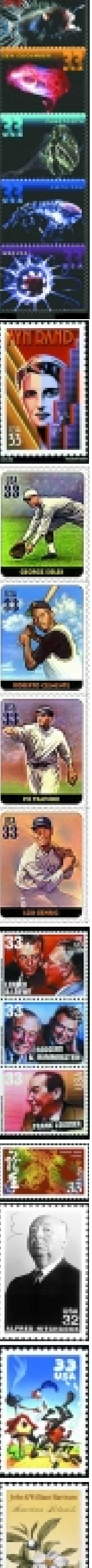

Correspondence

Dear Editor:

The June 2000 issue of *Modern Steel Construction* contained an interesting article titled "The Same Old Grind…An Investigation of Zinc-Rich Primer Performance Over Steel Corners." Having read the article, I offer the following comments for consideration by your readers.

I am a professional engineer who has prepared a number of shop and field painting specifications for bridge owners, including shop-applied, multi-coat paint systems that include a requirement for grinding edges of members to a 1/8 in. minimum radius.

In my opinion, the edge grinding requirement should be invoked on bridges that will be exposed to harsh environmental conditions where the additional surface preparation step is warranted. The edge grinding requirement involves major considerations including:

- The coating systems selected for bridges in severe service usually consists of an inorganic zinc primer, high-build epoxy intermediate coat and polyurethane topcoat;
- Industry experience and research performed in severe marine environments indicates that radiused edges on steel members results in a longer coating system life (reference, "Problem Solving Forum/ Cost-Effectiveness of Grinding Steel Edges," *JPCL*, Feb. 1989. "The Effects of Edge Preparation on Coating Life–Phases 1 and 2," National Shipbuilding Research Program, 1983 and 1985.);
- Industry experience indicates that relative fluid coatings such as epoxies and urethanes tend to flow away from sharp edges, thus producing thin coating films when cure is achieved and;
- There is no current practical method for accurately measuring dry film thickness on member edges outside of the laboratory.

The author reports that all of his laboratory studies were performed on edges upon which a fast setting (within seconds) inorganic zinc-rich primer was applied. The results of his study demonstrate that edge preparation has little or no effect on edges to which a single coast of inorganic zinc-rich primer is applied. Unfortunately, the primer is only one of part of the entire coating system usually selected for shop-application to steel bridges in severe service.

It should be noted that, in the case of a bridge coating system which includes an inorganic zinc-rich primer over-coated with a high-build epoxy intermediate coat, the epoxy intermediate barrier coat is designed and relied upon to provide the primary corrosion protection for the steel substrate, and that the inorganic zinc-rich primer provides the secondary defense, in-depth corrosion protection should the epoxy coat be defective, damages and/or fail.

Furthermore, inorganic zinc-rich paints having "throwing power," that is, the ability to protect surfaces that are not completely coated with primer. There is little doubt that this characteristic of inorganic zinc-rich plaints will protect poorly painted edges. Throwing power is also affected by the top-coats. It is to be expected that the edges coated with zinc-rich products and left without a top-coat would perform well in the testing protocol. Testing labs and paint manufacturers have known that the scribe areas on panels with and without top-coated zinc-rich systems perform quiet differently, a fact that should have been taken into account in the testing protocol.

The laboratory phase of the experiment used conventional application equipment. Given the difference in the velocity and deposition rates of the paint during application between conventional and airless, it is likely that edge performance of a coating (other than inorganic zinc-rich systems) will be affected by application equipment. Since most new paint systems on bridges are applied via airless equipment, the test should have been performed using airless equipment.

It is well-known in the paint industry that some coating materials that are formulated to be slower setting, such as high-build epoxies, will flow away from sharp edges, thus producing a lesser dry film thickness than that achieved on adjacent flat substrate areas. Since the author failed to take into consideration the fact that the coating system design for most bridges in severe service is intended to ensure adequate mid-coat dry film thickness and primary corrosion prevention. Therefore, the author's statement that, "Based in the results of the three phases of the study, it was concluded that grinding of the corners in the shop, for the purpose of improving the surfaces for coating coverage and ultimately corrosion protection, is unnecessary when employing ethyl silicate inorganic zinc-rich primer systems," can not be supported. In order for the author to make such a statement, a complete coating system consisting of inorganic zinc-rich primer, a high-build epoxy mid-coat and a polyurethane topcoat must be tested and application equipment that is prevalent in the industry must be used.

