



PUBLISHED AS AN INFORMATIONAL SERVICE TO OWNERS AND ENGINEERS OF STEEL WATER STORAGE TANKS BY TANK INDUSTRY CONSULTANTS, INC., 4912 W. 16th ST., SPEEDWAY, IN 46224, E. CRONE KNOY, PE, PRES.

EDITOR'S CORNER

A BUSY YEAR, THAT 1985. It saw TIC mature in many ways. Mike Doolittle became Chief, Inspection Services -- coordinating the field inspectors and scheduling Work in Process and Pre-Bid Inspections. He also has completed most of the work required to be a NACE Certified Coatings Inspector. "Doc" Reed brought over 30 years experience in the steel tank industry with GATX to TIC, serving as an inspector, and now as operations manager and "bean counter". Jeff Cannon and Kent Bacon brought their experiences as blasting and painting foremen to TIC as inspectors. Greg Howearth, a Chemical Engineering graduate of Rose-Hulman (where else?) came to us with experiences in polymer analysis and computer networking. Wendy Wells added her spirit and smile to our secretarial staff in the late summer. Tim [redacted] left, deciding to work for someone other than his "old man".

We continue to expand our scope of services. With more personnel and an increased understanding of the benefits which our services offer, we find our people involved in a larger variety of services over a larger geographic area--specifying and inspecting the construction and painting of two 1,000,000 gallon single pedestal tanks for the Newport News, VA Department of Utilities in conjunction with Baldwin & Gregg, Ltd.; inspecting the construction and painting of a new 1.5 million gallon single pedestal tank at Ft. Wayne, IN; and being involved in the construction and renovation of steel tanks from New Jersey to California -- Wisconsin to Texas. Other steel plate structures on which we have been working include gas holders, a low head dam, and waste treatment units. We continue to give our time and effort to support the professional activities of AWWA, NACE, SSPC, ASCE, NRWA, SPFA and other industry groups by serving on committees and speaking at conferences.

SEMINARS -- SEMINARS -- SEMINARS

As always, we at TIC have felt an obligation to communicate facts concerning steel plate structures to their owners. We continue to do this through our "What You Should Know About

Tank Maintenance" seminars. This winter we have offered these seminars in Dallas, Richmond, and here in Indianapolis. Early spring will find us in Newark and Kansas City. In response to several requests, we are also offering a "New Tank Seminar" on March 4. To add to the hectic pace, TIC has been contracted by Steel Plate Fabricators Association and American Iron and Steel Institute to design and coordinate Steel Water Tank Seminars offered throughout the country. The first ones offered were well received, and plans are to continue them next year. For information concerning TIC, SPFA/AISI, or other custom designed seminars--call us.

DESIGNING EXTERIOR COATING SYSTEMS

(Concluded from TANK TALKS 2 through 5)

As you'll recall, in TT5 we left you hanging with a table of characteristics of various exterior coating systems. As usual, I found it generated more questions than answers. In response to those requests for more information, I decided to complete the article.

Like wines, the generic name of various coatings usually refers only to the major ingredients used in their formulation. For this reason, the characteristics of a generic type of coating system will vary from manufacturer to manufacturer.

Alkyd -- The "old standby" coatings of the industry are the alkyd coatings. In non-hostile environments, alkyds have given over 20 years service without corrosion and without becoming aesthetically unacceptable. Shorter life spans of five to seven years have been received from lower quality alkyds, or high quality paints applied over incompatible primers or intermediate coats, non-corrosion inhibitive primers, improperly cleaned surfaces, or applied under improper conditions. Alkyds are the easiest to apply; may be applied by roller, brush, or spray; may be applied under reasonably adverse conditions but it must be above freezing and they may not be applied over moisture. When modified by adding silicone, the resulting "silicone alkyds" have excellent color and gloss retention, normally surpassed only by polyurethane coatings. The

silicone alkyds are relatively expensive with respect to "straight" alkyds, but are applied as a finish coat, over the ordinary rust-inhibitive alkyd primer(s) and intermediate coats. The comparable AWWA D102-78 exterior systems are No. 1 (Three coat alkyd), No. 4 (four coat alkyd, with two primer coats), and No. 3 (three coat silicone alkyd).

