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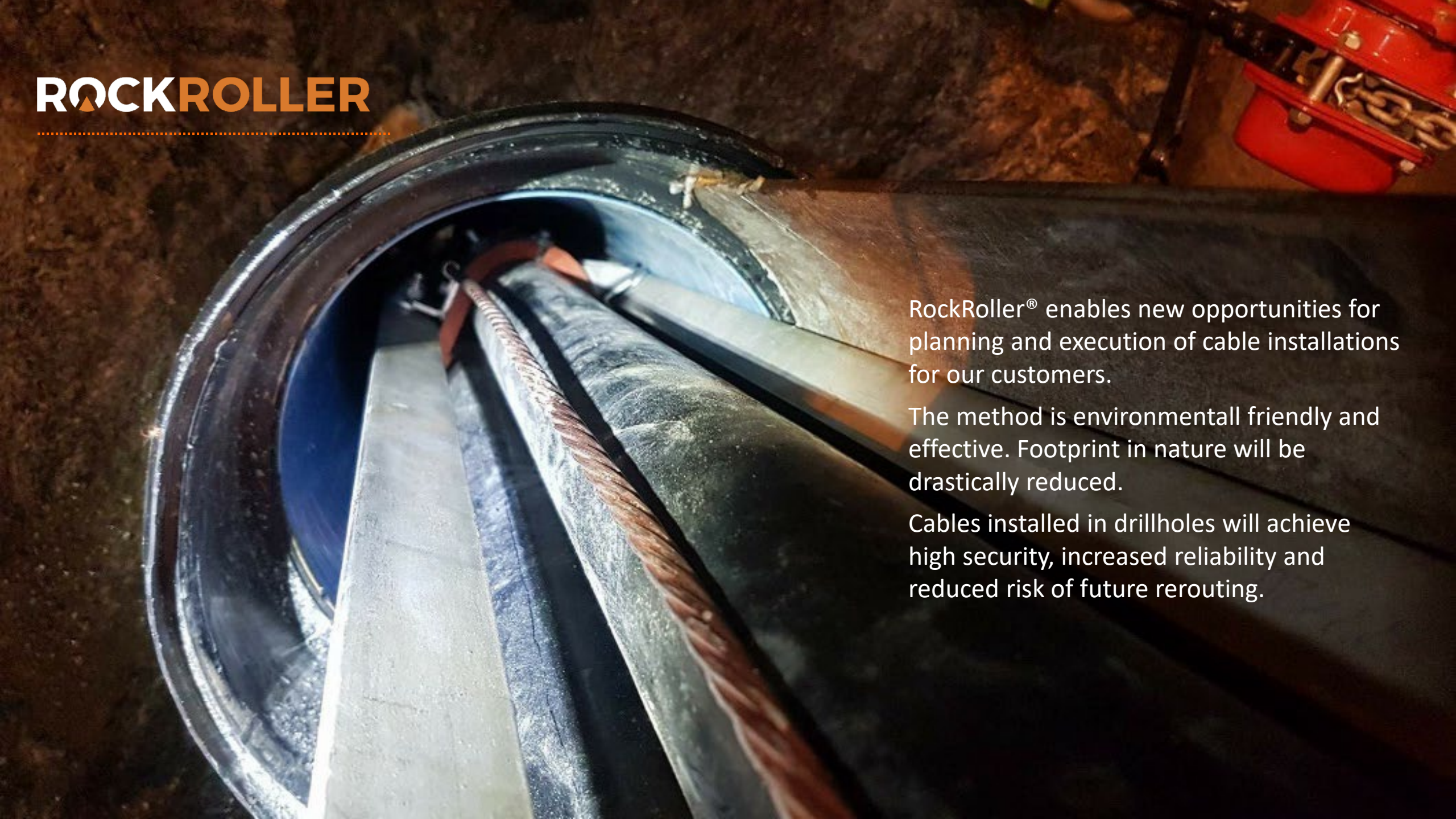

RockRoller® enables new opportunities for planning and execution of cable installations for our customers.

