

SKIPPER

— TRENCHLESS DRILLING —



TRENCHLESS DRILLING CATALOGUE

The Company

Skipper Limited, established in 1981, is the flagship of S K Bansal Group.

With a culture of excellence and orientation to growth, the company is positioned to win the future. Skipper is proactive, progressive and has been steadily improving its competitive advantage.

Strengths include - experienced and visionary management, a skilled and productive workforce, strong balance sheet, niche and high-quality products, strong customer service orientation, ownership of downstream steel-using businesses, strong information technology systems, and an ongoing planned development program.

We have recorded a strong financial performance with an annual turnover exceeding Rs 1165 crore (USD 186.4 million). Our presence in domestic and international markets is growing.

Skipper Limited is an ISO 9001 certified company. Environment and health issues are of great concern at Skipper Limited. We are also an ISO 14001 & ISO 18001 certified company.

The Products

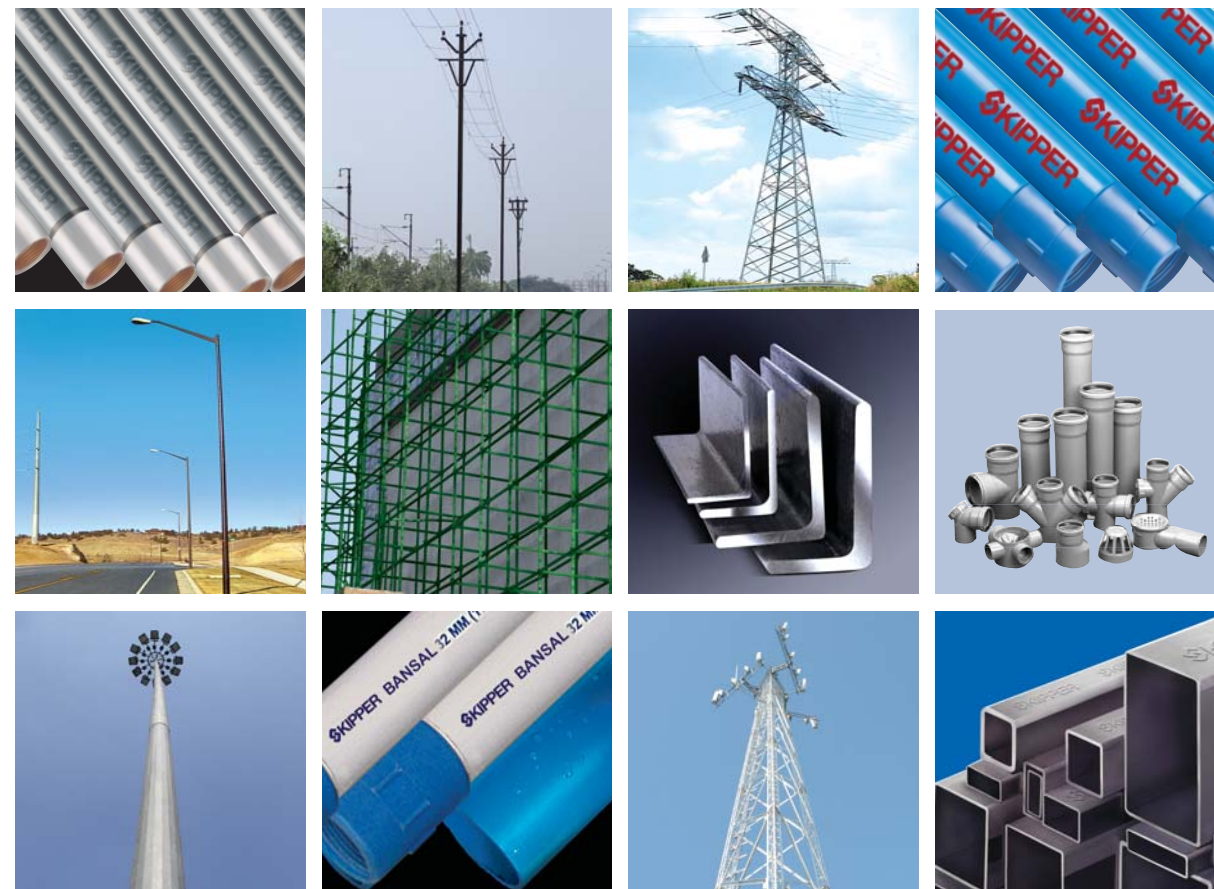
Our product value chain begins with steel billets as inputs from which we manufacture hot-rolled steel coils. The steel coils are used as inputs for the manufacture of steel pipes and tubes and for the manufacture of sections and structurals.

