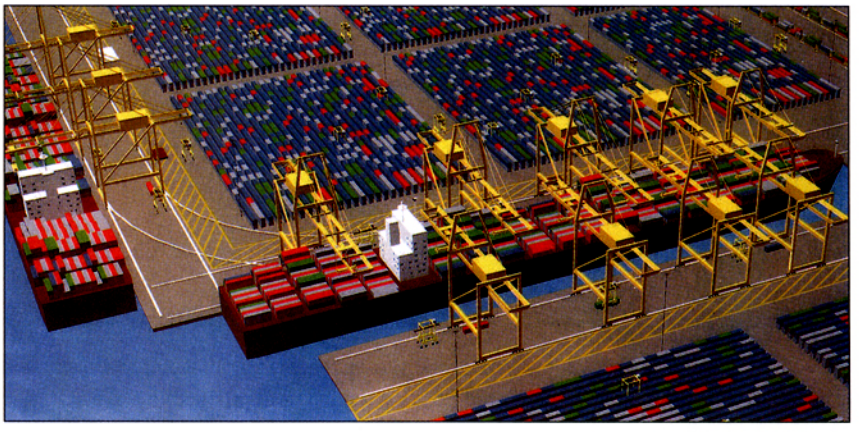
T'SLIPS IN AMSTERDAM

Michael Jordan, of Liftech Consultants Inc, describes the concept behind the crane configuration at the Ceres Amsterdam Terminal



EIGHT THOUSAND TEU ships will soon be here. Larger ships move containers for less, but the ships cost more. So the ship is producing only when it is moving cargo. However, the ship moves cargo at sea, not at the berth, so ship turn time is wasted time. The challenge, therefore, is economically to reduce turn time.

Reducing turn time has been the challenge for years. The obvious solution was to increase crane productivity. This was done; but it only helped a little since the quay could not keep up with the cranes. A more global view was needed. The cranes, quay, yard and gate must be examined as a system. The productivity of the system determines the ship turn time; the cranes are only part of the system.

However, a new system is being planned for the next century. It is designed to produce 300 net sustained moves per hour on one 8,000TEU ship. The key to this productivity is placing a large ship in a slip and servicing the ship from both sides, port and starboard. The new terminal being developed by the Port Management of Amsterdam and Ceres Marine Terminals Inc will provide berthing for three ships: two at a marginal wharf and one in a slip.

SHIP IN THE SLIP

The most interesting aspect of the Ceres Amsterdam Terminal is the ship in a slip. The slip can service a 20 container-wide megaship and a capacity of more than 8,000TEU. Navis Corporation developed a ship stow configuration with 20 containers on deck and a capacity of 8,028TEU. Jordan Woodman Dobson and Liftech Consultants studied the terminal operation based on moving a combined total of 4,390 various sized containers during one ship turn. The study was performed using the JWD/Liftech General Marine Terminal Simulation and the CraneSim computer models. Nine cranes can unload and load the ship in less than 15 hours.

The slip is 53m wide. Four post panamax cranes operate on the north side. Two post panamax and three super post panamax cranes operate on the south side. Four additional super post panamax cranes operate on the marginal wharf. All six of the super post panamax units can travel around the corner to be used on the marginal wharf.

The crane rails run for the full length of the marginal wharf and more than the full length of the slip. The extended rail at the slip allows for the operation of six super post panamax cranes on the south side of the slip if the two post panamax are parked beyond the slip. The waterside crane rail is set back seven metres from the face of the fenders to provide space for vehicles servicing the ship. This arrangement is used at the ECT Delta Terminal and at the new American President Lines Los Angeles terminal.

