www.gottwald.com

A Tribute to Success in Automation

Automated Guided Vehicles plus Software

GOTTWALD
port technology

Tom Todd assesses the experiences of two of Europe's leading terminals with automation.

ALTENWERDER AND DELTA COUNT COST OF AUTOMATION

Second-stage construction of Hamburg's high-tech Container Terminal Altenwerder (CTA) has already begun after the facility notched up 874,000 TEUs in its first full operational year. By the end of second phase development next year, the largely-automated CTA, billed as the most advanced terminal of its kind in the world, expects to be handling up to 2.9m TEUs a year - a million TEUs more than originally predicted.

"The AGV system at the CTA has proven itself," owners HHLA told PS referring to the 45 automated guided vehicles already in service at Altenwerder. "The figures speak for themselves," the firm says.

City-owned HHLA, Hamburg's biggest port operating firm, holds 74.9% of the shares in CTA while the other 25.1% is in the hands German line Hapag-Lloyd - a unique dedicated terminal involvement permit for a Hamburg city-owned facility.

The CTA was inaugurated in October 2002. After last year's performance, the 79ha site now expects to turn round 1.3-1.4m TEUs this year. When construction is completed, 14 container cranes will operate along the 1,400 metre-long Ballinkai quayside and serve four berths and big container ships simultaneously.

At the start of 2005 HHLA says it will have 55 AGVs in service which will be close to the 60 planned originally. The terminal does not deploy Automatic Stacking Cranes (ASC). The diesel-hydraulic, rubber-wheeled AGVs are from Gottwald Port Technology in Düsseldorf. The units, which weigh 25 tons, move containers from the bridge cranes on Ballinkai to the stacking blocks and are controlled by electronic transponder sensors embedded in the ground. They are said to have a positioning accuracy of plus/minus 3 cms.

The operational area between cranes and stacks is 100 metres wide and completely out of bounds to terminal personnel. The AGVs can carry 2 x 30 tons at a straight-ahead speed of 21 kms/hour – either a single 40 ft or 45 ft container or two 20 footers. Engine capacity is 257 kW (350 hp) and even refuelling is automatic – carried out by means of a robot refuelling vehicle.

Asked if the AGVs were working without problems and if they were cost effective enough to have a future at all on container terminals, HHLA says: "The application possibilities of the AGVs are significantly greater than those of conventional portal crane vehicles. AGVs are well-proven and very high performance vehicles which are very suitable for horizontal transport at container terminals", the company adds.

Clearly confident in the technology, HHLA is now planning more of the same. "The profitability of the CTA has been clearly demonstrated", it says. "Further expansion of the terminal along the same lines as now, is currently being planned".

However that confidence appeared less certain in 2002 when comment prior to CTA inauguration was not quite as glowing as it is now. Teeth were being gnashed and the political and PR impact of the introduction of the much-publicised terminal was eroded by a series of unforeseen computer software teething problems which delayed inauguration at least three times, and by months, and played havoc with timetables and schedules.

ECT's Gelderland: AGV/ASC economics and productivity "excellent"

Even after it went into service, local media were quick to report initial criticism from some terminal users and carriers frustrated by computer and other problems. The media quoted some customers as complaining about computer-motivated shipside loading and unloading problems and also about truck handling delays at the terminal. Planners and customers alike had expected glitches in the state-of-the art technology and experts had set aside months for trial and ship testing, but the initial problems clearly lasted longer than most people had anticipated. As one Hamburg official put it at the time: "We are entering completely new technological territory".

HHLA however told *PS* the problems have now been "largely overcome" and its impressive handling rates now point to what the company describes as unique advantages of AGV operation. "In semi-automatic transport operation between container bridge cranes, CTA has achieved a degree of automation with its specially designed software which is unique in the world", the firm says. It adds that "the ultra-modern control system organises almost every aspect of unloading, interim storage and on-transport of containers".

Reprinted from July/August 2004 issue of Port Strategy

Currently supporting the central AGV operation are nine Chinese semi-automatic 80 metre high 2Katz Post-Panamax container bridge cranes and a feeder bridge on three current berths, the third of which went into service just in March.

In August the last four container cranes will arrive from China. They are the biggest terminal gantry cranes in operation anywhere - 80 metre high units built by ZPMC in Shanghai, with outreaches spanning 22 rows of on-board containers.

CTA has 16 container stacking blocks on site – each 10 containers wide, 37 slots long and up to five boxes high – and by the end of 2004 or the start of 2005 there will be 22 such stacks. Each stack is served by automatically-operated, double-rail mounted gantry cranes (DRMGs) - a pair of them both rail-mounted, for each block. Each serves containers independently of the other.

