

PRODUCTION CAPABILITY

notes

IMPROVED MANUFACTURING THROUGH RELIABILITY IMPROVEMENT

S U C C E S S S T O R Y

Refinery Reliability Team Plugs the Leaks

One of the items on tap for the upcoming Asset Productivity Conference (April 6-8) will be the business value of Uptime—how the metric can help a business find improvement opportunities.

Representatives will relate positive experiences connected to Uptime. The stories they will share should, no doubt, be similar to a recent incident (and its aftermath) at Conoco—an incident that demonstrates the impact of the Uptime software.

Costly Leak

After an August '96 exchanger leak in a hydro-desulfurization unit, Conoco's Billings refinery quickly understood the impact that equipment failure—and a resulting shutdown—can have. In this case, it cost the company \$1.5 million in lost profits

A reliability team was formed to prevent a recurrence. As part of their efforts, members researched Uptime data to make a decision on exchanger replacements.

"We acquired lost profit opportunity figures and examined historical data collected on the four HDS exchangers," says reliability team member D'Neale Parker. "This enabled us to make sound decisions based on historical data and reliability."

Foresight

Even more, it enabled the team to spot trouble ahead for another unit part: They determined that an exchanger on another HDS unit need replacing now—and not in the year 2000 as had been scheduled. "The data told us it wouldn't make it," says Parker. "Replacing it now for \$150,000 is wiser than spending \$1.5 million for a shutdown."

Parker now is a believer: Uptime data can help in tracking the effects and frequency of equipment failures.

And Billings is now one of the sites leading the way to piloting Uptime software throughout all of Conoco. Says Reliability Improvement group leader Kelly Fiscus: "I expect all plant areas will use Uptime. It provides valuable information that is helpful in identifying reliability concerns."

For more information about exchanger reliability at Billings, contact D'Neale Parker at PARKDC @ BIRNA or ETN 477-7944.

Reliability: A Key to Asset Productivity

Improvement can have substantial impact of Asset Productivity

As the new DuPont CEO, Chad Holliday announced an asset productivity campaign targeting boosts of 1% in yield and 5% in Uptime (an estimated \$575MM value). In justifying these goals, he pointed out that the most successful companies continually transform themselves to attain ever higher standards of competitiveness.

And in this brave new world of global competition, where greater revenue with lower investment is desired, this calls for a shift into a new paradigm: one that depends on defect elimination, predictive maintenance, Uptime Excellence, Readiness to Operate, and other reliability-centered manufacturing techniques.

To achieve its aims, DuPont must adopt a reliability-focused approach throughout the entire organization. Benchmarking confirms that the reliability of an asset has a significant impact on an asset's productivity.

Analysis

Two recent studies reveal the effectiveness of a reliability-oriented focus. An analysis of the

hydrocarbon processing industry, done by Solomon Associates, Inc. of Dallas, shows conclusively that companies that are reliability focused – as opposed to repair-focused – have less demand for repair maintenance and therefore do less maintenance work. Seeking to proactively eliminate failures, their focus allows them to formulate actions to make permanent repairs and devise predictive and preventive remedies.

The study showed that a reliability-focused site can maintain four times as much equipment as a repair-focused site and still have less maintenance cost. Why? Because repair-focused personnel are too busy repairing failures; they don't have time to determine and eliminate the root causes.

"Stewardship"

The Solomon study describes how reliability-focused organizations achieved such cost-effective maintenance efficiency: Operations takes responsibility for overall asset integrity while Maintenance and Engineering are accountable for their additive and distinctive contribution. This seems logical, considering that operating assets are the sole source of

revenue generation – and that "stewardship" of those assets must include their reliability and integrity as well as their operating excellence. Essentially, operating personnel become the eyes and ears of the manufacturing equipment. (In DuPont, an Asset Productivity team includes operations and maintenance/engineering and technical.)

In line with this, maintenance is not segregated into business units but is networked into a holistic site unit with integrated systems like planning and scheduling, preventive/predictive technology, process safety management and sourcing. Maintenance cost goes down and Asset Productivity goes up by integrating Operations and Management into a unit passionate about defect elimination.

Says Reliability Improvement Team leader Glenn Kling: "As a corporation, we are transforming from an operate>fail>fix>operate

culture to one using predictive/preventive methods. Now, the challenge is to transition into a proactive defect elimination organization. Clearly, we have the

technology, people and systems to be, not just world class, but world leaders in Asset Productivity." Other observations the Solomon analysis made about the reliability-oriented approach include:

- The best management systems have P&S, central shops and store services, and a maintenance engineering department to support work-execution groups.
- Success depends on solid technical knowledge in the craftsmen and supervisors partnered with a readily available maintenance engineering group for support.
- Knowledge and training is essential – roles are filled by skilled craftsmen/operators trained to operate the processing units.

