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uni system
JAKUB

Development and realization program of
special method, devices and equipments
for training, rehabilitation, prevention,
recreation, sport and free time

CLIMBING SIMULATOR VERSION FOR LAW ENFORCEMENTS

JAKUB CLIMBING



SLOVAK REPUBLIC 2011

JAKUB CLIMBING SIMULATOR

1. Designation

1.1. The JAKUB Climbing Simulator is a comprehensive training aid used to exercise and drill the professional activities in connection with the body movements in surmounting the upright barriers and missions at heights.



1.2. The JAKUB Climbing Simulator will allow an intense, efficient, attractive, and safe simulation training in mastering heights and depths in both, the rugged terrains and on the buildings, overcoming the rope traverses spun across the deep spaces, ascents and descents along the horizontal and vertical poles, columns, ropes, rope ladders, nettings, lightening conductors, and façade drain risers, creeping through the narrow tubes and shafts. The trainees can wear suitable outfits along with their arms, being potentially exposed to various light and sound effects during such an exercise. Except for these rather specialized performances the simulator is offering a broad range for training potentials for improving strength, endurance, and dexterity. Of importance is its use in favor of the policeman's psychological formation, in improving the physical resistance, courage, certainty, self-control, inter-unit cooperation, etc.

1.3. Besides the professionals training the JAKUB Climbing Simulator is offering other alternative applications as well:

- Policeman's spending their leisure
- at the police recruiting and presentation events
- in the field of sports engagements within the limits of the practical climbing, wall climbing, and other contests to be held in particular



2. Technical Description

- 2.1. The JAKUB Climbing Simulator is assembled as a variable building set, allowing a technically easy and quick handling during its assembly and stripping; new training aids can be added. The Section consists of the bearing structure, training modules, and climbing exercise equipment.
- 2.2. The bearing structure is made of a climbing simulator spatial form. The structure is sized 10.04m x 11.89 m in its ground plan, being 10 m high. The abseiling tower reaches to the height of 14m. The training modules are attached to the individual sides of the bearing structure, A,B,C,D. The simulator is of a self-supporting design, as such, without the need of any anchorage. A static weight rests on the lower floors pads. Pipes are used to further stiffen the structure in all its planes. All this is responsible for the overall structure robustness, not allowing the tower overturns by action of wind. All of the bearing structure parts are made from high-quality, hot-dip galvanized steel.

The training modules make the bearing structure perimeter, being the inherent training parts of the simulator as modeling the realistic conditions that may be encountered during a variety of climbing missions and activities. They are fastened to the bearing structures on its sides A,B,C,D and inside the space E (see Figure 1) that jointly form the training grounds of about 1000 square meters.

SIDE "A" (see Figures 1 and 2)

On its surface sized 100 square meters the side A has the climbing walls in order to model a rugged terrain of various patterns and climbing difficulty (quoted to conform to the UIAA international classification). All these walls allow for the upper, lower, and continuous safeguards:

A.1. Terrain wall – modeling a normally encountered terrain with the climbing difficulty at the 1st – 3rd level, used for the basic climbing exercises for the individuals and teams, in conventional and improvised manners. Armament and ammunition transporting actions can also be practiced here, as well as the field personnel rescue and recovery missions.

A.2. Rocky wall – modeling a more difficult terrain with the climbing difficulty at the 3rd – 5th level. It supports the basis and advance training of the individuals, but mainly for the team cooperation in the climbing and rescuer actions, based on both the improvised and conventional methods. Rock steps and a chimney are available.

A.3. Mountain climbing wall – modeling a more difficult up to very demanding terrain, featuring the difficulty level between 5 – 10. A perpendicular and diverted wall is available as well as an overhanging wall onto which the climbing grips and steps (“stones”) can be mounted. The set is used for advance training for the leading climbers with gradual safeguarding of the climbing pairs and mutual safeguarding in conventional manners.

SIDE “B“ (see Figures 1 and 3)

On its training ground of 100 square meters the side B provides the walls that model the complete front façade of a 10 meters high four-story building. All the walls allow the upper and lower safeguards to be used:

B.1. Multipurpose wall – used for the conventional and improvised ascents and descents with a good deal of prediction, difficulty, and diversity of climbing efforts.

