

Stacker and Shiploader at the Port Kembla Coal Terminal

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ポート・ケンブラ石炭ターミナルにおけるスタッカーとシップローダー

肯伯拉港煤炭集散站的堆积机和船载装货机

وحدة التكديس وحالة السفن محطة الفحم ميناء بورت كمبرلا

1. Introduction

The Port Kembla Coal Terminal stockyard consists of two stacking conveyors on the outside of the piles and initially one, and in the future two reclaim conveyors between the piles. Each stacking conveyor has two rail-mounted stackers (Fig. 1).

The shiploading system is interruption free. It utilizes two shiploaders fed from a single dock conveyor. Stackers and shiploaders are to be supplied from Italmimpianti s.p.a., Genoa, Italy and Italmimpianti of Australia Pty. Ltd., Sydney. Details of the general operation of these machines are given in the paper by P. Soros in this issue (*bulk solids handling* No. 4 (1981)).

2. General Description: Stackers

The machines were designed to stack out coal at the rate of 4,400 t/h according to the specific gravity of the material, which may vary between 0.750 to 0.900 kg/m³.

The stacker consists of the following main components:

- Luffing boom, hydraulically activated,
- three leg gantry,
- truck with all stacker wheels driven and all tripper and trailer wheels idle.

All stackers are equipped with a trailer and transfer tower to allow stacking with Stacker No. 1, stacking out with Stacker No. 2 by moving the tripper by means of a rack unit, by-passing both machines.

The power supply between stackers and junction boxes is by means of cable reels.

The machine belt conveyor receives the material from the trailer hopper and the boom conveyor stacks out coal with a slope between — 14° to + 18°. The stacker booms are not the slewing type since they are placed at the outer side of piles.

The machine is suitable for operating at a maximum wind speed of 22 m/sec. From a static point of view, the structure is designed to withstand wind speeds of up to 50 m/sec when anchored to the runway.

The machine is equipped with a centralized lubrication system serving all rotating and subject to wear points and also with other manual lubrication devices.

A number of safety devices, which come into operation when the machine is not operating satisfactorily, is provided.

In the following the main technical data are summarised:

Material to be handled:

The machine will be suitable for handling coal with the following characteristics:

Material size:	minus 50 mm
Moisture content:	7.0 to 12.0 %
Material density:	750 to 900 kg/m ³
Angle of repose:	35° to 42°

Capacity:

Stacking rate:	4,400 t/h, normal rate
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Boom

Length of boom: (center of pivot to center of head pulley)	35 m
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Conveyor:

Center to center pulleys	40.5 m
Belt width	1,600 mm
Belt speed	5.37 m/sec
Belt capacity	4,400 to 5,700 t/h

3. General Description: Shiploader

The machines were designed to load ships of up to 150,000 DWT with coal at a rate of 6,600 t/h (Figs. 2 & 3).

The shiploader consists of the following main components:

- Front motor-driven fixed leg running on a wharf for an operating range of 210 m. For the front leg, double rail trucks are provided equipped with 24 wheels and 10 travel drive units.
- Rear completely equalized pendular leg. Rear trucks are of the single rail type equipped with 16 wheels and 10 travel drive units (Fig. 4).

