



Hazard Resilience Index (HRI)

Dam Failure and Structural Collapse

Dam Failure
 Structural Collapse - Buildings
 Structural Collapse - Transportation

Dam Failure and Structural Collapse

Please refer to the *Hazard Resilience Index Instructions (HRI)* document for more information on using this document.

Dam Failure ^{1 2}

Hazard Resilience Rating	High Resilience <input type="checkbox"/>	Low Resilience <input type="checkbox"/>	Need More Info <input type="checkbox"/>	Not Applicable <input type="checkbox"/>
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Yes	No	Need More Info	Not Applicable	FACTORS	This factor is important to my community
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Community-based dam failure exercises have taken place in schools and the community-at-large (e.g., table-top or full-scale exercises)	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Dam operators have an emergency response plan outlining what to do in the event of potential or actual dam failure	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Dam operators have spillways (parts of a dam designed to pass water from the upstream side of a dam to the downstream side) in place to catch overflow	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Dam reservoir operation restrictions are in place to minimize risks from overexertion of system	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Dam safety officials have recently assessed any dams which could affect the community and have retrofitted/started retrofitting any dams that don't meet safety standards (including earthquake resistant upgrades).	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Dam safety officials regularly monitor dams for compliance with safety protocols and ensure that the dams are well maintained.	<input type="checkbox"/>



<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	There is a warning system in place to notify community residents of a potential dam failure	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	There is a warning system in place to notify police, fire and ambulance personnel of a potential dam failure	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	There is a warning system in place to notify transient, migrant and homeless people of a potential dam failure	<input type="checkbox"/>

Structural Collapse – Buildings ³

Hazard Resilience Rating	High Resilience <input type="checkbox"/>	Low Resilience <input type="checkbox"/>	Need More Info <input type="checkbox"/>	Not Applicable <input type="checkbox"/>
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Yes	No	Need More Info	Not Applicable	FACTORS	This factor is important to my community
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Community officials regularly inspect new buildings being constructed and enforce building code requirements.	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Community officials regularly perform safety checks on existing public buildings.	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Community officials require unsafe structures to be rebuilt to current standards.	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Community-based structural collapse exercises have taken place in the community-at-large (e.g., table-top or full-scale exercises)	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Fire department personnel have received light urban search and rescue (LUSAR) training	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The community has a building retrofit (to equip with safety upgrades) policy in place (e.g., if more than 50% of the building is being retrofitted it has to be brought to code).	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The community has a retrofit policy in place for all unreinforced masonry buildings located in an earthquake hazard area.	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The community has an inventory of buildings not meeting modern building codes and posing a public risk.	<input type="checkbox"/>

Structural Collapse – Transportation ⁴

Hazard Resilience Rating	High Resilience <input type="checkbox"/>	Low Resilience <input type="checkbox"/>	Need More Info <input type="checkbox"/>	Not Applicable <input type="checkbox"/>
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Yes	No	Need More Info	Not Applicable	FACTORS	This factor is important to my community
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Community officials regularly inspect new structures being constructed and enforce engineering code requirements.	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Community officials regularly perform safety checks on existing transportation structures (e.g., bridge, overpasses).	<input type="checkbox"/>

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Community officials require unsafe structures to be rebuilt to current engineering standards.	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Community-based structural collapse exercises have taken place in the community-at-large (e.g., table-top or full-scale exercises)	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Fire department personnel have received heavy urban search and rescue (HUSAR) training	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The community has a long-term mitigation strategy in place to replace aging structures.	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The community has an inventory of structures not meeting modern building codes and posing a public risk.	<input type="checkbox"/>

References

¹ Lave, Lester B. & Balvanyos, Tunde. (1998). Risk Analysis and Management of Dam Safety. Risk Analysis, 18:4, 455-462.

² Johnstone, W.M. & Lence, B.J. (2009). Assessing the value of mitigation strategies in reducing rapid-onset, catastrophic floods. Journal of Flood Risk Management, 2, 209-221.

³ Melchers, Robert E. (2002). Safety and risk in structural engineering. Prog. Structural Engineering Mater, 4, 193-202.

⁴ Melchers, Robert E. (2002). Safety and risk in structural engineering. Prog. Structural Engineering Mater, 4, 193-202.