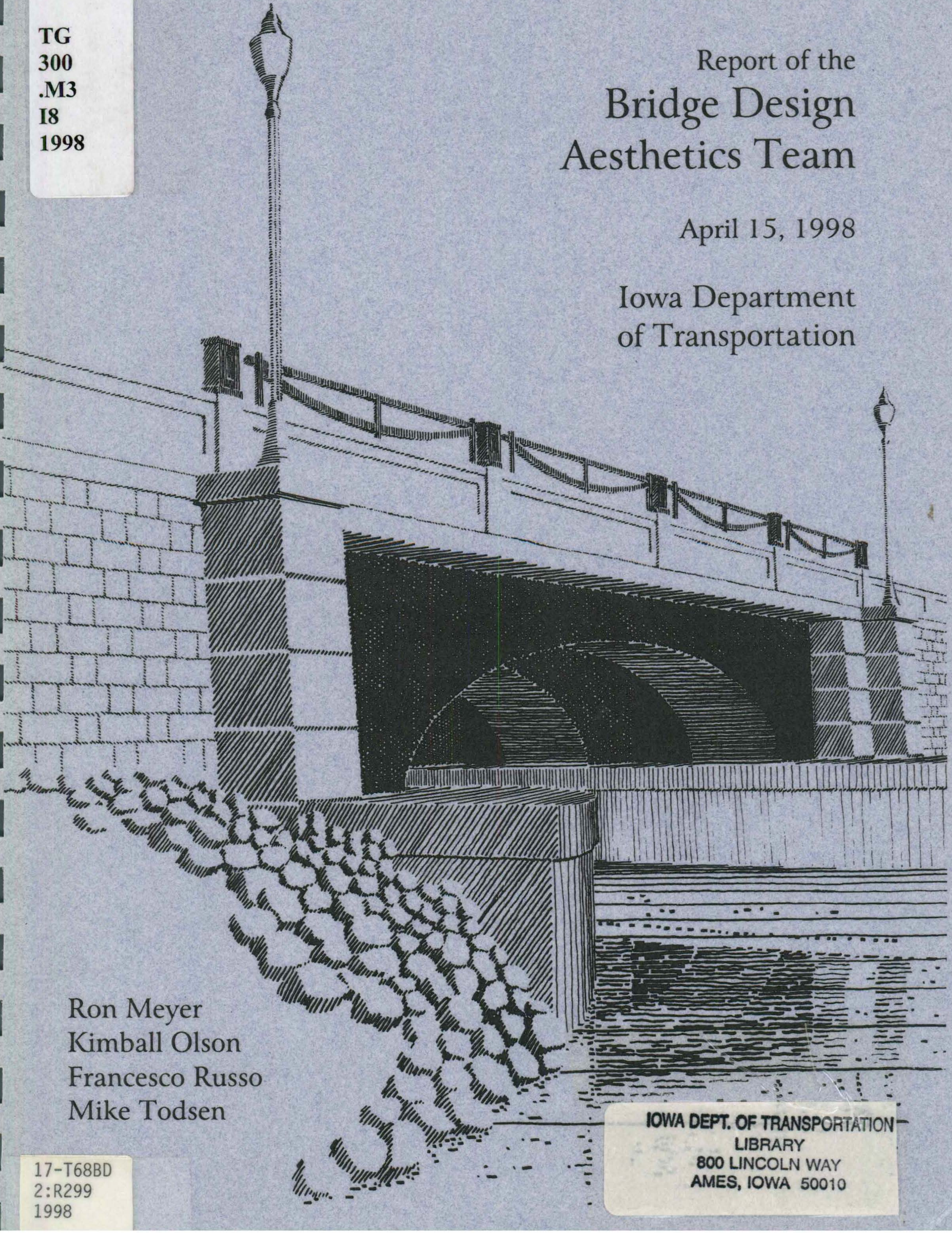
Report of the
Bridge Design Aesthetics Team

April 15, 1998

Iowa Department
of Transportation



Ron Meyer
Kimball Olson
Francesco Russo
Mike Todsen

REPORT OF THE BRIDGE DESIGN AESTHETICS TEAM

SUBMITTED TO:

William A. Lundquist
Bridge Engineer
Iowa Department of Transportation

PREPARED BY:

Ron Meyer
Kimball Olson
Francesco M. Russo
Mike Todsen

Office of Bridges and Structures

1.0 INTRODUCTION

"The first requirement for a beautiful bridge is that it must stand up long enough for us to look at it." Hardy Cross

In the past decade, the importance of aesthetic design considerations in the transportation field has become more pronounced. This is due in large part to the impact that local community groups now have on the design and construction process. These groups have begun to request that transportation projects assess and mitigate to the degree possible the deleterious impacts that they may possibly have on a community. A common solution to these concerns is the use of aesthetic design. By softening the impact of a highway and its structures, the road begins to become part of the community and less an imposition upon it.

Aesthetic design is also an outgrowth of the natural learning process whereby new and innovative uses of materials have allowed for graceful and very slender long-span bridge structures. It is in this context, that of the long-span suspension, cable-stayed, or arch bridge, that the concept of aesthetic design is most evident. However, these bridges constitute a very small portion of the total number of bridges constructed in a given year. It is the routine bridge that impacts the greatest number of people because it forms the lifeline by which communities work, play, and engage in commerce.

In response to the growing need for aesthetics in highway construction, two states have prepared highly detailed design manuals. In 1993, the Maryland DOT released the "Aesthetic Bridges Users Guide". This guide, and a similar one published by the Minnesota DOT in 1995 entitled "Aesthetic Guidelines for Bridge Design" presents a great amount of detail about the how, where, and when of aesthetic bridge design. The guides are an excellent reference which illustrate how to determine proper structural form, proportions, and appropriateness for bridges in dense urban and decidedly rural settings. These states have taken the lead in the area of bridge aesthetics and have been duly rewarded with numerous prize bridge awards.

In our own organization, aesthetics and community input have been a key component of the Art in Transportation (AiT) program established for the Iowa Rest Stops. The AiT Program, an outgrowth of the 1994 Governors Summit on Community Building and Design, states that part of its mission is to *"...advance the role of design and aesthetics in community building activities and programs."* The AiT Program worked with the Iowa Arts Council as part of a multi-disciplinary team in designing several new rest areas in the state. With a combination of artists, architects, engineers, and landscape architects all working together, it was believed that a community responsive but economical and functional rest area could be designed and constructed. Various themes from the local community as well as community input were sought as a way to make the rest area symbolic of its locale and not simply a way-station on one's journey through the state. The design team was seen as a viable way of soliciting community input via their elected and appointed officials.

bases on overhead bridges yet they are infrequently used. The resulting unused base is shown in Figure 1. The appearance of this concrete base and projecting conduit and anchor bolts lends an unfinished and unappealing appearance to the bridge. Additionally, locating the light pole base offset from the centerline of the pier presents a somewhat disjointed elevation view of the structure, with the pier cap, the pier diaphragm, and the light pole base forming a discontinuous series of vertical elements. The light pole base is usually located so close to the pier to appear as if it was meant to be centered over the pier.

