



Productivity Plus Programme

3P

What's in 3P?

The 3P project encompasses capital and civil works and a large amount of process re-engineering. The three key elements in 3P are improved stacking capacity, improved handling capacity and improved yard operations.

To increase stacking capacity in the yard area, HIT acquired new rail mounted gantry cranes (RMGs) and increased the stacking height of some existing rubber tyred gantry cranes (RTGs) from one over four to one over five containers. New quay cranes were purchased to increase container handling capacity at the quay side. HIT has also utilized new information technology, known as the 3P system, to improve yard operations to accommodate the changing demands of customers and increase overall productivity.

The 3P system is a state-of-the-art system delivering a fully integrated solution to handle HIT's business requirements and to enhance and support yard operations. The system is delivered by a 3-tier Client/ Server Architecture, deploying the Tuxedo Transaction Monitor (the middle layer) and the Oracle Relational Database Management System (the server layer), with fully integrated sub-systems and multiple levels of resilience and replicate systems. The system is running on HP 9000 series UNIX with 10 CPUs.



Hongkong International Terminals Limited (HIT) is the leading container terminal operator in Hong Kong and handles about 60% of the total throughput processed at the Kwai Chung Container Port. Running 24 hours a day and 364 days a year, HIT operates ten berths at its wholly owned terminals 4, 6 and 7, and another two berths through its 50-50 joint venture with China Ocean Shipping Co. (COSCO) at terminal 8 East. To cope with the challenge of increasing container throughput and maintaining Hong Kong as the world's leading port, HIT invested HK\$1.5 billion in its Productivity Plus Programme (3P) in 1994. The primary objective of the programme was to increase productivity in the terminals by 30%, and overcome throughput constraints before they arise.

The 3P system includes the following sub-systems to support planning, operations and monitoring of the whole terminal:

Automated Grounding Strategy: New container grounding rules were developed to determine the best grounding locations and allow the stacking of containers to a higher density while maintaining an efficient yard operation.

Movement Scheduling: The Movement Scheduler was designed to optimize the mode of operation through a better synchronization of container moves to be executed by the different types of equipment within the yard.

Internal Tractor Deployment: The new system synchronizes the internal tractor activities with quay crane and yard crane activities to fully utilize each piece of equipment. Also the implementation of an in-house paging system helps to maximize assignment of work to internal tractors.

External Tractor Handling: The implementation of an advanced interactive voice response system together with automation in gate areas provides greater gate efficiency, faster tractor turnaround time and improved security.

Other sub-systems include:

Container Inventory

Gate-house Operations

Data Radio Network

Operation Monitoring

Terminal Operation Planning

Ship Planning

Crane Working Programme



Reaping the golden harvest

The 3P system was implemented in three phases. A pilot was run on a small section of the HIT yard in mid-June 1996 and was expanded to its Terminal 4 a week later. The major cutover took place on 2 September 1996.

It was not long after the implementation of 3P that HIT attained a considerable increase in productivity.

Greater Throughput Capacity

Measuring the rate at which vessels can be loaded and unloaded is one of the ways to measure productivity. The faster the loading and unloading rate, the more vessels can be served and the greater the total throughput can be achieved and of course is a key element of customer service. With the addition of three new quay cranes and technology advances in operations, the average performance for quay cranes has increased over 30% only six months after the implementation of 3P. This improvement is equivalent to adding three more berths to HIT's facilities.



Increased Productivity Per Land Area

Productivity improvement in yard operations has been achieved with 3P supporting the increases in container handling capacity both at the quay side and at the gates.



The stacking height of containers was increased in some areas from four to five by extending some of the existing RTGs and from four to six with the new RMGs. The overall stacking capacity has

been increased 10 to 15 per cent which is equivalent to the adding of 14 hectares of land to the yard, so utilising the existing yard area more effectively.

Greater Efficiency means Better Customer Services

Another measure of productivity is the turnaround time for tractor drivers delivering or collecting containers from the terminal. Any reduction in turnaround time will enable servicing of more tractors, which also increases the container handling capacity. With tedious manual processes being replaced by automatic procedures in 3P, the turnaround time was initially reduced by over 20 per cent and significant manpower was released to concentrate on providing better customer services instead.



Computerworld Smithsonian Awards

Limited Outage Time

System failures occurring in container terminal operations could affect traffic flows and delay the shipping schedules. With the implementation of 3P, the maximum system outage time is limited to 10 minutes. With such highly resilient and stable system environment, any interruption can simply be absorbed within the yard to avoid traffic congestion and any impact to the ship operations can be minimized.



Reduce Traffic Congestion and Other Benefits

As Hong Kong is a small place with very high traffic volumes particularly at the port areas, any disruption to terminal operations can have a severe impact on the traffic flows. With its high availability design and the quicker turnarounds, 3P helps to minimize traffic congestion on public road networks. Moreover, as the Kwai Chung Container Port in Hong Kong is located closely to densely populated residential areas, the use of electrically-run RMGs is quieter, cleaner and more environmental friendly.

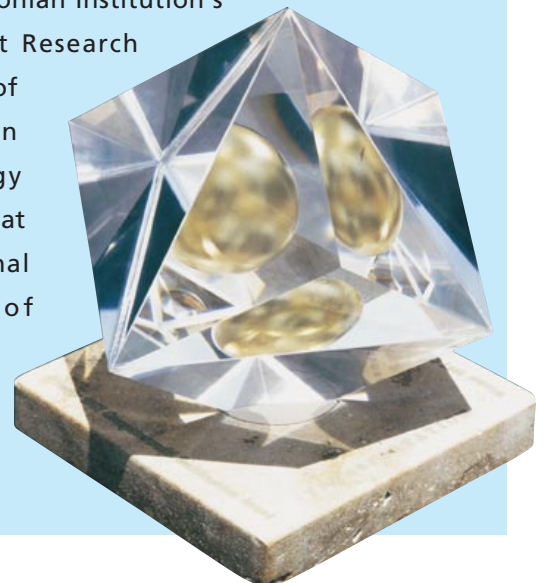


The 3P project not only boosted HIT's productivity by over 30%, it has also earned HIT the 1997 Computerworld Smithsonian Award. HIT is the first Asian winner to be awarded for their visionary use of information technology in the Transportation category.

The Computerworld Smithsonian Awards recognize first and foremost benefits to society brought by innovative applications of technology. The 3P project, together with the work of all the 1997 nominees were formally presented to the Smithsonian Institution and become part of the Smithsonian Institution's

Permanent Research

Collection of Information Technology Innovation at the National Museum of American History.



Future Development

Riding on its success, 3P has been proved as a symbol of quality improvement. No wonder the Port of Felixstowe, a wholly owned subsidiary of Hutchison Port Holdings (HPH), which is the largest container port in the UK, has announced its own Productivity Plus Programme in August 1997.

The success of 3P provides a new challenge to HIT to apply the system to other container terminals within the HPH group. Over time, HIT, through its parent company HPH, will seek to implement the developed solution in ports around the world. There are also opportunities within Hong Kong at the new Terminal 9, and perhaps the River Trade Terminal which HPH is a leading shareholder.

The Productivity Plus Programme is yet another example of HIT's commitment to innovation and to provide the highest levels of customer service. Efficiency improvements and the application of new technology are intended to provide our customers, whether they are shipowners, shippers, or tractor drivers, with the best possible care and attention from HIT.



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