

## WP1 – BE and SUOD: State of the Art (SoA), risks and human behavior

**T1.2 – SoA of earthquake (SUOD) impact on BE and related earthquake-induced modifications due to building/aggregate and aggregate/public spaces interfering conditions. Current risk-reduction strategies analysis. Definition of human behavior including crowding conditions by combining SoA data and real-world events analysis**

### D1.2.5 – HUMAN BEHAVIORS IN BE DURING EARTHQUAKES

**ABSTRACT.** The Built Environment (BE) earthquake risk assessment and planning do not consider human behaviors and their interactions with other individuals and with the BE (and its damages) as influencing elements for exposed community's safety. Meanwhile, the development of evacuation software to support these actions limitedly considers investigations about these aspects. Nevertheless, previous (limited) works (on limited samples) underline the importance of understanding behaviors to manage risks in the BE.

Starting from a complete state of the art on quantitative and qualitative methods for earthquake evacuation analysis, this work proposes **an innovative and complete database for earthquake evacuation models** according to literature suggestions, by integrating previous results with new analysis on a wide number of videotapes concerning real events from all over the World. **Human behaviors (qualitative aspects)** analysis are codified in respect to emergency stages, by underlining the evacuation process response from the building (indoor) to the Open Spaces in the BE, and by evidencing behaviors common with other emergencies and those typical of earthquakes. **Motion quantities** (i.e. individuals' speed) are investigated, confirming how people prefer moving with an average speed of about 2 to 3m/s (significantly higher than other kinds of evacuation, e.g. fire), especially in the first emergency moments and while being near to buildings and debris. Finally, fundamental diagrams of pedestrians' dynamics in earthquake emergency conditions are traced for indoor conditions confirming previous works results and suggesting that evacuation models (and their validation) should be based on earthquake-related data rather than general purposes ones.

