



Empowering ERP Asset Management Solutions

Control your maintenance costs

*Align analytics, scheduling,
budgeting, warranty, and mobility
for maximum effect*

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Gone are the days when business was so good that maintenance cost management was off the radar. Economic headwinds have companies starting to rethink their cost control strategies.

Maintenance cost visibility and management is crucial, particularly in industries where a less than 10% swing in costs can mean the difference between surviving or not. Mining and oil and gas illustrate this point. Two years ago, platinum in South Africa was produced at \$800 per ounce and sold for \$2,400 per ounce. At the time, maintenance spending was not a concern because profitability was assured. Now, with suppressed commodities prices and out of control costs, platinum producers are getting \$810 per ounce. One mine has already been shut down as a consequence.

Traditional cost management practices are imprecise and reactive, sometimes creating vast unintended consequences. Indiscriminate maintenance cuts that save money in the short term can eventually cause more breakdowns and impact production, safety and compliance. These ballooning costs can ultimately affect the viability of the organization.

Because of this, maintenance professionals need to find new ways to save money, be guardians of the company's assets, and deliver revenue through asset optimization. They need to gain control of the assets to ensure fewer breakdowns and drive toward a more reliable plant.

Gaining control of maintenance costs is a team effort that requires effective tools and continuous process improvement. It requires the visibility afforded by aligning analytics, budgeting, scheduling, warranty, and mobility tools that operate together as a natural extension of the corporate financials and asset management systems (ERP/EAM), greatly simplifying cost management.

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This paper will summarize how to better control maintenance costs by:

- Recognizing how maintenance influences performance and profitability
- Properly prioritizing maintenance work
- Taking actions based on analytics
- Applying optimal budgeting strategies
- Ensuring effective planning and scheduling
- Ramping up warranty practices
- Incorporating mobility solutions
- Employing the right tools

The relationship between maintenance and profitability

All too often, companies look at maintenance as a cost center, but if the assets are not operational, no products or profit will be generated. In fact, every dollar spent on maintenance is a pure profit dollar lost.

When a company can't sell its product or get its price for the product, then the maintenance budget becomes more important and costs need to be better managed. Failure to do so can have severe consequences for the business and those in charge. In one instance, because a company overspent on a shutdown project by \$20 million, the shutdown manager was fired. Closer monitoring of costs can reveal opportunities to improve uptime, reduce unplanned work, and improve the organization's bottom line.

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Understand maintenance priorities

Given the impact of maintenance on profitability, heightened attention to maintenance priorities is essential. The Pareto principle, or 80-20 rule, implies that 20% of equipment consumes 80% of maintenance costs. The reality is often worse than this principle suggests. For many companies, less than 5% of critical assets are responsible for more than 80% of maintenance costs. Focusing the maintenance budget and effort on this 5% is necessary to effectively control costs.

Assigning asset criticality is the first step in keeping spending under control. This reliability focused effort establishes an understanding of what equipment has the greatest impact on production and costs. From there, steps can be taken to ensure that the work performed on the critical equipment is of a critical nature; that the PM schedule, PM operations and maintenance frequency are correct to ensure the most uptime; and that critical parts and spares are on hand when needed.

Indeed, criticality designations improve cost management at multiple levels, from making and managing budgets to work planning and scheduling, inventory management, and warranty management. However, to achieve the full benefits of criticality analysis, tools that leverage this valuable data are necessary.

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Tie in analytics

Once the priorities are established, specific challenges and opportunities can be isolated with key performance indicators (KPIs) and reporting analytics. Analytics allow

organizations to see if downtime events or maintenance costs are trending upward and affecting the bottom line, and to zero in on possible solutions.

Detailed reports identifying scheduling compliance or spending trends invite questions about maintenance programs and efficiency. For example, are consistent definitions of planned versus unplanned being utilized as a baseline? Root causes of overspending can also be assessed and corrected – whether it's changing operational processes, vendor choices, staffing strategies, or other practices.

Analytics also provide feedback to improve overall costs by measuring against the forecast and budget. The ultimate goal is to have predictive analytics allowing budgets to be built not based on last year's activity, but on what is occurring now and expected going forward.

