

# STREAMLINING THE SPECIFICATION DEVELOPMENT PROCESS FOR BRIDGE PAINTING

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Abstract: NEPCOAT (Northeast Protective Coating Committee) developed an innovative approach for streamlining coating material testing and selection on a regional basis. Following their success, AASHTO took the concept nationwide within their NTPEP program. Based on the success of both programs, why not carry the concept an additional step and create a "NTSPEC" document? This paper discusses the development of standardized nationwide bridge painting specifications, and the benefits that can accrue to Owners, Engineers, Manufacturers, Contractors, and Inspectors.

## NEPCOAT and NTPEP

In the mid-1990's, the Northeast Protective Coating Committee (NEPCOAT), consisting of 8 states from Pennsylvania through Maine, conceived and developed a program for testing and qualifying coating materials for use on bridge structures. Once a coating was tested and approved through NEPCOAT, it was eligible to be used in any of the member states. In 1998, the American Association of State Highway Transportation Officials (AASHTO) used the testing concepts developed by NEPCOAT and added coating material qualification testing to their National Transportation Product Evaluation Program (NTPEP). Under NTPEP, coating manufacturers submit their products to AASHTO, where they undergo a standardized series of tests. Once completed, the test results are made

available to the states. This eliminates the need for each state to individually develop and maintain state-specific testing programs, while at the same time having the flexibility to adjust the acceptance criteria for the tests based on state-specific or bridge-specific needs. This also eliminates the need for each manufacturer to undergo unique and costly testing for each state. NEPCOAT and NTPEP are excellent concepts that benefit both the producer and user, saving time and money.

## Why Not NTSPEC?

The development of standardized specifications for surface preparation and painting provide similar potential benefits for saving money and improving coatings performance. DOT and industry experts, coating manufacturers, and contractors are well aware of the elements of specifications that are successful, as well as those that lead to controversy, claims, and substandard coatings performance. Standardized specifications could be developed that would be centered on the well-proven requirements of painting specifications.

When designing the painting requirements for a new or existing structure, it is common to start with a template or boilerplate specification. This can be cost-effective and technically sound if the requirements are tailored by someone knowledgeable in coatings. Unfortunately, coatings expertise is not being replaced at the state or district level at a pace

commensurate with the loss of such expertise through retirement.

As a result, the responsibility for modifying the template specification can fall into the lap of an engineer with limited knowledge of painting requirements. Perhaps it is time for industry to accept this fact, and together with AASHTO, take the steps necessary to assure that bridge painting specifications nationwide are technically sound and always up-to-date.

The advantage of NTSPEC goes far beyond the benefits of improved specification quality, and the elimination of gray, subjective requirements that lead to controversy and claims. NTSPEC will increase contractor familiarity with bridge painting across the country by standardizing the requirements. Because of this familiarity, the submittal process will be streamlined for contactors, manufacturers, and inspectors, as well as the engineers conducting the reviews. Familiarity with the requirements will also lead to an increase in the number of contractors willing to bid “NTSPEC” work in other states. Inspectors will become intimately familiar with all of the inspection points and the monitoring and testing required. The ultimate benefit is reduced costs in both coatings design and installation.

#### Many Specification Variations – for the Same Product – for the Same Goal

Painting specifications between the states vary considerably and can be unnecessarily complex. Reading, understanding, and complying with each of the unique requirements on a project-by-project basis is both onerous and costly. A few examples are provided to illustrate varying approaches to the same requirement:

Submittals  
Ambient Conditions  
Surface Cleanliness and Profile  
Coating Application  
Film Continuity  
Environmental Protection and Monitoring

#### Submittals

Existing Requirements – Range from little to no discussion of submittals to a request for intimate details regarding every piece of equipment that will be used for every operation. Some specifications require detailed Quality Control plans, while others require nothing addressing quality. Some specifications request a complete label analysis of the coating (e.g., volume solids, weight solids, weight per gallon, viscosity, etc.) with certifications for each batch while others only require the name of the products, MSDS, and product data sheets.

