

Port of Portland

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General Superintendent of Marine
Equipment Maintenance,
Port of Portland

Port of Portland Marine Maintenance Department Incorporates Avantis Solution

by Invensys Operations Management

Goals

- Move cargo expeditiously to provide cargo-handling services that enhance customers productivity in distributing goods;
- Provide high-quality service with great cost efficiency in order to maximize the business benefit to the Port of Portland.

Challenges

- Locate a single system that can handle the marine facilities and equipment maintenance department’s immediate needs and add dredging operations management and aviation facilities maintenance at Portland International Airport (PDX) in the future.

Solutions and Products

- Avantis Asset Management.

Results

- Streamlined operations to continue to move more than 30 million tons of cargo through port facilities every year;
- Reducing inventory in both the electric shop and the equipment shop by at least 65%;
- Improved tracking: port departments can now monitor the time it takes for someone to go out and do a maintenance or repair job;
- PM changes have saved a quarter of a million dollars in the first year.

Portland, Oregon – The Port of Portland was commissioned in 1891 to deepen and maintain the Columbia River navigation channel westward to the Pacific Ocean in order to provide safe passage for oceangoing ships bringing goods in from around the world and for exporting agricultural products from the West and Midwest.

The port's responsibilities and assets include terminals, four airports, and seven business parks along the Columbia and Willamette rivers. There are 50 piers, wharves, and docks at the port's five public terminals.

Combined with the private marine facilities in the Portland harbor, Portland is now the largest wheat export port in the U.S., the third largest export tonnage port on the West Coast, and the largest volume handler of automobiles (imports and exports) on the West Coast. Its container handling volume is 14th largest in the nation.

Client Challenge

Management at the Port of Portland had a little problem. The Marine Maintenance Department had been using three separate management systems, all of which were standalone. One was a COBOL-based system, the second was designed originally for over-the-road trucking, and the third was a homegrown system.

Taken together, all three systems didn't exactly fit with the container cranes, tractors, paving equipment, dredging barges, reach stackers, and railroad tracks they used every day to move more than 30 million tons of cargo through port facilities every year.

Port management decided to take the opportunity to research available computerized maintenance management systems (CMMS) and enterprise asset management (EAM) systems.

Their goal was to find a single system that could handle immediate needs in the marine facilities and equipment maintenance departments as well as be able to add dredging operations management and aviation facilities maintenance at Portland International Airport (PDX) in the future.

A team that included representatives from the IT, marine facilities and equipment maintenance, and purchasing departments reviewed requests for

proposal responses from as many as twelve suppliers. They selected the Avantis solution from Invensys.

Robert Maracle, General Superintendent of Marine Equipment Maintenance, said: *"Efficient operation of the port facilities is critical for two reasons. First, we need to be able to move a lot of cargo expeditiously in order to provide cargo-handling services that enhance our customers' productivity in distributing goods. Second, we need to be able to provide high-quality service with great cost efficiency in order to maximize the business benefit to the Port of Portland. Using a powerful toolset like the Avantis solution, we now have the ability to manage infrastructure maintenance in such a way that we're making the best use of our physical assets — and we're providing a growth path that can allow us to use one central set of enterprise applications to service our EAM needs for such a diverse array of facilities."*

Port of Portland staff worked with an EAM consulting firm to develop overall plans for the system. Planning was critical, Maracle noted, because no computing system could ever be efficient without the application requirements being well defined. Only then, given the ability to tailor the software to the application requirements, could computerized maintenance and asset management systems do the job.

According to Maracle, *"We spent a considerable amount of time designing and building the foundation of our hierarchy structure, which has never been changed. It has worked extremely well for us. I can't emphasize enough the value of planning, designing and thinking your way through some of these things ahead of time. It really pays off because you end up with something that you can put to work with confidence. You don't have to keep fixing it. It's well organized."*

In-House Implementation Project

The staff did all its own planning input, using three teams representing maintenance, inventory, and purchasing. They built the whole system on a theoretical basis in a conference room pilot (CRP) program, creating most of the asset hierarchies in an Access database, for subsequent transfer into the Avantis solution.

Working on it for five solid weeks, 10-12 hours a day, they ended up with a list that was about 6,000 lines long and about 20 columns wide.

