CHEManager EUROPE

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THE NEWSPAPER FOR THE CHEMICAL AND LIFE SCIENCE MARKETS

Markets and Companies

EU chemicals production up 10% in 2010

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Chemicals and Coatings

Get ready for the 2011 European Coatings Show!

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Newsflow

Following the March 11 earthquake and tsunami in Japan, a Dow Chemical plant north of Tokyo experienced flooding, but there were no reports of injuries or environmental damage. DuPont said some ceiling tiles fell at a Tokyo office. The company also reported minor damage to ceilings, walls and windows, as well as some piping at its engineering polymers facility in Utsunomiya, Japan. No injuries were reported.

Styron is planning an IPO less than nine months after Bain Capital bought it from Dow Chemical, two sources said. The lead underwriters on the IPO are expected to be chosen in the next few weeks, one of the sources said, but cautioned that the details are preliminary. Dow announced the $1.63 billion sale of its Styron basic plastics unit to Bain in March last year, and the deal closed in June.

BASF booked a €900 million pre-tax gain from the sale of its stake in German potash miner K+S, strengthening its plan to exit the nitrogen fertilizer business. BASF said earlier this month it was preparing to sell "major parts" of its nitrogen fertilizer business, which is under pressure from low-cost producers in the Middle East, such as SABIC (see also page 7).

'Chemistry – Our Life, Our Future'

The IUPAC Has High Hopes for the IYC 2011

Building Blocks – The International Year of Chemistry is now in full swing, and if the list of events on www.iyc2011.org is any indication, then the entire industry around the world is getting involved. But the IYC 2011 isn't just a vehicle to showcase chemicals and the chemical industry – the organizers of the year-long celebration have several important issues on the agenda that they are pushing forward during 2011. International Union of Pure and Applied Chemistry (IUPAC) Executive Director Dr. Terry Renner talked to Brandi Schuster about the main goals for the year and what needs to be done to improve the chemical industry's image in the public eye.

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CHEManager Europe: Dr. Renner, what are the most important topics within IYC 2011?

T. Renner: The unifying motto for IYC 2011 is "Chemistry – our life, our future." IYC 2011 is offering a wide range of interactive, educational and entertaining activities for people of all ages. The intent is to reach out around the globe with opportunities for public participation at the local, regional, national, and international levels.

In many circles chemistry, and in particular the chemical industry, has a quite negative perception, despite the vital contributions that chemical knowledge and technology continue to make toward the sustainability of human life. For instance, many people are not aware that the human body is arguably the most complex chemical reactor that exists. Without chemistry there can be no life. The fundamental objective of IYC 2011 is to face this negative image head-on and to bring about a new awareness among the general public – a kind of rebirth of chemistry. The population of the earth today is faced with serious challenges such as adequate water and food supplies, declining energy sources, effects of climate change on the environment, and provision of health care, especially in developing regions. Chemistry must play a vital role in the solutions to all of these issues.

What are the main objectives for the IYC 2011?

T. Renner: We aim to increase the public's appreciation of chemistry in meeting world needs; to increase young people's interest in chemistry; to generate enthusiasm for the creative future of chemistry; and to celebrate the 100th anniversary of Madame Maria Sklodowska-Curie's Nobel Prize, as well as the 100th anniversary of the founding of the International Association of Chemical Societies (IACS), the immediate predecessor of IUPAC.

No single person and no single country can address these challenges alone. International cooperation among chemical scientists together with a socially enlightened and better educated global population offer hope for the future. The personal achievements of Madame Curie serve to inspire young people, in particular young women, to pursue careers in the chemical sciences.

The International Year of Chemistry is a once-in-a-lifetime opportunity to lay the groundwork to address the serious problems of sustainability that the world is facing today. Although we are not likely to have a formal IYC again in the near future, the final challenge for IYC 2011 is to leverage the progress that is made during this year itself to carry early successes on into future years. The importance of education for the general public, and especially for young people, cannot be emphasized too strongly. Today's global problems require the brightest and most innovative and curious minds to discover real and lasting solutions through careers in chemistry and the other sciences. It is the task of the global chemistry community to stimulate and encourage today's youth to follow the necessary career paths toward our common goals.

International Year of CHEMISTRY 2011

What role do you think chemistry plays in today's society? What needs to be done to foster an interest in chemistry early on?

T. Renner: The problems faced on the earth today absolutely cannot be solved without chemistry. Chemistry is the pervasive factor in all of our daily activities without which there can be no life. The earlier that young people begin to appreciate this fact, the more likely it will be that they will consider chemistry for their careers. Comprehensive science education should begin at the earliest age possible, even at the beginning of formal elementary education. The general public must come to the realization that chemistry is an essential part of all life and that working as a chemical scientist is an honorable and important activity that contributes to the well-being of all humans. Industry must be a true partner in this undertaking, for it is industry that puts into practice the knowledge that is acquired from both academic and industrial chemical research. More scholarships for study of chemical sciences and opportunities to work as interns in the industrial setting are ways that industry can guarantee a steady and well-qualified source of employees in future years.

This is also the 100th anniversary of the founding of the International Association of Chemical Societies, which IUPAC succeeded in 1919. How has the role of the union changed over the years?

T. Renner: Toward the end of the 19th century and early in the 20th century, chemists around the world were searching for ways to share their newly found chemical knowledge and to collaborate on many technical issues that were relevant at the time. Many of these issues initially focused on nomenclature for organic and inorganic chemistry and on standardization of critical physical property data. For various reasons, not the least of which was World War I, progress was limited and a truly robust and effective international organization was not firmly established. Finally, in 1919 IUPAC was born. After some early organizational difficulties, IUPAC ultimately became a scientific association with truly global extent in 1931.

Today IUPAC is acknowledged as the world authority in the development of chemical terminology, including the naming of newly discovered elements and the definition of chemical nomenclature. IUPAC also deals with standardized methods of measurement, atomic weights, and other critical physical data. The Union sponsors major international scientific meetings in all areas of chemistry.

Today IUPAC has 57 national adhering organizations and four associate national adhering organizations as its membership. Although day-to-day operations are managed by the Secretariat located in Raleigh, North Carolina in the U.S., most of the scientific activities of IUPAC are carried out by approximately 1,000 chemists around the world who contribute their time and effort on a voluntary basis.

What are your primary focuses nowadays?

T. Renner: A key focus of IUPAC today is to encourage the participation of more countries, especially those in developing regions, as full members of the Union. Significant effort is also expended on matters of education and the application of chemical research and knowledge to world needs. This is consistent with the objectives of the UN Decade of Education for Sustainable Development.

The chemical industry often only makes headlines when scandals occur; what does the industry need to do in order to increase public appreciation for its contributions to society?

T. Renner: Unfortunately, the word chemistry is usually associated by the general public with environmental pollution or some industrial disaster. This negative perception is often reinforced by the news media. One way to overcome this adverse image is through education and raising general awareness of the importance of chemistry in everyday life. IUPAC has encouraged its members to conduct special activities during IYC 2011. To this end a dedicated website – www.iyc2011.org – has been established where participants around the world may post ideas for activities and share and discuss them with other interested scientists around the world. This method of open communication permits chemists to present a unified and consistent voice to the general public concerning the importance of chemical science and technology toward a sustainable future for all humankind.

The immediate goal is to keep the spark ignited by IYC 2011 alive well beyond the end of the calendar year 2011.

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About Dr. Terrence A. Renner

Dr. Terry Renner
IUPAC Executive Director

Dr Terrence A. Renner is the executive director of the International Union of Pure and Applied Chemistry (IUPAC). He obtained his bachelor of science degree in chemistry at DePaul University in Chicago, Ill. Thereafter, as a National Science Foundation Graduate Fellow, he completed his PhD in physical chemistry at Yale University in New Haven, Conn. Renner's working career has encompassed the fields of nuclear; environmental; physical; organic; surface; materials; process; and petroleum chemistry. More recently, in the realm of nanotechnology, his experience has expanded to include the interface of chemistry with biology, biochemistry and pharmaceutical chemistry at the nanoscale. Renner is an accomplished executive who understands the importance and relevance of both pure and applied science within the practical context of business and product development. He has represented companies globally in discussions and negotiations with academics, business leaders, and government officials at all levels to attain mutually beneficial objectives. He currently has a key organizational role as IUPAC leads the world chemical community through the International Year of Chemistry 2011.

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CONTENT

Global Supply Chain Rattled By Japan Quake, Tsunami

Disruptions Across Several Markets

Global companies from semiconductor makers to shipbuilders faced disruptions to operations after the March 11 earthquake and tsunami in Japan destroyed vital infrastructure and knocked out factories supplying everything from high-tech components to steel.

Thousands of people have been killed and millions have been left without water, electricity, homes or heat after the 8.9 magnitude quake triggered a massive tsunami which tore across a wide swath of coastline north of Tokyo. The earthquake has forced many firms to suspend production and shares in some of Japan's biggest companies tumbled in the first day of trading after the catastrophe, with Toyota Corp and Sony Corp falling 8% and 9%, respectively.

Plant closures and production outages from Japan's host of high-tech companies were among the biggest threats to the global supply chain, analysts said. "Japan remains critical to the global tech food chain," analysts at CLSA said in a report. "Beyond damage to facilities, supply chain disruptions driven by road-port-power outages are key factors to watch," CLSA said, estimating a fifth of all global technology products are made in Japan.

Korean shipbuilders and U.S. solar power companies were among other companies facing the threat of disruptions to supply, but with initial damage assessments still being made, companies and analysts said it was too early to accurately gauge how long disruptions might last.

Rolling power blackouts are likely to affect Tokyo and surrounding areas over the next few weeks, adding to the existing challenge of inspecting and repairing north Japan plants amid continuing aftershocks and the threat of major radiation leaks from damaged nuclear power plants.

Korean Companies Hit

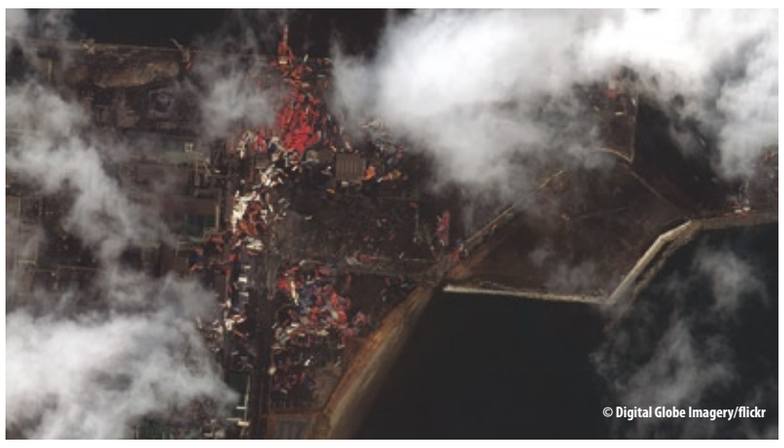
Japanese ports handling as much as 7% of the country's industrial output sustained major damage from the earthquake, with most seen out of operation for months.

Companies in neighboring South Korea, which depend heavily on Japan supplies such as LCD glass, chip equipment, silicon wafers and other products to produce semiconductors, were some of the most affected.

Hynix Semiconductor, the world's No.2 memory chipmaker and a rival of Japan's quake-hit Toshiba and Elpida Memory, said it was concerned the quake may weaken consumer demand further and disrupt supplies of chip components.

"It could give a boost to battered chip prices but that's a short-term impact from disrupted supplies by Japanese companies," said Kim Min-chul, chief financial officer at Hynix. "Longer-term we are more concerned about the quake reducing overall consumer demand and disrupting supplies of chip components and equipment, which could interrupt our production as well."

Hynix shares surged almost 9% on expectations of a short-term boost to chip prices and reduced competition, while shares in Toshiba, a conglomerate whose products include semiconductors and nuclear reactors, dived 16%. Toshiba, which supplies more than a third of the NAND memory chips used worldwide in devices such as Apple's hot-selling iPad, said it was starting the process of restarting a chip factory in Iwate, northern Japan. Shares of Shin-Etsu fell 6.7% in Tokyo, while rival silicon wafter makers Sumco Corp ended flat in a Tokyo market that closed down 6.2%. Spot prices for DRAM chips, mostly used in personal computers, had started rising in China, chip price tracker DRAMExChange said.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A satellite image shows smoke and damage caused by the March 11 earthquake and tsunami at the Sendai Port in Japan.

"Especially for PC and system manufactures, they need to be more proactive in DRAM inventory for the upcoming peak season," it said in a note.

Nokia, the world's largest mobile phone maker, said it was investigating the impact on supplies. About 12% of components used by Nokia were sourced in Japanese yen but the amount of Japanese components was likely larger in its phones as Nokia has recently renegotiated its supplier contracts in Japan to cut risks from swings in the value of the yen. "Until we have concrete information to share, it would be inappropriate to speculate on the possible impact to Nokia," a spokesman said.

Steel, Solar Affected

Companies reliant on Japanese steel such as South Korean shipbuilders were also expected to face supply constraints or higher prices due to disruptions caused by the quake and its aftermath. South Korea houses the world's top three shipbuilders — Hyundai Heavy Industries, Daewoo Shipbuilding and Marine and Samsung Heavy Industries.

"The earthquake has reportedly affected around 20% of the Japanese steel production capacity," said Kim Hyun-tae, an analyst at Hyundai Securities in Seoul. "It will disrupt production in Japan, one of the major steel producers exporting 40% of its output. In contrast, steel demand will rise for damage restoration."

Nippon Steel Corp, the world's No.4 steelmaker, said it resumed shipments from all its steel plants except its Kaimishi facility in northern Japan. Rival JFE Holdings said it was forced to stop shipments at one plant near Tokyo due to a power outage. On March 14, JFE Steel Corp, the world's No.5 steelmaker, halted production at a plant near Tokyo and No.4-ranked Nippon Steel suspended operations at two small plants.

"If there is a 10% rise in steel plates, it can result in a 1.5% fall in the operating profit margin for shipbuilders," said SK Securities analyst Lee Ji-hoon, adding roughly 15% of steel plate supplies for Korean shipbuilders come from Japan.

Korean steel maker POSCO was expected to benefit from tighter supplies and pressure on prices. Its shares rose almost 9% in Seoul.

The earthquake also raised risks of lower production from Japanese manufacturers of polysilicon and wafers — materials found in solar panels that convert sunlight into electricity. Credit Suisse expects supply problems at solar wafer maker M. Setek Co, a unit of AU Optronics, whose plant is situated near Sendai town, close to the epicenter of the quake. U.S. solar panel maker SunPower could be vulnerable to wafer supply disruption as it relies on M. Setek for up to 20% of its supplies or about 200 megawatts, Credit Suisse said.

An AU spokesman said initial assessment at the M. Setek plant showed no major damage but it was unclear when production would resume. Taiwan's TSMC, the world's largest contract maker of semiconductors, said there was no immediate threat to supplies.

"For raw materials like raw wafers, gases and chemicals and spare parts, we have enough inventories to keep things running for at least 30 days," said TSMC spokesman Michael Kramer.

Other high tech producers including Taiwanese smartphone make HTC said operations and components supply had not been affected but they would be talking to alternative suppliers and monitoring the situation in Japan.

For more on the crisis in Japan, please see page 16.

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EU Chemicals Production up 10 % in 2010

Growth Led by Polymers, Basic Inorganics and Petrochemicals

Slow Growth – EU chemicals production pushed further upwards in December, increasing 3.9 % compared with December 2009, according to the latest Cefic Chemicals Trends Report. As expected earlier, December figures were lower than November due to normal seasonal slowdown, resulting in a year-on-year annual growth rate of 10.1% for 2010.

Cefic Chief Economist Moncef Hadhri commented: "The EU chemicals sector has enjoyed a strong 2010, but the industry remains about 5.6% below pre-crisis levels. The data indicate that the EU chemicals sector recovery will continue in 2011 at a slower pace, with some differences between countries and chemicals sub-sectors."

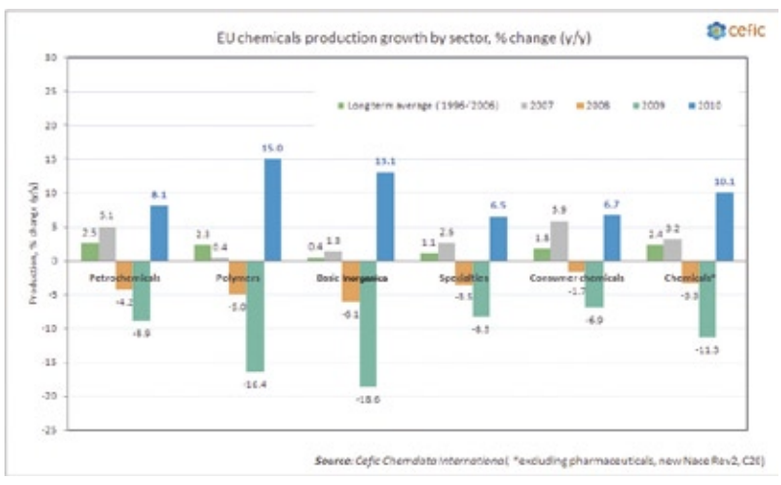

Fig. 1: Chemicals production growth by sector (% change, y-o-y)

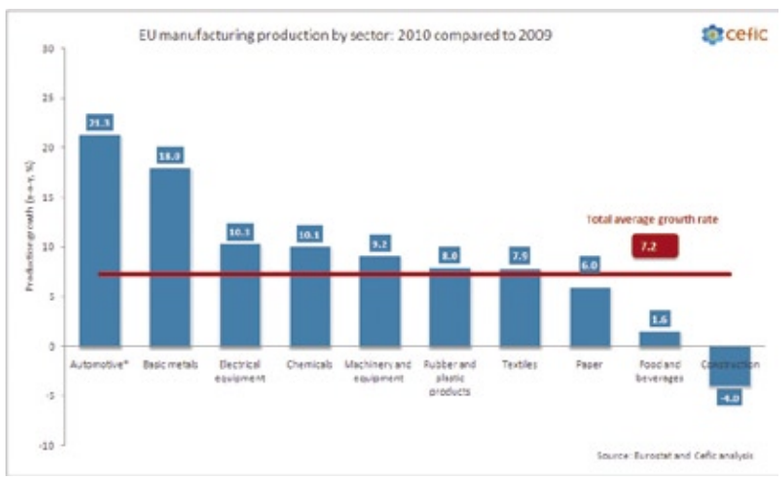

Fig. 2: EU manufacturing production growth, 2010 compared to 2009

Out Of The Abyss: Production Up 18.1% From December 2008 Low

The December 2010 EU production index was 18.1% higher than the bottom level reached in December 2008 and 3.9 % higher than December 2009. Production was up 10.1 % for full-year 2010 compared to the year prior, due to export-driven growth and increased orders from other EU manufacturing sectors.