Using the steel pipes and tubes as inputs we further manufacture swaged poles and scaffolding. The sections and structurals are used for the production of steel towers and structures for the power and telecom industries.

With a robust quality assurance plan in place and with processes that use cutting edge technology, our products are manufactured conforming to industry standards.

The company manufactures Hot Rolled products, GI & Black Pipes, PVC and SWR pipes and fittings, Scaffolding Systems, Transmission and Telecom Towers, Swaged, Highmast, Octagonal & Conical Poles. All our products are manufactured according to IS specifications using the latest technology.

Skipper's manufacturing facilities are located in West Bengal at Jangalpur (40,000 sq m) and Uluberia (150,000 sq m).



Trenchless Drilling

Horizontal Directional Drilling method (HDD) or Trenchless Technology (TT) stands for sub-surface construction works and is applied when fewer trenches or non-continuous trenches are required. HDD is a rapidly growing sector of the construction and civil engineering industry.

HDD enables trenchless installation up to 3000 m length below surfaces. HDD is a large-scale, high-technology version of guided boring with computerized remote control over the drilling head. HDD can traverse large distances horizontally and work at greater depths. It provides a superior guidance and tracking system using radio-driven locator technology to track the drilling head.

The steps involved in drilling operation are:

- 1 Planning, preliminary survey
- 2 Selecting the drilling units and drilling tools
- 3 Pilot bore and detection
- 4 Backreaming(s) or upsizing bore(s)
- 5 Pulling in the pipe

Skipper Advantage

Skipper has mid sized HDD Rigs for smaller applications such as river, canal and road crossings up to 550 m. The following are the strengths of Skipper Limited

- Providing services for over a decade
- Technical expertise with a team of professionals
- Financial stability of Skipper ensures that every project is executed successfully
- Rendering HDD Services to eminent clients

