

# PERCEPTION©

## Typical Benefits for the Shipbuilder

SPAR's PERCEPTION system links and integrates information across most business areas of the shipyard: cost estimating; planning and scheduling;; work orders and time charge management; purchasing and material control; and cost/schedule/progress reporting and forecasting. The system's earned value reporting functions have a long history of providing clear and concise reports to management on a regular and reliable basis (typically weekly, although daily progress reporting is often done as well.)

The primary benefit for earned value progress and performance reporting is that management is continually notified of actual progress, costs and schedules as well as forecasts of final costs and schedules for the ends of contracts. Performance reports are generated not only by a contract's work breakdown structure, but also by each work center of production work center. Early notice of cost and schedule problems allows management early opportunities to fix the problems before they jeopardize contracts and adversely impact later stage work efforts. These reports keep production on track, minimize rework, and help avoid the added costs when delays cause early stage work to be performed at the more expensive later stage phases of work.

**It is undoubtedly true that you can't improve it if you can't measure it.**

The following are actual examples of where PERCEPTION has provided shipyards with measurable benefits:

### **1. Catching Production Problems Early Before They Become a Serious Impact on a Contract.**

An East Coast Canadian shipbuilder had undertaken a contract to build a coastal product carrier. Early in the contract, the system began reporting rather significant cost problems with steel assembly operations. These problems became so serious that management wanted a thorough investigation. An interview with the steel assembly shop revealed that they had to reject and rework a fair number of steel parts that were being delivered to the assembly shop from the fabrication shop. What was revealed was that the numerical control (NC) codes being provided the fab shop were in error, but the problems were not

being relayed back to engineering. Once engineering was appraised of the problem, these errors were eliminated and the steel assembly operations became back on track.

This is a good example of how an early warning system like PERCEPTION can play a significant role in a successful management of contracts. Without that early warning reporting, problems can fester. What may start out as an ignored minor problem can quickly become so serious that an entire contract may be in jeopardy. Small problems also can create ripple effect larger problems for work scheduled further down the line. Any delays caused by production problems or unavailable material to work scheduled for early stages of construction may require that work to be performed at much less productive stages. For example work planned for on-block that is delayed later for on-board will increase labor costs by as much as 3-5 times.

## **2. Monitoring & Reducing Overhead Costs.**

Another East Coast Canadian shipbuilder was having worries about its cost of overhead activities. Their accounting system was not capable of tracking these costs in a meaningful way. The general manager noted that the level of these expenses amounted to what could be building a large tug boat on spec. So, he decided to put these activities under the control and earned value reporting features of the PERCEPTION system. Since PERCEPTION allows multiple work breakdown structures, the shipyard set one up especially for activities like repairs and maintenance of facilities and equipment; meetings and personnel private affairs; etc. At the end of that year, the shipyard management was amazed at what costs were being consumed that really were not necessary. For example, the cost of repairs to old and obsolete equipment easily was justification for replacement and a very reasonable return on investment. Excessive meetings were eliminated and many other overhead issues were successfully addressed to minimize their costs to the shipyard. The total labor hours saved amounted to 70,000 each year.

## **3. How Good Are PERCEPTION's Earned Value Assessment Features?**

Within the PERCEPTION system's Earned Value features is a continuous tracking and reporting of Estimates At Completion (EACs) at each level of the project Work Breakdown Structure (WBS). The system develops EACs based upon the earned value of the work being performed. The earned value, by definition, is the percentage of a budget corresponding to the increment of work completed. That percentage also is the reported progress, which can be entered either as a manually determined value. However, PERCEPTION also generates an automated progress assessment based on how well or poorly actual labor hours have

been performing relative to their budgets. Very early in the project, when actual costs exceed budgets, the system only hints at cost and progress problems, but as the project gets further underway, these problems become much more evident and are reported as such. A similar process is used when work is under-running; the system only hints that there will be a likely under-run overall for the project. Then as the project gets further underway and if the under-runs continue, the system will provide a greater cost savings in its EACs.

