



**FORMOSA PROJECT
STATE GOVERNOR
REVEALS PLANS
FOR LOUISIANA
PRICE TRENDS P16**

ASIA PP BOOST

Start-up of several new projects pushes China production in H1 2015 up 22.6% year on year **40**

**THIS ISSUE
DIGITAL
ONLY**

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ICIS Chemical Business

MAKING SENSE OF CHEMICAL PRICES





Advanced digital technology is playing an increasingly important role in improving plant performance

Time to go digital

Unplanned outages can mean lost profits, so at a time of high operating rates and other challenges, now is the time to improve reliability through increased plant digitisation

PETER FRANDINA, PAUL BJACEK & KARIN WALCZYK ACCENTURE

With the “big bang” of huge amounts of new petrochemical investment in North America continuing to develop, disruptions are occurring, such as falling oil prices squeezing margins; persistent talent issues affecting plant construction and operations; and high utilisation rates causing a correspondingly high level of unplanned shutdowns.

The missed profit opportunity alone, on a major cracker shutdown in the US Gulf Coast, was \$1.4m per day per worldscale cracker in the first quarter of 2015.

Digital technologies can help alleviate these issues, and now is the time to make the change. On a global basis, including digital-

enabling technologies in chemical plants can represent an opportunity to raise industry profits by up to \$50bn/year. This estimate is based on an Accenture/ICIS survey of global chemical industry participants. The average response indicated a potential 7.3% improvement in profit from exploiting all current technologies.

ROOT CAUSES TO OUTAGES

Unplanned outages are reaching new highs (in both the US and Europe) in certain products, as producers strain production assets and strive for greater safety goals.

Higher operating rates are occurring in some (not all) products and regions as a result of: a positive change in competitiveness related to weaker currency; a lengthy period of underinvestment; lower oil prices; and the low

cost position of gas-based chemical investments (such as in North America).

When coupled with greater complexity in plant controls and a focus on safety, the higher utilisation environment is contributing to the greater frequency of unplanned outages. This is exacerbated by the higher average age of petrochemical plants in North America and Europe (see graph, above right), often immature/reactive maintenance processes and strategies, and talent issues. In our survey with *ICIS Chemical Business*, respondents indicated, to a free text question, that talent issues are the most significant challenge to business operations. The scope of issues include retention, training in latest methods, availability and competency. Lack of time available to train in new skills was also expressed. An additional complication is that the average age

of US chemical workers is above that of most other industries. This makes knowledge transfer, and perhaps change management, a greater issue in this industry.

TECHNOLOGIES ARE RIPE

The digital world has been benefiting from a convergence of new software, hardware, and communications technologies, making accessible an extraordinary level of new-found information on numerous operations processes that, if properly exploited, can improve operational performance across many dimensions. The convergence is just beginning. Some of the key enabling technologies include wireless tracking such as RFID and GPS, mobile equipment, plus visual and sensing devices.

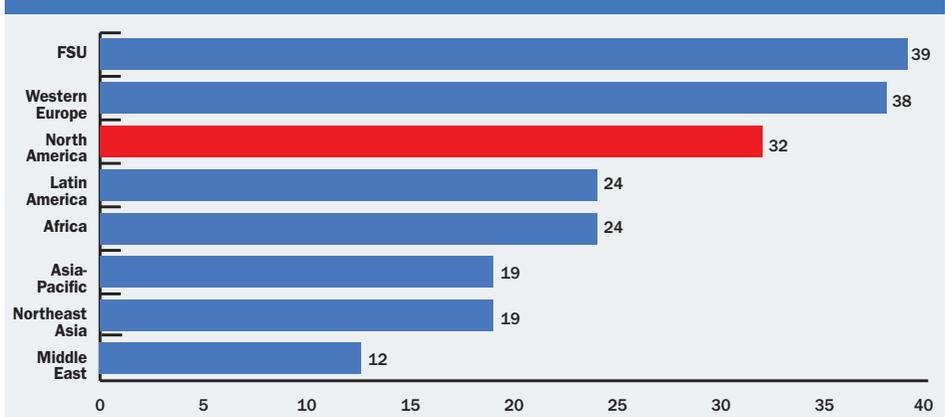
With the proper analytics, trained personnel and decision-making processes in place, significant improvements can be made in plant reliability. That all, however, hinges on the level of investment that has been made in level 2/3 (plant level/machine level IT systems) digital foundations over the past decade. Organisations are quickly realising that many of their applications, interfaces and architectures are unsupported, fragile and a potential liability.