B.2. Wall with windows – having 4 windows above each other, with windowsills, lightening conductor, and riser pipe, being used to practice the climbing actions by means of these building windows, lightening conductor, and riser pipe, assaults on the building by a taskforce, provided the mutual safeguarding and combat support and recovery of the threatened personnel from the building.

B.3. Wall with balconies – containing four balconies above each other, used to practice assaults on the building by individuals and groups, material lifting onto and lowering from the building, and recovery of the jeopardized personnel from the building.

B.4. Smooth wall – comprised of a smooth surface and fixed (steel) ladder, used to practice roof abseiling, lowering various materials and people exposed to threats, building ascents and descents on a fixed ladder.

B.5. Abseiling platform – sized 2.40m x 2.50m, allowing the troops to abseil from helicopter down to a building roof and further down to the ground using the building wall as a support. The platform is at the height of 10 m.

SIDE “C“ (see Figures 1 and 4)

On its training surface of over 100 square meters the Side C has an abseiling tower, the space where the rope netting can be spun and the brackets used to anchor the vertical mountain climbing ropes and poles, ladder and column:

- C.1. Column** – its height is 7m, fastened to the bearing structure with the brackets. Sliding down can be practiced here.
- C.2. Rope netting** – is installed by means of a static rope into the opening in the bearing structure, being sized 5 m x 4 m. Being used to climb from one side over to the other as across a fence and as a barriers during the sliding down from the opposite side D with the use of a cableway.
- C.3. Climbing poles** – can be found in the leftmost and right parts of the side C, reaching up to 8 m in height. Both the crossed-leg grip and non-crossed-leg grip climbing can be practiced here, as well as the sliding down the pole.
- C.4. Abseiling tower** – is a part of the bearing structure, being 14 m high. In its upper part the tower has a horizontal pole upon which the abseiling ropes can be hooked up. The tower allows a gradual training in abseiling down from the levels between 4 m to 14 m.
- C.5. Rope ladder** – having 10 m in length. It is to be attached to the bearing structure bracket, used to practice ascents and descents.

SIDE“D“ (see Figures1 and 5)

SIDE D contains main staircase, abseiling tower and horizontal consoles for vertical alpinist ropes..

- D.1. Simulator main staircase** – used to access the JAKUB CLIMBING Simulator
- D.2. Horizontal poles** - 10 5-meter long poles are spaced vertically from 0.5m do 10m. They are used to drill the ascents and descents along the steel structure, transporting the armament and ammunition and injured.
- D.3. Abseiling tower** – part of the load- bearing steel structure, 14m high, in its upper part with a horizontal bar on which abseiling ropes are suspended to train abseiling from 4 up to 14 m.

INNER PART “E“ (see Figures 1, 6, 7 and 8)

In its inner part the bearing structure has a training space sized 1,000 cubic meters. A training house, shaft, manholes, cableways, rope traverses, and climbing ropes can be installed therein.

E.1. Training house – is a small ground-floor structure, connected with outer space by a manhole and shaft. It can be used to practice the abseiling down onto building, breakthroughs into the building from air and ground surface, temporary building evacuations and rescue missions on the building.

E.2. Shaft – is 6 m high, having 1 m in diameter, allowing the single-rope descending and ascending technique drills, to practice the personnel recovery from the narrow voids, and claustrophobia prevention.

E.3. Pipeline – is 12m long, having 0.63 – 0.8m in diameter, used to practice creeping through the narrow clearances in avoidance of claustrophobia.

E.4. Cableway – is 15m long, to be mounted on the bearing structure at the top of the side D with its landing on the opposite side of the rope netting. Long cableways are to be spun as marked out on the bearing structure upper part with their landings on the surrounding grounds. They can be up to 50 or even more meters long.

E.5. Rope traverses – are to be made from the mountain climber ropes and anchored diagonally onto the bearing structure, differing in height when of the single-rope type, or placed next to/above each when of the twin-rope type.

E.6. Climbing ropes – are to be hooked up on the brackets. They can reach up to 5 m in length, used to practice the crossed-leg grip and non-crossed-leg grip climbing and fast rope abseiling.

