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BIENVENIDOS
AL

TALLER DE ESTRUCTURAS EQUIPADAS CON BRBs

EN UN MOMENTO INICIAMOS…

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TALLER DE ESTRUCTURAS EQUIPADAS CON BRBs

Dr. Héctor Guerrero Bobadilla

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1. INTRODUCCIÓN

Conceptos básicos de los Contraventeos Restringidos al Pandeo

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Conceptos básicos de los Contraventeos Restringidos al Pandeo

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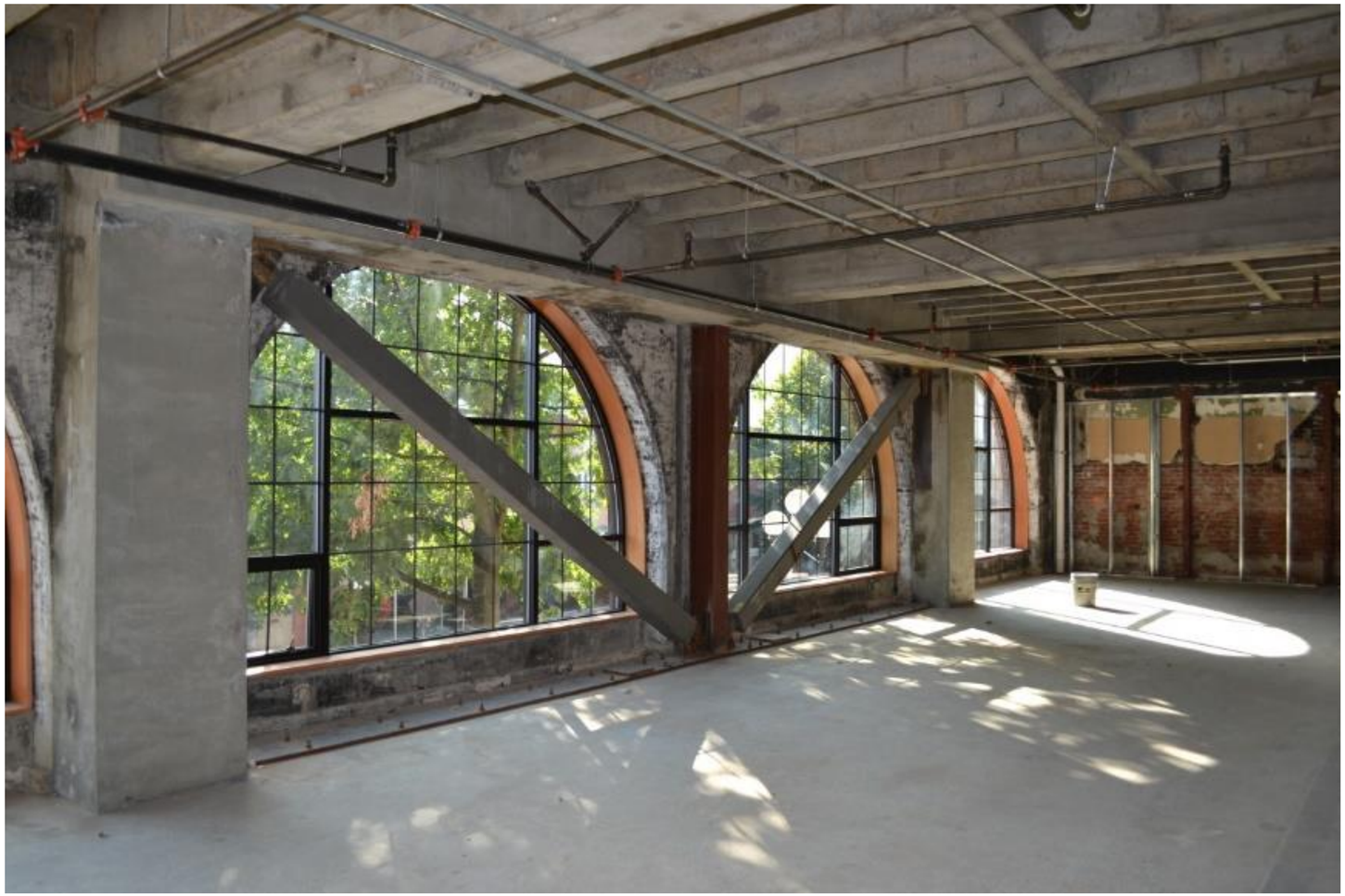

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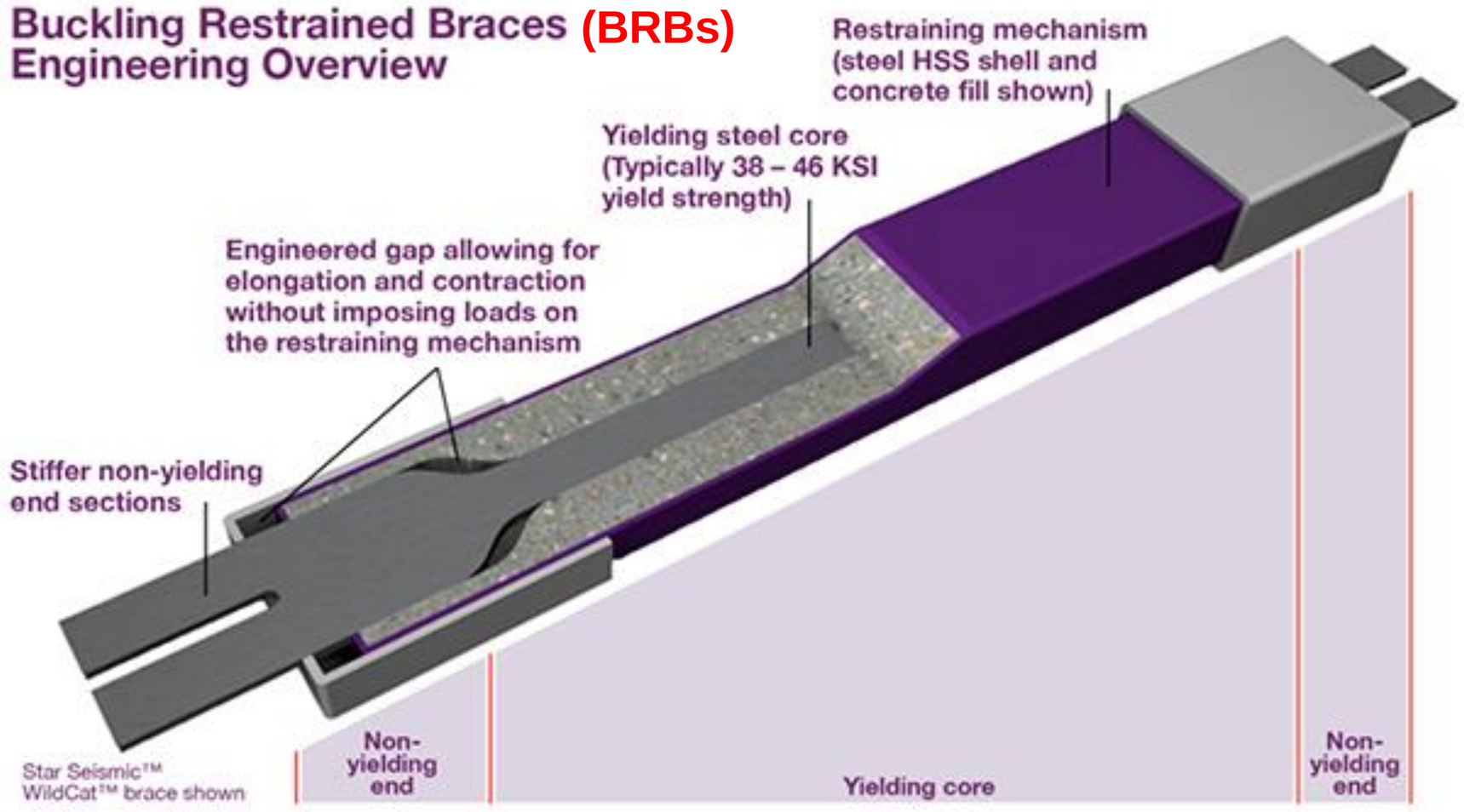

