

*RAV12N1, January - April 2022*

*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 first issue of the twelfth year of the ALCONPAT Journal.

The objective of the Journal is the publication of contributions on basic or applied research directly related to solving problems about quality control, pathology and recovery of constructions, with related case studies being welcome in these areas.

This V12N1 edition begins with a work from **Brazil**, where Emerson Félix and colleagues present an experimental investigation with the objective of evaluating the influence of the frequency of the efforts, the level of applied tension and the compressive strength of the material on the fatigue behavior of concrete. The tests were carried out considering three load frequencies (0.125, 0.25 and 0.5 Hz), two levels of maximum stress (50% and 70% of the compressive strength) and concretes with three classes of compressive strength (30, 50 and 70 MPa). The results found indicate that as the load frequency increases, the life under fatigue conditions increases exponentially. However, it was observed that the life under fatigue conditions is lower in concretes with high compressive strength, and presents an inverse relationship with the compressive strength of the material.

In the second work, Jordi Payá and colleagues from **Spain** show that alkaline activation cements (AAC) require an alkaline component for the activation of the precursor. The manufacture of the alkaline activator (AA) involves a very important energy and raw material consumption, so that the carbon footprint of AACs is fundamentally influenced by this factor. An alternative is the use of other subjects for AA preparation. In this work an exhaustive analysis of the different alternatives is carried out: silica-based materials for the preparation of alternative silicates and alkaline-based materials. Carbon footprints are compared relative to commercial Portland cements, and the effect of replacing commercial reagents with alternative activators is analyzed.

The third article comes from **Brazil**, where Fernanda Pacheco and colleagues analyze the healing potential of concrete using chemical and bacterial solutions, evaluating different materials that can be used for encapsulation. Expanded clay and perlite were used to encapsulate the agents. To analyze the effectiveness of healing, visual analysis techniques were performed using a high precision light microscope and 3D microtomography. The results pointed to a better performance of the BAC.AE mixture (bacterial solution encapsulated in expanded clay), using a bacterial solution encapsulated in expanded clay, which was able to heal cracks of up to 0.57mm. The mixtures BAC.PE (bacterial solution encapsulated in expanded perlite), bacterial solution encapsulated in expanded perlite, and SS (sodium silicate), a chemical solution added at the time of mixing to replace the water, healed cracks of 0.16 mm and 0.29 mm respectively.

In the fourth article from **Spain**, Rayara Pinto Costa and colleagues evaluate the variability in the prediction of the useful life of concrete structures through four models that estimate the natural advance of the carbonation front. The results show that there is variability in the estimated carbonation front. The models of Possan (2010) and Ekolu (2018) present estimated values close to those measured, while those of Ho and Lewis (1987) and Bob and Affana (1993) underestimate and overestimate the natural carbonation front. Only concretes without the addition of supplementary cementing materials were considered, due to model limitations. The compressive strength, CO<sub>2</sub> concentration and relative humidity have a significant influence on the results and the variability depends on the parameters considered in the models.

The fifth article, by Ronei Hoffmann Malaquias and colleagues, comes from **Brazil** and analyzes the performance of the treatment of rising humidity in walls, through the use of crystallizing and hydrophobic chemical blockers available in the Brazilian market, with their introduction by gravity. The evaluation of the rising humidity was carried out by calculating the water absorption rate in the samples, combined with the images obtained by the thermographic camera. From the results found, it was concluded that the treatment did not completely reduce the pathology in the walls, however, both products obtained a good performance, managing to considerably reduce the water absorption rates.

The sixth work of this issue is written by Carlos Fernando Gomes do Nascimento and colleagues from **Brazil**. They verify whether voids intensify the triggering of reinforcement corrosion in aerated concrete, using slabs with specific light masses. The methodology was based on four tests: visual inspection, corrosion potential, electrical resistivity and loss of mass. In relation to the L1 family, the L2 and L3 families (higher air content) were more susceptible to the corrosion of the reinforcement, as well as in the amount of lost mass of the steel bars in 90% of the cases. However, the behavior of some slabs indicates that there is a possibility that the process is asymptomatic in terms of staining, considering that the influence of the roof on the corrosion process of the steel bars was verified.

In the seventh work, from **Mexico**, Alberto Mena and Pedro Castro Borges present the practical use of the safety factor (FS) in the column repair strategy of a reinforced concrete building with historical value (almost 70 years) is presented. 80% of a building located in the historic center of the city of Campeche, Mexico, declared a World Heritage Site by UNESCO, was repaired. Strategies were used for a better use of material resources, equipment, and labor in the repair of walls, columns, slabs, and beams. One of the strategies was to use the theoretical FS to calculate the repair depth without structural consequences but fulfilling the purpose of controlling the carbonation of the concrete and maintaining the desired prediction of service life.

In the paper eight, from **Spain**, David Bru and Salvador Ivorra analyze the current state of the roof of the Basilica of Santa María, Alicante, Spain. This building dates from the 13th century and is listed. For the analysis of the efflorescences that are observed, an analysis of the construction typology is carried out, as well as a visual analysis of the state of the same, describing the existing pathological manifestations, both in the exterior area of the roofs, and in the interior area of the rooms under them. For the technical analysis of possible leaks from the roof to the interior rooms of the basilica, a

watertightness test and verification is carried out through the control of the variation of temperatures by means of thermographic analysis. The existence and position of leaks that have damaged this listed building can be concluded.

The last article that closes this issue is written by Zakaryaa Zarhri and colleagues from **Mexico**, who present a bibliometric study of the literature on the use of tire rubber in construction to promote the interest of using it as a raw material to reduce pollution at the level global. The works published in the period 1999-2020 in both Scopus and Web of Science (WoS) databases are taken into account using the Methodi Ordinatio and VOSviewer software. In this period, a total of 967 documents on the use of rubber in structural and non-structural concretes have been published and 1182 authors have contributed on the subject. Since 2010, the interest of researchers in introducing rubber in construction has increased. China, the United States and Australia are the countries with the greatest interest in researching rubber-concrete.

In this issue, for the first time, an internationally outstanding scientist who has died recently is honored with an "In Memoriam". On this occasion, the "In Memoriam" section is written by Carmen Andrade and by José Bastidas to honor José Antonio González. I met José Antonio in person in 1993 at the CNIM in Madrid. He was an extremely easy come easy go person and of whom I remember extremely enriching moments. One of them, which I will comment on here, was on my first visit, when in a spontaneous, didactic and enriching way, he gave me a personal electrochemistry class, but focused on the Resistance to Linear Polarization method. At the end of the class, he gave me his autographed book on the fight against corrosion. I was always his fan and I have had his books since then. Who better than Carmen Andrade and José Bastidas to talk about his size and hidden greatness through a humility and simplicity that is not so easy to find today. I invite you to enjoy "In Memoriam".

We are confident that the articles in this issue will constitute an important reference for those readers involved with questions of evaluations and characterizations of materials, elements and structures. We thank the authors participating in this issue for their willingness and effort to present quality articles and meet the established deadlines.

At the beginning of 2022, I must broadly acknowledge the original editorial staff and those who have joined this initiative that has led us to where we are now. But without a doubt, the greatest recognition is deserved by our authors of articles, who have trusted our journal and invested time, money and effort to publish their research work with us, despite the fact that many of them have had better options in their moment. The recognition is extended to our readers, like you, who read us and quote the RA internationally.

On behalf of the Editorial Board



Pedro Castro Borges  
Editor in Chief