ImpactECS Client Success Story

About Pratt & Whitney Canada

Year Founded
2000

Annual Revenues
$602 Million

Industry
Aircraft Manufacturing

Headquarters
Longueuil, PQ Canada

Object Technology Opens New Costing Horizons For Pratt & Whitney Canada

"Our manufacturing costs were killing us," says Claude Lévesque, manager costing operations at Pratt and Whitney Canada. "We knew that we had to reduce them, but first we had to determine what they actually were." Lévesque describes a typical problem for the manufacturer still using traditional "standard costing" systems that allocate large pieces of overhead to production processes, and bury essential elements of manufacturing cost. These systems not only create incorrect costs; they don't provide the costing accuracy or detail needed in today's hotly competitive business environment. It's time for a paradigm shift in costing methodology; one that measures actual costs by manufacturing process, by product, by customer, or by any other attribute that will lead to more knowledgeable management action. That paradigm shift is well under way at Pratt and Whitney, Canada.

The Canadian Operation of Pratt and Whitney leads the world in the design and production of small and medium gas turbine engines for business aircraft, helicopters, regional transportation, military trainers, utility aircraft, auxiliary power units, and industrial and marine applications. However, until recently, this company of 6000 people, in five manufacturing plants, still relied on traditional costing methods. "We needed to develop far more cost wisdom than was enabled by our traditional standard cost system," adds Lévesque.

The five P&W plants each house different manufacturing functions — engineering (Montreal and Toronto), assembly and test (Montreal, Ledbridge and Toronto), and final parts manufacture (Halifax and Montreal). Thousands of parts and hundreds of manufacturing processes go into making the seven families of Pratt and Whitney engines. P&W parts are sold as spares as well. "We do a very large spare parts business," says Lévesque, an industrial engineer with a masters degree in accounting. "But even the parts business is competitive, since many independent suppliers now sell replacement parts for our engines." Finding a way to identify actual manufacturing cost by every part and progressively roll up the costs into subassemblies, assemblies and engines seemed virtually impossible. "We needed a whole new type of costing software package," says Lévesque. "One made for complex manufacturing, with enough calculation scope to model each manufacturing process in detail, and with sufficient flexibility to accurately accumulate manufacturing costs right through to finished engine."

Objects To The Rescue

The search led the team to review and ultimately select the "Impact:3C" object-based costing software from 3C Software, in Atlanta, GA. "The architecture of most cost accounting software systems used today was created 20 or more years ago," says Peter Tezza, founder and CEO of 3C Software, and a pioneer in costing software technology. "We formed 3C Software to bring cost accounting applications to the same technology level as other distributed information software found in the many manufacturing companies," adds Tezza. "We've done that with the Impact:3C package."

Impact:3C is object-oriented costing software that provides great flexibility in its application. "We didn't have to fit into any fixed template," adds Lévesque. That was very important to us in the software selection." He offers the analogy of a word processor that lets you assemble the words you desire, rather than use a system that provides a fixed set of words from which you must choose. "We wanted to use our own words," he adds.

Developed in compliance with Microsoft standards, the software runs on the Windows 95/98/NT platforms, and provides a familiar, user-friendly interface to Windows users. Its distributed, client-server architecture is fully open to other systems. "Cost data can come from many places, and the results sent to many places" says Lévesque. "So it's important that the costing software can easily communicate with other software systems."

The result is a new type of costing software, more accommodating in managing costs, a technology that provides quick overviews and easy drill-down capability to get to great levels of detail. Importantly, this new software technology is highly modular, providing great

flexibility - allowing companies to adopt their own costing methodology, tailor it to individual plants, and periodically update it as the manufacturing processes change.

“Giant Calculator” allows ABC Costing
The required costing detail called for huge calculation capability, which is provided by “CostTalk,” a powerful costing-engine. “CostTalk is like a giant calculator,” says Tezza, “equipped with all of the mathematical relations and calculations needed in designing a modern manufacturing costing system.” CostTalk allows plants to develop the right costing model for their processes and products, using their familiar Microsoft tools as well.

“Once we found the right software tool, we knew it was practical to implement Activity Based Costing (ABC) in our plants,” says Lévesque. ABC is a costing discipline used to correct the shortcomings in the over-generalized cost systems of the past. It is a means of directing an organization’s costs to the manufacturing activities that required those costs to be incurred.

“We had heard from other companies that ABC had evolved beyond the point of simply developing more accurate and relevant product, process, and service costs,” adds Lévesque. These firms had begun to use ABC to manage the drivers of production activity, and be the basis of major decisions on product lines, market segments and manufacturing processes. Pratt & Whitney looked to make a similar leap in company effectiveness. “Most ABC software derive their costs from the chart of accounts,” says Lévesque, “whereas the Impact:3C software derives its costs from the actual manufacturing process operation, making it uniquely suited for manufacturing companies.”