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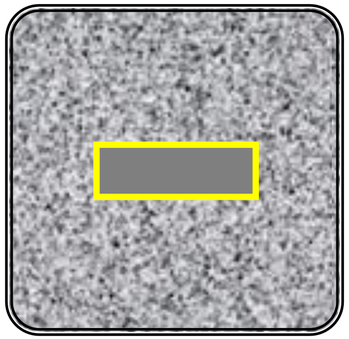
Conceptos básicos de los Contraventeos Restringidos al Pandeo

Núcleo

Funda

Los CRPs son muy simples

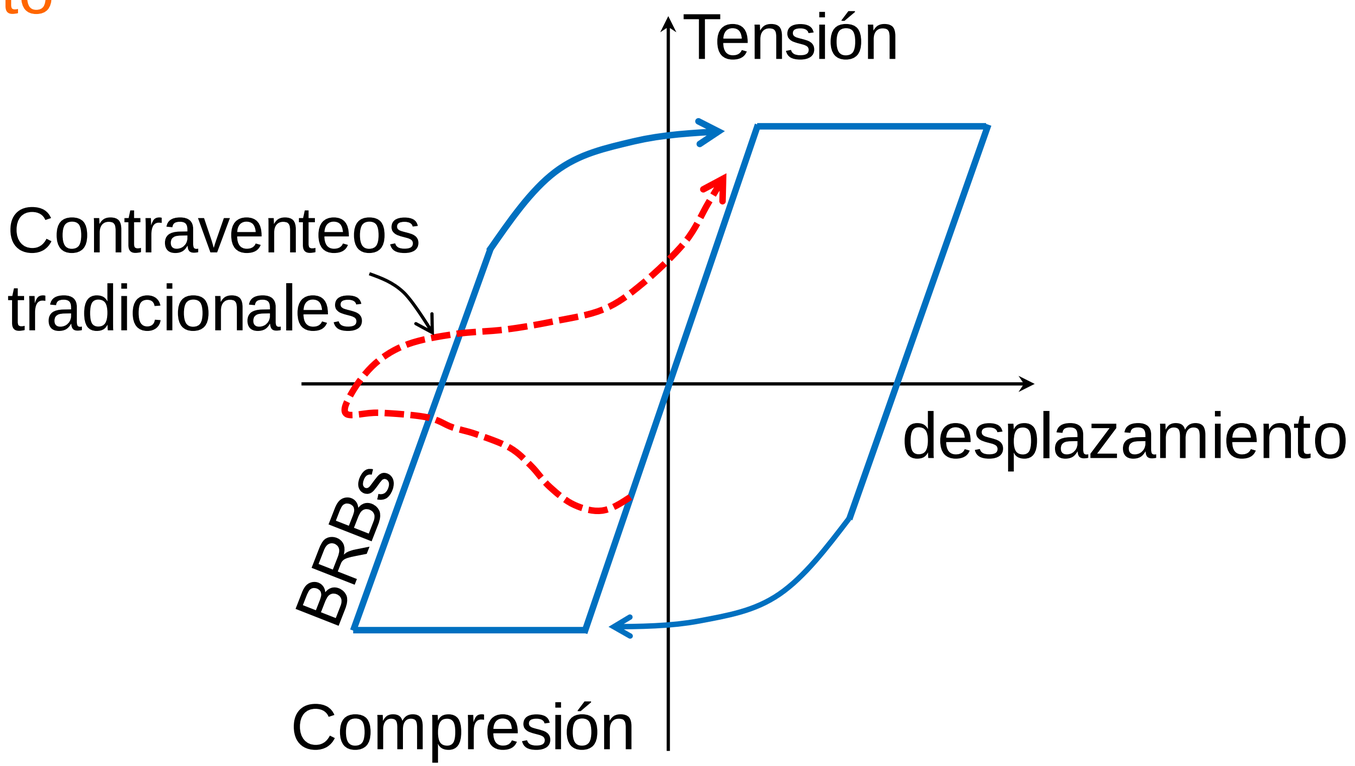
Conceptos básicos de los Contraventeos Restringidos al Pandeo



1. El núcleo se coloca dentro de la funda y ésta se rellena de concreto.
2. Se coloca un material desmoldante para des-adherir el núcleo y la funda.