The method is environmentall friendly and effective. Footprint in nature will be drastically reduced.

Cables installed in drillholes will achieve high security, increased reliability and reduced risk of future rerouting.

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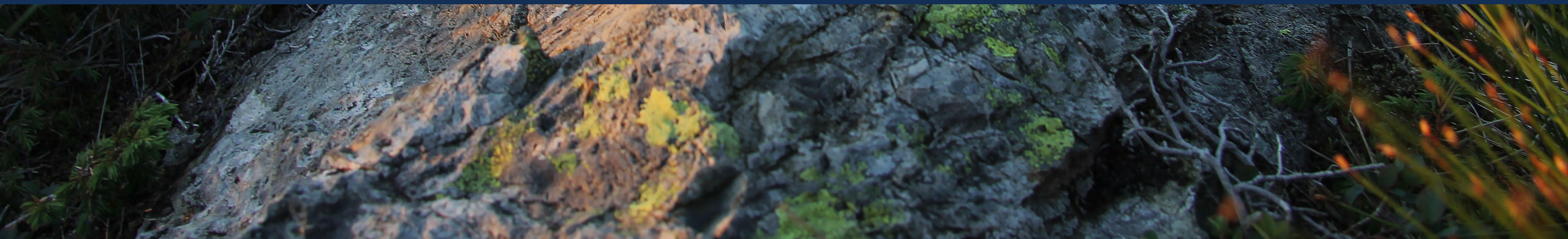
- Horizontal Directional Drilling in rock and soil
- 3 km profiles possible today. Longer profiles can be achieved by jointing.
- Cable pull directly in drill holes or through conduits / liners.
- Ampacity is great in rock
- Scalable system
- Effective installation
- Possible to pulls spare conductors and aux systems

- Cities and urban areas
- Power plants
- Unavailable and steep terrain
- Conserved nature
- Making available areas for other purposes
- Passing lakes and fjords
- Landing of submarine cables
- Reuse old pipes



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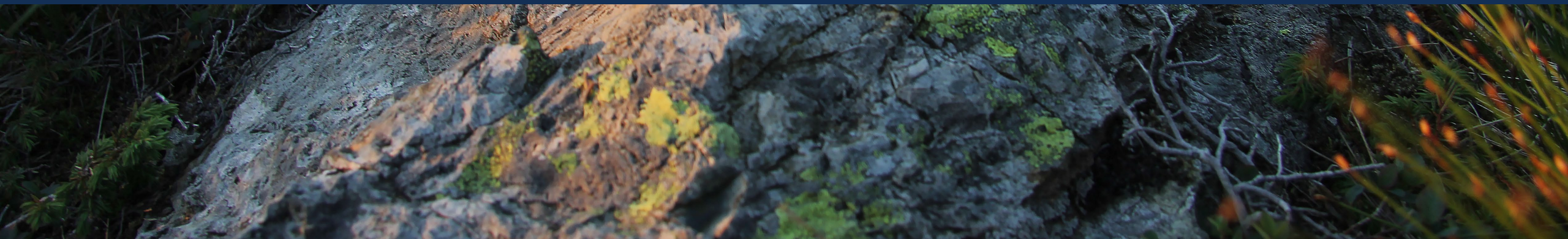
Investment benefits:

- Minimal footprint and intervention in nature
- Enable infrastructure in nature reserves and protected areas
- Simplifies proceedings with regards to landowner interests
- Shorter cables and higher transmission capacities
- In some cases, competitive to trenches and overhead lines. Very competitive to tunnels.
- Release valuable real estates
- Eliminates need for traffic regulations in projects
- Simplifies project planning and shorter project execution
- Increased HSE and reduced rigging need

Operations benefits:

- Stable and protected operation conditions ensures long lifetime on investments
- Good thermal conditions
- Unaffected by snowfall, avalanche, landslide, wind, flooding and lightning
- High social security
- Reduced need for maintenance
- Standard cables can be used for optimal preparedness
- Avoid conflict with future infrastructure projects



