Appendix E.

Supplementary Rockfall Simulation Data

Description:

The accompanying PDF provides 2D and 3D holographic rockfall results and graphs for each area of interest (source zones 1,2 and 3).

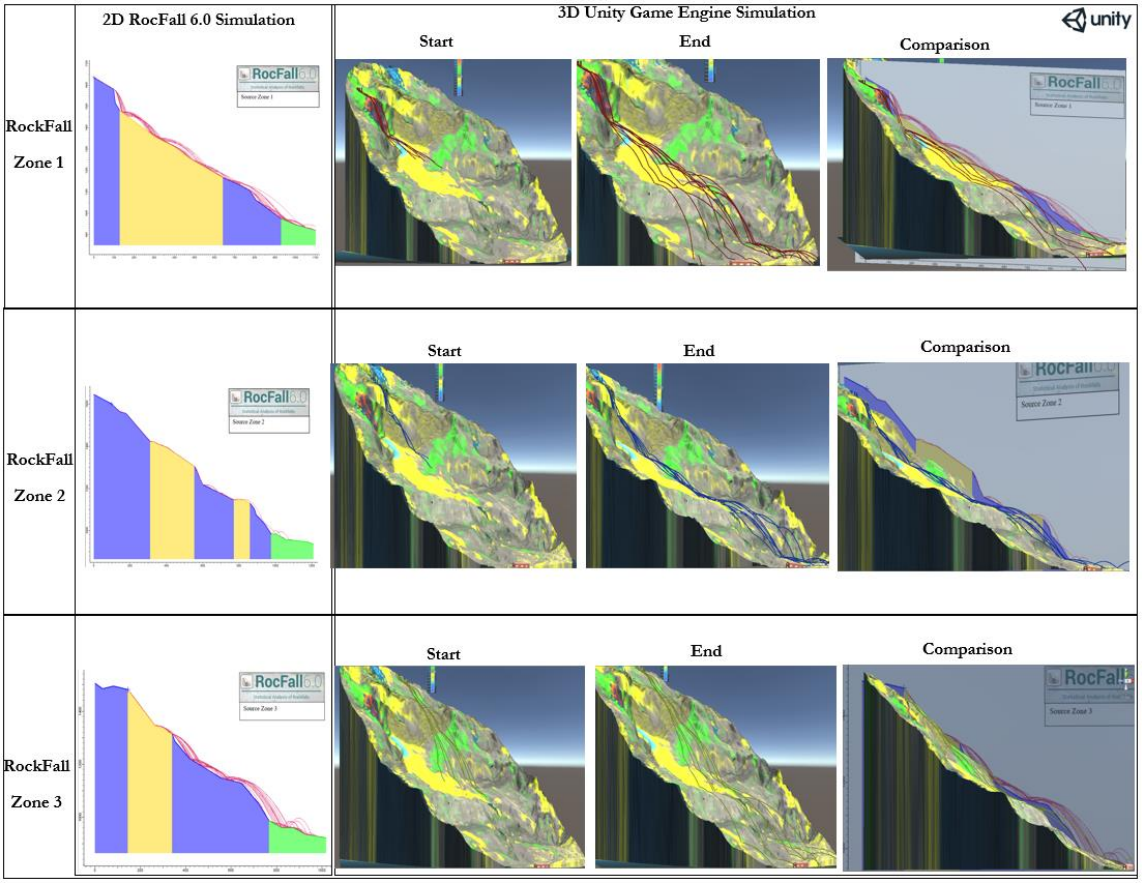

Figure E 1. **Rockfall comparative analysis for the Jure Landslide for rockfall source zone 1, 2, and 3 both with 2D RocFall 6.0 (Rocscience, 2018i) and 3D holographic rockfall modelling application within Unity (Unity Technologies, 2019). When comparing the bounce height, generally 3D modelling will calculate higher bounce heights (thus total kinetic energies) than 2D. This is noted in all three simulations, especially at locations of loose talus (yellow/tan), where 2D shows the rocks slide/roll, and the 3D physics engine in Unity calculates bounces, which is more realistic with undulating/rugged topography in these areas.**