Conceptos básicos de los Contraventeos Restringidos al Pandeo

Comportamiento histerético



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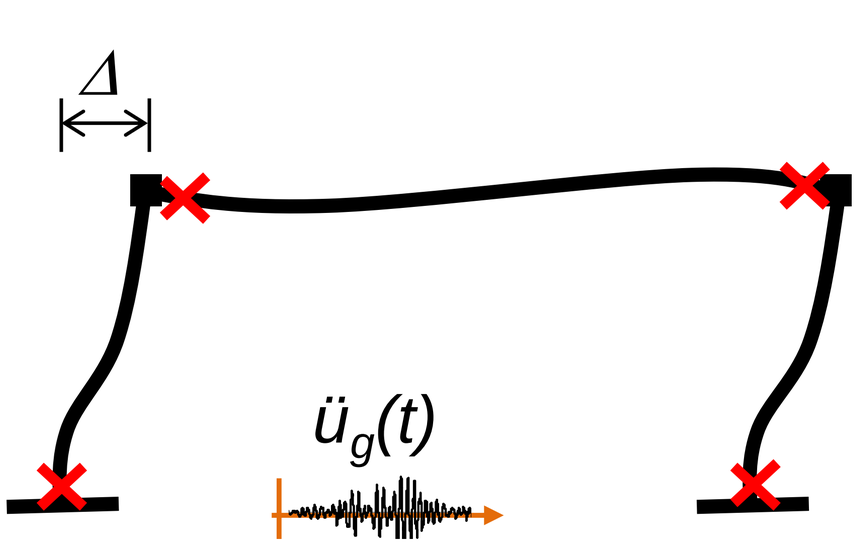
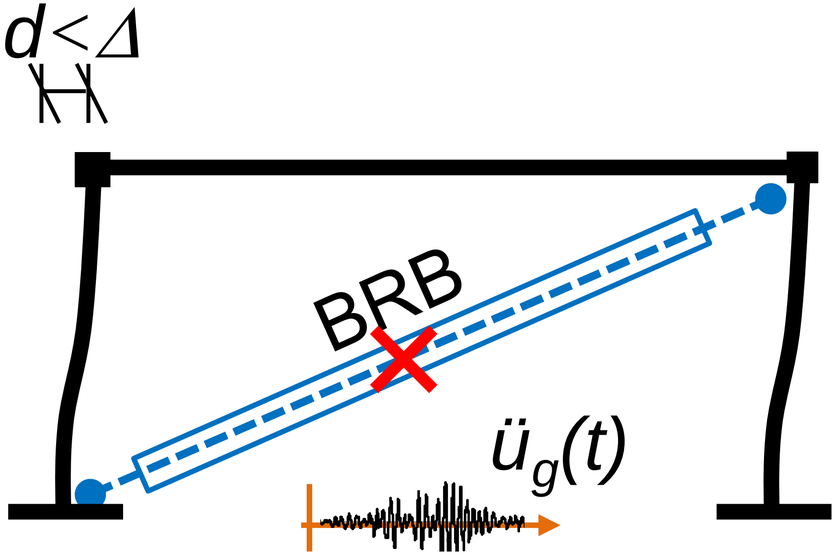
BRBs como fusibles estructurales





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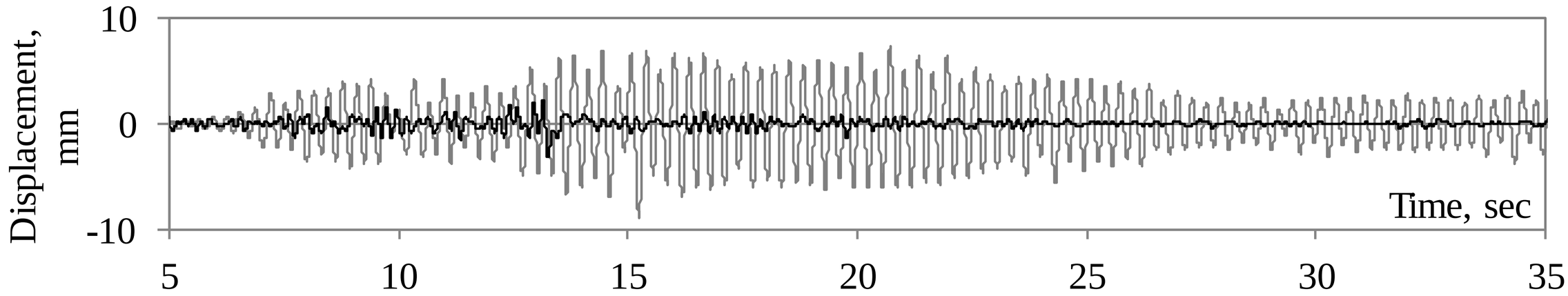
Experimentos

Conceptos básicos de los Contraventeos Restringidos al Pandeo

Experimentos



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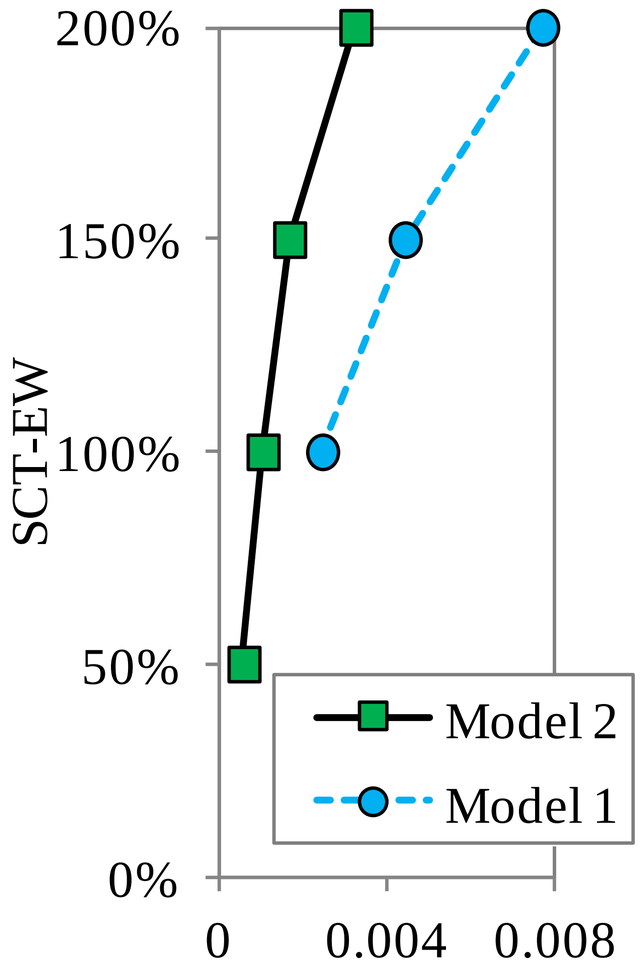
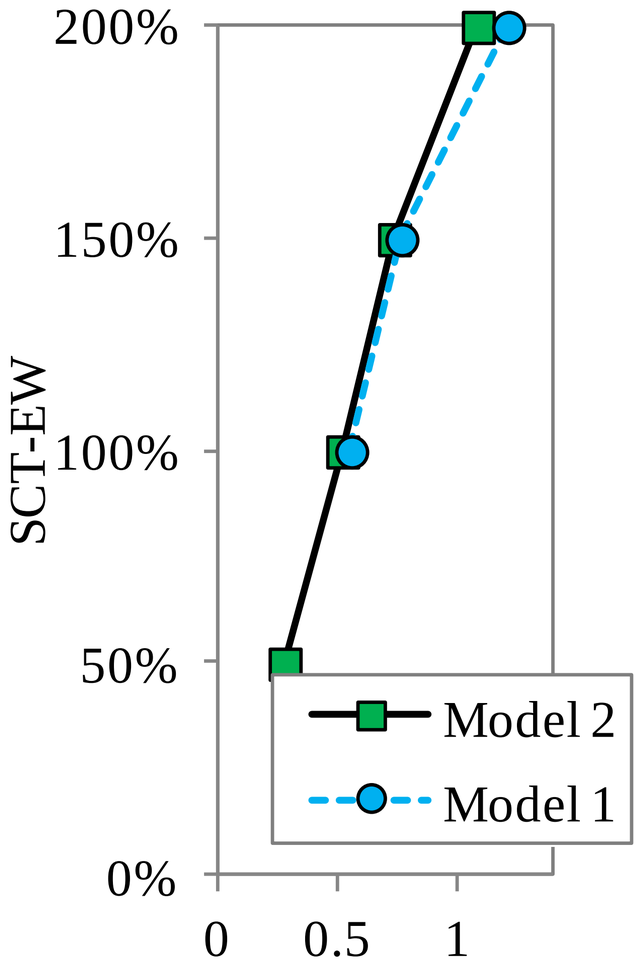