Modified Acrylics -- In the search for exterior coatings which were relatively inexpensive, but had "dry fallout" characteristics, several "fast-dry" type coatings have been developed by modifying acrylic or alkyd formulations so that the overspray of the coating dries before landing on automobiles or other surrounding property. Although normally having relatively the same or better color and gloss retention than the "straight" alkyds, they frequently do not have the life of the alkyds. This "dryfall" modification usually causes the coatings to be brittle, and their quick drying characteristics create some adhesion problems with the underlying primer or intermediate coats.

Epoxy and Polyurethanes -- Properly applied epoxy coatings have excellent adhesion to properly prepared substrates. This excellent adhesion gives good corrosion protection without the use of corrosion inhibitors. Although not included in the AWWA systems, zinc-rich epoxy primers are very good for use in several industrial or coastal environments. The disadvantages of epoxy coatings applied on the exterior of structures stem from their tendencies to chalk and fade under the ultraviolet rays of the sun. Because of this, polyurethane top-coats have been developed to protect the underlying epoxies from the deterioration caused by the environment. Most epoxies and polyurethanes have more stringent application conditions than alkyd coatings. They dry slowly, and the overspray or droplets formed by rollers or brushes adhere tightly to automobiles or other adjacent property. Even when removed quickly with a cloth soaked in solvent, they sometimes cause color changes on the unintentionally painted surfaces. There are many types of polyurethanes, but the most commonly used ones are aliphatic-polyester polyurethanes -- these formulations are quite moisture sensitive and require warm temperatures to cure before the painted surface reaches the dew-point of the surrounding air. Polyurethanes have excellent (presently unsurpassed) color and gloss retention. When applied over properly cured

(not too soft or not too hard) epoxy or urethane top-coats they have excellent resistance to chipping, cracking, and abrasion. Both the epoxies and polyurethanes are two component catalytically cured formulations. Usually graffiti can be removed using a cloth soaked in solvent or an industrial cleaner.

The advantage of vinyls is that their dry-fall characteristics make them an excellent choice for use on tanks in densely populated areas, especially when all old coatings need be removed anyway. They are solvent cured, and the various coats adhere to each other well. When applied too thick, thinned too much, or applied over steel which is too hot, pinholes or craters develop in the coating or tiny bumps of entrapped solvent are created. These defects must be removed prior to the succeeding coats or the problem continues or is accentuated by the application of more coats. Some manufacturers add acrylic resins to the final coat of vinyl, giving improved color and gloss retention. Vinyl systems are covered in AWWA D102-78 Exterior System #2.

Other Systems -- There are many proprietary systems on the market. Some have proven to perform quite well, while others have appeared to be a good laboratory coating but have not proven successful in field application. In addition to the AWWA Standards, system standards are covered in Steel Structures Painting Council Systems and Specifications, Military Specifications and ASTM designations. These include inorganic zinc primers for severe exposures, water soluble coatings to prevent the escape of volatile hydrocarbons into the atmosphere, and a myriad of other systems.

The available systems are constantly changing -- new ones with improved life or reduced environmental hazards are becoming available as others are being phased out due to governmental regulations. Since published standards are difficult to change and keep current, it is suggested that you keep abreast of currently available systems by reading industry literature. Presently, the most easily read and current information is published in the SSPC "Journal of Protective Coatings and Linings" (4400 Fifth Avenue, Pittsburgh, Pennsylvania 15213 - Telephone 412/578-3106.)

For a reprint of the complete article, "Designing Exterior Coating Systems", contact TIC at P.O. Box 24359, Speedway, IN 46224.