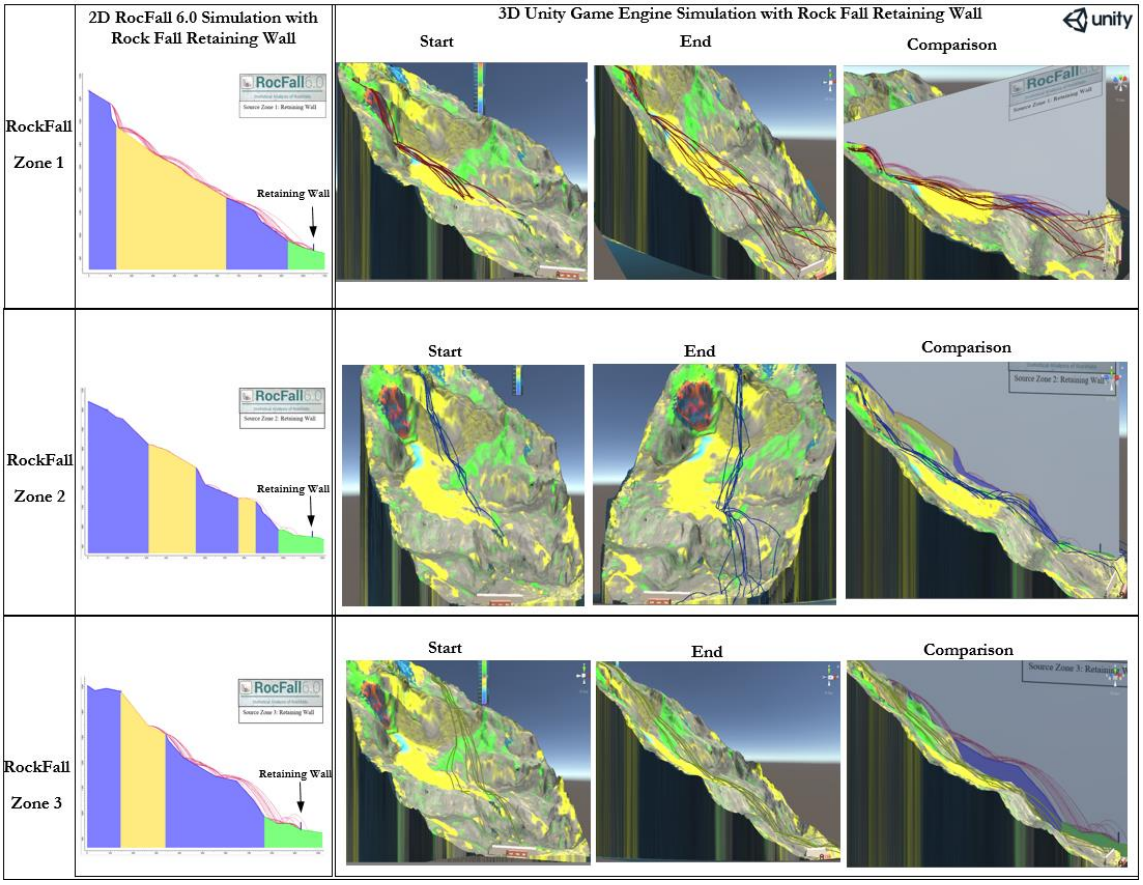

Figure E 2. **Rockfall comparative analysis for the Jure Landslide for rockfall source zone 1, 2, and 3 with rock-filled gabion both with 2D RocFall 6.0 (Rocscience, 2018i) and 3D holographic rockfall modelling application within Unity (Unity Technologies, 2019). The retaining wall has been added into the simulation to visualize and communicate the effects of adding a low cost mitigation rock fall structure to protect the Arniko highway. This demonstrates how this new virtual holographic rockfall modelling technique, as one part of a larger Jure Landslide geodatabase, can advance the method that rockfall identification, modelling, and mitigation are conducted and communicated to various stakeholders including academia, government, consulting clients, and communities living in potentially hazardous areas.**