a) peak inter-storey drift



d) peak accelerat., *g*

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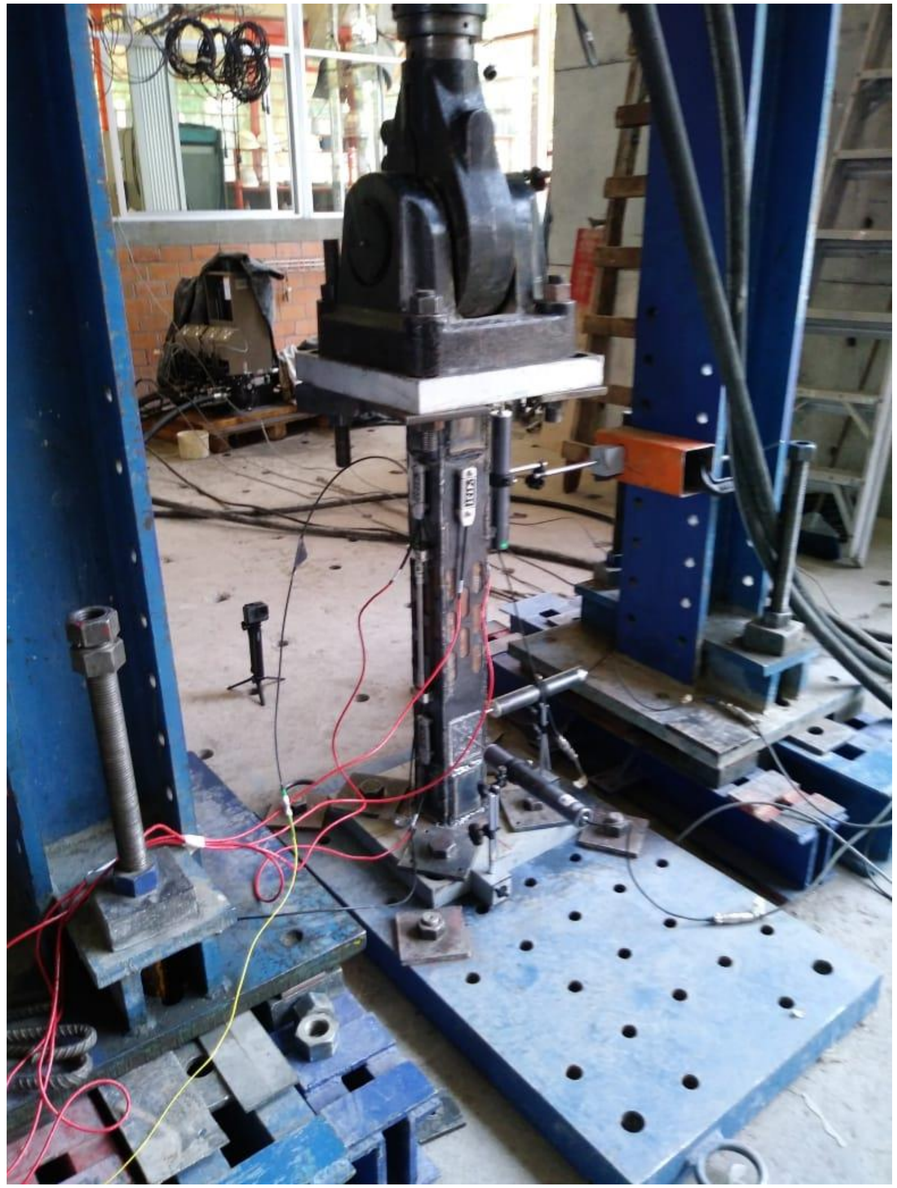

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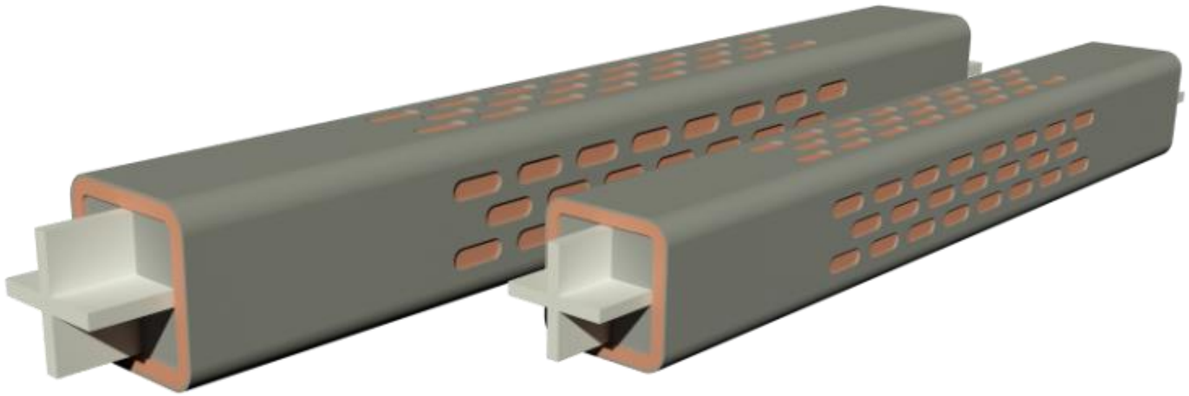