Export-Led Recovery: Trade Surplus Up 9.7% in First 11 Months Of 2010

The EU external trade surplus for chemicals improved during the first 11 months of 2010 by 9.7% compared with the same period the previous year. The sector generated an extra-EU trade surplus of nearly €42.9 billion in the period from January to November 2010, up €3.8 billion compared with the same period in 2009. Specialty chemicals mainly contributed to the additional surplus, sectoral analysis reveals. External demand from non-EU Europe, Latin America, and emerging Asia primarily drove the EU trade surplus spike during the first 11 months of 2010.

Exports Drive Sales: Chemicals Sales Up 17.4% In First 11 Months Of 2010

Chemicals sales in November 2010 were 16.1% higher on a year-on-year basis. Exports drove sales during the first eleven months of 2010, with total sales up 17.4% compared to the same period in 2009.

Sector Trends: Polymers, Petrochemicals, Basic Inorganics Are Recovery 'Standouts'

Industry production growth continued in December for three standout sectors: polymers, basic inorganics, and petrochemicals. Polymers production rose by 15% during the whole year 2010, compared to 2009. Basic inorganics and petrochemicals rose by 13.1 and 8.1% respectively for the same full-year period.

Other chemical sub-sectors less affected by the crisis – namely consumer and specialty chemicals – have been recovering at a more modest rate. Production rose by 6.5% in specialty chemicals and 6.7% for consumer chemicals during 2010.

EU Chemicals Industry Pushes On, Production Up 3.9% In December

Customer Trends: Significant Recovery Registered In 2010 By Most EU Chemicals Consumers.

The EU chemicals sector was buoyed by EU industry, thanks to a full-year production level in 2010 expanding by 7.2% on a year-on-year basis. Industry has kept on a steady recovery path since April 2009, despite sectors experiencing different impacts from the crisis. The biggest production increases for 2010 came from automotive, 21.3 %; basic metals, 18 %; electrical equipment, 10.3%; and chemicals, 10.1%. Construction, a key chemicals customer, however, fell by 4%.

Strong increase in EU Economic Sentiment Indicator (ESI)

The latest Economic Sentiment Indicator (ESI) resumed its upward trend in February in both the European Union and the euro area, according to the February 2011 Business and Consumer Survey (BCS) published by the European Commission. The monthly survey reported that after pausing in January, the EU indicator increased strongly in February, climbing by 1.4 points to 107.2. Service sector sentiment showed a significant rise and mainly drove improvement. Most member states recorded an improvement in sentiment.

February ESI reaches above long-term average in most member states, Spain still lags

The ESI is now above its long term-average in six out of the seven largest member states, with Spain still catching up. Sentiment in industry increased further by 1.1 points in the EU The gain in confidence in this sector reflects sizeable improvements in both (domestic) order books and export order books. Managers were also optimistic about their production expectations and employment expectations. Sentiment in services rose significantly. Managers were especially upbeat about the evolution of demand observed in the past months, while they were more cautious about expected demand. Sentiment in construction increased significantly as well, although the indicator remains at very low levels. Sentiment in the retail sector weakened substantially in the European Union. Confidence among consumers remained stable in the EU. Managers in industry and services signaled a significant increase in their selling price expectations, while households also reported a rise in their assessment of past and future price trends.

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IMF Warns of Overheating in Emerging Markets

Emerging-market economies that powered the global recovery may be growing too fast for their own good as inflation pressures build, a top International Monetary Fund official said. China, Brazil and other fast-growing nations have struggled to contain inflation and control heavy inflows of investment money. Although the IMF has been warning for months of the risks of price pressure, the comments by the Fund's first deputy managing director, John Lipsky, suggested the IMF is growing increasingly concerned. "For the emerging economies, growing at 6.5 to 7%, their margins of excess capacity have been largely used up, and as a result we're starting to see incipient signs of overheating," Lipsky said. For emerging markets, cooling growth without inflicting too much damage on the global economy will require some delicate maneuvering. China has made curbing inflation its top policy priority this year. Brazil and some other emerging markets have increased taxes on foreign investors or raised banks' reserve requirements to try to slow inflows of investment money and ward off inflationary pressures.

Lipsky, however, offered only a lukewarm endorsement of such moves, known as capital controls. He said the measures may be necessary and useful at times, but those cases were "few and far between" and other methods such as adjusting exchange rates and monetary or fiscal policies ought to take precedence. ■

U.S. Supreme Court Lets 'Pay for Delay' Ruling Stand

The U.S. Supreme Court let stand a ruling that drug companies can pay rivals to delay production of generic drugs without violating federal antitrust laws. The justices refused to review a U.S. appeals court ruling that upheld the dismissal of a legal challenge to a deal between Bayer and Teva Pharmaceutical Industries' Barr Laboratories. Bayer paid Barr to prevent it from bringing to market a version of the antibiotic drug Cipro. When the Supreme Court refuses to hear an appeal, as in the Cipro case, it is not a ruling on the merits of the dispute and it does not set a national precedent. The Cipro deal, involving Bayer's 1997 settlement of patent litigation with Barr, was challenged by a number of pharmacies, which appealed to the Supreme Court. More than 30 states and various consumer groups supported the appeal.

The U.S. Federal Trade Commission has opposed such deals and has supported legislation pending in Congress to prohibit such settlements, which it says have increased in recent years. The FTC has also taken companies to court for so-called "reverse payment" deals, where brand name companies pay generic drug firms to stay out of the market. ■

Innovative Additives For Coatings

Challenges in the Market on the Rise


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Raising The Bar – Formulators of latex architectural paints and coatings have made tremendous progress in recent years and raised the bar with new product introductions. These new paint formulations not only perform better but are also demonstrating significant improvements with regard to environmental and human health attributes. Add to this a dedicated effort by many to improve the overall sustainability of their formulations while controlling costs, and one can see that the job of a formulator today is more challenging than ever.

Fortunately, paint chemists don't have to work alone. Additive suppliers like Ashland Aqualon Functional Ingredients, a commercial unit of Ashland, are dedicated to collaborating with top chemists and paint producers to develop and commercialize an ongoing stream of new and advanced rheology modifiers and other additives that help formulators achieve their goals.

Better color reproduction, improved flow and leveling, sag resistance and anti-spatter are a few of the top goals most often mentioned by formulators of premium deco paints in 2011. However, on the surface, many of these properties seem to contradict each other – better leveling with improved sag is a good example. The Aquaflow line of nonionic synthetic associative thickeners (NSATs) has been delivering a steady stream of new advancements for years. This line now includes three grades of Aquaflow XLS, a second-generation KU builder (low shear effective) that has been engineered with unique structure recovery behavior and optimized for multiple resin systems to deliver superior leveling combined with exceptional sag resistance, not previously demonstrated from NSAT chemistry.

Near-Zero VOC Paints

In addition to Aquaflow XLS, Ashland Aqualon Functional Ingredients has also developed and launched new high-shear effective NSATs (ICI builders), including NHS-350 and NMS-450 grades that are highly efficient. These not only offer cost savings potential, but because less can be used, increased free water is available to formulators. All of these new Aquaflow products, and others introduced over the past five years, are free of aklylphenol ethoxylates (APEOs), solvent-free and employ new carrier technology that lowers as-sold viscosity for easier incorporation and improved plant handling. These attributes are necessary for the newest near-zero volatile organic compound (VOC) "green" paints that have rapidly been gaining share in virtually all markets.

"The architectural coatings manufacturers in North America and Europe have been aggressively driving toward lower total VOC content for nearly a decade," said Dale MacDonald, vice president, Coatings Additives, for Ashland Aqualon Functional Ingredients.

Determining VOC Content

However the definition of VOCs in coatings differs significantly in the U.S. when compared to Europe. Europe has taken the position that any chemical or substance with a boiling point above 250°C degrees will not be counted as a VOC in paint. There are many organic solvents with boiling points just above 250°C that are effectively exempted in Europe, but at the same time may contribute to VOC in the U.S.

For many years, the U.S. has relied upon the Environmental Protection Agency (EPA) Method 24 to determine VOC content of paints. Many believe this method is inaccurate for today's low VOC formulations. There is a clear movement to replace the outdated Method 24 with a new gas chromatography-mass spectrometry method.

"Adoption of this more precise method would leapfrog the U.S. past Europe in terms of restricting more materials and raising the bar regarding what chemists and formulators must achieve to deliver low- or true zero-VOC coatings," added MacDonald.

There is also speculation that Europe and the world will soon migrate to a similar and/or common standard because major raw materials from multinational suppliers are selling to world markets.

Rheology Modifiers for Waterborne Decorative Coatings

Natrosol hydroxyethylcellulose (HEC) and Natrosol Plus modified HEC are the world's most widely used rheology modifiers for waterborne decorative coatings. Natrosol HEC is a brand valued throughout the world because of cost-effective performance, superior consistency and unsurpassed colorant compatibility. It is also one of the best rheology modifiers for creamy, in-can appearance and stability (anti-syneresis).

In 2010, Ashland introduced its newest addition to this product family with Natrosol HE 3KB, a highly efficient version which combines the most desired attributes of spatter-resistance and bio-stability in a product that often demonstrates superior brush leveling and thus, applied hiding. In addition to customer-valued performance, HEC remains one of the most cost-effective thickener technologies and also excels on the sustainability front. The cellulose ether chemistry is derived from natural, renewable wood and cotton feedstocks. In addition, HEC is typically sold as a dispersible dry powder, which means no APEO content, no added solvents or carriers and the lowest carbon-footprint impact from transportation.

It is also noteworthy that specific grades of Natrosol HEC are commonly used upstream in the paint supply chain, as a protective colloid in the emulsion polymerization of latex polymers, which are subsequently employed as primary film formers in latex paint.

Moving Away From APEO

The movement away from APEO-containing materials began in Europe, where alkylphenol chemistry was initially identified as potentially harmful to human reproductive health, particularly when it enters the water supply. This concern has spread rapidly throughout the world. Though some legacy APEO-based materials remain in use, most paint producers will not qualify any new materials unless they are APEO-free.

Ashland's line of specialty surfactants offer new grades that are both APEO-free and solvent-free, thus contributing essentially zero-VOC to paint formulations, while providing multiple benefits. These new, high-performance surfactants offer environmentally preferred alternatives to legacy, APEO-containing nonionic surfactants and wetting agents and serve to improve color, gloss and overall formulation stability. Specific types can also enhance freeze-thaw resistance and stabilize reactive pigments such as ZnO.

Ashland's Manufacturing Site in China

At the end of 2010, Ashland celebrated the grand-opening and start-up of its newest and most advanced manufacturing site in China. This world-class facility, located in the Nanjing Chemical Industry Park, and dedicated to producing Natrosol HEC products, is Ashland's fourth HEC production facility, joining those in North America and the Netherlands. In addition to high-volume local production of HEC, this investment includes an applications laboratory and state-of-the-art training facilities for our sales organization, distributors and customers. Natrosol HEC is a cellulosic polymer used as an additive in a wide variety of industrial and consumer products including latex paints, paper coatings and personal care items such as shampoos and shower gels.

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Prolonging Coating Life

Culture-Independent Bacteria Identification

Product Protection – Aqueous products such as emulsion paints, lacquers and a number of plasters partly consist of organic components that can be used as sources of nutrient by micro-organisms such as bacteria, fungi and yeasts. They are therefore susceptible to microbial attack and require optimum protection against biocorrosion. The use of microbicides is often the only way to provide the customer with a long-term stable and usable product.

Dr. Monika Lamoratta
Material Protection Products business unit, Lanxess

Dr. Frank Sauer
Head of Technical Marketing Paint & Coatings, Lanxess

For a wall paint that is to be used on a customer's property, preservation firstly prevents the growth of organisms that might be harmful to health, such as molds, and secondly the property remains presentable for longer, which means that expensive redecoration does not have to be carried out so often. Apart from avoiding risks to health, appropriate preservation therefore makes a substantial contribution to prolonging the service life of a coating, thereby saving natural resources. This shows that sustainability and economic interests are not necessarily incompatible, but can also complement each other.

Methods Of Identifying Microorganisms

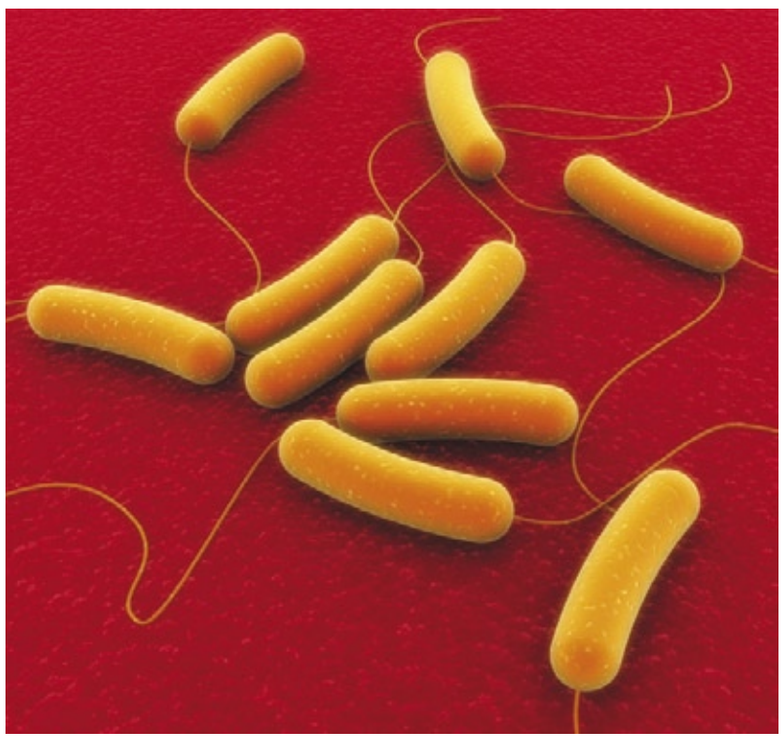
The selection of the right microbicide is based on the type of destructive micro-organisms in the product. It is usually not a single genus of bacteria, fungi or yeasts, but rather complex microbial communities that are responsible for degradation of emulsion paints. To effectively control the spectrum of destructive microorganisms, the composition of these communities must be known.

Up to now, conventional methods of identification have been used that necessitate cultivation of the affected product. There are two general methods of identifying microorganisms:

The first method characterizes bacteria by phenotyping. Here, the colony that has grown is examined, for example, for size, shape and color. This examination is normally followed by biochemical methods, such as Gram staining and oxidize reaction, which allow the search to be narrowed down to species and genus.

Another method was only recently established in routine practice that allows characterization at genetic level. This characterization is based on evolutionary changes. During the course of development, because of changed environmental conditions, different bacterial species have developed from just a few antecedents. These adaptations took place at DNA level in the information-carrying regions, the genome. Molecular-biological identification is based on differences in the genetic code. An area of the DNA that is used in practice for this is, for example, the 16S rRNA gene. The sequence of a segment of this gene can be assigned precisely to a specific species of bacteria.

With the above-mentioned method, the bacteria have first of all to be cultured in the products, and the grown colonies have to be separated. Genomic DNA is isolated from each colony and the 16S rRNA gene segment is amplified by polymerase chain reaction (PCR). By sequencing the gene segment and making a comparison with published sequences in a database, the individual organisms can be identified by family, genus and ultimately species.



Bacteria in a colored electron microscope image

The disadvantage of the methods described here is that they need a cultivation step. With this, however, because of the chosen experimental parameters such as nutrient supply, temperature and oxygen level, the result can be a preselection of certain microorganisms. Organisms which are unable to reproduce under the selected culture conditions cannot be identified by the methods described above.

This problem could be overcome using a method which is not culture-dependent. We have therefore developed a method which allows DNA-based identification of bacteria directly from an infested product, e.g. an emulsion paint.

Culture-Independent Identification of Bacterial Communities

This newly-developed method is based on the sequence-dependent separation of gene segments of the same size by denaturing gradient gel electrophoresis (DGGE).

In this case, the DNA of all the bacteria contained in the product is isolated and the respective 16S rRNA gene segments are then amplified. If there is infestation by a bacterial community, a mixture is obtained of 16S rRNA gene segments of the same size, which only differ from one another in their sequence. This mixture is then separated by DGGE according to sequence.

This separation is possible because gene segments with different DNA sequences have different melting points, i.e. the type and frequency of the building blocks of a DNA sequence determine the temperature at which the DNA double strands separate from one another. This characteristic is utilized in electrophoresis as a partly separated strand of DNA is less mobile in the gel than a double strand. A mixture of 16S rRNA gene segments can therefore be separated using this method.

The fragments that are now separated from each other are sequenced and compared with known DNA segments in a database. Ideally, using this method, a specific number of identification results is obtained which reflects the number of contaminating bacterial strains in the product.

Direct DNA Isolation from Contaminated Products

To be able to use this method in practice, bacterial DNA have to be isolated from emulsion paints and the gene fragments have to be optimally separated from each other in the DGGE. This was tested in a test system with three strains of bacteria, Escherichia coli, Pseudomonas aeruginosa and Staphylococcus aureus in the same bacterial concentration in three different paint systems. Typical external emulsion paints with a base of pure acrylic, styrene acrylic and polyvinyl acetate binders were used.

This simple method of DGGE should allow individual species to be identified from a mixture of bacteria or directly from the paint. For this, isolated DNA was amplified and the corresponding gene fragments separated by DGGE.

As expected, all the organisms from a mixture of bacteria were identified with a high degree of conformity. Somewhat surprisingly, from a contaminated emulsion paint, only the Pseudomonas aeruginosa species was prominently represented.

A comparison of the methods shows that culturing gives a varying number of identification results (table 1), with the non-culture-dependent DGGE method allowing a rather more accurate identification as regards the Pseudomonas species found.

Table 1: Identification results from contaminated emulsion paint using two different methods

With culturing
Comamonas testosteroni
Flavobacterium mizutaii
Pseudomonas aeruginosa
Delftia tsuruhatensis
Pseudomonas sp.
Microbacterium keratanolyticum
Independent of culture
Pseudomonas fluorescens
Pseudomonas putida

The fact that relatively fewer bacterial species were found directly from a coating product compared to an artificial mixture of bacteria could be an indication of the fact that not all bacterial strains that are present are equally involved in the destruction of the product. Separation using DGGE correlates to some degree with the concentration of bacterial DNA in the paint. To this extent, DGGE can be regarded as a semi-quantitative method. Thus, the bacteria detected by DGGE could be the dominant species in the coating product which are mainly responsible for destruction of the product.

