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Systemic Vulnerability and Risk Assessment of Transportation Systems Under Natural Hazards Towards More Resilient and Robust Infrastructures

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Abstract

Transportation infrastructures are complex systems of various connected components like bridges, roads, tunnels, embankments, retaining walls in case of a highway system or wharfs, cranes, buildings, utility systems in case of port facilities. Due to their spatial extent, they are exposed to variable natural hazards such as earthquakes, tsunami or landslides. Experience from past disastrous events shows that transportation infrastructures are quite vulnerable due to the lack of redundancy, the lengthy repair time, the rerouting difficulties or the cascading failures and interdependencies. Their damage could be greatly disruptive in terms of safety of life, business disruption, access to emergency services and key lifelines utilities, rescue operations and socio-economic impacts. Therefore, in terms of resilience it is important to recognize and quantify the risks and global losses associated...

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