

Paint Inspections Matter

The APCA represents the major painting contractors in Alberta with a focus on commercial/institutional projects and quality assurance paint inspections.

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Newsletter: Painting Concrete with Fly Ash in the Mixture

In the world of construction and architecture, new technologies and materials are constantly being explored to improve the durability, sustainability, and aesthetics of concrete. One such development is the incorporation of fly ash into concrete mixtures. Fly ash, a byproduct of coal combustion, has become an increasingly popular additive to enhance the properties of concrete, including its strength, workability, and environmental footprint. However, questions remain about the impact of fly ash on concrete's appearance, particularly when it comes to painting.

In this newsletter, we will explore the effects of painting concrete surfaces that includes fly ash in its mixture.

Cons of Painting Concrete with Fly Ash in the Mixture

1. Potential for Surface Discoloration

One of the biggest challenges when it comes to painting concrete with fly ash in the mixture is the potential for discoloration. Fly ash can cause the concrete to have a grey or lighter hue, which might not be suitable for all design aesthetics. In some cases, the paint may not adhere well to these variations in the surface, and the final color may not match expectations. Special primers or coatings might be necessary to achieve a uniform finish.

2. Slower Curing Time

While fly ash improves concrete's workability, it can also slow down the curing process. The hydration of fly ash is slower compared to regular cement, which can lead to a delay in the concrete reaching full strength. This can impact the timing of painting projects, as freshly mixed concrete with fly ash may take longer to set and dry completely. The extended curing time may also affect the paint's adhesion, requiring a longer waiting period before applying a finish.

3. Increased Risk of Surface Efflorescence

Efflorescence, the white, chalky powder that appears on concrete surfaces, can be more prominent when fly ash is used in the mixture. This is due to the chemical reactions that can occur when water interacts with the minerals in the fly ash. Efflorescence can mar the appearance of painted surfaces, requiring additional cleaning or treatment to maintain a neat look. Efflorescence may also impact the durability of paint if not addressed properly.

4. Potential for Inconsistent Results

The characteristics of fly ash can vary based on the source and how it's processed. This inconsistency can lead to variations in the mix, resulting in concrete that behaves differently than expected. For instance, variations in fly ash content may affect the strength, curing time, or porosity of the concrete, making it harder to predict how the surface will respond to painting. As a result, it may be more difficult to achieve consistent results with painted finishes.

5. Adhesion Problems

One of the most significant issues when painting fly ash concrete with latex paint is adhesion. Fly ash can create a smoother, denser surface, which can make it harder for latex paint to properly bond. Concrete that is too smooth or that hasn't been properly prepared might cause the paint to peel, crack, or chip over time. Without proper surface preparation, the paint might not stick as effectively.

Traditionally, painting a cast in place or tilt up concrete panel could be done using MPI EXT 3.1 as a system. This uses MPI #3, Alkali Resistant primer followed by a latex topcoat.

Over the last few years, we have encountered projects that were painted as above but then they experienced severe adhesion issues, with almost complete failure, as seen below.



Naturally we need to be wary of mould release agents that will impair adhesion, but we also must be aware of concrete that has a fly ash additive.

As stated earlier, one of the most significant issues when painting concrete that has fly ash in the mixture with latex paint is adhesion. Fly ash can create a smoother, denser, non-porous surface, which can make it harder for latex paint to properly bond. As Fly Ash is a byproduct of coal, it creates an oily residue in the concrete affecting adhesion.

We have found here and across North America, the best primers on this surface are oil-based primers, such as MPI #69, oil-based bonding primer.

We recommend that on all Cast in Place or Tilt up Concrete Panel jobs the following due diligence should be performed.

- 1. Ask the question, is there Fly Ash in the concrete mix. The concrete spec may say, or the GC may know.
- 2. Pour/spray water onto the concrete panel and check for water penetration. If it runs down the wall and does not penetrate then there is something making the surface nonporous. It could be a mould release agent OR Fly Ash OR both.
- 3. Do a "Mock Up" area. Apply the specified primer/paint system (probably a MPI #3, water-based primer and a sample of a MPI #69, oil-based bonding primer).
- 4. Allow to dry for a least 1 week and perform the ASTM D3359-09E adhesion test (tape and X cut).
- 5. Test for results.

Conclusion:

Caution should be taken when painting cast in place or tilt up concrete panels with fly ash in the mixture. Performing pre job, quality control as suggested above to determine porosity and adhesion characteristics will indicate to everyone of any potential issues before a larger problem develops.

Feedback

Is there anything that you would like to see from the APCA? Anything that would provide more value to you and all the members. The APCA is always interested in its member's opinions, so please send us your suggestions and any feedback you may have on what we can do to make the APCA a better organization. Please pass on your comments to Kirk Beggs at marketing@apca.ca

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