



# Maximizing Equipment Uptime

The benefits of maximizing your equipment's uptime are obvious: if your equipment is not running, then it cannot produce; if it is not producing, then your revenue and profits are on hold.

Although planned maintenance has a cost impact as machinery sits idle, there is an accompanying long-term benefit of keeping everything functioning to its optimum over the long haul. Unplanned downtime, however, is more damaging—typically costing 1.5 times as much as planned downtime. Emergency downtime (when something has gone seriously, catastrophically wrong) can cost five-times as much as downtime for planned maintenance.

## Avoiding Unplanned Downtime is Critical

In this white paper, we will look at how unplanned downtime affects a company's production processes and bottom line—and how sensible and well-targeted planning can maximize equipment uptime rates to the benefit of companies and their clients.

## Consequences of Unplanned Downtime

Unplanned downtime incurs potentially huge costs to production, to consumers, to shareholders—and, depending on the industry involved, can have significant legal ramifications.

For example, a catastrophic shutdown in an oil refinery due to an explosion in one of their production units can lead to maintenance and repairs that last for months, with the accompanying loss of revenue.

A shutdown in the oil and gas industry can also have devastating financial consequences. For a refinery producing 150,000 barrels a day at \$58 a barrel, each day spent not working costs a literal fortune.

Even while equipment is shut down, oil continues to be extracted and it doesn't stop just because there's a problem in the refinery. During a shutdown, any oil that cannot be diverted to other facilities will continue to build up and increase the cost burden for the refineries involved.

Clearly, there's a tremendous cost associated with events such as these. Companies and manufacturers operate on a cash flow model where raw materials go in, finished product comes out. When that principle is disturbed or shut down, the cash flow is interrupted to the point where these companies risk their quarterly and possibly annual profitability.

When it comes to unplanned downtime, all manufacturing sectors face the risk and the financial impact of being unable to go to market. For example, an hour of unscheduled shutdown can cost a high-volume semiconductor manufacturer a million dollars. So anything that manufacturing engineers can do to maximize their equipment and process uptime, or get their systems to maintain optimum performance, is certainly worth consideration.

In addition to the financial consequences, the situation can be compounded with the legal ramifications of something of the magnitude of a massive oil spill. In these circumstances, a company can be faced with a long-term payout that affects profitability to the shareholders. The end of the supply chain can be affected as well. In the example of an oil spill, customers will inevitably see an increase in gas prices at the pump to help offset the tremendous expense of clean up and repair.

## Case Study: *The Energy Assurance Daily Shutdown Report*

The U.S. Department of Energy publishes the Energy Assurance Daily: a document that comes out every day with a specific mission to inform its readers on which oil refineries are up and running and those that aren't—and why.

In 2012, they produced a snapshot report on the refinery scene. In the report, they determined that, between 2009 and 2012, 1,700 refineries were shut down for scheduled and unscheduled turnarounds, equating to about 1.2 refineries a day. After they tallied all the lost opportunity, just in the maintenance realm of the process, it was determined that those 1,700 refineries lost over \$32 million because of shutdowns.

Of those shutdowns:

- 46% were due to mechanical problems
- 19% were due to electrical disruptions and power failures
- 23% were due maintenance issues
- 12% were due to fires (lightning strikes were a significant problem in the Gulf Coast region and Eastern United States)

Clearly shutdowns can happen for a variety of reasons—and not all of them can be prevented—but their cost can be devastating for a company, no matter how large they may be. It is essential for companies to have plans and processes in place to minimize the disruption of an unplanned shutdown; the efficient and continued running of a plant or factory depends on it.

## Maximizing Your Uptime: Options

### Intelligent Systems

A popular, relatively recent innovation is a move toward smarter systems to regulate and monitor specific tasks and processes. For example, in the mining industry, there is a great deal of interest in a system that monitors the

amount of lubrication provided in the multiport injection manifolds. Because a lot of mining today is done in remote, hard-to-access areas, equipment managers place a premium on systems that can remotely monitor performance.

Systems that monitor their own production, allowing for early warnings when things may be about to go wrong, can significantly reduce costs for companies working in extreme locations. Using smart systems to cut down on the need for human inspections—or having repairs done before something catastrophic can occur—is an extremely valuable option for these companies.

