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## CORROSION PREVENTION FOR STEEL BRIDGES

**Summary:** A recent study by the U.S. Department of Transportation evaluating environmentally acceptable materials for the corrosion protection of steel bridges *concluded that metallized coating systems consistently provided the highest level of corrosion prevention, the longest maintenance-free protection, and the lowest life cycle costs of all the systems tested.* TAFE's Model 8860 High Output Arc Spray System was designed specifically for the task of thermal spray coating large structures fast, economically, and with high coating density and bond strength.

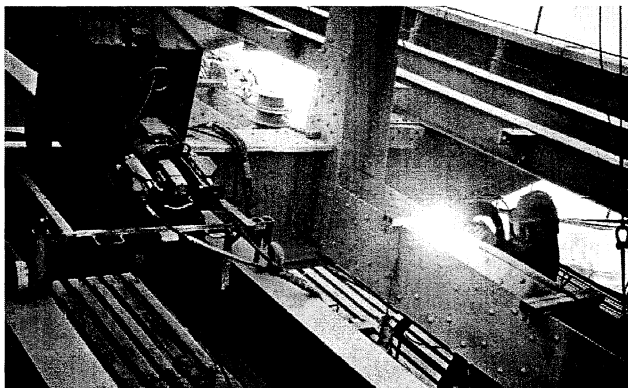
**The Challenge:** As one bridge maintenance manager put it, "We are on a 20 year maintenance cycle, so a protective coating better last that long, because we can't get back to it any sooner." This is troubling when you consider that most organic-based coating systems require repair within five years. If the protective coating were to fail in a critical area, it could jeopardize the security of the bridge.

The three main challenges related to the protection of steel bridges from corrosion attack are: 1) current protection systems require ongoing maintenance; 2) maintenance budgets are shrinking or static while the cost of bridge maintenance continues to increase; and 3) ever more stringent EPA regulations regarding exposure to Volatile Organic Compounds (VOC) are limiting available options.

**Solution:** The TAFE Model 8860 High Output Arc Spray System, with high speed and high capacity capability, resolves these issues. The TAFE 8860 Arc Spray System was designed specifically for the application of aluminum, zinc, and 85/15 zinc aluminum corrosion prevention coatings on industrial structures in the field.



*As maintenance budgets tighten, and bridge maintenance costs continue to increase, many fiscally responsible officials are evaluating their options based on a life cycle cost analysis. Above, the under structure of the Trenton No Toll Bridge was protected with TAFE 02Z Zinc coating. The coating is expected to deliver a minimum of 30 years reliable service life.*



*A recent U.S. DOT report concluded that metallized coating systems consistently provide the longest and most reliable corrosion prevention, and the lowest life cycle costs of all systems tested. Significant savings are realized in the costs related to containment, materials, bridge downtime, and labor. In a life cycle cost analysis the thermal spray option should deliver a 5-fold saving over alternative coating processes.*

### Longest Service Life

A recent report by the U.S. DOT, (FHWA-RD-96-058) dated January 1997, concluded that the ***thermal spray coatings should provide a minimum of 30 years reliable service.*** This presents a significant savings in dollars, time, labor and materials.

### Lowest Life Cycle Costs

***Case studies have demonstrated the thermal spray option will provide approximately a 5-fold saving over alternative coating processes.*** Although thermal spray has a higher initial price tag, in a life cycle analysis this option is by far the least expensive and the longest lasting.

