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A pseudo-3D rock fall scenario and risk assessment model – case study of Danfon site, Taipei

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Risk assessment of rock fall is a complex issue owing to its uncertainty in many aspects, including the time of initiation, the path of falling rock, the impact energy, etc. However, the risk assessment model can be constructed with scenario simulation and loss estimation. The study adopted a 2-D rock simulation program – Rocfall to generate the path, velocity and energy of rock fall. The digital elevation model and slope profile are derived from aerial photos, aero LiDAR and ground based LiDAR. The ground based LiDAR and field investigation provides the dimension of rock particle susceptible to fall and ground conditions for particle to rebound. The falling paths and locations of deposition are divided into cells to calculate impact frequency and provide information to establish risk assessment model. The risk assessment model is based on potential and frequency of rock fall resulting from the rock fall simulation. Loss of the potential area is assessed based on the affected buildings, residences, and traffic conditions. The risk assessment model established can provide suggestions to related agency for strategy and mitigation of potential hazardous area.