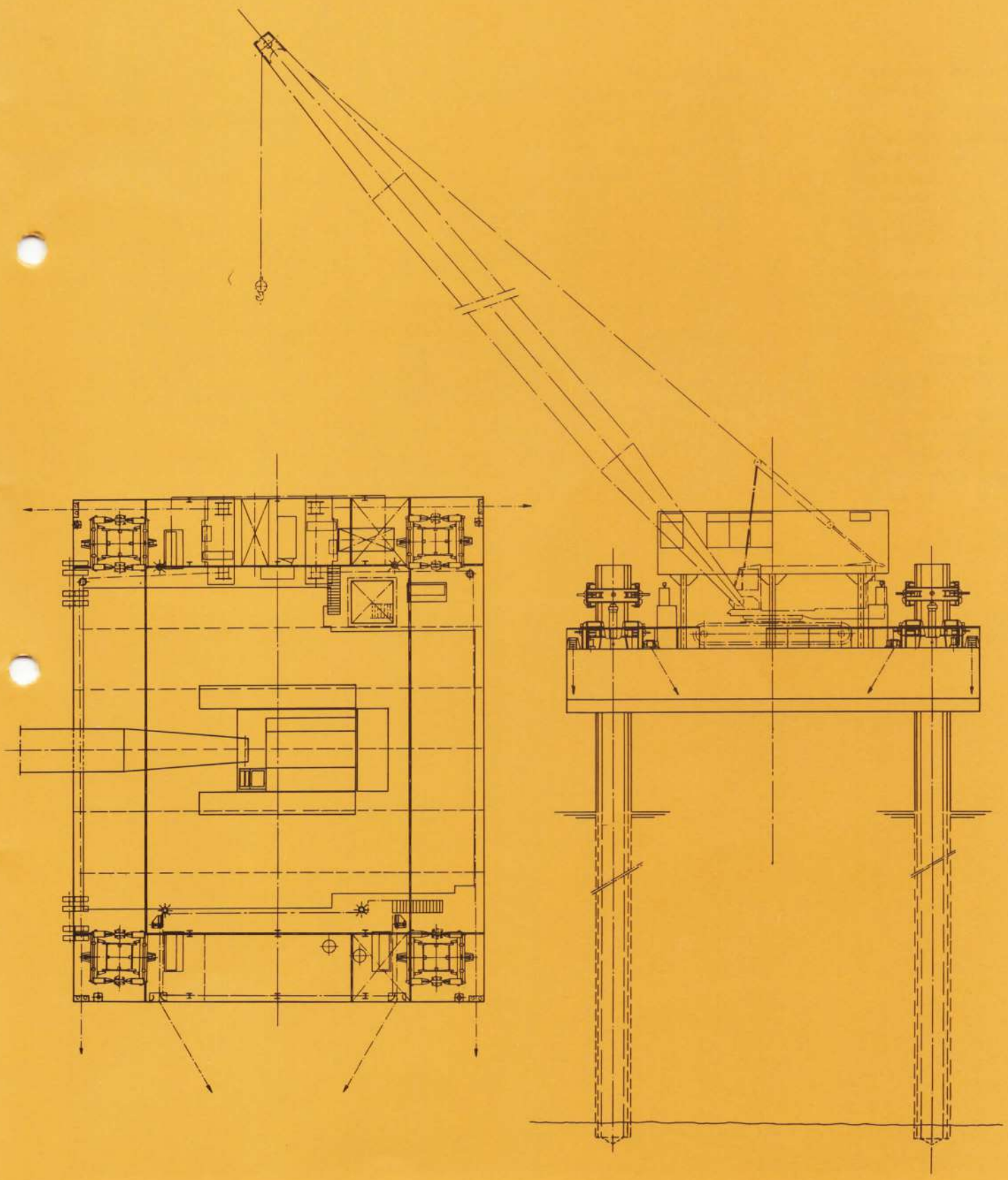
- Crawlercrane with a lifting capacity of 50 tons at a 14 m radius
- Drilling machinery
- Pile guiding frame
- Prefabricated living quarter
- Pile driver

Particulars

Two complete double drum electric mooring winches.

First job

Jetty-construction.



Kraanvogel, Lepelaar

Names: Lepelaar and Kraanvogel

Built : 1964

Owner: Rijkswaterstaat (Engineering Department of the Netherlands Ministry of Transport and Waterways)

Main dimensions

Pontoon -	length	70.00 m
	width	26.00 m
	depth	4.30 m
Leg length		45 m
Jacking capacity per leg		1,050 tons

Capable of working in water depths of up to 20 m.
Accommodation 16 men (day and night quarters).

Equipment

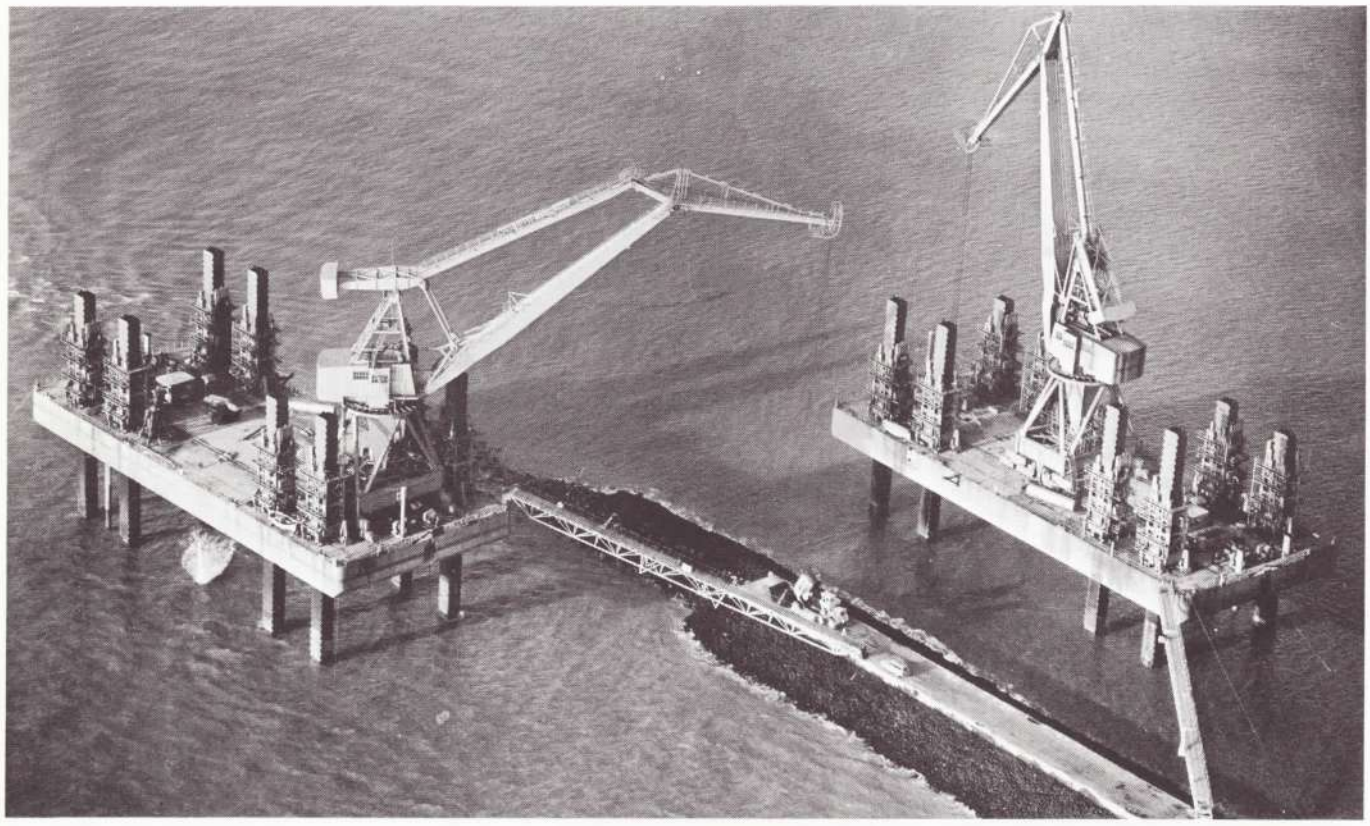
Gantry crane of 50 tons capacity at 56 m radius.