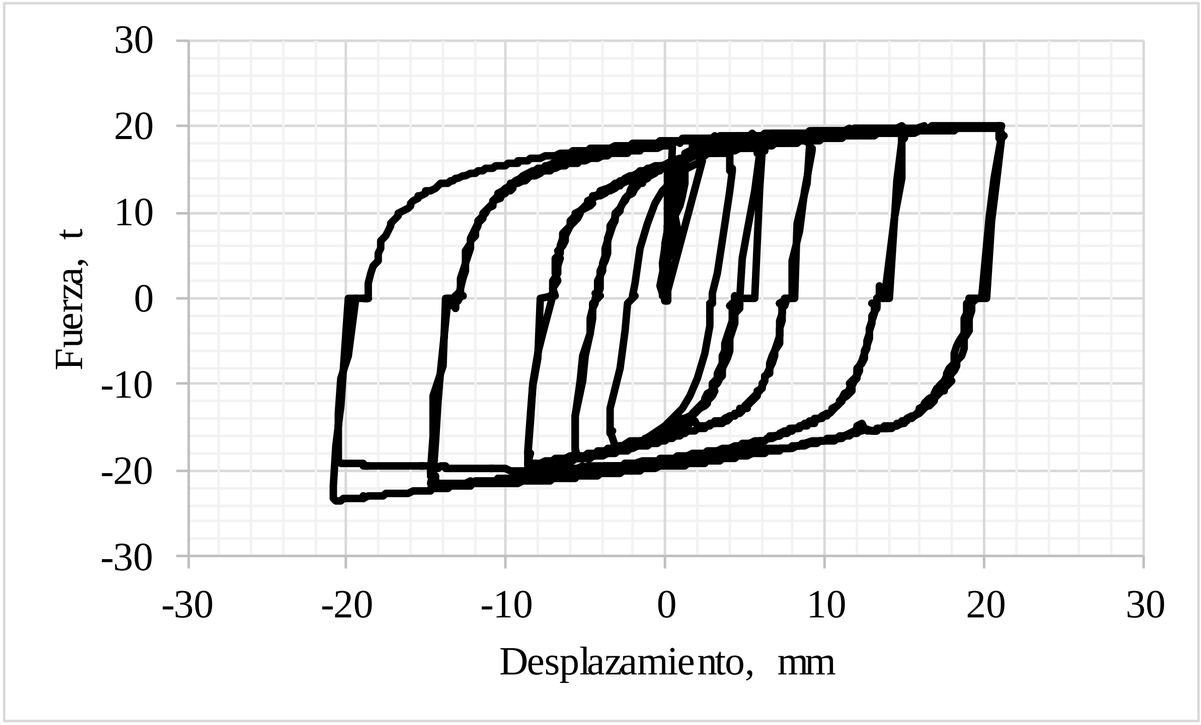

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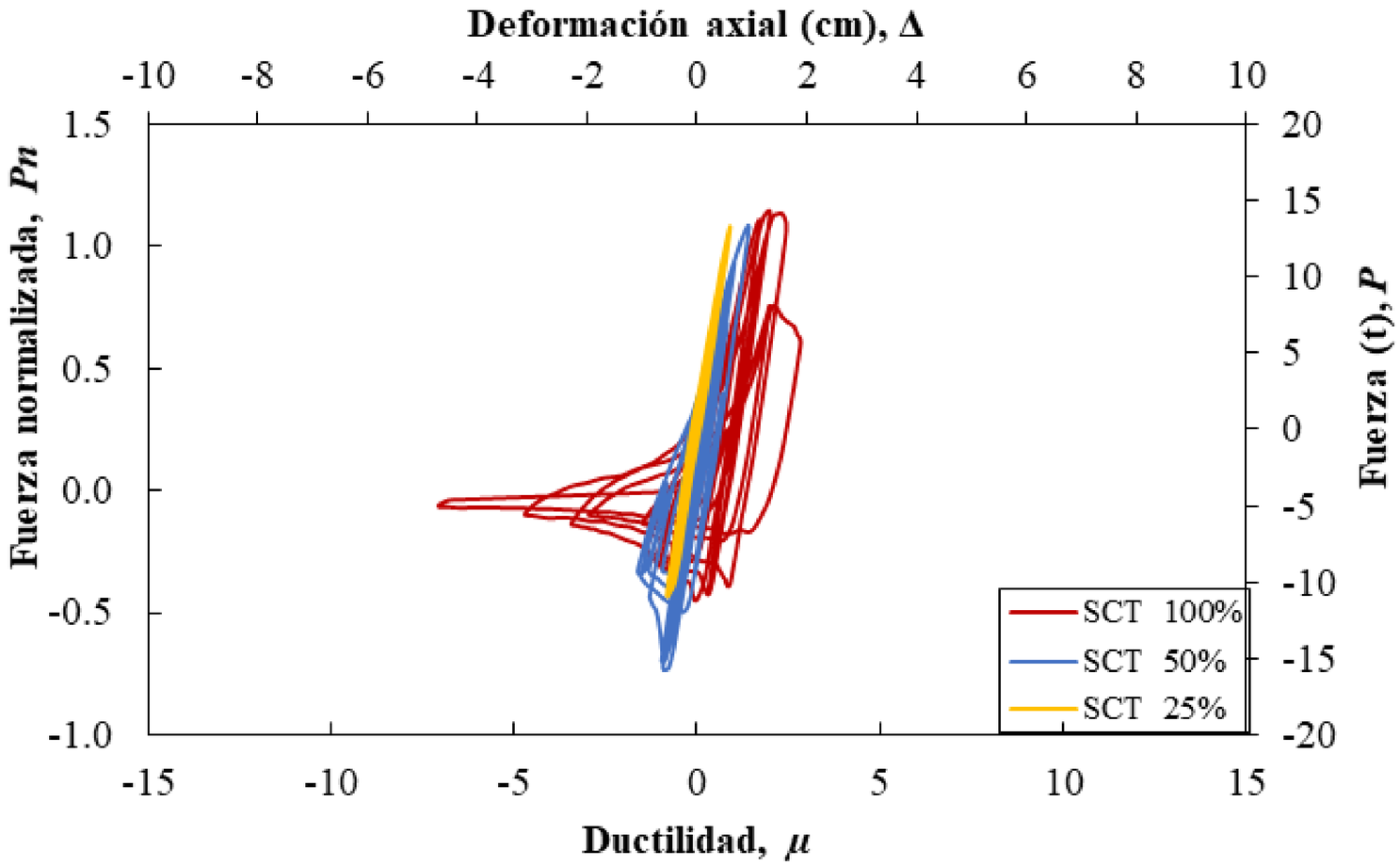