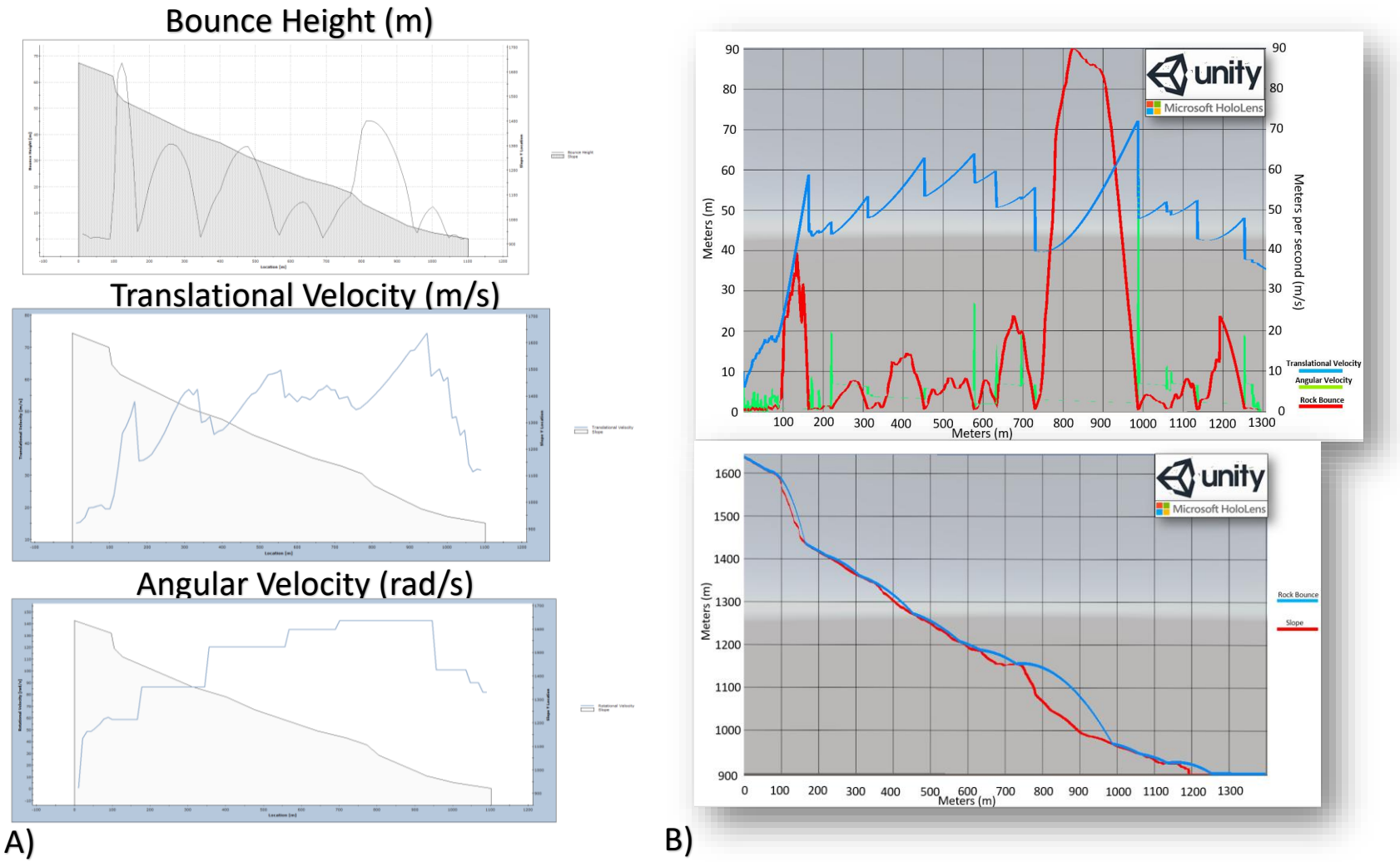

Figure E 3. **Jure Landslide rockfall modelling comparative analysis, validating the holographic rockfall modelling application with 2D RockFall 6.0 (Rocscience, 2018i). Example of source zone 1 bounce height, translational velocity, and angular velocity for A) 2D RockFall 6.0 (Rocscience, 2018i) and B) Holographic rockfall modelling application. When comparing results at each source zone location between the 2D RocFall 6.0 (Rocscience, 2018i) and the 3D holographic rockfall simulation, it appears that the holographic rockfall modelling calculates slightly higher magnitude bounce height (~10 m) and translational velocity (~5 m/s), with a lower rotational velocity (~35 rad/s).**