Align the budgeting strategy

From the analytics insight, specific budgeting decisions can be made. For instance, if having an asset down for six hours costs \$80,000 in production losses, it may make sense to increase the maintenance budget tenfold if it will reduce the production loss by half. A correlation between the number of inspections performed and the number of failures on high criticality equipment can drive greater inspection funding. Reports that show PdM is reducing downtime can justify an expansion of this approach.

The maintenance organization tends to drive the budget except when profitability declines. Then, greater cost and budget control is needed and limits tend to be dictated from above. Once the framework is established, budgeting tools and strategies will influence how the costs are managed. Following are some examples.

Zero-based budgets

Zero-based budgets allow realistic costs to be forecasted based on historical PM data, with a cushion to cover non-routine costs. If \$90,000 was the average maintenance spend in recent years, and \$50,000 of that was for planned work and the balance was unplanned or corrective, then that would be the zero base for the next budget year. Reserve amounts would cover the non-routine (e.g., tank relining or railroad tie changeover) and corrective (e.g., breakdown) maintenance tasks, and a contingency cushion would account for cost inflation or overruns (e.g., labor or fuel).

Budget scenarios

Creating multiple budget scenarios gives management the ability to approve the optimal choice. Budget scenarios illustrate the impact of the various proposals, providing time to weigh the options and whether the risks are acceptable, and factoring that into the decision.

Budget revisions

Throughout the year, budget forecasts will be revised to reflect variations between the plans and actuals. Most companies update their forecasts quarterly, although some industries perform revisions more frequently. In mining, for example, budgets vary by commodity price. If gold is \$1,000/oz then the budget will be higher than it would be if gold dropped to \$900/oz.

Budget revisions provide a way to control operating spend, as actual business conditions will influence decisions on which maintenance plans to deactivate or add back to the schedule. Budgeting systems that support multiple revision scenarios ensure more thoughtful decisions.

Managing to the budget

The best budgeting systems provide a real-time view of where the money is spent as the jobs are completed, and any unexpected costs and breakdowns as they occur.

Budgeting systems bring visibility to maintenance costs and can prevent work plans that are unfunded or no longer needed from inadvertently being scheduled. A South Africa refinery wasted significant time and dollars when numerous maintenance plans were loaded by mistake. Because the plans were not validated or stopped, the work was scheduled and executed, causing the refinery to exceed its maintenance budget at a time when cuts were intended.

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Any spending issues should be escalated before the work is completed. Ideally, the ERP system will provide flags to warn when budgets are being exceeded or restrict the overage altogether, and some scheduling systems will notify the scheduler when the budget is running low. However, when there is no alignment between the job plan, schedule and budget, it makes it very difficult to determine the actual state for escalations.

If during the year the maintenance budget is cut or overspent, any reductions should be applied to nonessential tasks, as lowering spending on critical assets would increase risk and costs in the long run. A conveyor can be fed manually until it is fixed, or a project to sandblast and repaint rusting tanks may be delayed for a year, or an oil change frequency can be reduced.

Keeping management involved in the approval cycle and having the ability to roll up costs for finance increases visibility and accountability corporate wide.

Expect the unexpected

In a perfect world, one budget owner would have complete control over all costs charged to a budget, and anything beyond the original scope would have to be

approved by that owner. The reality is that multiple people can approve spending against a budget. Most companies escalate work approvals based on a dollar value, with higher amounts requiring sign-off by higher level approvers, and external commitments can be made without the budget owner's knowledge.

In some organizations, commitments can account for as much as half of the maintenance spend, and that rate will grow if the outsourcing trend continues. These service contracts and material purchases are not recorded until they become actuals, when it is too late to control the costs. Furthermore, vendors who sit on the invoices in order to make sales targets will delay cost recognition, further complicating budget management. Some companies are countering this by self-invoicing.

Drive revenue and manage costs with effective planning and scheduling

Now that the goals and budget strategies are aligned, work planning and scheduling comes into focus. To keep spending on budget, work plans and schedules must be carefully established, and adapted as circumstances change.

Planned work is always more cost effective than reactive, and even a marginal increase in planned work can produce massive savings. Best practices dictate that 80% of work is planned, because unplanned or corrective work is typically seven or eight times more expensive than planned work. In other words, a \$700-800 unplanned work order would have cost only \$100 if it were properly planned.