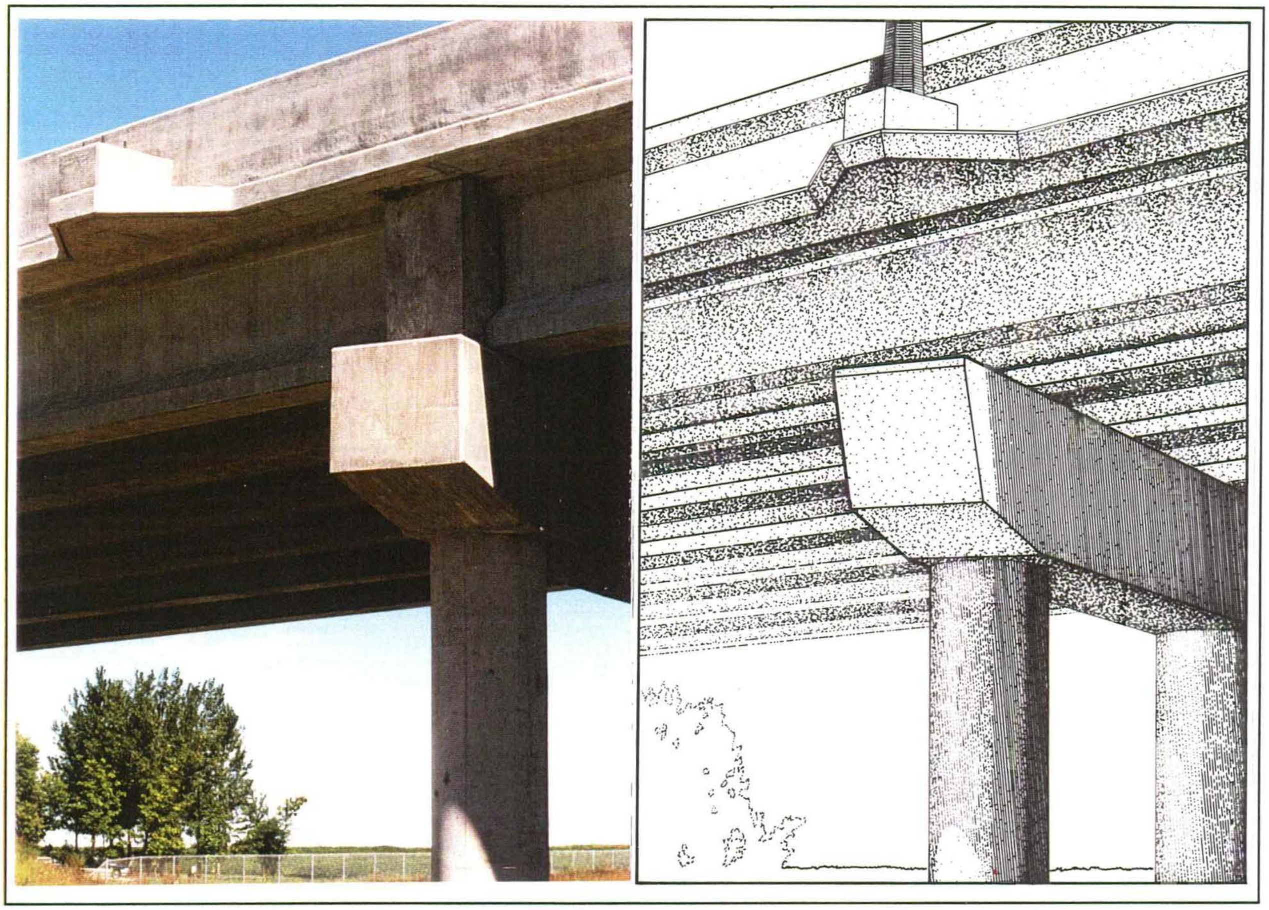


Figure 1 Typical Prestressed Concrete Bridge Pier Diaphragm, Light Pole Base, Pier Cap, Slab Edge, and Barrier Rail as well as Suggested Modifications

Team members Kimball Olson and Mike Todsen conferred with Dave Little, Office of Design, about the process involved in determining when and where light pole bases, and presumably lights, are to be installed. The light pole base, often referred to informally as the "blister"(an unfortunately appropriate moniker), is currently located by approach roadway lighting criteria without regard to its architectural impact on the bridge structure. It was conceded that in very few instances will a light indeed be installed on our bridges, except for those at interchanges and urban areas. The blister and its unseen conduit in the barrier rail are provided under the assumption that lighting may be needed in the future.

It is the Team's contention that since a bridge is undeniably the dominant built feature of a roadway, it should be the determining factor in the placement of roadway lighting in the vicinity of the bridge. Additionally, we propose that if a bridge is not too long to be illuminated by poles placed at its abutments, or beyond the abutments, then it should be lighted as such with no other light poles, or unused "blisters", on the bridge itself. It is the Team's understanding that the continued use of light pole bases on all of our bridges will be reconsidered. Additionally, when required, the bases will be centered over the pier in lieu of the typical horizontal offset.

3.1.3 Slab Overhang Treatment

As a means of providing a more appealing elevation view on our typical bridges, a relatively simple but visually powerful modification is suggested for our slab overhang detail. Figure 1, and more so Figure 2, present a clear depiction of the change in the vertical face at the edge of the slab. It is intended to slightly bevel the face of the slab, a very simple "no-cost" way of providing a strong visual feature to the bridge.

One should note in Figure 2 that the photograph of the overhanging slab illustrates the rather stark appearance of the large vertical face of the slab and rail combination. The battered face has several purposes. By undercutting the slab edge as shown in the rendering presented in Figures 1 and 2, the slab is much less obtrusive and has a pronounced shadow line. In addition to the shadow line cast on the slab face due to the undercutting of the edge, the beveled face is also consistent with the imagery presented by the prestressed beams with their sloping flanges.

Although this slab treatment was developed primarily because of how it complements the beveled surfaces of the prestressed concrete beam, the beveled face also works well on steel girder bridges, further distinguishing materials from each other by their shape as well as their color and texture. In addition, the tapered slab edge tends to separate the slab from the barrier rail, clarifying its difference in function from that of the rail.

An additional modification to the slab concerns the treatment of the slab as it reaches the end of the bridge. Figure 3 illustrates that when the bridge slab approaches the end of the bridge where the wings are located, it appears to become an integral part of the substructure. A suggested improvement would be to slightly decrease the thickness of the wing walls such that the slab has a slight projection outward of the wing face. This projection would tend to better represent the terminus of the bridge by allowing the slab to fade into the berm surrounding the abutment instead of terminating the slab at the front face of the abutment. The resultant effect of these changes is to create the perception of an apparently longer, more slender bridge structure.