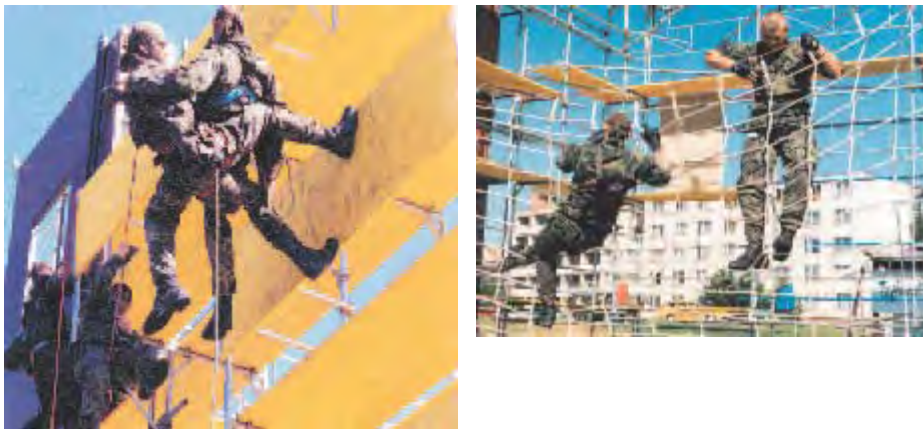
Climbing equipment on support of the JAKUB CLIMBING Simulator drills is composed of:

- individual kit: sitting becket, grab-hooks with locks and abseiling eight-shape
- taskforce kit : static ropes, dynamic ropes, sling harness, Rep cords,

3. Functional Description

3.1. In its comprehensive purpose and special construction of the JAKUB Climbing Simulator is a unique policeman’s training equipment. It is a multipurpose training system used to model the activities that are frequented in a realistic police life or that are anticipated and for which it is necessary to arouse in the servicemen the bodily and psychic dispositions without which they could hardly be mastered.

- 3.2. In its training purpose the JAKUB CLIMBING Simulator responds to a widely known fact that an unprepared individual has a stress feeling during his/her vertical moves and at elevated position and that this feeling can culminate in a physical or psychic failure with other adverse consequences. Using a well-adapted practice on special equipment capable to simulate the realistic conditions one can attain the positive adaptation responses and optimal solutions, when facing the demanding, height-related situations. With this system the individuals who suffer a height-ascribable anxiety beyond any control (hypsophobia) and as such cannot carry out any operations in the elevated positions can be excluded form further advance training.



- 3.4. Functionally, the JAKUB CLIMBING Simulator is laid out for better:
- adaptation of the vestibular, visual, tactile, circulatory, pulmonary, and nerve systems for the activities at the elevated positions
 - establishing and further development of the basic and special locomotors capabilities and skills for upright barriers overcoming
 - establishing and enhancing the psychic resistance which is necessary for adequate conduct and responses during the risky situations experienced at heights
 - simulation of standard and critical situations at heights
 - application of the safe training process methodological procedures and didactic rules
 - practical application of the technical and tactical solutions to the realistic situations within the scope of the simulated training
 - testing for the individual training successes diagnostics for the psychophysical preconditions and selection of suitable trainees
 - diagnostics for the psychophysical preconditions and selection of suitable trainees

The JAKUB CLIMBING Simulator allows a safe and methodological practicing by raising gradually the heights at which the trainees operate. The Simulator even conforms to the strict environmental aspects as the building or wilderness suffer no wear during the practices and can be installed near the policeman's everyday quarters without the need of any approaching moves. During the helicopter abseiling practices the operations are modeled without any operating costs that would otherwise have to be incurred.



3.5. When done in the CLIMBING Section, the exercises are not to be used instead of their counterparts in the realistic situations. By means of this Section one can transfer a major part of the efforts aimed to improve the vertical operations to a environment-friendly system which is moreover apt in the methodological and safety terms and upkeep the final portion of the training aimed like this until the modeled situations are mastered in full.



4. Technical Parameters

4.1. Bearing structure -	width 10.04 m	
	length 11.89 m	
	height 14.00 m	
	static payload	7,392 kg
	groundsheet rated payload	2.0 kN/m ²
	payload on brackets and connection pipes in a single bay	2.5 kN
	frame column bearing capacity	18.8 kN

4.2. Side A

- | | | |
|---------------------------------------|------------------------------|---------|
| • three-segment mountain climber wall | | |
| | width | 3.6 m |
| | height | 10 m |
| | payload on safeguarding lugs | 10.0 kN |
| | payload on artificial grips | 1.2 kN |
- | | | |
|----------------|-------------|------------|
| • terrain wall | | |
| | width | 2.4 m |
| | height | 8.0 m |
| | inclination | 30 degrees |
- | | | |
|----------------------------------|------------------------------|---------|
| • rocky wall, three-segment type | | |
| | width | 3.6 m |
| | height | 10.0 m |
| | payload on safeguarding lugs | 10.0 kN |
| | payload on artificial grips | 1.2 kN |

