

CEMENT - THERMAL POWER - MINERALS

Central Cone Silos

Single silos.
Ring silos.
Multicompart-
ment silos.
From 2 to
22 chambers,
diameters:
14 to 27 m.



EPC-Contracting

Piling.
Civil works.
Steel structure,
supply/erection.
Electrical/
mechanical
supply and
erection.



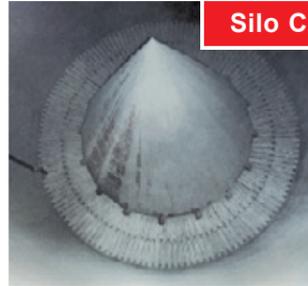
Marine Cement Terminals

Floating
terminals.
Mini terminals.
Silo systems.
Dome systems.
Flat storage
terminals.



Silo Conversions

Economic
modifications
with advanced
cutting-edge
technology.



Cement Carriers

Advanced
technology for
self-discharging
Cement Carriers
including the
Midship tunnel.



Components

The key for
a well
functioning plant:
Components,
all made
to measure.



Ship Unloaders

Stationary or
mobile types:
From the
5,000 class
up to the
60,000 class.



Spare Parts

High stock
availability:
Just-in-time
supply
of spare parts.
After-sales
Service.



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IBAU HAMBURG

Self-Discharging Cement Carriers

IBAU HAMBURG Cement Carriers
From low-capacity, temporary units to large fully computerised plants
Advanced technology for self-discharging Cement Carriers



For seaborne cement transportation: M.V. GOLIATH reaching Sydney



Cargo holds with aeration panels and fluidisation system with feeding of the IBAU Pump



Fluidizing cargo holds

The sloped bottoms of the cargo holds are covered with fluidizing panels. Rotary piston blowers supply the compressed air oil-free to fluidize the cement above the panels so that

the cement can flow to the lowest point, where the discharge gate is installed. The discharge rate is adjusted by an IBAU Flow-control gate. The midship tunnel system is dividing the cargo holds into a portside and star-

board compartment. The IBAU Pumps and rotary piston blowers are placed in the midship tunnel. The midship tunnel eliminates an additional bottom-to-deck hold for the discharge equipment.



The IBAU HAMBURG Tunnel concept: Midship tunnel with IBAU Pump and aeration panels.

The IBAU Midship tunnel concept: The trade of cement and similar products results in new ship capacities and more and more conversions of conventional bulk carriers into specialized cement selfunloaders. Selfunloading cement carriers need no shore based ship unloading equipment and have a totally enclosed cargo handling system, using a fluidizing system in the cargo holds for cement unloading.

Cost reductions: Cargo holds with fluidisation systems and IBAU Pumps Up to now, the world fleet comprises about 300 units between 1,000 dwt and 60,000 dwt for seaborne cement transportation. Additionally, about 200 units exist in the <1,000 dwt range for lake and river transport.

In line with the market demand, IBAU HAMBURG has developed concepts for new ships as well as the conversion of bulk carriers into cement self-unloaders, which can be adapted for ship sizes up to 60,000 dwt. Especially the cement carriers in the upper range require advanced systems, which are fully automated allowing to achieve high loading and unloading rates.

**IBAU HAMBURG
 new self-discharging
 technology**

Advanced self-unloaders in the 1,000 dwt to 60,000 dwt range are equipped with fluidisation systems in the cargo holds.

The systems can be installed in new ships and conversions within three months. They can be adapted to the different ship sizes and different types of cement, fly ash or similar materials.

Unique in the IBAU Concept is the space-saving midship tunnel design that integrates the discharge equipment and divides the holds into a portside and starboard compartment.

The midship tunnel eliminates an additional bottom-to-deck hold for the discharge equipment.

The fluidisation system comprises inclined aeration panels, which cover the complete hold bottom. Cement flows to the lowest points in the holds, where IBAU Flow-control gates are installed, which allow an adjustable and computerized flow.

For transporting the cement from the holds to the shore terminal, specially designed screw pumps are used, which have a very low feed point and allow a lateral feed from the left and right hand side. Each pump transports up to 350 t/h cement. Conveying distances of more than 600 m can be achieved.



