

MANUFACTURING SHIFTS SUPPLY

Recent economic indicators signal an expanding global economic recovery and suggest that manufacturing is growing at an encouraging rate. However, companies appear to be accelerating restructuring efforts following the recession, which could have serious repercussions for the adhesives raw materials supply chain going forward.

First, the good news. In early February, the Institute for Supply Management (ISM) reported a rise in its Purchasing Managers Index (PMI) to the highest level seen in six years. A number of the ISM indicators are showing strong current and future performance for manufacturing, the ISM said. New orders are on the rise, although purchasing managers still think that customer inventories remain dangerously low.

The bad news is that while the PMI has climbed steadily over the past six months, major companies are changing the face of the North American chemicals industry. The shift from commodity to specialty chemicals is gaining steam and companies continue to move operations overseas to take advantage of lower labor costs, more readily available feed stocks and growing demand from emerging markets. The goals for 2010: lower costs and healthier margins.

Dow Chemical is one company that is "repositioning its Basic Chemicals portfolio to more efficiently feed our higher value, higher margin downstream performance business," CEO Andrew Liveris told analysts on the company's Q4 2009 results conference call in early February.

In 2009, Dow closed or announced plans to close six ethylene-related chemical plants in Louisiana and Texas, reducing its Gulf Coast ethylene consumption by 30%. This year, the company plans to divest an additional \$2 billion worth of basic chemicals facilities and assets in North America.

This isn't new. Chemical companies have been shifting production overseas for at least a decade. The steady rise in energy costs, increasing environmental regulation and burgeoning demand from developing countries have hastened the exodus. But according to Federal Reserve estimates, U.S. chemical capacity declined 1.7% in 2009 and the overall decrease in industrial capacity was the largest on record.

"The chemical industry is leaving the United States, and it won't be back," Peter Huntsman, CEO of Huntsman Corp told the *Wall Street Journal* in early February. Huntsman has slowly moved the bulk of its capacity offshore and shifted what remains in the U.S. to focus on specialty chemicals.

These moves are changing the supply landscape for North American adhesives producers. As feedstock supply moves overseas and local manufacturers shift to more specialized product lines, adhesives companies are losing local supplies of key raw materials.

This comes at a time when many buyers are actively shifting back to local suppliers in an attempt to reduce lead times, avoid missed shipments and increase the security of their supply chain. In December, *Purchasing* reported the results of a recent poll in which more than half of the respondents said they were engaged in more near-shoring in response to the recession. Only 28% of respondents saw low-cost country sourcing as a viable growth strategy.

One of the problems is that the adhesives industry has never been a high-margin business for raw materials suppliers. In fact, often buyers of adhesives raw materials must pay price premiums to secure the supply they need. Ironically, in the current post-recession soft-demand environment, many suppliers are showing little interest in growing

volume with adhesives companies because the margins just aren't attractive compared to other industry segments.

All of this could lead to a more challenging landscape for the adhesives industry going forward. U.S.-based manufacturing offers many advantages by keeping transportation costs in check, allowing for just-in-time deliveries and permitting both suppliers and customers to keep lower inventories in their warehouses.

When supply is sourced overseas, purchasing professionals must extend lead times, requiring better forecasting and closer communications throughout the supply chain. Freight costs also represent a greater percentage of product costs. Current capacity issues in the ocean freight industry are complicating planning and driving up costs (see accompanying article). In addition, growth markets, like China, located closer to raw material suppliers, can have an inordinate influence on price and require North American-based buyers to raise premiums in order to compete for supply.

Yet another problem is the limited number of specialized bulk material carriers that can accommodate the raw materials. Only very "stable to shipping" raw materials can withstand the hot ambient temperatures and long passage. Without specialized handling and storage, pellets can melt and reconsolidate into a solid mass, which then requires additional handling at the receiving end. Securing specialized cargo capacity comes at additional cost and can further increase logistics and lead times.

It's clear that restructuring may improve the economics of the upstream chemical companies but it has the potential to introduce significant additional cost throughout the downstream supply chain. The end result: higher adhesives prices. ■

ADHESIVES PRICE TRENDS IN 2010

Industry insiders expect price increases for adhesives in the coming year. The best current forecasts for upstream feedstocks and raw materials used in the formulation of adhesives indicate rising costs will continue through 2010. While the increases will affect all adhesives types, some will feel the impact more than others.

Hot melt adhesives, including pressure sensitive, packaging and bookbinding hot melts, will by far experience the greatest increase. Part of the problem is that many of the production and supply issues that plagued hot melt raw materials prior to the recession never disappeared. Now many of the same issues will be amplified by post-recession economics.

Rising tackifier costs will be responsible for a significant proportion of the hot melt price increases, since tackifiers are the largest volume component of hot melt formulations. The shift to lighter cracking slates has reduced the availability

and quality of tackifier feedstocks. Shortages and price increases are affecting the entire tackifier market (see accompanying article). Increasing SBS rubber, wax and EVA costs will also put pressure on hot melt costs in coming months.