4.3. Side B

- | | | |
|-----------------------|--------|--------|
| • wall with balconies | | |
| | width | 2.50 m |
| | depth | 0.85 m |
| | height | 10.0 m |
- | | | |
|---------------------|------------------------------|---------|
| • wall with windows | | |
| | width | 2.4 m |
| | height | 10.0 m |
| | payload on safeguarding lugs | 10.0 kN |
- | | | |
|---------------|------------------------------|---------|
| • smooth wall | | |
| | width | 2.4 m |
| | height | 9.0 m |
| | payload on safeguarding lugs | 10.0 kN |
- | | | |
|---------------------|-------|-------|
| • multipurpose wall | | |
| | width | 2.4 m |

height	10.0 m
payload on safeguarding lugs	10.0 kN

4.4. Side C

- Sliding down column

height	7.0 m
diameter	0.2 m
- upright pole

height	8.0 m
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4.5. Side D

- horizontal poles

width	10.0 m
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4.6. Side F

- sewerage shaft

height	6.0 m
diameter	1.0 m
- air duct

length	12 m
diameter	0.63 – 0.8m

6. Operating & Maintenance Instructions

7.1. The product shall remain operable within the temperature range between -40°C and $+70^{\circ}\text{C}$.

7.2. Up to 32 trainees can practice on the system provided a uniform distribution of their weight – eight of them on each side.

7.3. All the trainees must be safeguarded while really practicing. While moving on the floor groundsheets the trainees are safeguarded by the inner and outer safety railings. The rope railings shall be set up where it is not possible for the training reasons to use the bearing structure railing.

7.4. Any training on the system shall have to be carried out within the limits of the applicable commands, ordinances, and directions.

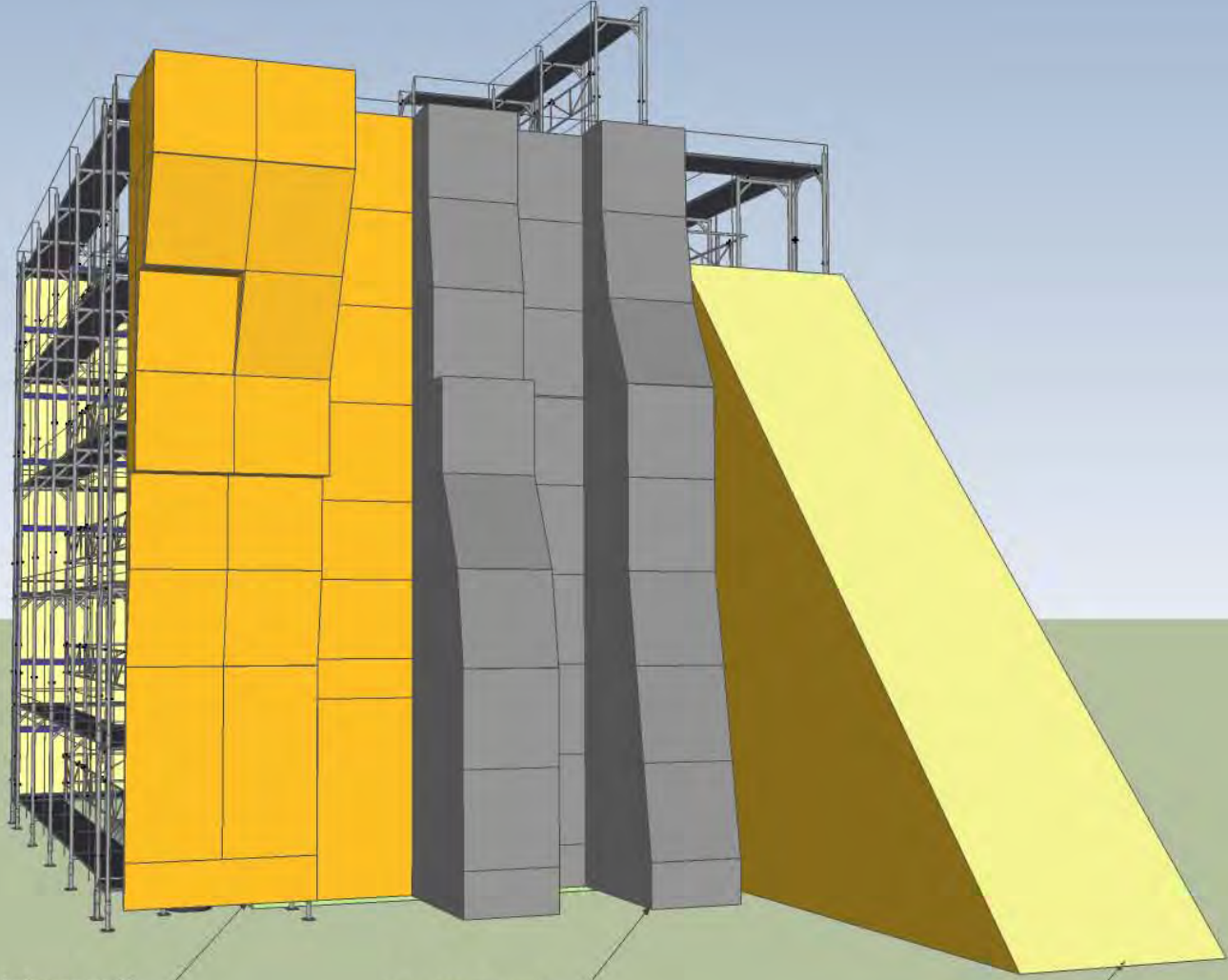
7.5. Only the properly trained instructors will be authorized to conduct any practicing on the system

