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Shape memory alloys and their application in structural oscillations attenuation (Conference Paper)

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Abstract

The paper investigates the benefits that the SMA-behaviour can introduce in the dynamical response of a structural system. The influence of SMA tendons contributing to the overall strength of a simple elastic-plastic structural model undergoing horizontal shaking and subject to vertical loads is firstly analysed, proving that coupling super-elastic members with elastic-plastic structures yields an excellent performance in attenuation both of the $P-\Delta$ effect and of the final residual deformation. In the second investigation, this system is looked at as an isolation device and is introduced in a m.d.o.f. elastic-plastic structural model; its attitude in suppressing plastic deformations in the super-structure is demonstrated. © 2003 Elsevier B.V. All rights reserved.

Author keywords

Earthquake engineering applications; Pseudo-elasticity; Shape memory alloys

Indexed keywords

Engineering controlled terms: Attenuation; Deformation; Dynamic response; Earthquake effects; Elastoplasticity; Mathematical models; Performance; Phase transitions; Problem solving; Structural analysis; Vibration control

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Engineering main heading: Shape memory effect

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Abstract

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The influence of SMA tendons contributing to the overall strength of a simple elastic-plastic structural model undergoing horizontal shaking and subject to vertical loads is firstly analysed, proving that coupling super-elastic members with elastic-plastic structures yields an excellent performance in attenuation both of the $P-\Delta$ effect and of the final residual deformation.

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Shape memory alloys; Pseudo-elasticity; Earthquake engineering applications

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