IBAU's Cement Carrier Technology M.V. KEDAH at Westport

When different cement types such as white and grey cement have to be transported one after another with the same cement tanker a 100 % cement reclaim from the cargo holds is required. The innovative IBAU Vacuum cleaner assists the reclaiming process, to make a 100 % cement reclaiming rate possible.

The cargo holds are equipped with docking stations for the mechanical cleaner, which directs the remaining cement into the bin of an IBAU Pump. Particle separation is effected in the pump filter and no additional cement transportation equipment is needed.

**How it works:
 Cement Carrier
 loading / unloading**

The self-unloader is loaded and unloaded in the most flexible and simple way by means of IBAU Pumps.

To achieve unloading rates of up to 1,200 t/h, four IBAU Pumps can be used in parallel. The pumps are supplied with oil-free conveying air by screw compressors, which are located in deck houses, together with the filtering equipment.

For direct loading with high capacities again IBAU Screw pumps are used, which pneumatically convey the cement through one or more pipelines directly into the

cargo holds. Flexible hoses for the connection of the shore and ship pipes are carried by an on-board crane. Loading lines on deck are equipped with motor actuated IBAU Two-way valves for directing the cement into the selected holds.

The required compressed air is generated by the compressors on board. For cement distribution on deck from a central receiving bin either Fluid-slides or horizontal screws can be used. IBAU fluid-slides are used for capacities up to 1,200 t/h, while IBAU Screw conveyors are recommended for capacities up to 500 t/h. Such systems are very common if a mechanical ship loader is used.

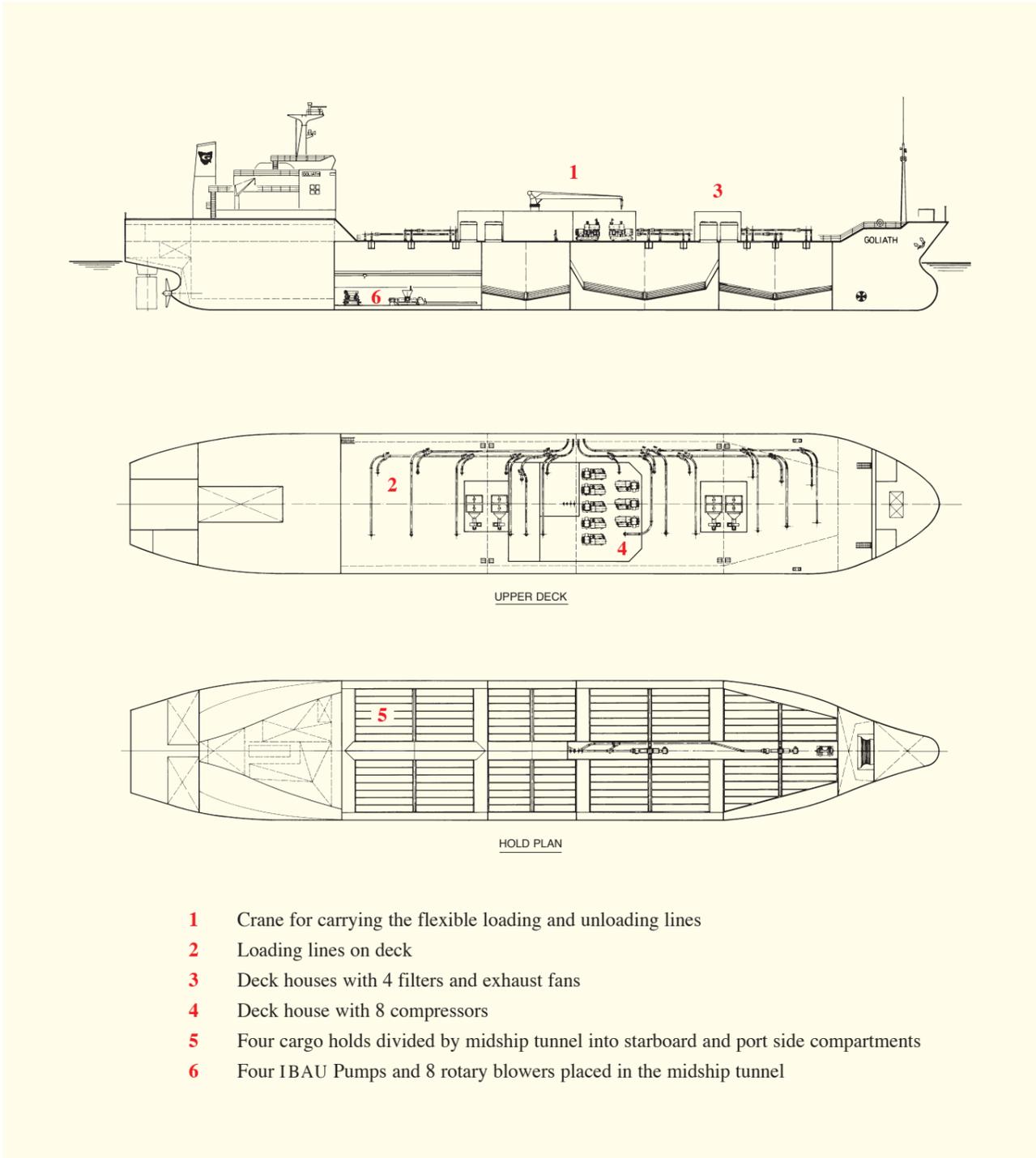
For highest reliability, cement loading and reclaiming for the self-unloader can be completely automated and computer controlled. During loading, cement is automatically directed into the holds, while the ship is balanced.