The Avantis solution provides the features that let port management tie together operations that are diverse in type and geography. It uses the 'entity' concept to facilitate recording of costing and maintenance activity records for anything users wish to track. 'Parent-child' relationships can be set up easily to build hierarchies for cost rollups and operating statistics. Work management features ensure that maintenance personnel have control of incoming work, while providing a flexible way to track work in progress. Planning functions include information on labor, materials, tools, drawings and instructions, and subcontractor requirements, and this detail can be included on work orders. Preventive maintenance (PM) functions can be structured in libraries of standard jobs with automatic work order generation, inspection checklists, and PM routine specs.

Using the detailed history of equipment information that is developed via day-to-day activities, supervisors can analyze failure histories, track failure causes, and take action accordingly. Maintenance parts inventories can be better managed, especially when dealing with large numbers of unique and low unit value items that can often be subject to unpredictable demand. Workflow can be better planned and purchasing and procurement functions can be tied directly into maintenance programs.

New Data Input and Trending

The Port of Portland runs a weekly schedule for the electric and equipment shops. These runs are tied in with the inventory and purchasing systems as well.

Port staff is now in the process of reducing inventory in both the electric shop and the equipment shop by at least 65%. More parts are now ordered for just-in-time delivery — and a key to achieving this was identifying replenishment levels so that only as many parts were purchased as were needed.



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"Our purchasing people love automatic replenishment because they can now simply press a key and generate a purchase order for everything that's on the list. We're now more efficient about identifying replenishment groups as well, and it has reduced our inventory by significant amounts, which translates into major savings," said Maracle.

The new system's versatility lets each department handle similar tasks differently. In facilities maintenance, for example, data templates are used for posting employee time cards, while bar codes are used to enter time data in the electrical shop.

The new system now permits port departments to actually track the time it takes for someone to go out and do maintenance and repairs. In the old equipment shop system, only one 'employee' was identified, as number 9998. When supervisors went to a work order to see what was done and who performed the work, it was always number 9998. There was no accountability, a problem that has plagued this work force for years.

According to Maracle, "That's all changed in Avantis. We identify every employee in the shop and everything that they work on. Our identity structure is quite detailed and it allows us to look at all data related to a piece of equipment and spot trends to discover what kinds of problems we're having. We've identified entities right down to engine components, transmissions, and tires."

Realizing Potential Savings

When Port of Portland staff set up new preventive maintenance programs within the Avantis solution, they were able to do some things that they weren't able to do in the past.

Handling PM on container cranes represented a huge expense in the past because each crane was serviced in total for every PM. Today's new generation of cranes has indicators that tell exactly how many hours each drive motor has actually run, as a percentage of the crane 'on' hours.

"Environmental issues are a major concern here at the port and we've cut down the waste volume of the oil and filters that we have to dispose of. The beauty of the system is that we have the information we need to review trends like this," said Maracle. *"We can retrieve any data that's been input and can slice and dice it any way we want in order to do theoretical planning. This is something I now use every day."*

Success Reflected in ROI

While the crane PM changes have already saved a quarter of a million dollars in the first year, they are just one measurement of return on investment for Port of Portland staff.

"The whole project ended up costing us about \$2.1 million, which was about 8% over our projected budget for the entire project. But we've more than made that back in ROI already, so the project has paid for itself," Maracle commented.

Work procedures in general are much more efficient now, which is reflected as much in work that's not being done as it is in how people do their work.

"We have a much better analytical tool to examine our procedures, so we're no longer doing PM on stupid things like bathroom fans anymore. We figured in some cases it would be more effective if we just let things fail," said Maracle. *"Sometimes you can buy a brand-new piece of equipment and still be ahead of the game, just because of the money we didn't spend on PM. We were only able to cull out a lot of that stuff by using Avantis."*

Beyond these initial applications, other departments within the Port of Portland are now looking at how they might use the Avantis solution.

The engineering department is looking at it as a replacement for a project management system, since the hierarchical structure approach would let them treat each engineering project as an entity unto itself. Airport maintenance at PDX is currently based on an outmoded DOS based system, and those operational functions are on the verge of being transitioned to the Avantis solution.

River dredging projects may soon be treated as entities within the Avantis solution, with work orders opened for each project and tasks opened within the work orders.

Maracle added, *"The EAM system has been so successful that we now get requests for visits and demonstrations from other port facilities around the country that are looking for a system that will help them achieve the same benefits."*

*This document was realized thanks to the support of:
Robert Maracle, General Superintendent of Marine Equipment
Maintenance, Port of Portland.*