The Eighth International Conference on
Structural Engineering, Mechanics and Computation

Research on structural robustness through large-scale testing

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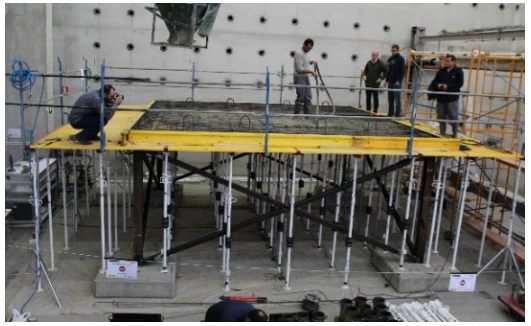
BUILDING RESILIENT

CALSENS

Research on structural robustness through large-scale testing

Outline

1	Robustness
2	Research at Building Resilient
3	Experimental campaigns
4	Endure project
5	Outcomes & application


Endure project

Research on structural robustness through large-scale testing

Endure project

Call	ERC Consolidator Grant 2020
Acronym	Endure
Title	Fuse-based segmentation design: Avoiding failure propagation in building structures
Budget	2.509.375 €
Where	ICITECH - UPV
When	2022-2026

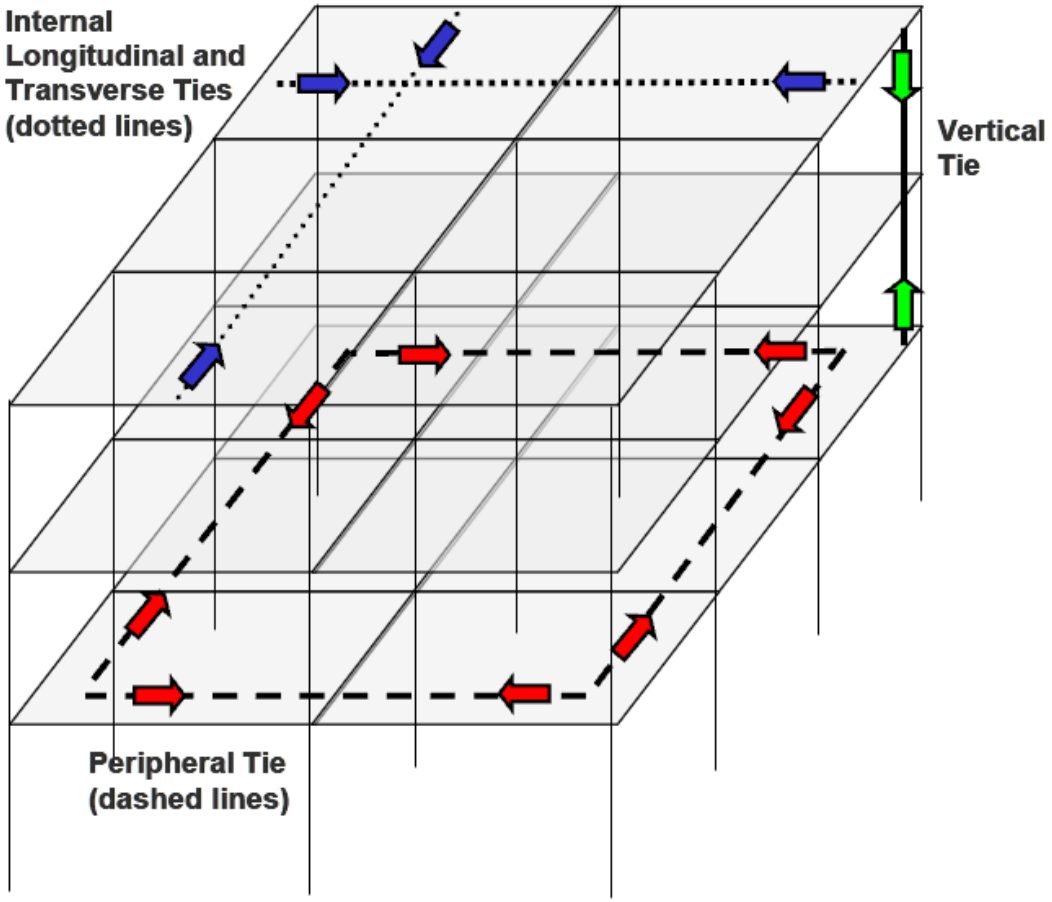
Endure

European Research Council
Established by the European Commission

Endure project – Current design philosophies

When a critical element fails ➔ Alternative Load Paths ➔ Continuity, redundancy and ductility

Effective in many extreme situations.