Unloading rates can be pre-selected and the operator gets information about any hold and discharge equipment at any time. IBAU HAMBURG can fit the computer systems with latest state-of-the-art technology to ensure highest recovery from the cargo holds with the shortest berthing time in the port.

The described loading / unloading technology optimally assists computer automation.



M.V. GOLIATH at Devonport Harbour supply depot



The drawing shows the general layout of the cement tanker M.V. GOLIATH (15,000 dwt)



M.V. GOLIATH board crane lifting the loading pipes



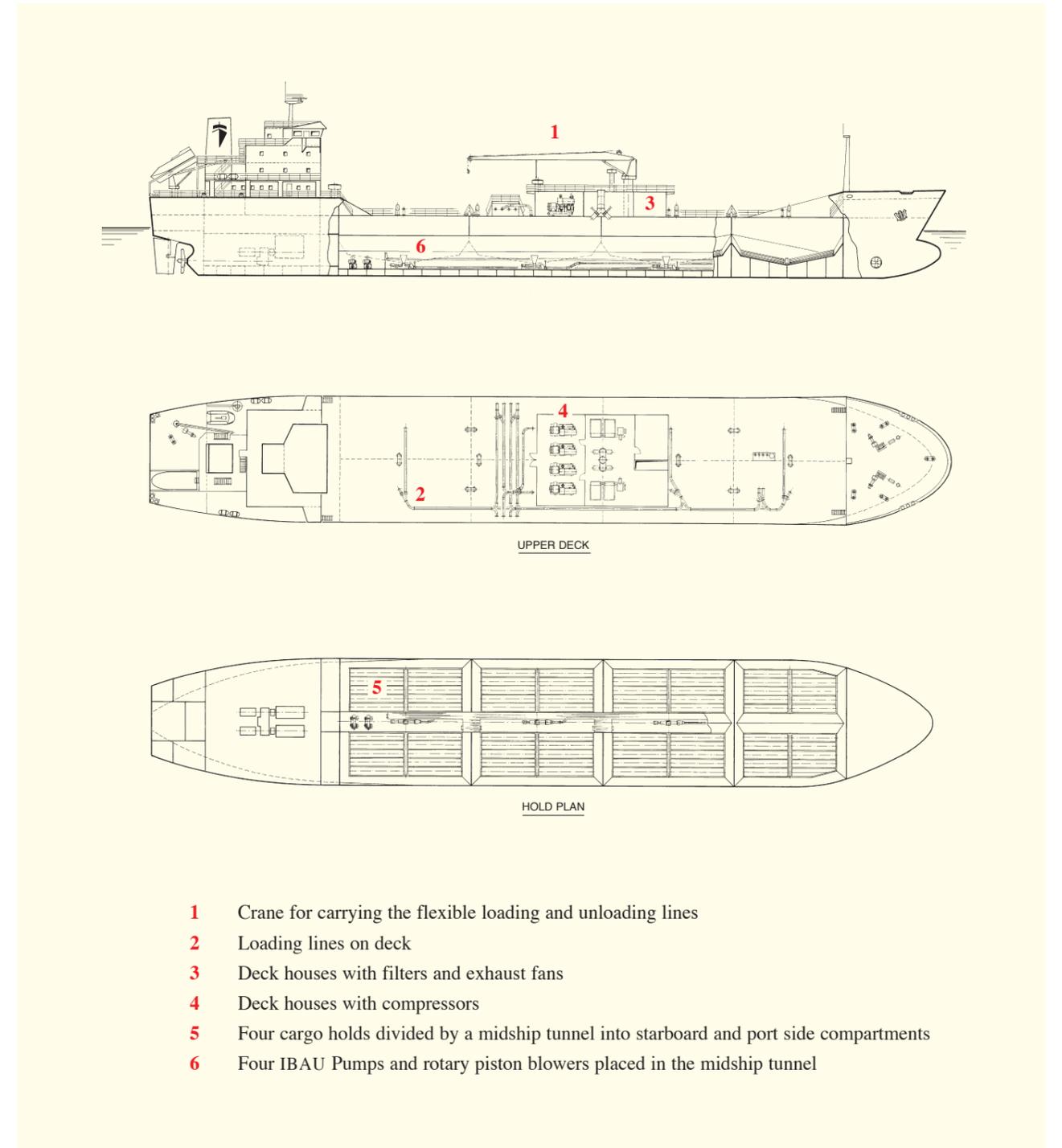
M.V. GOLIATH loading procedure for dustfree loading independent from any weather conditions