Some of Skipper HDD Clients

CESC, KMC, KMDA, WBSEB, KMWSA

Reliance, Vodafone, Airtel

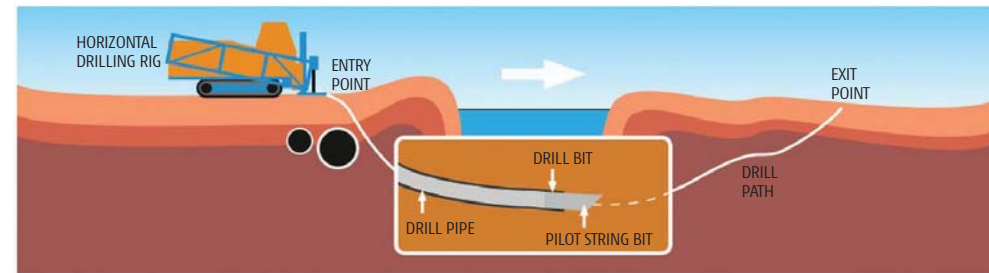
JUSCO, PHED, BSNL, MTNL

TTSL, VSNL, Eastern Command, SIDCGL

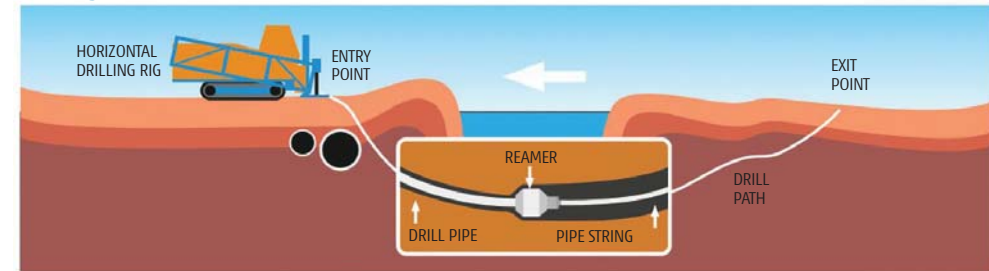
Green Gas, IOCL, OFDC, GAIL, L&T



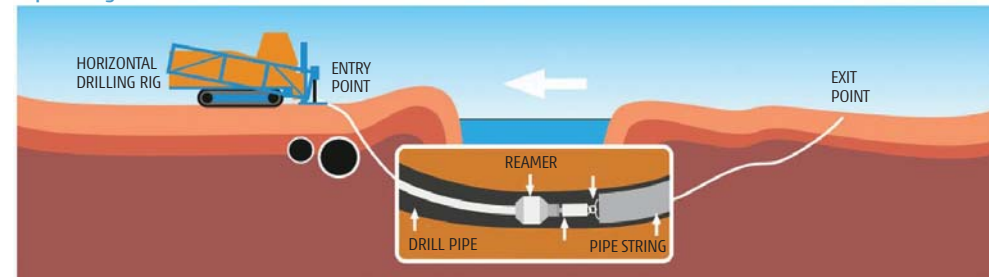
Drilling the Pilot Hole



Reaming the Pilot Hole



Pipe String Pullback



HDD Advantages

- Surfaces worth conserving are neither broken up nor damaged
- Restoration and repair are not required, which leads to high economical advantage
- No public hazard or traffic disturbance
- Low social costs, because detours are avoided
- Short equipping times, short drilling and construction time
- Very economic for river, road, canal, rail track, bridge crossings
- Supported by the dynamic impact of the striking mechanism
- Less chance of accident & injury to workers
- Wide spectrum of applications
- Acknowledged procedure
- Pulling force measurement and position determination possible

HDD Applications

Horizontal directional drilling can be used in many situations where conventional drilling is impossible or cost prohibitive.

- Under buildings, roads, and other surface obstructions
- Under active sites where surface operations preclude disruption or drilling equipment
- To efficiently extract soil vapor
- To treat contaminant plumes through soil venting
- To identify the causes of decreased well performance
- To place leak detection sensors beneath solid or hazardous waste landfills
- To install gas collection systems at landfills or waste dumps
- To stabilizing hillsides for mine waste dumps or other unstable granular soil masses
- To install groundwater collection galleries in shallow aquifers for private or public water supply
- To convey fluids between wells and treatment facilities

GPRS & Soil Testing

Ground Penetrating Radar Survey

RADAR (Radio Direction and Ranging) for detecting underground utilities to determine the depth and age of the utility. How is it done?

Electromagnetic energy is transmitted as a pulse and the detection of that energy which gets reflected from the target. The time delay of reflection indicates the range of the target which helps in identifying utilities like water supply pipeline, power and telecom cables etc.

Soil Testing

The Soil is tested in the laboratory to determine the different physical characteristics like hardness, compressive strength, plasticity etc. The plastic limit is the moisture content at which soil begins to behave as a plastic material.

This plastic index is the ideal working condition for the drilling operation to take place. The drilling fluid is prepared & supplied to the drilling hole so the operation can take place in this plastic index. These limits of soil are referred as Waterberg limits.