Question – Do the state-specific differences in submittal requirements, which take significant time for contractors to prepare and for states and engineering firms to review, make a difference in the performance of the project and the quality of the final product? If submittals benefit the project, why not standardize the requirements to streamline the process, and to allow all contractors and states to benefit by working under the optimum submittal packages on all jobs? In this way, contractors bidding a “NTSPEC” job, and manufacturers interested in supplying products, will know precisely what submittals are required, regardless which state is advertising the work.

#### Ambient Conditions

Existing Requirements – Range from simply following the manufacturer’s instructions, to stipulating specific temperature, dew point and humidity

restrictions for surface preparation and the application of each coat. Some specifications require that conditions be maintained and monitored for a stipulated time prior to exposing the coating to the elements, while others are silent on these issues.

Question – If the generic coating type is the same, are unique restrictions on ambient conditions necessary from state to state? If the coating will cure and perform on a bridge painted at 50°F and 60% relative humidity in New York, it should follow that it will cure and perform well when applied at 50°F and 60% relative humidity in Illinois. Why not standardize the requirements and allow contractors and states to benefit by working under the same set of reasonable weather conditions? In this way, contractors bidding a “NTSPEC” job will know precisely what restrictions will be invoked on ambient conditions, regardless which state is advertising the work.

#### Surface Cleanliness and Profile

Existing Requirements – For the same coating system, state-specific requirements can range from SP6 Commercial Blast to SP5 White Metal, with surface profile restrictions from 1.0 to 2.5 mils, 2.0 to 3.5 mils, and 2.5 to 4.0 mils.

Question – Since the generic coating type is the common link in every case, is it necessary for specifications to include such a variety of cleanliness and profile requirements for the same system, and even the same brand? If the design life of the system is achieved with an SP10 Near White Blast, and a surface profile from 1.5 to 4.0 mils is acceptable, it seems logical to standardize the surface preparation requirements based on the needs of the coating system rather on the state in which it

is applied. Surface profile is a particularly relevant issue when removing old lead-based coatings applied to mill scale. In order to productively remove the paint and mill scale, it is not uncommon for surface profiles to exceed 3.5 or 4.0 mils. If the application of an additional mil of the prime coat is an acceptable remedy for the deeper profiles, rather than evaluate these issues on a case-by-case basis each time they occur, it would be more efficient to address the practical profile ranges that can be expected and subsequent coating remedies up front in the specification. In this way, contractors bidding a “NTSPEC” job will know precisely what restrictions will be invoked on surface cleanliness and profile, regardless which state is advertising the work.

#### Coating Mixing

Existing Requirements – Requirements for mixing range from the use of full kits only to allowing partial mixes.

Question – If the mixing of partial kits for certain systems can lead to performance problems, why not uniformly invoke a mixing restriction on bridge projects? In this way, contractors bidding a “NTSPEC” job and manufacturers interested in supplying products, will be able to adjust for the material kit sizes and quantities that are needed.

#### Film Continuity

Existing Requirements – Requirements range from little to no discussion of film continuity to the complete exclusion of runs, sags, overspray, and orange peel.

Question – Many specifications indicate that runs or sags are not permitted. This is zero tolerance. If minor surface irregularities such as small runs will not affect performance of a given system

regardless where it is applied in the country, why not establish realistic criteria regarding film continuity? The requirements could be developed in two categories – one where aesthetics is a driving factor such as outside fascia, and another where aesthetics is less important such as interior floor beams and stringers. In this way, practical criteria will be developed and contractors bidding a “NTSPEC” job will know precisely what restrictions will be invoked on film discontinuities, regardless which state is advertising the work.

### Environmental Protection and Monitoring

Existing Requirements – Requirements range from “comply with all regulations” to detailed prescriptive measures for containment, environmental monitoring, and waste handling.

Question – If controls over emissions of lead and overspray are appropriate to protect the public from bridge painting operations in Pittsburgh, PA, is it not reasonable to invoke similar controls to protect people living next to a painting project in Pittsburg, KS? The proximity of the public and sensitive receptors to the project should dictate the level of controls that are needed, rather than state-specific knowledge of lead issues. Specific levels of control could be identified based on the proximity of the public to the project site and on the surrounding land usage. In this way, contractors bidding a “NTSPEC” job will know precisely what restrictions will be invoked on environmental issues, regardless which state is advertising the work.