Corroboration

The "DuPont/Conoco Turnaround and Maintenance Best Practices" study supports the Solomon study on the positive impact of the reliability approach. It reveals that a reliability focus – and not simply maintenance efficiency – is the key to improved Uptime. Also: money spent on reliability yields a more profitable return than the money spent on maintenance

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Analyzer Reliability Workshop

The DuPont Analyzer Reliability Improvement team's 1998 workshop and face-to-face meeting will be held April 20-23 in Houston at the Airport Marriott Hotel. The event will highlight knowledge of process analyzers and sample systems. For information, contact Karl Wondersek at DUCOM 357-1539 or by e-mail at WONDERKW@A1@WWPS.

ON THE WEB**Click On "PC Notes"**

Looking for back issues of "Production Capability Notes"? Check the Reliability Improvement web page at <http://genesis.bec.dupont.com/riteam/riframes.htm>. The site offers information on RI, implementing an RI program, RI tools and slides, and articles on instrument reliability as well as all the past issues of "Production Capability Notes."

RAC Link Established

A link to the Reliability Analysis Center in Rome, NY has been established in the RI web page. The RAC is operated by the Department of Defense and its home page offers both information and resources. To connect, go to the RI web page and click on "Linking to other networks." (The URL for the RAC web page is rome.itri.com/rac/.)

Reliability Team Members Listing

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Asset Productivity Conference Highlights Reliable Processes

The upcoming Asset Productivity Conference (April 6-8, Baltimore, MD) looks to be a major event of the new year as well as a milestone for the company's emerging new direction. DuPont sites from around the globe will share success stories of practices implemented.

The CMLT-sponsored event will show how reliability-oriented improvement processes yield continuous Asset Productivity improvement with minimal investment.

Operations leadership (plant unit, area managers, etc.) as well as maintenance practitioners (team leaders, engineers, technicians, mechanics, etc.) will find value in the conference. Two agendas have been designed: a "Leadership Track" to explore new directions in people management and a "Practitioner Track" to focus on tools and techniques available.

The "Leadership Track," for the managers, focuses on, among other topics:

- Zero safety incidents in maintenance
- implementing RCM
- planning & scheduling

- Uptime Excellence self-assessment
- Root Cause Failure Analysis
- renewing skills of maintenance professionals
- building new facilities ready to operate

The "Practitioner Track" highlights:

- inspecting incoming materials
- determining maintenance core competencies
- planning and scheduling basics
- improving shutdown effectiveness
- using SAP as a reliability tool

The aim is to provide information that will be useful throughout the attendees' organizations.

Reliability: A Key to Asset Productivity *(Continued)*

efficiency. And that has a major impact on asset productivity. "From a maintenance perspective," says John Gangemi, Dacron® Engineering Manager, "reliability cannot be separated from the basic discipline of planning work based on a preventive, predictive mindset that is aligned with the right operations and manufacturing strategy."

RCFA is a "Safe" Bet

Targeting "0" injuries will be a goal discussed at the Asset Productivity Conference. It might seem an odd topic for a productivity-focused event, but safety is top priority at DuPont.

Reliability techniques apply to safety, too, as a recent site incident reveals. A loosened flange – and the potential hazard it posed – resulted in a root cause failure analysis that resulted in a systemic change.

The process started when a mechanic loosened a flange to begin removing an instrument on a steam system believed to have been "locked and drained." (The instrument appeared to have been included in a larger "shut down" lockout plan). When the mechanic loosened the flange bolts, water began coming out. As the mechanic waited for the water to stop, steam began blowing out. Injury was prevented since the mechanic followed a basic line break rule: Always loosen the bolts on the opposite side of the flange and wait for all drainage to stop.

Blame could have been pointed, and nothing would have changed, but the RCFA (using a why tree) provided some "systemic" insights likely to prevent recurrence.

After identifying the physical (Level 1) failure effect – the escaping steam – the investi-

gation determined two key human causes (Level 2):

- The names on the two steam systems were so close as to be confusing.
- The word "test" on the repair order had a different meaning to the person who wrote the RO and the mechanic doing the work.

The resulting changes included:

- Steam systems clearly identified and communicated.
- Training emphasizing clear communications (RO initiator: "Say exactly what you mean"; RO implementer: "Ask to make sure.")

Finally, systemic Level 3 causes included:

- Additional "lock out" confusion resulted from the two steam systems being almost physically identical to each other and also spread over a large area through pipe bridges.

Resulting changes:

- Lockouts must be field verified against lockout drawing, even when the work is part of a larger, verified, existing lockout.
- Piping systems will be identified as they enter/exit pipe bridges.

This example illustrates how our safety goal of "Zero" is most likely achieved in a culture where the transition has occurred from pointing fingers of blame to making systemic changes. Reliability technology is the key.



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