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Review a review of piezoelectric material -based structural control and health monitoring techniques for engineering structures : Challenges and opportunities

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With the breadth of applications and analysis performed over the last few decades, it would not be an exaggeration to call piezoelectric materials “the top of the crop” of smart materials. Piezoelectric materials have emerged as the most researched materials for practical applications among the numerous smart materials. They owe it to a few main reasons, including low cost, high bandwidth of service, availability in a variety of formats, and ease of handling and execution. Several authors have used piezoelectric materials as sensors and actuators to effectively control structural vibrations, noise, and active control, as well as for structural health monitoring, over the last three decades. These studies cover a wide range of engineering disciplines, from vast space systems to aerospace, automotive, civil, and biomedical engineering. Therefore, in this review, a study has been reported on piezoelectric materials and their advantages in engineering fields with fundamental modeling and applications. Next, the new approaches and hypotheses suggested by different scholars are also explored for control/repair methods and the structural health monitoring of engineering structures. Lastly, the challenges and opportunities has been discussed based on the exhaustive literature studies for future work. As

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a result, this review can serve as a guideline for the researchers who want to use piezoelectric materials for engineering structures. © 2021 by the authors. Licensee MDPI, Basel, Switzerland.

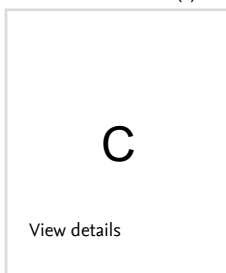
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Active control ; Damage structure ; Noise control ; Piezoelectric material ; SHM ; Vibration control

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