### It Can't be Done

There will be countless reasons why changes to existing state painting specifications will be resisted:

- Our specifications are too well entrenched.
- A new format won't fit our specification system.
- We don't do well with change.
- Our environments and needs are different – no one has challenges like we do.
- We're unique.

But our industry has overcome greater questions and objections regarding change in the past:

- Blast clean all the steel in the shop?
- Eliminate lead? It's the only thing that works.
- Waterborne paint for bridge use?
- Plural component coatings in the field?
- Salts?
- Recyclable steel grit in the field?
- Full containment and dust collection on bridges?

### How Could NTSPEC be Formatted?

NTSPEC would consist of a master specification with supplemental tables for each coating system that is used. The master specification would include standardized text that addresses items that are common to all projects – items that are not bridge-specific or coating system specific. This would include submittals, ambient conditions during surface preparation, compressed air cleanliness, mixing requirements, film continuity, Quality Control inspections, and Quality Assurance oversight.

Separate tables would be prepared for each coating system addressing system-specific requirements such as the degree of surface preparation and surface profile, ambient conditions during coating

application and curing, stripe coating, and dry film thickness. Individual tables containing this data would be prepared for all of the commonly used systems: inorganic zinc/epoxy/urethane, inorganic zinc/acrylic/acrylic, epoxy zinc/epoxy/urethane, epoxy/urethane, moisture cure urethane, etc.

For example, if a given bridge were going to be coated with an epoxy zinc/epoxy/urethane system, the contract would include the master specification and the epoxy zinc/epoxy/urethane table. This package would then link to the NTPEP list of tested products to identify the specific brands of materials available for use. In this way both NTPEP and NTSPEC would compliment each other.

The environmental specifications could be developed in a similar manner as the paint system tables. Projects would be classified according to proximity of the public and sensitive receptors, and surrounding land use. For each combination, the unique requirements for worker protection, containment, environmental monitoring and waste handling/disposal would be developed in stand-alone documents. When the specification package is assembled, the appropriate worker/environmental sections would be invoked.

The final step is to tailor the requirements to state-specific or bridge-specific needs. A standardized addendum format would be used that identifies the paragraph to be changed and the replacement text that is to be followed.

The technical package for a project would include the master specification (which is unchanged), the appropriate paint system table (which is unchanged), and the

appropriate worker/environmental protection sections (which are unchanged). Other than selecting the correct paint system tables and the appropriate worker/environmental sections, the only thing the designer has to do is complete the addendum sheet when it is necessary to tailor the requirements in the above packages to the state or bridge-specific needs. Very little tailoring is anticipated.

Once contractors complete a few NTSPEC projects, they will become familiar with the requirements of the master specification, the requirements of the paint system table(s), and the requirements of the worker/environmental package. In order to bid a project, the focus will be placed on the addendum sheet that will identify changes that are specific to the bridge being advertised. Similar benefits will accrue to coating manufacturers and inspectors, greatly reducing the bidding time and effort required, while at the same time reducing concerns that key requirements are being overlooked.

### Conclusions

Specifications are already being borrowed between states, or are used from one bridge to the next, but the specific requirements may not be directly transferable and errors are easily made. By consciously developing national specifications, requirements that work are retained, while language that has created problems in the past is eliminated. The specifications can be continually updated electronically at a single location, with access from all of the states, making certain that the specifications remain current with the technology. Tailoring the specifications to state-specific or bridge-specific needs can be easily accomplished with an addendum sheet.

NTSPEC will save the states time and money at the design stage and submittal review stages and will increase the pool of contractors willing to bid projects across state lines once they gain comfort and familiarity with the NTSPEC requirements. NTSPEC will save contractors, coating manufacturers and inspectors time and money when responding to bid requests. NTSPEC will save both contractors and manufacturers time and money when developing submittal packages, because the packages will be uniform nation-wide. Inspectors will gain comfort by knowing the specific inspections and tests required on a NTSPEC project, regardless of the state. Intimate familiarity with the project requirements will lead to project efficiencies, which should reduce construction costs as well.

NTSPEC – a win-win proposition for all parties involved.