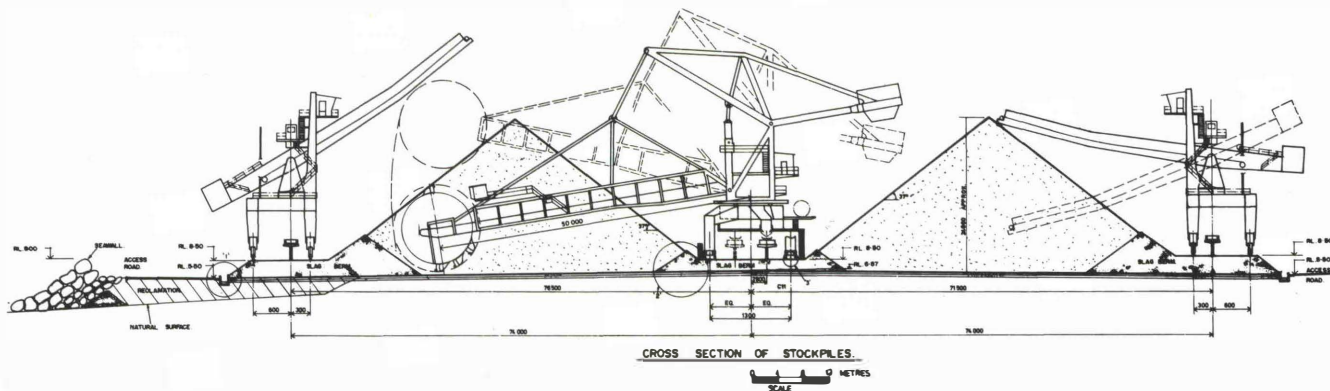


Fig. 1: Cross-section of stockpile

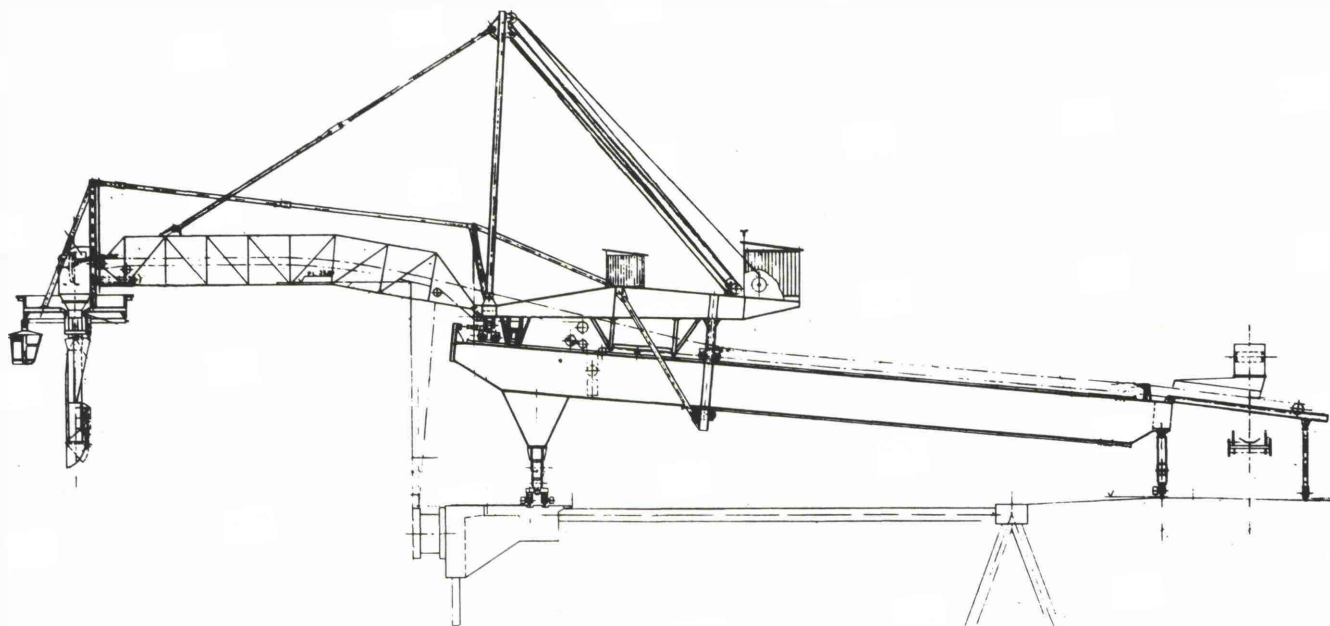


Fig. 2: General arrangement of travelling shiploader

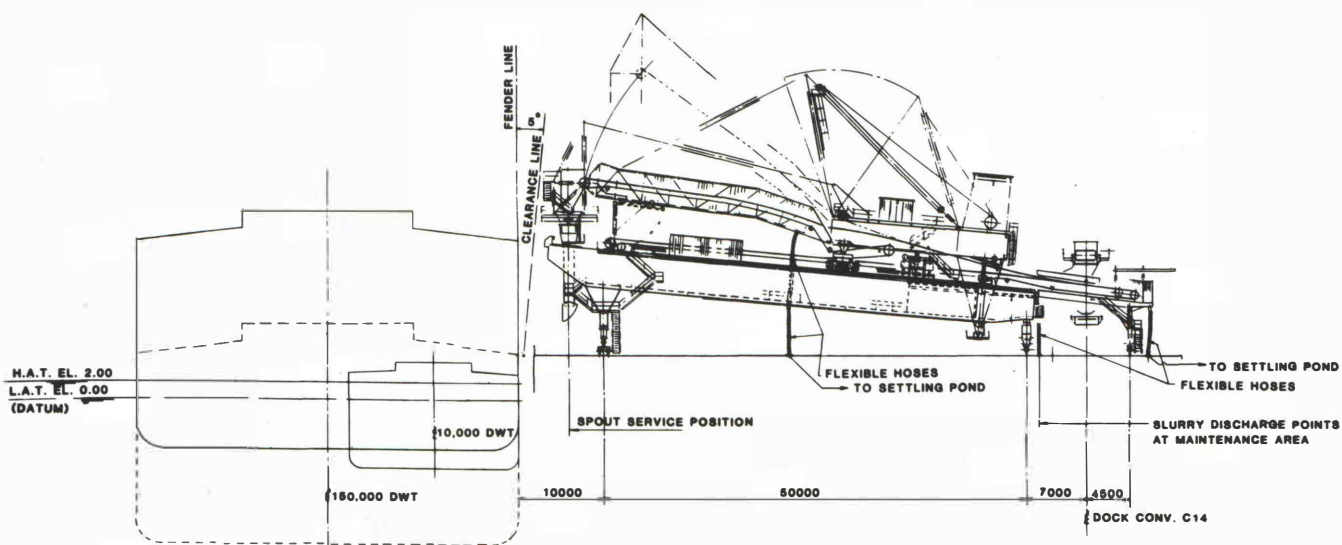


Fig. 3: Bridge-type travelling shiploader

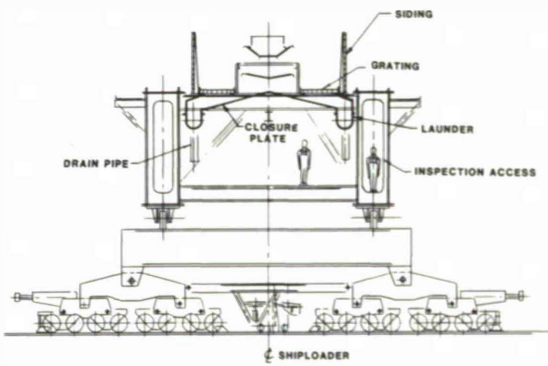


Fig. 4: Section through shiploader bridge

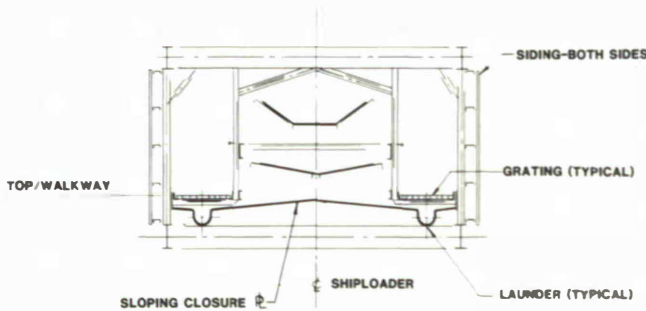


Fig. 5: Section through shiploader boom

— Main bridge consisting of two box-type girders, placed sidewise at a distance of 10 m, and connected by lattice bracing. The shuttle will move lengthwise on the main bridge.

Shuttle:

This is the part of the machine which is used for the loading operations. It can be considered as a storage yard stacker moving, by means of two rack drive units, in the boom direction instead of perpendicular to it (Fig. 5). The shuttle consists of:

- a) A main girder made of two solid-wall beams connected by windbracing transversal elements. An uplift yoke all around the main bridge is provided.
- b) A boom of lattice structure, hinged to the front part of the shuttle by means of a self-aligning spherical plain bearing. The boom is suspended by tie rods from the movable mast, which, in turn, is connected by a reeving system to the boom mast.
- c) movable masts.

Trailer — By-Pass Tower — Tripper:

Shiploader No.1 is equipped with a trailer tripper and transfer tower to allow loading of shilo No. 1 or shilo No. 2 by moving the tripper by means of a rack unit. Shiploader No. 2 is equipped only with a tripper.

The power supply between shiploader and junction box is by means of cable reels and between bridge and shuttle by means of a festooned cable.