3.1.4 Barrier Rail Modification

The barrier rail, as well as the slab, beams, and pier cap end face, are all seen in full elevation from the motorist's perspective. As such, these elements are key areas where aesthetic treatments can be most effective. The rail provides a distinct opportunity to create a more

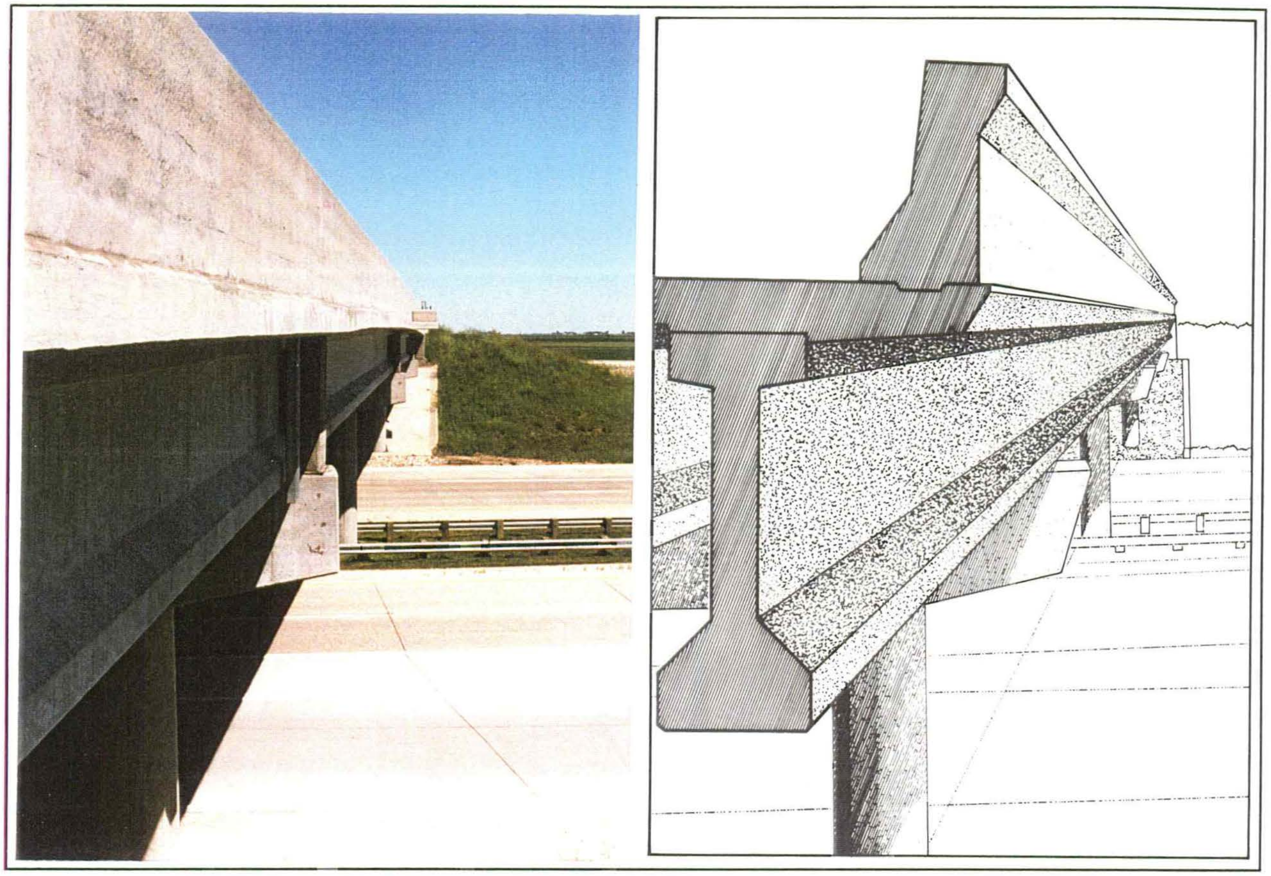


Figure 2 Existing and Proposed View Illustrating the Removal of the Pier Diaphragm Projections as well as the Slab Edge and Barrier Rail Modifications

appealing bridge. A means of accomplishing this articulation is through the use of a cap feature. This cap is best seen in Figure 2.

The purpose of the rail cap, like the slab edge bevel, is to break up the large vertical surface presented to the viewer. The rail cap will serve as a means of casting shadow onto the surface of the rail thus generating a color contrast. In addition to the shadow line, the cap will tend to provide a top to the bridge, i.e., a strong architectural feature that casts the upper limit of the bridge against the sky.

In addition to the geometric change to the rail shape brought about by the addition of the rail cap, additional treatments can be applied to the rail primarily related to the use of color and texture. A very simple way to show separation between the rail and the bridge slab is through the use of an integral colorant. No detailed recommendations are being made about the use of a particular hue at this time but in a general sense the hue should be complementary to the gray color typical to most concrete, i.e., another color from the family of earth tones. The use of color in the rail system should be tempered however with the need to provide a reflective surface for those motorists on the road above. Several states have begun to deal with the issue of reflectivity in concrete barrier rails and are moving towards a bright white surface such as that created through use of an architectural white cement and white silica sand concrete mix.

In addition to, or in lieu of the use of colors, the use of texture on exposed concrete surfaces such as the barrier rail should be explored. The texture can be as simple on most bridges as one provided by a post-applied cementitious mix brushed onto a cured concrete surface or a brushing of the concrete while it is still "green". The brushed finish provides an appealing surface and also helps to hide surface irregularities present from forming and casting of the concrete as well as slight variations in color of the cast-in-place concrete due to variations in mix, curing conditions, etc. The post-applied finish can also be used in an unrelated area, bridge piers, to help hide concrete staining which can occur on weathering steel bridges.

3.1.5 Pier Cap End

Once again, the issue of complementary surfaces and homogeneity of appearance is addressed, this time on a substructure feature. Similar to the approach taken when considering modifications to the slab edge and barrier rail, steps were taken to modify the end view, i.e., that view seen most frequently by motorists.

Figure 1 and 2 most dramatically show the impact of modifying the pier cap end by similarly beveling the exposed face to complement the beams, slab, and rail treatment. The effect of the pier end bevel is shown in a secondary fashion in Figures 3 and 4 of this report. The purpose of the pier cap end bevel is to decrease the brightness of the pier cap end and to provide a color contrast to the other surfaces in the structure.

3.1.6 Abutment Modifications

In conjunction with modifications made to the slab where it crosses the abutment are modifications to the form of the abutment itself. The intended modifications are presented in Figures 3 and 4. The modifications shown are relatively simple changes to the shape and texture of the integral abutment. The sloping of the front face of the abutment maskwall tends to add somewhat more mass to the end of the bridge and more strongly supports the end of the structure. Additionally, the intersecting slopes of the abutment and the berm are more visually appealing than the static vertical abutment face. The forward sloping abutment is not uncommon in other states and is frequently presented in aesthetic design guides as a relatively simple but powerful modification to traditional bridge designs.