With the conventional method the growth of these bacteria, which may be insignificant in terms of destruction of the paint, is also promoted. This means that the presence of these strains of bacteria would be substantially overvalued.

'As Much As Necessary, As Little As Possible'

The results show that it is possible in principle for a bacterial community to be identified by DGGE without culturing. Regarding contaminated products such as emulsion paints, at present fewer strains are identified than with the conventional method. It seems possible, however, that optimization of the DGGE method would close this gap, thus providing new insights into the processes involved in the destruction of paint in the container which would allow the user, in line with the motto "As much as necessary, as little as possible," to protect products not only effectively but also in a sustainable way.

Monika Lamoratta and Frank Sauer, Lanxess

▶ www.lanxess.com

chemanager-online.com/en/tags/coatings

Binders: Master Ingredients of Paints

Ter Group Distributes Polysil Binders for Polypropylene Coatings

Agreement – The leading supplier of chemical raw materials Ter Group signed an agreement with Polysil Sales for the international distribution of binders designed for polypropylene coatings effective as of Jan. 1.

The Ter Group is primarily engaged in the distribution of specialty chemicals and the global trading of chemical raw materials for the manufacturing industries: paints and coatings, adhesives, food and feed, cosmetics, plastics, glass fiber composites, paper and various other specialty industries. Alongside the wax business, trading of gum rosin has a long tradition within the Ter Group. From its Hamburg-based headquarters, the Ter Group manages its international subsidiaries, successfully operating a global position of procurement, selling and logistics.

The company Polysil was founded in 2005 in Wolfsburg, Germany, involving Auto Vision, a 100 %-owned subsidiary of Volkswagen. The strategic objective was to develop paints that adhere strongly and permanently on polypropylene (PP) surfaces, without any pre-treatment like flaming, fluorination or plasma treatment. Polypropylene is one of the world's most important thermoplastic materials for the automotive industry, but is also used for many other applications in industrial and consumer products.

The Polysil products enable the varnishing of polypropylene without pre-treatment and therefore achieve cost reduction as well as an improvement in quality. By appliance of Polysil costly and complex pre-treatment of PP may be avoided, significant quality risks will be reduced to a minimum.

Polysil products contain substances which polarize the surface of polypropylene immediately after application. Hence hetero atoms are deposited on the polypropylene surface. Electro-chemical interactions result in a particularly strong and permanent adhesion of the paint on the PP-surface.

Polysil high-tech products are innovative and of excellent efficacy. Besides solvent-based and water-borne primers and single-layer coatings, Polysil offers binders for the ink and coatings industry, which are marketed and distributed by Ter Group.

Binders are the master ingredients of paints. Binders are polymers (resins) forming a continuous film on the substrate surface. Binders are responsible for good adhesion of the coating to the substrate. Binders hold

the pigment particles distributed throughout the coating. Binders are dispersed in a carrier, which can be water or anorganic- based solvent.

Polysil binders are available as solvent-based and as water-dilutable products with excellent adhesion to non-pre-treated polypropylene (PP) and a wide variety of other plastic substrates such as ABS, PC and others.

Polysil offers three types of binders:

- Solvent-based Polysil binder for 1K paints is a hydrolysis-resistant and xylene-free binder based on modified acrylic copolymers.
- This binder is used for the formulation of primers and direct-to-plastic applications such as base coats, single layer coats and printing inks with outstanding stability against alkaline solutions, acids and salts, water, humidity, low temperatures, etc.
- Solvent-based Polysil binder for two pack paints is a modified acrylic resin cross linking with polyisocyanate. Due to its good heat resistance it withstands forced drying up to 100 °C. This binder is used for the formulation of two pack primers as well as matt and glossy single-layer two pack coats.
- Water-dilutable Polysil binder is a modified self-crosslinking acrylic dispersion with different Tg values. This binder is used for the formulation of primers, printing inks and direct-to-plastic applications. It forms films at room temperature and facilitates formulations free of VOC.

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Termeer to Walk Away from Genzyme with About $160 Million

Genzyme Chief Executive Henri Termeer is set to walk away with nearly $160 million when the sale of his company to French drugmaker Sanofi-Aventis is final – and stands to earn considerably more should Genzyme's multiple sclerosis drug prove as successful as Termeer has predicted.

Termeer is set to receive compensation of $145.9 million from his Genzyme shares, stock options and restricted stock units on completion of the $20.1 billion deal with Sanofi, according to a regulatory filing.

The longtime CEO would also receive $12.5 million in a change of control payment if his employment were terminated with or without cause, according to the filing. Termeer has already said he would leave the company following a brief transition period, which would trigger the additional payment.

In addition to the agreed upon $74 per share price for Genzyme stock, each shareholder will receive one contingent value right (CVR) per Genzyme share, which could increase in value to a maximum $14, primarily based on the company achieving sales milestones for its experimental MS drug Lemtrada. The CVRs will trade separately on Nasdaq. If Lemtrada's annual sales eventually hit $2.8 billion and the company reached earlier manufacturing and regulatory goals, Termeer's take would be an additional $62.8 million from his CVRs, according to the filing. ■

Dow Plans Halt of Dutch Naphtha Cracker

Dow Chemical plans to halt operation of a LHC-1 naphtha cracker at its Terneuzen plant in the Netherlands for maintenance until April 25, the company said.

Three naphtha crackers operate at the Dutch plant, and the ethylene-producing LHC-1 unit has the capacity to process 215 tons of naphtha per hour, a person who works at the Dow Chemical cracker said. The Terneuzen plant has the capacity to produce around 1.8 million tons of ethylene per year, according to 2009 figures published by the Association of Petrochemicals Producers in Europe. ■

Harmless Is Not Enough

The Evolution of Protective Coatings

Everlasting Construction – Healthy buildings are a topical issue within the modern construction industry, and coatings play an important role. High-performance coatings solutions that offering extra benefits such as weather- and wash-resistance, UV-protection and other qualities are required to build an everlasting construction. One of the essential additional qualities is bacterial defense.

Antibacterial coatings are being designed not only for applying on walls and ceilings but also on everything human beings have contact with. Nowadays advanced doorknobs, window frames, air conditioners and refrigerators are treated with a special antibacterial coating. Various substances are being used as antibacterial agents: formaldehyde, diuron, chlorine-containing solutions, silver and other metal compounds.

With regard to internal coatings, in its recent study on "Coatings Markets for Healthy Buildings" Frost & Sullivan reports a shift from nanosilver to regular forms of silver. Furthermore, the importance of copper as an antimicrobial agent is on the rise.

Mariya Novak
NanoUnion

Nanocarboxylates – an Eco-Friendly Alternative to Toxic Nanoparticles

The key factor in making the product ecologically friendly centers around erosion-explosive nanotechnology. This cutting-edge technology was developed by a group of Ukrainian scientists in June 2009.

To put it simply, a series of electric explosions facilitate a release of energy. Vast amounts of energy compel the metal to break into pieces. The dispersed particles are called nanoaquachelates (nanoparticles in aqueous solution). In order to even out the number of particles per volume unit, citric acid is added. The derived aqueous solutions of metal nanoparticles have become known as "nanocarboxylates."

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Owing to the invented technology, nanocarboxylates retain the original qualities of the metal (e.g. antibacterial for silver, antifungal for copper, etc.), being at the same time entirely organic and ecologically friendly. A multitude of minuscule-sized fractions enhances the active surface by 1,013 times. Thereby, beneficial properties of precious metals are maintained and significantly increased.

This technology resulted in creation of a range of antibacterial coatings under the TopPro brand. NanoScreen, the antibacterial complex, contains silver, which is a powerful antibacterial agent, and copper, which accentuates the antibacterial qualities of silver and adds antifungal properties. Ions penetrate the microorganism, destroying the protective functions of microbial cells, inhibit the respiratory chain of enzymes, oxidize reactions and the fission process. This leads to the death of the cells.

While the majority of existing antibacterial paints have a short-lived immediate effect, TopPro offers an active, long-lasting antibacterial protection. The results of the ongoing study show that TopPro remains effective 12 months after the application. The technology applied in the new product does not foresee any evaporation of the antibacterial agent. Thus, it is expected to be effective as long as the coating is physically present on the surface.

Harmless Is Not Enough

The concept of environmental friendly modern coatings is supported by antibacterial or antifungal properties. Such coatings should not only be free of toxic contaminants (sulfates, nitrates, phosphates, chlorine, aldehyde, etc), they should be at the same time aimed at improving the air quality in the premises, providing prolonged bacterial protection.

TopPro's current lineup consists of two products. TopPro Essential is a waterborne silky-smooth acrylate, silicone-based antibacterial coating for interior works. And TopPro Umbrella, which is a waterborne silky-smooth, water-resistant silicone-based coating for interior and exterior works. Two more products are about to be launched this year. TopPro Synergy is an energy saving insulation solution for interior and exterior works and TopPro Freeze is a fire-resistant intumescent coating for interior and exterior works. The company's R&D is working on future lineup developments: antibacterial primers and tiles caulks, as well as antibacterial resin flooring solutions.

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Roche's Strong Pipeline Leaves Shareholders Optimistic

Bruno Keller, a Roche shareholder for the past 10 years, is so confident about the Swiss drugmaker's prospects after a turbulent year that he is giving his wife Roche stock for her birthday. "I am going to instruct my banker to buy some stock this afternoon," Keller told Reuters after the group's annual general meeting. "This is a birthday present for my wife."

Roche shareholders had a bumpy ride last year when the group hit a number of product setbacks, rattling investor confidence and shaving around a fifth off the company's value. But many long-term investors said in Basel they believed in the group's future prospects thanks to its pipeline, which Roche Chairman Franz Humer described as the best in the industry at the annual shareholder meeting. "We are doing the right thing. We have to have patience and wait for these things to mature. I have full confidence that this will be reflected in the stock price," Humer said when a shareholder questioned the stock's performance. The trust that the

vast majority of Roche's shareholders are putting in Humer and Chief Executive Severin Schwan underscores the stable shareholder base the group has.

Roche shareholders backed a 10% dividend hike to 6.60 Swiss francs per share and non-voting equity at the AGM, increasing the appeal to investors. Roche stock has risen over 2% so far this year, outperforming a 5% drop in Novartis shares and a near-flat performance for the European healthcare index. ■

Pandit, Ambani: Global Deleveraging Still a Challenge

Global deleveraging remains a challenge as economies are still recovering from the financial crisis, the chiefs of Citigroup and Reliance Industries said, agreeing that emerging markets will drive growth.

"The imbalances that caused the financial crisis still need to be worked out," Citigroup CEO Vikram Pandit said at a panel discussion at a meeting of the Institute of International Finance in New Delhi.

"There is high debt in developed markets, high deficit, trade imbalances. And the migration towards emerging markets is clear," he said.

Vikram Pandit
Citigroup CEO

Billionaire Mukesh Ambani, chairman of India's largest listed firm Reliance Industries, said he would not celebrate a recovery yet.

"We still have to see a roadmap to deleveraging," said Ambani, ranked Asia's richest man by Forbes with a net worth of $29 billion. "The debt has not gone away, we have got some breathing time. We have to have a path and it has to be transparent to all of us. That is still not seen and that is why the lack of confidence and the high amount of money on corporate balance sheets."

Mukesh Ambani
Chairman of Reliance Industries

Ambani said India and other emerging markets were insulated from the global financial crisis that started in the U.S. and sent rippling effects through the world in 2008.

Ambani said he expected India's economy to reach $5 trillion by 2022 or 2025, from its current level of $1.3 trillion. In comparison, China's economy has already hit $5 trillion.

"The emerging market story is only going to become stronger, and I clearly see India leading the way," Ambani said. He also predicted that India will be the fastest growing economy in the world in five years. "Our challenge within India is this growth has to be inclusive. It is very important that benefits of growth go to all sections of society." ■

Teva's Shlomo Yanai Sees Benefit from Obama Health Reforms

Teva Pharmaceutical Industries, the world's largest generics drugmaker, said it stands to benefit from the Obama administration's healthcare reform and other plans aimed at getting cheaper medicines to the U.S. market.

"The healthcare reform and biologics reform are going in the right direction from Teva's perspective," Teva Chief Executive Shlomo Yanai said recently.

"If we take the healthcare potential future for us, we see an additional 31 million Americans that would buy medicine they cannot afford today and probably buy generics and not the very expensive innovative products," he said.

In February, U.S. President Barack Obama, as part of his 2012 budget proposal, called for cutting the number of years drugmakers could exclusively market brand name biologic drugs to seven years from 12. Teva saw its generic sales in the U.S. rise 16% in 2010 to $5.8 billion.

Its shares have dropped more than 8% in the wake of fourth-quarter results that missed expectations and a 2011 profit outlook that fell short of forecasts.

Teva has estimated revenue in 2011 would rise about 17% to between $18.5 billion and $19.0 billion while earnings per share before items would reach $4.90 to $5.20. Analysts were expecting revenue of $18.98 billion and adjusted EPS of $5.30, according to Thomson Reuters I/B/E/S.

He said a new logistics center, in which Teva invested more than $100 million, will help the company streamline its operations in Israel by unifying its distribution and being near Israel's international airport and main highways.

"It will save us a lot of money," Yanai said, adding Teva will see its investment returned in five years. ■

BASF to Divest 'Major Parts' of Nitrogen Fertilizer Business

BASF is preparing to divest "major parts" of its nitrogen fertilizer business, which is under pressure from low-cost producers in the Middle East. The company said that the operations it is putting on the block account for less than 1% of its group annual revenue, which would be less than €640 million ($885 million).

The businesses, with a combined annual capacity of about 2.5 million tons of fertilizer, comprise plants in Antwerp, Belgium, and BASF's 50% share in its PEC-Rhin joint venture with France's Total.

German fertilizer producer K+S said it is looking at a part of the operations put up for sale.

BASF did not name prospective buyers but said it plans to complete the transaction by the first quarter of 2012.

German potash fertilizer specialist K+S, in which BASF holds a 10% stake, in 2000 agreed to market BASF's nitrogen products, but the business is grappling with low-cost rivals.

Middle Eastern chemical companies such as SABIC, are using their cheap access to natural gas, the feedstock needed for nitrogen, to boost their fertilizer businesses.

BASF added it would not sell the nitrogen plants at its Ludwigshafen, Germany, headquarters because they are too closely tied with its other operations. ■

The Hidden Market

Demand for Adhesives and Sealants is on the Rise

Sticking Together – Adhesives and sealants are specialty chemical products whose demand is increasing steadily – not only in well-established applications but even more so in innovative and high-tech end-use markets. While they are designed and expected to perform in increasingly sophisticated applications, their importance is evidenced typically when their service fails.

The Global Demand

The global usage of adhesives and sealants represented a market of 12.2 million tons of formulated products in 2010 and a value of €30 billion. Within the total chemical market, adhesives and sealants hold a share of less than 1% and are viewed as a specialty market.

The worldwide economic crisis in 2008 and 2009 caused the level of the global demand for adhesives and sealants to drop 5–6%. Growth resumed in 2010, which was supported by a recovery in the industrialized nations and a strong upswing in the emerging markets (China, Brazil, India, Eastern Europe).

In 2010, the Asia-Pacific (APAC) region reached a demand volume similar to that in the Europe-Middle East-Africa (EMEA) region. Together the two regions controlled 70% of the world demand for adhesives and sealants, followed by the Americas.

The growth projections 2010–2013 include a particular strong growth expected in the APAC region, which will make it the largest global market in 2013. While the global demand for adhesives and sealants is projected to average an annual growth of 4–4.5%, the demand in China and India is expected to grow at nearly twice the rate of the global demand.

Market Segments

The market for adhesives and sealants is comprised of thousands of end uses. The realm of market applications expands as new end uses keep developing, driven by the need for new and innovative attachment solutions.

According to the Classification of Adhesives and Sealants established by the industry associations such as FEICA (Association of European Adhesives and Sealants Manufacturers in Brussels) and the ASC (Adhesive and Sealant Council in the U.S.) the market is divided up in eight broad market segments. These market segments can in turn be broken down into many sub-segments.

When looking at the total market, adhesives account for about 75% of the volume consumed and sealants 25%.

Adhesive And Sealant Products

Adhesives and sealants are also classified by the technologies and by the polymers used for formulating the products. Four technologies and about 15 polymer classes serve as bases for meeting the bonding and sealing performance requirements worldwide.

	Formulating Technologies			
Polymer Base	Water Borne	Solvent Borne	Reactive	Hot Melts
Vinyl				
Acrylic				
Rubber (Nat. + Synth.)				
Natural Products				
Polyurethane				
Block Copolymers				
Epoxy				
Silicone				
Other				

Legend: Polymer demand by technology — Prevalent | Moderate | Small

Technologies

Water-borne systems account for more than 50% of the global demand for adhesives and sealants. Their primary use is in converting/packaging and building/construction applications, and their growth is about equal to the average growth rate defined for the entire market.

Solvent-borne systems are primarily used in contact adhesives in construction applications, as well as in adhesives for footwear, leather and various assembly applications. The usage of solvent-borne adhesives is increasingly restricted by VOC regulations. Therefore the demand for this technology is growing below the average rate projected for the adhesive and sealant market. Solvent-borne systems tend to be substituted by safer water borne, reactive and hot melt products.

Reactive systems are chemically reactive adhesives and sealants. These systems are growing at a sustained rate as the technology prevails in sealant formulations and in structural adhesive bonding. Reactive systems are available as one and two-part systems.

Hot melts are 100% solids systems that find primary application in packaging/converting, woodworking/joinery and other product assembly adhesives. The demand for this technology is growing at a rate higher than the industry average.

Raw Materials

Four major raw material classes – vinyls, acrylics, rubber (natural and synthetic) and polyurethanes serve as polymer bases for nearly two-thirds of the adhesives and sealants consumed worldwide. These polymers can be used in various technologies and their usage is spread across many market applications. In some end uses, the demand for these polymers qualifies as mature and is growing more slowly than the total market.

Other competing polymers are gaining gradual market share. Epoxies, silicones, natural products such as starches and dextrins, and the block copolymers belong to the next tier of raw materials that are more market-application specific. They usually experience above-average growth through market penetration and the displacement of commoditized raw materials.

Other raw material types include reactive modified acrylics, cyanaoacylates and anaerobics, silane modified polymers, polysulfides and various polyolefins. These raw materials represent for the most part high-value added polymers used in niche markets.

