AMPP

CIP-Bridge

AMPP Bridge Coatings Inspection Specialty

Question: 1273

A coating inspector measures the dew point on a bridge surface as 12°C at relative humidity of 85% and ambient temperature of 18°C. The ambient temperature is expected to drop to 14°C overnight. Based on this data, what would be the most critical recommendation regarding coating application?

A. Apply coating before temperature falls below dew point to avoid condensation
B. Wait until after temperature stabilizes for 8 hours to ensure adhesion
C. Proceed with coating if relative humidity decreases below 70% within 2 hours
D. Pre-cool substrate surface to match ambient temperature, then apply coating
E. Use coating with accelerated cure additives to offset dew point risk

Answer: A

Explanation: The dew point is 12°C, so as the temperature decreases overnight to 14°C ambient and likely lower surface temperature, it can approach or fall below dew point, causing condensation on the surface. Applying the coating before this temperature drop is essential to avoid moisture-related defects. Waiting ignores imminent conditions.

Question: 1274

Which environmental factor most critically affects the accuracy of wet film thickness measurements on a zinc-rich primer during bridge coating operations?

A. Relative humidity causing coating absorption
B. Surface contamination altering gauge readings
C. Wind speed increasing film drying rate
D. Temperature affecting coating viscosity and gauge calibration
E. Ambient light interfering with gauge visibility

Answer: D

Explanation: Temperature affects viscosity of the coating and calibration of WFT gauges leading to inaccurate measurements. Relative humidity can influence drying time but not measurement accuracy. Wind speed affects drying but not thickness gauge readings. Surface contamination is relevant but less critical, and ambient light is irrelevant.

Question: 1275

During an inspection of a bridge exposed to de-icing salts in a cold climate, the CIP Level 3 inspector must evaluate corrosion risk under the coating system. Which parameter most directly influences the likelihood of corrosion initiation at holidays and coating defects?

A. Dry film thickness of the topcoat
B. Surface profile height of the blasted steel
C. Concentration of chloride ions at the substrate/coating interface
D. Electrical resistivity between substrate and coating
E. Adhesion strength between primer and substrate

Answer: C

Explanation: The concentration of chloride ions at the substrate/coating interface is the primary factor influencing corrosion initiation, especially at coating holidays where the substrate is exposed. Although dry film thickness and adhesion are important, chloride concentration directly accelerates corrosion. Surface profile affects mechanical bonding but not corrosion chemistry. Electrical resistivity relates to coating integrity but chloride is more critical.

Question: 1276

You are reviewing a daily inspection report for a bridge coating project that specifies a three-coat epoxy system per SSPC-PA 2. The report indicates a dry film thickness (DFT) measurement of 8 mils for the primer coat, but the specification requires 6–8 mils. Upon verification, you find the measurement was taken with a Type 1 magnetic gage not calibrated for the substrate. What should you do to ensure accurate reporting?

A. Accept the measurement as it falls within the specified range
B. Use a Type 2 electronic gage to verify the DFT and update the report
C. Report the measurement as non-compliant and request reapplication
D. Recalibrate the gage for the substrate and remeasure the DFT
E. Note the calibration issue in the report and continue with the next coat

Answer: D

Explanation: Recalibrating the gage for the substrate and remeasuring the DFT ensures accurate measurement per SSPC-PA 2, which requires calibration specific to the substrate. Accepting the measurement (Accept the measurement as it falls within the specified range) risks inaccuracy due to improper calibration. Reporting as non-compliant without verification (Report the measurement as non-compliant and request reapplication) is premature. Using a Type 2 gage (Use a Type 2 electronic gage to verify the DFT and update the report) assumes availability and does not address the calibration issue directly. Noting the issue without remeasuring (Note the calibration issue in the report and continue with the next coat) fails to ensure compliance.

Question: 1277

During routine inspection of a bridge painted 10 years ago, a corrosion breakthrough with undercutting is observed beneath the coating. The original surface prep was abrasive blasting to SSPC-SP10, but partial cleaning was done during maintenance using power tools only. What is the most appropriate corrective measure?