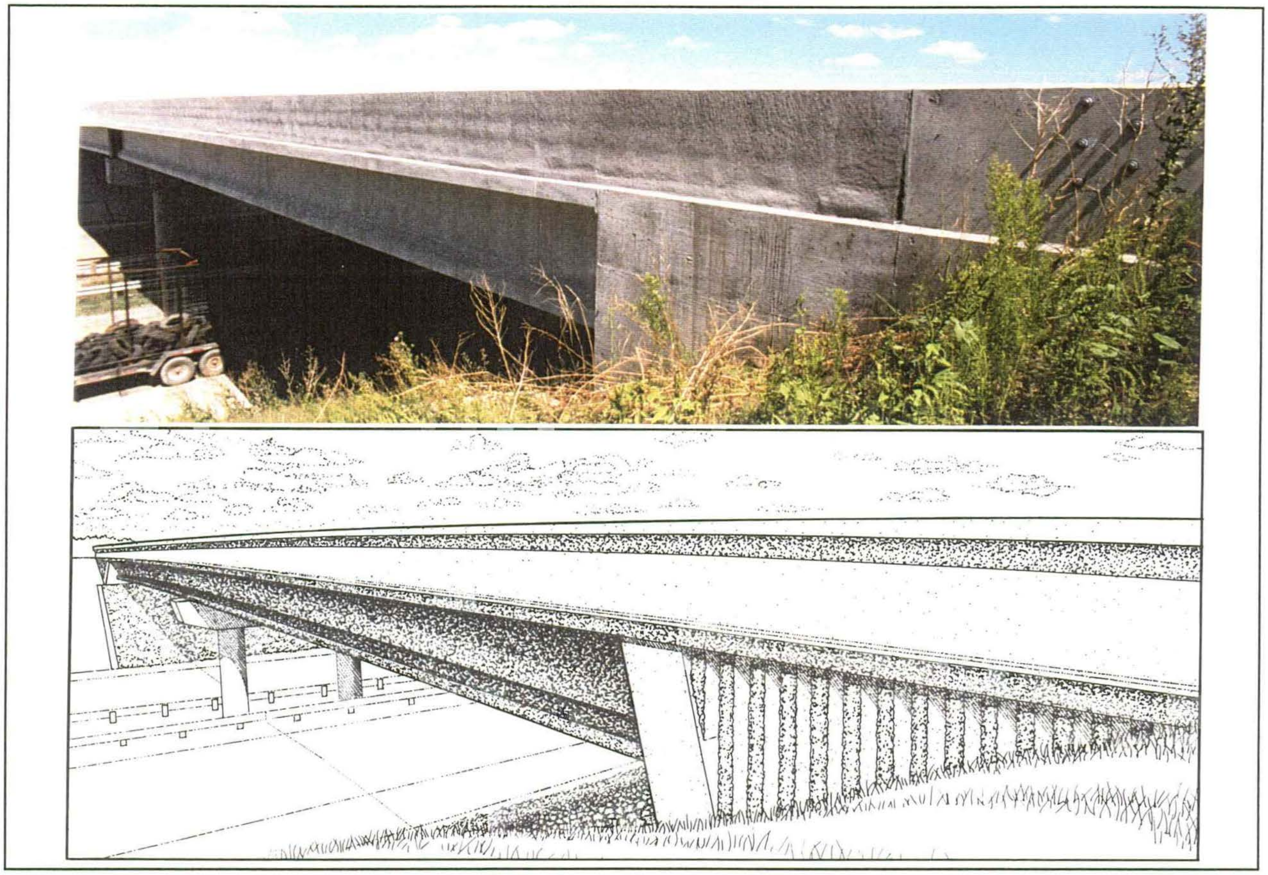


Figure 3 Proposed Abutment Modifications - Battered Maskwall and Overhanging Slab at the Wings

A secondary feature illustrated in Figures 3 and 4 is the use of abutment face texturing. This texturing may take the form of the fractured rib pattern shown or other forms. The texturing could easily be accomplished through the use of form liners, sand blasting, or other commonly used and relatively simple techniques.

3.1.7 Prestressed Concrete Beam Color

A common aesthetic treatment applied to a bridge structure is the use of a colorant. Sometimes this color treatment takes the form of an accent strip on a barrier rail, a dyed or stained concrete wall surface, or other variations on the theme. A novel use of color would be in the prestressed concrete beams themselves, a high-impact solution appropriate to the fleeting nature of bridge viewing opportunities available to the motorist.

In their current form, our prestressed concrete beams vary somewhat in color from light to medium gray. It is the Team's desire to incorporate an integral cement pigment at the precast plant to provide a more earth tone appearance to the beams. This additive would only need to be applied to the fascia beams since they are the only ones which will receive a direct view.