In best practice scheduling, at least half of the work is scheduled at least 30 days in advance to ensure the parts, tools, staff and contractors are available when needed. All costs on the work order (labor, material, contract time) reflect on the budget as planned spend, and as the work orders are completed, the actuals, too, are reflected. Scheduling practices also have the potential to drive revenue gains. Filtering schedules to focus on critical assets increases equipment availability, allowing more goods and revenue to be generated.

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Following are additional ways to improve work planning and scheduling and generate maintenance savings.

PM optimization

It is not possible or even necessary to ensure 100% uptime. If maximum production profitability is supported by 85% uptime, then an effective PM program will ensure sufficient maintenance is performed so that downtime does not exceed 15%.

In order for production reliability to improve and corrective maintenance costs to decrease, the PM strategy itself must improve, whether it's deploying a mobile solution or predictive technologies, eliminating walkdown inspections that provide little value, or hiring consultants to do reliability testing.

PM optimization begins by asking the right questions. Is the right work being done at the right time on the right assets? Putting higher emphasis on the most critical assets may increase the output that can be sold for a profit. Is the frequency of PM tasks optimal? Skipping one oil change day per year may save labor and material costs and prevent taking the equipment out of service, but it could eventually increase the risk of failure-induced downtime, which raises maintenance costs and reduces production.

Work order quality checks

Work order quality checks are effective for cost control because they improve job starts and compliance, and reduce operational risks. Specifically, they make sure the work is properly planned, because a poor description, incorrect hours or missing parts means the technician won't be able to complete the task, and their time will have been wasted when other priority work could have been accomplished.

Work order quality checks are also the last chance to determine whether the job still fits within the budget, so it can be blocked from the scheduling cycle or sent for a higher level of approval if needed.

Inventory optimization

For optimal inventory planning, criticality assignments are carried into the bills of materials (BOM) so those stock levels receive extra attention. This helps to minimize the desire of maintenance personnel to hide away critical spares for fear that they won't be in inventory when needed. During a cleanup at one company, \$400 million in stock value was found in drawers, under desks, and in offices for this reason.

For non-critical spares, a just-in-time approach is more efficient. Min/max thresholds and economic reorder points are useful for ensuring the inventory levels are correct and spending is focused on current needs. Sufficient lead time protects against higher prices for last minute purchases, and also supports scheduling compliance by ensuring the parts are available on time.

Resource optimization

Resource planning is another cost containment strategy, as improving utilization of resources can minimize overtime and contractor costs.

Best practices suggest having 80% FTE on staff and 20% contractors, although this ratio has moved in waves with the rise and ebb in outsourcing. Benefits costs are avoided with contractors, but they lack the long-term knowledge base of staff personnel, making them less effective and more costly in the long run. On the other

hand, it is too expensive to rely wholly on staff labor and more difficult to make cuts in a downturn. Mentoring and apprentice programs are recommended to balance the exodus of the aging workforce and influx of young recruits.

Improperly structured or managed manpower contracts are a source of high costs. If someone creates a purchase requisition for contract services and bypasses the maintenance work order, then the contractors' time is more difficult to manage and track. Setting up contracts in man hours instead of days eliminates confusion over whether 24-hour days or 8-hour days were intended. Leveling out the contractor requirements is another cost containment strategy.

A cost-effective contract cannot be negotiated without concrete requirements from the maintenance organization. The scheduling and management of contract resources should mirror the processes used with internal personnel to maximize their productivity.

Use warranties for more than just cost recovery

Another pillar of cost control is warranty tracking and management. The obvious goal of warranty tracking is to claim and get credit for in-warranty repairs in order to return the costs to the budget, but the greater benefit is in providing the ability to start eliminating warranties altogether.

In smaller companies, warranties are often ignored because the potential revenue is relatively small. In certain regions like the Middle East, even the largest organizations overlooked this earnings opportunity until relatively recently. The global economic slowdown forced more attention on warranties by companies across the board. On average, 3-5% of operational spend is returned with effective warranty management. For companies with a 7-8% profit margin, getting 5% of operational spend back in warranty recovery is especially significant.

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Far greater savings result from enabling companies to reassess how they choose, evaluate, and negotiate with suppliers. For example, a cable manufacturer is not as concerned about recovering the cost of a \$10,000 failed motor when \$400,000 in cable had to be thrown away because it caused production to shut down in the middle of a run. If an asset fails too often, the contract may not be renewed. If reliability is high, the procurement negotiator may be willing to increase the contract or pay more for it.