A. Apply a compatible overcoat after spot cleaning corrosion rust only
B. Seal the undercut areas with epoxy mastic without removing existing coatings
C. Conduct full abrasive blasting to bare metal in affected areas followed by complete recoating
D. Increase inspection intervals to monitor progression before repair
E. Use chemical stripping agents in the maintenance procedure to avoid abrasive blasting

Answer: C

Explanation: Corrosion breakthrough with undercutting after power tool cleaning indicates insufficient surface preparation. Full abrasive blasting to bare metal in affected areas and recoating is essential to restore coating integrity.

Question: 1278

Upon receipt of a new coating batch, the inspector is required to verify compliance of material properties as per SDS and job specifications. Which documentation step is essential to confirm before allowing the material usage?

A. Verify storage temperature and humidity logs since arrival
B. Confirm product batch number and expiration date against purchase order
C. Cross-check volatile organic compound (VOC) content with environmental permits
D. Examine SDS for PPE requirements only
E. Compare color shades visually to prior batches

Answer: B

Explanation: Confirming batch number and expiration date against the purchase order ensures materials are within specification and safe for use, avoiding out-of-date or incorrect products. Storage conditions are important but secondary to batch verification. VOC compliance is typically checked by environmental teams, not initial receipt. Reviewing SDS solely for PPE is insufficient, and color comparison is cosmetic rather than compliance related.

Question: 1279

During a bridge overcoating project, you measure a DFT of 8 mils for an existing epoxy coating with 5% blistering. The specification requires a minimum 10-mil DFT and no blistering for overcoating with polyurethane. What is the best corrective action?

A. Apply a 2-mil polyurethane topcoat to meet DFT
B. Conduct abrasive blasting to SSPC-SP 6 and recoat
C. Perform adhesion tests to evaluate blistering impact
D. Solvent clean per SSPC-SP 1 to remove blisters
E. Use a high-build polyurethane to cover blisters

Answer: B

Explanation: The existing epoxy coating's 8-mil DFT and 5% blistering fail the specification's requirements for overcoating (10-mil minimum, no blistering). Abrasive blasting to SSPC-SP 6 removes the defective coating and prepares the surface for a new system, ensuring compliance. Applying a thin topcoat or high-build polyurethane doesn't address blistering or low DFT. Adhesion tests may confirm issues but don't resolve them. Solvent cleaning cannot remove blisters, which indicate coating failure.

Question: 1280

An inspector observes a zinc-rich primer application on a bridge using a conventional spray system. The specification requires a DFT of 75–100 µm and a maximum overspray of 5%. The inspector estimates overspray at 10%. What should the inspector recommend?

A. Accept the overspray as it is within 10% of the limit
B. Require a holiday test (ASTM D5162) to check for defects
C. Instruct the applicator to adjust the spray pattern to reduce overspray
D. Suggest switching to a brush application to eliminate overspray
E. Verify the DFT across multiple locations

Answer: C

Explanation: Overspray of 10% exceeds the specified maximum of 5%, which can lead to uneven coating and material waste. Adjusting the spray pattern reduces overspray to meet the specification. Accepting the overspray violates the requirement. A holiday test (ASTM D5162) detects pinholes but does not address overspray. Switching to a brush application is impractical for large areas and not specified. Verifying the DFT ensures thickness but does not correct overspray.