Endure project – Limitations of current codes

Design philosophies ineffective. Scenarios

Large initial failures:

Failure of several columns; Failure of o one or more bay slab(s)

Wide-span slabs:

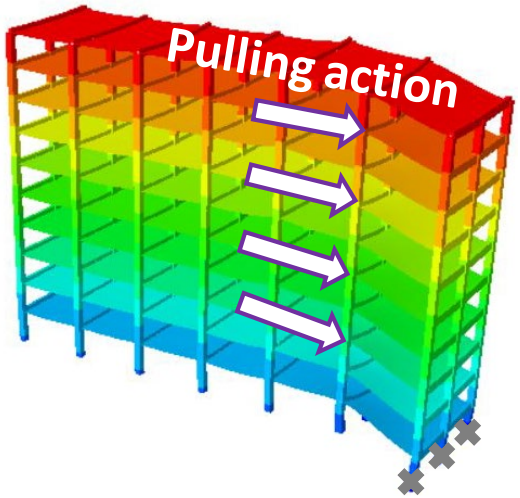
Precast construction; Posttensioned slabs; Composite floors

Continuity

Increases risk of progressive collapse

Local failure pulls the other zones

New research is necessary



Endure project – Overall aim

To develop a novel fuse-based segmentation design approach to arrest the propagation of failures in building structures

