**Self-Compacting Concrete Durability Assessment via Fuzzy-Logic and Bayesian Networks**

 [Khalil Abdi](https://link.springer.com/article/10.1007/s40996-024-01576-6#auth-Khalil-Abdi-Aff1),

 [Yacine Sahraoui](https://link.springer.com/article/10.1007/s40996-024-01576-6#auth-Yacine-Sahraoui-Aff2),

 [Nabil Kebaili](https://link.springer.com/article/10.1007/s40996-024-01576-6#auth-Nabil-Kebaili-Aff1),

 [Mourad Nahal](https://link.springer.com/article/10.1007/s40996-024-01576-6#auth-Mourad-Nahal-Aff2)

 [Mohamed Djouhri](https://link.springer.com/article/10.1007/s40996-024-01576-6#auth-Mohamed-Djouhri-Aff1)

**Abstract**

This paper presents a hybrid approach for assessing the durability of self-compacting concrete (SCC) in Algeria using Fuzzy-logic and Bayesian network (BN) methods. The methodology comprises three principal steps: Constructing a database based on expert opinions, learning the Bayesian Network (BN) structure, and using the BN for durability assessment. Focusing on the influence of uncertainties for eighty-six (86) basic events, probabilistic inference techniques combined with fuzzy set theories are used to predict SCC durability. The study classifies and evaluates the impact of critical events on SCC durability, conducting a comparative analysis between coastal and desert regions. Results indicate a significant SCC durability rate of 84.73%, highlighting influences from material defects, bad design, corrosion, poor construction sites, external forces, and cracks. These insights aid decision-makers in improving SCC structures..