100 MOVEMENTS AN HOUR

In March this year the terminal's AGVs coped with Hapag-Lloyd's 100,000 dwt SHANGHAI EXPRESS with a capacity of 7,500 TEUs, and recorded more than 100 movements an hour for the first time since the terminal was inaugurated. Inside 40 hours, four container bridge cranes notched up a total 4,150 movements.

In April CTA, which has also invested heavily in speeding up truck handling, marked another record when it handled more than 1,825 trucks and 810 rail containers in a day. A second truck gate was opened in November 2003 and CTA is now regularly handling up to 1,800 trucks daily. This is all a long way from some of the criticism levelled at them in the days leading up to and following the troubled inauguration.

On the trucking front local media quoted one company operations manager as saying there were still problems with offloading and that he would be happy to get a consistent ten moves an hour while 20-25 moves were standard. CTA's own target at that time – this less than two years ago - was 40-50 movements an hour. The critic quoted in 2002 was also quoted as saying he dreaded what would happen if ships of the SHANGHAI EXPRESS generation ever called for simultaneous handling. The terminal's March movements will hopefully have doused these fears.

HHLA's Olaf Mager, who kept this correspondent well abreast of teething problems at the CTA during the inaugural year, says the blips would iron themselves out as productivity improved. He says the malfunctions which took place in 2002 were inevitable given the complexity and newness of the CTA's technology. That appears to have been the case, given the claims now being made for the terminal and news of its future expansion.

SIMILAR EXPERIENCES AT DELTA

Hutchison Port Holdings (HPH) group member Europe Container Terminals (ECT) in Rotterdam is among very few other facilities which have been involved with AGVs and ASCs for some time. Its experience is close to, and has a lot in common with, Altenwerder's.

ECT says it is continuing to expand AGV activity at its big Delta Terminal and lists 183 AGVs in operation as of 2003 along with 99 ASCs. "The value of the AGV and the ASC has proven itself", ECT director of operations Jan Gelderland maintains, echoing Altenwerder's satisfaction with the new technology. Gelderland says all the current expansion at Delta would be achieved by using existing AGV and ASC operating systems and building on them.

AGVs were first introduced at Rotterdam in 1990 on the Maasvlakte and were also from Gottwald which, incidentally, reports

Container cranes and AGVs at Hamburg's new CTA: expansion plans being mulled

that it has to date delivered more than 260 AGVs to both ECT and CTA. Gelderland says: "We will continue to grow in steps and we are presently increasing capacity with six container cranes and all the related ASCs and AGVs."

ECT ordered six more ASCs last December and 11 more have just been booked from Kalmar. The company will reportedly have 120 ASCs in operation at its Rotterdam terminals by April next year. The latest units are similar to previous units delivered recently to ECT by Kalmar in that they are capable of stacking 1 over 4 high and 6 containers wide.

INITIAL SOFTWARE HICCUPS

Rotterdam, like Hamburg, acknowledges that its automated progress has not been achieved without initial technological hiccups. Delta's teething problems with the new technology also involved software, Gelderland admits, and had concerned system connectivity and the "co-ordination and inter-relation between the various types of software and hardware."

Sharing the German viewpoint again however, Gelderland indicates initial teething problems were inevitable with such automated systems and stresses they had to be sorted out "at the start".

German media reports say about half of the €650m cost of the CTA went into its modern technology. HHLA would not confirm this and in Rotterdam Gelderland was also not prepared to say what it had cost ECT to bring in the new automatic technology. He did however indicate that, like Altenwerder, he thought AGV and ASC technology had paid off handsomely concluding: "The economics and the productivity of the units is excellent." PS

Teething troubles, but big ships now no problem at CTA

www.gottwald.com

Area = 140,000 m². Accuracy = within 3 cm.

Accuracy is a key factor at the Container-Terminal Altenwerder in Hamburg. And this is guaranteed to a large extent by the Automated Guided Vehicles (AGVs) supplied by Gottwald. No less than 45 Gottwald AGVs are in operation at this, the most advanced, handling terminal in the world on an area measuring 100 x 1,400 m, moving containers between quay and stackyard. Fully automatically, accurately and fast. Guided by transponders and controlled by Gottwald's software for the job orders, travel direction, speed, fuel tank level – all with pinpoint accuracy. Gottwald's AGVs approach the gantries and park to within 3 cm, ready to collect their load.

As the world's only supplier of complete fleets of AGVs, Gottwald Port Technology has more than 250 of these vehicles in operation worldwide and is the preferred supplier in this field of consulting, hardware, software and after-sales services. Make contact with precision port technology – make contact with Gottwald.

Gottwald Port Technology GmbH: Postfach 18 03 43 • 40570 Düsseldorf, Germany
Phone: +49 211 7102-0 • Fax: +49 211 7102-3744 • info@gottwald.com • www.gottwald.com

GOTTWALD
port technology