“DISSIPABLE”

Title: **DISSIPABLE – Fully dissipative and easily repairable devices for resilient buildings with composite steel-concrete structures**
Fund: Research Fund for Coal and Steel (RFCS-2017)
Partners: Politecnico di Milano (Italy), Instituto Superior Técnico (Portugal), National Technical University of Athens (Greece), D. Sofras – Masina Team SA (Greece), Universita degli studi di Trento (Italy), Rheinisch-Westfälische Technische Hochschule Aachen (Germany), Rina Consulting – Centro Sviluppo Materiali SPA (Italy), Universita di Pisa (Italy)
Research group (NTUA): I. Vayas , D. Vamvatsikos, P. Thanopoulos, K. Papavasileiou
Duration: 01/06/18 - 31/05/21
Budget: 1,814,811.65 €

Summary

Anti-seismic devices previously designed and characterized within RFCS Projects by the project partners will be further developed taking into account the experience collected so far. Optimized structural systems will be proposed, with improved dissipation, reliability and reparability features. Single storey buildings with seismic resistance provided by the improved devices will be built and subjected to strong earthquakes. Systematic post-earthquake repair and reassembly procedures for these buildings applied and provided as “instructions for use”. Ability of repaired systems to resist strong earthquakes will be examined. Economic and environmental benefits and improved resiliency properties of the proposed systems will be quantified.

Description

The following systems will be investigated during DISSIPABLE:
DRD type 1 is a new version of INERD™ pin-device:
In order to improve the behaviour of the connection, appropriate spacers are introduced between the eye-bar plates that would not interfere with the mounting of the system, but will prevent bending of the plates. In addition, stainless steel (SS) and high-strength steel (HSS) will be applied to the pin element and/or the plates, exploiting the enhanced strain hardening behaviour available from austenitic stainless-steel grades, able to extend cyclic resistance and limit bearing deformations. Moreover, measures are proposed to improve the replaceability of the pins, as well as to enhance the re-centring capabilities of the system.

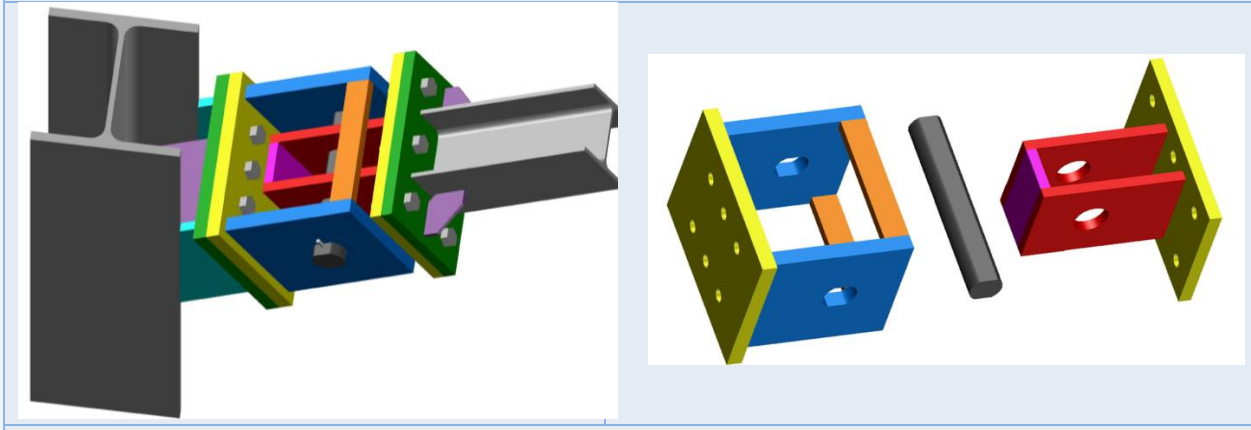

Fig. 1: Proposed modifications to the INERD™ pin devices (DRD1)

DRD type 2 is a new version of the FUSEIS-1 devices:

With increasing floor numbers in a steel frame, the original FUSEIS-1 system becomes too flexible, behaving more or less like a shear wall. As a result, a modification/extension of the FUSEIS-1 beam device is proposed in order to stiffen the structure by rigidly connecting two systems together every 4-5 storeys with storey-high trusses.

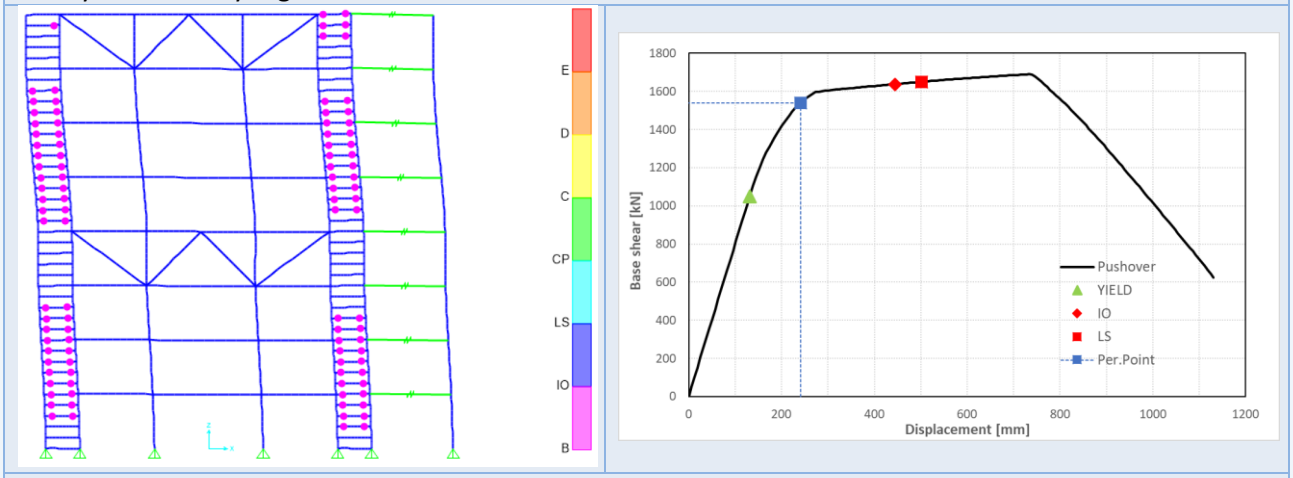

Fig. 2: Initial analysis results for the DRD2 system

DRD type 3 is a new version of the FUSEIS-2 devices:

Some aspects of this system require more investigations in order to further validate it, following the FUSEIS project. In particular, its functionality needs to be validated on a 3D steel-concrete frame model.