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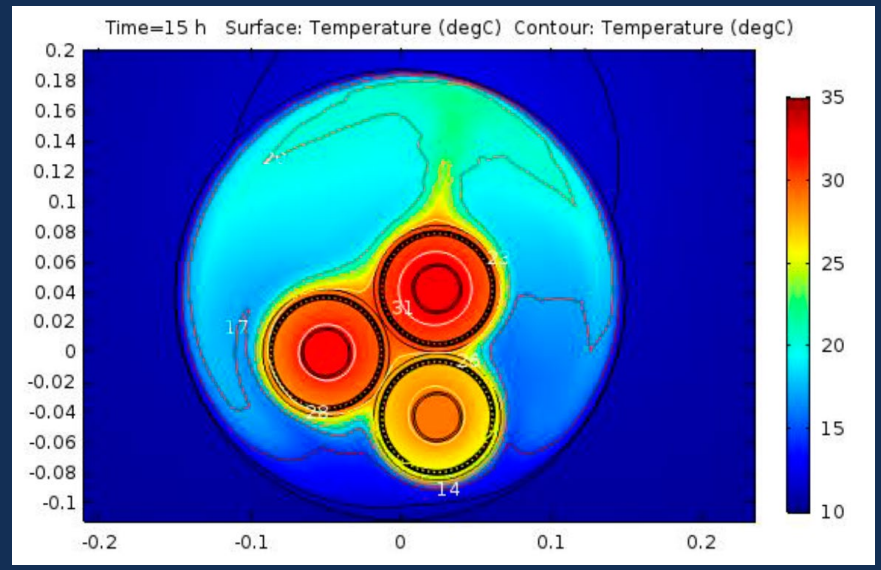
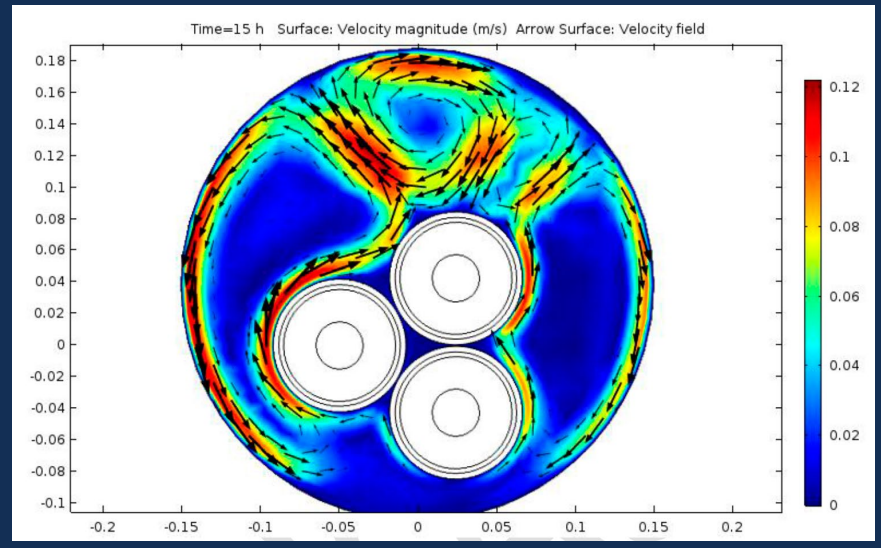
Good thermal properties for cables installed in drillholes in rock

- COMSOL Multiphysics FEA analysis
- High ampacity
- Little sensitive to rock types
- Little sensitive to drillhole size
- Little sensitive to positioning in the drill hole

