

Award-winning papers in 2021

Papers published in *Forensic Engineering* are eligible for awards from the Institution of Civil Engineers. Papers from any of the ICE journals can be nominated for several awards. In addition, each journal has awards dedicated to their specific subject area

On Friday 14 October 2022, ICE president Ed McCann presented awards to the following papers published in *Forensic Engineering* in 2021. The editorial panel nominated their best papers and an awards committee chaired by Tim Broyd allocated the awards.

Charles Manby Prize

The Charles Manby Prize, presented to the best paper that covers information and communications technology/geographic information systems/building information modelling in its broadest sense, was awarded to Rodrigues *et al.* (2021).

Abstract

Portugal is a country that is often affected by large wildfires, which can be characterised by a high level of destruction of material goods and deaths. Portugal will never forget the fatalities linked to forest fires in recent years; in 2017, more than 100 people died. Vila Real is one of the districts with the

highest occurrence of wildfires. This study characterised the risk of fire for the District of Vila Real, based on Geographic Information Systems. This work applies a methodology at a district level that allows better decision making by those responsible for district civil protection, since they have a new decision making support tool. This new tool gives information about the wildfire risk, the priority of surveillance of the most dangerous areas and the travel time of the firefighters in their emergency response area. Most of the district (61.78%) presents a medium, high or very high risk in the context of wildfires. Regarding travel time, most of the territory under study is more than 15 min from the fire brigades. Since 70% of the district's area is not visible from any lookout post or only from one, the areas in need of enhanced surveillance were determined.

Overseas Prize (Mokshagundam Visvesvaraya Award)

The Overseas Prize (Mokshagundam Visvesvaraya Award), presented to the best papers written by overseas authors or covering an overseas project, was awarded to Anand *et al.* (2021).



Rees Jeffreys Award winner Seung Woo Lee with ICE president Ed McCann



Overseas Prize (Mokshagundam Visvesvaraya Award) winner N. Anand with ICE president Ed McCann

Abstract

Structural concrete is a composite material commonly used for the construction of buildings and structures. Reinforced concrete members should be designed for strength, as well as durability. The long service life of the entire structure depends on the durability of concrete. The quality of construction materials, cover to the concrete, exposure conditions and quality of concrete are some of the key factors that affect the durability of concrete. Also, water penetrates easily and finds its way inside concrete through connected pores if the degree of compaction is not proper. Stagnant rainwater in the roof or a high water table may pave the way for the entry of water. The entry of water into structural concrete mainly causes corrosion, thereby reducing the strength of structural elements and initiating the spalling of concrete. A case study based on diagnosis, non-destructive testing and failure analysis of a reinforced concrete building in India is presented. The rehabilitation measures to be undertaken to maintain the service life of the building are also presented.

Thomas Telford Premium Prize

The Telford Premium, presented to the best paper published in *Forensic Engineering*, was awarded to Robery (2021).

Abstract

While reinforced concrete construction has boomed over the past 70 years, forensic analysis of failures shows that many structures have not achieved the design service life due to poor durability. This can primarily be attributed to a lack of understanding about durability design, poor construction practices and poor life-cycle maintenance, resulting in unexpected

deterioration and damage that requires intervention. Exposure to chloride ions continues to present the construction industry with the greatest challenges. In Europe, EN 206 sets durability performance criteria for reinforced concrete under normal exposure environments, supplemented by national recommendations. Increasingly, infrastructure is being built either in environments that are so hostile to reinforced concrete or with service design lives that are so long, that they are outside the scope of European standards. For design in hostile environments, both within Europe and around the world, performance-related durability methods have been adopted, using predictive ingress models over extended service lives. However, even then, the fundamental risk remains as to whether what the designer intended, through the various cement and cover combinations, will be achieved in practice by the contractor's workforce and site practices. This paper explores the lessons from durability failures of reinforced concrete and examines how performance can be modelled and enhanced in extreme environments and assured by effective corrosion monitoring and management strategies.

REFERENCES

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- Rodrigues A, Raposo J, Reis J et al. (2021) Wildfire risk management in the District of Vila Real (Portugal). *Proceedings of the Institution of Civil Engineers – Forensic Engineering* **174(3)**: 77–86, <https://doi.org/10.1680/jfoen.21.00010>.