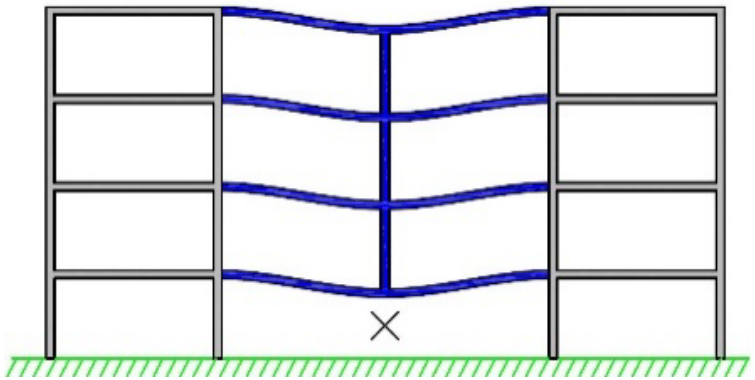
Analogy

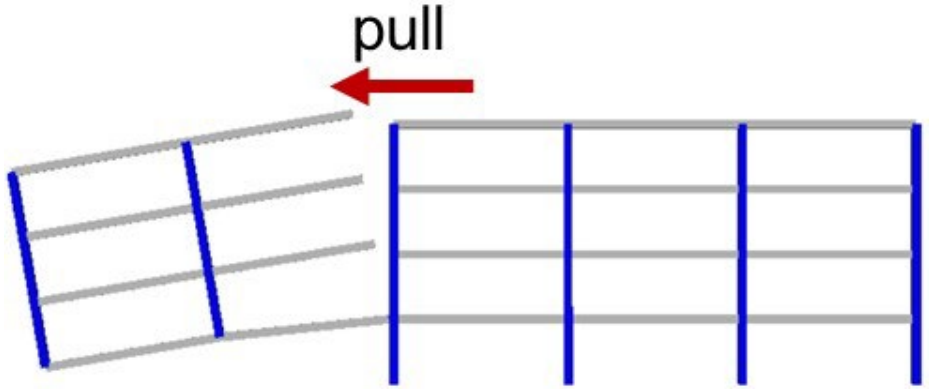
⇨ Electrical networks

Use of fuses

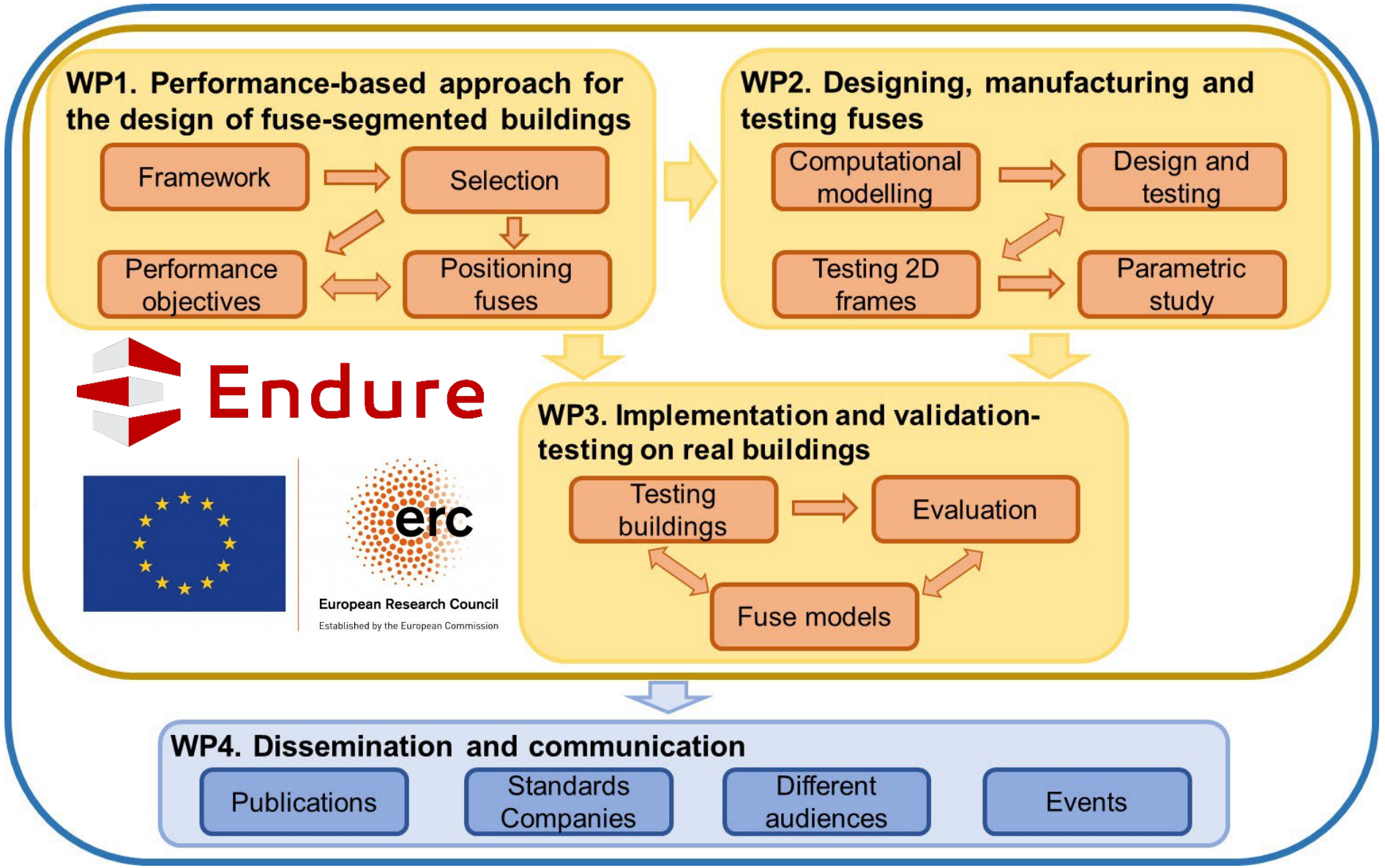
⇨ Continuity for normal loads or small initial failures (codes)