Particulars

Each platform has eight legs. The legs have special pointed extremities for rock penetration. These platforms can withstand breaking waves up to 10 metres high.

First job

Breakwater construction in the North Sea off IJmuiden, Holland.



PIM

Name : PIM
Built : 1978
Owner : "IVAN MILUTINOVIC"
PIM
Yugoslavia

Main dimensions

length	39.80 m
breadth	25.20 m
depth	4.20 m
Leg length	40 m
Jacking capacity per leg	700 tons

Capable of working in water depths of up to 30 m.
Accommodation for a crew of 10 is provided.

Equipment

- One crawler mounted crane Manitowoc type 4600
- Pile drivers
- 100-ton capacity crane over slot

Particulars

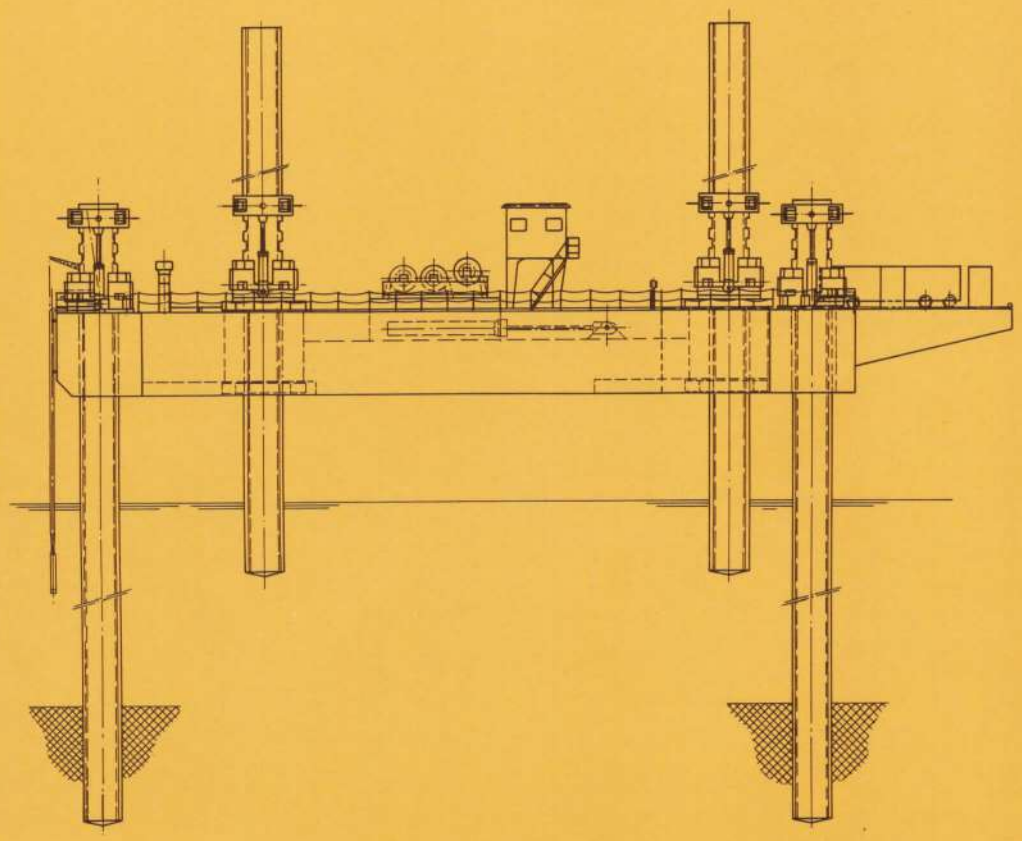
The platform is able to walk under full payload by means of 4 fixed and 4 sliding legs.

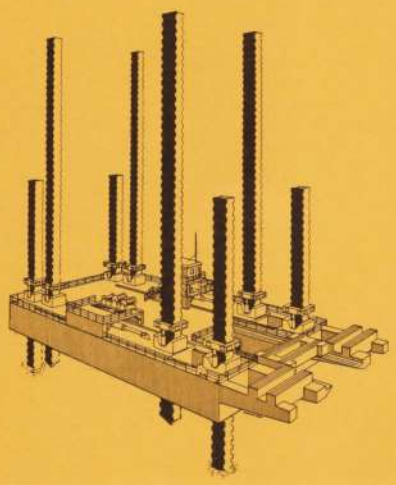
Walking stroke

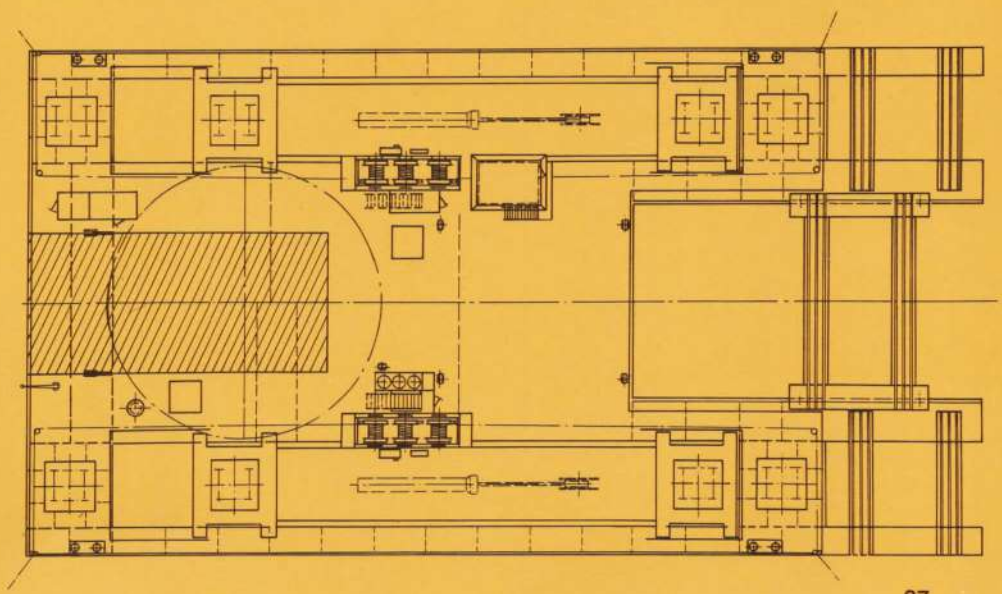
4 m.