7.6. All the parts of the JAKUB Climbing and Air Drop Simulator's CLIMBING Section must be kept clean. For these reasons the Section is expected to be relieved of dirt (mud, dust, exhales) by rinsing it with water or suitable detergent, mainly on its groundsheets and all

the training modules once in three months or depending on their condition.

- 7.7. Owing to its hot-dip galvanized finish the steel part of the bearing structure does not require any special maintenance throughout its life span. This part will not also need any conservation (greasing).
- 7.8. Refreshment of protective coat on the training module plywood paneling is to be done once in 3 years, and/or depending on the level of its wear and tear.
- 7.9. Compulsory replacement of the safeguarding lugs on the training modules is to be done once in 3 years, and/or depending on their condition.
- 7.10. Mountain climber grips do not require any maintenance during the course of the training season. Quality of their fastening with the Allen head screw has to be checked before each practice.
- 7.11. Comprehensive inspection controls of the bearing structure and training modules shall be carried out by the supplier once by the end of warranty, using the supplier's own means, but later, after the warranty expiry, at the customer costs. The particular timelines will be agreed between the supplier and customer. On finding out that the simulator is complete and in a satisfactory operable condition the supplier shall issue for the customer the "Record of the Inspection Control Execution and Results".
- 7.12. Specialized regular inspections and testing of the ropes have to be carried out in the following intervals:
 - every 24 months from the manufacture date
 - after a fall capture
 - after every emergency
- 7.13. All the repairs on the steel part of the bearing structure, construction of the training modules, and fastening of the safeguarding lugs, lightening conductors, riser pipe, grips, and footrests on the walls may only be done by the supplier.

