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Design Considerations for the Implementation of UHPC to Containment Buildings

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ABSTRACT

Ultra-high performance concrete (UHPC) is a fiber-reinforced cementitious material with high compressive strength, ductility, durability, and low permeability, garnering interest for its application to nuclear containment buildings (Androuët 2024). This study evaluates the impact of UHPC on code-based rebar design (Joint ACI-ASME Committee 359 2019) and examines its compliance with regulatory standards for beyond design-basis internal pressure (NRC 2010). UHPC material properties and constitutive laws, as outlined in design guidelines by AFNOR (2016) and Graybeal and Helou (2023), are discussed in terms of their integration into containment design. The findings of this study provide foundational insights into developing UHPC containment designs and potential codification.

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