Near-Term Future Is BRIGHT for Industrial Maintenance Coatings

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The definition of industrial maintenance (IM) coatings is up for debate. Some consider them to include any coatings applied for the purpose of protecting assets. Others limit the segment to coatings applied in the field only, with OEM coatings categorized separately. Either way, the outlook for the general industrial coatings market appears to be quite positive. The value of sales has increased in recent years and this trend is expected to continue through 2007, and possibly into 2008. During this period of growth, players throughout the supply chain have focused on development of new technologies to establish competitive advantage and maximize their opportunities.

The global market for field applied, ambient temperature-cure industrial maintenance coatings is valued at $3.0–$4.5 billion by consulting firm Kusumgar, Nerlfi & Growney. These coatings are used in the petrochemical, chemical, power generation, and other industries, and for bridges and highways, water and waste water treatment facilities, factories, and other applications. Regionally, the U.S. accounts for $1–$1.5 billion, Asia for $1.3–$2.0 billion, and Europe for $0.8–$1.0 billion. Western markets and Japan are mature, while Asia, and specifically China, is experiencing the fastest growth.

The broader definition of industrial maintenance coatings includes both field-applied and OEM coatings used to protect assets. They include roofing, food and beverage, process plant, recreational, and commercial applications in addition to those listed in the previous paragraph. According to The ChemQuest Group, the global market for IM coatings using this definition totals $6 billion, with North America contributing $2.0 billion. The break down between field-applied and OEM coatings is approximately 65%/35%.

The ChemQuest Group pegs the growth rate for industrial maintenance and other special purpose coatings in North America at 3.4% in 2006, up from 2.3% in 2005. The value of the market was estimated to increase by 5.6% in 2006 versus 2005, with the trend predicted to continue in 2007.

Around the world, the highest growth rates can be seen in Eastern Europe (7–8%) and Asia (9%).

The refining and chemical industries account for approximately 50% of the consumption of IM coatings based on the broader definition of the market. Bridges and highways and marine applications each account for nearly an additional 10% of sales. The remaining 30% is divided among numerous end uses. Dow Coatings has identified the marine segment as one of the fastest growing areas for industrial maintenance-type coatings. "Growth in this segment is due to the dramatically increased demand for new ships and containers," explains Carlo Spaniol, global marketing manager for Dow Coatings. He does note that in countries like China, India, and Russia, where rapidly increasing investments into the local industrial infrastructure are being made, significant growth can be expected for general protective coatings as well.

Growth in the IM market is closely tied to capital spending and maintenance cycles, with new construction accounting for about 35% of the market and maintenance the remaining 65%. "When capacity utilization drops, as it did in the earlier part of this decade, the use of existing equipment rises and new construction is minimal. In addition, maintenance cycles are often delayed," explains Dan Murad, president and CEO of The ChemQuest Group. "Today, we are seeing capacity utilization in the low 80% range, which is a pretty good level. The peak is usually in the upper 80s, so we still have room for growth, too."

High oil prices are providing a "catch-22" for IM suppliers. On the one hand, higher oil prices are increasing energy and raw material costs for coatings producers. On the other hand, refiners have more money to spend and are increasing the number of new construction projects and moving up their maintenance cycles as well.

Government spending can also be an important factor for the IM market. In the U.S., the federal government recently passed a spending bill for highway and bridge projects that will have a positive impact on demand for IM coatings. Municipal spending on waste water treatment plants and other facilities is also expected to increase in 2007. Corporate spending to improve facilities is on the rise as well.

The value associated with industrial maintenance coatings lies chiefly in the protection they provide, most specifically corrosion and chemical resistance. According to Rick Jones, vice president of The ChemQuest Group, some paint manufacturers add value by providing a distribution model geared toward contractors. "IM paints are applied by contractors, and suppliers that can make it easier for contractors to get their material definitely have a competitive advantage. More recently, application productivity has become an important factor in determining overall value of IM coatings."

Like with many other segments of the coatings industry, IM coatings producers are faced with the challenge of creating new value while facing increasing global competition, consolidation, and rising regulatory pressures. On the positive side, offshoring and globalization have had little impact on the demand in the IM segment. "In general, IM coatings are used for the protection of regional assets. Oil refineries and chemical plants are not mobile, and users are looking for local suppliers," explains Murad.