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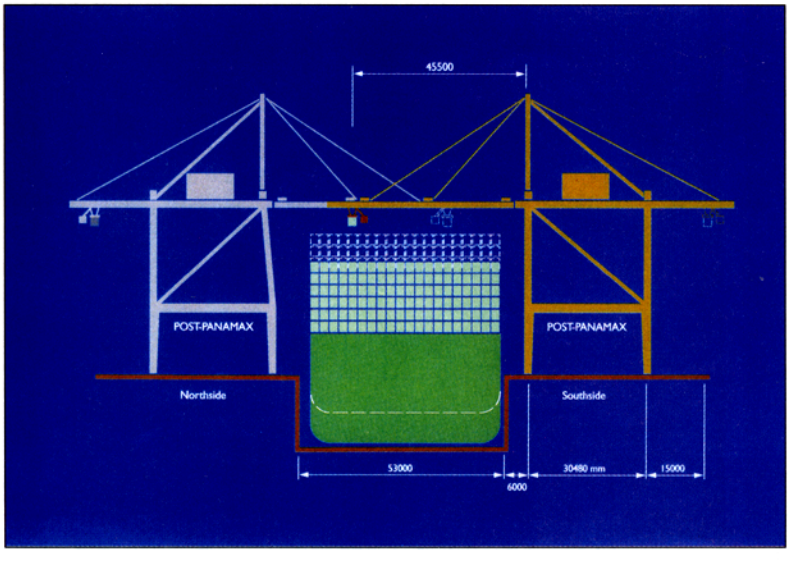
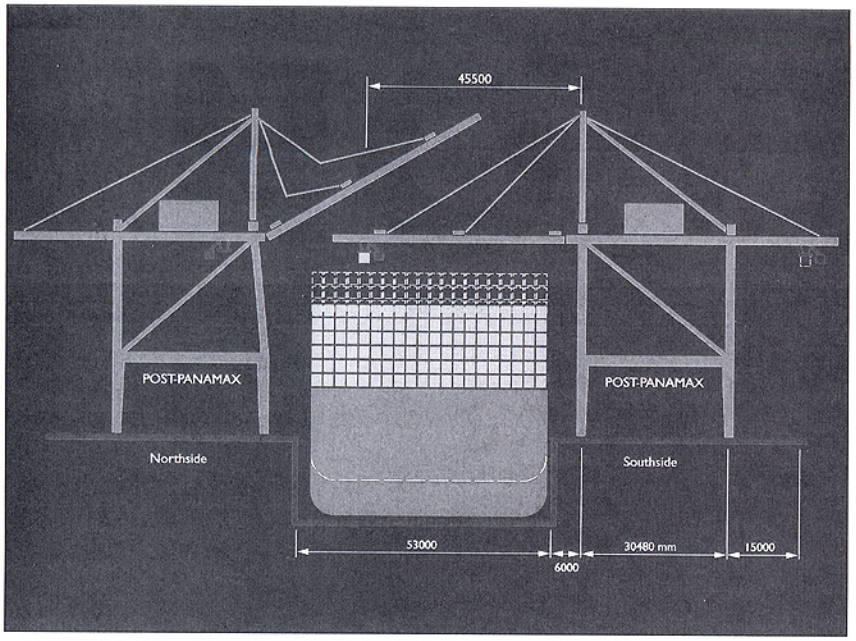


THE CRANES

The planned average net productivity of the cranes will be 33 moves per hour per crane. This is a very realistic expectation for net productivity. For a short duration, crane productivity will be much higher than the average net productivity. The overall productivity of the cranes is limited by



the total system. Increasing crane productivity will not increase total system productivity.

The super post panamax cranes can reach across the megaship's deck. The post panamax cranes can reach two-thirds of the way across the deck. The south and north cranes are able to pass each other when one crane boom is raised by 30 degrees. The width of the boom and trolley is limited so 40ft and 20ft containers can be handled in adjacent holds.

The cranes can travel around the corner on curved rails. The power cable from the corner to the crane will remain connected and provide power to the crane while it travels around the corner. The power cable trench runs along the edge of the quay, but not around the corner. The power cable will be terminated at the corner. When the cranes travel around the corner, the cable will drape from the corner to the pull reels on the cranes. The pull reel will be operated manually during cornering. Liftech Consultants and McKay International Engineers developed a similar arrangement for the Port of Tacoma, which works well.

Conventional crane stops are located at the end of the runways. Special mechanical and electrical anti-collision devices will prevent the cranes from colliding while operating near the corner, or while traversing around the corner.

Alternatives

During the study, crane alternatives were considered. Bridge cranes were ruled out because of problems with size and the required clearance to pass a ship's house. Two trolleys on one crane created very difficult control problems, since one trolley's load and motions would disturb the other trolley. Fixed booms were considered for the north cranes. The cost would be reduced slightly, but operations would be restricted.

The solution

The final solution was based on careful examinations of all the practical alternatives. Productivity was determined using simulation programmes that have been proven to be accurate. Cost estimates were based on experience with similar components. The overall operation and feasibility was evaluated by the key personnel of Ceres Marine Terminals and Port Management of Amsterdam. The terminal will be ready for the challenge of the 8,000TEU ships. ■

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Crane characteristics

Crane type	
Rope trolley, boom down operation	
Capacity	**65t**
Spreader	
20/40/45 twin 20	
Geometry	
Backreach from landside rail	**15.24m**
Rail gauge	**30.48m**
Outreach from waterside rail	
Super post panamax	**55.80m**
Post panamax	**45.50m**
Lift above waterside rail	**36.00m**
Total lift	**48.80m**
Clear height under portal	**16.00m**
Clearance between legs	**18.25m**
Out-to-out bumpers	**26.00m**
Speeds and accelerations	**m/min**
Main hoist	
Hoisting with rated load	**70**
Hoisting with empty spreader	**180**
Trolley motion	**244**
Gantry travel motion	**46**
Electrics	
Main power	**10,000v**
Cable reel with fibre optics	**630m**
Controls	
GE DC 2000, ABB Siemens, or HMA	
Four fall with electronic sway control	
Semi-automatic operation	
Mechanical list/trim/skew control