**Jakub climbing
Side A**

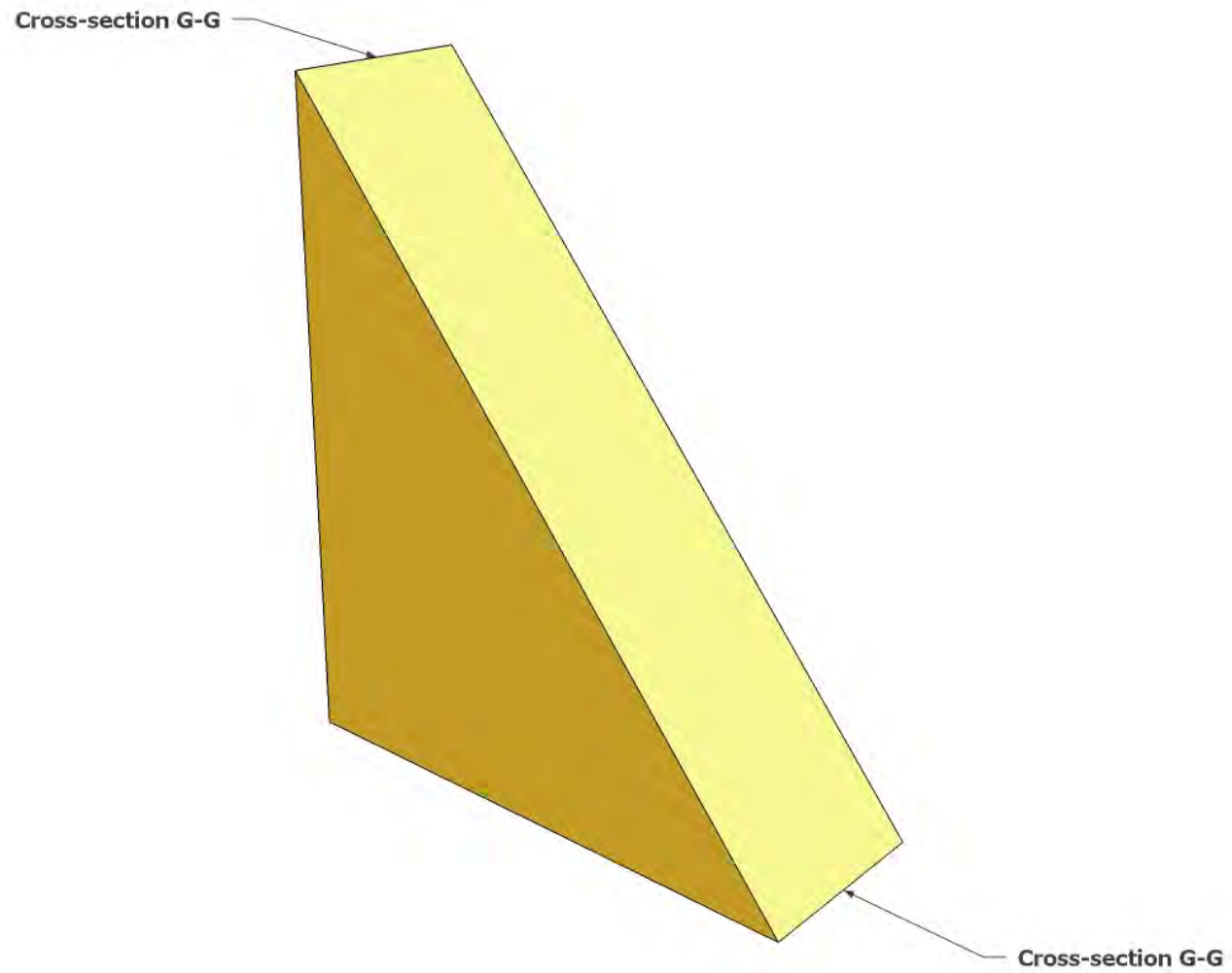


A 3 - Mountaineer wall

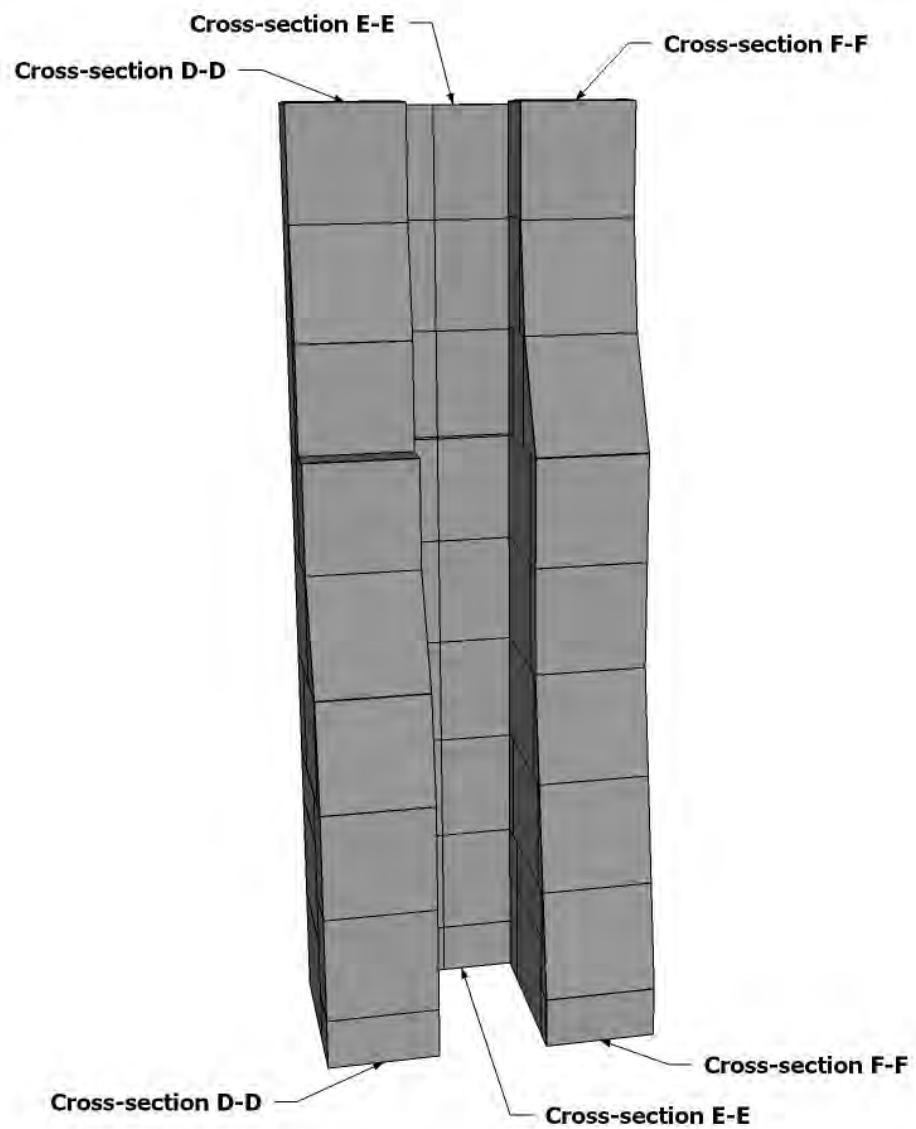
A 2 - Rock wall

A 1 - Terrain wall

**Jakub climbing
A 1 - Terrain wall**