First job

Jetty-construction.







KAJIMA in operation

General

The *Kajima,* a KAWASAKI-IHC self-elevating platform, was completed in 1972. Its construction reflects Kawasaki's desire to participate in the nationwide programme of major projects in the fields of harbour and offshore airport construction, bridge building, etc.

The construction and equipping of this platform are fully in keeping with the status of the largest unit of its type in the world. A U-shaped opening at the stern of the platform greatly facilitates the movement of, or access to, the structures handled and thus adds greatly to the efficiency of the operations. The structure which spans the slot performs a dual function, housing the crew's quarters and serving as reinforcement.

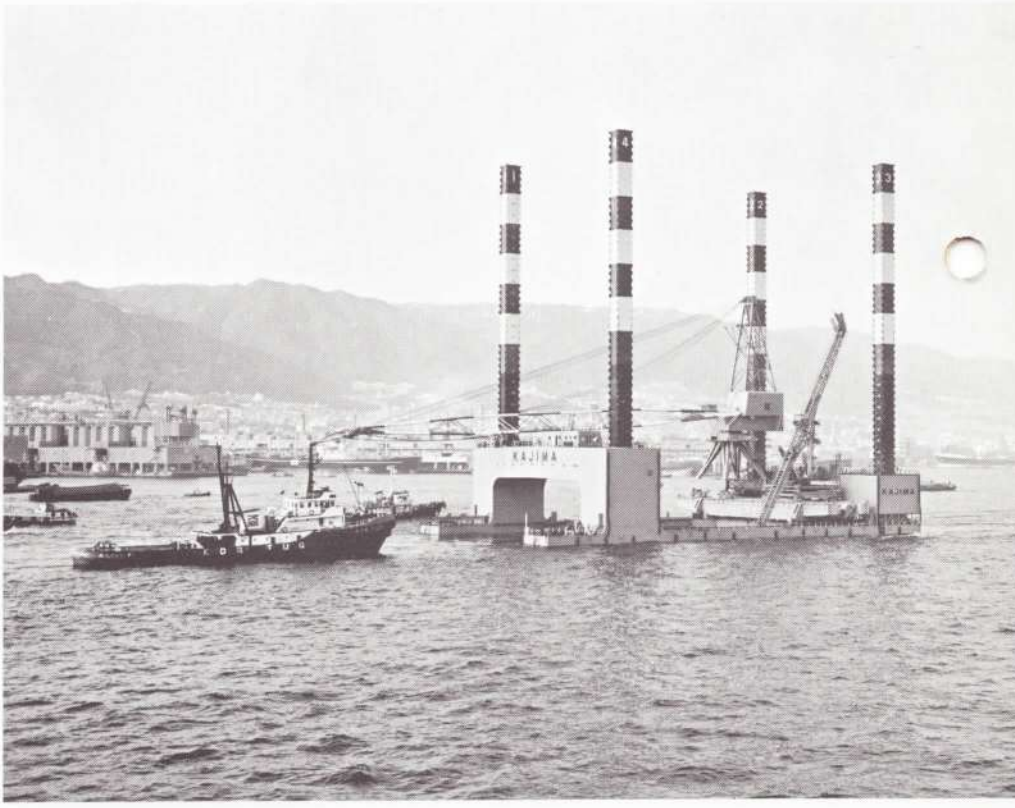
In operation

Hokkaido is the northernmost island of Japan, and winters in the Tomakomai region are exceptionally cold, with piercing winds which even freeze the snow.

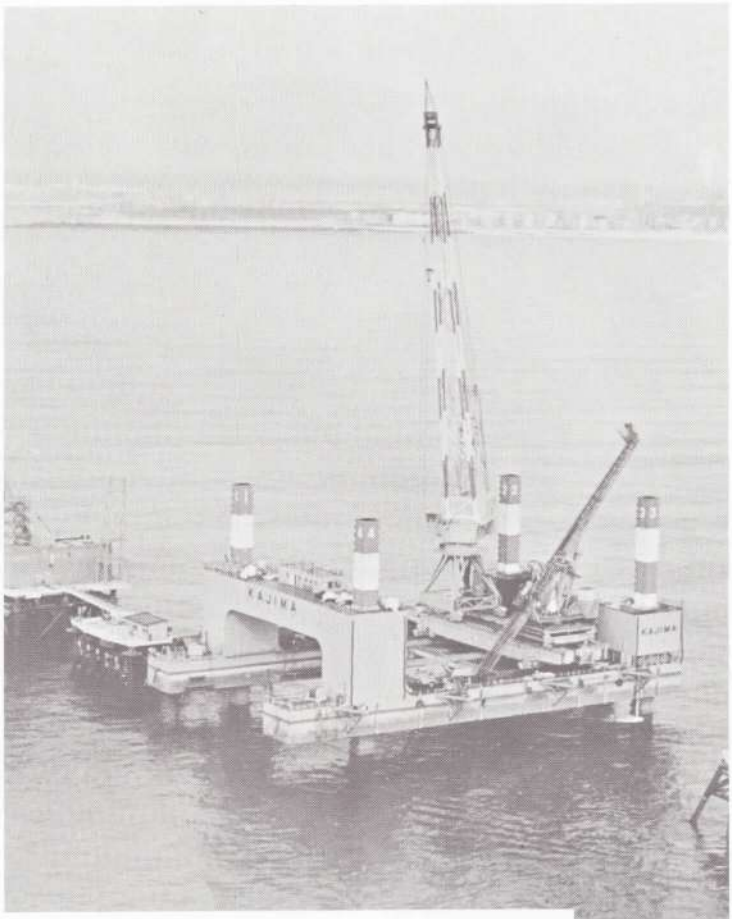
Construction workers are braving the elements there, building a terminal for tankers of up to 500,000 d.w.t., which will discharge their cargoes to a nearby refinery.

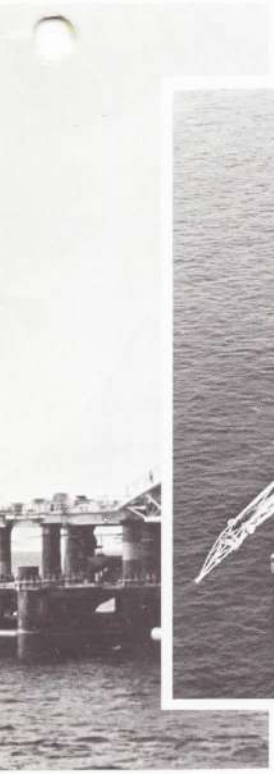
The foundations for the terminal are being constructed with the aid of the self-elevating platform *Kajima,* which acts as a mobile base for operations on or below the surface. It is towed to the location, where the four legs are lowered on the seabed. Then the platform is jacked up to the appropriate height for the operation which is to be carried out. Among the principal advantages of this method is that the operations can continue without hindrance from storms, waves or currents.