M.V. KORALIA cement carrier



M.V. KORALIA reaching a supply depot



The drawing shows the general layout of the cement tanker M.V. KORALIA (8,500 dwt)

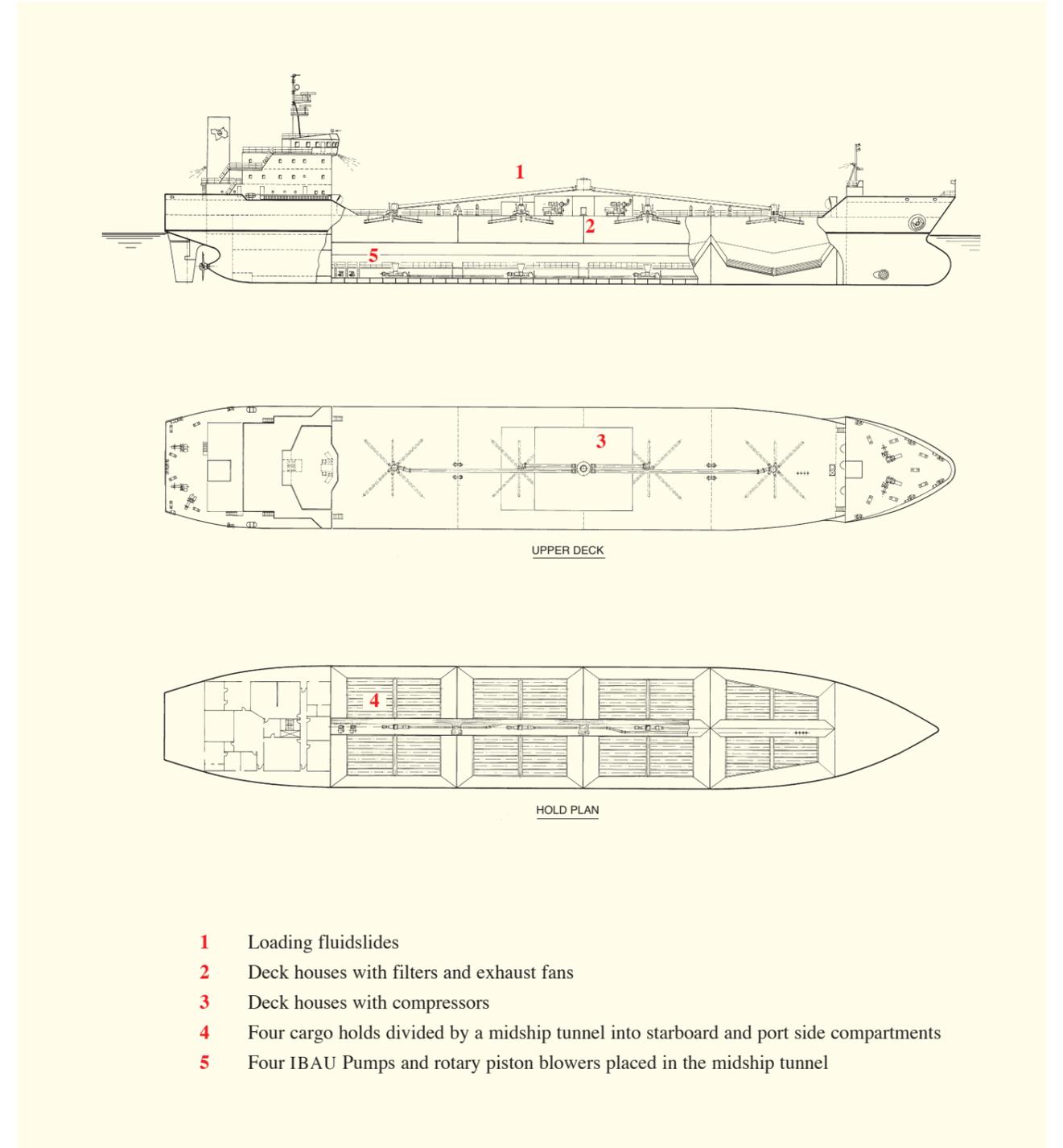


M.V. KEDAH I
 Cement supply
 on the open sea



M.V. KEDAH II
 in the dry dock

M.V. KEDAH III
 during one of
 its supply voyages

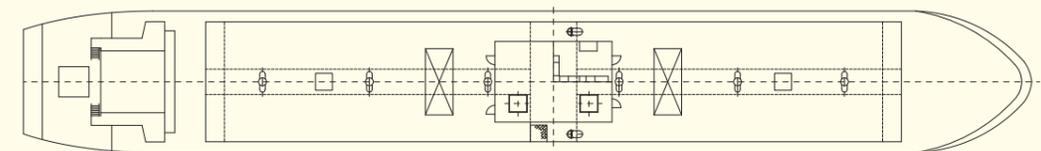
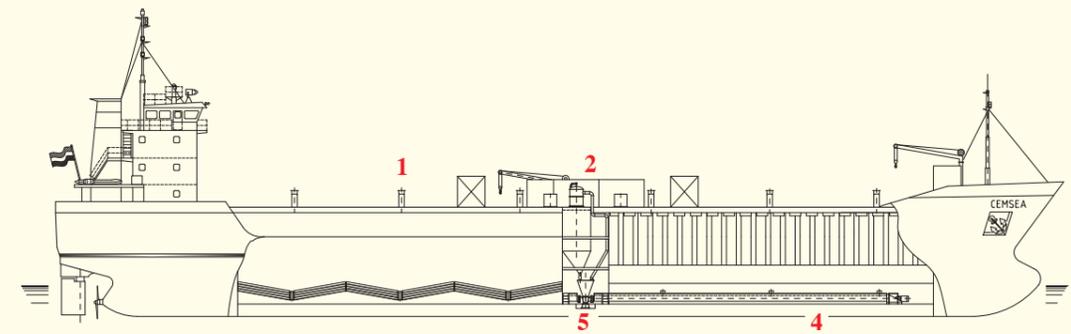


- 1** Loading fluidslides
- 2** Deck houses with filters and exhaust fans
- 3** Deck houses with compressors
- 4** Four cargo holds divided by a midship tunnel into starboard and port side compartments
- 5** Four IBAU Pumps and rotary piston blowers placed in the midship tunnel

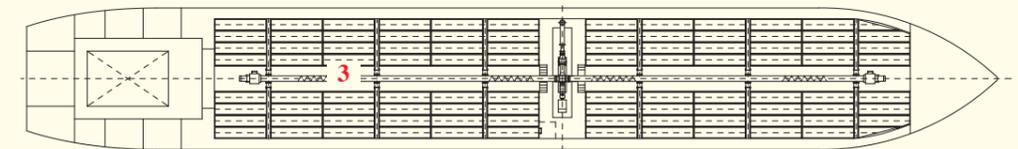
The drawing shows the general layout of the cement tanker M.V. KEDAH I, II & III (16,000 dwt)



M.V. CEMSEA at the Rostock harbour terminal



UPPER DECK



HOLD PLAN

- 1 Loading points on deck
- 2 Deck house with compressors
- 3 Cargo holds divided by a midship tunnel into starboard and port side compartments
- 4 Horizontal screw conveyer placed in the midship tunnel
- 5 IBAU Pump placed in the midship tunnel