- Each installation requires analysis of the thermal conditions





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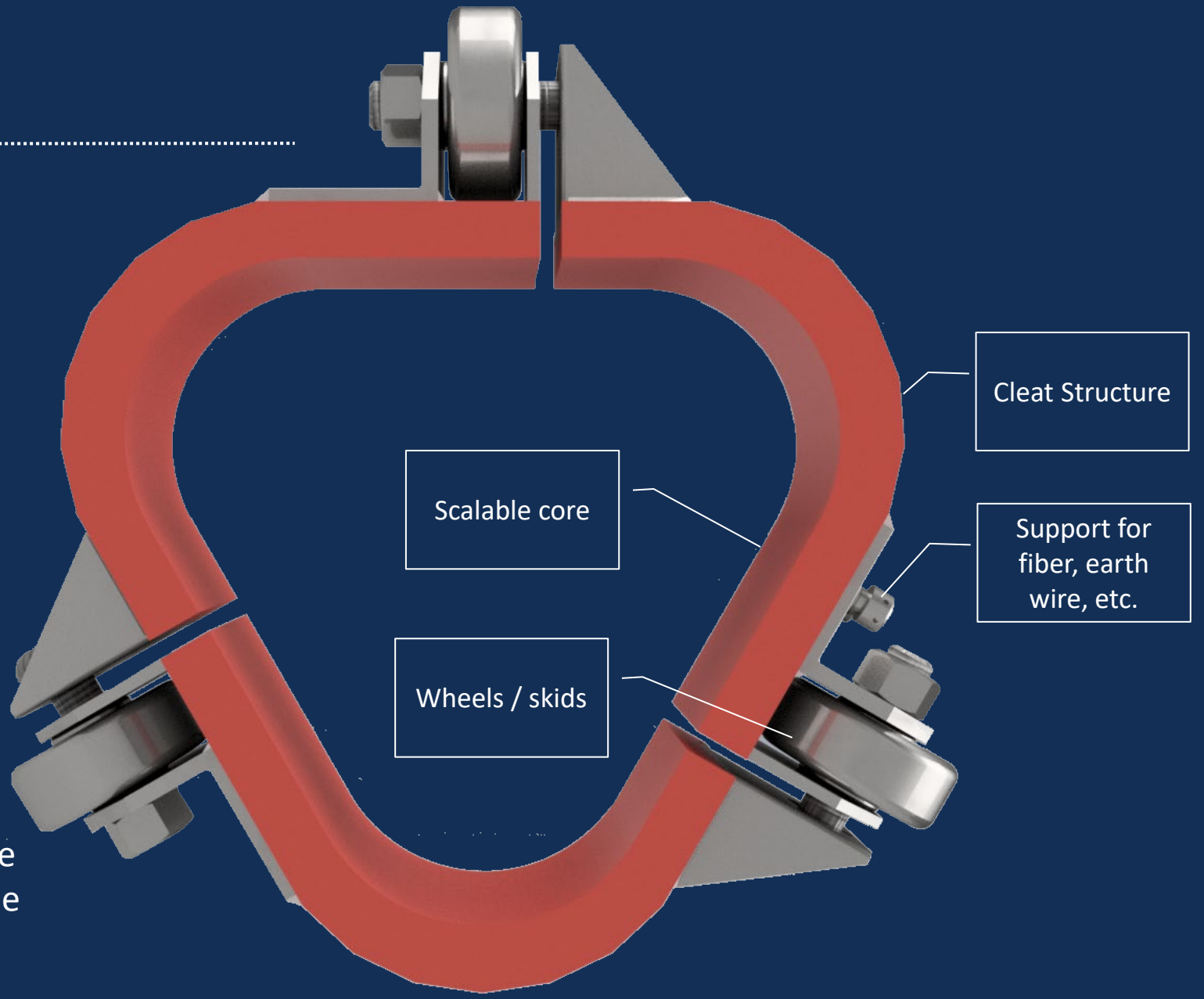