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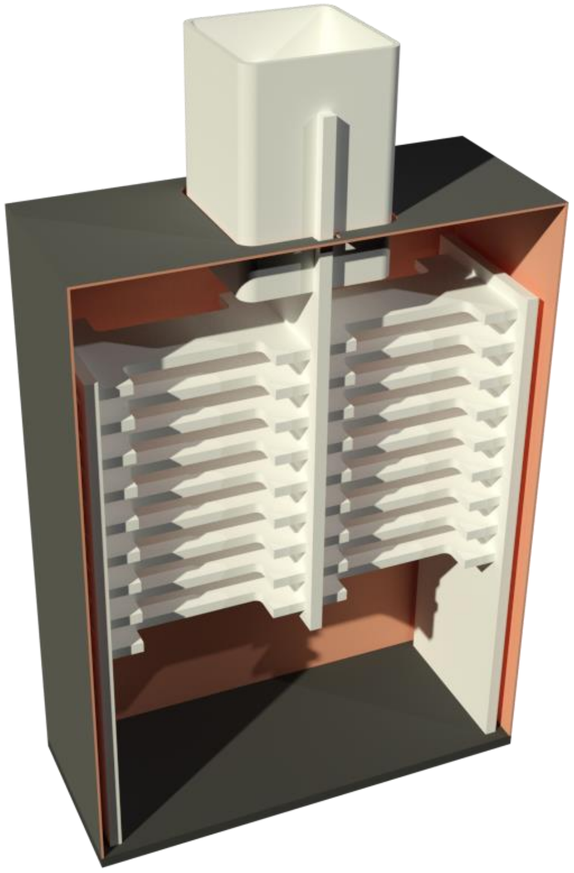

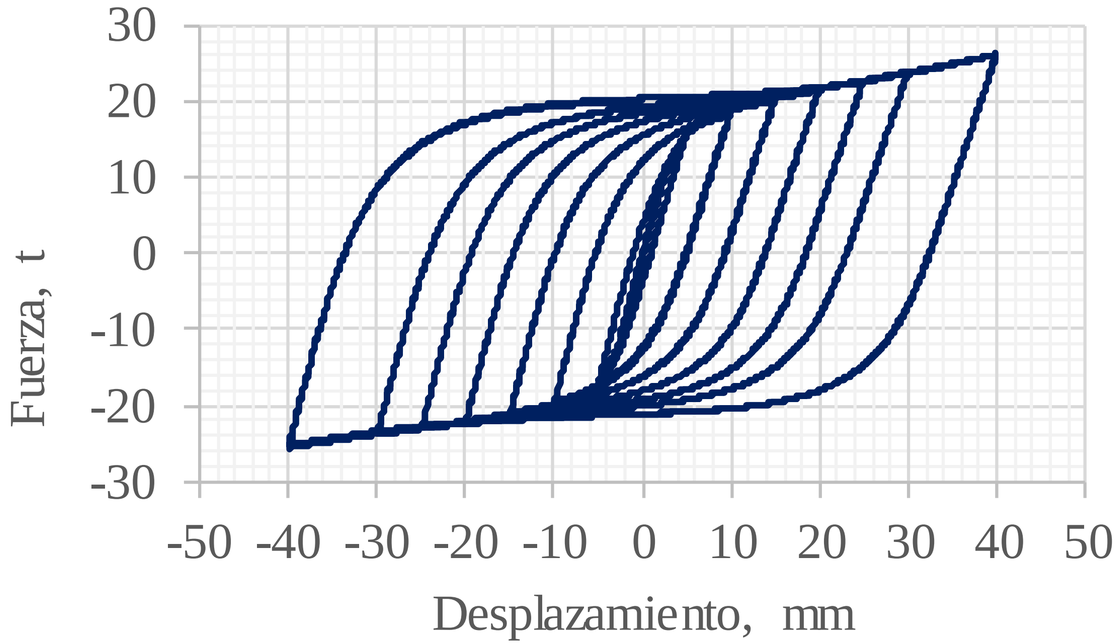

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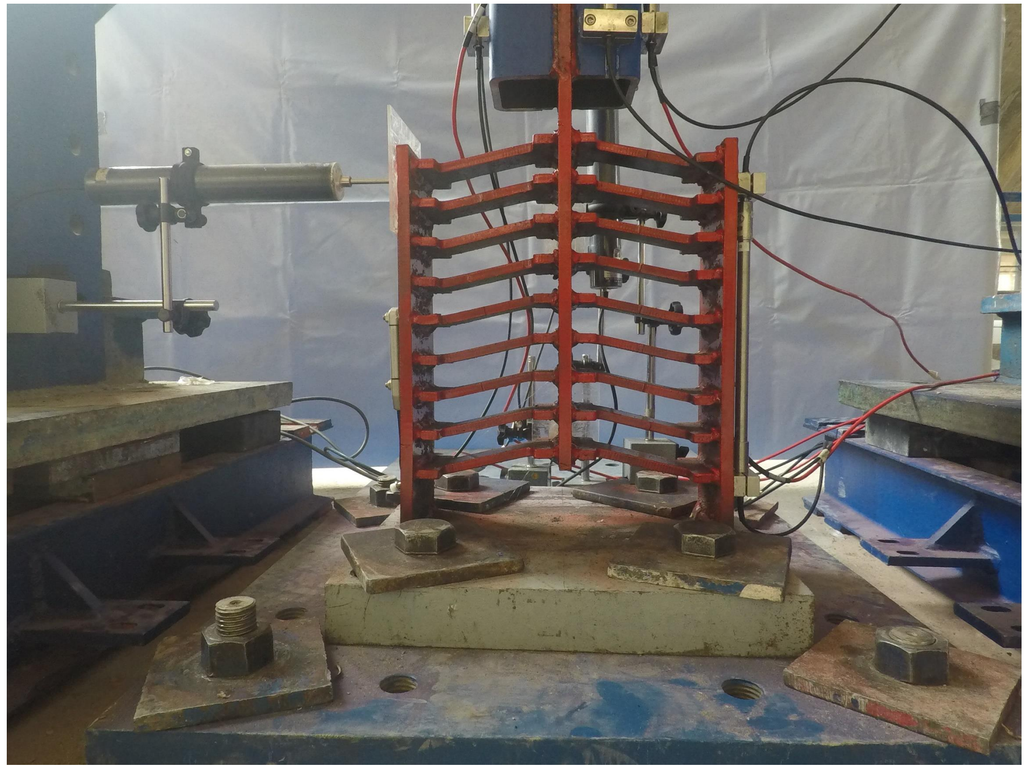