Competition is increasing, however, for raw material suppliers to the IM market—pigment, solvent, rheology modifier, and other additive producers in particular face growing low-cost competition. At the same time, raw material and energy prices are climbing. Many suppliers have been successful in passing some of these increasing costs on to their customers, but not all have been recovered. Lower margins for these suppliers mean less money available to invest in R&D.

The threat of consolidation also hangs over the heads of many regional players. Not many large acquisitions have taken place recently, though. PPG's recent purchase of Ameron is the only large scale transaction within the last two years. "The IM market is very diverse," notes Michael Growney, a consultant with Kusumgar, Nerlfi & Growney. "There are a handful of really big companies that serve the international markets. After that, companies rapidly decrease in size and focus on serving regional markets or developing specialized technologies."

Consolidation in the future will likely take the form of bigger producers getting even larger by purchasing successful smaller producers. Growney expects that larger companies will look to make acquisitions that will either give them access to new technology they do not have or will gain them entry into regional segments of the market in which they do not yet have a position. "This activity will have both positive and negative effects," asserts Spaniol. "It will enable globalization and drive the quality and consistency of the products available in the IM coatings market. Unfortunately, at the same time, it will take diversity and competition out of the market and potentially decrease investment in innovation and new technology development."

Innovation is critical in the IM industry today as more stringent regulatory requirements are introduced. "Environmental regulations continue to drive reformulation and new technology," states Jones. Because of the high liability associated with the failure of industrial maintenance coatings, there is an extended approval process, which often can be as long as five to

seven years. Performance and maintenance specifications are typically set in 15–20 year cycles. In addition, waterborne coatings often do not provide the level of performance required, particularly for equipment and facilities in the chemical and oil refining industries. As a result, solvents are still widely used in IM coatings.

Regulations are catching up with the industrial maintenance coatings market, though, and manufacturers must find ways to reduce volatile organic compounds from their formulations. At the same time, customers expect performance levels to be maintained or even improved, while the overall cost of application is reduced. "One of the biggest challenges is introducing new, VOC-compliant and high-build products into the market that are as reliable and trusted as the products they are replacing," says Mark Thomas, director of marketing for Themec.

Keeping up with changing regulations and the various regulations in different regions is also an issue. "The continual onslaught of new environmental regulations means that new product development must take place more quickly than ever before," notes Carl Angeloff, PE, manager , business development, Corrosion Protection, with Bayer MaterialScience. "We must constantly keep developing new formulations to meet these regulations and make sure that we maintain the same level of protection desired by our customers." With different states in the U.S. and different countries or regions throughout the world issuing varying regulations, everyone in the IM supply chain must maintain much broader inventories in order to be sure product is available that meets the different specifications. This need leads to higher costs and adds to the difficulty of maintaining appropriate stock of materials.

"Maximizing performance while creating a coating that is extremely tolerant to less than ideal application environments is also important for maintaining competitiveness," adds Thomas. Raw material suppliers and coatings producers have responded by focusing on the development of new technologies to address these issues.

Traditionally, industrial maintenance coatings were applied in a three-coat system, with a zinc-rich primer providing corrosion protection, an epoxy mid-layer for chemical resistance, and a polyurethane topcoat for weathering and durability. New resin technologies include polyureas, polyaspartics, polysiloxanes, waterborne polyurethanes (actually an older technology revived for a new application), fluoropolymers, and water-based acrylics. Zinc-rich primers remain the key method for providing corrosion protection. There is some interest in "smart" coatings, but currently costs are too high for this technology to find commercial application in the IM market.

Waterbased coatings have made inroads in formulations designed for bridges and low end rail (flat and box car) applications. However, soventborne coatings are still required for applications with higher performance demands. As a result, high solids technology is receiving more attention as a means for achieving environmental compliance. Two-part waterborne coatings have also received interest from the commercial sector, according to Angeloff. These coatings have little to no odor and are attractive for office buildings with metal facades and large numbers of occupants.

In addition to meeting regulatory requirements, IM paint manufacturers are also looking to technological innovation as a way to reduce costs for their customers. Traditional IM coating systems can have long cure times that occur only at warmer temperatures, often require premixing before application, and can often be applied only to clean surfaces in order to ensure good adhesion. The cost of the paint is only 15–20% of the total cost of the application process, according to Murad. Sand-blasting can be as much as seven times the cost of the paint. "Labor and application costs account for the greatest portion of any industrial maintenance coating project," he notes.