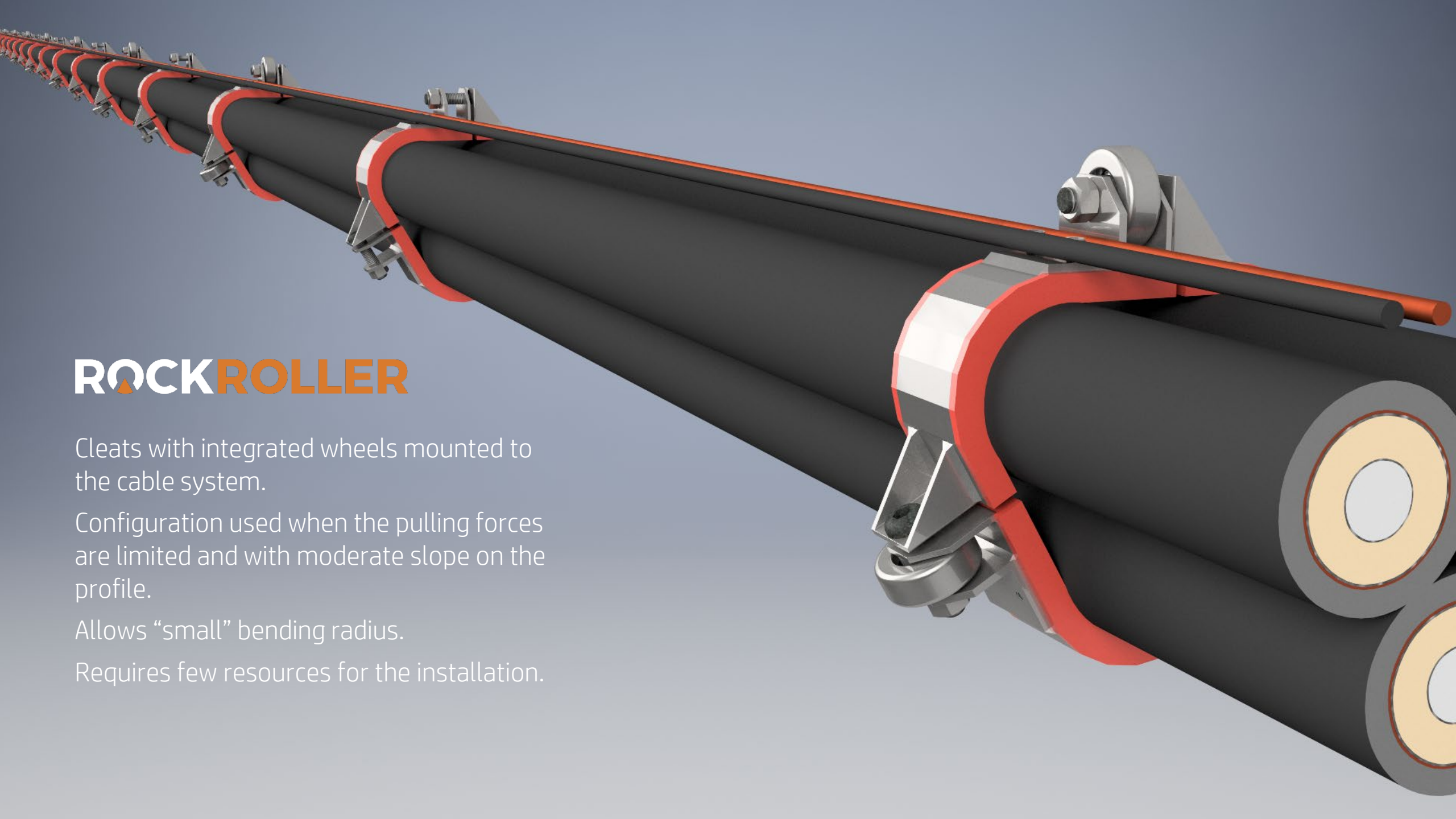
Ca. 2% rolling friction on rock. Equals 11500 m pulling length for TSLF 630 ALU cable in horizontal profile

