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Horizontal Directional Drilling

Horizontal Directional Drilling

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Why HDD

- Surface is neither broken nor damaged
- Restoration and repair are not required
- No public hazard or traffic disturbance
- Low social costs, because detours are avoided
- Short equipping, drilling and construction times

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Why HDD

- Very economic for river, road, canal, rail track, bridge crossings
- Least chance of accident & injury of workers
- Wide spectrum of application
- Pulling force measurement and position determination are possible
- Latest Modern Organized System.

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The Skipper Advantage

- Providing services for over a decade
- Rendering HDD Services to eminent clients
- HDD Services to eminent clients:
  - Reliance, Vodafone, Airtel
  - CESC, KMC, KMDA, WBSEB
  - JUSCO, PHED, BSNL, MTNL
  - TTSL, VSNL, Eastern Command, SIDCGL
  - Green Gas, IOCL, OFDC, GAIL , L&T

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The Skipper Advantage

- Skipper has mid sizes HDD Rigs for smaller applications such river crossings, canal crossings, road crossings up to 550 m.
- Technical expertise with a team of professionals
- Financial stability of Skipper ensures that every project is executed successfully

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Horizontal Directional Drilling

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HDD Technology

- HDD Technology stands for subsurface construction works
- Applied when fewer trenches or non-continuous trenches are required
- Rapidly growing sector of the construction and civil engineering industry

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Horizontal Directional Drilling

- Large-scale, high-technology version of guided boring with computerized remote control over the drilling head
- Can traverse large distances horizontally and work at greater depths
- Better guidance and tracking system using radio-driven locator technology to track the drilling head

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Horizontal Directional Drilling

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Steps in HDD

- Preliminary Survey: Gather all details of the project area like location, topography, vicinity, underground activity & utilities
- Planning: Study or drill path area, gradient to be maintained, length of drilling based on
  - Ground Penetrating Radar Survey
  - Soil Testing

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Horizontal Directional Drilling

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Non Surface-launched Trenchless Drilling

- Non surface-launched TTs require entry and exit pit
- These are not done from the ground surface only
- Distinguished from guided boring or HDD by a lack of directional control at the cutting head
- Traditional boring/coring uses a receiving pit to "catch" the drilling apparatus so localized directional control is not required

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Non Surface-launched Trenchless Drilling

- Pipe Pulling/Pushing: Uses hydraulic, mechanical, or air jacks to push/pull a pipe through a horizontal stratum
- Compaction methods: Distinguished from jacking methods because they do not remove soil which is compacted in situ, and remains around the installed pipe.

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Non Surface-launched Trenchless Drilling

- Water Pressure: Used for assisting the drilling or cutting operation. Pressure makes space through the soil for laying of pipe.
- Tunneling: Technique that involves excavating soil or rock at the leading edge of the boring machine and erecting a lining system from within the excavated space

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Ground Penetrating Radar System

- RADAR (Radio Direction and Ranging) technology used for detecting underground utilities.
- Helps identify the utilities like water supply pipeline, power cables, telephone cables
- Helps determine depth and age of utility

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Ground Penetrating Radar System

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Soil Testing & Plastic Index

- Soil tested to determine physical characteristics like hardness, compressive strength, plasticity
- The plastic index, which indicates the ideal working condition for drilling operation to take place, is determined
- The drilling fluid, appropriate to the plastic index, is prepared & supplied to the drilling hole

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Pilot Boring

- A drill bit is chosen depending upon the type of rock material and soil condition
- Soil drilling fluid is prepared according to the Plastic Index
- The data log sheet is prepared based on the surveys and the necessary RPM, Pitch, angle/deflection
- Depths are derived from invert levels along with the pulling force required

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Pilot Boring

- A entry pit and exit pit may be excavated if necessary
- The Pilot bore is drilled slowly maintaining the necessary gradient using the tracking & guidance system.
- The Tracker measures the depth at every meter already marked by lime ($CaCO_3$)

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Tracking

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Reaming

- The pilot drill bit is removed and the reamer of necessary size is attached for enlarging the hole
- Reaming is done in two or three passes with sufficient step increase in the reamer size
- Reaming also evens the bore hole
- Helps stabilize pipe laying by spraying bentonite fluid

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Reamers

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Product Pipe Laying

- Once the hole is ready for the next step: pulling the product pipe
- The reamer in the last pass at the exit location is attached by the product pipe conduit that is prepared
- The pipe is then pulled through the bore hole and placed at the desired location

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Pipelines

Water & Sewerage Pipelines

- HDPE: High Density Polyethylene
  Used for water & sewerage lines. Conform to IS 4984,IS 14333 of grade PE 80 and PE 100

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HDPE Pipelines

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Water & Sewerage Pipelines

- MS Pipes: Mild Steel Pipes, API pipes
  Excellent resistance to corrosion, can withstand high pressure. Conform to IS:1239 / IS:3589 / IS:4270 / IS:1978 /IS 9295 etc.

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Steel Pipelines

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Thank you


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