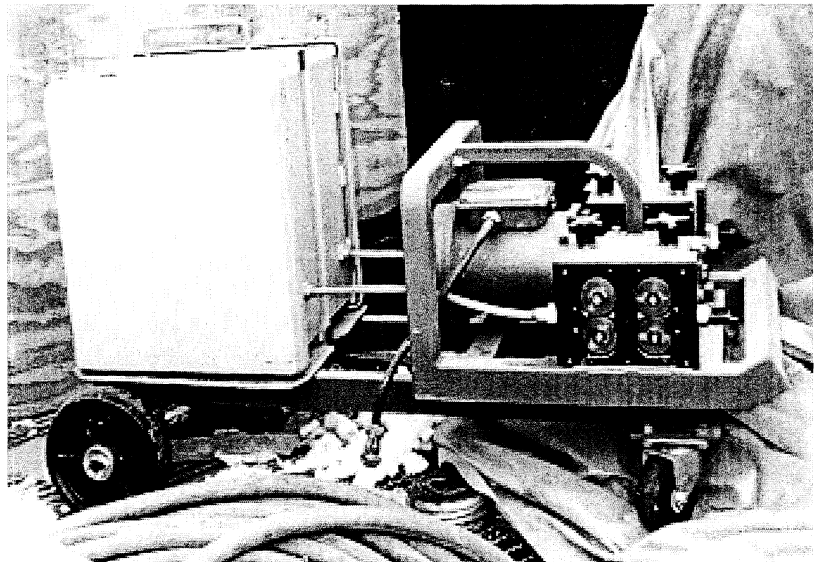
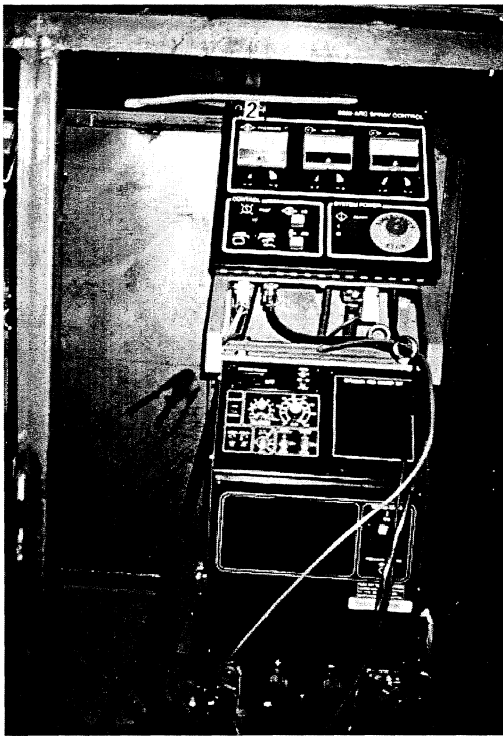
### High Speed Application

With its 600 amp power source, reliable wire feed drive, and its ability to spray fan patterns greater than 12 inches, *the Model 8860 Arc Spray System can apply more square footage of protection per hour than any other commercially available arc spray system (100+ lbs/hr[45+Kg/hr], 90sq/foot/hr [8.4 sqm/hr] @ 8+ mils [203μ] thickness).* For flexibility, the system utilizes both 3/16 inch and 1/8 inch coating wires for flexibility.

### On Site Portability

The Model 8860 Arc Spray System is designed to accommodate and endure the rigors of field application. It is engineered for robustness to ensure reliability. The gun is a very light 4.8 lbs (2.2Kg), reducing operator fatigue. The control console and power supply can be positioned up to 100 feet from the work area for staging area flexibility.

### Environmental Acceptance



*The Tafa Model 8860 High Output Arc Spray System is designed for high speed application and on site portability. With its unique wide spray pattern capability, 600 amp power source, and reliable wire feed drive it can apply more square footage of protection per hour than any other commercially available arc spray system (100+ lbs/hr, 90sq/foot/hr @ 8+ mils thickness). Elements of the system can be combined or separated, and positioned as far as 100 feet from the work area for optimal staging area flexibility. Engineered for robustness, the 8860 is built to endure the rigors of field applications.*

The zinc and aluminum coating materials used in the Model 8860 Arc Spray System are rated “environmentally acceptable” by the EPA. However, standard precautionary procedures are required for these materials. (see: Tafa Zinc Wire 02Z MSDS# T129, Tafa Aluminum Wire 01T MSDS# T109, Tafa Zinc Aluminum Wire 02A MSDS# T156)

### Typical Application

Three materials have proven to be very effective in bridge corrosion prevention systems: Tafa Zinc Wire 02Z; Tafa Aluminum Wire 01T; Tafa 85/15 Zinc Aluminum Wire 02A (please see Tafa Bulletin 2.3.1.5)