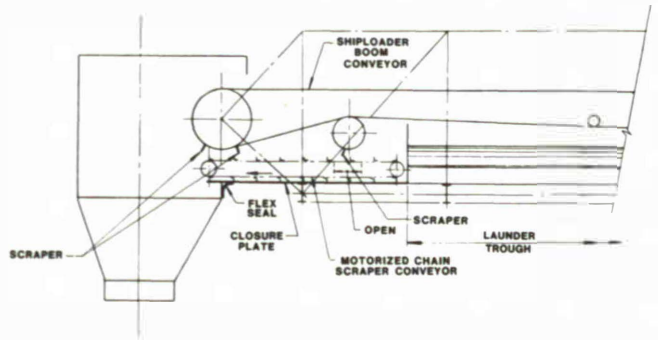


Fig. 6: Shiploader boom conveyor discharge with spout

The machine belt conveyor receives material from the tripper (shilo 2) and from trailer (shilo 1) hopper and, by means of a system similar to a mobile head, the material is transferred from the impact section to the shuttle and then to the boom conveyor in order to reach the ship holds through a pivoting spout whose task is the prevention of dust generation and reaching far away parts of the holds (Fig. 6).

The machine is suitable for operating at a maximum wind speed of 22 m/sec. From a static point of view, the structure is designed to withstand wind speeds of up to 50 m/sec when anchored to its runways.

The machine is equipped with a central lubrication system serving all rotating and subject to wear points and also with other manual lubrication devices.

A number of safety devices, which come into operation when the machine is not operating satisfactorily, is provided.

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The machine will be suitable for handling coal with the following characteristics:

Material size:	minus 50 mm
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Material density:	750 to 900 kg/m ³
Angle of repose:	35° to 42°

Capacity:

Shiploading rate:	6,600 t/h, normal rate
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Boom

Length of boom: (center of pivot to center of loading spout)	32 m
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Conveyor:

Center to center pulleys (max. extension)	90 m
Belt width	2,200 mm
Belt speed	4.4 m/sec
Belt capacity	7,500 to 9,600 t/h