Can be dimensioned for short circuit protection in accordance with the requirements in IEC 61914

Material selection in accordance with the environment and expected lifetime of the installation. Minim AISI 316L





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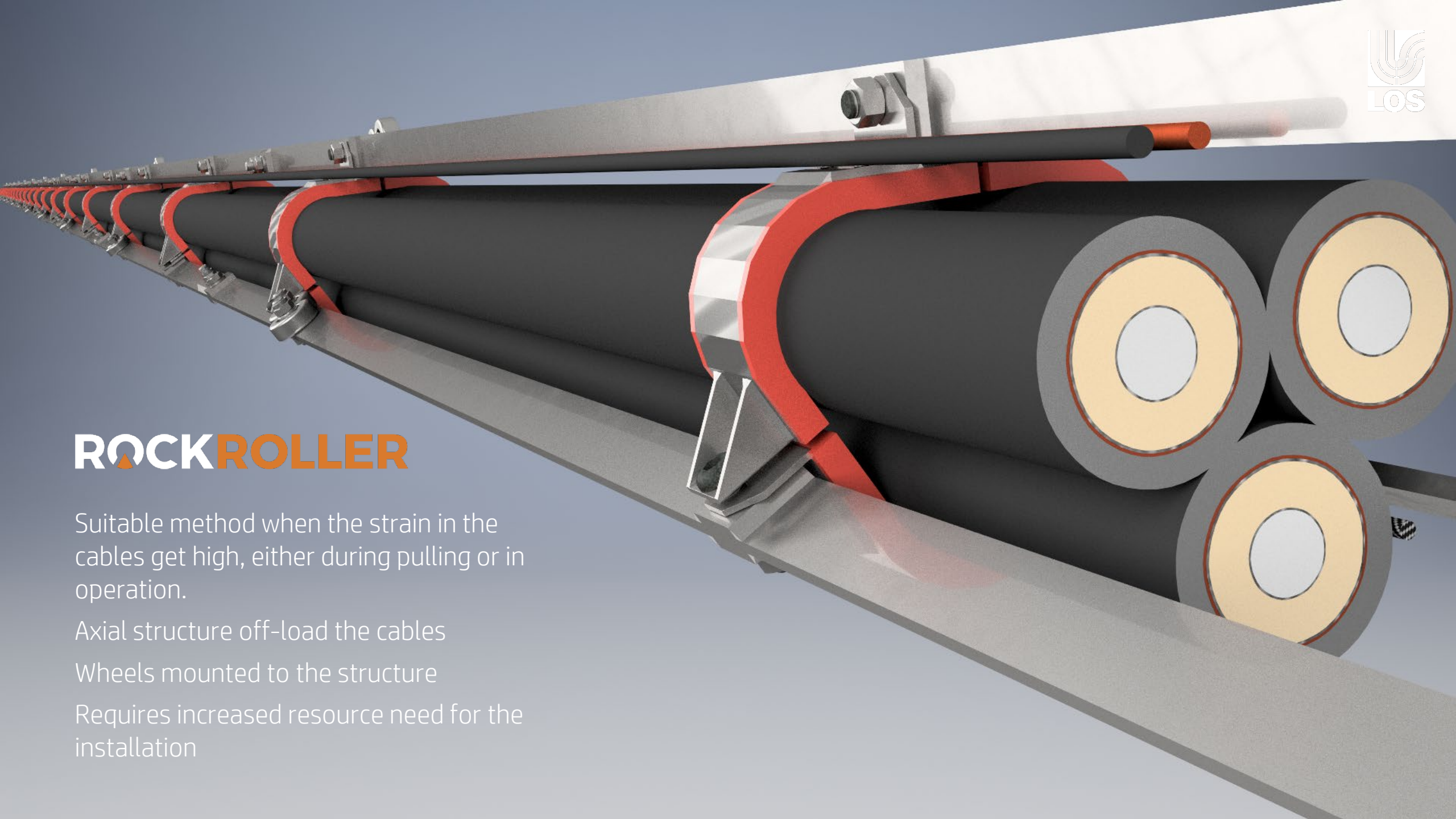
Cleats with integrated wheels mounted to the cable system.

