

INTERREG III – ALCOTRA - Projet n° 023



ACTION A BASIC DESCRIPTION OF THE FIELDS OF THE DATA BASE

1. VALLEY WALL

| <i>Field name</i> | <i>Basic description</i> | <i>Type</i> |
|--------------------------------------|---|-------------|
| Name | Name of the homogenous valley wall, in which one or several rock falls occurred | text |
| GEOMETRY | | |
| Zmax, Zmin | Maximal and minimal elevations of the valley wall (m or degree) | integer |
| X1, Y1 | Coordinates of the upper left corner of the valley wall (m or degree) | real |
| X2, Y2 | Coordinates of the upper right corner of the valley wall (m or degree) | real |
| X3, Y3 | Coordinates of the lower right corner of the valley wall (m or degree) | real |
| X4, Y4 | Coordinates of the lower left corner of the valley wall (m or degree) | real |
| Projection system / datum | Coordinates system (WGS84 is preferred) | look up |
| MORPHOLOGY | | |
| Morphology description | Slope angle, aspect, ... | memo |
| Overall stability of the slope | Is the whole valley wall moving? What velocity (cm/year)? | memo |
| CLIMATOLOGY | | |
| Annual rainfall | Mean annual rainfall (mm) | integer |
| Annual temperature | Mean annual temperature (°C) | real |
| Data source and climatic remarks | Name of the climatic station and distance from the rock fall (horizontally and vertically), measurement period, ... | memo |
| HYDROLOGY AND SEISMS | | |
| Spring | Presence of spring(s) in the valley wall | boolean |
| Seepage | Seepage in the valley wall | boolean |
| Type of permeability | Type of permeability of the rock mass (fissural, karstic, porosity) | look up |
| Proximity of an active seismic fault | | boolean |
| PGA475 | Peak Ground Acceleration with 475 year return period (g unit) | text |
| Hydrological and seisms setting | e. g. discharge of springs and torrents, name and distance of the active seismic fault | memo |
| GEOLOGY | | |
| Tectonic unit | Tectonic unit according to Schmid et al. (2004) | look up |
| Stratigraphy | | memo |
| Lithology | | look up |

2. ROCK FALL (contains basic information on the event)

| <i>Field name</i> | <i>Basic description</i> | <i>Type</i> |
|-------------------------------------|---|-------------|
| Ordinary name | Ordinary name of the rock fall | text |
| Present hazard | Present hazard means that the description does not concern an occurred rock fall, but a potential one | boolean |
| GENERALITIES | | |
| Responsible | Responsible of the data | look up |
| Update | | date |
| Appreciation | Appreciation on the quality of the information | look up |
| Other names | Other names of the rock fall | memo |
| <i>Location</i> | | |
| Municipality | Municipality where the major part of the scar is located | text |
| Administrative subdivision | Département (F), Region (I), Canton (CH) | look up |
| Country | | look up |
| <i>Centroid of scarp</i> | | |
| X, Y, Z | Coordinates of the centroid of the scarp (m or degree) | real |
| Projection / datum | Coordinates system | look up |
| Valley wall | valley wall where the rock fall took place | look up |
| <i>Date</i> | | |
| Century | | text |
| Year | | integer |
| Month | | integer |
| Day | | integer |
| Hour | | integer |
| Minute | | integer |
| Duration | Duration in decimal hour | integer |
| Dating | Dating (for Holocene or Pleistocène rock falls) | boolean |
| Comment on date or dating | e.g. what method was used for dating, dated material, lab code, results and their significance (true age, min/max, ...) | memo |
| VOLUME | | |
| Initial volume | Volume of the rock mass before the movement (with the uncertainty) | long int |
| Volume of deposit | Volume of the deposit (with the uncertainty) | long int |
| Remarks on volumes | | memo |
| EFFECTS | | |
| Fatalities | Number of deaths | long int |
| Value | Cost of damages (euros) | real |
| About the evaluation | Comment on the evaluation | memo |
| Valley dam | Did the rock fall dam the valley ? | boolean |
| Effect | Lake, alluvium filling, stream diversion | look up |
| Dam failure | Did the rock fall dam fail ? | boolean |
| Comment | e.g. date and effects of dam failure | memo |
| Secondary effects | | memo |
| Residual activities | | memo |
| REFERENCES AND OTHER REMARKS | | |
| ID | Identification number of the rock fall in different inventories | text |
| References | Bibliographic references | memo |
| Maps | Existing maps of the rock fall | memo |
| Remarks | Remarks about the information sources | memo |

