

Underground installation methods!

Social and environmental cost comparison

Study made by Telecom Italia

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Introduction

- In the field of underground construction and maintenance the development of alternative techniques does not only stimulate innovation and production but can and will create different social/environmental impacts on us all.
- It should be the goal of the utility companies and contractors to search for methods limiting the impact as much as possible.
- Assessments should be made during the improvement of current and or development of new techniques.
- The focus of this report is to compare the installation costs of three alternative underground installation techniques versus the traditional open cut
 - Horizontal directional drilling
 - Micro trenching
 - Mini trenching
- The costs analyzed in this particular report are focused on three impact areas
 - Installation
 - Increased traffic
 - Environmental



Installation techniques

- Trenching/open cut

- Planning/preparation
- Remove the surface layer
- Dig the trench
- (Evacuate the soil)
- Install the product
- (bring new soil soil)
- Fill and compact the trench
- Repair top layer



- Trenchless

- Planning/preparation
 - Define start & exit pit
- Remove the surface layer at the pits
- Dig both pits
- (Evacuate the soil)
- Pilot bore
- (prereaming)
- Product installation



Installation techniques

- Micro trench

- 7-10cm deep, 10-12 mm wide
- Planning/preparation
- Cut the trench
- Clean the trench by air
- Install the product
- Repair the surface

- Mini trench

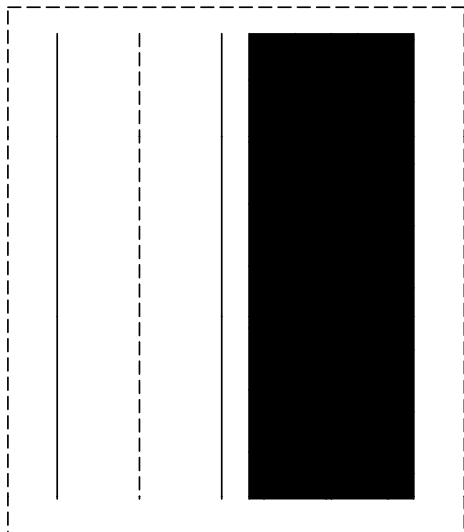
- 30-35 cm deep, 70-100mm
- Planning/preparation
- Cut the trench (rockwheel)
 - Material can be reused to fill the trench
- Install the product
- Repair the surface



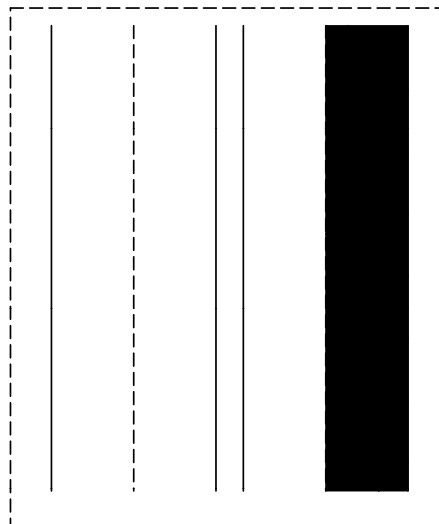
Cost analysis

- Considered
 - Installation
 - Increased traffic
 - Environmental

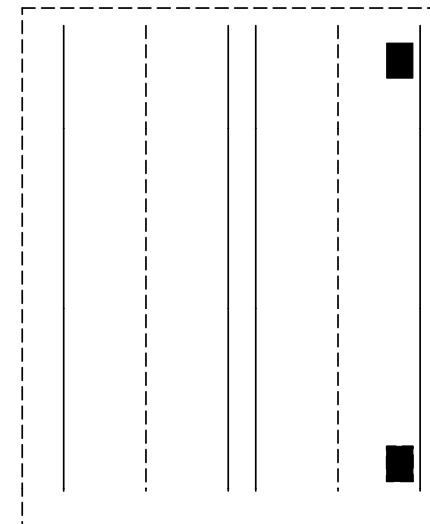
Dual carriage way impact



Traditional



Micro / Mini trench



Trenchless

Installation

The installation cost is representing the total amount of resources being necessary for the realization of the project taking planning, permits/concessions, material, equipment, labor, etc in consideration.