An example of how the system actually performs was evident at a West Coast Canadian shipbuilder when PERCEPTION was first installed at that facility. After only a few weeks into a new contract, the shipyard general manager called SPAR insisting that the PERCEPTION EAC for steel work was way off the mark. The shipyard had earlier established a total steel work budget of 100,000 labor hours, but the first few structural units were being completed considerably under their work order budgets. The general manager's own EAC at that early stage of the contract was for steel work to not exceed more than 70,000 hours, his manual forecast of 30% savings. His complaint was that the system was reporting an EAC of 95,000 hours, which he decided was much too high. SPAR suggested that the shipbuilder continue using the system and track its reported EACs week by week. Eventually the work then entered into more difficult structural assemblies, the cost savings began to disappear, and the manager's EACs began to climb accordingly as did the PERCEPTION system's EACs, but much more gently. The total hours expended when the steel work was complete was 110,000 hours, an over-run of 10%.

The problem most humans have is that when events are good, there is a tendency to celebrate too early and assume the rest of the day will exhibit the same level of success. However, this is a very risky assumption when success is measured on a very small limited experience. Too much celebrating also tends to let one's eye off the ball, when a more careful management of one's resources most often promises better success.

#### **4. Improving Contract Progress Assessments for Better Financial Management.**

One U.S. shipbuilder in the North East U.S. had difficulties satisfying their bank as to their claims for progress payments. Using their manual progress assessments just did not immediately satisfy the bank, who required time-consuming audits of work accomplished in their on-going contracts. In time, after using the PERCEPTION system, the bank became so convinced that the automated progress assessments reported by the system were far more accurate and reliable than any of their earlier manual assessments provided by the

shipbuilder. This shipbuilder now submits the Perception Progress report to the bank monthly as support for their progress payments.

#### **5. Moving Budgets Around Can Create Some Interesting Effects On Reported Progress.**

After a project gets under way, there is a realization that the budgets set for various elements of the project WBS may not correlate very well with the scope of work for each element. For example, piping systems may be set with budgets that are too short, which joiner work may have more budget than is realistically going to be used.

One shipyard moved budgets around trying to re-set them more closely according to the scope of work that had become better understood than when the project was first put together. Unfortunately, the piping system suddenly was beset with a drop in progress, while the joiner work got a boost in their progress. Such changes become even more noticeable when the two work areas have significantly different earned values.

There needs to be a good measure of discipline in setting and maintaining budgets.

#### **6. Ship Repair Is More Difficult To Process Information Because Time Is Always Short.**

While new construction is typified by careful planning and scheduling, ship repair is not. Ship owners need quick turn-around of their vessels in order to minimize down time from their scheduled routes. This places considerable pressure upon the repair yard to respond quickly to the ship owner's request for quotes usually on short notice. Once the contract has been awarded, the yard is put under more pressure to perform the committed scope of work, and often more from change orders, within the time frame set by the ship owner.

There are three very important stages of the ship repair business:

- i. Produce the cost estimate and do this as quickly and as accurately as physically possible
- ii. Produce the production orders as quickly as possible
- iii. Produce the customer invoice as quickly as possible before the ship leaves the yard.

PERCEPTION provides features for generating a good estimate quickly then automating the contents of the estimate into preliminary production work orders and material requisitions for purchasing.

## **7. Monitoring the Performance of the Individual Shops within the Organization.**

An East Coast US shipyard was having difficulty understanding why the throughput of one of their panel lines was dropping. They performed many test but found that the equipment was operating to specification. Using the Cost Performance Indices for this work center, calculated by the PERCEPTION software, they tied the sudden drop in throughput to a specific date. They then analyzed the time charges from that date forward and found the shop foreman, who was hired about the same time, was taking this specific panel line crew to lunch 2 or 3 times a week where they consumed alcohol. This resulted in poor performance by the panel line crew on these specific days. Needless to say, the foreman was fired.

## **8. Monitoring The Inventory And Cycle Counts.**

A Mid-West US shipyard did not understand why the usage of some of their consumables was increasing. They added these items to their PERCEPTION Parts Catalog and started tracking the purchases and production withdraws. They soon discovered that once a month a particular shop foreman was withdrawing a large quantity from the storeroom during the evening shift. The material was later discovered at a local hardware store, which was owned by a family member.



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