

A Comprehensive Review of Seismic Performance Enhancement in Steel Plate Shear Walls using Waste Tyre Rubber Aggregates: Materials, Methods, and Structural Behavior

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Abstract: The authors present an overview of significant developments in seismic-resistant building using a combination of waste tyre rubber aggregates integrated into concrete and steel reinforced plate systems. Recent concerns regarding seismic vulnerability globally and environmental sustainability have resulted in a surge of interest in new composite materials for enhancing both structural durability and waste recycling. In addition to discussing experimental data and comparisons of mechanical properties, seismic behavior and energy absorption capacity of shear walls constructed with rubberized concrete and reinforced steel plates, this literature review also includes discussions of application of these composite materials, construction techniques and possible regulatory pathways for implementation. Based on the results of experimental studies and comparison of data, the review identifies that hybrid composite systems of steel-reinforced rubber concrete may be a viable method of providing resilient and environmentally sustainable structures, specifically when rubber is replaced at levels of approximately 10-15% by volume of coarse aggregate

Keywords: Seismic-resistant construction, Waste tyre rubber, Steel plate reinforcement, Energy dissipation