The pontoon of the *Kajima* measures 74 x 45 x 5 metres.



in Japanese waters





The gross weight of the platform is of the order of 6,500 tons.

Up to 100 tons of civil engineering plant, or a crane of equivalent weight, can be carried. With the legs extended to 80 m, the platform can operate in 55 metres of water. The jacking operation is controlled by one man from a central console. In an emergency the jacking units can be operated locally.

The platform is designed to withstand winds of 60 m/sec., a current of 4 knots and 6-metre waves, and to operate in temperatures down to -20° C. Air-conditioned quarters for a crew of 40 are provided.

The *Kajima* was also used to drive piles for the foundations of a new ocean berth at a point two miles off Tomakomai.

The water depth at the location is 25 metres.

Many other major projects are planned, such as a mammoth bridge linking the islands of Honshu and Shikoku, and a number of harbour developments. Self-elevating platforms are expected to play an important role in the realization of these.

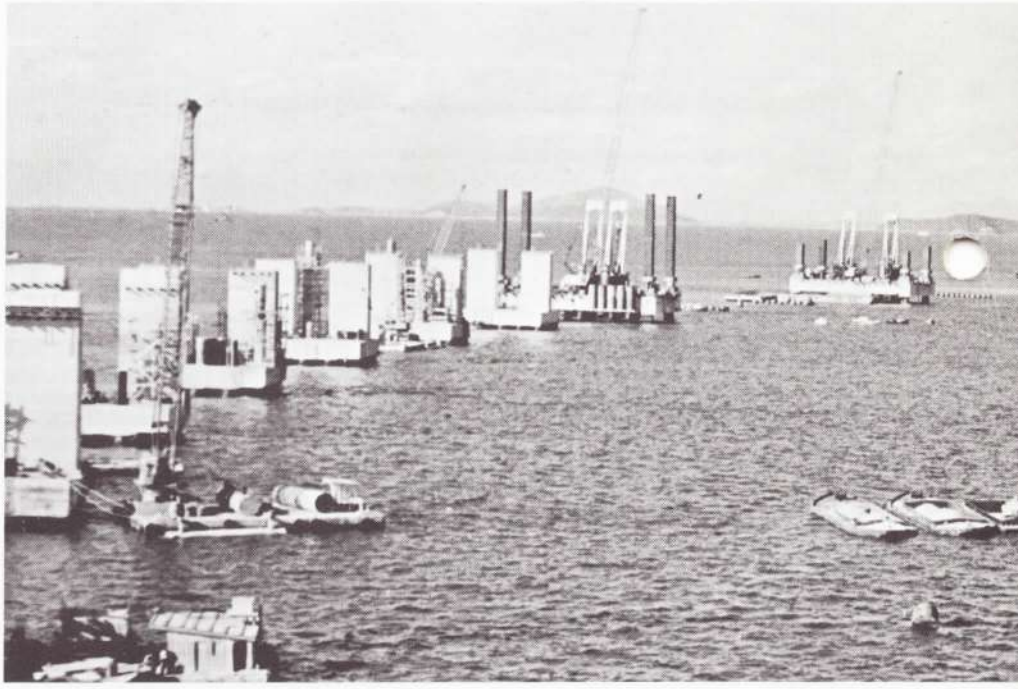
Bridge building in Brazil

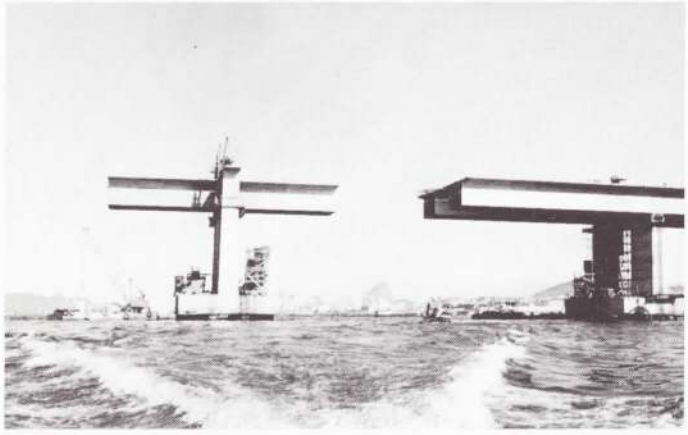
The inhabitants of Rio de Janeiro and Niteroi have long dreamed of a physical link between their cities, which lie on opposite sides of Guanabara Bay. As long ago as 1875, in the reign of Emperor Don Pedro II, there was talk of building a bridge. That plan has been realized and a company, Empresa de Construção e Exploração da Ponte Presidente Costa e Silva (ECEX), was created to complete the construction and operation of the new link in Brazil's chain of communications.
The bridge has an overall length of 14 km, of which 9 km span water, making it one of the longest in the world.
The piers which support the spans are spaced at intervals of 80 metres.