The drawing shows the general layout of the cement tanker M.V. CEMSEA (4,100 dwt)



M.V. CEMSEA and M.V. CEMSTAR during supply voyage



M.V. CEMSEA in the Kiel Canal



Preparation for discharge



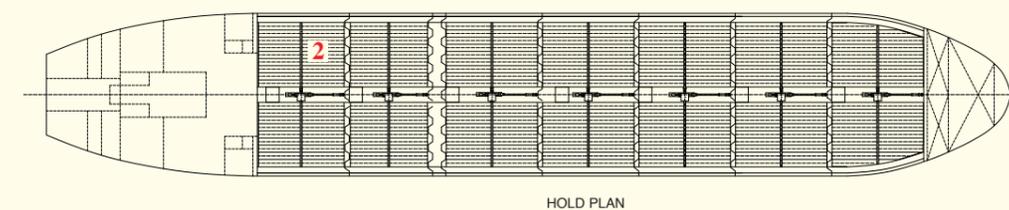
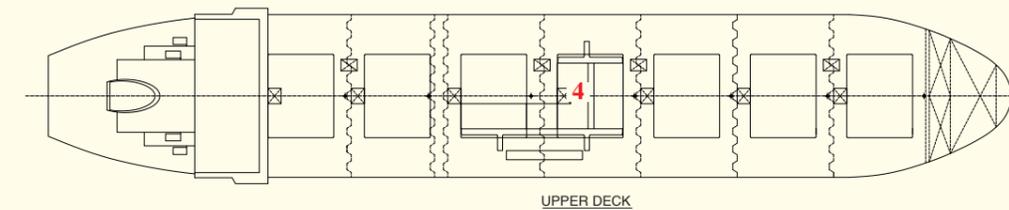
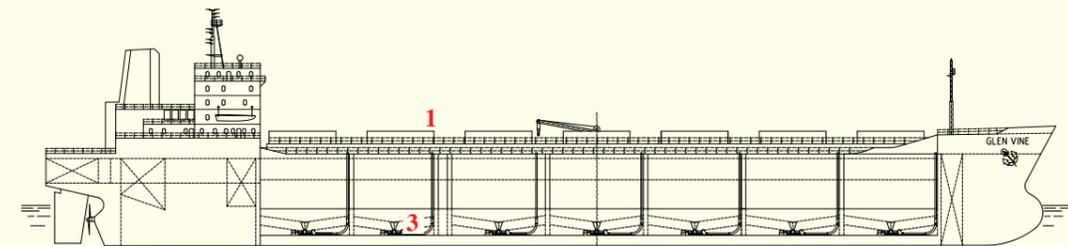
M.V. CEMSEA III



M.V. CEMSEA cement supply by HOLCIM



Cement Carrier M.V. GLEN VINE



- 1** Crane for carrying the flexible loading and unloading lines
- 2** Seven cargo holds divided by midship tunnel into starboard and port side compartments
- 3** Seven IBAU Pumps placed in the midship tunnel
- 4** Deck house with compressors