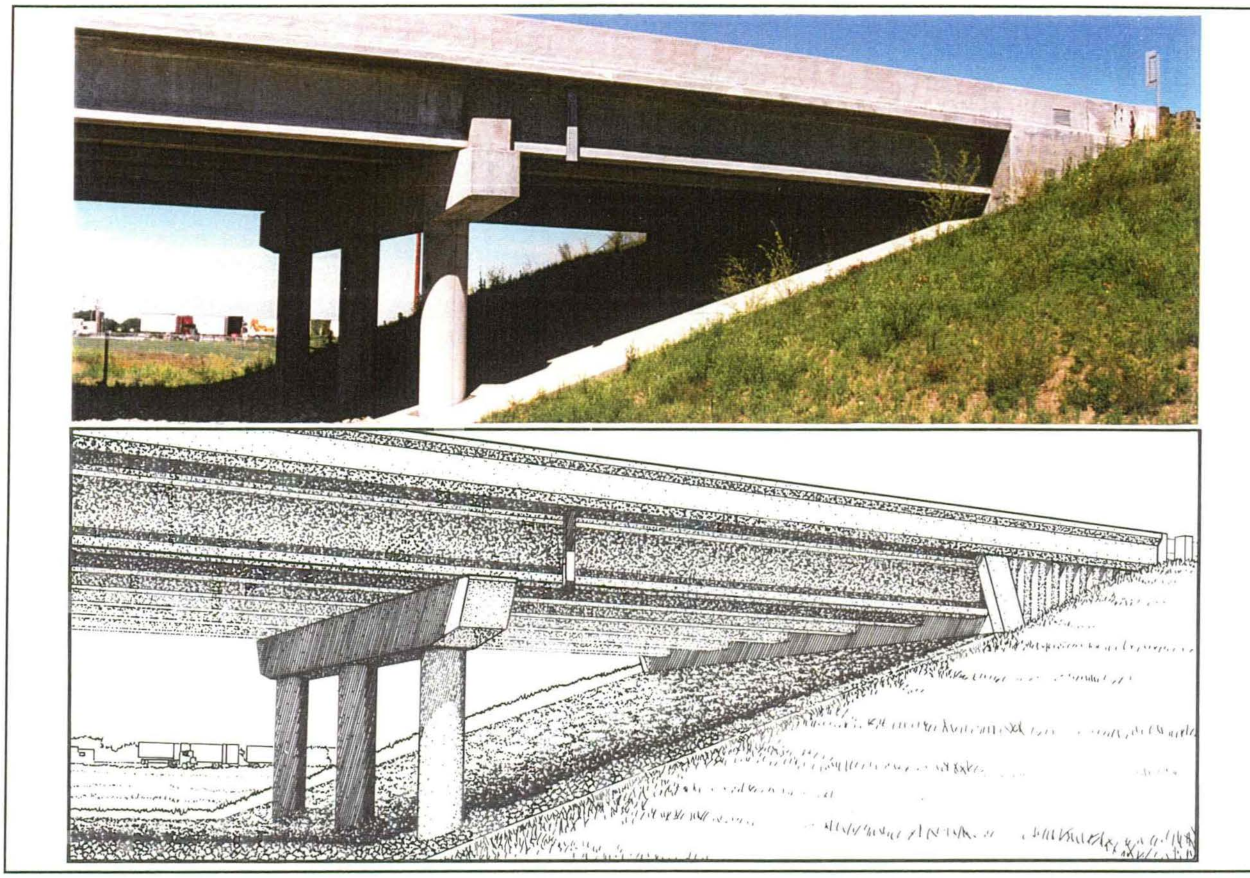


Figure 4 Existing and Proposed Views - Barrier Rail, Slab Edge, Pier Cap, and Abutment Modifications Shown

However, if the color contrast is stark enough to be distinguishable from the adjacent beams by travelers on the road below, it would be prudent to specify that the admixture be used in all beams in the structure. When these colored beams are contrasted against a differently colored concrete in the substructure and rail system, the bridge will become a more appealing visual experience for the motorist.

3.1.8 Pedestrian Screen

The use of traditional right-of-way (ROW) fence as pedestrian screen is illustrated in Figure 5. This bridge is one of the new overhead structures in Nevada, IA, over US 30. The use of the same fence material for both the ROW and pedestrian fence across the bridge does nothing to signify to a pedestrian that there is something unique about the bridge as differentiated from the surrounding areas. The Team proposes to use a different type of pedestrian screen, one which is more appropriate for close person / feature interaction, in lieu of the more traditional galvanized chain link fence. The type of fence proposed, shown in Figure 5, is more akin to the type of fence one would expect to find in residential settings, and much less industrial in nature than the galvanized fence.

Figure 5 Existing Pedestrian Railing and Right-of-Way Fence Relationship - Possible Alternate Pedestrian Screen (inset photo)

3.2 Steel Bridges

The construction of new steel bridges is somewhat limited in the state. They are employed much less frequently than their biggest competitor, the prestressed concrete beam bridge. In fact, in span ranges where either beam type is a viable alternative, the prestressed concrete beam is almost always chosen for economic reasons. However, for spans over approximately 130', the only option available to the Department at this time is a very deep (72") prestressed beam known as the Bulb-Tee, or welded plate steel beams. The Bulb-Tee is further limited to a maximum span of approximately 150'.

Fortunately, steel beams are inherently "craftable" in the sense that the plates can be cut into a variety of forms that are aesthetically pleasing. The forms include linear tapered or curved haunch beams that are visually consistent with the structural nature of the beams. Additionally, because most steel beam bridges are required at interchanges, water / hazard crossings, and urban environments, where long spans are common, they are high visibility structures. This is not to say that concrete is an inflexible material. However, current DOT practices limit the use of prestressed concrete to the very standard looking prestressed concrete beam bridge as opposed to other beam shapes found across the nation.

Figure 6 Haunched Steel Beams, Warren County, Iowa - IA 5 Bypass, Interchange with US 65 / 69

The steel beam bridge is generally a very slender looking structure. The use of steel for the superstructure and concrete for the substructure and slab presents an interesting contrast in materials that is appealing. This contrast is further accentuated by the deep brown color of weathering steel, a steel which develops a dark brown patina over time, framed against a much different color concrete.

The use of steel in bridge superstructures currently takes one of two forms - weathering or painted steel. Weathering steel, as described previously will take on a deep brown patina after several years of exposure. However, until such time as the structure is fully weathered, its color may be quite uneven. The other steel type is painted steel. These bridges are generally characterized by their signature green paint scheme. Both of these bridges have advantages and disadvantages.

Weathering steel has the advantage of being a relatively maintenance-free material in the sense that it does not have to be routinely cleaned and repainted. This is a significant feature in the age of regulations that make it very difficult, for instance, to blast and repaint a structure over wetlands and waterways. However, one disadvantage in the eyes of the traveling public, is the staining that occurs at the piers and abutments of some weathering steel bridges. As the steel weathers and is rained upon, sprayed with road spray, etc., there is a tendency for the runoff to stain concrete surfaces. The degree of staining seems to be a function of the amount of protection provided to the concrete during bridge erection, when a significant amount of staining can occur before the deck is in place, and also the degree of care exercised by the fabricator in sand blasting all of the steel properly before it is shipped to the site. Proper sand blasting at the shop seems to lessen the degree of staining in the steel and also helps to assure a uniform weathered appearance.

An additional disadvantage of weathering steel is that it is ill-suited for environments in which it will continuously be wet, i.e., low clearance water crossings, or tunnel-like wide bridges where the road salt spray will linger beneath the bridge causing accelerated corrosion. The use of weathering steel is on balance, however, preferable to painted steel because of the minimization of long-term maintenance expenses.

The use of painted steel seems to be on the decline in Iowa and nationwide because of the expense associated with cleaning and repainting. If it is desired or required to use painted steel in a project, the Team's recommendation is to explore the use of a paint color other than the standard green. The existing color belies the true nature of the material, i.e., people expect things to look a certain way, concrete is gray, steel is gray to brown, but never green. The State of Nebraska has recently begun using a brown / tan paint scheme for its painted bridges and this paint has shown to be a much more attractive alternative. Painted steel still has its place in environmental conditions ill-suited to weathering steel but its sometimes high maintenance costs may make it a prohibitive choice except when absolutely required.

4.0 AESTHETIC TREATMENT SELECTION CRITERIA

In order to apply aesthetic treatments to a bridge, they first need to be warranted. There are numerous criteria that enter into the "equation" when determining whether or not aesthetic treatments of a "routine" or "special" nature are worth considering on a project. The most important criteria is that related to the amount of visibility that a particular structure or series of structures receives. In that regard, bridges will be classified in this report as either Level "A", Level "B", or Level "C" Structures.

4.1 Level "A" Bridges

Level "A" structures will receive only a brief mention in this document. The Level "A" structure is a major crossing such as that at Burlington, Iowa, shown in Figure 7, or a unique structure of unusual type such as the Lake Okoboji Bridge, shown in Figure 8.

Figure 7 Cable-Stayed Bridge at Burlington, Iowa.

The Level "A" bridge is one which is usually very expensive in its own right and is situated in a high-impact area such that the need to create a visually appealing structure is imperative. These bridges are viewed by both motorists on the carried feature as well as by motorists, pedestrians, boaters, etc., in the vicinity of the bridge. It would ill-serve the Team to focus their efforts on the aesthetic design of Level "A" structures since they are so unique. As mentioned in Section 2.0 of this document, the focus of the Team is to concentrate on ways to improve the vast majority of our bridges which are of a markedly simpler construction. These bridges are the Level "C" and "B" bridges to be explored in the text which follows.