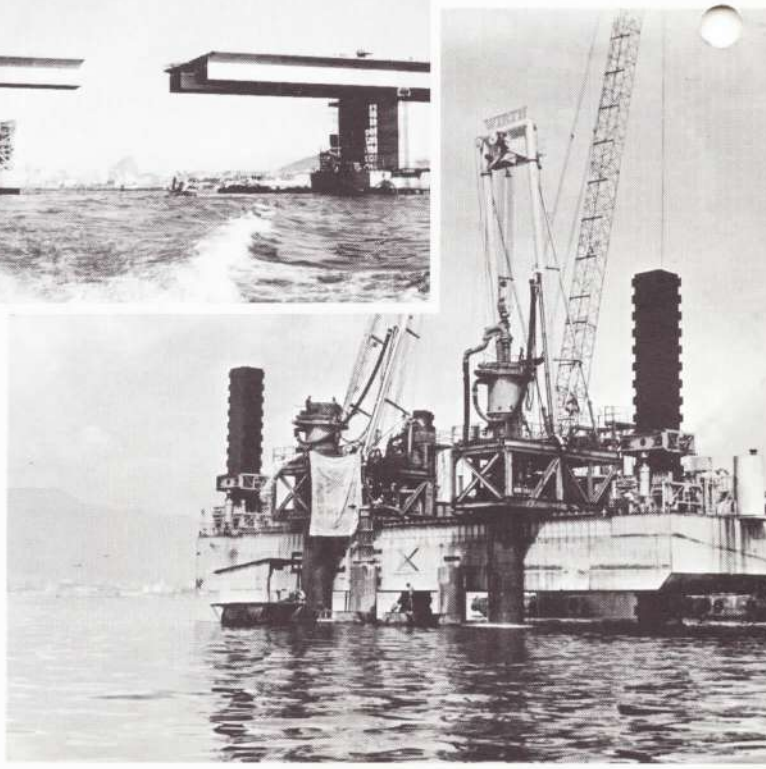
Concrete foundations

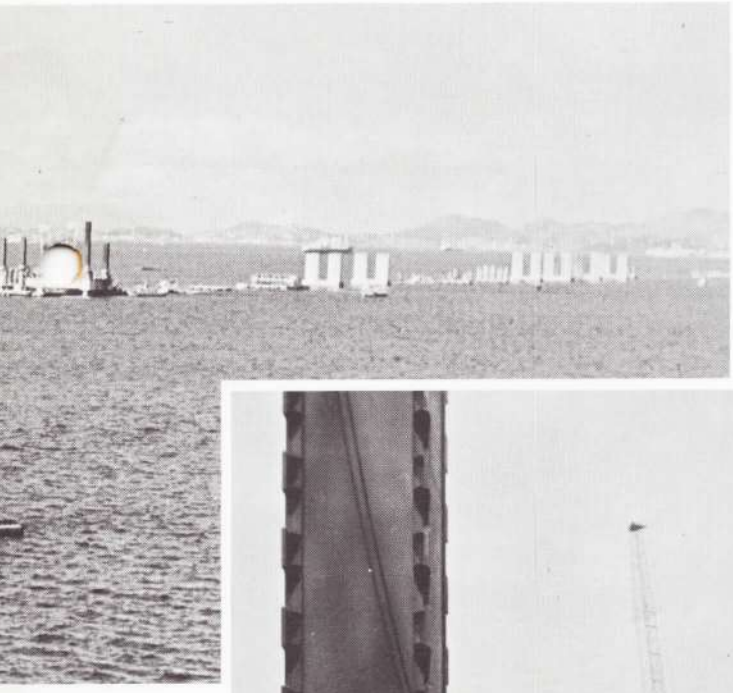
The piers are supported on concrete piles anchored in the rocky bed of the bay. These are located in pre-drilled shafts.
To avoid interference with the operations by weather or rough seas, ECEX elected to mount their drilling installations on self-elevating platforms. After a wide search which included Japan, France and the United States, ECEX placed an order for three platforms with IHC Holland.
ECEX engineers had already become acquainted with IHC units of this type and had been greatly impressed by their performance.
The pontoons for the three platforms were built in a Brazilian shipyard under the supervision of IHC Holland engineers. The legs, hydraulic jacking system and other machinery were manufactured in Holland and shipped to the Brazilian yard for installation.

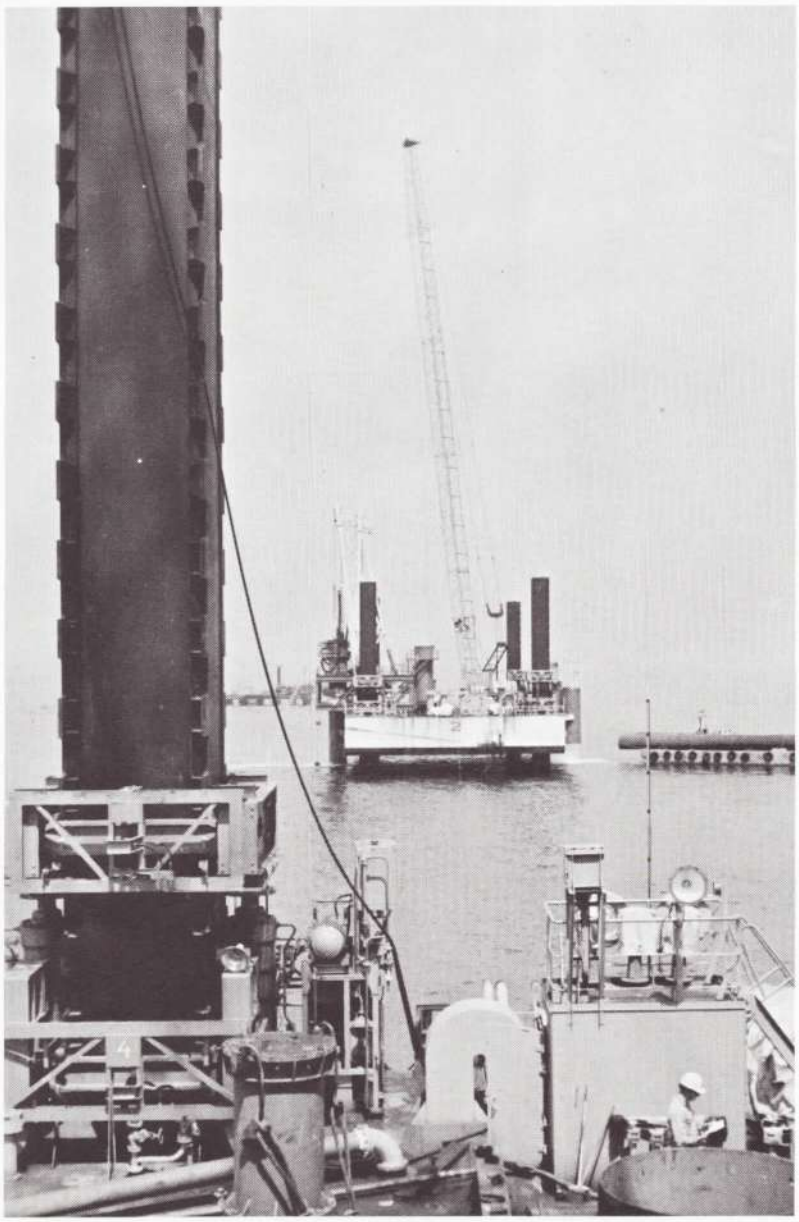
Each pontoon measures 46.35 x 24.10 x 4.20 metres and is supported on four legs. Two of the











platforms have legs 60.20 metres in length; the legs of the third measure 50.20 metres. The platforms are raised and lowered by means of patented IHC hydraulic jacking systems.

The pontoons are divided to provide an engineroom, cabins, office, messroom, pantry, stores and washrooms. The crew's quarters are air-conditioned.

With the legs in the raised position, the pontoon was moved into position with the aid of six anchors and its own warping winches.

A positional accuracy of 30 centimetres was achieved. The position was verified by means of laser beams, after which the legs were lowered and prestressed, and the platform jacked up to the required level, i.e. clear of the waves.

From this solid structure, drilling was carried out without hindrance from wind or waves.

The drilling and casing machinery for sinking the pile shafts was mounted on one of the long sides of the pontoon. To assist sinking, the casings were rotated to and fro as they were driven downwards.

The purpose of the casing was to prevent the collapse of the wall of the shaft as this was drilled through clay and sand strata to the rock in which the pile was to be anchored.