3. INITIAL SLOPE

| <i>Name</i> | <i>Basic description</i> | <i>Type</i> |
|---|--|-------------|
| GENERALITIES | | |
| <i>Topographical data before failure</i> | | |
| Existing maps before failure | | boolean |
| DTM of initial slope | | boolean |
| Comment on maps, DTM and other remarks | e.g. morphology of the slope or the valley before the rock fall | memo |
| PROFILE | | |
| Segment code | The slope profile is divided in segments (from top to bottom), each defined by two points (top and toe) | text |
| <i>Segment top</i> | | |
| X1, Z1 | Coordinates of the segment top (m) | integer |
| <i>Segment toe</i> | | |
| X2, Z2 | Coordinates of the segment toe (m) | integer |
| Segment aspect | Aspect of the slope segment, counted clockwise from north (°) | integer |
| Substratum lithology | | look up |
| Superficial deposit | Material over the substratum (alluvium, glacier, undistinguished deposits, no cover, scree, rock fall deposit, till) | look up |
| Water presence | Type of water (snow, lake, wet, moist, dry) | look up |
| Vegetation | Bush, forest, grass, grass and forest, moss, no, nude | look up |
| Hydrology, facies, morphology and other remarks | | memo |

4. DISCONTINUITIES

| <i>Name</i> | <i>Basic description</i> | <i>Type</i> |
|------------------------|--|-------------|
| Code | Code of the discontinuity set | text |
| CHARACTERISTICS | | |
| <i>Generalities</i> | | |
| Taking part in failure | | boolean |
| Plane of failure | | boolean |
| Open | Joints are generally open in the rock mass | boolean |
| Weathering | | boolean |
| Monitoring | One or several joints of the set were (or are) monitored | boolean |
| Position | Position in the scar (basal slip surface, lateral shear plane, rear tension crack) | look up |
| Discontinuity type | Bedding plane, fault, joint, other, schistosity/foliation | look up |
| Lithology | | look up |
| Infilling | Cemented (quartz, calcite, ...), clay, loose material, other, no | look up |
| <i>Geometry</i> | | |
| Dip direction | Dip direction, counted clockwise from the north | integer |
| Dip | Dip (from the horizontal plane) | integer |
| Spacing | Spacing between the joints of the set (measured perpendicularly to the joints) | real |
| Extension | Extension (length) of the joints of the set | real |
| Roughness | Barton's JRC (Joint Roughness Coefficient) at the scale of 10 cm | integer |
| Ondulation | Barton's JRC (Joint Roughness Coefficient) at the scale of 10 m | integer |
| Opening | Free distance between the two rock surfaces of a joint | real |
| Cluster | The joints of the family are locally concentrated in clusters | boolean |
| Unique plane | The set consist in an unique plane (which can play an important role in the failure) | boolean |
| REMARKS | Example: The slide affected massive limestone beds, overlying thin layers of marl and limestone. | memo |

5. FAILURE

| <i>Name</i> | <i>Basic description</i> | <i>Type</i> |
|---|---|-------------|
| SCAR | | |
| Movement preceding rock fall | Failure mechanism before the fall (buckle, column failure, composite movement, compound slide, overhang failure, planar slide, rotational slide, stepped slide, stepped wedge slide, topple, wedge slide) | look up |
| Maximal elevation of the scar | Elevation of the upper point of the scar (m) | integer |
| Minimal elevation of the scar | Elevation of the lower point of the scar (m) | integer |
| Maximal inclined length of the scar | (m) | integer |
| Maximal width of the scar | (m) | integer |
| Maximal thickness of the fallen rock mass | Initial maximal thickness of the fallen rock mass, before the fall (m) | integer |
| Inclined surface of the scar | (m ²) | long int |
| Catchment basin | Area in which the rainwater flows towards the scar (m ²) | long int |
| REMARKS | | |
| Detailed mechanism | examples: composite slide-topple mechanism, topple of an isolated column, rotational sliding surface resulting from flexural topple of the strata. | memo |
| Morphology and geometry of the scar | e.g. precise if the sliding surface is visible or partly covered by the deposit | memo |
| CAUSES | | |
| <i>Ground conditions</i> | | |
| Weathered material | | look up |
| Sheared material | | look up |
| Jointed or fissured material | | look up |
| Adversely oriented discontinuities | | look up |
| Contrast in permeability | Contrast in permeability and its effect on ground water | look up |
| Contrast in stiffness | e.g. stiff material over plastic material | look up |
| <i>Geomorphological processes</i> | | |
| Tectonic uplift | | look up |
| Glacial rebound | | look up |
| Glacial erosion of slope toe | | look up |
| Deep-seated gravitational slope deformation | | look up |
| Previous large landslide | | look up |
| Fluvial erosion | | look up |
| Wave erosion of the toe | | look up |
| Erosion of lateral margins | | look up |
| Deposition loading the slope crest | | look up |
| Vegetation removal | by erosion, forest fire, drought | look up |
| <i>Man-made processes</i> | | |
| Excavation of slope or its toe | | look up |
| Loading of slope or its crest | | look up |
| Irrigation | | look up |
| Drawdown of reservoir | | look up |
| Infilling of reservoir | | look up |