Question: 1281

You perform an electrolytic corrosion rate calculation for a steel bridge in a marine environment. The formula is:
Corrosion rate (mpy) = (K × I_corr × Equivalent weight) / (Density × Area)
Where K is a constant, I_corr is corrosion current in amps, equivalent weight ~27.9 for iron.
If the corrosion current density is 10 µA/cm², steel density 7.85 g/cm³, $K=3.27\times10^{-3}$, and area 100 cm², calculate the corrosion rate in mils per year (mpy).
B. 0.117 mpy
C. 1.17 mpy
D. 17.1 mpy
E. 0.012 mpy

Answer: A

Explanation:

Given: I_corr = 10 µA/cm² = 10×10^{-6} A/cm²
Area = 100 cm²
Total current I = I_corr × Area = $10\times10^{-6} \times 100 = 1\times10^{-3}$ A
Corrosion rate = $(3.27\times10^{-3} \times 1\times10^{-3} \times 27.9) / 7.85 = (9.12\times10^{-5})/7.85$ = approx 1.16×10^{-5} mpy ×10^5 = 1.17 mpy

Question: 1282

When attempting to detect holidays on a newly-applied bridge coating with a low-voltage wet sponge holiday detector, the inspector uses a sponge saturated with tap water. Unexpectedly, false holiday signals appear. Why is tap water inappropriate and what should be used instead?

A. Tap water has low enough conductivity to prevent proper voltage transfer; use saline water solution
B. Tap water contains impurities causing increased conductivity and false alarms; use distilled or deionized water
C. Tap water is too corrosive and damages the coating; use pure alcohol instead
D. The temperature of tap water affects detector sensitivity; use warmed water at 25°C
E. Tap water promotes electrode wear; use synthetic sponge material dry instead

Answer: B

Explanation: Tap water contains ions and minerals which increase conductivity, reducing detection voltage and causing false holiday signals. Distilled or deionized water with minimal impurities is recommended to maintain the proper conductivity for holiday detection.

Question: 1283

An applicator is preparing to apply an epoxy intermediate coat on a steel bridge girder previously coated with a zinc-rich primer. The project specification requires a dry film thickness (DFT) of 100–150 µm for the epoxy coat, with a surface profile of 50–75 µm. Upon inspection, the measured DFT averages 80 µm, and the surface profile is 40 µm. What should the inspector recommend?

A. Require re-blasting to achieve the specified surface profile before reapplication
B. Instruct the applicator to apply an additional coat to achieve the required DFT
C. Accept the coating as the DFT is within 20% of the specified range
D. Suggest increasing the spray pressure to achieve the desired DFT
E. Verify the calibration of the DFT gauge using a certified shim

Answer: A

Explanation: The surface profile of 40 µm is below the specified 50–75 µm, which can affect adhesion and performance of the epoxy intermediate coat. Additionally, the DFT of 80 µm is below the required 100–150 µm, indicating insufficient coating thickness. Re-blasting to achieve the specified surface profile is necessary before applying additional coating to ensure proper adhesion and thickness. Accepting the coating as the DFT is within 20% of the specified range is incorrect, as it does not meet the explicit project requirements. Applying an additional coat without correcting the surface profile risks poor adhesion. Increasing spray pressure may not address the profile issue and could lead to uneven application. Verifying the DFT gauge calibration is a good practice but does not address the non-compliant surface profile or thickness.

Question: 1284

During a bridge coating project, you identify a coating defect (sagging) on a vertical surface. The ITP requires an NCR with a corrective action plan and adhesion testing (ASTM D3359) to ensure coating integrity. What should the NCR include?

A. Sagging observation and immediate recoating plan
B. Sagging observation, ASTM D3359 test results, and corrective action
C. Sagging observation only, noted in the daily log
D. Sagging observation and client waiver request
E. Sagging observation and halt operations without NCR

Answer: B

Explanation: The ITP requires an NCR with adhesion testing (ASTM D3359) and corrective action for defects. "Sagging observation, ASTM D3359 test results, and corrective action" is correct. "Sagging observation and immediate recoating plan" misses testing. "Sagging observation only, noted in the daily log" skips the NCR. "Sagging observation and client waiver request" bypasses required testing. "Sagging observation and halt operations without NCR" violates documentation.

Question: 1285

While reviewing an inspection test plan, you notice the acceptance criteria for surface cleanliness reference both SSPC-SP6 and ISO 8501-1 standards, which have slightly different cleanliness levels specified. How should the conflicting references be handled in the ITP?