4.2 Level "C" Bridges

The level "C" Bridge is a bridge of the more common types constructed in the State of Iowa; prestressed concrete or steel beams and concrete slab bridges. The level "C" and subsequently Level "B" bridges are similar in the sense that they represent bridge types and exposure conditions typical to the State, yet they differ in the amount and nature of the applied aesthetic treatments.

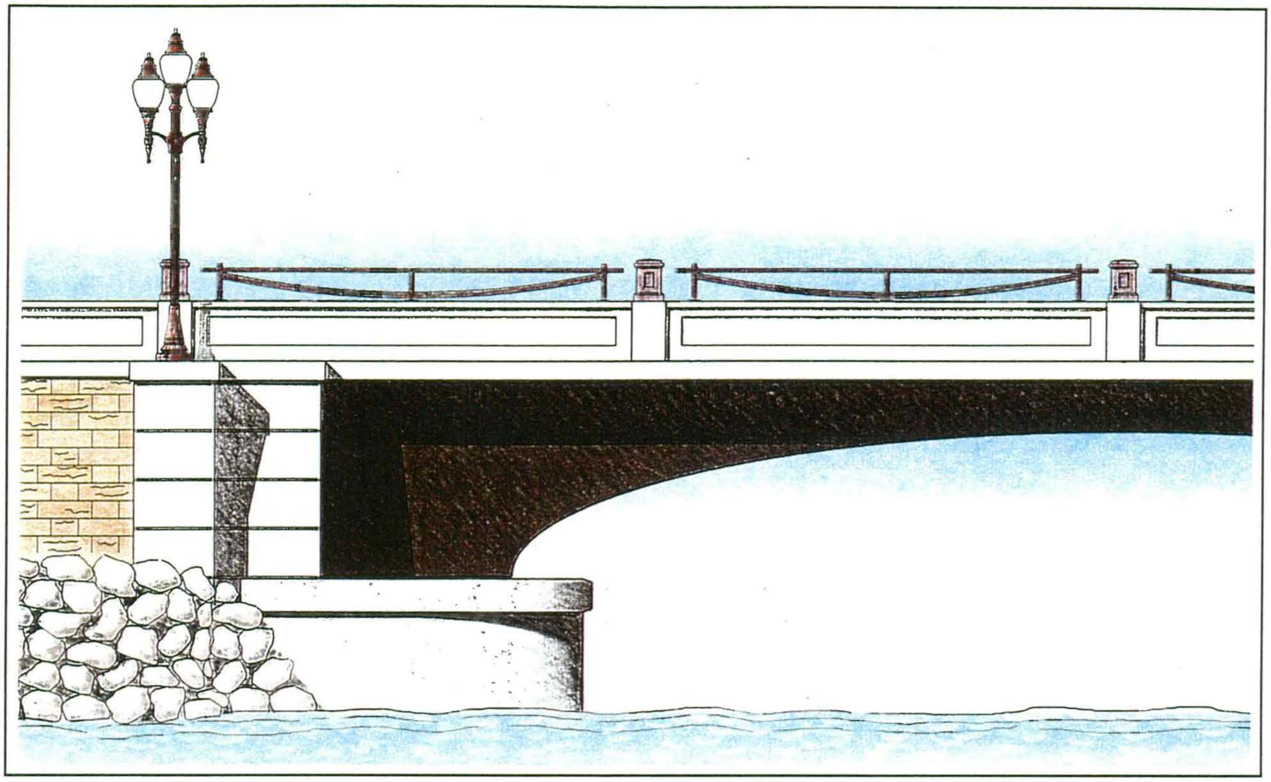


Figure 8 Lake Okoboji Bridge

Section 3 broadly discussed the "target areas" on typical bridges that could / should be aesthetically treated. It is the Team's opinion that these areas be treated on most bridges, the exception being those with no reasonable opportunity for viewing the treatments. These "zero visibility" bridges include small stream crossings or crossings over features not conducive to easy viewing of the structure. Level "C" bridges are those structures whose aesthetic treatments are limited to those discussed in Section 3. A Level "C" bridge is broadly defined as a bridge not located in a "high-visibility" area, i.e., not in a dense urban environment, resort area, state park, etc. An example of a Level "C" bridge is the typical rural overpass structure found throughout the State. The vast majority of the bridges in the State are Level "C" bridges. The Team is of the opinion that the scope of aesthetic treatment required for Level "C" bridges need not encompass any more than the simple, routine treatments previously shown.

4.3 Level "B" Bridges

Level "B" bridges, like Level "C" bridges, are bridges of common forms. They are differentiated from Level "C" bridges, however, by a higher level of visibility. Level "B" bridges are those bridges located in urban environments, along heavily traveled corridors, and resort / recreation areas where there is a high degree of exposure. It is envisioned that not only will the Level "B" bridge have most, if not all, of the routine aesthetic design features previously presented as modifications to our standard bridge, but would also incorporate some additional special aesthetic features.