More than Just Accounting
To properly measure manufacturing costs, the P&W costing team studied the routing of each and every part as it passed through production, and assigned costs according to the true behavior of the process and its demand on company resources — direct and indirect (e.g. materials, machine usage, energy, inspection, documentation). “It’s far more than an accounting exercise,” says Lévesque. “We had to thoroughly understand each manufacturing process, in order to properly accumulate its actual costs as accurately and rationally as possible.”

Each process step (e.g. sandblasting, drilling, deburring), has a different set of rules for calculating its costs, and these rules are implemented in the CostTalk engine. The resulting calculation is then automatically defined as a software object, usable in subsequent manufacturing. Step by step, each object is rolled into downstream manufacturing processes, accumulating its measure of costs along the way, and its calculations packaged as a new intelligent object. “The intelligent objects allow us to exactly replicate the machining of every part made in the plant, says Lévesque. “They accumulate the cost calculations according to the model.” Hundreds of objects were defined for the many manufacturing and non-manufacturing processes. “Without the intelligent object technology, the job would have bordered on impossible, since we would have to write lines of software code for each and every manufacturing step,” he adds. The result is a tailored methodology for developing each level of manufacturing cost.

The sandblasting process quickly showed the merit of ABC costing. Traditionally, overhead was applied to the sandblasting process based on the number of hours of operation. However, the cost analysis revealed that the usage of sandblasting “beads” ñ from grains of sand to almost BB size — contributed far more to the cost than the operational hours. The specific part being processed (e.g. a pin, blade or washer) strongly influenced bead usage. Overhead was reapplied according to bead usage, and costs changed significantly. “For some parts, the old standard costs were off by 100% or more,” says Lévesque. Each process (grinding, deburring, sandblasting, etc.) has its own distinct methodology, resulting in tailored costing rules. Even development and depreciation costs are included in the final costs.

Lévesque provides an additional example of two manufactured parts; one is very small (a washer) and purchased then modified by P&W; one is very large (engine case) and made and tested in a running engine, a very expensive operation. The old standard costing practice used machine hours to allocate overhead, so if both parts had the same machine hours, they would get the same share of overhead, incorrectly burdening the washer with the same overhead as the engine. Now, each part carries just the direct costs and overhead that are expended in making that part.

The old way showed costs by department, while the new method reports cost by machine, which then translates easily to costs per part moving through the machine’s process. “The new activity-based costing is far more representative of true cost,” adds Lévesque, though it

requires a conceptual shift for most managers."

"We don't rely on the standard costs at all in developing the new costing," says Levesque. Costs are derived from purchased material plus each step in the manufacturing process. All of this is calculated by the Impact:3C software, in spite of the substantial Enterprise Resource Planning (ERP) system also installed in the company. "Most ERP systems don't provide the flexibility that comes from object-oriented technology. That's why they need to be supplemented with an object-oriented costing system," adds Lévesque.

To date, the costing team has completed the lowest costing level - i.e. the two parts plants in Halifax and Montreal. These plants represent the first steps in the manufacturing process (about 450 people in each). When all levels of manufacturing have been modeled, a cost rollup can be done from the lowest activity level (the parts plant) to the highest (assembly and test plants) resulting in a finished engine. (See Figure 1) The rollup functionality consists of the measures of facility, process, material and labor required to make a specific part on a specific machine. The present work covers 5 levels of the 12 level rollup.

Valuable Side Effects
The ABC costing also shows which machines are busy and which are underutilized. "The machine-utilization data turned out to be a valuable byproduct from the process," adds Lévesque. "In the middle of this exercise, I realized that we could get capacity utilization in addition to cost with a slight reconfiguration of the model." So they changed the costing model accordingly, since capacity utilization was such a valuable piece of information.

"Once we get all of the infrastructure costs assigned, we know what it costs us to have one hour of capacity for every machine. Knowing that, we can pinpoint used and unused capacity is for each manufacturing process." 'Unused cost' is calculated each month to determine where the unused capacity lies. Conversely, costs with little or no unused capacity show where the bottlenecks may be. "Our costing models follow in accordance with the Theory of Constraints," says Lévesque. "So every month we can tell where the bottlenecks and unused capacity reside." Yield per part may also be calculated using the unused capacity costing models. Yield calculation is accomplished automatically for each part and department. "This was a real breakthrough for us, using the costing system," says Lévesque.

Since the software will handle any numeric attributes, the team decided to use it to roll up engine weight as well. "Weight is a critical variable in aircraft engines," says Lévesque, "so why not use the costing software to calculate it."

To learn more about ImpactECS and discover how it can help your company produce results, call 800-226-2036 or visit us online at www.3csoftware.com.