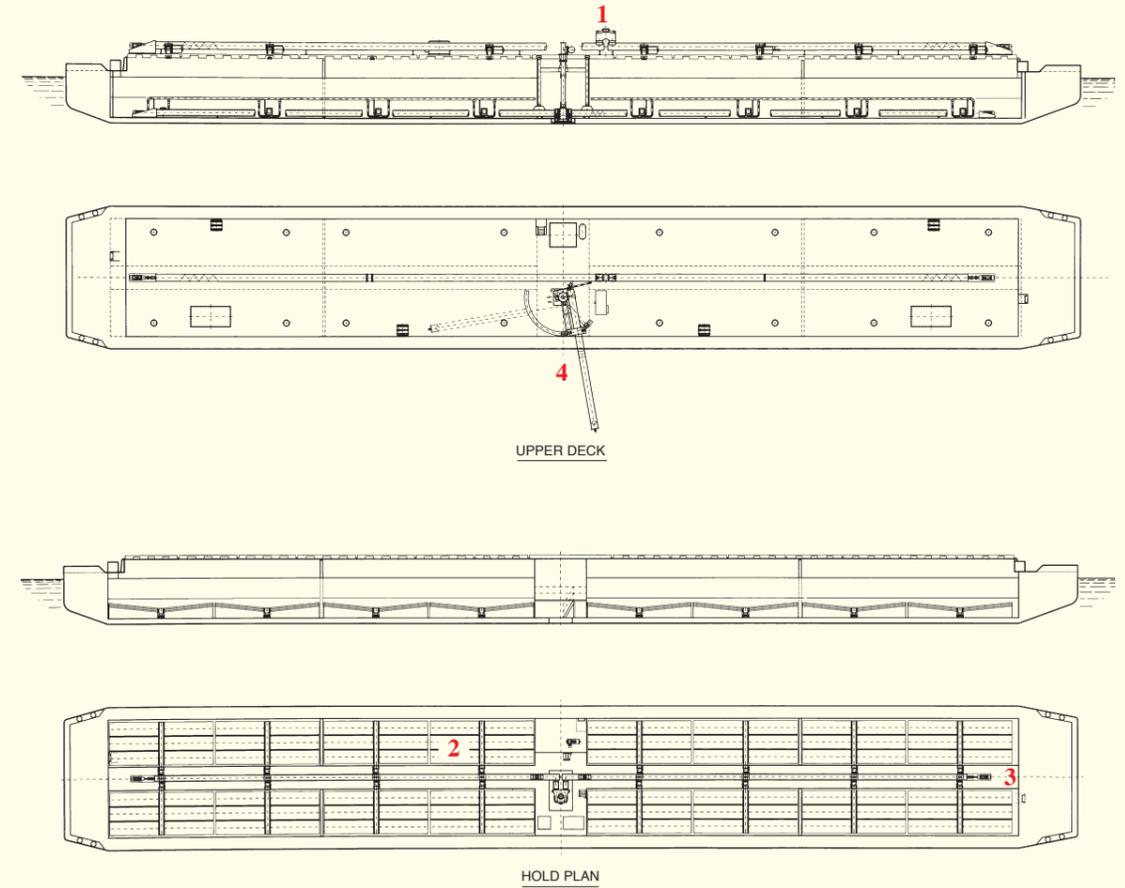
The drawing shows the general layout of the cement tanker M.V. GLEN VINE (60,000 dwt)



The cement barge of LAFARGE CEMENT during the voyage on the River Seine



The cement barge reaching the unloading station



- 1 Feeding screw conveyor
- 2 Two cargo holds
- 3 Discharge screw conveyor
- 4 Flexible screw conveyor for unloading

The drawing shows the general layout of the cement barge (2,200 dwt)



Loading station for LAFARGE CEMENT at Le Havre port

Conclusion

The concepts of IBAU HAMBURG are driven by the market needs. Conversions have to become operational within three months.

Advanced systems have to fit to the terminal facilities and require high loading / unloading rates up to 1,200 t/h.

These can very effectively be met with the IBAU Pump system, which fulfills the most stringent system requirements.

The direct loading / unloading mode requires no intermediate transport and transfer points as it is necessary with vacuum / pressure vessel systems.

Another major advantage is the possible long conveying distance and the possible complete automation.

The system can also be adapted to cement tankers, which alternatively transport different cement types.

IBAU HAMBURG has an intensive project experience. For smaller ship sizes such as river barges also mechanical screw conveyors are economical.

Why IBAU Pumps work better:

The IBAU pump is the only direct unloading solution that does not need any intermediate transport and the space requirement in the ship hold is very low.

Vacuum systems as well as screw systems mainly are combined with pressure vessel conveying for ship to shore transport.

The capacity range of IBAU Pumps installed in parallel is as high as with the most advanced screw conveyor systems.

The conveying distance can be up to 600 m, which covers the known terminal requirements.

The specific power consumption that is required for an IBAU Pump is not higher than for a combined vacuum / pressure vessel system and only slightly above screw systems for medium and long distance transports.

Another strong point of the IBAU Pump is the adaptability to latest automation requirements.

When screw conveying systems are combined with IBAU Pumps some special advantages are received compared to the vacuum / pressure vessel solution, such as lower energy requirements and the long conveying distance.



Feeding of IBAU Pump



Midship tunnel with screw conveyor



Cargo hold discharge



Cargo hold with aeration panels



The IBAU Pump in the midship