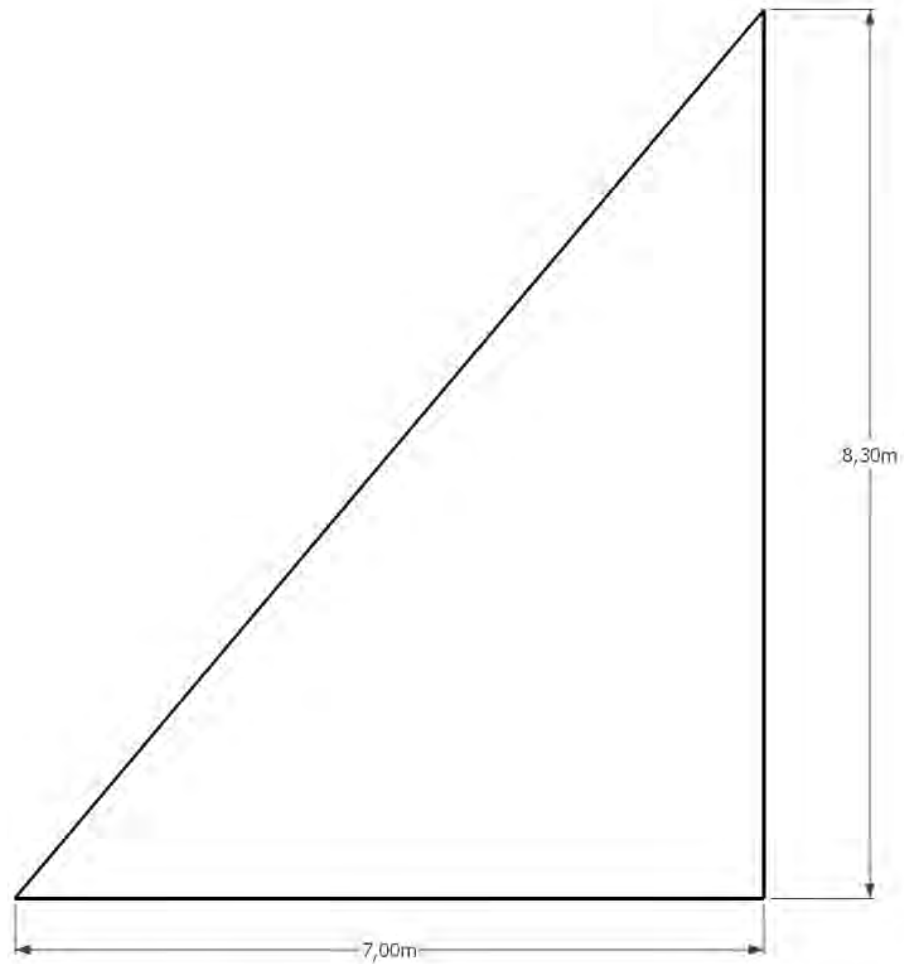
**Jakub climbing
A 2 - Rock wall**



**Jakub climbing
A 3 - Mountaineer wall**

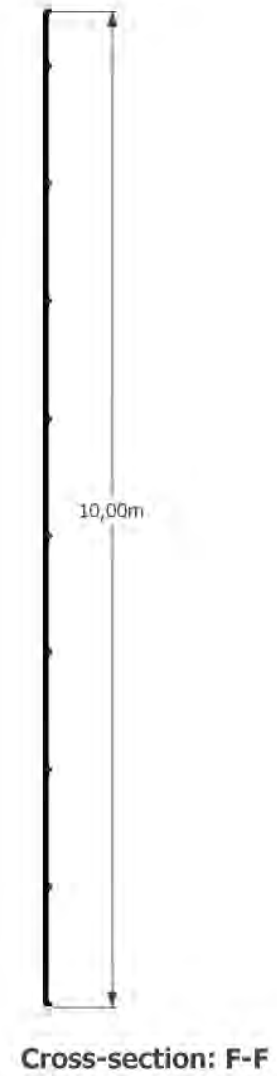
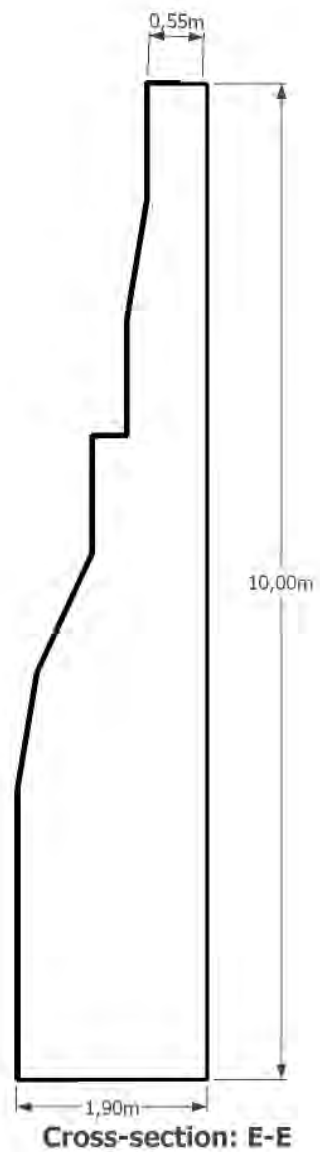