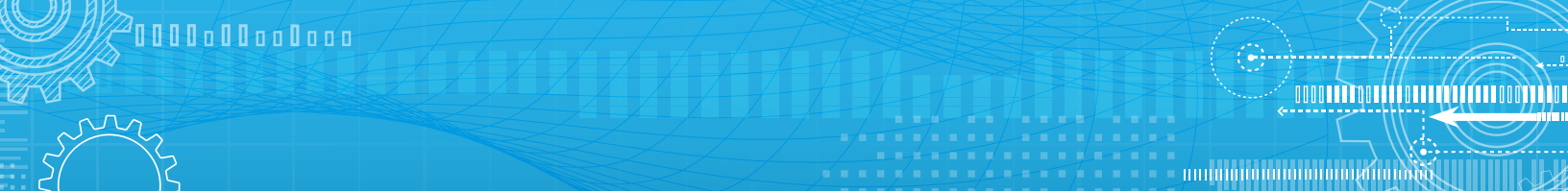
### Preventative Maintenance

A regular cycle of preventative maintenance, and understanding the life cycle of any device, is essential if you want to avoid unplanned downtime. Too often, companies are faced with the challenge of bringing down equipment for repair and maintenance or letting it continue to run to keep production numbers up. It is a delicate balance that should only be practiced by experienced maintenance and electrical engineering personnel.

The real solution is to make sure that your system is optimized—and if you can make it smarter, do it. An effective preventive maintenance program is extremely important and your approach to production must be optimized.

Older industrial facilities with additional systems added over a long period of time could have tens of thousands of valves that were installed over many years. Developing a program to carry out periodic maintenance, or at least inspections, on thousands of different components seems like a daunting undertaking. It appears, at least on the surface, that just letting it run to failure is the easier model as long as you have replacement parts on hand.

However, large-scale maintenance processes are now much easier to carry out. Thanks to advances in maintenance technology, monitoring hundreds or even



thousands of components is now a realistic option for companies of all sizes.

In the industrial complex, the environmental impacts and the state and federal regulations on emissions mean that the emission levels of plants are being recorded and analyzed on a daily basis.

Refiners sometimes hire third-party companies to walk through their different process units with an emissions measuring instrument. When they pass the instrument over a valve, it measures any emissions being released. The instrument reports to an analyzing unit that identifies if this valve is emitting hydrocarbon gases. It also identifies the valve tag number, and reports all the data back to the refinery.

In this example, we're discussing a regulatory compliance issue, but this quickly becomes an important business issue. Compliance issues become business issues when they affect the output and profitability of companies.

When the State of California issues invoices for thousands of dollars a day for emissions violations due to a refinery putting too much sulfur, NOx, or SOx in the air, then clearly it becomes a business decision on whether to rectify the problem or continue paying the fines. Employing this new technology could alleviate serious financial penalties.

Although refineries struggle with the ever-changing emissions standards levied upon them, they will always listen to solutions that they can participate in to comply.

### Supply-Chain Management

Another facet of managing equipment uptime relates to the supply chain itself. The availability of crucial components is critical to success; not having ready access to parts is setting a company up for failure.

For example, your equipment may rely on a particular device, but it's only available with a 17-week lead time. If you're responsible for the supply chain of a company

that has aging or legacy units, you need to be sure to have replacement parts available locally, whether with a maintenance partner or on your own shelves. You then need to be sure you have the proper people in place who have been trained to swap the parts in and out as necessary.

Much of a manufacturer's downtime can come from inventory stock-outs and delayed deliveries. Automotive manufacturers, for instance, who are under constant pressure to reduce costs, have tightened their supply chains to the point that they typically have less than a single-day supply of parts at the final assembly plant. If the company needs more parts than that, then they are going to experience a potentially expensive delay, with machinery and workers standing idle while they wait for the items to arrive.

### Managing Obsolescence

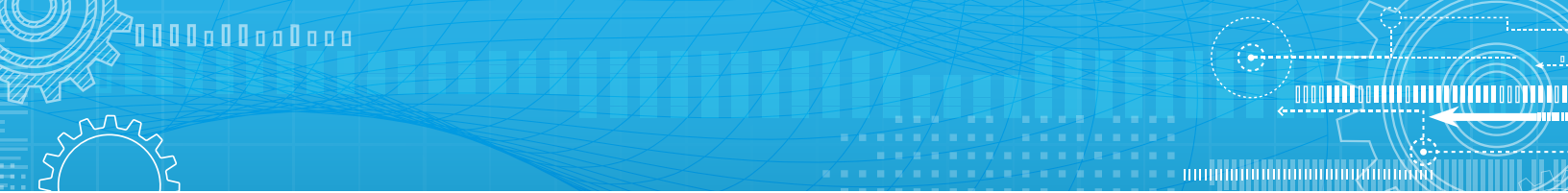
When it comes to ensuring that your equipment and processes continue to function at maximum effectiveness, then you have to be aware of the dangers of obsolescence. An efficient, intelligent process would be to maintain links with essential suppliers so you're notified well in advance when a product is going to be discontinued.

When the time comes that a part you rely on will no longer be produced, you then need to come up with an alternative solution in a timely fashion before your machines goes down.

