

5611003 COATING EXISTING STRUCTURAL STEEL – CONTAINMENT SYSTEM
COMMENTS FROM INTERNAL/INDUSTRY REVIEW

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Comments: (11-28-11)

Could we spell out what SPCC stands for? Spill Prevention, Control and Countermeasure.

561-10.3 Containment System: Submit a written containment system design plan in accordance with this section and the contract documents at the pre-construction conference or as directed by the Engineer which clearly describes the proposed containment system applicable to the intended removal method and in accordance with the requirements outlined herein and SSPC Guide 6, Guide for Containing Debris Generated During Paint Removal Activities.

Response: SSPC is the acronym for ‘Society of Protective Coatings’ and is listed/defined in Section 1 of the Spec Book. This guide describes methods of paint removal, containment systems and procedures for minimizing or preventing emissions from escaping the work area, and procedures for assessing the adequacy of the controls over emissions.
No change made.

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Comments: (1-3-12)

Temporary Work Structures – Most containment system platforms consist of Catenary Suspended Scaffolding, which is covered extensively in OSHA under 1926, Subpart (L). Section 103 of the Standard Specifications incorporates Elevated platforms but excludes scaffolding. I’d like to see this addressed by requiring all containment submissions incorporating suspended scaffolding and/or elevated platforms to be included under the Provisions of Temporary Work Structures. I have seen many instances where the platforms have been erected improperly. Mandating the contractor’s Specialty Engineer to review and sign-off on the completed platform installation(s) would go a long way to addressing this issue.

Design Loading – OSHA typically classifies scaffolding as light duty (25 psf design loading), medium duty (50 psf design loading) and heavy duty (75 psf) unless the scaffolding loading is specified by the design engineer. A properly designed platform will include all dead load, plus live load including personnel, equipment and spent abrasive. The OSHA mandated design safety factors are 4:1 for catenary suspended platforms and components, and 6:1 for the main catenary support cables.

What happens on most painting projects is that the containment platform loadings are usually selected (and often under estimated) by the contractor’s Specialty Engineer. Expendable abrasive typically weights 90 to 130 pcf (7.5 psf/inch depth to 11 psf/inch depth) recyclable steel grit weighs much more. Oftentimes, there is little or no design allowance for spent abrasive on the

platforms. I've seen design loadings proposed as low as 5 to 10 psf. The use of such low design loadings increases the potential for under-designed platforms and compromised safety factors. As reviewers, we are often at odds with the contractor's Specialty Engineer regarding such low platform design loads. I'd like to see the department start to specify minimum design loadings in their specifications to address this.

Platform Flooring – The OSHA requirements for suspended scaffolding flooring mandate a 4:1 safety factor. This safety factor is based on all INTENDED loading. Problems arise when contractor's propose material(s) for platform flooring that were never intended for this purpose. Chain link fence, which is primarily used to divide property; is a perfect example of this. If such an item is to be utilized as a platform floor, there should be some justification for its use. Such justification could include a detailed structural analysis, or actual testing. In 1998 Columbia University performed such testing for Total Containment Systems, and it was found to be suitable for a suspended platform when certain design aspects were incorporated. The problem is that many containment systems are submitted that do not incorporate these design elements.

Lately, several contractors have been proposing fall arrest netting as the floor of a suspended platform. I am not aware of any structural analysis or empirical testing qualifying this material as a suitable flooring for a suspended platform.

I'd like to see the department enforce the OSHA provisions for minimum platform safety factors and put the onus on the contractor's engineer to effectively demonstrate (through analysis or testing) that their proposed platform flooring is suitable for its intended application.

Contingency Planning – The present specification contains the requirement for contingency planning in the event of tropical storms and hurricanes. I'd like to see this requirement go further to include preparation for other impending severe weather events such as thunderstorms. I have seen the wind associated with severe thunderstorms shred containment tarps. I would like to see the department require abrasive blasting operations to cease, and all spent abrasive removed from the containment flooring in advance of pending severe thunderstorms.

Connection Hardware – One of the most rampant problems that we see with containment platforms involves improper and/or counterfeit connection hardware. Items that fall into these category include but are not limited to shackles, cable clamps and hooks. This can be described as follows:

Improper Hardware – Examples of this include situations where the contractor's Engineer of Record (EOR) designs the platform utilizing design values from a known domestically sourced hardware manufacturer. These catalog cuts are included as part of the design calculations. The problems occur when the containment drawings do not call out the specific hardware used for design, or different hardware is improperly substituted in the field. A perfect example of this involves hardware that states "CHINA". China is a country and not a reproducible or traceable producer of connection hardware. There are several problems with Chinese hardware, including quality control issues, questionable and inconsistent metallurgy and unreliable breaking strengths. Testing of such Chinese hardware has yielded actual strengths that are across the board, some good - some bad. We consider such hardware unreliable and unsafe. The way to address this is to require

the actual hardware used as the basis of design to be noted on the containment drawings, and installed in the field.

Counterfeit Hardware – There have been numerous documented examples of counterfeit examples of domestically produced shackles, hooks and cable clamps showing up on job sites. The Department of Energy, Office of Corporate Safety Analysis provides an excellent resource in the identification and tracking of counterfeit hardware. Their website can be accessed as follows:

<http://www.hss.energy.gov/sesa/corporatesafety/sci/>

I would like to see this subject dealt with by requiring traceability and reproducibility in all platform hardware. There are several good industry specifications which could be referenced:

- Department of Energy STD-1090-2004 (or latest version) for shackles.
- Federal Specification RRC-271D (or latest version) for Working Load Limits and Traceability Codes
- ASME B30.26-2004(or latest version) for Rigging Hardware Safety Standards

Please feel free to discuss and pass along to the Department. Should they have any questions, I would be more than happy to assist or discuss.

Response: It is the Contractor’s responsibility to design, erect and maintain a containment system that performs the intended function and meets all safety requirements – see second paragraph of 561-10.3. The intent of the proposed changes is to clarify the Contractor’s responsibility to ensure the existing structure can support the proposed containment system.
No changes made.

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Comments: (1-3-12)

In addition to Paul’s comments, I would like to add that from our previous experience, many of the Specialty Engineers are not provided the latest bridge model or inspection report to incorporate into the Containment Design. This can be very dangerous in drastically reducing the safety factor of the cables or intermediate supports of the work platform. Corrosion can weaken the members quite significantly and these supports are carrying workers over live traffic. This has been addressed on the latest Mathews Bridge project and we would recommend that it continue.

Thanks for allowing us to comment.

Response: The engineers performing the evaluation of the existing structures must be qualified to perform that type of work. As such, they would use applicable analysis techniques and data.
No changes made.