TECHNOLOGY ADOPTION TO DATE

Chemical companies are just beginning to develop digital strategies for operations, but unfortunately only a few have made first steps in this area. Not surprisingly, early adopters also correspond to companies we have determined to be high performers.

A recent survey we conducted with *ICIS Chemical Business* reveals that while the majority of respondents agree that including enabling technologies in new plants is important, the same number are only implementing incremental new technologies. The survey showed that companies have been implementing mainly the lowest-cost/ most straightforward technologies, such as camera/video monitoring. This reluctance to adopt new technologies to a greater magnitude reveals a tension in decision-making, especially

AVERAGE AGE OF ETHYLENE CRACKERS (YEARS)



SOURCE: Accenture Research, analysis of ICIS Consulting data

since reducing plant operating costs, improving product quality and growing income were among the top business priorities indicated.

Part of the reluctance to change is a fear of implementing new/unproven technologies or making major changes in plant operations. Much of the hesitancy stems from human resources constraints revolving around talent availability, training and competence. The irony is that digitalisation would mitigate these issues. A commitment to overcoming implementation and training issues is sorely needed.

So, what are the most utilised digital plant technologies? Here are three examples of ways in which companies are improving plant reliability and safety:

- **Reliability-centered maintenance (RCM):** analytical models show the probability of machinery failure and predict potential problems. The information can reveal how and when the equipment might fail and aid the development of preventative contingency or maintenance plans. This helps to significantly reduce the risk of unplanned downtime or even catastrophic failure. Additionally, it offers opportunities to incorporate training into the maintenance plan and bring new insights into the inner workings of machinery.

- **Valuing historian data:** operational historians are databases that can archive time-based

process data. For example, a historian might keep a log of the temperature of an oven or the pressure of a reactor, with readings taken every second. With the historian, the process engineer can access enormous amounts of data in the form of automatically generated charts. With the proper analytical tools and continual process tuning, operations can be optimised and product quality improved.

- **Applying cloud solutions:** cloud computing allows computing and data storage offsite, utilising the internet. Cloud computing can bring greater operational and cost agility across the enterprise, making some IT costs variable. Some companies are using the cloud to tighten security, while easily keeping up with the latest software.

Over its history, the chemical industry has made step changes in operational performance, from the adoption of continuous process technology to scale operations to advanced process controls. We believe the next wave is plant digitalisation, harnessing the convergence and declining cost of new enabling technologies.

Chemical companies would do well to harness digital technologies not only to reduce unplanned outages, but also to improve quality, safety, flexibility, innovation and costs – all benefits that will be necessary in an increasingly sophisticated and competitive global industry.

With all the new plant building in North America, the Middle East, China and elsewhere, now is the time to jump ahead with this technology and obtain a share of the \$50bn profit opportunity. ■

Peter Frandina is a managing director of Accenture plant and commercial services, chemicals lead, based in Houston. **Paul Bjacek** is the global chemicals-natural resources research lead for Accenture, based in Houston. **Karin Walczyk** is the global resources innovation research lead in Düsseldorf. In June 2015 Accenture released a report called "The Digital Plant: Reaping the Rewards of Disruption." For more information, contact paul.bjacek@accenture.com

UNPLANNED LOST PRODUCTION FOR US ETHYLENE (% OF CAPACITY)



SOURCE: Mark Woods, Ethylene Strategies International