6,600m³ Side Casting Trailing Suction Hopper Dredger “HANG JUN 6002”

This vessel is a side casting trailing suction hopper dredger which is one of the two sister dredgers, the largest class in the world, and is intended for dredging rivers and harbors in China.

The vessel is capable of dredging operation including either loading the dredge materials into the hopper or discharging the dredged materials directly onto the water to a distance of more than 100 m from the ship side by using the discharge boom.

Overboard discharge boom
The overboard discharge boom is equipped with a 1,400 mm² discharge pipe and the length from the slewing center to the end of the discharge pipe is 114.5 m. The slewing mechanism of the boom is of pin rack pinion system and is powered by two D.C motors to turn the boom 180 degrees within about 10 minutes.

Hopper
The hopper, of 6,623 m³ capacity, is divided into three compartments by longitudinal bulkheads to minimize the free water effect and its lower part is divided into twenty inverted pyramid hopper compartments, each equipped with a conical valve to dump the spoil from the hoppers. The conical bottom valves are remotely operated by hydraulic cylinders.

Dredge pump
Four sets of dredge pumps, of single suction single stage centrifugal type, are installed in pump room. Each dredge pump is driven by a diesel engine through a clutch and reduction gear.

Drag arm and drag ladder
The vessel is equipped with two drag arms on each side and two drag ladders in the ladder well. The trunnions for the side drag arms are of sliding type, while the trunnions for the drag ladders are of the fixed type.

The sliding trunnions is equipped with an automatic jet coupling which can automatically connect with the hull side coupling when the feeding jet water is supplied to the drag head.

Both drag arms and drag ladders are equipped with automatic suction device to control the excessive suction pressure of the dredge pump.

The drag head attached to each drag arm or drag ladder is of California type with high pressure water jet nozzles in addition to the digging teeth, which is very effective for dredging the hard packed sand.

Dredging instruments
The following instruments are provided on the dredger to achieve the efficient dredging:

a) Ship position display.
b) Electro magnetic flow meter.
c) Isotope concentration meter with production meter.
d) Drag arm figure indication.
e) Echo sounder
f) Discharge boom position indicator.
g) Discharge boom monitor.

Power system
Two sets of main engines are installed in the engine room. Each engine is Vee-type, 4 cycle, trunk piston, medium speed diesel engine with a turbocharger and is coupled to the controllable-pitch propeller through the clutch and reduction gear.

Electric power is supplied by three main generators and one auxiliary generator.

Each main generator engine is driven by an in-line, 4 cycle, trunk piston type turbocharged diesel engine.

In pump engine room, there are installed four sets of dredge pump engines, each of the in-line, 4 cycle, trunk piston type with turbocharger.

---

**Principal Particulars**

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loa x Lpp x B x D x d</td>
<td>199.95 x 155.0 x 29.0 x 12.0 x 8.0 m</td>
</tr>
<tr>
<td>Classification</td>
<td>NK, NS* (Dredger) and MNS*</td>
</tr>
<tr>
<td>Gross tonnage</td>
<td>14,324 t</td>
</tr>
<tr>
<td>Deadweight</td>
<td>14,334 t</td>
</tr>
<tr>
<td>Hopper capacity (at upper over flow level)</td>
<td>6,623 m³</td>
</tr>
<tr>
<td>Trial speed</td>
<td>15.09 kts</td>
</tr>
<tr>
<td>Service speed</td>
<td>14.8 kts</td>
</tr>
<tr>
<td>Dredging speed (against a tidal current of 3 kts)</td>
<td>2.5 kts</td>
</tr>
<tr>
<td>Complement</td>
<td>73</td>
</tr>
<tr>
<td>Maximum dredging depth (at 4.5 m draft)</td>
<td>24.0 m</td>
</tr>
<tr>
<td>Dredge pump</td>
<td>10,500 m³/h x 40 m x 4</td>
</tr>
<tr>
<td>Dredge pump diesel engine</td>
<td>MCR 2,200 ps x 600 rpm x 4</td>
</tr>
<tr>
<td>Jet pump</td>
<td>900 m³/h x 90 m x 4</td>
</tr>
<tr>
<td>Motor AC 375 kW x 1500 rpm x 4</td>
<td></td>
</tr>
<tr>
<td>Drag arm</td>
<td>Side trailing type x 2</td>
</tr>
<tr>
<td>Drag ladder</td>
<td>Center trailing type x 2</td>
</tr>
<tr>
<td>Main engine</td>
<td>MCR 7,300 ps x 420 rpm x 2</td>
</tr>
<tr>
<td>Propeller</td>
<td>4-blade, controllable pitch type x 2</td>
</tr>
<tr>
<td>Main generator</td>
<td>1,375 kVA x 400 V x 50 Hz x 30 x 3</td>
</tr>
<tr>
<td>Main generator diesel engine</td>
<td>1,650 hp x 750 rpm x 3</td>
</tr>
<tr>
<td>Bow thruster</td>
<td>Electric drives x 1</td>
</tr>
<tr>
<td>Motor AC 720 kW</td>
<td></td>
</tr>
</tbody>
</table>