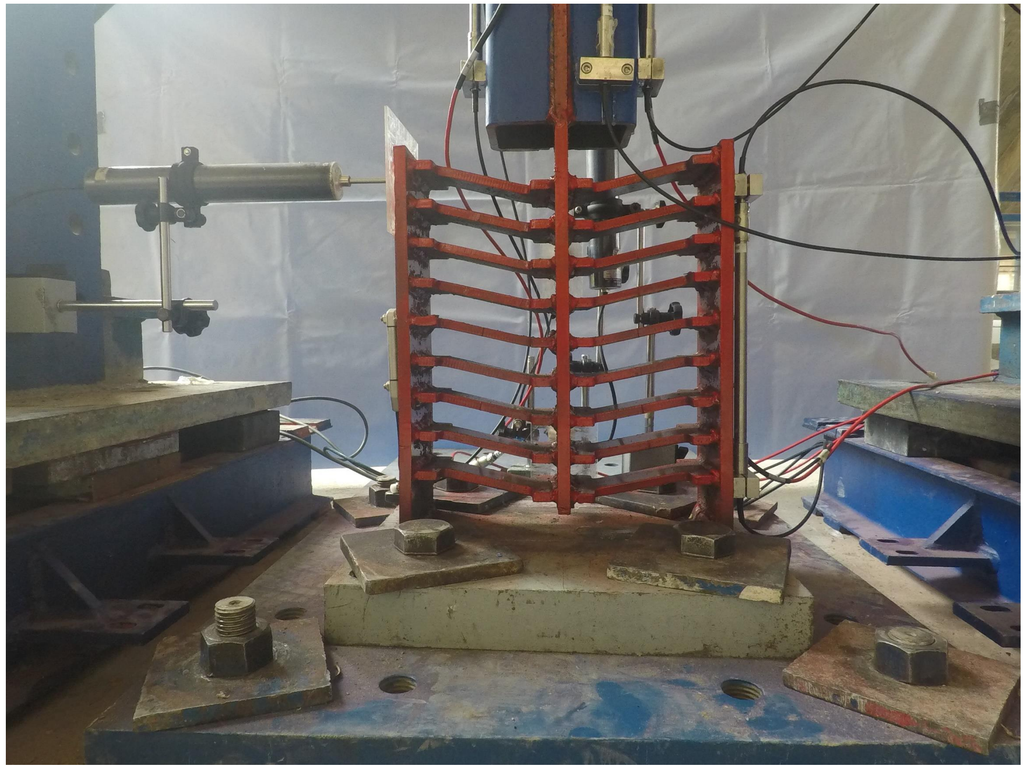

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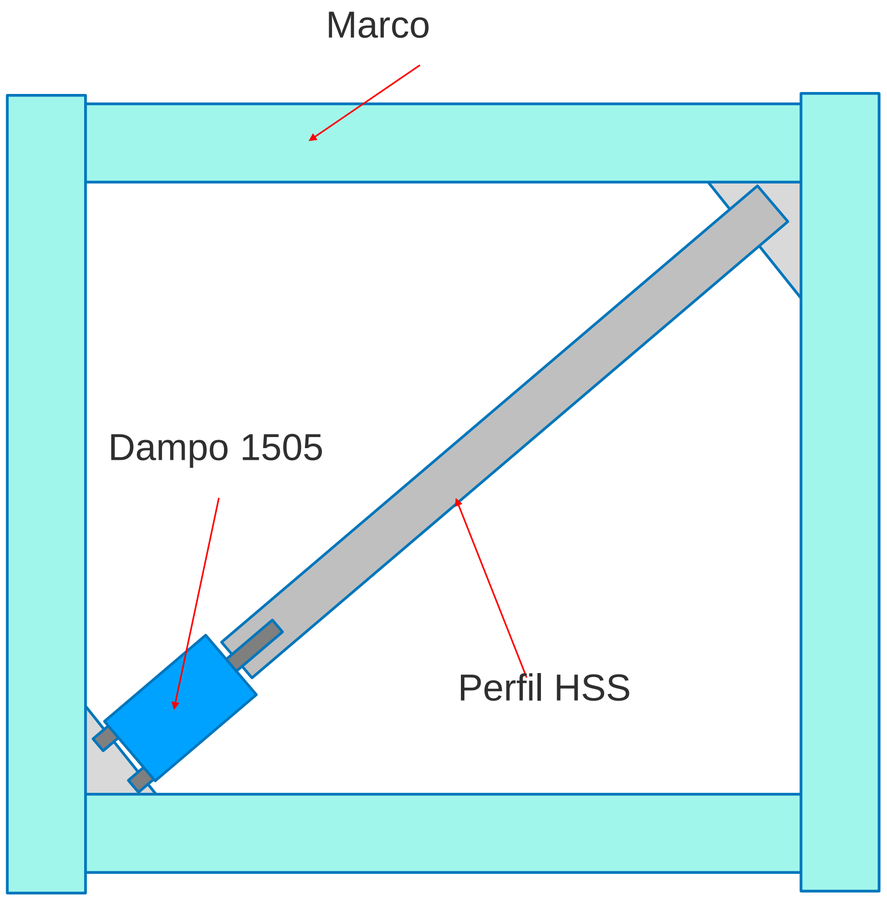
Experimentos



Conceptos básicos de los Contraventeos Restringidos al Pandeo

Estudios numéricos

Soil Dynamics and Earthquake Engineering 31 (2011) 478–490

Contents lists available at ScienceDirect

Soil Dynamics and Earthquake Engineering

journal homepage: www.elsevier.com/locate/soildyn

Comparative seismic performance of steel frames retrofitted with buckling-restrained braces through the application of Force-Based and Displacement-Based approaches

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ABSTRACT

This paper presents an analytical study aimed at evaluating the feasibility of using buckling-restrained braces as a retrofit scheme for existing multi-bay multi-story steel buildings. For that purpose, the seismic response of four two-dimensional frame models representative of typical steel buildings designed in a region of high seismicity was analyzed prior to and after including buckling-restrained braces as a retrofit strategy. The braces were designed following Force-Based and Displacement-Based approaches. The structural performance of the different versions of the frames was evaluated by subjecting each one to a set of twenty ground motions representative of the design earthquake with 10% exceedance probability in fifty years. It was observed that buckling-restrained braces allow for an efficient reduction in the peak drift demands in the retrofitted frames. However, since the beneficial effect of the braces cannot be fully controlled under a Force-Based design approach, it was concluded that a Displacement-Based design approach is the best option to achieve optimum structural performance.

