713.00 PAINTING (*SSHC Section 709*)

713.01 DESCRIPTION - The painting of metal structures has a dual purpose. The primary function of paint application is to preserve the life of the metal. A second function, especially important in highway grade separations, is to produce and maintain an improved appearance. Painting includes the preparation of the surface and the application of the paint coatings.

A. Painting (*SSHC Section 709*)

1. New Non-Weathering Structural Steel

a. Shop applied paint system shall be used for non-weathering steel bridges.

b. A field applied "top coat" is usually required. A top coat will also be required when it is deemed necessary due to aesthetics.

c. The contractor will be required to touch-up any damaged areas after erection. Touch-up with top coat paint system shall be the same paint as the shop coat.

2. New Weathering (ASTM A 588) Structural Steel

a. The plans require shop applied prime paint to selected areas on the structure. They also require:

b. The approved paint system.

c. Only paint where shown in the plans with approved paint system.

d. The contractor to touch-up any damage to primed areas after erection prior to top coating. This includes bolts in those areas. Touch-up paint shall be the same paint as the shop coat.

3. Field Painting

a. Field painting of structural steel shall be done as shown in the plans and special provisions.

713.02 MATERIAL REQUIREMENTS - Paint sampling should be done according to the "*Materials Sampling Guide*" unless the paint to be used is from tested stock in which case it will be tagged to show acceptance.

A. Mixing Paint

1. Follow the manufacturers recommended mixing and thinning procedures.

713.03 CONSTRUCTION METHODS

A. Painting Structural Steel

1. Paint which has been applied on rust, or dirty surfaces will peel and crack. If rust blisters form under the paint film, they can, in time, seriously reduce the effective cross section of structural shapes. The specifications require that all erection work be completed before the cleaning process is started. The cleaning should be done in a systematic manner, with the painters cleaning a given area or member before painting it.

2. Paint shall be applied as prescribed by contract specifications or the manufacturer's recommendations, whichever is most demanding. The Project Manager shall determine the correct procedure if the contract specifications differ from the manufacturer's recommendations.

3. The Project Manager or inspector should insist that the painting be done systematically, with painters working in groups on a given coat. The practice of having cleaners and painters spread out all over a bridge, with the inspector not knowing what men are working on each operation, nor which members have been cleaned and painted, should not be permitted. Painting should, in general, be started with the highest bridge members and progress downward, in order to cover areas where paint has dripped from the work above. Painting operations below deck level, should be permitted only after the deck slab concrete has been placed. Girders painted prior to the concrete placement are likely to be spattered by form leakage and may be badly scarred by form removal, necessitating considerable recleaning and repainting of all coats.

4. The plans and specifications require different paint film thickness depending on the type of paint specified. The Project Manager should check the plans and specifications to determine the types of paint required to verify that the correct system has been certified and should check for the required dry film thickness.

   a. County bridges usually only get one coat.

   b. New state structures usually get two coats.

   c. Repainting an existing structure usually means adding a third coat.

5. The Project Manager or inspector should check the dry film thickness of the shop and field coats of paint applied on structural steel in accordance with the following instructions:

6. Shop Coat - The shop coat of paint may or may not have been checked in the fabricator's shop; nevertheless the shop coat should always be checked in the field, and any deficiency in paint film thickness corrected, before the second coat is started. When the dry film thickness of the shop coat is found to be inadequate, the Materials and Research Engineer should be notified in order that the particular fabricator involved may be made aware of the situation.

7. Second and Third Coats - Checking the thickness of the second and third coat with the magnetic gauge is accomplished by measuring the cumulative thickness of the first (or shop coat) and the additional coats. The dry film thickness of the second coat should always be checked and any deficiency in paint film thickness corrected before the third coat is started. Any deficiency in paint film thickness must be corrected before the work can be considered complete and consideration of acceptance given.

8. The equipment used to check the dry film paint thickness is called a magnetic dry film thickness gauge. One or two of these gauges are being furnished to each District Office for use in the District in checking the painting of steel structures. These gauges are expensive, delicate instruments and must be carefully handled and always kept in the carrying case when not in use. The procedure for using the gauge is as follows:

    a. Turn dial to maximum reading.

    b. Place pole on the surface to be measured.

    c. Be sure the magnetic contact is touching the painted surface.

    d. Slowly and as continuously as possible, rotate the dial clockwise until magnetic contact breaks. A click will be heard when the pin breaks contact. At this point the coating thickness can be read on the dial indicator. The reading will remain on the dial when the gauge is removed from the surface being checked. The gauge can also be held in any position to take a reading. The magnetic gauge reads directly in mils. A reading of 2 on the dial indicates that the thickness of the paint film is 2 mils or .002 inch.

9. The frequency of testing for paint thickness should be as follows:

    a. Girders - Each line of girders should be checked at a maximum interval of 50 ft (15 m) and at each check point, 3 or 4 tests should be made. For example, on a 200 ft (60 m) bridge each line of girders should be checked at the abutments and at 3 intermediate points. At each one of these points three or four places should be checked such as a point on the web, a point on each flange, and a point on a stiffener.

    b. Separators, Cross-frames and Floor Beams - Alternate lines of separators, cross-frames and floor beams should be checked two times at one location. For example, the top and bottom angle should both be checked for every other line of cross-frames.

    c. Lateral Bracing - Lateral bracing should be checked at about 50 foot intervals.

    d. Miscellaneous Material - Material such as expansion devices, tie rods, bearing plates and drainage systems should be spot checked for required paint film thickness.

10. Additional tests should be made, as required, to determine the extent and location of any areas deficient in paint film thickness.

11. The bridge notebook or diary should verify that the paint film thickness on each structure meets the thickness requirement specified, and the entry should include the signature of the inspector and date of inspection.