Market Trends

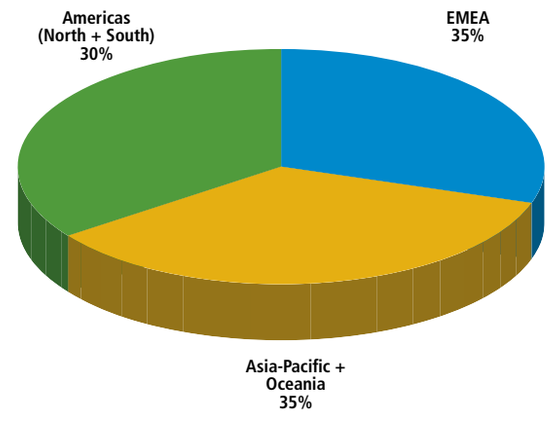
The growth of the emerging markets has not only a positive impact on the volumes of adhesives and sealants consumed (especially in the construction and industrial sectors) but also on the level of technological demand. The new industrial plants being installed and infrastructure developments taking place in the emerging markets tend to call for modern, state-of-the-art bonding and fastening techniques, which has a leap-frogging effect on the demand for adhesives and sealants.

In addition to the positive macroeconomic effects of the geographic growth, the effort to improve energy efficiency and reduce CO_2 emissions is also a major force driving the demand for adhesives and sealants. The following end-use market trends are providing for a long-term sustainable growth of the demand worldwide:

- The increasing use of new lightweight assembly materials used in the transportation and the wind energy (rotor blades) sectors requires adhesive bonding rather than mechanical fastening.
- Improved building energy efficiency is stimulating the use of insulation panels as well as insulated windows. The attachment of panels together with the production and installation of insulated windows generate sustained demand for construction adhesives and sealants.
- The miniaturization trend and complex designs seen in industrial and consumer goods creates an assembly challenge. Adhesives are increasingly displacing the use of mechanical fasteners for bonding elements that are difficult to reach and where space is restricted – mobile phones being a typical example.
- Noise and vibration damping in mechanical engineering and in the transportation sector are growing in importance and creating new applications for adhesives and sealants.

On a less positive note, the adhesive and sealant industry is also experiencing the current negative effects of rising raw material and energy costs as well as the raw material supply disruptions.

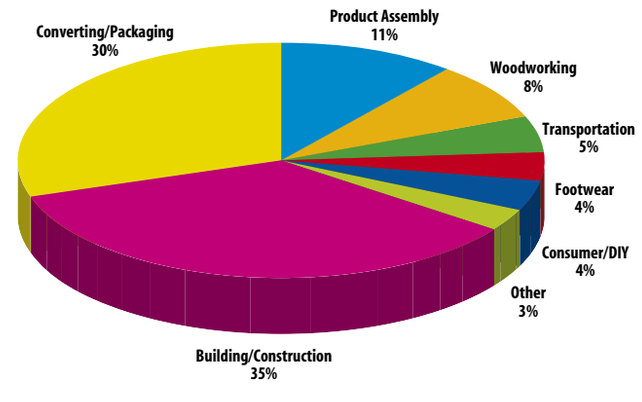
World Demand for Adhesive and Sealants 2010: Fig. 1
12.2 Miilion T., € 30 bn



Source: CHEM Research/DPNA International © GIT VERLAG

Regional markets

World Demand for Adhesive and Sealants 2010: Fig. 2
12.2 Miilion T., € 30 bn



Source: CHEM Research/DPNA International © GIT VERLAG

Market segments

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Production

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Production

Find out how automation keeps chemical production plants efficient

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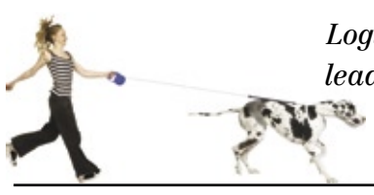

Logistics

Logistics providers should take the lead in showing customers the way

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Logistics

How to identify, develop and retaining tomorrow's supply chain talent

Page 14

Helsinn Plans New Cytotoxic Plant Helsinn Advanced Synthesis has announced plans to build a new CHF 20 million cytotoxic plant at the company's Biasca, Switzerland site. Helsinn Advanced Synthesis' General Manager Paolo Guainazzi said that Helsinn's expertise in highly potent compounds would allow for a smooth transition into the cytotoxic market. Commission for laboratory projects will commence in Q1 2012.

The laboratory will include dedicated areas for R&D and QC: in addition one small scale GMP area will be available for the production of reduced quantities of cytotoxic APIs for clinical and registration purposes (grams to hundreds of grams). The layout, personnel, and material flow for the lab and production area are designed to be completely independent from the existing API production plant.

The cytotoxic plant will have two different production areas. Both production areas are designed to process one product at a time. The first production area will have three reactor units.This equipment includes 1 × 250L S.S. glass-lined Reactor; 1 × 250L Hastelloy C2000 Reactor; 1 × 400L Hastelloy C2000 Reactor; and 1 × 0.125 m³ Hastelloy C2000 Filter dryer within a glove box. This area will be able to produce up to 10KG per batch. The second production area will also have three reactor units.This equipment includes 1 × 630L S.S. glass-lined Reactor; 1 × 630L Hastelloy C2000 Reactor; 1 × 800L Hastelloy C200 Reactor; and 1 × 0.25 m³ Hastelloy C2000 Filter dryer within a glove box.

This area will be able to produce up to 20 kg per batch (hundreds of kg/year).The operative conditions of the production area of the cytotoxic plant will range from –80 °C to +160 °C for temperature and full vacuum up to +6 bars for pressure.

BASF To Build 2nd Sodium Methylate In South America BASF said it will build an additional production plant for sodium methylate in South America. Argentina is the planned location for the second plant with an annual capacity of about 60,000 metric tons. The construction of the plant is planned at BASF's General Lagos site in Rosario, which is in the center of Argentina's biodiesel production. The start of operation for the first sodium methylate plant in South America, located in Guaratinguetá, Brazil, will take place as scheduled at the end of 2011.

BASF said it expects about 20% of the annual global demand for biodiesel, which is about 30 million tons, to come from South America in 2015.

DSM JV to Build Composite Resins Facility in China DSM announced that its joint venture Jinling DSM Resins (JDR) will invest approximately €50 million in a new production facility for composite resins in Nanjing, China. The new facility, which will replace the current facility, will be among the largest manufacturing plants for composite resins in the world. DSM's share in the investment is 75 %.

The new facility will substantially strengthen the local position of the joint venture in the markets for composite materials in China. DSM holds 75 % of the shares in JDR whereas Sinopec Assets Management holds 25 % in the joint venture. The expansion follows on the continued strong demand for high-end resins in all the application segments in the region. The new unit is expected to come on stream early 2012.

SABIC, Exxon Mobil Chemical to Build Only 1 Rubber Plant Project SABIC said it would build only one rubber plant project, in Jubail on Saudi Arabia's Gulf coast, instead of two as originally planned. When SABIC and Exxon Mobil Chemical first announced the rubber project, they said the expansion would include the Kemya joint venture between the two companies and their other venture, Yanpet, which is based in Yanbu on the Red Sea coast. But SABIC said in a bourse statement it would go ahead with only one of those ventures, since the Jubail location provides better synergies with the Kemya petrochemical facility.

The capacity of the project is little changed at more than 400,000 tons per year of carbon black, rubber and synthetic polymers for domestic and international sales. SABIC said work on the detailed engineering designs had reached an advanced stage. It did not say what the cost of the project would be, although an executive from Exxon Mobil Chemical had said it would cost $5 billion.

Kayan Inks Deal With Saudi Firm And Dow-Aramco Saudi Kayan Petrochemicals has signed a preliminary agreement with Saudi Acrylic Acid (SAAC) and a joint venture between U.S. Dow Chemical and Saudi Aramco to build a 1.8 billion-riyal ($480 million) n-Butanol plant in the kingdom.

Kayan said in a bourse statement that the three partners will each hold an equal stake of 33.3 % in the plant and would share the costs of the project. The plant, designed to have an annual capacity of 330,000 tons of n-Butanol, will be located in Jubail and operated by SAAC, Kayan said.

Production is due to start in the second half of 2014. Kayan, an affiliate of petrochemicals major SABIC is expected to begin commercial production at its Jubail petrochemicals complex in the second half of the year. Aramco and Dow plan to build a $20 billion mega petrochemical project in Jubail.

ARC Advisory Group's Vision of Evolution

From DCS to a Collaborative Process Automation System

Conceptual Model – A Vision of Collaborative Process Automation System (CPAS) is the ARC Advisory Group's vision of how process automation systems should evolve through the next decade. CPAS does not describe any particular commercially available system, but rather it presents a conceptual model as a vision. While the technologies associated with CPAS are available and proven, not all are currently available within any single offering. In this first part of the two-part series, ARC's Director of European Research David Humphrey looks at the evolution and history of process automation systems.

David Humphrey, Director European Research, ARC Advisory Group

CPAS is an application-enabling environment for process control, advanced process control, and operations management applications that also includes human empowerment applications such as decision support and advanced analytics. CPAS spans from sensors and actuators to ERP interfaces. To minimize confusion, CPAS does not recognize software such as MES or HMI SCADA as subsystems, but rather addresses these as classes of applications. Within the constraints of the IEC 61131-3 programming and configuration standard, CPAS incorporates a single model with distributed processing and shared services. It is data-driven, all-digital and based on international standards. CPAS systems are inherently robust, deliver high accuracy with low total cost of ownership (TCO), and support a high level of collaboration. The CPAS concept is the product of several decades of technological process automation evolution, each with its specific characteristics and focus.

The Computer Integrated Manufacturing Decade

The CPAS vision began with the introduction of computer-integrated manufacturing (CIM) in the 1960s and 1970s. CIM was ahead of its time and largely an academic exercise because the necessary supporting computer and network technology was not yet in place. Focused on supervisory applications, its primary value was to validate what was possible and set the stage for future developments. The Purdue Operations Model, model-based predictive control, and optimization came out of the CIM era.

The System (DCS) Centric Decade

The 1970s brought us the microprocessor and distributed process automation in the form of the first distributed control systems (DCS). These marked the transition from analog technology to the greater precision of digital technology and used IEEE 802.4 token passing communication because of its determinism. These systems were essentially proprietary in nature with closed communications.

The Network-Centric Open Systems Decade

The next decade (mid 1980s through mid 1990s) began to address the proprietary nature of systems and brought us the "network-centric open system," with much of the associated technology developed by the U.S. Department of Defense (DOD). The DOD developed the first open standards-based operating system, Unix, and more importantly, a truly state-of-the-art standards-based networking technology, IEE 802.3 Ethernet TCP/IP.

Rather than using token passing, Ethernet uses collision algorithms (CSMA/CD). This networking technology enabled client-server computing, the internet and, ultimately, CPAS with global data access. Most process automation system suppliers were late to embrace Ethernet because they believed it was not deterministic enough – which later proved not to be the case. Object management (not to be confused with object programming) describes the ability to organize related data or information into a common structure, perform higher-level operations on it, and interact with it as a defined entity.

This decade also saw the introduction of the first commercially available process data historians. Since most process control systems at the time had not yet embraced Ethernet, most systems became historian-centric with respect to data access for supervisory applications. Ultimately, Ethernet TCP/IP became ubiquitous as the state-of-the-art networking infrastructure for process automation and enterprise systems.

The Application-Centric Decade

A common foundation for networking made it possible to incorporate process control and information into the same application environment, making possible the application-centric decade (mid 1980s to mid 1990s). It also heralded the Windows environment as the presentation vehicle of choice. This marked the point in the evolution of process automation technology where the focus shifts from the underlying technology to application-enabling technology. Many major advances were built on internet technology, most significantly Ethernet and TCP/IP, which enabled the CPAS concept of the "Common Information Infrastructure." In essence, this collapsed the traditional DCS architecture onto a common network backbone by allowing the process control and supervisory applications to interact in automation configurations in exactly the same way that Internet applications interact. It also provided a vehicle to integrate standards-based fieldbus technology into the same infrastructure and to exchange data using the same mechanisms.

Object management (not to be confused with object programming) is a major beneficiary of this technology. It describes the ability to organize related data or information into a common structure, perform higher-level operations on it, and interact with it as a defined entity. Examples of object management are the grouping of objects associated with a unit operation and performing global functions like alarm suppression with a single action, or creating inheritance or association between different objects. Object management is an important capability when the process to be controlled is functionally decomposed for advanced functions.

Up until the application-centric decade, there were an unlimited number of approaches for describing, designing, interfacing and programming applications. This decade delivered the ISA88 common reference model for structuring process control applications, which is applicable to continuous, batch, and discrete process control. It also brought us the ISA95 reference model for operations management applications. Finally, it brought us IEC 61131-3; an international standard that organizes and prescribes the most commonly used process control languages and configuration.

Maintenance is the second largest controllable cost in a typical process plant. In the application-centric decade, predictive maintenance, which is about one-tenth the cost of routine maintenance, drove the need for plant asset management (PAM) applications. Most process automation systems incorporate PAM extensions, but with varying success. PAM began as a maintenance facility for automation field devices, but now reaches into automation assets themselves as well as into the plant production assets that automation controls.

With the introduction of information technology into process control systems, it was inevitable that Windows, the operator interface of choice, would soon follow. Object Linking and Embedding for Process Control (OPC) technology also gave us a basis for interfacing Microsoft-based applications with both organized and disparate data and information. Traditional OPC is a de facto standard communication protocol for non-mission-critical applications. OPC-UA (Universal Architecture) promises to be more robust and deterministic.

The Business-Centric Decade

The previous four decades were a precursor for the current business-centric decade because at this point, the focus is continuing to evolve from the underlying and application-enabling technologies to actually improving business performance. The business-centric decade introduces some significant capabilities. These include identifying potential incidents in time to avoid them, operating on an exception basis, automating operations management work processes to support a knowledge management workforce, operating proactively based on predictive modeling, and finally, unifying business and manufacturing work processes.

The Emergence Of CPAS

When the benefits of utilizing information technologies in process plants became obvious, the major process automation companies brought new systems to market, marking the evolution to the next generation of automation systems. Each system differed based on how a specific supplier viewed the problems to be solved and its perceived solutions to those problems.

This led to a period of confusion for users, with several major operating companies retaining the ARC Advisory Group to draft the vision for a system that supported process control, advanced process control, and operations management applications, complemented by human empowerment applications such as decision support and advanced analytics. This vision needed to include general guiding principles, while also providing enough detail to allow in-depth internal discussions as well as productive problem-solution discussions with external suppliers. This effort resulted in the Collaborative Process Automation System, or CPAS.

Part two of this series, which will cover the CPAS vision and guiding principles, will be published on April 14.

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Improving Efficiency

Automation Keeps Chemical Production Plants Deft

Highest Levels – With state-of-the-art automation procedures, it is possible to reach significantly higher levels of efficiency in chemical production plants. These objectives can be achieved within a short time and at moderate expense, usually with an excellent cost-benefit. The field of application is wide. In the control area, there are many benefits to using a model-based concept over PID control (proportional-integral-derivative-controller). In the management area, PIMS (plant information management systems) are gaining importance.

Wolfgang Albert
Senior Manager
Automation and Process Management,
Evonik Degussa

Model-Based Concepts Vs. PID

The "normal" functions of an automation system are feedback and feed-forward control. This includes interlocks as well as sequential functions. Safety functions, alarms, process states and their visualization and means to act on the process are also a part of the basic function set of a DCS (distributed control system). Being able to identify improvement potential on this level requires sound knowledge of production processes. The team has to be able to choose the right tools, find the optimum in the relevant production process, and judge the robustness of the installed applications. Moreover, it is absolutely essential that people from the production environment be involved in basically every step of the automation process. If the project team fails to do so, the whole project is doomed to fail. This may sound trivial, but it really is not. Model-based approaches have been on the scene for 15 years now, but PID controllers have been there for more than 50 years.

There are two objectives to aim for. Process oscillation should be reduced significantly. Process transitions, that is, going from operating point A to B, should be accelerated without violating any given process restriction. Using a PID is like driving a car with an opaque windshield. The driver may use the side window and try to keep the car in the lane by maintaining a constant distance to the guard rails or some other road boundary. In this case, the driver is aware that he/she is turning only if this distance changes. This is definitely a complicated approach to driving a car. By contrast, using a model-based control concept is like seeing through a freshly wiped windshield. The driver sees what is in front of him/her and he/she can take action early on. This is surely a better way to perform this given task.

Model-Based Control

The example of temperature control in a fermentation process shows the benefits of model-based approaches to the chemical industry. Periodically, water has to be injected into different fermentation tanks. For the water to remain aseptic, it must be heated to about 90 °C. Since this temperature would kill the biomass in the fermentation reactors, the liquid has to be cooled to 30 °C before it is injected. The faster this lower set-point is reached, the sooner water can be injected. This, of course, saves batch time.

After the model-based control is implemented, the lower set-point is reached at least five minutes earlier. Since there was a total of 60 injections per batch, the total of batch-time reduction amounted to at least 300 minutes. Needless to say, the economies gained from this automation project were exceptionally high.

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Knowing Everything There Is to Know

With the help of PIMS, added value can be achieved on the MES (manufacturing execution system) level. In general, this means that process-related data and information are used to find optimization potential. This refers to International Standard (ISA 95) "puzzle parts" such as performance analysis, process management, and date acquisition only. It does not include workflow optimization. PIMS enable engineers to find a correlation or hidden information, which serves as the point of departure for optimization efforts. Beneficial categories are finding and understanding process contexts as well as identifying root causes and improvement potential. Two case studies show what this means.

The first example refers to a separation column in a plant in Asia. At times the temperature in this column would begin to oscillate. Despite intensive research, the staff could not find the cause. That was where a team from Europe came in – without actually having to travel to Asia. Using computer networks, the team members had access to all process data. They took all process data points around the column – about 35 points over a period of several days. Then they fed the information into a statistical program to find out which process points dynamically correlate with the examined temperature.

After a few minutes, they had first results. There was only one significant relationship: the level in the feed tank. But since the feed flow was constant, it became clear that the temperature problem was caused somewhere upstream. After a few hours of additional statistical evaluations, the cause was found three or four process steps upstream – where no one had ever looked. Afterwards, it was easy to solve the problem. The temperature in the separation column has been even ever since.

Finding Root Causes

Evonik also uses PIMS to improve its alarm management even further. Just as a reminder: An alarm is a message which indicates that a process variable is deviating from its set-point and requires immediate operator interaction. In some cases, it may become difficult to judge which alarms are the most urgent – and which have a lower priority.

To deal with this dilemma, the international user association of automation technology in process industries, Namur, published a guide for designers and operators of chemical production plants (NE 102). It helps them to improve the conception, the use, and the maintenance of alarm systems. One of the objectives is to optimize the prioritization of alarms. All these measures, of course, improve the availability of production plants. Alarm management is often based on frequency distribution. Concentrating on the top five or ten brings good results with reasonable effort. PIMS help them to achieve this goal.

