



DOSSIER DE SOUTENANCE D'UNE THESE DE DOCTORAT

Le Doyen de la Faculté des Sciences a le plaisir d'informer le public qu'une soutenance de
thèse de Doctorat en

«Chimie Fondamentale et Appliquée »

aura lieu le 30/12/2023 à 10H à la Faculté des Sciences, Kénitra

La Thèse sera présentée par Mr **EJBOUH ADIL**

Sous le thème :

Durability performance of reinforced concrete structure in aggressive environment: Case study of prestressed concrete pipe for drinking water in semi-arid area Morocco

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Date de soutenance : 30/12/2023

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Sujet de thèse :

Durability performance of reinforced concrete structure in aggressive environment: Case study of prestressed concrete pipe for drinking water in semi-arid area Morocco

Abstract :

The concrete pipes are widely used for drinking water distribution and transmission. Concrete pipe performs well as the concrete properties and environmental characteristics are favorable. However, the service life of the concrete pipeline is shorter in the semiarid area of Morocco, especially in three regions: Errachida-Erfoud, Agadir, and Oujda-Taourirt, where the degradation rate is extremely high. While pipelines structure in other region of the country are performing in good condition. For this (ONEE) had proceeded to resolve this problem issue via (UIT) and (ESMR).

This thesis focused on three main axes. The first is to identify and determine the primary cause of concrete pipe deterioration in the semiarid environment. Many diagnostics and expertise assessments were conducted in the field study of the three regions. The exposure class related to the environmental action of each region is determined according to the national (NM 10.1.008) and international (EN 206-1) standards.

The second aspect on which this thesis focused was the simulation of the real condition exposure of the concrete pipe structure by designing an auto-Pilot project able to simulate the real conditions and nature laying of concrete pipeline. Furthermore, this novel experimental Pilot study lead to determined the pathology as well as the cure of the degradation pipelines in simulated steppe climate.

The third one is to find an efficient solution of this problematic of real-life concrete pipe durability in this aggressive environment. In this study a local available clay, limestone and fly ash were incorporated in concrete pipe as a supplementary cementitious material (SCMs). The major innovation presented in this project is the investigation of Limestone Calcined Clay Cement (LC3) technology. The LC3 technology improves the durability performance and lowers both the environmental and the cost impact.