Paint producers, resin manufacturers, and raw material suppliers have all responded by investigating new technologies that will reduce the application time and labor intensity of the process. "Many recent advances make it possible for contractors to apply paint to dirtier surfaces, reduce application time by applying thicker film builds at lower temperatures, and using two coats rather than the traditional three," says Growney. Extending potlife, maximizing product mixing through the use of plural component sprayers and increasing the use of water-blasting (instead of the much more expensive sand-blasting technique) are additional cost-saving measures.

Polysiloxanes are an example of a new technology that allows for reduction of the number of necessary coats from three to two. Developed by Ameron (now owned by PPG) and a supplier, a new polysiloxane topcoat, which is applied over the zinc-rich primer, provides the same level of protection as the traditional epoxy midcoat/topcoat system.

Direct-to-metal (DTM) one-coat systems are based on polyurethane resins and are designed for architectural applications where protective coatings are required. Polyaspartics developed by Bayer MaterialScience have been incorporated into Sherwin-Williams' Fastclad paints for use in DTM applications. Separately, the Northeast Protective Coating Committee (NEPCOAT) has approved two coat polyaspartic-based systems as being equivalent to traditional three-coat systems, according to Angeloff.

Another innovative technology is polyureas, which have made it possible to reduce the cure time of IM coating systems. "Asset owners can't afford to have their facility sitting idle. Return-to-service is becoming a critical factor for IM coatings applications. Polyureas are one technology that provides very rapid cure times, which allows contractors to complete the painting process in a shorter period of time, thus reducing the cost of the process and the time the facility is not available for operation," Growney states.

Water-cured urethanes were developed many years ago but never found widespread use. Recently, this technology has been revived as an attractive alternative for IM applications. Because the coating is cured by water, these formulations can be applied even on misty days. "This technology significantly widens the window of opportunity for the contractor. Asset owners also have more time to plan for maintenance activities," explains Jones.

In addition to the development of new resin technologies, paint companies are using new additive packages and other formulation modifications to provide some sort of performance advantage. Tnemec, for example, has developed a color additive package for spray-on clear topcoats. The paint, when applied, looks purple, enabling the contractor to see what portions of the substrate have been covered. The coating then dries clear. "This technology provides both labor and material savings without impacting the performance of the product," Murad comments. Growney adds that much of the current R&D effort is being carried out by smaller companies that are creating very high performance products designed for niche applications.

Dow Coatings is introducing a new epoxy toughening technology that allows the formulator to regain some of the coating ductility lost when products were reformulated for decreased solvent content, according to Spaniol. The company's strategy is to work with leading and fast-growing coating formulators, pursuing focused development cooperation to address future trends and opportunities. "We also take a global approach to the market, making heavy investments in emerging economies, especially China, to support market growth in those areas and expand our current position," he states.

Another opportunity for differentiation may present itself to enterprising IM manufacturers. "The role of color may become much more important in the IM segment than it has in the past," explains Angeloff. "Aesthetics traditionally were not an important aspect of protective coatings. We at Bayer MaterialScience see a new trend developing that refutes this approach. Color and appearance may well become another important performance characteristic that coatings producers will have to attain."

Emerging areas, according to The ChemQuest Group, include energy-efficient technology found in cool roof coatings, and coatings developed to address threats associated with terrorist attacks. International Paint's Interchar coating can withstand temperatures as high as 2000°F for four hours. LIFESHIELD™ Engineered Systems LLC offers a pre-fabricated, reinforced polyurea panel system that provides blast mitigation properties, and therefore reduced fragmentation, through a combination of outstanding cohesion, tensile strength, and elastomeric performance characteristics. LINE-X Industrial Coatings produces a 100% solids polyurethane–polyurea elastomer that is professionally sprayed on to walls and overhead surfaces that has been approved for blast mitigation by the U.S. Air Force Research Laboratory.

These more radical technology changes, like "smart" technology, will be much slower to be adopted. But there is interest, and only time will tell where it may lead. For the present, industrial maintenance coatings producers and their suppliers will focus on more incremental developments. Significant progress has been made in recent years, and with the anticipated higher growth rates over the next year or so, more positives can only be expected.