Date of delivery: February 1980

Owner: China National Machinery Import and Export Corporation

Builder: Ishikawajima-Harima Heavy Industry Co., Ltd.
SIDE CASTING, TRAILING SUCTION HOPPER DREDGER

6,600 m³

"Hang Jun 6001 & 6002"

Owner: The People's Republic of China
Date completed: Feb. 1980
Classification: NK (Nippon Kaiji Kyokai)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length (o.a.)</td>
<td>193.95 m</td>
</tr>
<tr>
<td>Length (o.b.)</td>
<td>163.00 m</td>
</tr>
<tr>
<td>Breadth (mld)</td>
<td>29.00 m</td>
</tr>
<tr>
<td>Depth (mld)</td>
<td>12.00 m</td>
</tr>
<tr>
<td>Load draft</td>
<td>9.00 m</td>
</tr>
<tr>
<td>Gross tonnage</td>
<td>14,328 t</td>
</tr>
<tr>
<td>Deadweight</td>
<td>14,614 t</td>
</tr>
<tr>
<td>Hopper capacity</td>
<td>6,622 m³</td>
</tr>
<tr>
<td>Trial speed</td>
<td>15.09 kts</td>
</tr>
<tr>
<td>Compliment</td>
<td>73 persons</td>
</tr>
<tr>
<td>Dredging depth, max.</td>
<td>24 m</td>
</tr>
<tr>
<td>Dredge pump</td>
<td></td>
</tr>
<tr>
<td>Drag arm</td>
<td></td>
</tr>
<tr>
<td>Drag ladder</td>
<td></td>
</tr>
<tr>
<td>Jet pump</td>
<td></td>
</tr>
<tr>
<td>Discharge boom</td>
<td></td>
</tr>
<tr>
<td>Main engine</td>
<td></td>
</tr>
<tr>
<td>Propeller</td>
<td></td>
</tr>
<tr>
<td>Main generator</td>
<td></td>
</tr>
<tr>
<td>Diesel engine driven,</td>
<td>24 m</td>
</tr>
<tr>
<td>10,500 m³/h x 40 m</td>
<td>4 sets</td>
</tr>
<tr>
<td>900 mm³</td>
<td>2 sets</td>
</tr>
<tr>
<td>800 m³/h x 90 m</td>
<td>4 sets</td>
</tr>
<tr>
<td>114.5 m length</td>
<td>1 set</td>
</tr>
<tr>
<td>7,600 ps</td>
<td>2 sets</td>
</tr>
<tr>
<td>Controllable pitch type</td>
<td>2 sets</td>
</tr>
<tr>
<td>Diesel engine driven</td>
<td></td>
</tr>
<tr>
<td>AC 1,375 KVA</td>
<td>3 sets</td>
</tr>
</tbody>
</table>
Side-Casting, Trailing Suction Hopper Dredger

HANG JUN 6001
HANG JUN 6002
IHI has been recognized as a leading builder of various types of vessels, including those used for dredging, for a number of years. IHI is continuing vigorous development of a wide range of new equipment, with innovations reflecting the company's broad experience and advanced technology. And with foremost consideration to users' needs, IHI has developed, designed and manufactured the dredger and its equipment in line with the three principles of "PRM."

**Performance** — Excellent performance and efficiency

**Reliability** — High reliability and safety

**Maintenance** — Easy and minimum maintenance

This dredger in operation in the Yangtze River, China, is a side-casting, trailing suction hopper type, and is the largest class of its kind in the world. With this dredger, dredging operations can be conducted using an ordinary hopper loading system, or by directly discharging dredged material over 100 meters from the ship, using the vessel's long discharge boom.

The vessel is capable of dredging by using two drag arms on each side, as well as two drag ladders within the ladder well, and four dredging pumps driven by four diesel engines. This dredger, which is designed to operate even under rough conditions with waves up to two meters high, is equipped with the latest functions and facilities to enable efficient development of rivers and harbors.