| | | |
|-------------------------------------|--|---------|
| Mining | Open pits or underground galleries | look up |
| Artificial vibration | including blasting, traffic, pile driving, heavy machinery | look up |
| <i>Physical processes</i> | | look up |
| Intense rainfall | Intense, short period, rainfall | look up |
| Rapid snow melt | Rapid melt of deep snow | look up |
| Prolonged exceptional precipitation | | look up |
| Earthquake | | look up |
| Thawing of permafrost | | look up |
| Freeze and thaw weathering | | look up |
| Shrink and swell weathering | of expansive soils | look up |
| Rapid drawdown | following floods, high tides or breaching of natural dam | look up |
| Trigger | Does this process explain the date of the rock fall? | boolean |
| <i>Forewarning signs</i> | | |
| New tension cracks | | look up |
| Precursory falls | | look up |
| Hydrogeological precursory signs | | look up |
| Piezometric precursory signs | | look up |
| Subsidence | | look up |
| Noise | | look up |
| Others | | memo |

6. POST-FAILURE SLOPE

| <i>Name</i> | <i>Basic description</i> | <i>Type</i> |
|--|---|-------------|
| GENERALITIES | | |
| <i>Propagation parameters</i> | | |
| Hmax (m) | Difference of elevation between the higher point of the scar and the extreme point of the deposit. | integer |
| Lmax (m) | Horizontal distance between the higher point of the scar and the extreme point of the deposit, measured along the trajectory. | integer |
| Propagation mechanism | Avalanche (continuous flow of blocks), fall (free falling, bouncing on the slope, rolling), slide | look up |
| alpha (°) | "Fahrböschung" or propagation angle = $\text{Arctan}(H_{\text{max}}/L_{\text{max}})$ | integer |
| <i>Factors influencing propagation</i> | | |
| Ice over the path | | look up |
| Snow over the path | | look up |
| Incorporation of water | | look up |
| Incorporation of other materials | | look up |
| Chanelization of the fallen rock mass | | look up |
| Remarks | | memo |
| PROFILE | | |
| Segment code | The slope profile is divided in segments (from top to bottom), each defined by two points (top and toe) | text |
| <i>Segment top</i> | | |
| X1, Z1 | Coordinates of the segment top (m) | integer |
| <i>Segment toe</i> | | |
| X2, Z2 | Coordinates of the segment toe (m) | integer |
| Segment aspect | Aspect of the slope segment, counted clockwise from north (°) | integer |
| Width of the flow path (m) | | integer |
| Present thickness of the | | integer |

| | | |
|--|--|---------|
| deposit (m) | | |
| Type | Type of segment (scar, transit, deposit, outside) | look up |
| Substratum lithology | | look up |
| Superficial deposit | Material over the substratum (alluvium, glacier, undistinguished deposits, no cover, scree, rock fall deposit, till) | look up |
| Water presence | Type of water (snow, lake, wet, moist, dry) | look up |
| Vegetation | Bush, forest, grass, grass and forest, moss, no, nude | look up |
| Post-event reworking of deposit material | | boolean |
| Remarks | | memo |

7. DEPOSIT

| <i>Name</i> | <i>Basic description</i> | <i>Type</i> |
|--|---|-------------|
| GENERALITIES | | |
| <i>Morphometry characteristics</i> | | |
| Zmax, Zmin (m) | Maximal and minimal elevation of the deposit surface | integer |
| Horizontal length of the deposit (m) | | integer |
| Horizontal projected surface (m ²) | | long int |
| Maximal vertical thickness (m) | | integer |
| Maximal width (m) | Maximal width normal to the trajectory | integer |
| Run up | Does the rock fall run up the opposite side of the valley? | boolean |
| Seepage | Is there seepage on the deposit | boolean |
| Shape of the deposit | Chanelized, single tongue, L shape, T shape, other | look up |
| Deposit evolution and other remarks | e.g. precise if the deposit has been eroded since the rock fall, missing volume if known, ... | memo |
| ZONES | | |
| Zone code | The deposit can be divided in different zones, having different characteristics | text |
| Zmax, Zmin (m) | Maximal and minimal elevation of the zone surface | integer |
| Horizontal projected surface (m ²) | | long int |
| Average vertical thickness (m) | | long int |
| Type of matrix | clast supported, matrix supported | look up |
| Maximal block size (m ³) | | real |
| Average block size (m ³) | | real |
| Slided block | Is this part (zone) of the deposit a slided block? | boolean |
| Acquiferous role | Is this part (zone) of the deposit an aquifer? | boolean |
| Description and other remarks | e.g. granulometric parameters (D10, D25, D50, D75, D90) | memo |