An effective solution in many cases is to work on a guided transition for parts that have been declared obsolete, with as much early notification as possible, to avoid the expense and stress of recalibration when the machinery is needed the most.

### Leveraging Expertise

Maintenance personnel in oil field operations inevitably develop a thorough understanding of everything that is likely to go wrong in oil field facilities around the world, and become specialists at getting to very remote



places that are often washed out and tough to access. When there's millions of dollars of equipment sitting out in the middle of a field on fire, you need workers with the special skills required to get to where they need to be as fast and as safely as possible.

The key here is specialization: know who the expert is; he or she is the one who can get the job done the first time with the least amount of fuss and complication. On-site, in the middle of the night, it's always preferable to call on a field service technician who knows exactly what's going on because he or she has already dealt with similar problems multiple times. The benefits of using field service technicians who are seasoned and experienced with a particular application in that particular environment is priceless.

When you specialize these services and you partner up with an organization that has that core technology understanding, they can go out and troubleshoot quicker, problem-solve faster, and be out of your way sooner—allowing you to be back up and online in less time than you would otherwise.

### Improved Education

The best person to monitor a system may well be the person who operates it every day. He or she will know if the warning light on the equipment is accurate or a little over-sensitive; whether that odd-sounding noise is really something to worry about; whether the claimed maximum output for a machine is really what it's capable of producing.

The classic line is that unscheduled downtime will occur because the person operating or monitoring the equipment is not trained well enough on the system to know that there are ways to check what's wrong before you pull the "OFF" lever. Having someone in the plant who is fully trained and experienced with the systems and the parameters—the quirky little things that certain controllers, automation systems, valves, or other pieces of sensing equipment can do—makes a huge difference to the successful maintenance of equipment.

The time to a solution with a trained service provider is much faster and the return to productivity is much shorter. Time and resources spent on ensuring that operators are fully trained on the intricacies of the machines they work on will be returned with increases in efficiencies and a reduction in downtime.

### Maintenance Evaluations

When you take the time to carry out an evaluation, determine how to create an effective plan that includes working with the long turnaround times we mentioned earlier. Focus on specific areas and ensure you have a plan in place to deal with all imaginable scenarios. For supply chain issues, the questions would include:

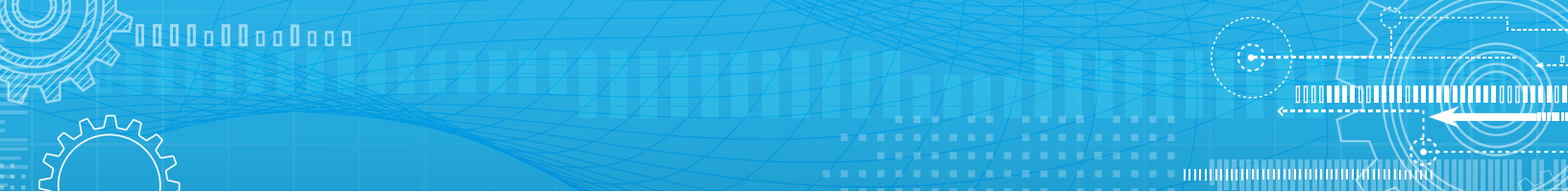
- How would your company prefer to handle the supply chain?
- Would you stock the parts yourself or should an external partner manage the process?
- If you choose an external partner, what would that arrangement look like?

Coming up with an effective maintenance plan for each facility in your organization is an extremely valuable exercise. Being prepared for an emergency is best achieved by ensuring, if something potentially catastrophic occurs, that there's no emergency at all—just the beginning of a well-planned recovery process.

### A Partner You Can Trust

As we have seen, equipment downtime costs can be astronomical. Industrial manufacturers must work hard to ensure that their systems continue to perform efficiently and that their workforce has the necessary skills and experience to contribute to the continued optimal performance of the equipment they work on every day.

Regular maintenance, accident-prevention, training, and the supply chain all have an impact on equipment downtime. It's hard work, there's no doubt about that, but you don't have to do it all alone. With the right partner,



keeping equipment running can be a comparatively stress-free process.

At Valin, our aim is to be the people you trust and have confidence in when it comes to maximizing the uptime of your equipment. Our promise is to help you achieve your goals through a process of listening to your pain-points and then customizing a solution to fit the unique needs of your company. If you're concerned about equipment downtime and need a partner to support you, Valin should be your first choice.

Valin is the leading technical solutions provider for the energy and technology industries. For 40 years, Valin has offered personalized order management, onsite field support, comprehensive training, and applied expert engineering services utilizing automation, fluid management, precision measurement, process heating, filtration, and fluid power products.

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