Configuration used when the pulling forces are limited and with moderate slope on the profile.

Allows “small” bending radius.

Requires few resources for the installation.



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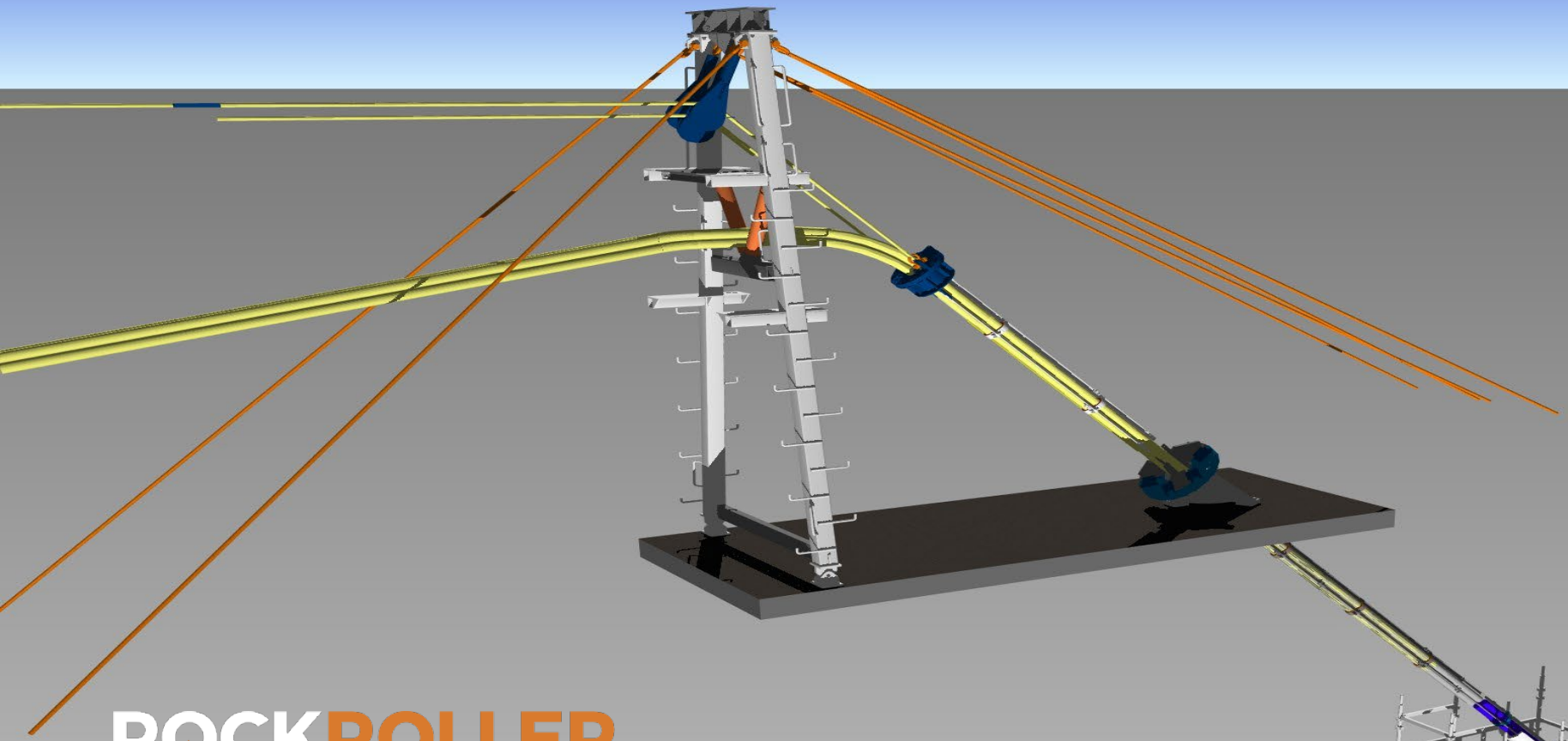
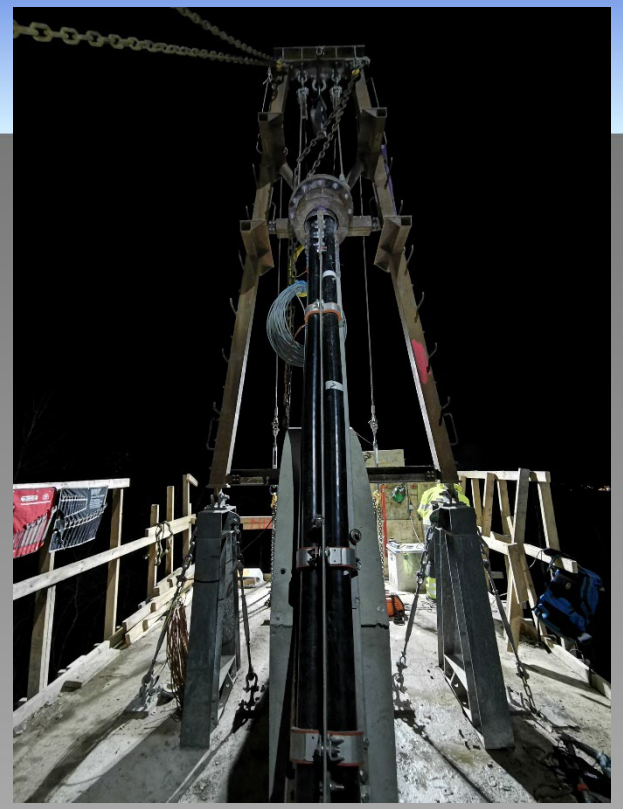
Suitable method when the strain in the cables get high, either during pulling or in operation.