⇨ Separate building segments when failure propagation is inevitable





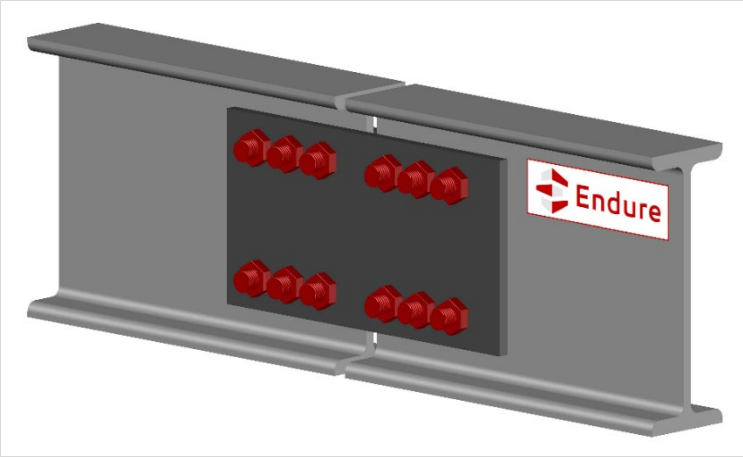
Endure project – Research plan

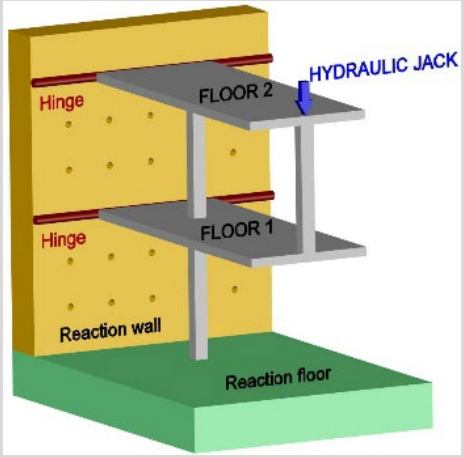


Endure project – Experimental campaigns

WP2. Designing, manufacturing and testing fuses

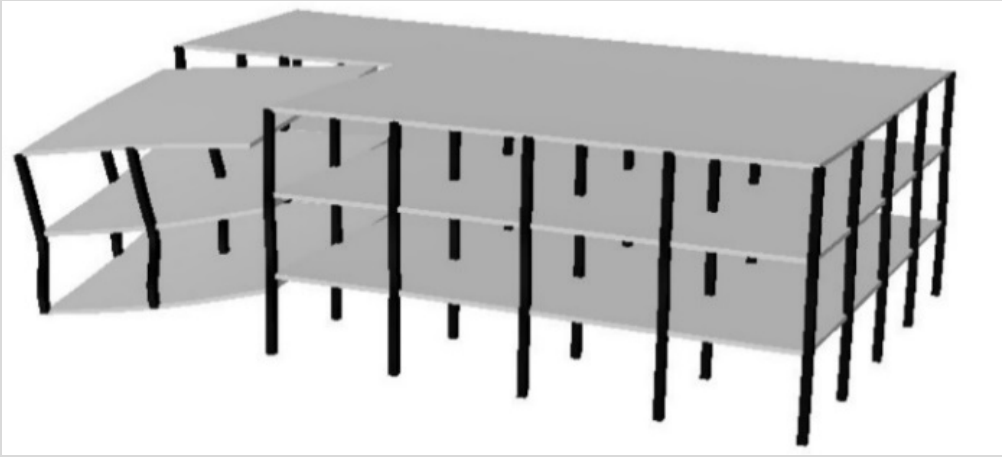
- Computational modelling → Design and testing
- Testing 2D frames → Parametric study



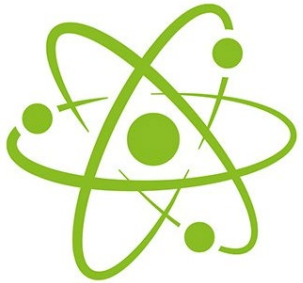


WP3. Implementation and validation-testing on real buildings

- Testing buildings → Evaluation
- Fuse models

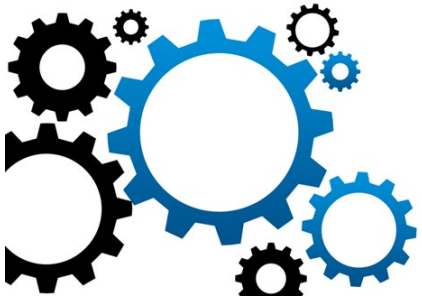


Endure project – Impact



Science

Open up a new research area



Technology

New design philosophy
New patent development channels
New construction procedures

Society

Safer buildings and saving of lives