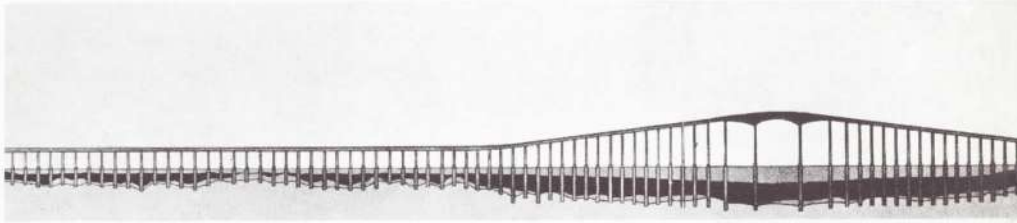
When a section of the casing was in position, the drillstring was lowered into it and drilling commenced. The drill bit, which was 2 metres in diameter, moved a few metres ahead of the casing.

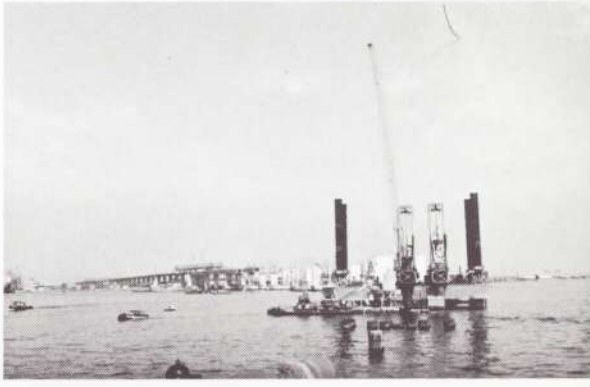
When more solid material was reached, the progression of the casing ceased and drilling of the rock continued to a depth of several metres.

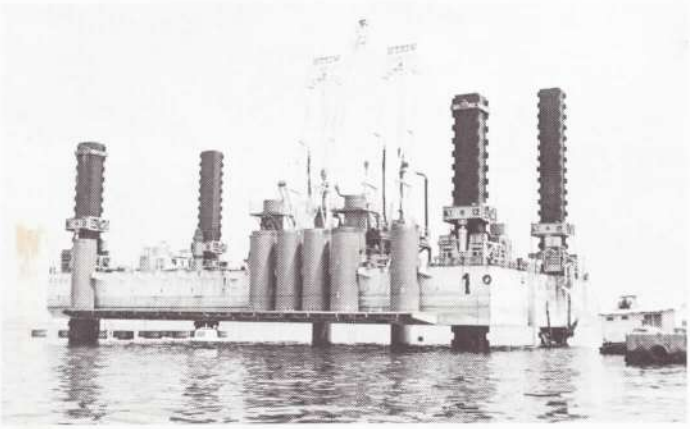
The depth of the shafts was determined by the nature of the subsoil, but could be as great as 80 metres. The slurry was ex-

tracted by means of airlifts, the jet pumps and compressors for which are installed in the engineroom and on deck, respectively.
When the shaft was clean, and after inspection by a diver, a second 1.80 m diameter steel pipe was lowered into the first. Into this pipe, which served as "shuttering", the reinforcing bars for the pile were placed, after which it was pumped full of concrete.
Next, the original casing was withdrawn; simultaneously the space between the two was filled with sand. The recovered casing was then available for the following shaft.
The casing machine had a maximum pull of 300 tons. This was required to overcome the immense friction in the thick clay strata.
Each of the four main piers of the bridge is supported on 40 concrete piles, and the remainder each on 10 piles.
After the piers had been constructed, the spans were placed in position.
The concrete sections were prefabricated in a factory situated on the site, from whence they were taken by barge to the erection point. There they were hoisted into position with a special crane and linked to the existing structure. The central section of the bridge, comprising a main span 300 metres in length and two 200-metre auxiliary spans, is of steel construction.

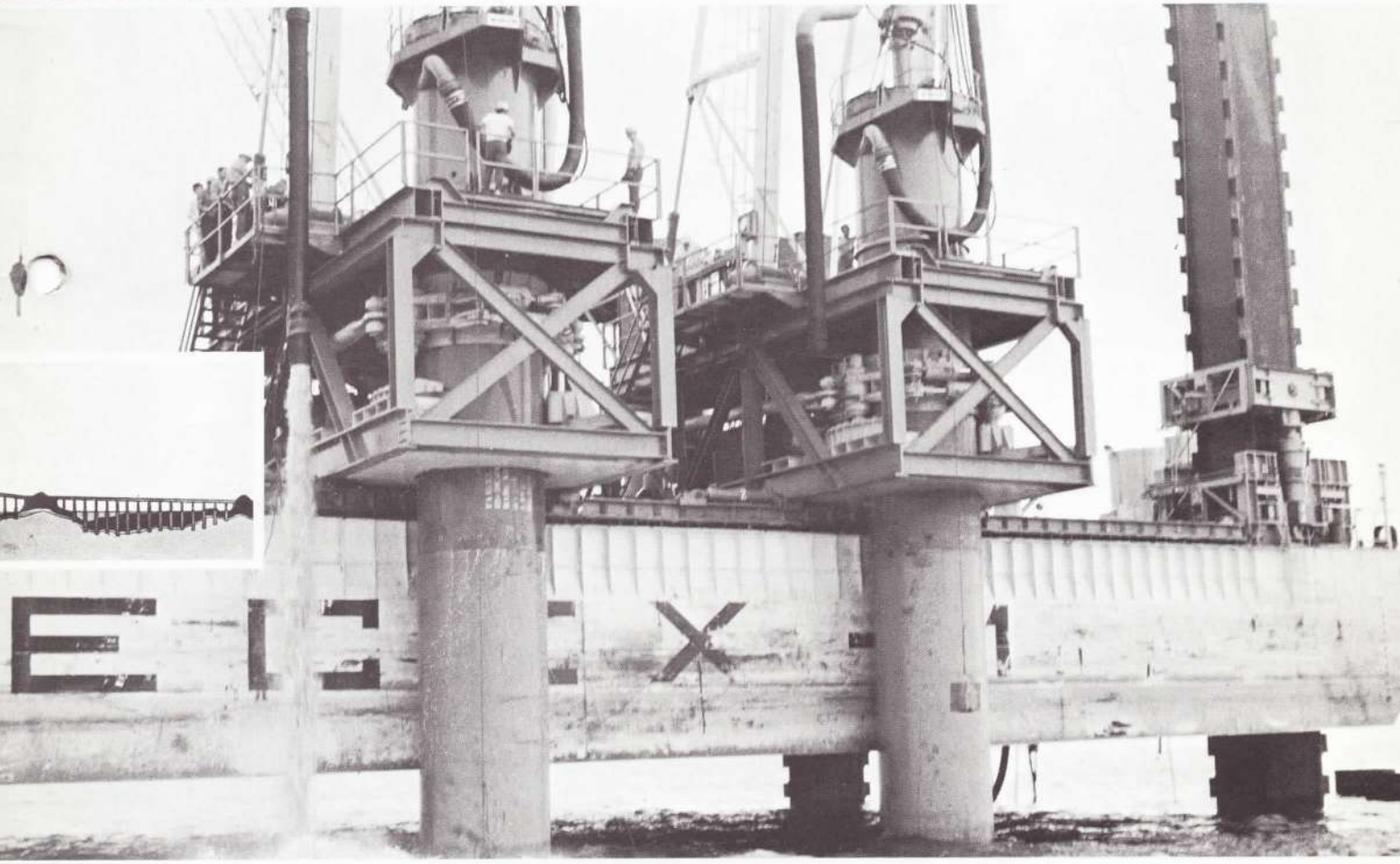
The steel sections, which were fabricated on a nearby island, were made floatable and towed to the piers on which they rest. These were raised on to the piers by means of jacks, the auxiliary spans being positioned first, followed by the central span.
In all, the steelwork weighs 13,000 tons.







