Getting started easily!

Powerful and fast computations (1 million of blocks and more!)

User friendly 3D visualization!

Integrated analysis and statistical tools!

Help to build risk maps!

Positioning and dimensioning of protection works!

Export of results to GIS!

* Version 5.1, compatible Windows XP (service pack 3), Vista, Seven and Windows 8 (32 and 64 bits)

www.rocpro3d.com
Physical model
- Choice of a rigid block (integration of the block mass and rotation in the computation) or a lumped-mass formulation

Rolling/sliding kinematics
- Frictional rolling (rigid block) or frictional sliding (lumped-mass) model, integrated numerically onto the DTM using a stable and accurate algorithm

Impact physical model
- Effects of block rotation (rigid block)
- Standard (constant) or velocity dependent $R_n$

Choice of the computation mode
- Deterministic mode
- Probabilistic mode, with choice of equiprobable or Gaussian variables

Creating the mesh points
- By import of point files (DXF, TXT, CSV, DEM format), level curve files (DXF format). The mapping of images is possible
- By level curves digitization of a scanned map, as RocPro3D handles irregular triangular meshes
- By input of a 2D profile of points (X, Z), to which a width (Y) is then added

Building the mesh
- By Delaunay triangulation, or by grid triangulation for DTM with regularly spaced points
- By import of any triangular mesh (PLY, 3DS, STL format)

Mapping of soils onto the DTM
- Easy mapping of the soils onto the DTM thanks to multi-modes selection of faces: selection by individual faces, by zones, by ranges (altitude, dip, etc.)

Physical parameters of soils
- In an intuitive dialog box, each soil parameter (energy restitution coefficients, rolling/sliding coefficient, limit velocities and angles for transition phases, and associated uncertainties) can be easily modified. To make use even easier, RocPro3D provides 6 predefined soil types
Block sources
- Creation of linear or surface sources
- No limit on the number of sources
- Specification of block settings (number, density, shape, size, starting conditions, associated uncertainties)

Choice of the computation strategy
- Classical computation, with display of trajectories, easily achievable up to 20,000 blocks
- Massive computation, without limit on the number of computed blocks (1 million, even more), allowing an analysis with maps of parameters and with protections statistics

For increased performances, computations can be run in parallel on all your computer cores (the computation time is approximately divided by the number of processors)

ANALYZING RESULTS

RocPro3D provides four main interactive and flexible views, allowing to analyze the results:
- The 2D and 3D views, with data at each impact point (XYZ coordinates, soil, angles and velocity before and after rebound)
- The vertical profile view along the block trajectories and the protection works, providing the energy and height of the blocks
- The graphs and histograms view for statistical analysis

TRAJECTORIES

Display of trajectories
- Display of trajectories in the 2D and 3D views
- Display of trajectories along a vertical profile, with representation of the DTM, the soils and the protections
- Possibility to select displayed trajectories (single or all, flying above the protection, etc.)

Analysis tools
- Colouring of trajectories according to the parameter variation (block energy, velocity, height or travel time)
- Diagram of the evolution of energy, velocity, height and travel time along the trajectory
- Export of computed data
Available maps
- Energy
- Energy-class (risk map)
- Height
- Velocity and travel time
- Trajectories density
- Impacts and stopping points

Grid settings
- Specification of the cell number and dimension

Statistical parameters of maps
- Choice of the parameter analysed in each cell: maximum, mean, confidence limit (%), quantile (%), normality (test allowing to assess if the population of the cells follows a normal law, and consequently if the mean or confidence limit are meaningful)

Statistical analysis of cells
- For each cell, analysis of the mean, standard deviation and median, with histogram and associated cumulated frequency curves

Creation
- Possibility to create **fictitious** protections (data collectors), **nets** or **embankments**
- No limit on the number of protections

Impacts of blocks in the protection
- Display of impacts in the protection, with corresponding energy, velocity, height and travel time (color scale)

Statistical analysis (energy, velocity, height, travel time of blocks)
- For each protection, computation of impacts statistics (mean, max, confidence level, quantiles, Kolmogorov-Smirnov test) and display of the histogram and cumulated frequency curves
- Possibility to refine the statistical analysis by applying filters on the protection data (source, section, impact type)