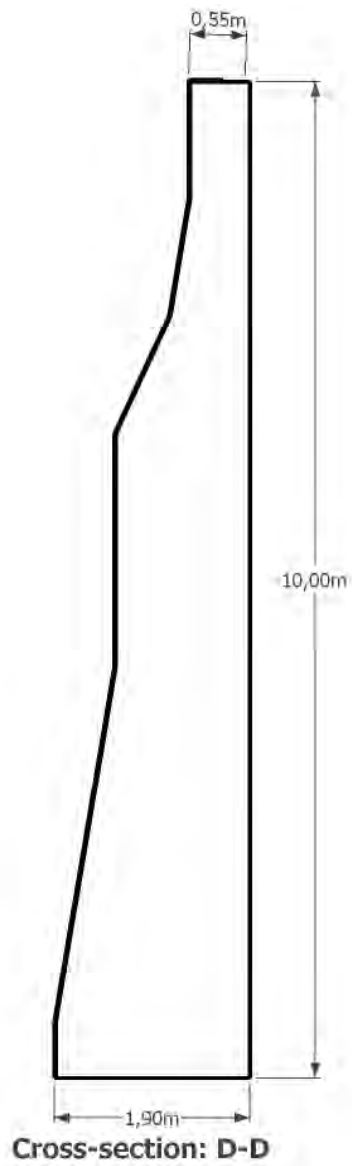


Jakub climbing
A 1 - Terrain wall



Cross-section: G-G

**Jakub climbing
A 2 - Rock wall
Cross-Sections**





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