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**Manufacturing Record of Side-Casting, Trailing Suction Hopper Dredger** (as of 1980)

<table>
<thead>
<tr>
<th>Ships</th>
<th>Owners</th>
<th>Year</th>
<th>L x B x D (m)</th>
<th>Hopper Capacity (m²)</th>
<th>Dredging Depth (m)</th>
<th>Main Engines (ps)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZULIA</td>
<td>Sea dredge Co., Inc.</td>
<td>1959</td>
<td>160.0 x 29.0 x 12.2</td>
<td>6,600</td>
<td>18.3</td>
<td>Turbine 6,050 x 2</td>
</tr>
<tr>
<td>ICQA</td>
<td>Universe Tankships Inc.</td>
<td>1961</td>
<td>149.3 x 29.0 x 12.2</td>
<td>2,240</td>
<td>18.3</td>
<td>Diesel 5,260 x 2</td>
</tr>
<tr>
<td>HANG JUN 6001</td>
<td>The People's Republic of China</td>
<td>1980</td>
<td>153.0 x 29.0 x 12.2</td>
<td>6,800</td>
<td>24.0</td>
<td>Diesel 7,800 x 2</td>
</tr>
<tr>
<td>HANG JUN 6002</td>
<td>The People's Republic of China</td>
<td>1980</td>
<td>153.0 x 29.0 x 12.2</td>
<td>6,600</td>
<td>24.0</td>
<td>Diesel 7,800 x 2</td>
</tr>
</tbody>
</table>
Contributing to the Operational Efficiency

Boom Dredging

The long discharge boom permits direct discharge of dredged material for greater efficiency. Furthermore, continuous dredging can be conducted to increase the efficiency of waterway dredging and/or maintenance dredging.

Discharge Boom
The discharge boom is 114.5 meters in length from its pivot, and can be fixed at 45° or 90° starboard or portside according to the conditions of the dredging site. It is designed to rotate continuously, covering 180° in ten minutes.

Hopper Dredging

Besides boom dredging, the dredged materials sucked up from the vessel's four drag heads are loaded into a hopper of approximately 6,500 m³ capacity, to meet a wide range of dredging needs.

Hopper
The hopper, of approximately 6,500 m³ capacity, is composed of three transverse subdivisions to improve vessel's stability. It is provided with a conical type door for easy clamping even in shallow waters.
Control of Dredging Operations

The control of dredging operations is conducted by drag arm and drag ladder control consoles as well as a dredge control console which are both installed in the wheel house. These centralized control facilities are provided for higher efficiency and safety.

Major Dredging Instrumentation
- Ship position display
- Electromagnetic flow meter
- Isotope concentration meter with production meter
- Drag arm figure indicator
- Echo sounder
- Discharge boom position indicator
- Discharge boom ITV

Drag Head

Drag head is equipped with highly efficient teeth and high pressure water nozzles and is designed to dredge even accreted sand.
General Arrangement

Principal Particulars

1. Hull Part
   Length O.A. 193.95m
   Length S.P 153.0m
   Breadth MLD 29.0m
   Depth MLD 12.0m
   Designed Draft MLD 8.0m
   Classification NK

2. Dredging Machinery Part
   Max. Dredging Depth 24.0m
   Hopper Volume 6,622m³
   Dredge Pump Capacity x total head 10,500 m³/h x 40 m

3. Machinery Part
   Prime Mover for Dredge Pump 4 sets
     Type Four Cycle Diesel
     Output 3,200ps x 600 rpm
     Jet Pump 4 sets
     Capacity x total head 900 m³/h x 90 m
     Motor AC 375kW x 1,500 rpm
   Dredge Pipe
     Dragarm 900mm x 2
     Dragladder 900mm x 2
     Draghead self-adjustable type x 4
   Hopper loading pipe 1,100mm
   Discharge Pipe 1,400mm
   Discharge Boom 1 set
   Length (from center of Rotation) 114.5m
   Turning angle 180°
   Turning device electric driven
   Swell Compensator pin-lack pinion type 4 sets
   Main Engine 2 sets
     Type 4 cycle diesel
     MCR 7,800 ps x 520 rpm
   Propeller 2 sets
     Type 4 blade C.P.P. (HIS-LIPS)
   Main Generator 3 sets
     AC 1,375kVA x 400 V x 50 Hz x 750 rpm
   Diesel Engines for Main Generator 3 sets
     1,650ps x 750 rpm
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8000-1000 Printed in Japan (F)