What The Future Holds

There is still huge potential for optimizing production plants in the chemical industry. Process control technologies can be used to identify and optimize the parameters. Usually, the costs are low, and the benefits high. The necessary measures can be taken within a short time. Last, once automation is used, additional ideas arise and improvements in efficiency continue.

Despite these advantages, there are still many demanding challenges. Most of them are non-technical. The most important task is building a trustful relationship with the "process owners," that is, plant operators and other staff. They are the ones who discover potential and address the appropriate department in their company. This is always worth the effort.

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South Korean Honam Considering Indonesia Petrochemical Plants

South Korea's Honam Petrochemical said it was considering building a petrochemical complex in Indonesia, which market estimates indicate could cost up to 5 trillion won ($4.49 billion).

Asia's No. 2 petrochemical maker reported to the stock market that it was considering building petrochemical plants in foreign countries including Indonesia under its mid- and long-term plans, although nothing had been finalized. Honam has a combined production capacity of 2.5 million tons per year (tpy) in South Korea and Malaysia, where it received takeover approval from shareholders of Malaysia's largest petrochemicals maker Titan Chemicals Corp last December. "This long-term investment consideration includes building an at least 1 million tpy naphtha cracker and downstream plants," said a company source, who declined to be identified because of the sensitivity of the issue. He said through 2015 the company would first sort out financing issues for the project to enable a final decision, while construction would take about a year to complete.

The completed complex would make Honam Petrochemical Asia's No. 1 petrochemicals maker, he said, adding that this investment consideration was based upon studies of market outlook, and supply and demand balances. Last month, South Korea's Lotte Group, which owns 57.2% of Honam Petrochemical, said it was considering investing as much as $5 billion to build a petrochemical plant in Indonesia. ■

Bayer MaterialsScience Inaugurates New Indian Polyisocyanates Unit

Dr. Tony Van Osselaer, member of the executive committee of Bayer MaterialScience, at the coconut breaking ceremony, a Hindu ritual.

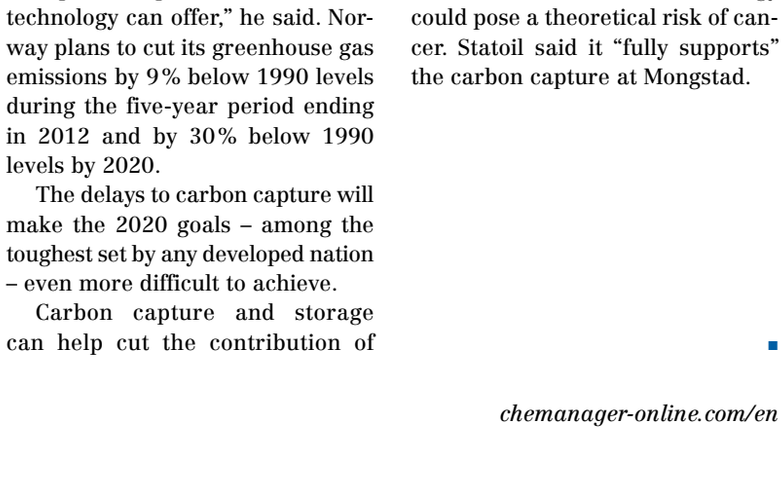
Bayer MaterialScience has inaugurated a manufacturing facility for polyisocyanates at Ankleshwar, India. Polyisocyanates are used as raw materials for the production of polyurethane coatings and adhesives. With the investment of €20 million, the company said wants to expand its business in India and to participate in the strong growth of this local market for coatings and adhesives.

The plant will produce Desmodur N grades based on aliphatic hexamethylene diisocyanate (HDI). These raw materials are used for automotive, industrial and plastics coatings. Furthermore, Desmodur L grades will be manufactured from aromatic toluylene diisocyanate (TDI). These are used as raw materials for wood and furniture coatings as well as for the formulation of adhesives for flexible packaging.

The initial capacity amounts to 15,000 tons per year. It will be increased in stages in the coming years in accordance with the predicted growth for polyurethane coatings and adhesives. ■

Norway to Widen Carbon Capture Technology Hunt

Norway will consider a wider range of technologies for a long-delayed flagship carbon capture project to avoid health worries from chemicals in the original plan, the government said recently. Environmentalists have strongly criticized Oslo for delays in the project designed to limit greenhouse gas emissions from the Mongstad oil refinery on the west coast, and have accused its operator Statoil of reluctance to invest. A white paper presented to parliament said the government now favored looking at a wider range of technologies than in the original plan to use amines, derivatives of ammonia meant to separate carbon dioxide from exhaust gases at the plant.



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Mongstad oil refinery

"The government now wants to open up to more technologies than amine in further work," a statement by the Ministry of Oil and Energy said. It said work was needed to ensure there were no "negative effects for health or the environment."

The ministry also said it would adjust planning so that technologies were checked before the full project was under way. The center-left government said it was putting off a decision to finance the project until 2016. It was the latest blow to a scheme that Prime Minister Jens Stoltenberg said in 2007 would be the technological equivalent of a "moon landing" for Norway.

A carbon capture and storage facility at Mongstad, meant to showcase technology for curbing climate change, was originally planned to be in place by 2014 but has been delayed several times.

"CO_2 management can play a key role in reducing the world's emissions of greenhouse gases," outgoing Minister of Oil and Energy Terje Riis-Johansen said in a statement. Riis-Johansen in early March and was replaced by Ola Borten Moe.

Emissions Cut

"A broad and lasting effort is needed to exploit the possibilities that this technology can offer," he said. Norway plans to cut its greenhouse gas emissions by 9% below 1990 levels during the five-year period ending in 2012 and by 30% below 1990 levels by 2020.

The delays to carbon capture will make the 2020 goals – among the toughest set by any developed nation – even more difficult to achieve.

Carbon capture and storage can help cut the contribution of coal and gas-fired power plants to global warming by trapping and burying the greenhouse gas carbon dioxide, but has yet to be fully tested on a commercial scale. In amine technology, carbon dioxide is captured in the flue gas by an amine solvent, a liquid comprising water and amines that absorbs the greenhouse gas.

Statoil, said in a recent report that the use of amine technology could pose a theoretical risk of cancer. Statoil said it "fully supports" the carbon capture at Mongstad. ■

Easy Integration into the Existing IT Environment

What Are the Benefits of an Instrumentation and Control Planning System?

Necessary Support – In order to operate a plant safely and reliably, the first prerequisite is to know exactly what shape it is in. It is essential for the plant documentation to reflect plant reality as accurately as possible. Here, instrumentation and control planning systems (I&C-CAE systems) provide the necessary support. In the classic process industry the plants involved are usually large production plants consisting of individual plant components which are mostly non-centrally organized. These individual components are often built up gradually. Depending on their date of construction, an I&C-CAE system may often not have been planned in originally. It would then have to be integrated into an already-existing IT environment.

Evelyn Landgraf
Marketing, Roesberg Engineering

Ralph Roesberg
Managing Partner of Roesberg Engineering

Just over 10 years ago now, BASF also required an I&C-CAE system capable of working reliably with the software systems already installed there. This requirement was in itself a strong argument for using the I&C planning system Prodok by Roesberg Engineering. In the meantime, ten years on, not only BASF's Ludwigshafen site, but also the sites in Antwerp, Schwarzheide and Tarragona, as well as smaller BASF sites in Central and South America, are working with the tool developed by the automation experts from Karlsruhe.

Simplicity Of Integration

It isn't possible for everyone to do all tasks equally well. Thus, the automation experts concentrate on their core competence of instrumentation and control engineering, while ensuring that their I&C system provides interfaces to the software of other manufacturers. Where software is concerned, rather than: "Everything from one hand," the overriding philosophy is: "The Best of Everything!" – which also means independence from specific manufacturers. Interfaces are developed according to the user's requirements in each case.

Fig. 1 shows the interfaces in use at present at BASF: P&IDs are transmitted to Prodok via the PD-Explorer. There is an interface to SAP for transmission of data from the technical sites, i.e. the points where maintenance measures have to be carried out (SAP PM). These are automatically identified and updated if there are changes. Via another interface, specifications for individual instrumentation and control devices are transmitted for ordering purposes (via SAP PS to SAP MM). To keep an eye on costs at all times, there is an export from the I&C-CAE-System to BASF's own cost estimation module Kelpro. Calculation data for valves and differential pressure transmitters pass to the calculation program Conval, from which the results are re-transmitted. Of course, there is also an interface to LiveDok for the maintenance of digital plant documentation.

Standardization: Much In Demand

In addition to these, an NE-100 interface is used. Namur Recommendation 100 defines formulations that improve communication when purchasing I&C equipment and enables electronic data exchange (fig. 2). BASF uses this standard for inquiries and orders to external suppliers. But NE-100 is also used for internal ordering: When a device is requested from the central warehouse, a download of an NE100.xml document containing information about the device is activated at the same time. This information is integrated into Prodok and is then available for plant documentation. A similar system is used for configuration orders to the internal Automation Engineering Technical Center. Here the configuration order is issued in the form of precise specifications in an NE-100 document set. The Center configures the devices that have been ordered in accordance with the specifications, adds further information to the NE-100 document if appropriate and then delivers the device together with the relevant NE-100 XML file, which can then be integrated into the plant documentation. Special forms are not only used to transmit the necessary information for ordering and bidding purposes; they can also be used to supply a wide range of information about a device, which can then form an input into plant documentation. Thanks to appropriate interfaces, data import is possible at the touch of a button and time-consuming, potentially inaccurate manual data entry is a thing of the past.

Regarding the depth of information made available for plant documentation, Endress+Hauser's W@M-Portal one step further. Here, at the touch of a button, details of devices from this manufacturer can be retrieved via an internet link, including stored master data, documentations, inspection certificates, ATEX certificates, product-specific spare parts lists and events occurring over the whole life cycle. For this purpose, too, an interface has been defined in Prodok.

A 'Living' Plant Needs 'Living' Documentation

Changes are continually being made to plants in the process industry, whether due to maintenance, to keep them state-of-the-art, or because changes in legislation, for instance health and safety regulations, require it. Changes also need to be consistently documented. In this respect, electronic plant documentation has unbeatable advantages, as Martin Dubovy , head of the IT and I&C Departments at Roesberg Engineering, explains: "BASF now uses LiveDok for its digital I&C plant documentation. With LiveDok, a maintenance specialist carries the current documentation with him on his PDA or tablet PC any time he attends to the plant. He can also – using a simple tool – enter any changes made to the plant on his portable device. Changes undertaken in this way are centrally stored and are immediately available to all plant employees. So for instance, the Service Center in charge of Emergency Maintenance can now access the digital I&C documentation, and can thus react faster when problems occur."

However, not only does constantly updated documentation provide the basis for reliable, efficient plant operation – it is also a requirement necessitated by legal provisions and by increasingly stringent occupational safety regulations.

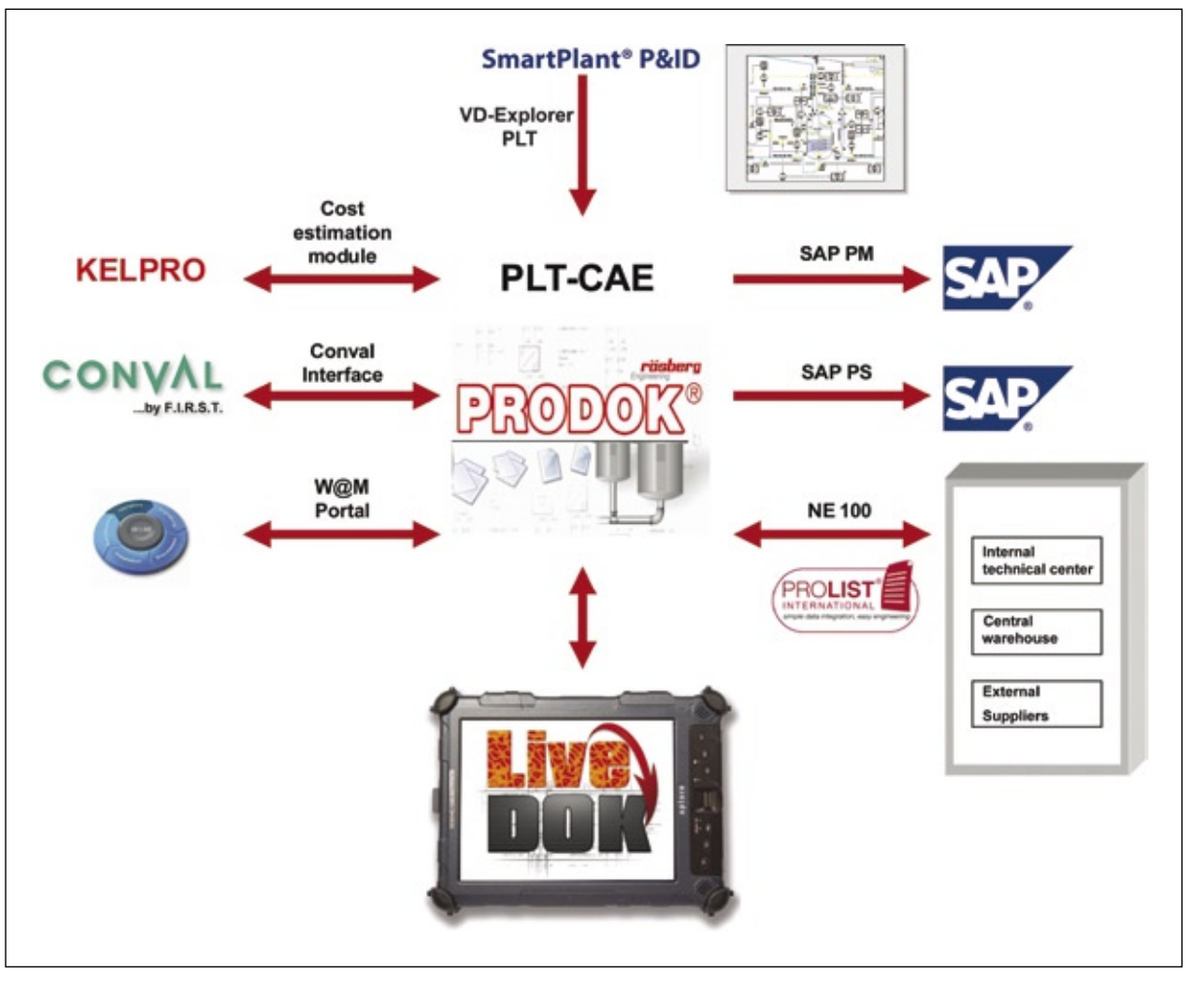

Fig. 1: Thanks to numerous interfaces, the I&C-CAE planning system can be integrated into an existing IT infrastructure.

Standardization: Simplifies Work

BASF's Ludwigshafen site comprises numerous individual plants, each with 500 to 18,000 measuring points. There is an increasing need for cross-plant work. In these circumstances, service and maintenance are greatly simplified if all plant documentation is available in standard form. Thus for instance over the past few years clear input formulations have been defined for P&IDs at BASF. This also improves safety, because fewer misunderstandings occur when reading plans with a standardized structure.

The I&C-CAE system also accommodates this idea of standardization. Ralph Roesberg, managing partner of Roesberg Engineering, explains: "Instead of many different documents in various formats such as Excel, PDF or CAD, with us all I&C information is integrated into one system in standardized form." To ensure that the same devices always have the same designation, details of the most important devices used in the plants have been entered in a central master database. If a device is to be represented in the I&C-CAE system, the user selects it from this standard library. Although the initial recording of the information is relatively time-consuming, the standard library can then be used throughout the group and – after adaptation into the appropriate language – even internationally. Thus everyone throughout the group speaks the same language, and this makes it much easier, for instance, to organize changes from the central office in Ludwigshafen.

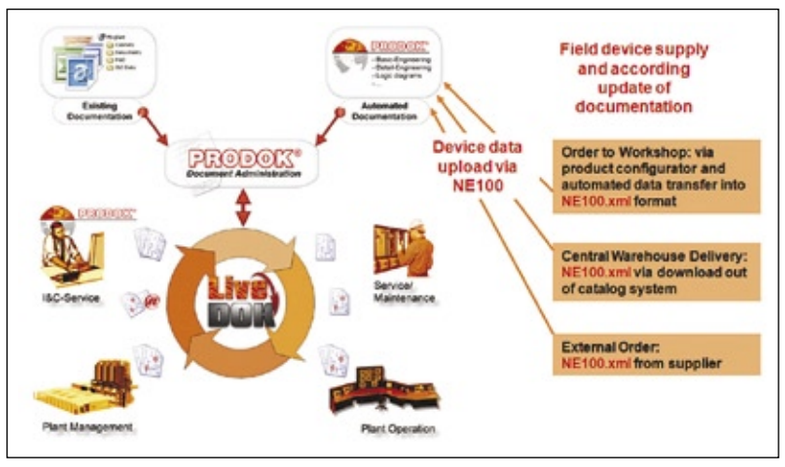

Fig. 2: NE-100 provides a standardized structure based on an XML schema in which information on devices can be exchanged. If this is consistently used, the engineering process can be almost completely automated, offers can be more easily compared and precious working time is saved.

Keeping An Overview

Standardization and centralization make it easier to keep an overview. If there are problems with a component, or if a device in use is discontinued, all components of the same type that are built into plants can be located simply by calling them up, and appropriate action can be taken. Another helpful function in the documentation is the possibility of attaching Ex(i) certificates directly to the measuring points concerned, meaning that they can be found immediately when required.

In an extensive plant in the process industry, the inspection of all automatic protective devices is also a complex matter. The SAP system generally triggers an inspection, but does not give any indication of how inspection should be carried out. In Prodok, testing instructions and an inspection record can be kept for each protective device that requires inspection in specific cycles. The record has to be filled in and "signed" by the inspector. These data are then also available in the plant documentation. "The generating of inspection instructions is a new feature which we have developed in response to customer demand," Roesberg said. "At BASF, this was implemented in December 2010."

Plant Servicing – Over the Whole Life Cycle

In many instances, the automation experts from Karlsruhe continue to provide a support service for plants over the whole life cycle. This means that they are closely acquainted with customers' real needs, for one thing, and for another, that they also have an interest in ensuring that their software adapts simply and straightforwardly to changing requirements. Whereas external engineering firms frequently tend to regard plants as being static, with Prodok continuous technical development is catered for. This is apparent, for instance, in the fact that migration from one software version to the next highest version can take place automatically. BASF's use of Prodok has demonstrated that this really works. At the Ludwigshafen site there are more than 300 different plants and plant components and more than 700 registered users to be taken into account. Despite this great size, changing the version of Prodok only took one weekend. This is an unbeatable argument for many plants in the process industry which have been operating in many cases for over 30 or 40 years – or even longer. Provided the software adapts uncomplicatedly to technical innovation, it is possible for an "old" plant to remain always state-of-the-art.

