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Aesthetic degradation of concrete surface morphology

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The aesthetic aspect of concrete surfaces is usually neglected. Generally, anyone get used to the fact, that concrete surface look, after some time, becomes less aesthetic. It is the reason why the problem is poorly treated in the literature and remains unknown. It is important to understand the morphological differences of as-cast concrete surfaces created by different type and material of formworks. There is also need to name the potential threats, that affects the aesthetic aspect of the designing the concrete surface remaining "beautiful" for a whole lifetime of a structure despite of various less or more tribological damaging processes.

Keywords: concrete surface, surface morphology metrology, aesthetic of concrete surface,

1. Introduction

The human senses were traditionally viewed as passive receptors but nowadays research has demonstrated that the brain's perceptual systems pre-consciously attempt to make sense of their input even if there is still debate about the extent to which perception is an active making decision process. Recent work showed that visual cortical activity measured by functional magnetic resonance imaging can be decoded into the hierarchical features of a pre-trained deep neural network for the same input image, providing a way to make use of the information from hierarchical visual features [1].

For a very long time the aesthetic aspect of concrete surface placed in broad context of cognition sciences has been neglected. It was very often due to the fact that the concrete surface has been covered with other material. However due to fast progress in neurophysiology this topic has been reconsidered. Designing the surface of the architectural concrete it is believed to maintain “untouched” for 50 and sometimes for 150 years. Proper designing of this surface is not finished at choosing the right mixture of concrete but also of choosing the most efficient formwork suitable to its rheological, tribological as well as haptic and esthetic function [2]. Nowadays, it can be seen more often, that concrete structures has been presented as-cast without covering the beauty of the concrete itself. It happens not only for the huge structures but also for the smaller elements and parts of the small architecture.

2. Formworks and their impact at the as-cast concrete surface morphology

In order to obtain different morphology of the concrete surface the different formwork are used [3]. The most commonly are made of wood, plywood or steel. Depend on the concrete element surface potential to be exposed, it can be formed in different way.

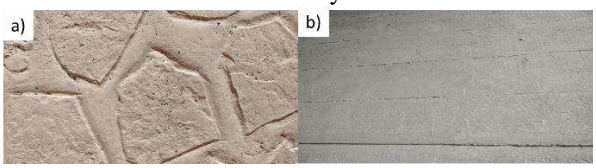

Figure 1: The view of the as-cast concrete surfaces of the hydroelectric dam (a) ceiling in football stadium (b).

The size in this case does not matter, because as it can be seen in figure 1a, especially prepared formwork was used during erecting the hydroelectric dam. In the figure 1 there is another example of concrete surface of element made using wooden formwork. Both are presenting aesthetically well at the beginning of its lifetime but still there is a question. Which of the as-cast concrete surface maintain “untouched” for the very long time?

3. Threats to aesthetic look of concrete surface

Concrete elements are exposed to adverse environmental influences such as: dust in the air, rain water, high or low temperature, biological and chemical and evidently different wear processes [4]. These influences strongly affect the aesthetic aspect in relation to morphological characterization of the concrete elements surface, as it can be seen in figure 2.

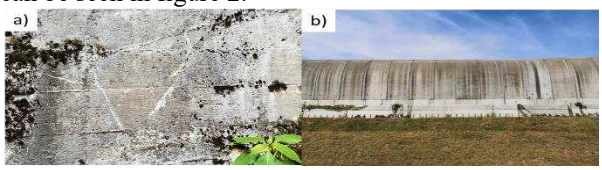

Figure 2: The possible threats of the as-cast concrete surfaces chemical and biological (a) dirt and water (b).

4. Discussion

The topic of the aesthetic aspect of concrete surface and the influence of the formwork to it, still has not been fully discussed. Metrology of surface morphology constitutes one of powerful approaches. Still there are missing gaps in the literature which should be filled in the topic of the influence of formwork to the morphology of as-cast concrete surfaces and its influence at resistance to environment nature wear process and human activities.

5. References

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