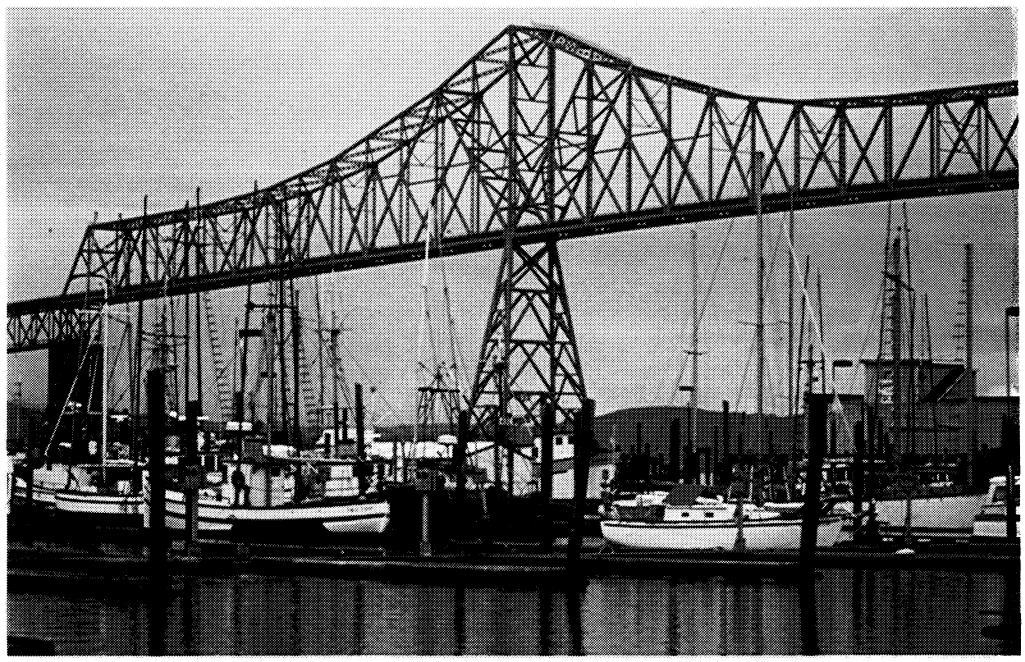
Protective Coating

Because of exposure to salt spray and fog, coastal or ocean structures—such as bridges, pipelines, ships and oil rigs—require more corrosion protection than is needed inland. One study found that anti-corrosion coatings with a 25-year lifetime inland were good for only a few years in coastal areas.

Seeking to reduce maintenance costs for gantries and other structures at Kennedy Space Center—which is located on Florida's Atlantic Coast—Goddard Space Flight Center conducted a research program aimed at development of a superior coating that would not only resist salt corrosion but would also protect Kennedy launch structures from the very hot rocket exhaust and the thermal shock created by rapid temperature changes during a space launch. The successful research effort resulted in a new type of inorganic coating that is being marketed commercially.

Anti-corrosion coatings formulated of zinc dust have been available for years in both organic and inorganic forms. They provide protection, but they require two or three coats and a relatively long curing period. Looking for maximum maintenance cost-effectiveness, Goddard



sought to improve upon the inorganic chemistry by boosting the ratio of potassium silicate. The result was an easy-to-apply coating that would provide long term protection with a single application, a zinc-rich coating with a water-based potassium silicate binder. It offers cost advantages in materials, labor hours per application and fewer applications over a given time span.

In 1981, NASA granted a license for the coating technology to Shane Associates, Inc., Wynnewood, Pennsylvania. In 1982, Inorganic Coatings, Inc., West Chester, Pennsylvania signed an agreement to become sole manufacturer and sales agent under the Shane license. Inorganic Coatings is now marketing the product under the trade name K-ZINC 531.

Because K-ZINC 531 is water-based, it is non-toxic, non-flammable and has no organic emissions. The high ratio silicate formulation bonds to steel and in just 30 minutes creates a very hard ceramic finish with superior adhesion and abrasion resistance. The improved technology allows application over a minimal commercial sandblast, fast drying in high humidity conditions, and compatibility with both solvent and water-based topcoats.

The formula has been tested in severe environments around the world and over long periods of time; in every case, the coating has displayed outstanding corrosion resistance. In June 1976, six test panels were sprayed just 100 feet from the high tide line at Kennedy Space Center. Seven years later, an inspection of the panels showed them completely free of corrosion, and thickness measurements disclosed essentially no film loss despite constant sun, moisture and salt attack.

Similarly, the California Department of Transportation tested a coated panel in a salt spray chamber; after 7,000 hours of exposure, the coating showed no sign of breakdown. Federal Electric Corporation applied coatings to antennas in Hawaii and on Canton Island in the South Pacific; both were in excellent condition after two years of exposure to salt air.

The formula was applied to a girder panel on the Columbia River Bridge (far left) at Astoria, Oregon in July 1977. Five years later, inspection uncovered some slight deterioration at one point on the panel but otherwise there was no failure or loss of film due to weathering. The photo at top center shows William Bangert, a bridge maintenance specialist with the Oregon State Highway Division, inspecting the test girder; at bottom left, Bangert is using a 30-power magnifier for a closeup examination.

An example of a commercial application is one made last year at a warehouse of Birdsboro Company, Birdsboro, Pennsylvania. In the photo above, a worker is applying the coating to a surface that was first sandblasted. The photo below is a comparison view showing areas of the building before sandblasting and after application of K-ZINC 531.