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Compressed Air at the Right Price

Concrete Measures for Enormous Energy Saving Potential

Saving Energy – Today's technology offers compressed air users myriad ways to significantly reduce energy consumption and CO_2 emissions. It has long been recognized that energy consumption accounts for the lion's share of compressed air costs, and this was already a subject of considerable discussion within the compressed air sector around the time of the first oil crisis in the early 1970s. During that period, rotary screw compressors were starting their ascendance as the technology of choice for industrial compressed air production.

Spotting this trend early on, Kaeser Kompressoren not only added rotary screw compressors to its extensive product range, but went on to develop its proprietary energy saving "Sigma Profile" screw airend rotors. "More air, more savings …" was already the slogan even back then. However, the topic of energy efficiency only came back to the forefront at the end of the '90s with the signing of the Kyoto Protocol. At about the same time, the EU launched the "Save II" initiative. A study carried out within the framework of this initiative gave rise to the "Druckluft effizient" (Efficient Compressed Air) campaign, which was a collaborative project between the VDMA (German Engineering Federation), Fraunhofer ISI, the German Energy Agency (Dena) and businesses from the compressed air sector.

Over 30 % Energy Saving Potential

The study determined that compressed air systems in Europe had an average energy saving potentialof nearly 33 %. This finding was further consolidated by compressed air audits carried out as part of another measurement program; the audits revealed potential energy savings for the companies studied of between 18–70 %, depending on circumstance. So, in spite of some improvements, many companies' compressed air installations are more akin to those from the 1970s than to today's energy efficient systems.

Electrical Drives with Enhanced Performance

In the last few years, it has been possible to develop electric motors that operate at unprecedented levels of efficiency. In order to unify the various energy efficiency standards for asynchronous motors from around the world as a globalized standard, the International Electrotechnical Commission (IEC) created the IEC 60034-30 international norm. It defines the efficiency classes IE1 to IE3, with IE3 being the highest class. In Europe, motors complying with this premium efficiency class will be obligatory for drives from 7.5–375 kW as from Jan. 1, 2015. Kaeser, however, already began installing IE3 motors in its new rotary screw compressors in 2010, and the rest of the product range will follow suit in a gradual roll out.


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100 % of a compressor's electrical energy consumption is converted into heat. With fluid-cooled rotary screw compressors, up to 96 % of that energy can be recovered and reused. Perhaps surprisingly, the usable energy in compressed air actually comes from the ambient surroundings: During the compression process and conversion of the electrical drive energy into heat, the compressor charges the air it draws in with energy potential corresponding to approximately 25 % of the compressor's electrical power consumption. This energy is only usable however once the compressed air expands at its point of use and in so doing absorbs heat energy from the surrounding environment.

Energy Saving Compressors

Modern compressors are prime examples of highly developed mechatronic systems. Consequently, their efficiency is not only determined by optimum interplay between mechanical and thermodynamic components, but also between electrical and electronic components. Power transmission too plays a key role: Modern direct drive systems eliminate the transmission losses associated with gear or belt driven systems as the drive motor and compressor airend rotate at the exactly the same speed. The energy efficiency of the airend itself can also be increased further through optimization of the screw rotor profile and ancillary equipment for cooling, as well as through minimization of internal pressure losses.

Flexible Internal Compressor Control

A further important efficiency enhancing component is the compressor's internal controller. In the past, these systems often only had one control mode, yet modern industrial PC-based systems offer up to five pre-programmed options, thereby enabling compressor performance to be precisely matched to suit compressed air demand.

Kaeser's new Sigma Control 2 controller also offers added advantages: This advanced system provides greater flexibility through its numerous interfaces and innovative plug-in communication modules. Therefore, connection to energy-saving master control systems, computer networks and/or remote diagnostics and monitoring systems, such as Kaeser's Teleservice facility, couldn't be easier. The large display located on the control panel also simplifies on-site communication with the system, whilst the addition of an RFID reader ensures service continuity, increases security and significantly raises service quality.

High Service Quality

Moreover, these controllers provide an excellent basis for planned preventive maintenance resulting from continuous monitoring of compressor status and even the compressed air filters. This is essential for any comprehensive service concept that strives to ensure best possible dependability and availability, as well as optimized energy and maintenance costs. Needless to say, service should not be restricted solely to the compressors and other components, but should extend to cover the compressed air system as a whole.

Energy Efficient Compressed Air Drying

The impact of compressed air treatment on the energy efficiency of a compressed air system should also not be underestimated; this is especially true of drying. Significant strides have been made in recent years regarding the most efficient and widely used process (for pressure dew points to +3 °C) of refrigeration drying. New refrigerants and advanced refrigeration dryers equipped with energy saving cycling control, and with the ability to adapt to actual compressed air demand, have led to significant energy savings. There's now even a highly efficient combination process involving refrigeration and desiccant drying designed for applications requiring considerably dryer air (pressure dew points to –40 °C). In some instances this method can completely replace the far more energy intensive process of desiccant drying and, in other cases, it's even possible to use recyclable heat from the compressor to regenerate the desiccant material.

Analysis of Actual Compressed Air Demand

Of course it's necessary to achieve best possible efficiency from the individual components within the compressed air installation, but this requirement is not in itself sufficient to ensure optimized efficiency of the system as a whole. The key to success lies in the optimized integration of these separate components into the system. This is where computer-aided demand analyses such as Kaeser's ADA (Air Demand Analysis) prove invaluable: With their help, it is possible to determine actual compressed air demand over time, establish the efficiency of a compressed air system and to identify how availability and performance may be improved. Special planning software such as Kaeser's Energy Saving System (KESS), for example, can subsequently simulate and compare various system options, as well as accurately calculate potential energy savings.

Optimized Compressed Air Management

There are also many areas for potential cost savings when it comes to compressed air system monitoring and control. Advanced master control and management systems, such as the "Sigma Air Manager" (SAM), provide users with the transparency and performance required to tap into these savings. Featuring state-of-the-art adaptive 3-D-Control technology (patent-pending), the latest SAM versions are now more effective than ever. What sets these next generation controllers apart from conventional systems is that they are able to take the three crucial "dimensions" that affect energy-efficient compressor control within a compressed air station into consideration, namely switching losses associated with compressor start-up and shutdown; additional energy consumption for pressure increases above the required pressure; and control losses resulting from idling and FC losses. In order to ensure optimum performance, the SAM constantly analyses the relationship between these factors, calculates the best possible result and controls the compressors accordingly. Moreover, the SAM delivers exceptional cost transparency and provides preventative maintenance coordination for the entire compressed air system.

Utilizing Recyclable Compressor Heat

Heat recovery provides another major source of potential energy savings: Up to 96 % of the energy fed into a compressor can be recovered and reused for heating purposes. Therefore, companies that factor this energy into their supply concept can benefit from substantial additional cost savings and reduce their impact on the environment though reduced CO_2 emissions. This recycled energy can be used, for example, to provide space heating, to create hot air curtains, to heat service and process water or to preheat combustion air – the possibilities are almost endless.

Minimization Of Leakages …

The energy losses incurred as a result of leakages in the compressed air distribution pipe network can be equated, in biological terms, to severe blood loss: leakage rates of 10–25 % are common. Over the course of a year, such losses add up to appreciable additional energy consumption and, as a consequence, costs. With help from modern detection equipment however, leakages can be quickly located and rectified. This enables users to keep losses to an absolute minimum, although sadly they can never be completely eliminated.

… And Numerous Other Small Shortcomings

There are also other causes of energy losses and large pressure differences within the compressed air distribution network. These causes include contamination in the piping, inadequate pipe diameter and unfavorable pipe layout that adversely affects flow performance. These shortcomings should therefore also be corrected or avoided.

Erwin Ruppelt, executive project engineer, and Michael Bahr, press officer, Kaeser Kompressoren

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South Africa Oil Refiners Must Upgrade by 2017

Crude oil refineries in South Africa have until 2017 to upgrade their plants, the country's energy minister said upon releasing new draft fuel specifications in Africa's largest economy. South Africa wants less cancer-causing benzene and sulfur in its fuels as it seeks to reduce the health and climate impact of dirtier fuels within two years, Energy Minister Dipuo Peters said. "We are (now) reducing the allowable levels of benzene, which is a known carcinogen, from 5 % to 1 %," Peters said. Besides public health concerns, South Africa, a net importer of fuels and the continent's worst polluter, also wanted to reduce its greenhouse emissions.

"We are therefore reducing the level of sulfur in our fuel 500 parts per million to 10 parts per million," Peters said. The low levels of sulfur would allow for the introduction of engines that spew less carbon dioxide emissions, complementing a carbon tax introduced by Finance Minister Pravin Gordhan and likely to hit company profits and consumers. South Africa wants to further clean up its liquid fuels industry after previously prohibiting the addition of lead into all grades of petrol and reducing sulfur in diesel.


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Four crude oil refineries, operated by Shell and BP among others, need to invest up to $4 billion on a cleaner fuels upgrade, but have demurred over uncertainty regarding the cost of reconfiguring refineries.

The South African Petroleum Industry Association, which represents major oil companies, has been in talks with the government on the rollout of new Euro 4 or Euro 5 fuel specifications but has said it wants a cost-recovery mechanism before investing in upgrades. "There are approaches that can be considered including differentiated taxes, which create an advantage for high-quality fuel," Peters said. She said turmoil in North Africa and the Middle East, which has pushed oil prices to new highs, demonstrated the need for South Africans to change their driving habits to use fuel more efficiently. The country is expected to have to import 180,000 barrels per day of fuels by 2020 if it does not invest in a proposed $10 billion 400,000 bpd new refinery at Coega. ■

The Brave New World of Chemical Supply Management

Logistics Providers Should Take the Lead in Showing Customers the Way

Trusted Advisers – Despite strong growth prospects in the industry, chemical supply chain managers are increasingly cautious in the face of continued uncertainty and relentless competitive pressure. Logistics providers are well-placed to help and should position themselves increasingly as trusted advisers.

Andrew Jackson
President & CEO, Agility Chemicals

Global Outlook

Following the global economic crisis and cyclical downturn of 2008, there has been a rapid and largely unforeseen recovery of the chemical industry in 2010. An ICIS Chemical Business article from December 2010 reported growth in the chemical sector of 12% in 2010 and predicts a growth rate of around 8% for the next two years.

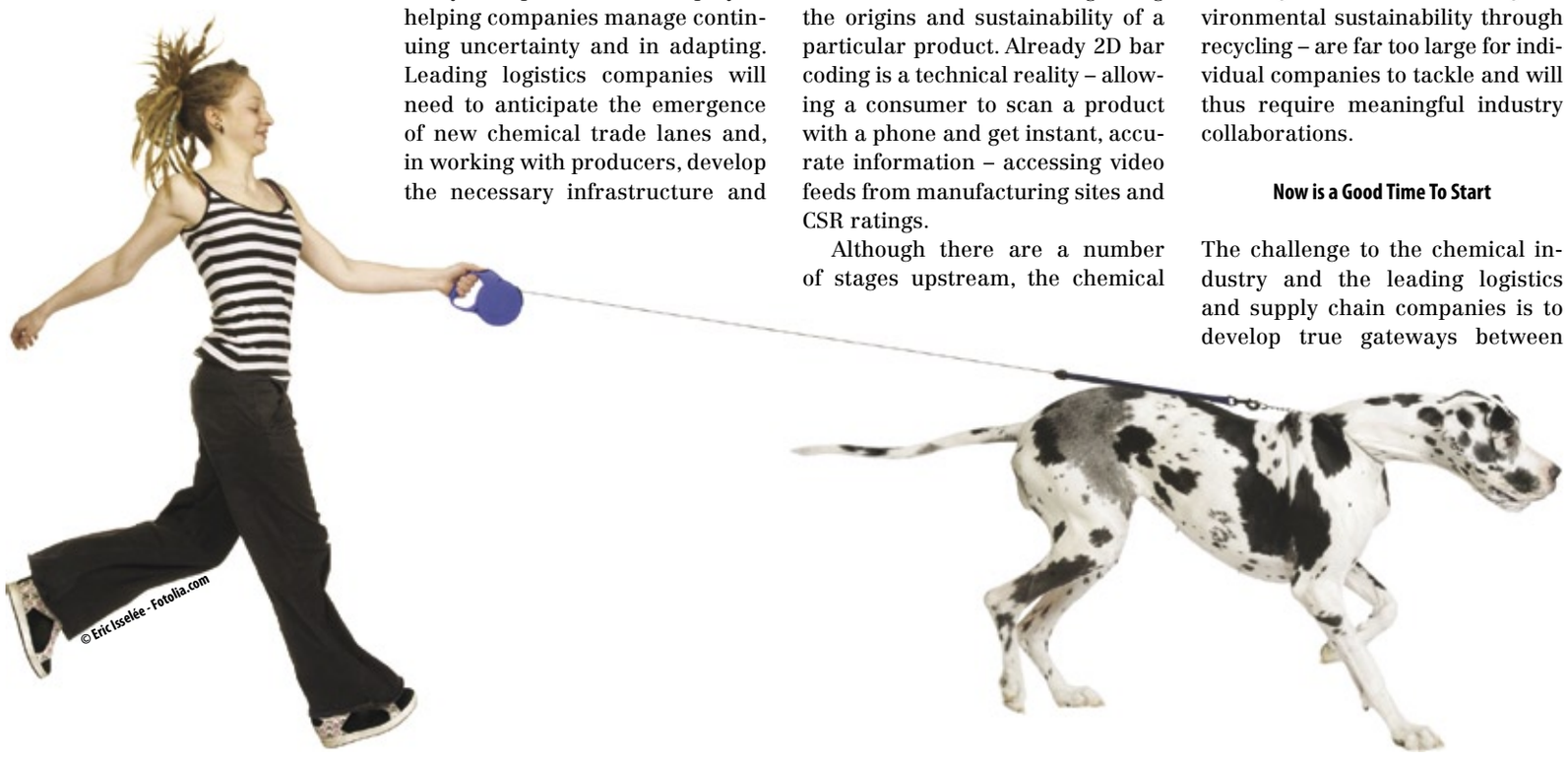
This turnaround can be attributed to strong growth and profitability in emerging markets, most especially around increased demand in China. The industry has yet to experience the impact of lower-cost exports from the Middle East flooding the European market. At the other end of the spectrum, a favorable exchange rate coupled with abundant, cheaper shale gas has given a significant boost to U.S. exports. The turnaround story seems set to continue with China expected to overtake the United States as the largest export market for chemicals in 2011 (approaching $700 billion).

The shape of the industry is changing fast and will continue to do so over the next few years with global scale super-sites emerging. According to the Gulf Petrochemical Industry, the next seven years will see a 50% increase in global capacity as more than 22 million tons of new chemicals and polymer capacity come on-stream across major sites in the Middle East.

Despite these growth trends, managers remain cautious in the face of potential challenges. Volatility in the price of commodities and currencies as well as greater austerity measures imposed by cost-conscious governments will pose a serious threat to the chemical industry. In addition, concerns about political instability across certain Middle Eastern countries have cast a shadow of uncertainty over supply chain operations in the region. Despite last year's strong performance and a positive outlook for 2011, many chemical companies continue to be very cost-conscious and in an economy where cash is king, companies are holding inventories at or close to historic lows.

Managing Uncertainty And Risk

Forecasting has traditionally been viewed as a "business as usual" activity. However, the events of the last two to three years have made for unprecedented uncertainty. Strategies to manage these levels of uncertainty are now critical in achieving alignment across businesses and supply chains, with scenario-based planning, accurate visibility and supply chain agility all required more than ever to mitigate risk.



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In the new world, supply chain managers and business leaders must anticipate and plan for upside and downside risk. More than ever, there needs to be a plan b, c or even d – plans that promote visibility throughout the supply chain and feature management styles and mechanisms that are responsive, dynamic, flexible and hands-on. This can only be achieved through the alignment of external stakeholders and service providers and through developing deeper and more trusting, flexible relationships. It is only when these elements come together that companies will be able to better manage risk and uncertainty.

New Opportunities as Emerging Markets Develop

A new set of opportunities is emerging as the production portfolio within emerging markets drifts downstream with companies converting oil and gas into a larger range of value-added commodity chemicals and derivatives. In the Middle East, for example, countries that have traditionally been exporters of chemicals are becoming importers as they require more inward process chemicals. This presents interesting supply chain challenges both in terms of scale and complexity. The logistics infrastructure in these regions needs to change to support this new and more complex product mix. Lessons can be learned from the mature markets in Europe and North America as to how more complex logistics requirements can be integrated into the supply chain.

In meeting these new and distinct challenges – and in taking the new opportunities they represent –logistics providers have an absolutely indispensible role to play in helping companies manage continuing uncertainty and in adapting. Leading logistics companies will need to anticipate the emergence of new chemical trade lanes and, in working with producers, develop the necessary infrastructure and gateways between emerging manufacturing hubs and their demand markets.

Mainstreaming Sustainability, Delivering on Corporate Social Responsibility

In a context of higher oil prices and increasingly scarce resources, businesses are under pressure to change the way they manage sustainability and social responsibility in their supply chain. High-profile industrial accidents, such as BP's mammoth oil spill in the Gulf of Mexico, have renewed and strengthened global consumer conscience and have intensified this pressure. More than ever, all players must take into account sustainability and environmental factors – a robust and meaningful corporate social responsibility strategy will be nothing less than essential for operating in this brave new world.

Traditionally, supply chain managers have long focused on four key objectives – cost, quality, speed and reliability – with corporate social responsibility all too often a peripheral activity run in parallel to the core operations of the organization. This approach has delivered good results and many incremental improvements. However, the real winners in the future are the companies fully able to integrate CSR through the lifeblood of their businesses. Coca-Cola for example set out to reduce water usage per liter of Coke in their manufacturing facilities from around three liters of water per liter of coke to two liters of water per liter of coke. However, this overlooked the 200 liters of water required to grow the necessary sugar – Coca-Cola then worked with farmers to improve the overall water footprint in the value chain and moved to more sustainable farming methods – with benefits both to the company and to the planet.

The Harvard Business Review reported in 2010 that only 33% of supply chain managers were confident that they understood the sustainability performance of their first-tier suppliers. The number halved when quizzed on second-tier suppliers. With new consumer technologies changing the corporate playing field, supply chain managers will need to identify and deliver real change, developing closer relationships between cost and sustainability. In consumer product labeling, for example, more and more data is included regarding the origins and sustainability of a particular product. Already 2D bar coding is a technical reality – allowing a consumer to scan a product with a phone and get instant, accurate information – accessing video feeds from manufacturing sites and CSR ratings.