At its highest point, the central span is 72 metres above the water.
This project again clearly demonstrated the value of self-elevating platforms for civil engineering.



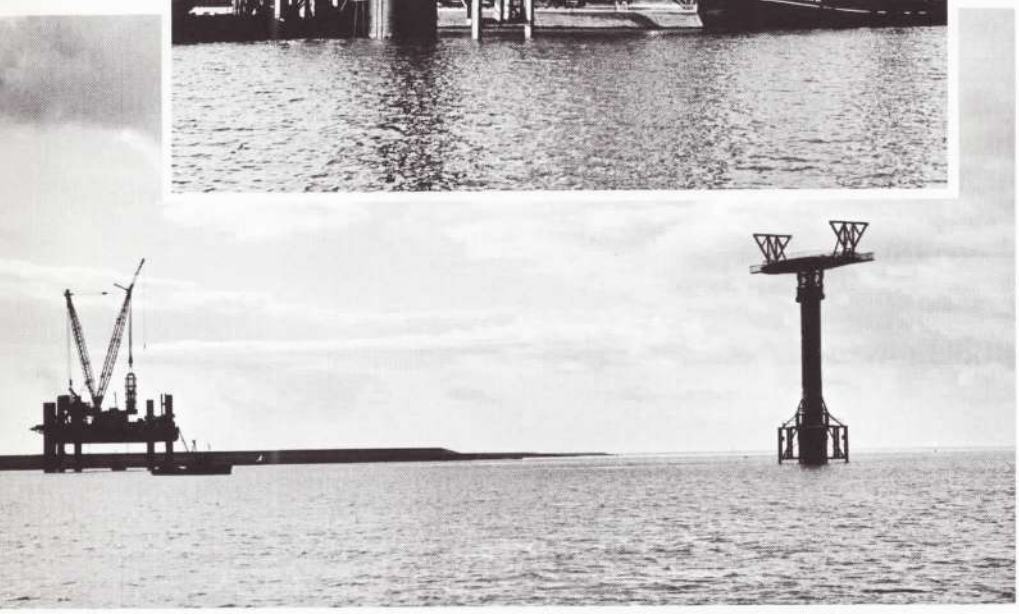
Construction of aerial cableway

Holland is still in the process of improving its defences against the sea. The gigantic Delta Plan, which was undertaken in order to prevent a recurrence of the flood disaster of 1953, is nearing completion, but a number of projects have still to be executed.

Among these is the closure of the Eastern Scheldt estuary by the construction of a dam linking the islands of Schouwen-Duiveland and North Beveland. This is the most difficult of all. If you look at the map, you will see that the dam will have to be constructed in open water — on the doorstep of the North Sea, in fact.

To cope with this seemingly impossible task, the Dutch have developed a highly ingenious and effective method of dam-building. It has already been used with success on other projects. What they do is to erect a cableway across the water, and dump vast quantities of solid material from cars which run constantly to and fro across the cables. Obviously, a cableway of this length requires support at intervals. To provide this, pylons are being spaced across the estuary.

The pylons are supported by thirteen gigantic steel piles. These have been driven from the self-elevating platform *Stevin 73,* which was designed and built by IHC Holland for Van Splunder's Aannemingsmaatschappij, a member of the Stevin Group. The platform is of the 4-leg type and has a rectangular pontoon measuring 23.5 x 38.5 x 4.20 metres. The legs measure 1.8 x 1.8 metres in cross-section, are 60 metres in length and weigh 100 tons apiece. The complete platform weighs more than 1,000 tons. The legs are fitted with toothed racks, with the aid of which the pontoon can be



raised or lowered. Jacking is by means of a patented IHC Holland system. Control is centralized, but the four jacking units can be operated independently if necessary.

The crane

The platform is equipped with a crane with a hoisting capacity of 320 tons at a radius of 12.5 m, or 100 tons at 30 metres. Even at the maximum radius of 43 m, the capacity remains a useful 50 tons.

An auxiliary jib with a maximum load capacity of 45 tons enables loads up to 25 tons to be handled at a radius of 50 metres. In all cases the load can be swung through 360°.

The length of the steel piles which were to be driven from the platform imposed quite severe demands in terms of hoisting height.

At minimum radius, a height of 43 m above the platform can be achieved with the main jib, or 58 m with main and auxiliary jibs.

With the pontoon in the raised position, an additional 12 m or so from platform deck to waterline is obtained. The immense hoisting height was achieved by mounting the crane 7 metres above the deck.

Guide frame

Positional accuracy of the piles is, of course, a prerequisite for the success of the operation. To achieve this, the platform is equipped with a guide frame which enables the pile to be positioned to an accuracy of ± 50 centimetres in spite of the action of wind, waves and current.

The platform has accommodation for a crew of 40.

This comprises single and twin berth cabins, a messroom, a fully-equipped galley and toilet facilities. The comprehensive nature of the quarters reflects

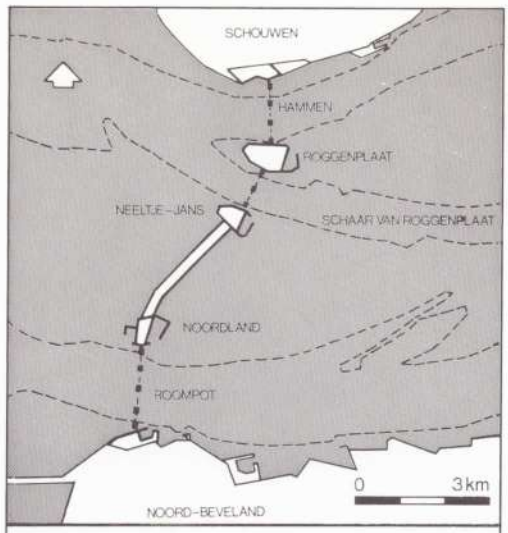
the need for long periods to be spent on board, a frequent occurrence in the world of offshore contracting.

