Building Materials at a Glance

Material	Fire Resistance	Rain and Floods	Extreme Temperatures	Wind	Seismic Resilience
Rammed Earth	✅ Naturally fire-resistant.	⚠️ Rammed earth is vulnerable to flood/moisture damage, including mold.	✅ Temperature regulation: Good thermal mass aids in maintaining comfortable temperatures. ⚠️ Poor insulation.	⚠️ Roof is vulnerable to damage in windy conditions.	⚠️ Reinforcements are needed to improve seismic resilience, such as bracing or panels.
Straw Bale	✅ Fire-resistant, with a 2-hour fire rating. Plaster further strengthens fire resilience.	❗ Risk of moisture retention and mold, especially if exposed to rain or water during construction	⚠️ Temperature regulation: low density means low thermal mass. ✅ Insulation: Straw bale has higher insulation value than standard walls.	✅ Can withstand substantial dynamic force (i.e., wind) with minimal movement	✅ Straw bale absorbs energy well and straw bale walls have wide footprints.
Cob	✅ Fire-resistant, with a 2-4 hour fire rating.	❗ Vulnerable to flood damage	✅ Temperature regulation: good due to high thermal mass. ⚠️ Insulation: low	❓ Little information available about wind resistance	⚠️ Reinforcements are needed to improve seismic resilience
Hempcrete	✅ Fire-resistant, with a 1-4 hour fire rating.	✅ Hempcrete is naturally vapour-permeable and the presence of lime makes the material more resilient to moisture and mould.	✅ Temperature regulation: good due to high thermal mass. ⚠️ Insulation: moderate.	Typically used as infill, so has less influence on wind resilience	✅ Hempcrete is flexible, elastic, and lightweight. This makes it more seismically resilient.
Autoclaved Aerated Concrete (AAC)	✅ High hourly fire rating, which means AAC can withstand fire for a long period before damage.	⚠️ Inorganic and breathable, making it resistant to mould. May require an exterior coating to prevent moisture ingress.	⚠️ Temperature regulation: Lower due to low/moderate thermal mass. ✅ Excellent insulation.	⚠️ Needs reinforcements for wind resistance	✅ High compressive strength contributes to seismic resilience.
Mass Timber	✅ Fire rating of 3+ hours; surface char forms a protective layer.	⚠️ Risk of swelling/decay without protective detailing.	✅ Temperature regulation: good due to high thermal mass. ⚠️ Insulation: moderate.	✅ Strong wind resistance due to engineered connections that provide stability.	✅ Flexibility and engineered joints help withstand earthquakes