Axial structure off-load the cables

Wheels mounted to the structure

Requires increased resource need for the installation





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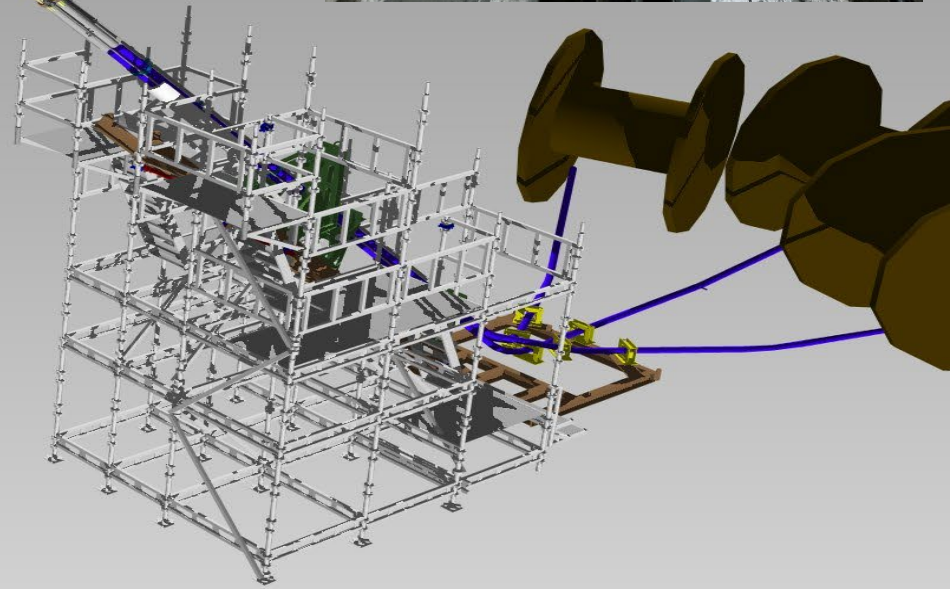
Rigging of cable pulling in steep ducts

Method used in hydro power plants.



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Documentation

- Data logger
  - Length
  - Slope
  - Pulling force
  - Time laps video
- As-built drill profile for input to BIM
- MC check records for the installation