Save time and money with mobility

Also important to maintenance cost management is the efficiency of the mobile workforce. Increasingly sophisticated mobile solutions are generating hard dollar savings, higher compliance, greater communication throughout the organization, and benefits from real-time data input.

Maintenance planners can use mobile technology to scope and plan a job at the same time, while still in the field. Maintenance planners at a fertilizer producer are saving roughly 30 minutes per work order and improving the overall quality of work by using mobile devices to plan work orders, take pictures, and add notes and instructions.

Mobility allows the crafts to spend more time adding value and less time sitting at a computer terminal. It saves them from relying on memory or hand-written notes to enter (or have a clerk enter) high-quality, accurate work order or quality plan information later in a computer. Instead, the data is captured on the spot on a handheld device while the knowledge is still fresh. The savings can add up very quickly.

When a mobile device is brought to the job site, maintenance technicians have the supporting documents, drawings and instructions readily available, which improves safety, efficiency and job starts. In breakdown or emergency situations, a technician can see at a glance if the problem asset is categorized as critical and proactively create a work request or work order, attach pictures, request parts, and create alerts rather than waiting until later and possibly forgetting to do so. This real-time response expedites corrective action and shortens downtime by as much as a day.

Mobility also allows for more and better quality plan or maintenance plan inspections without adding additional staff. The information is more timely, for instance the immediate reporting of a leak. And, it assures a safer work environment with fewer breakdowns and less reactive work.

From a management standpoint, mobile solutions provide ready awareness of where each technician is physically, the progress on their workload, and how much of their work day is actually spent on wrench time. Too little wrench time is common but can be improved with the right tools and processes.

Inventory practices are also improved by mobility. Storeroom personnel performing cycle counts or picking parts for multiple work orders can log the information as they go, rather than writing it down and entering it in a computer later. The data is more current and accurate, which contributes to better assignment of min/max values and reorder points.

Choose the right tools

The potential for analytics, budgeting, scheduling, warranty management, and mobility to improve maintenance costs rides on the tools used. VIZIYA's WorkAlign product suite, a single-source solution, is a robust and tightly integrated portfolio that is unique in its functionality and ease of use. The VIZIYA WorkAlign suite integrates with all of the leading maintenance systems in real time – including Oracle eAM, JDE CAM, Peoplesoft CAM, SAP PM, IBM Maximo, Infor, and EMPAC.

The potential to improve maintenance costs rides on the tools used.

- **WorkAlign Analytics** calculates and presents crucial metrics, allowing companies to monitor progress against business objectives and optimize their software, processes, and business results.
- **WorkAlign Maintenance Budgeting** automatically creates budgets based on existing work plans, and supports zero-based budgeting for unplanned work. It has the ability to assure adequate budgets for critical assets and establish tighter limits for lower priority assets.
- **WorkAlign Scheduler** allows maintenance supervisors and planners to easily filter down to the most urgent jobs for the most critical assets in a particular location, and make better planning and scheduling decisions. It also manages resource availability for employees and contractors, with or without an HR interface.
- **WorkAlign Warranty Tracker** flags work orders that have warranty coverage and presents a claim for users to review and submit. It also provides knowledge of critical equipment that routinely fails in early life so that vendor choices and purchasing decisions can be improved.
- **WorkAlign Mobile** puts essential data in the hands of users in the field to ensure awareness of priorities, and simplifies work execution and data collection, such as entering failure codes, inventory transactions, or new work requests.

Remember, the “right” solution is one that is fully functional and inherently easy to use, so the users will willingly and proactively use it to control their maintenance spend. VIZIYA designed its solutions to this high standard so that maximum benefits can be achieved.



About VIZIYA

Headquartered in Hamilton, ON, with offices in Barcelona, Perth, Atlanta and Dubai, VIZIYA is the industry leader providing bolt-on software products to enhance ERP-based asset maintenance systems. VIZIYA's proprietary WorkAlign™ Product Suite delivers seamless integration into existing ERP systems. With over 45,000 users at 740 sites across 6 continents, the world's best companies use VIZIYA products to help them better maintain their assets. Visit viziya.com for more information.