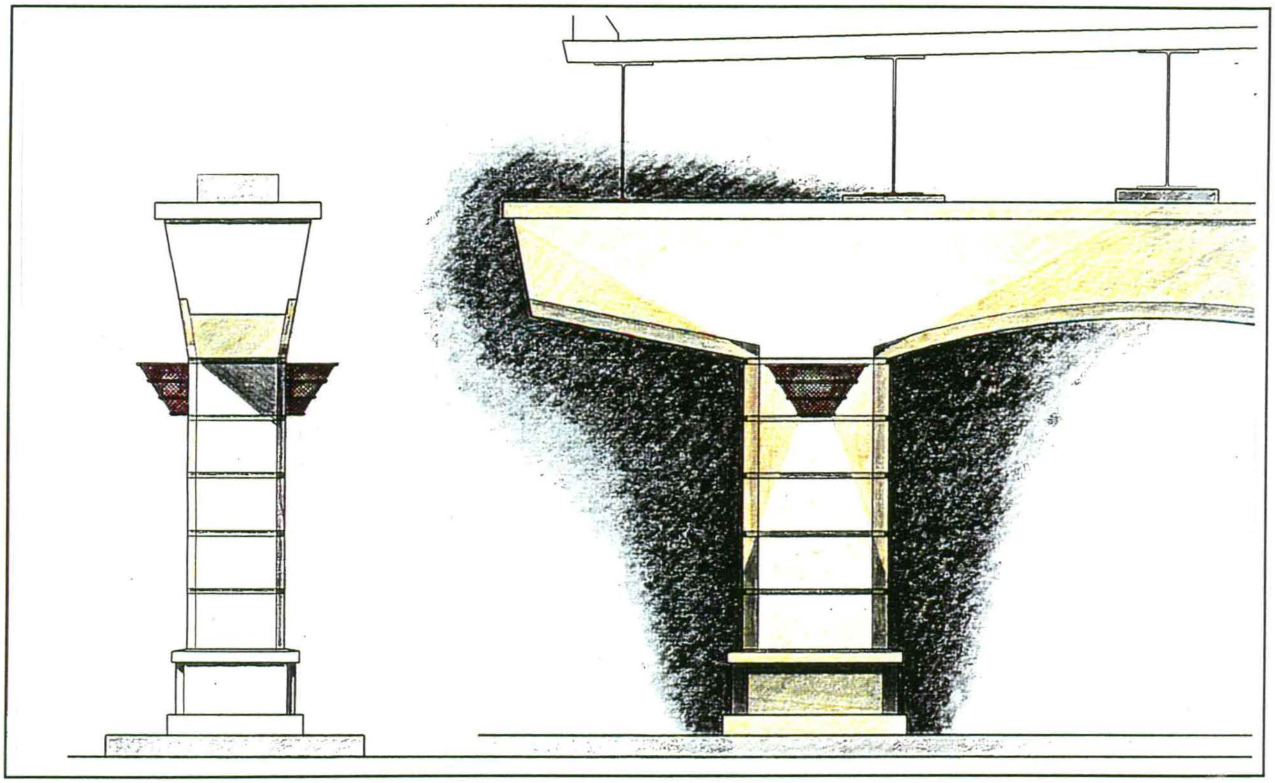


Figure 9 I-80 over Merle Hay Road - Proposed Structure

The primary means of making an impact beyond that prescribed for Level "C" bridges is through the use of additional aesthetic treatments on the substructure. Figure 9 presents an illustration of the type of treatment given to a particular Level "B" project, the proposed I-80 over Merle Hay Road crossing located north of Des Moines. The Merle Hay Road crossing is classified as a Level "B" structure because of the amount of exposure to the public that the bridge will receive. The structure is located at a very busy interchange, likely one of the busiest urban interchanges in the State.

The design for the Merle Hay Road bridge evolved from very early in the design process as one in which aesthetic design would be an important consideration. The aesthetic design was deemed to be very important particularly to the City of Johnston which views the bridge carrying I-80 over Merle Hay Road as the "gateway" to their city. The Office of Bridges and Structures was proactive in the design process in the sense that local communities were kept abreast of the evolution of the design and periodically consulted for input.

The Merle Hay Road project uses a relatively simple superstructure type, a two span steel stringer bridge, but combines it with a highly articulated substructure constructed with colored concrete. The combination of the rectangular bridge columns and column reveals, arched soffit and beveled end face of the pier cap, plinths located at the column base, and the addition of column lighting fixtures, make a pronounced architectural statement and convey a sense of value in the project to the community at large.

The Merle Hay project is seen as a successful example of the combination of aesthetic, structural, and functional objectives in a product that the DOT and communities which surround the structure can take pride in. Bridges similar in appearance and size to the I-80 over Merle Hay Road crossing will also be constructed along the I-80 corridor where it crosses 2nd Avenue as well as East 14th Street. The use of a similar structure type will lend a feel of uniformity to the corridor.

5.0 IMPACT OF WORKMANSHIP ON AESTHETIC TREATMENTS

The last item, workmanship assurances, deals with the quality of work the Department is receiving from its bridge contractors and how this quality will impact our desire to further articulate the forms and surfaces of our "standard" bridges and custom structures.

As part of the process of developing aesthetic design recommendations for the Office of Bridges and Structures, a strong focus has been placed on an area over which we, as members of the Office of Bridges and Structures, have very little control at the present time; the area of workmanship. The issue of workmanship and quality control / quality assurance is important because as designs and constructed features become more ornate through the incorporation of additional aesthetic treatments, especially on bridges with higher levels of visibility, the aesthetic treatment will naturally draw the eye to more closely examine the structure. If upon closer examination, one sees poor concrete finishes, extensive concrete staining, poorly constructed joints, etc., the bridge may not be regarded as a structural and functional accomplishment but rather as an example of misguided effort and misspent money. There is reason to believe, based on a cursory assessment of in-place workmanship, that these problems can and do exist even in projects constructed in the Department's "own back yard". Several examples of what the Team deems to be inferior workmanship are shown in Figures 10 through 13.

Figure 10 View of bridge abutment and barrier rail showing inconsistent concrete surfaces, "legibility" of barrier reinforcing steel through concrete, and results of leaky joints in formwork.

Figure 11 View of bridge abutment and slab end showing formwork joint leaks and variable depth of slab resulting in a "fishbelly" effect.

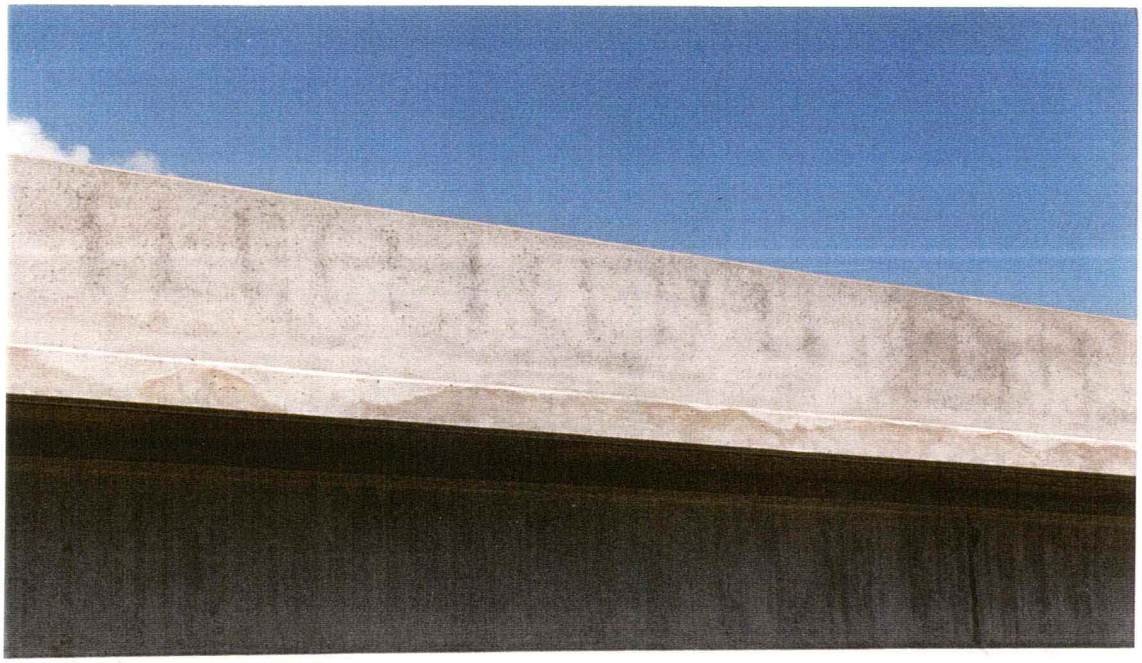


Figure 12 View of barrier rail showing "legibility" of reinforcing through rail concrete surface and slurry staining on slab edge from rail forming operation.

