INNOVATIONS OF THE HAYWIRED SCENARIO

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ABSTRACT

The earthquake scenario’s name, HayWired, refers to the rupture of the Hayward Fault and speaks to the potential disruption to our wired and wireless world. More generally, “wired” represents interconnectedness at many levels— in the seismicity evidenced by afterslip and aftershocks, interdependencies of lifelines, social connectivity through technology and within communities, and ripple effects of damages and disruption throughout an economy, encompassing the modern digital economy.

HayWired presents various engineering innovations by explaining why using a conventional map of median ground shaking for a disaster planning scenario tends to under-predict damage; leveraging the time histories of the physics-based earthquake ground motions to analyze tall building performance; including liquefaction, landslide, aftershock, and fire hazards in damage assessments; examining the International Building Code's seismic performance objectives for new buildings, exploring the tradeoffs between greater strength and higher cost of new buildings, and public preferences for that tradeoff; offering a new urban search and rescue model of extrication demand from stalled elevators and collapsed buildings; offering a new non-proprietary, non-black-box model of water network resilience for an earthquake sequence, lifeline interaction, resource limitations, and service restoration; developing visualizations of multiple co-located lifelines exposed to multiple hazards; and quantifying the benefits of earthquake early warning (EEW) coupled with drop, cover, and hold on actions.

HayWired delves deeper into the social and economic impacts by considering population displacement from hazards and exacerbated by socioeconomic factors and community constraints on recovery; addressing relationships between workplaces and homes; tackling voice/data

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infrastructure vulnerabilities and service restoration; examining the role of technology in mitigating or exacerbating economic effects and testing for sensitivity to productivity and migration assumptions; and highlighting potential societal benefits of EEW.

The HayWired coalition involves State of California and San Francisco Bay region partners, representing agencies and experts in lifelines, engineering, local government, public health, business, and emergency management. Prior to April 2018 the coalition is embracing three goals to (1) improve the communication and use of earthquake-hazard science in decision making, (2) advance basic knowledge of earthquake risks and to inform actions to reduce earthquake risks, and (3) help build community capacity to respond to and recover from earthquakes. Through a collaborative and intensive series of workshops and user-engagement activities, scenario researchers and potential users of the information are building on the Bay Area’s foundation of earthquake preparedness, to further enhance earthquake- and disaster-resilience planning, policy, and action across the region.