Although there are a number of stages upstream, the chemical industry will need to play its part and consider all aspects of its supply chain both internally and externally to drive change. Companies will need to look beyond their immediate network of suppliers and customers and implement far-reaching changes. Some of today's challenges – such as ensuring environmental sustainability through recycling – are far too large for individual companies to tackle and will thus require meaningful industry collaborations.

Now is a Good Time To Start

The challenge to the chemical industry and the leading logistics and supply chain companies is to develop true gateways between supply and demand, fully integrating all components – the physical, the commercial and the information. The industry needs to deliver lower cost and lower carbon supply chains together with better utilization and occupacity of the infrastructure. It also needs to develop new technologies that maximize transit payload, postponement of packaging and post process manufacturing, compounding and blending. In a world where the future arrives earlier than we expect, now is a good time to start.

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Andrew will be speaking on this topic at the LogiChem Europe conference on April 6 at 9:15 a.m.

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ThyssenKrupp Supervisory Board Appoints Guido Kerkhoff to Executive Board The supervisory board of ThyssenKrupp has appointed Guido Kerkhoff as member of the executive board for a period of five years effective April 1. He will take over as chief financial officer from Dr. Alan Hippe. At his own request, Dr. Hippe is leaving the executive board of ThyssenKrupp on March 31.

Dr. Uwe Liebelt

Dr. Uwe Liebelt to Become President of BASF's Paper Chemicals division Dr. Uwe Liebelt will become president of BASF's Paper Chemicals division, located in Basel, Switzerland, effective April 1. Liebelt is currently senior vice president, Dispersions & Pigments North America located in Charlotte, North Carolina. Dr. Ehrenfried Baumgartner, current president of the Paper Chemicals division, is retiring.

Richard L. Wilson

K+S Announces New Leadership Team K+S is pleased to announce that Richard L. Wilson, formerly vice president, Manufacturing for Morton Salt, has been appointed as Chief Executive Officer of Potash One effective March 1. Wilson is replacing Alexa Hergenröther, head of Corporate Development at K+S, who was the CEO for an interim period.

Wilson is a 40-year veteran of Morton Salt and has broad experience in solution mining and processing. In his new role, Wilson will lead the management team based in Saskatoon, Canada, that is focused on the implementation of the Legacy Project, a planned K+S potash solution mining facility in Saskatchewan.

The position of CFO of Potash One will continue to be held by Luis E. Mendoza, who was previously the vice president of K+S North America.

Mike Ferguson, formerly vice president, Projects at Potash One, will continue to act as senior vice president and project manager of Potash One. Erika Ritchie will continue to retain her position as vice president Environmental & Regulatory Affairs of Potash One. Dr. Franz Xaver Spachtholz, formerly head of General Mining Division at K+S, has been appointed as vice president Engineering of Potash One.

Friedhelm Felten to Head Procurement at Merck Effective April 1, Friedhelm Felten will become head of Corporate Procurement, taking over responsibility for the global purchasing activities of the Merck Group. He succeeds Friedrich Schmitt, who has headed the function since 1997 and will be retiring at the end of July. Felten will report directly to Dr. Michael Becker, CFO.

Corporate Procurement, which operates through a global matrix organization, is responsible for purchasing production materials such as pharmaceutical raw materials and chemicals, and for procuring technical components such as production and laboratory equipment as well as services like pharmaceutical research and development. The approximately 500 members of the global matrix organization handle an annual purchasing volume of around €4.5 billion.

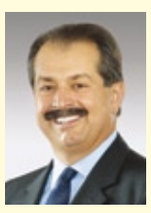
Felten joined Merck in July 2009 as head of Procurement for Services. He has many years of management experience in purchasing and in other functions at international companies, including DHL Global Forwarding in Singapore, DHL Logistics in London, and BASF in Ludwigshafen as well as various BASF subsidiaries in Asia.

Eastman Board Elects New Member The board of directors of Eastman Chemical Company has elected Brett D. Begemann as a director. Begemann is executive vice president and chief commercial officer, Monsanto Company, a global provider of technology-based solutions and agricultural products that improve farm productivity and food quality.

Begemann graduated from the University of Missouri in 1983 with a bachelor's degree in agricultural economics. Upon graduation he joined Monsanto in the company's sales and marketing organization. Since that time Begemann has had various senior management assignments, each with increasing levels of responsibility. He has served in several key international positions, including vice president, Asia Pacific, Singapore, and executive vice president, International. Begemann currently serves as chief commercial officer, with responsibility for Monsanto's global commercial operations, including the company's two major business sectors.

Martin Riswick Appointed General Manager AkzoNobel Chlor-Alkali Martin Riswick has been appointed general manager of AkzoNobel's worldwide Chlor-Alkali activities, part of the company's Industrial Chemicals business, effective March 1. Riswick succeeds Knut Schwalenberg, who has become Managing Director of AkzoNobel Industrial Chemicals on Jan. 1.

Riswick studied Chemical Engineering at the University of Twente (the Netherlands), and started his career as an R&D Chemist with the Dutch subsidiary of National Starch & Chemical Company in 1983. Since 1993 he held subsequent positions in the UK and in Singapore. Since 2006 he has been leading the global Elotex business, lately part of AkzoNobel Functional Chemicals in Sempach, Switzerland.



Andrew Liveris

Andrew Liveris To Leave Citi Board Dow Chief Executive Andrew Liveris will leave Citigroup board of directors in April, the bank said in a regulatory filing. Liveris will not stand for re-election at the bank's annual meeting on April 21, according to the filing. The head of the largest U.S. chemical maker, Liveris joined Citigroup's board in 2005 and was one of the few remaining directors from before the financial crisis. He is also on the IBM board of directors. Regulators pressed the bank to add more directors with financial experience during the crisis, as massive losses forced Citigroup to take $45 billion in U.S. bailout funds. In February, the bank reported its first full-year profit since 2007.

Closing The Skills Gap

Identifying, Developing and Retaining Tomorrow's Supply Chain Talent

The Right Stuff – As the complexities of our supply chains have evolved, so have the complexities of the competencies required for effective supply chain leaders. Supply chain leaders can no longer simply be "specialists" within a supply chain field. Although specific roles still exist within the supply chain function for specialists, the role of a leader can no longer be only a supply-chain specialist. The competencies required today are truly a broad, diverse and dynamic mix, and difficult to find in one person. This makes the search for supply chain talent and leadership even more challenging.

In addition to the key leadership qualities of vision, strategic thinking, and development of people and teams, the broad set of competencies include:

- Dealing with uncertainty and thriving during constant change.
- Analyzing information, scenarios, and potential risks enabling executable plans.
- Linking strategic decision making with execution.
- Seeing the big picture.
- Effectively communicating with many levels.
- Continually mastering new skills, processes, and technologies.
- Possessing and cultivating business acumen.
- Possessing and leveraging financial acumen.
- Bridging functional requirements across the organization.
- Understanding, meeting and exceeding customer needs.

These competencies, by the way, are the same ones that can be found on a résumé for C-level positions today.

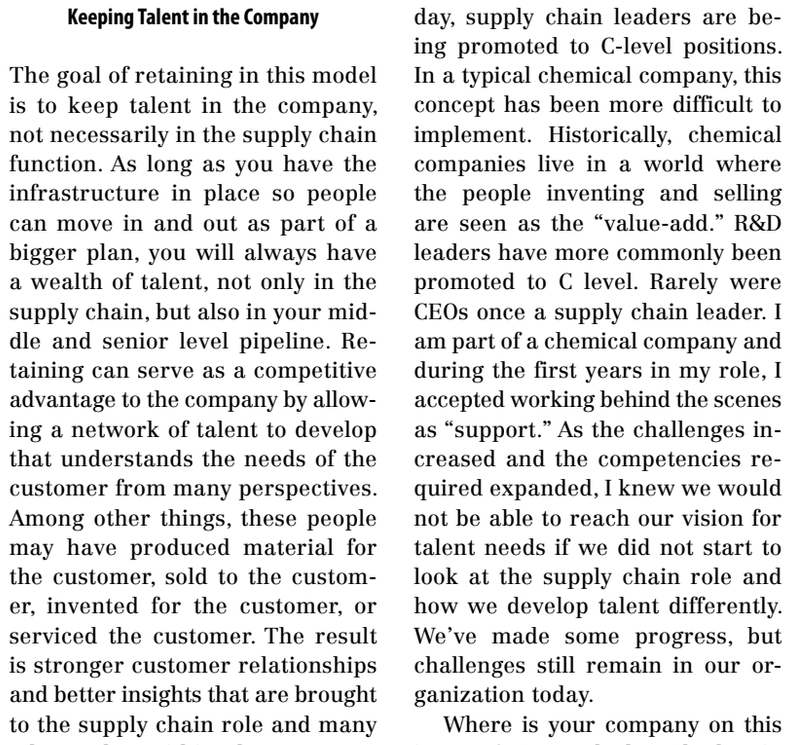
The Challenge

How do we find talent with this complex mix of competencies that is interested in spending time in the supply chain function? Most people don't have all of these when they are born. They don't get them from an MBA or logistics classes, from specializing in a field or function, from working in different functions, businesses, or countries. If they don't get these from doing one of the activities above, how do they get them? Organizations must be able to help talent develop the complex mix of competencies by proactively identifying a plan that includes many or all of the activities above.

If it takes this range of experiences and investment to build a complex set of competencies, then how do we do this? What does it take to promote and establish the infrastructure across an entire organization? If you do agree to invest in the time and process to make this work, how do you know it is working? What does retention really mean? How does this provide a competitive advantage? These questions go on and on …

It starts by having the business case to convince your organization that supply chain is an important role and an important function for your key talent to spend time. Senior leadership has to understand the necessity of this role in the development of company leaders. Let's put in the investment to build this infrastructure and to let talent spend meaningful time in supply chain along their development path.

Next, the organization must foster an environment that promotes a sustainable development planning process. The environment should drive full engagement across managers and associates, not just one that includes engagement by only the few that believe. One that demonstrates an effective process will help lay out the right paths, build the right skills, share the strengths, improve the weaknesses, and does all of this around the complex mix of competencies. The environment must promote self-advocacy. It continually should strive to move the culture towards encouraging people to venture from the norm, think differently about career paths, to speak up regarding what they want to do and where they want to go. Future leaders are willing to speak up, learn and change in order to grow personally and professionally.



Kelly will be speaking on this topic at the LogiChem Europe conference on April 7 at 11:30 a.m.

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Keeping Talent in the Company

The goal of retaining in this model is to keep talent in the company, not necessarily in the supply chain function. As long as you have the infrastructure in place so people can move in and out as part of a bigger plan, you will always have a wealth of talent, not only in the supply chain, but also in your middle and senior level pipeline. Retaining can serve as a competitive advantage to the company by allowing a network of talent to develop that understands the needs of the customer from many perspectives. Among other things, these people may have produced material for the customer, sold to the customer, invented for the customer, or serviced the customer. The result is stronger customer relationships and better insights that are brought to the supply chain role and many other roles within the company. Retaining talent yields an efficient, credible, internal cross functional group speaking the same language with a stronger skill set. The result is talent that can move your organization forward faster in finding new, innovative solutions and products.

In non-chemical companies today, supply chain leaders are being promoted to C-level positions. In a typical chemical company, this concept has been more difficult to implement. Historically, chemical companies live in a world where the people inventing and selling are seen as the "value-add." R&D leaders have more commonly been promoted to C level. Rarely were CEOs once a supply chain leader. I am part of a chemical company and during the first years in my role, I accepted working behind the scenes as "support." As the challenges increased and the competencies required expanded, I knew we would not be able to reach our vision for talent needs if we did not start to look at the supply chain role and how we develop talent differently. We've made some progress, but challenges still remain in our organization today.

Where is your company on this journey? Have a look at the box in the upper right-hand corner.

If most of your answers were on the left side of the arrow, then you will have challenges finding talent in your supply chain organization (and your senior level positions). If most of your answers are on the right side, then you should be ahead of the game on finding and developing supply chain talent. Most of us find ourselves somewhere in the middle and should continue pushing towards the right to identify, develop and retain tomorrow's supply chain talent.

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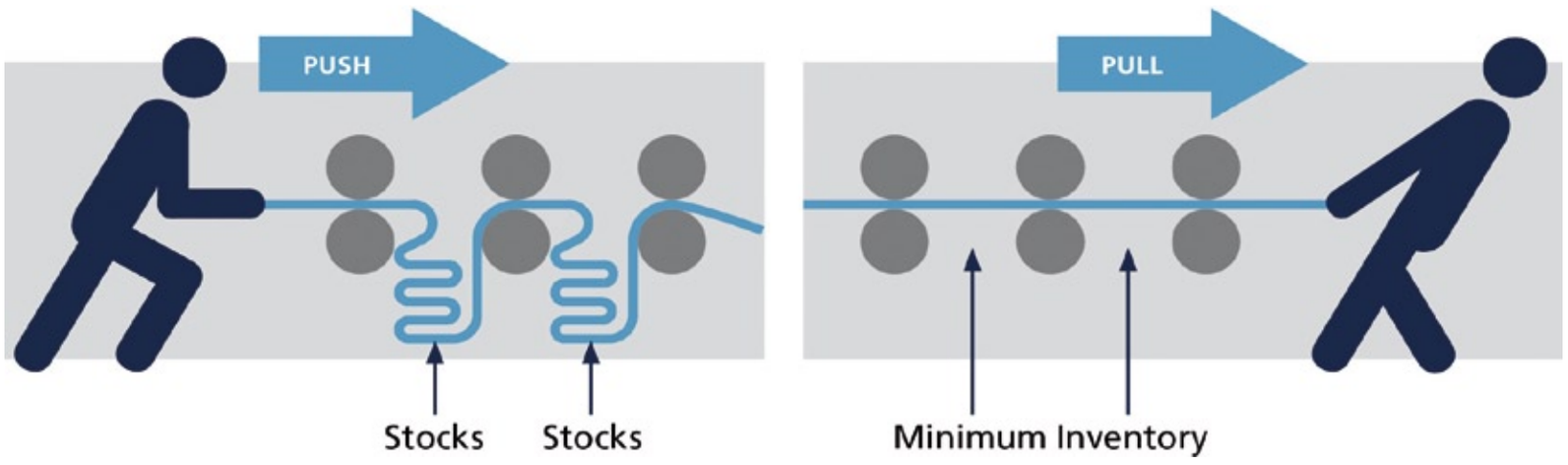
Kombiverkehr: Boom in Austrian Services

More and more forwarders and transport companies are looking to change from road to rail for their shipments between Germany and Austria. To meet this rapid increase in customer demand, Frankfurt-based Kombiverkehris joined forces with Intercontainer Austria to launch five new trains a week in each direction between Neuss and Vienna from the beginning of March. "We have doubled our transport capacity between Austria and Germany in less than a year," said Robert Breuhahn, managing director of the European market leader for shifting transport from road to rail. Neuss-Hessentor has become the CT terminal with the greatest frequency of departures. Other departure points for direct trains in Germany will be Duisburg and Ludwigshafen. Each week, 16 direct trains will leave Neuss alone, heading either for Wels in Upper Austria or serving Vienna, the capital city, and with it the east of the country. These trains will also contain through wagon groups to Budapest, which means that containers, swap bodies and semitrailers can also reach the Hungarian market in less time and without the additional crane operation costs that would be necessary for transfers to other trains.Dutch and Belgian forwarders and transport companies are also showing greater interest in these routes. The later closing time for acceptance means that the trains leaving Neuss are suitable even for shipments that do not start in the Belgian or Dutch border area until the afternoon. ■

Supply Chain Agility

How to Meet Volatile Market Demand?



Unpredictability – The chemical supply chain management is facing an increasing volatility, both on the market and supplier side. This is caused by the effects of global networks and the emerging markets, price fluctuations and changing customer buying patterns after the recession. The upswing has increased demand in many cases beyond production output and shortages within the value chains are amplifying the effect towards the end customers. However, nobody knows how long this will stay.

Dr. Jörg Schmid
Principal, Competence Center Chemicals, Camelot Management Consultants

Dr. Sven Mandewirth
Partner, Competence Center Chemicals, Camelot Management Consultants

To meet these challenges and ambitious growth targets, companies need to become more agile. How can this be achieved without just adding cost and inventory? Focusing on the area of supply chain and operations, there are three different levels where change has to happen: execution, planning and structure.

If companies want to realize more short term improvements to master the current challenges, improvements in the area of execution and planning will be first choice. However, in order to achieve long term and sustainable performance increase, structural and process design changes need to follow.

As in everyday life, agility comes with attributes like quick, slim and well trained. To achieve this in the supply chain, we can transfer and apply well proven approaches like LEAN and Six Sigma in order to remove waste and to increase process stability. The key is to focus on the end-to-end value chains and to enhance responsiveness and flexibility.

Execution

- **End-to-end streamlining – supply chain agility starts in production**
  Regarding agility of execution, supply chain depends on the characteristics of the production processes and the availability of the precursor materials. Quite often, the improvements can be achieved with much less effort and cost at the beginning of the process chain. Leaving supply chain on its own means in many cases the buildup of additional buffer stocks to support flexibility. And in current days, when production capacity may not be sufficient to satisfy customer demand, these additional buffer stocks will remain a pipe dream.

- **Increase responsiveness – reduce cycle times**
  Time is money: This is still true especially in supply-chain management. Long cycle times along the value chain do not only freeze cash as inventory; long lead times also block quick response to changing market requirements. On basis of an as-is process mapping, the opportunities for acceleration can be efficiently identified and realized.

- **Enable flexibility – create transparency**
  A key to support flexibility is the transparency of the information like changed demands, stock levels on a regional level or the status of the customer order for all players in the order to cash process chain. Real-time information supports quick decisions in case of product shortage and enables rerouting of material according to changed customer orders. State of the art business warehouse/business intelligence solutions, linked to enterprise resource planning and advanced planning systems, deliver this transparency.

Having optimized the execution level, the next step is to be aware that execution is in fact relying on what planning anticipated. In order to create the best basis for execution, it is necessary to apply the same thinking to the planning level.

Planning

- **End-to-end streamlining – segmentation to allocate the best suitable planning approaches**
  Until the last recession, make to forecast was dominating as the planning approach in chemical industry. Meanwhile, the application of pull strategies is seen as a valid alternative. On the basis of segmentation principles, the allocation of the best-fit planning strategy can be derived on an objective basis. Decoupling buffer stocks segment the supply network in manageable pieces. The focus of the planner is on the profitable but critical materials, supported by alert functionality.