Cost comparison vs open cut			
	HDD	Microtrench	Minitrench
Installation costs	-29%	-78%	-64%

Increased traffic

The cost generated due to increased traffic is depending on the geometric configuration of the installation towards the existing roads, we can consider three types:

- Parallel installation (minor interruption)
- Cross sectional installation (mayor interruption)
- Combined installation (see above)

The following parameters have been taken on consideration: time loss due to increased traveling, increased fuel consumption.

Cost comparison vs open cut			
	HDD	Microtrench	Minitrench
Incremental traffic cost	-74%	-91%	-74%



Environmental impact cost

The cost of environmental impact is related to:

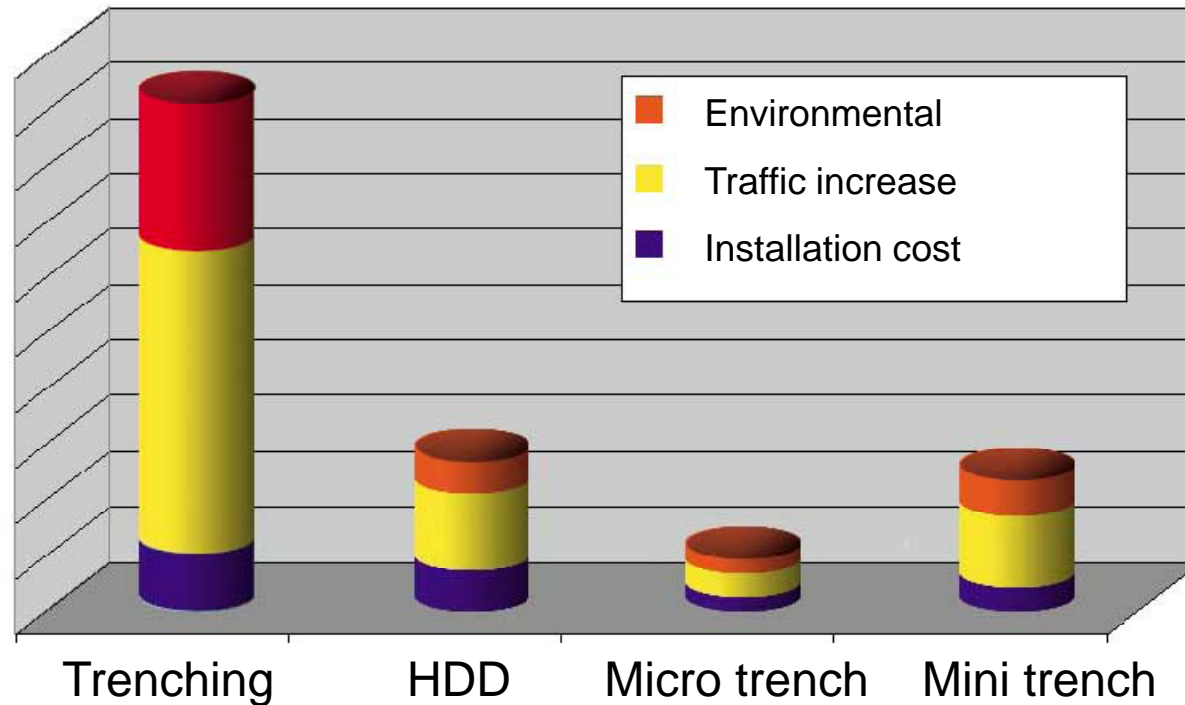
- Consumption of resources
- Production of emissions

Cost comparison vs open cut

	HDD	Microtrench	Minitrench
Environmental cost	-75%	-90%	-74%



Results



- Open cut is:
 - 3 times more expensive than HDD
 - 4 times more expensive than Mini trench
 - 10 times more expensive than Micro trench

Conclusion

- HDD is more economical than open cut mainly driven by the huge savings on traffic disruption and associated environmental costs.

Supporting literature

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