

# **Development of non-destructive testing approaches for detection and characterisation of Reinforced Aerated Autoclaved Concrete (RAAC)**

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Reinforced Autoclaved Aerated Concrete (RAAC) is a lightweight aerated cementitious material that has been used in building structures across the UK and Europe since the late 1950's. RAAC panels are manufactured off-site and used for floor, roof, and walls. In the recent past, serious concerns have been raised regarding the structural integrity of the buildings installed with RAAC panels. Various governmental agencies have reported that the in-service performance of RAAC panels is deteriorating due to water ingress, corrosion of reinforcement, excessive displacement, and cracking. With an unknown number of buildings at risk of rapid deterioration and or even potential risk of failure, the development of reliable non-destructive testing (NDT) methodologies to detect the presence of RAAC panels and characterise the extent of their deterioration is crucial to develop strategies on extend the lifetime of the building. In this study, we examine the potential of various NDT technologies (including ground penetrating radar, ultrasound, x-ray backscatter) for detecting and characterising RAAC panels in-line with existing key inspection requirements. To this end, we will first discuss the results of the measurements carried out controlled laboratory-based trials on RAAC and traditional reinforced concrete panels to evaluate the effectiveness of NDT techniques to identify the presence of RAAC and assess key factors influencing their structural integrity. Following which, we will provide the findings of the investigation carried out from extensive on-site in-situ trials of RAAC panels to assess inspection performance in representative environments.