- **Increase responsiveness – apply pull strategies**
  Planning information in the chemicals industry environment is quite often not reliable enough to derive the stock-keeping unit (SKU) mix. Responsiveness to changing market requirements needs a direct and robust link into planning. Pull strategies synchronize the fine planning of the production runs on SKU level with the depletion of the warehouse due to recent customer orders.

- **Enable flexibility – quick and efficient decision making processes**
  Flexibility in planning is driven by an efficient decision making process on basis of transparent information. The classical S&OP process needs to be transformed into an integrated business management platform. Financially evaluated scenarios deliver the basis for quick, margin oriented decision making. This can be realized by integration of advanced planning solutions with business warehouse/business intelligence solutions.

Planning processes anticipate future developments and optimize the performance within the boundaries of structural design and according constraints. To overcome these boundaries, the approach has to be applied to the structural design.

Structure

On the structural level, it is crucial to understand how agile a chemical company actually needs to be tomorrow, considering future price, demand and supply trends. Next question to be answered is which options are feasible to increase and ensure agility. Following measures need to be evaluated: complexity management of product portfolio; transparency across the value chain including customers and suppliers; flexibility of the capacity allocation as well as the supply chain risk management. These topics are mandatory for the today's agenda, to be well prepared for the challenges of a future growth or an economic downturn.

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Case Study from Specialty Chemicals

A central finishing plant delivered a perfect "pull case." A complex product portfolio led to a considerable waiting queue in the classical planning approach. Due to a low changeover and shut down effort, the pull approach could reduce the work in process inventory by more than 50 %. For standard chemical production plants, one can still expect benefits between 10 % and 25 % inventory reduction while maintaining the service level. The inventory reduction can be harvested as cash release or be "reinvested" to increase agility for high profitable materials.

What Products Are Suitable for Pull Strategies?

Pull strategies have a considerable potential for improving inventory levels and in parallel customer service. However, not every chemical product is suitable for pull strategies. This depends on the level of demand fluctuation as well as on the characteristics of the production setup. Therefore the introduction of pull principles in chemical production is not just a simple shift of a one size fits all approach from make to forecast to pull. This transformation is a supply chain planning redesign that is based on upfront product segmentation.

"To achieve a step change in planning performance, tactical S&OP planning and short term scheduling needs to be split," said Jörg Schmid. "For the S&OP process, aggregated information on a global and bulk level is sufficient. Remove the 'waste' of a 12 months out SKU level information that is not relevant for high level production planning. And replace error prone SKU forecasts for production scheduling by inventory pull control as far as applicable."

Pull is one of the main principles of "lean process design." Camelot does not only apply the pull principle but the complete, well-proven lean process approach to supply chain management. This approach puts external and internal customers in the focus and derives the value creating factors. These factors are the fundamentals to shape the supply chain process design.

Having done this, design meets production reality. Due to technical and production process constraints, the chemical process industry is not as flexible as discrete manufacturing. The alignment of the design draft with the production facts finally leads to a realistic allocation of planning principles and parameter sizing.

Looking at the range of products being manufactured on one production line, it shows that they are linked to the whole variety of production scheduling policies. This needs to be handled in an efficient way in the daily and monthly planning routines.

"However, the best principles are only one half of the equation," Sven Mandewirth said. "People make it or break it. The user focused interface is key for a sustainable implementation of such a new planning philosophy."

Our technology partner Camelot IT Lab has developed an according solution and delivers a state of the art integration of these principles into advanced planning systems like SAP APO. In order to ensure a sustainable implementation, the company has added an integrated tool to calculate inventory trigger points and safety stocks based on ERP data and direct update of the according master data settings. This facilitates the essential adjustment of the system settings to the moving business reality.

For a proof of concept, standalone solutions suitable for a pilot range are available. However, quite often the first step to overcome natural skepticism is a simulation of a characteristic section of the customers supply chain.

EVENTS

11th International Automobile Recycling Congress, March 23–25, Budapest. Delegates from industry, authorities and academia will discuss and present news and challenges of the manufacturing and end-of-life vehicle (ELV) business. The congress will bring together the various links in the ELV recycling chain such as car manufacturers, metal and plastic scrap traders, recyclers, shredder operators and policy-makers from around the world. Sessions will focus on new cards and recycling technologies; where cars are sold and where they will be recycled; best available recycling technologies; closing the recycling loop; and much more. There will also be a one-day workshop on Reach.

▶ www.icm.ch

DIA 23rd Annual EuroMeeting, March 28–30, Geneva. The EuroMeeting attracts more than 3,000 professionals from over 50 countries. It brings together professionals from the biopharmaceutical industry, contract service organizations, clinical research, regulatory agencies, health ministries, patients' organizations and universities. This convergence affords attendees the opportunity to network with professional colleagues from around the world. This year's conference will introduce important new themes such as global drug development in the real world. These themes will highlight new perspectives on current systems and stimulate discussion on new ways of working, as well as provide opportunities for new partnerships.

▶ www.diahome.org

European Coatings Show, March 29–31, Nuremberg, Germany. The European Coatings Show plus Adhesives, Sealants, Construction Chemicals is the leading exhibition for the international coating and paint industry every two years. The exhibitors source information on the production of coatings, paints, sealants, construction chemicals and adhesives. The 806 exhibitors who came to Nuremberg for the European Coatings Show 2009 from 42 countries offered the 19,756 trade visitors from 100 countries a world-class range of raw materials, laboratory and production equipment, testing and measuring equipment, and services on a net display area of 27,490 m^2.

▶ www.european-coatings-show.com

Hanover Fair, April 4–8, Hanover, Germany. The world of technology in Hanover. Exhibitors have the opportunity the market potential of their company and its products fully. International representatives from business, politics and research are on the ground, to all industries to network. The bulk of trade visitors come with concrete investment plans. The Hanover Fair subdivided into 14 trade fairs is the ideal interface for the innovations of tomorrow.

▶ www.hannovermesse.de

LogiChem Europe, April 5–7, Antwerp, Belgium. LogiChem 2011 will be the event's 10th anniversary and an opportunity for the most senior supply chain directors from the European chemicals community to come together once again share experiences, make new contacts and benchmark the latest chemical supply chain initiatives. Not only will LogiChem 2011 be a chance for the chemical industry to reminisce about the last ten years but an opportunity to shape the next decade. To celebrate a decade of LogiChem, there will be an exciting three day program filled with networking opportunities in Antwerp. The 2011 speaker faculty features a first-class line-up of the most forward thinking chemical companies and chemical supply chain experts. With a brand new agenda format, you can create a personalized program around your top chemical supply chain and global logistics priorities.

▶ www.logichemeurope.com

Chemical Development & Scale-Up in the Fine Chemical and Pharmaceutical Industries, April 5–7, Nice. This ever-popular 3-day training course for chemists and engineers in industry aims to discuss the most efficient methods for developing cheap, robust processes. It covers the principles of scale-up and development and provides examples and case studies from industry. Not to be missed if you are just starting work in chemical development and a useful refresher for more experienced development chemists.

▶ www.scientificupdate.co.uk

8th International Chlorine Technology Conference & Exhibition, April 5–7, Budapest. The conference provides a valuable forum for those involved in health, safety, environment and technical matters related to all aspects of the production, transportation and use of chlorine. Based on the previous events experience, more than 300 participants are expected, coming from all over Europe but also other regions of the world and representing chlorine producing and using companies as well as equipment and service providers for the chlorine industry. Presentations will be in English; printed summaries of all proceedings will be available in English before the conference and the full presentations will be available on USB sticks at the end of the last session. The exhibition, which runs in parallel to the Conference, gives participants an opportunity to meet representatives from a wide range of suppliers and services to the industry. They will include engineering companies, consultancies and equipment manufacturers and we count on at least 35 exhibitors.

▶ www.cefic-events.org

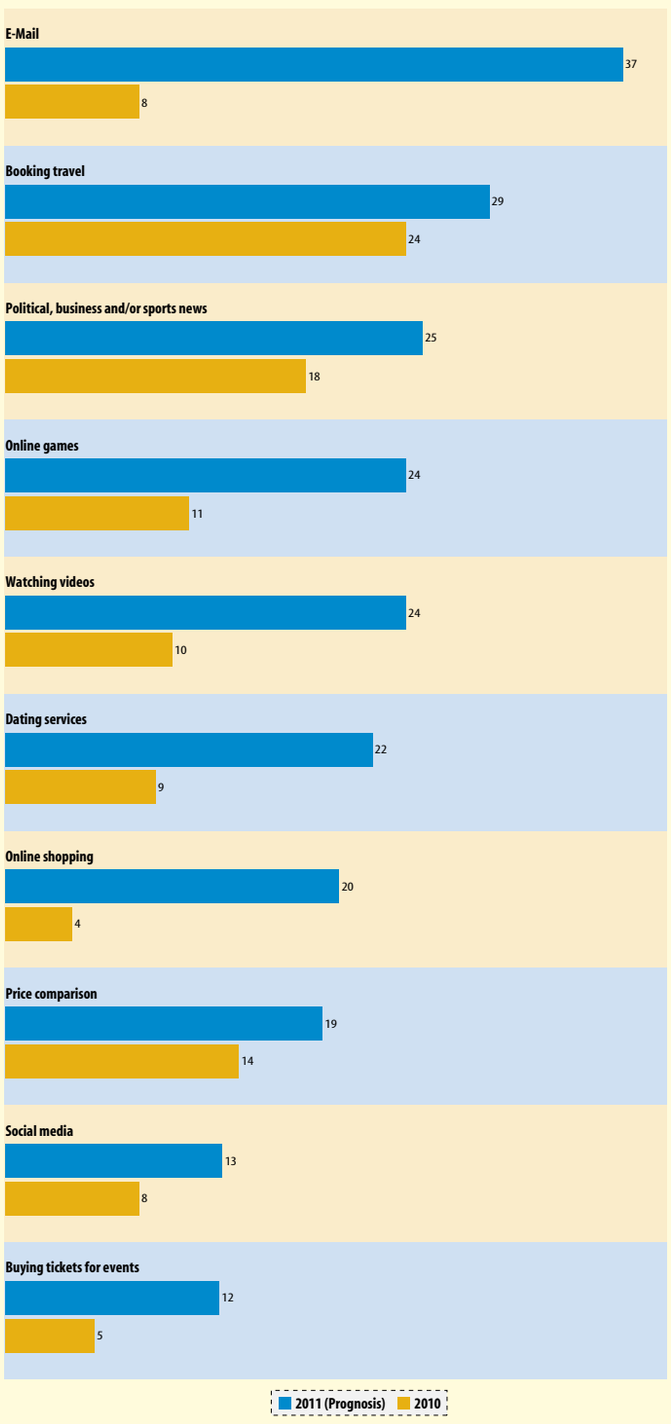
X-Talk Chemie, April 13, Frankenthal, Germany. Themed "Continuous Supply Chain Management: Freight Buying – Transport Management – Freight billing – KPI & Reports" AXIT, HPI and INTTRA extend an invitation to this expert information exchange. The agenda of this half-day event includes expert lectures, discussions and live demos related to today's challenges in the chemical industry's logistics. The speakers, logistics experts from DyStar Colours Distribution, Lexzau Scharbau and H.C. Starck will present successful practical examples.
In the course of the X-Talk Chemie, the hosts offer access to a competence network consisting of more than 400 forwarders, 30 shipowners and 35 chemical shippers as well as a best practice which the three companies have developed based on their comprehensive experience in the chemical industry. Registration for the event is possible until April 4.

▶ www.axit.de/xtalkchemie

There's an App for That – The Rise of the Smartphone

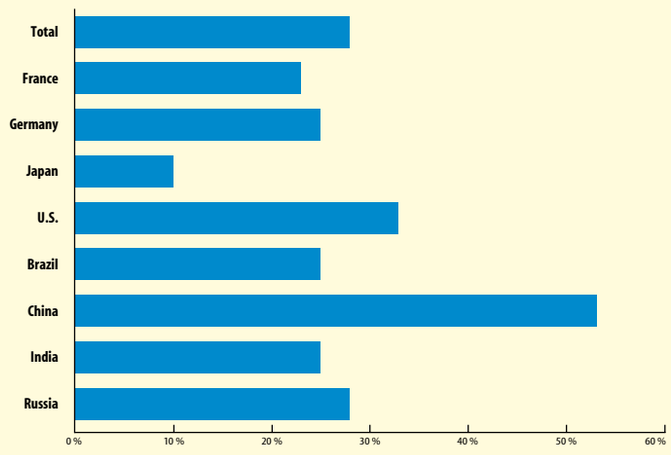
Preferred smartphone applications Fig. 1

in %



Source: Accenture and Frankfurter Rundschau © GIT VERLAG

Smartphone ownership Fig. 2



Source: Accenture © GIT VERLAG

Accenture recently released its 2011 Consumer Technology Power Rankings, in which top consumer technologies are ranked based on their global penetration and changes in their projected rates of growth year over year. It comes as no surprise that run-of-the-mill mobile phones are losing out to the iPhone and co. — ranked 10th overall, the purchase rate of smartphones is projected to increase by 26 % in 2011. Globally, more than one-fourth of the survey population owns a smartphone China is the geography with the most enthusiastic consumption: More than one-half of Chinese respondents in the Accenture survey currently own a smartphone, compared with one-third of U.S. respondents. Chinese enthusiasm is fairly new as well. Almost 40% of Chinese respondents purchased their smartphones in 2010 (representing more than half of those who now own one). And smartphones are predicted to be the most-purchased device in China in 2011, with 38% planning to buy one.

In addition to China, the smartphone is predicted to be the most-purchased device in India and Russia and the second-most purchased device in Brazil, Germany, the U.S. and France. Besides making phone calls, the smartphone applications rated most valuable to consumers are texting, taking photos, checking email and browsing the Web. These activities are all more important to younger generations than older ones.

In addition, consumers of different economies also have different interests in smartphone applications. Listening to music was a more popular smartphone activity in emerging markets (led by younger generations).

Reading books, magazines and newspapers was a top smartphone application for 13 % of emerging-market respondents, compared with just 3% of those in mature markets. Mature-market countries exhibit big differences in application preferences between younger and older generations. In these countries, more than half of adult consumers under 25 years old ranked texting as a top-three smartphone application, while only 21% of those over 55 did so.

While consumer interest in smartphones is high, competition among various smartphone alternatives is extensive as well. So how can consumer electronics companies recoup innovation investments, protect margins and capture growth in this fiercely competitive, rapidly growing market? Accenture's data indicates that commanding a premium for ever-faster and smarter smartphones could be tough. Just over one-third of respondents said they would not be willing to pay a premium for any of the five enhanced capabilities we queried about. In fact, respondents were evenly divided about what, if anything, warranted a premium price. Older generations were far less interested in paying a premium for enhanced smartphone capabilities. And consumers in mature markets are far less willing to pay for various enhancements to smartphones than emerging markets. (Source: Accenture)

Japan Fights to Avert Nuclear Meltdown after Quake

Japan is battling to prevent a nuclear catastrophe and to care for millions of people without power or water in its worst crisis since World War Two, after a massive earthquake and tsunami that is feared to have killed more than 10,000 people.

A badly wounded nation has seen whole villages and towns wiped off the map by a wall of water, leaving in its wake an international humanitarian effort of epic proportions.

A grim-faced Prime Minister Naoto Kan said the world's third biggest economy faced rolling blackouts as it, while officials confirmed three nuclear reactors were at risk of overheating, raising fears of an uncontrolled radiation leak.

"The earthquake, tsunami and the nuclear incident have been the biggest crisis Japan has encountered in the 65 years since the end of World War Two," Kan told a news conference. "We're under scrutiny on whether we, the Japanese people, can overcome this crisis."

As he spoke, officials worked desperately to stop fuel rods in the damaged reactors from overheating. If they fail, the containers that house the core could melt, or even explode, releasing radioactive material into the atmosphere.

Broadcaster NHK, quoting a police official, said more than 10,000 people may have been killed as the wall of water triggered by March 11's 8.9-magnitude quake surged across the coastline, reducing whole towns to rubble.

Kyodo news agency said 80,000 people had been evacuated from a 20-km radius around a stricken nuclear plant, joining more than 450,000 other evacuees from quake and tsunami-hit areas in the northeast of the main island Honshu.

Almost 2 million households were without power in the freezing north, the government said. There were about 1.4 million without running water.

Nuclear Crisis

The most urgent crisis centers on the Fukushima Daiichi nuclear complex, where all three reactors were threatening to overheat, and where authorities said they had been forced to vent radioactive steam into the air to relieve reactor pressure.

Damaged water pipe shoots water following earthquake off Japan's coast. (U.S. Navy photo by Chief Mass Communication Specialist Daniel Sanford)

The complex, 240 km north of Tokyo, was rocked by an explosion on March 12, which blew the roof off a reactor building. The government did not rule out further blasts there but said this would not necessarily damage the reactor vessels.

Authorities have poured sea water in all three of the complex's reactor to cool them down.

The complex, run by Tokyo Electric Power, is the biggest nuclear concern but not the only one: On March 14, the U.N. nuclear watchdog said Japanese authorities had notified it of an emergency at another plant further north, at Onagawa.

But Japan's nuclear safety agency denied problems at the Onagawa plant, run by Tohoku Electric Power, noting that radioactive releases from the Fukushima Daiichi complex had been detected at Onagawa, but that these were within safe levels at a tiny fraction of the radiation received in an x-ray.

Shortly later, a cooling-system problem was reported at another nuclear plant closer to Tokyo, in Ibaraki prefecture.

'Not Another Chernobyl'

The nuclear accident, the worst since Chernobyl in Soviet Ukraine in 1986, sparked criticism that authorities were ill-prepared for such a massive quake and the threat that could pose to the country's nuclear power industry.

Prime Minister Kan sought to allay radiation fears: "Radiation has been released in the air, but there are no reports that a large amount was released," Jiji news agency quoted him as saying. "This is fundamentally different from the Chernobyl accident."

Economic Impact

Already saddled with debts twice the size of its $5 trillion economy and threatened with credit downgrades, the government is discussing a temporary tax rise to fund relief work. Analysts expect the economy to suffer a hit in the short-term, then get a boost from reconstruction activity.

"When we talk about natural disasters, we tend to see an initial sharp drop in production... then you tend to have a V-shaped rebound. But initially everyone underestimates the damage," said

Michala Marcussen, head of global economics at Societe Generale.

The Bank of Japan was expected to supply as much money as needed to prevent the disaster from destabilizing markets and its banking system.

It is also expected to signal its readiness to ease monetary policy further if the damage from the worst quake since records began in Japan 140 years ago threatens a fragile economic recovery. ■

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