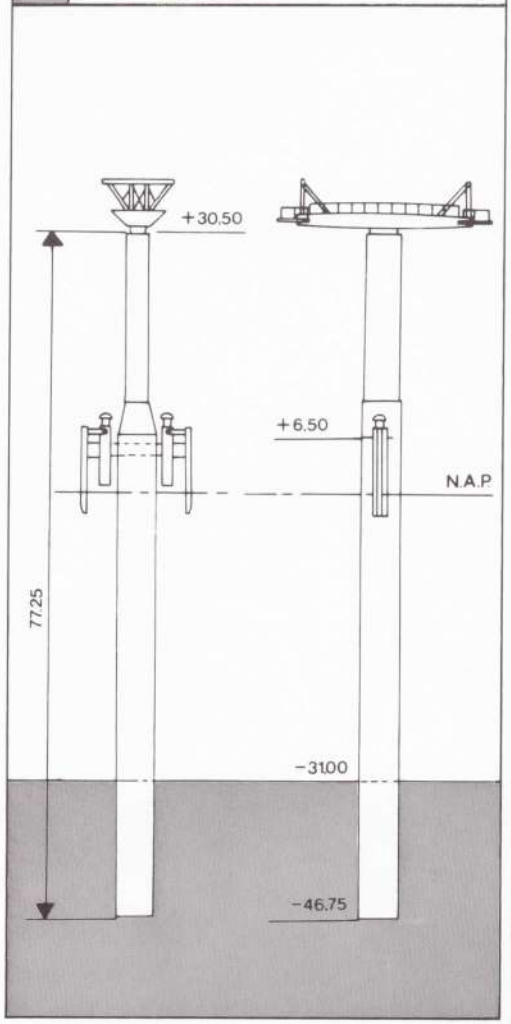
Stability

With hurricane-force winds and towering waves, absolute stability is a prime requirement. To ensure this, the entire structure has been dimensioned to meet the following physical conditions:
wind velocities up to 160 km/hr. (hurricane force); wave heights up to 8 m; current velocities up to 1.75 m/sec. (6.5 km/hr.). The platform is designed to operate in water depths of 40-50 metres, depending upon leg penetration.

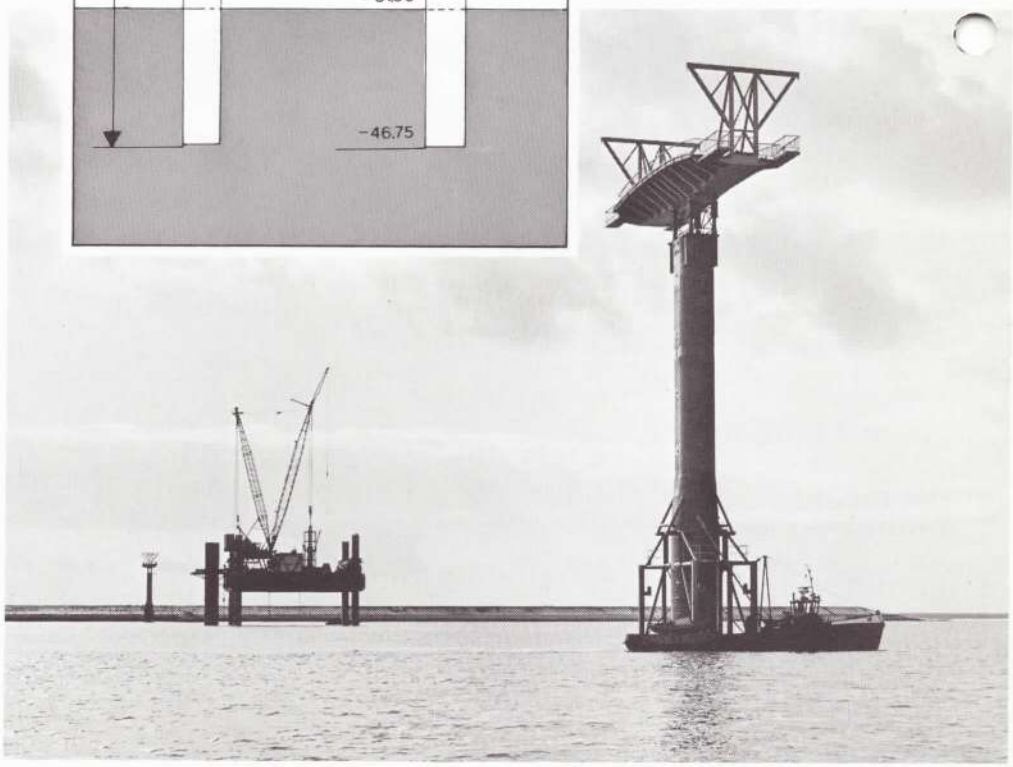
The pylons

All but one of the pylons is of the single type. The exception, number 4, at which two cableways will terminate, has twin columns rigidly linked beneath the cable support frame.
The piles, which are about 400 metres apart, vary in diameter between 3.1 and 4.8 m. The longest measures 57 metres. They are being driven to a depth of 15-20 metres into the sandy bed, which is highly compacted and in which cone resistances of more than 300 kg/cm² are encountered.
The single pylons consist of three parts: a pile, a column and an adaptor. The pile, the crown of which is situated 4.00 m above New Amsterdam Datum, is a steel tube of constant diameter and wall thickness. The diameters and wall thicknesses vary between piles and are determined by the stresses which will be imposed on the pylon and the permissible degree of movement. The column extends from a point 10.50 m above New Amsterdam Datum to the underside of the cable support frame. It consists of a steel tube with an elliptical





cross-section, the larger dimension of which is equal to the pile diameter. This is so positioned that the smaller dimension, which in all cases is 2.50 m, is at right angles to the cable. The adaptor, which joins these two parts and provides the transition from circular to elliptical tube, is also fabricated from steel.
The pylons are also being constructed with the aid of the *Stevin 73*. First, the pile is lifted into the vertical position and placed in the guide frame, by which it is held accurately in position. The position-fixing equipment employed includes laser beams. Once in position, the pile is driven into the bed of the estuary. Should a build-up of soil or increased friction prevent further progress, a revolving cutter is lowered into the pile and the obstruction removed.
When the requisite depth has been attained, the crown of the pile is burned off at a point 4.00 m above New Amsterdam



Datum. The adaptor and the pylon proper, which are manufactured and assembled ashore, are then placed on top of the pile with the aid of the *Stevin's* crane and temporarily secured. When the position of the pylon in relation to its neighbour has been verified, the joint between the pile crown and the adaptor is finally welded. If necessary, the column can be tilted slightly in order to obtain exact alignment of the cable support frame. The final stage is to crane the frame into position on top of the pylon. Here, too, the construction is such that minor positional errors can be corrected.

To absorb shock loads in the event of a vessel striking the pylon at right angles to the cableway, and thus to prevent excessive movement of the support frame, each pylon is equipped with a buffer construction on the two vulnerable sides.

Piling frame

As explained, the steel piles range up to 320 tons in weight and 5 metres in diameter. These, then, were the factors which determined the choice of pile-driving equipment. The hammer, which delivers 25-ton blows, is mounted in a frame and placed on a steel cap which transmits the energy to the pile. The hammer is of the pneumatic type and is fed from compressors carried on board the platform. The space provided on and below the deck enables a wide range of machinery and supplies to be accommodated.

The construction of the cableway across the Eastern Scheldt was the first operation on which this versatile piece of offshore equipment was used. With it, Van Splunder will doubtless achieve other spectacular successes in the hydraulic engineering field in the future.

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