Waterborne adhesives will not be immune to price increases this year, although the magnitude of the increases will lag those expected for hot melts. Increases in vinyl acetate monomer-derived raw materials are expected to drive the increases.

In addition, for many suppliers last year's price increases were too small and came too late in the year. As a result, they did not get the kind of increases they felt they needed to sustain margins and meet the minimum reinvestment value that their shareholders demand. ICIS reports that product prices in January had barely covered raw materials cost increases. This means that suppliers are expected to nominate larger increases and



aggressively defend them as they seek to rebuild margins and profitability in 2010. Between this pent-up pressure and the normal time lag for upstream costs to be expressed in downstream prices, the pricing trend for adhesives raw materials is going to continue to rise for several quarters. This in turn will lead to increasing adhesives prices in 2010. ■

HIDDEN COSTS: OCEAN FREIGHT

An abysmal year for ocean freight companies is setting the stage for volatile behavior and bottlenecks in outbound freight from China.



Available ocean freight capacity from China to the U.S. is now tight. Just a short time ago, it seemed that ocean carriers couldn't order ships fast enough to keep up with the boom. Then when demand dropped off a cliff during the recession, they cancelled orders, scrapped older ships, dry docked new vessels and reduced capacity on major shipping lane segments from Asia to America. They deployed smaller vessels and anchored the largest vessels, using them as floating storage for empty containers,

all in an attempt to better match capacity to demand.

Now, demand has picked up but carriers remain cautious about the recovery and are trying to salvage some level of profit. So they're reluctant to put vessels back into service. This is causing problems for customers sourcing materials, including adhesives raw materials, in Asia for the North American market.

As a result, containers are scarce and customers are paying higher rates to ensure that their containers make it onto ships. With export volumes exceeding available capacity, carriers are rolling shipments (bumping containers off ships to make room for higher-paying cargoes), asking for large emergency rate increases and then taking their time sailing across the sea (to save on fuel).

The bottleneck was exacerbated by the Chinese New Year as shippers tried to push through higher volumes of inventory prior to the holiday shutdowns. But an imbalance in westbound and eastbound freight volumes could prolong the problem. There is more freight moving to the U.S. and less freight (and less profitable freight) destined for Asia. Even though containers headed to the U.S. are loaded

with consumer merchandise (flat screen televisions, computers and electronics) that commands much higher freight rates than the low-value commodities (wastepaper, hay and scrap metal) moving to Asia, profitability on the Asia-bound runs is limiting capacity. Vessel owners are expected to keep capacity tight in the near term to make sure that runs are profitable — even if that means shipments sit on docks in China.

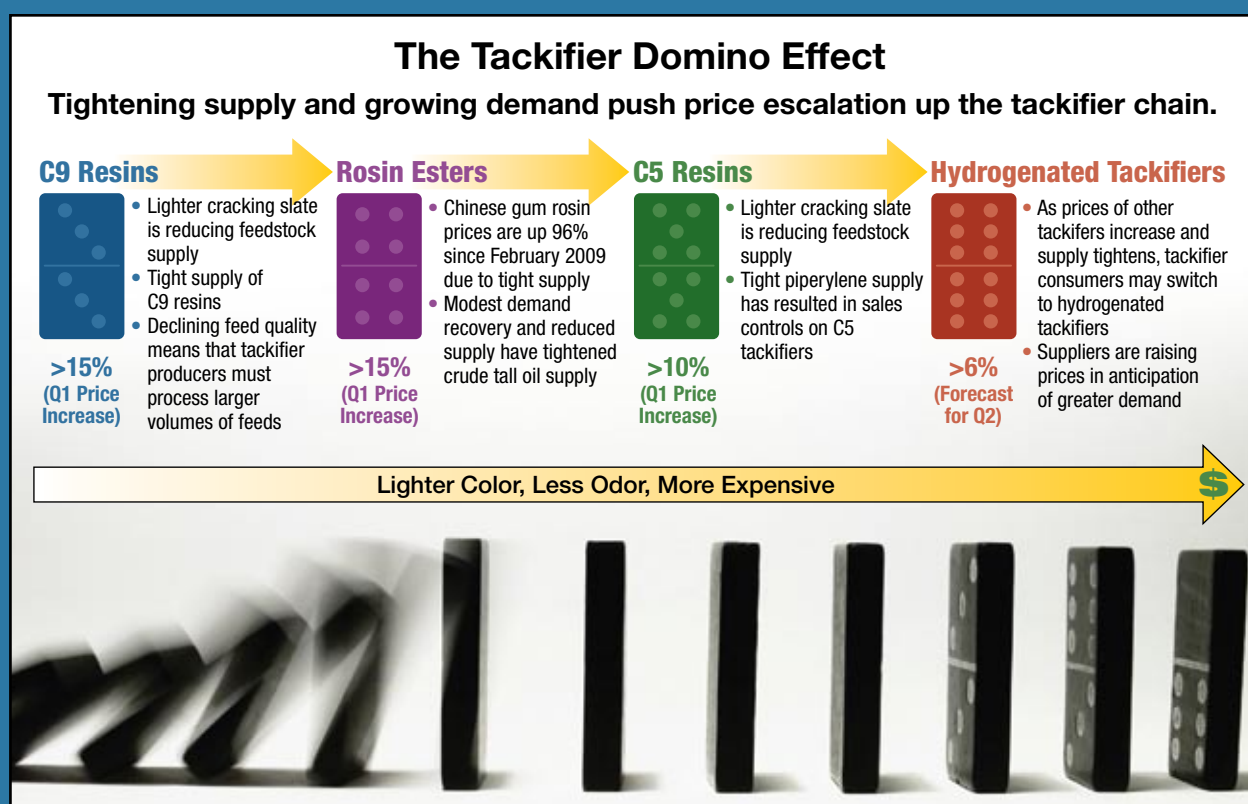
All of this increases costs and time to market. Drewry Shipping Consultants in London report that emergency rate charges of up to 20% went into effect mid-January. Carriers have announced additional price increases in coming months. Drewry Shipping Consultants forecast a 15% increase in average freight container rates in 2010 over 2009. Meanwhile shipments are being delayed by two-to-four weeks.

