RAV10N3, September – December 2020

Message from the Editor in Chief

JOURNAL OF THE LATIN-AMERICAN ASSOCIATION OF QUALITY CONTROL, PATHOLOGY AND RECOVERY OF CONSTRUCTION

http://www.revistaalconpat.org

With great satisfaction, we present the third issue of the tenth year of the ALCONPAT Journal.

The objective of the Journal is to publish contributions of basic and applied research directly associated with the solution of problems related with quality control, pathology and recovery of constructions being welcomed studio cases in these areas.

This edition of V10N3 starts with a work from **Mexico**, where Laura Vaca Arciga and colleagues show the use of silicon-based (NS) and functionalized (NF) nanoparticles as an emerging preventive surface treatment (ST) in reinforced concrete specimens. The specimens were manufactured with a water/cement (w/c) ratio of 0.65 and subjected to a previous aging period through exposure to CO_2. Subsequently, of the different variants of the treatment applied by spraying (using a dispersion of 0.1% of nanoparticles in water) and afterwards, the carbonation was added. The results of carbonation depth and contact angle indicate that there is an influence between the degree of aging and the efficiency of each treatment.

In the second work, from **Brazil**, Guido Lessa Ribeiro Filho and colleagues discuss the impact of varying the dry paint film thickness (DFT) on the underpaint corrosion of steel plates obtained from the floor of an offshore oil platform is evaluated. The specimens were all prepared using the same material and paint scheme, and the DFT and exposure conditions in a salt spray chamber were varied and compared with the results obtained in a real situation. The results indicated that corrosion initiated at sites where the paint was damaged, may be more important than corrosion through the undamaged paint due to permeation, even in cases where the DFT is thin. In specimens whose substrates were previously damaged, there were pathological manifestations of osmotic blistering. The underpaint corrosion that occurred after the paint was damaged in the field occurred at an intensity like that observed for the tested specimens.

In the third article, from **Brazil**, Emerson Felipe Felix and colleagues present the modeling and analysis of the corrosion effects due to carbonation on reinforced concrete elements through a numerical model based on the Finite Element Method. In order to minimize corrosion damage, tools are required to understand the pathological manifestation on the mechanical behavior of reinforced concrete. It was found that depending on the reinforcement corrosion stage, the state of stress and deformation of the concrete element is compromised. Besides, results show the efficiency of the developed model and its applicability to the simulation of the mechanical behavior of reinforced concrete structures subjected to uniform corrosion.

The fourth work, by Arnulfo Luévanos Rojas and his colleagues from **Mexico**, shows an analytical model for the design of corner combined footings subjected to an axial load and two orthogonal flexural moments by each column that takes into account the real pressure on the ground below of the footing, and the methodology is based on the principle that the integration of the shear force is the moment. The current design considers the maximum pressure at all contact points. This model is verified by equilibrium of shear forces, and moments. The application of the model is presented by means of a numerical example. Therefore, the proposed model is the most appropriate, because it generates better quality control in the resources used.

The fifth work in this edition was written by Ricardo Boni and Paulo Helene, from **Brazil**. This paper presents a case study about the challenges and good building practices involved in the execution of structural reinforced concrete pile caps over steel piles. The structural reinforcements were carried out in a project with 3 residential towers of approximately 30 floors each, located on the seafront. As a result, it was observed that mix design to define the type and characteristics of concrete, prototype event, particularities of the construction site, executive procedures employed, as well as the systematic monitoring and control of concreting events and other constructive stages was determinant to promote the safety and quality of reinforcement services in accordance with the assumptions and design requirements.

The sixth work, from **Bolivia** (Marina Pacara Copa and colleagues), discusses the time range to optimize and understand infrared thermography results when used on damage detection for flexible pavement. A monitoring activity was performed during 14 continuous hours (5:00 a.m. to 7:00 p.m.) for four study areas in a centrally located avenue in Cochabamba City, Bolivia. This activity evidenced an effective time range to take thermographic images from 11:00 a.m. to 4:00 p.m. Damage visualization by differential colorimetry in thermograms at different times was also verified. This test enables locating areas where a detailed inspection may be performed. As a limitation, its sensibility to changes under environmental conditions is evident.

In the seventh work, from Brazil, Wildson Wellington Silva and Eliana Cristina Barreto Monteiro identify the pathological manifestations and the strains of the air-conditioned apparatus of reinforced concrete in the buildings, given the large number of partial collapses in totals buildings. The data was collected by 3D software and consolidated on the ground. Of the 61 buildings analyzed, 48% are window type, which, in a situation of degradation and collapse, may fall to the ground with an impact of the order of tons. In coastal regions, accelerated effects of corrosion of reinforcements are increased, such as high humidity, contamination by motor vehicles and the marina region. It is concluded that these are not suitable for structures, which, together with the low quality and accelerating effects of corrosion of the armor, must not be able to recover.

The last article that closes this issue is written by Luciani Somensi Lorenzi and colleagues from Brazil. They say that the ABNT NBR 15575: 2013 tests are part of the knowledge of the civil construction sector, but the heat shock and thermal shock test is innovative and does not have a consolidated history. The purpose of this research is to make a critical analysis and present proposals. The results showed

that the experiment is quite inaccurate in the description of the procedure and equipment. Adjustments and innovations to provide more reliable results were provided. However, no proposals were made regarding visual inspection and the number of cycles. It is concluded that the lack of information on the test has direct responsibility for the results and that the suggested proposals have the potential to be incorporated.

In this issue, three articles were published because of their originality and contributions. They were distinguished at the CONPAT 2019 Congress with the awards A (Pathology of construction) and B (Repair of construction), which were featured in the work of Laura Vaca et al (Mexico), Ricardo Boni and Paulo Helene (Brazil), and Mariana Pacara et al (Bolivia). These papers have undergone additional evaluation by the Revista Alconpat, a process coordinated by the Co-Editor in Chief of the RA (Dr. Francisco Alonso Farrera).

We are confident that the articles in this issue will constitute an important reference for those readers involved with questions related with science and technology of concrete. We thank the authors for participating in this issue, and for their willingness and effort to present high quality articles and meet the established timelines.

On behalf of the Editorial Board

Pedro Castro Borges

Editor in Chief