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Estudios numéricos

Conclusiones:

- Los métodos basados en desplazamientos son mejores porque permiten un mejor control de las distorsiones de entrepiso y del daño.
- CRPs permiten mitigar desplazamientos residuales.

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Estudios numéricos

THE STRUCTURAL DESIGN OF TALL AND SPECIAL BUILDINGS
Struct. Design Tall Spec. Build. (2011)
Published online in Wiley Online Library (wileyonlinelibrary.com). DOI: 10.1002/tal.716

Comparative reliability of two 24-story braced buildings: traditional versus innovative

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SUMMARY

The seismic reliability of two 24-story buildings that have the same geometry and structural layout was evaluated and compared. The structural system of the first building consists of ductile steel braces and composite moment-resisting frames (traditional building). The structural system of the second building consists of nonductile flexible steel frames stiffened through a system of buckling-restrained braces (innovative building). Whereas the former was designed according to the Mexico City Building Code, the latter was designed according to a displacement-based methodology. Both buildings were assumed to be located at the same site in the lake zone of Mexico City. The study shows that in spite of being considerably lighter, the innovative building exhibits higher levels of reliability. Copyright © 2011 John Wiley & Sons, Ltd.

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Conclusiones:

La estructura equipada con CRPs :

- Redujo la cantidad de acero estructural a sólo el 40%.
- Presentó niveles de confiabilidad mayores.

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Estudios numéricos

Contents lists available at ScienceDirect

Engineering Structures

journal homepage: www.elsevier.com/locate/engstruct

Evaluation of the economic benefits of using Buckling-Restrained Braces in hospital structures located in very soft soils

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[b] Universidad Autónoma Metropolitana, Department of Materials, México City, Mexico
[c] Universidad Nacional Autónoma de México, Institute of Engineering, México City, Mexico

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Buckling-Restrained Braces (BRBs)
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Very soft soils
Lakebed zone of Mexico City
Economic benefits of BRBs

ABSTRACT

Since economic quantities are more meaningful to decision makers than dynamic response parameters, this paper examines the economic benefits of using Buckling-Restrained Braces (BRBs) in hospitals located in the very soft soils of the lakebed zone of Mexico City. Since non-structural elements and contents are far more expensive than the structure itself, they are included in detail in the analyses. The results of analyses on three-, six-, and nine-storey frames, which represent short-period structures, show that the expected (or probable) losses and lifecycle costs are smaller when structures are equipped with BRBs. Different cases (defined by the contribution of the BRBs to the strength capacity of the structure) were analysed and compared. The best design options were identified from a comparison of lifecycle costs. As an example, a comparison of cost-benefit analysis between a bare frame and a frame designed under gravity loads and equipped with BRBs, shows that the latter is more economical; because, for the same initial cost, the lifecycle costs are significantly smaller.

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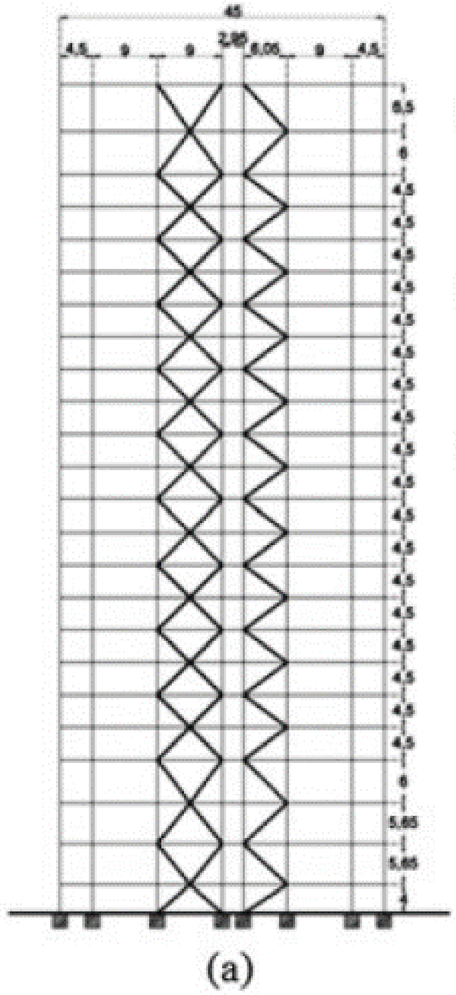
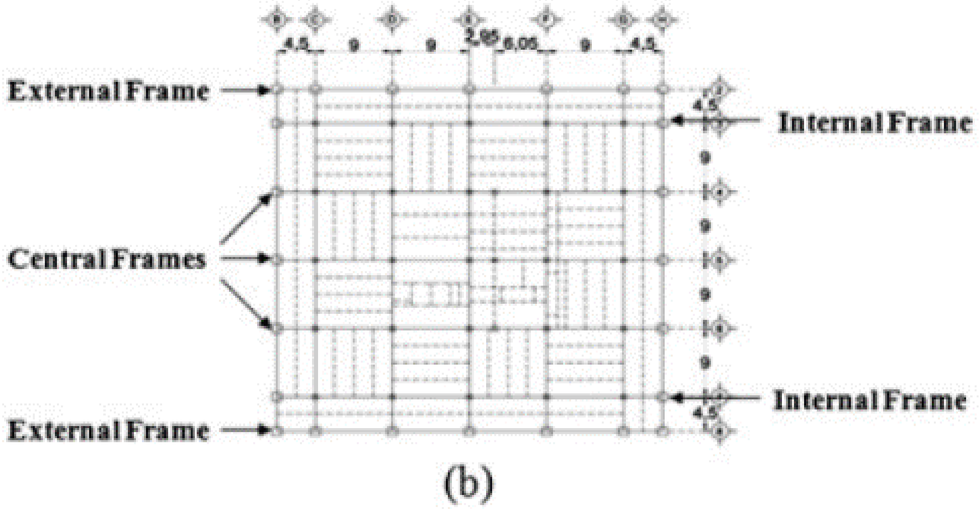
Ventajas





Ahorro de acero estructural: 60%

(Teran y Montiel, 2011)

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Aplicaciones

Conceptos básicos de los Contraventeos Restringidos al Pandeo

Reflexión:

- ¿qué esperamos?

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