This means that suppliers must increase lead times on orders. It also means that they need to increase the volume of product in their pipelines to ensure supply. All of this puts additional pressure on the supply chain and will have an inflationary effect on the price of imported raw materials used in adhesives. ■

HOTSPOT: TACKIFIERS

Tackifier suppliers raised prices in Q1 and more increases are expected in Q2. Since tackifiers make up such a large volume of hot melt adhesives formulas, this will have a large impact on hot melt adhesives prices.

Adhesive chemists can choose from a range of tackifier raw materials, including C9 resins, rosin esters, C5 resins and hydrogenated versions of these. Most tackifiers are not interchangeable in a given formula, but when the supply of one feed becomes tight or prices escalate formulas using other types of tackifiers are considered. For example, as C9 rosins become scarce, adhesive companies will often offer the market another product based on a different tackifier such as a rosin ester or a C5 resin. If gum rosins become pricey, they can substitute crude tall oil-based rosins. This means that shifts in the supply/price dynamics of one tackifier feedstock can reverberate through the entire tackifier chain. ■



UPDATE: WATERBORNE ADHESIVES

Rising feedstock prices and unexpected plant outages continue to pressure raw materials used in waterborne adhesives.

Acrylic Acid: Recently, the global availability of acrylic acid, the precursor to a number of acrylate esters, including butyl acrylate (BA) and 2-ethyl hexyl acrylate (2-EHA), tightened sharply. Units at two large U.S. acrylic acid suppliers, Dow and American Actyl, experienced unplanned outages in December taking approximately 25% of American acrylic acid supply offline.

Both companies initiated sales controls, and Dow extended controls to its global inventory of acrylate esters. Other North American suppliers also initiated sales controls in response to the tightening market, a sign that lower-than-normal global inventories post-recession must be carefully managed.

The outages resulted in immediate price increases. Further price hikes were agreed in February. Two major suppliers have announced acrylate increases on the order of 20% for March.

Rising propylene costs are supporting the price trend. Unexpected outages and the coldest weather in 14 years along the Gulf Coast, which

affected production and hindered transportation, restricted propylene supply in early 2010. According to Technon, at least 12 propylene crackers experienced some form of outage in January.

This means that operations are playing catch-up just as maintenance turnaround season is about to begin. As a result, propylene availability "is reported as being very tight with little room for consumers to take up any new business opportunities not already scheduled for production," CMAI said in a recent report.

Contract propylene prices have climbed almost 20% since the beginning of the year. Spot prices are up 27%. This does not bode well for supply or costs as demand grows in coming months.

Vinyl Acetate Monomer (VAM): Unexpected outages and rising feedstock costs are moving VAM prices higher this year. In early January, LyondellBassell declared *force majeure* on VAM production from its La Porte, Texas plant and set VAM allocations at 50%, according to Technon. The plant had trouble restarting after a planned maintenance shutdown. Then in February, the company declared *force majeure* on ethylene production from its Corpus Christi, Texas cracker, which supplies feed to the VAM

facility, extending the outage. LyondellBassell lifted the *force majeure* on February 23rd and increased the VAM allocation to 100%.

Meanwhile, other Gulf Coast ethylene producers initiated sales controls and allocations in response to outages caused by the unseasonably cold weather. Deutsche Bank reports that 22% of North American ethylene production was offline in January due to weather.

As a result, contract ethylene prices have climbed 18% since the beginning of the year. Spot prices are up almost 36%. CMAI forecasts a climb in ethylene demand in March. And, even when all crackers resume normal operation, the supply of ethane (the lowest-cost feed for ethylene) will not be sufficient to meet demand. This should keep ethylene prices elevated in 2010 and put pressure on costs for all downstream derivatives.

U.S. producers raised VAM prices on January 1st. All major suppliers issued increases for February and March. This has affected the VAM-derivatives used in the formulation of waterborne adhesives. PVA, PVOH and VAE all rose by 5% in Q1 2010. Larger increases are forecast for Q2 2010. ■