HDD Method

Forces applied to the laid pipes

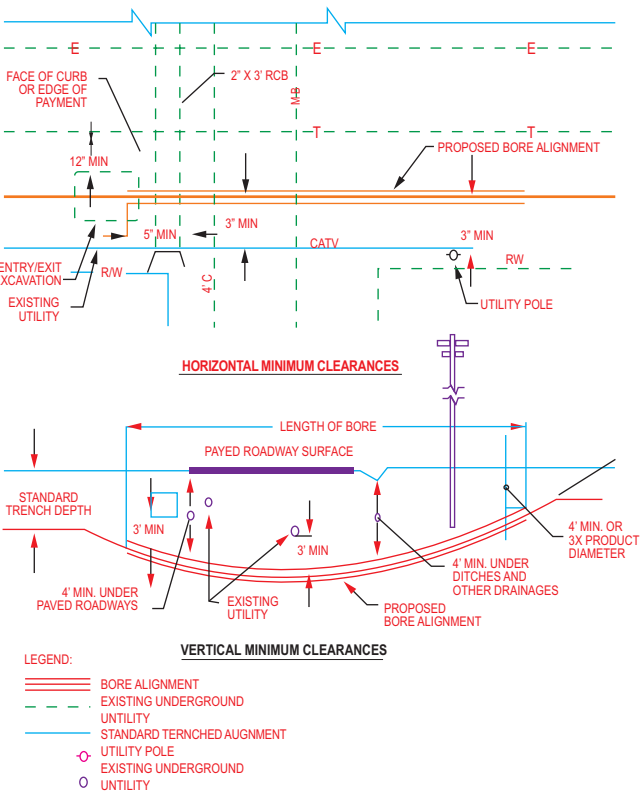
- When the pilot hole is drilled - the pressure force and the torque moment are transferred from the drilling machine via the drilling string to the drilling head
- When extending the hole - the tractive force from the drilling machine is transferred via the drilling string to the backreamer and the connected dragged drilling string
- When laying the pipes - the tractive force from the drilling machine is transferred via the drilling string to the backreamer the laid piping

Flushing Suspension

This is a mixture of bentonite or another suitable material and water of chemical admixtures, it meets the following functions:

- Transfer of the hydraulic energy to the drilling head and the backreamer for cutting and disconnecting in water
- Soil transport and hole cleaning
- Circulation of the flushing suspension
- Lubrication and cooling of the drilling tool
- Supporting and protecting the hole against collapsing

Minimum Clearances



Installation Stages

Installation of a pipeline by HDD is generally accomplished in three stages.

The first stage consists of directionally drilling a small diameter pilot hole along a designed directional path.

The second stage involves enlarging this pilot hole to a diameter suitable for installation of the pipeline.

The third stage consists of pulling the pipeline back into the enlarged hole.

Pilot hole directional control is achieved by using a non-rotating drill string with an asymmetrical leading edge. The asymmetry of the leading edge creates a steering bias while the non-rotating aspect of the drill string allows the steering bias to be held in a specific position while drilling. If a change in direction is required, the drill string is rolled so that the direction of bias is the same as the desired change in direction. Straight progress may be achieved by drilling with a series of offsetting tool face positions.



Installation Notes

- 1 All works shall be in accordance with clients code & specifications
- 2 All HDD installation activities shall be in compliance with the HDD guidelines handbook
- 3 The permitted shall be responsible for notification of one-call service and coordination of all utilities prior to construction
- 4 All construction materials, including drilling fluid, shall be removed from the site prior to restoration of disturbed areas
- 5 All restoration work shall be in accordance with the manual of infrastructure standards for right-of way restoration. In restoring the right-of-way. The permittee guarantees its works
- 6 Excavations under paved surfaces with the dept. Standard details for street trenching



For HDD Projects or Technology related queries contact:
Mr. S. Chakraborty
94330 09125 | shamindra.chakraborty@skipperlimited.com

skipperlimited.com



Skipper Products

Hot Rolled Products | MS & GI Pipes | PVC Pipes & Fittings | SWR Pipes & Fittings
Hollow Sections | Swaged, Highmast, Octagonal & Conical Poles
Scaffolding Systems | Telecom & Transmission Towers



3A Loudon Street, Kolkata 700 017
+91 33 2289 5731 | mail@skipperlimited.com