A. Allow contractor to select the preferred standard for surface preparation
B. Accept the stricter of the two standards as the acceptance criteria without clarification
C. Apply whichever standard the inspector prefers during inspection
D. Clarify and specify a single standard or harmonized criteria in the ITP to avoid ambiguity
E. Omit surface cleanliness criteria entirely to prevent confusion

Answer: D

Explanation: To maintain clarity and inspection consistency, the ITP should specify one standard or provide clearly harmonized criteria.

Question: 1286

While inspecting a bridge coated with an alkyd system, you notice flaking after 24 months in a high-humidity environment. The specification requires a DFT of 8-10 mils, and measurements show 9 mils. What is the most likely cause, and what should be done?

A. Increase the DFT to 12 mils
B. Apply a polyurethane topcoat to improve durability
C. Remove and reapply the alkyd system after surface preparation
D. Switch to a zinc-rich primer system
E. Use a higher solids alkyd

Answer: B

Explanation: Flaking in alkyd coatings in high-humidity environments is often due to poor moisture resistance, leading to loss of adhesion. Applying a polyurethane topcoat (after proper surface preparation) improves durability and moisture resistance. Increasing DFT or using higher solids alkyds does not address moisture sensitivity. Removing and reapplying the same alkyd system is less effective than upgrading to polyurethane. Switching to a zinc-rich primer alone doesn't address topcoat durability.

Question: 1287

A steel bridge in a marine environment has a 25-year-old coating with widespread rust. Per AMPP, what is the best maintenance strategy?

A. Overcoat with a compatible alkyd after minimal cleaning.
B. Conduct spot repairs with an epoxy primer after SSPC-SP 3 preparation.
C. Apply a full recoat with a zinc-rich primer and polyurethane topcoat after SSPC-SP 10.
D. Use a moisture-cured urethane after SSPC-SP 7 preparation.
E. Apply a high-build epoxy overcoat after SSPC-SP 2 cleaning.

Answer: C

Explanation: Apply a full recoat with a zinc-rich primer and polyurethane topcoat after SSPC-SP 10 is necessary for widespread rust in a marine environment, per AMPP standards. Conduct spot repairs with an epoxy primer is inadequate. Overcoat with a compatible alkyd is not durable. Use a moisture-cured urethane after SSPC-SP 7 is insufficient. Apply a high-build epoxy overcoat after SSPC-SP 2 is inadequate.

Question: 1288

An inspector encounters a surface that was blasted to SSPC-SP10 but the anchor profile measured with a Testex replica tape is consistently lower than specified by 20%. On closer inspection, the abrasive material used was changed from angular steel grit to rounded slag. What is the likely cause of reduced profile?

A. Slag abrasive chemically alters surface reducing measurement accuracy
B. The change in abrasive type should not affect the surface profile within SSPC-SP10
C. The operator likely did not grit blast for required time duration causing low profile
D. Testing method error because replica tape is inaccurate for slag-blasted surfaces
E. Rounded slag produces lower surface profile compared to angular steel grit abrasives

Answer: E

Explanation: Angular steel grit abrasives generally produce a higher anchor profile compared to rounded slag abrasives due to their shape and impact characteristics. The use of rounded slag can reduce the expected surface roughness typical for SSPC-SP10.

Question: 1289

You are asked to design a monitoring plan for atmospheric corrosion under a newly developed coating system. Which combination of environmental parameters should be continuously logged for accurate prediction of corrosion initiation?

A. pH of rainwater, atmospheric CO_2 concentration, solar radiation, and air pressure
B. Ultraviolet intensity, wind speed, atmospheric particulate matter, and coating thickness
C. Surface chloride deposition rate, relative humidity, temperature, and time of wetness
D. Surface temperature, steel strain gauges, coating gloss, and rainfall amount
E. Surface roughness, diurnal temperature range, sulfate deposition, and dew point

Answer: C

Explanation: Chloride deposition, humidity, temperature, and time of wetness are directly linked to atmospheric corrosion rates. The other combinations include indirect factors or variables unrelated to corrosion rates and coating performance.