Finally, as pointed out in the article, not all fabrication shops are created equal, neither are all applicators in the same shop are equally skilled. Specifiers are forced to take this into account. The section of the article titled, "Phase 2 Application Results," clearly documents the problems of coating edges in a fabrication shop. One out of two shops had problems unless the edges were in some way treated. Obviously this is a very small sample, but based on the results it is just as easy to conclude that edge treatment is necessary as it is to conclude application technique is important, in fact both are important. Why would the specifier not utilize an objective requirement he can control and inspect instead of a subjective evaluation of the application techniques of individual shops or painter?

In summary, edge preparation of steel members for structures in severe service is, in fact, a proven technique for extending the life of multi-coat paint systems. Edge preparation adds cost to the overall project and, as such, the project designer should carefully consider the cost benefits of edge preparation during planning of the project.

Jon R. Cavallo, P.E.
Vice President
Corrosion Control Consultants and Labs
Eliot, ME

Dear Editor:

Several respondents to my article, "Value Engineering for Steel Construction," pointed to an error regarding application of a concentrated load on steel joist top cord. I feel an explanation would be beneficial to other readers.

Prior to 1987 the SJI required the top chords of steel joists to be designed to resist a concentrated 400# load placed anywhere between top chord panel points in addition to the normal uniform load. This provision was ample to support many routine super-imposed roof loads such as the loads delivered by roof frames for exhaust fans, some air handling units, roof drains, sky lights, roof scuttles, smoke vents and such. This was an excellent approach to the problem of where exactly to locate the concentrated loads because such information is rarely available during the design stage.

Since 1987, however, SJI had dropped the 400# requirement. Now SJI considers concentrated loads a special condition and the information must be relayed to the joist manufacturer at the time the joists are ordered. If this information is not then available additional web members, if required, are applied in the field as pointed out by one of the respondents.

Correspondence

In updating my article for current publication I failed to note this 1987 change by SJI and for this I apologize to your readers.

David T. Ricker, P.E.

Dear Editor:

Thank you for the wealth of information provided in the April 2000 issue of Modern Steel Construction regarding value engineering. Having spent over 20 years working as a structural engineer, I have recently taken an engineering management position with a steel joist and deck manufacturing company and appreciate your including the information on steel joists and decking. I am sure that you had many other suggestions following this article, but I would like to add one more.

Steel joists and joist girders are two-dimensional truss systems. Although we have been able to place many different types of loading schemes onto the trusses, they are still not meant to be loaded laterally (perpendicular to the joist or girder in the plane of the floor). This most frequently occurs when some type of wall or screen is placed on a roof. Yes, horizontal bridging is installed between joist top and bottom cords, but this is primarily for stability and capable of transferring only small lateral forced. It is the responsibility of the engineer-of-record to determine the method of transferring these lateral loads into the structural framing system. Please do not rely on or expect the joist manufacturer to design this load transfer system as they are not responsible for the overall structural system.

Again, thank you for including steel joists and decks in you resent article. I continue to look forward to excellent and relevant articles in *Modern Steel Construction* in the future.

Walter F. Worthley, Jr., P.E.
Chief Engineer
Valley Joist-West
Fernley, NV

Dear Editor:

I wanted to tell you how much I enjoyed your tribute editorial to Bob Lorenz, Lew Brunner and Morrie Caminer in the June issue of Modern Steel Construction. Each of these three gentlemen have played an important role in the history of AISC and you have done an excellent job of recognizing their contributions. I consider each of them a friend of mine as well as a business associate and have enjoyed the opportunity to both work and socialize with them over the past two decades.

Stephen E. Egger
President
Egger Steel Co.
Sioux Falls

Send CORRESPONDENCE to:

Editor,
Modern Steel Construction,
One East Wacker Dr., Suite 2406,
Chicago, IL 60601

or

email:
melnick@blacksquirrel.net

or

fax:
312/670-0341