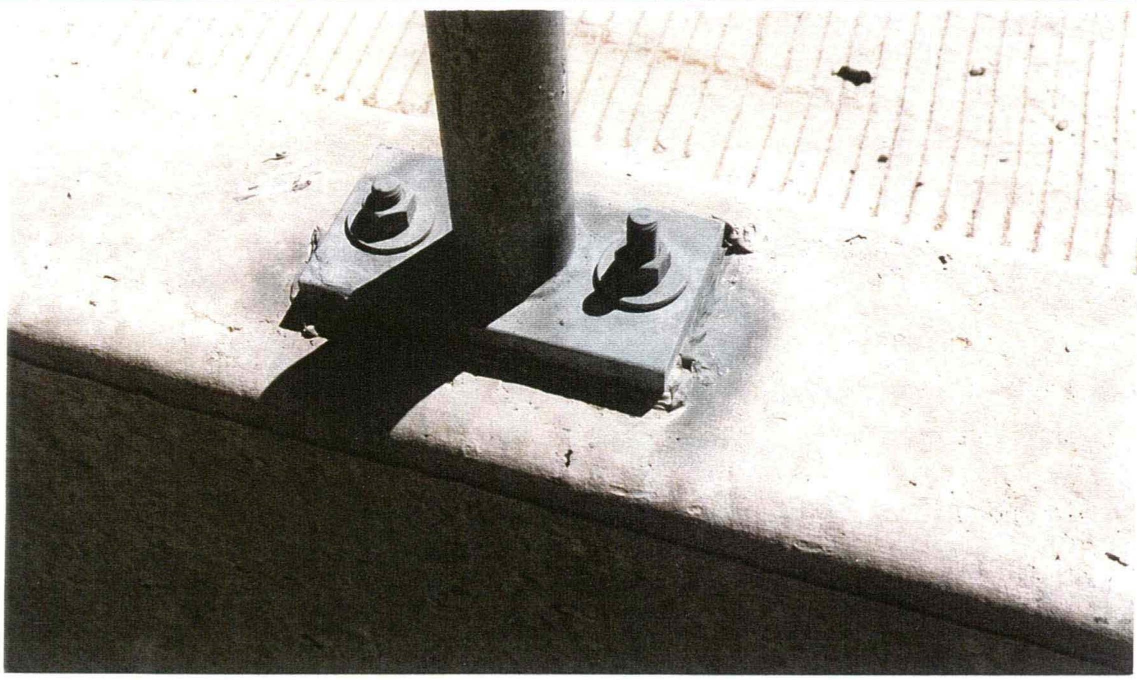


Figure 13 View of pedestrian rail at sidewalk showing inconsistent setting of mounting studs, haphazard application of caulking material and paint overspray.

The figures are particularly troubling in that they illustrate the problem of attaining satisfactory quality in the constructed product on bridges of very simple forms. Once the additional architectural features are applied to the structure, is there any assurance that the work quality will somehow improve or will it in fact get worse?

The opinion of the Team is that in some ways, the use of our suggested modifications to the standard bridge will mask some of the construction irregularities found in current work. For instance, the use of the broken rib pattern on the abutment wing wall will alleviate many of the problems associated with poor quality in the abutment formwork. The problems with the existing planar walls is that they look out-of-plane in some instances, seem to have a very nonuniform color, and have poor joints at the plywood form intersections. The broken rib pattern, with its natural hierarchical shape and shadows, will tend to diminish slight surface irregularities, changes in surface color, etc., as they will tend to blend into the roughened and multi-hued surface.

A different problem could occur in the barrier rails. For instance, the overhanging rail cap has a distinct horizontal line at the base of the cap which tends to draw the eye of the viewer. If this rail cap is not formed properly, i.e., the cap is "wavy" in the vertical plane, the rail will not only attract the viewer's eye but the construction problem will in fact be amplified because the viewer is tending to focus on it more directly. The same could be said for the beveled slab edge detail.

It is this second scenario, that of problem amplification, that most concerns the Team. The Department must have the will to enforce those standard and supplemental specifications covering work quality. Until such time that the regulations are enforced, and enforced uniformly across the State, the efforts aimed at beautifying future structures will have little if any real impact. Unless the Department and its contractors can cooperatively improve the quality of the "standard bridge", it is somewhat misguided to expect that a higher level of detail could reasonably be incorporated into a structure with a guarantee of final appearance being as per plan.

The two test cases involving aesthetic design, those located at Lake Okoboji and the I-80/ Merle Hay Road interchange, will provide significant insight into the abilities of our contractors to provide high quality products and our inspectors to assure compliance with the design plans. Constructibility and quality control will also be essential criteria for review of a consultant's upcoming development of aesthetic strategies for the I-235 corridor through Des Moines.

6.0 CONCLUSION

This report has summarized the efforts of the four person Bridge Design Aesthetics Team. The Team has examined numerous ways of improving the appearance of our "standard" bridges; those composed of prestressed concrete or steel stringers in addition to those constructed as reinforced slabs. Detailed recommendations were presented for the beam bridges but could easily be extended to slab bridges. The recommendations are limited primarily to bridges located in low to moderate visibility areas composed of the aforementioned superstructure types. No real attempt was made to address unique, high visibility structures, such as the cable stayed bridge at Burlington. It is the consensus opinion of not only the Team, but the engineering community, that these bridges need to be designed on a case-by-case basis.

Numerous examples were presented in a compare / contrast fashion illustrating both the typical existing detail as well as the proposed change to said details. These examples show all relevant modifications when possible so that the effect of the aesthetic modifications on the appearance of the entire structure can be appreciated.

A section was presented detailing the impacts of workmanship on the quality of existing structures as well as the proposed structures. The emphasis was made that better controls on workmanship are imperative if the Department intends to pursue the idea of aesthetic bridge design any further than the conceptual stage.

There is a large social context into which *all* objects in our built environment must fit, an "invisible context" embodied by our ideals as a community, a generation, a population. One need only look at the demands made on the design of automobiles, advertising, appliances, computer hardware and software, web sites, clothing, packaging, etc. to understand the value placed on image in everything we consume. In architecture there has been a tremendous resurgence in the use of decoration, in part as a retort against many years of visually sterile, machine-like modernism. In this context, a strictly utilitarian approach to bridge design stands out like the proverbial "sore thumb", or at the very least serves as a testimonial to a lack of pride in our built environment.

One may ask, "What's wrong with Iowa's bridges?". From every point of view there will be a different answer to this question. In a purely practical sense, nothing is wrong with our bridges as we design them today. They are efficient, pragmatic structures that fulfill the purpose asked of them, *if* all you ask is that they meet the requirements dictated by the movement of vehicles over otherwise impassable obstacles. But from a different point of view, the typical bridge we deliver today is nothing more than a "kit of parts", a collection of elements laid together piecemeal, no effort having been made to pull the entire composition together. What we've attempted is to create a clearer, more complete vision through a careful articulation of forms. Our goal is to build bridges that are truer representations of functioning structures and stronger embodiments of pride in our built environment.