HDD Training



HDD Planning and Routing

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Pipeline Routing

Pipeline routing is a skill often overlooked on a pipeline project. A skilled pipeline router can make a difficult project much easier and reduce the overall project costs.

When routing pipelines, there are often obstacles that require the route to deviate from the envisioned route. These obstacle include:

- Highways
- Railroads
- Waterways
- Existing Infrastructure
- Underground Utilities
- Landowner Requirements
- Geologic Hazards
- Wetlands or Sensitive Areas

When routing, trenchless crossings are often required to complete the pipeline project.





Routing Considerations



Through the routing process, pipeline routers decide the preferred route by determining the optimal location to cross obstacles along the route.

When conventional open-cut construction methods are either not suitable or regulations prevent obtaining a permit, trenchless methods are evaluated. Some of the trenchless methods used on pipeline projects include:

- Horizontal Directional Drilling
- Conventional Road Bores
- Slickbores
- Microctunneling
- Direct Pipe ®



Routing with HDD in Mind

When routing a pipeline through areas where trenchless methods might be needed, we recommend considering several factors that can reduce complexity and construction costs and increase the feasibility of the trenches crossing. These factors include the following:

- Minimum Required Length
- Physical Obstacles
- River Erosion
- Channel Migration
- DOT and Railroad Requirements
- Topography and Elevation Change
- Geologic Conditions
- Landslide Potential
- Workspaces
- Pipe Stringing Area
- Site Access





Minimum Length HDD

GEOENGINEERS						
MINIMUM CROSSING			10°/8°		12°/10°	
OD	RADIUS	MIN W.T.	HML	MD	HML	MD
8"	800	0.173"	507 ft	23 ft	558 ft	30 ft
12"	1200	0.240"	647 ft	30 ft	726 ft	39 ft
16"	1600	0.320"	790 ft	35 ft	893 ft	48 ft
20"	2000	0.400"	930 ft	41 ft	1061 ft	57 ft
24"	2400	0.480"	1070 ft	47 ft	1229 ft	65 ft
30"	3000	0.600"	1280 ft	56 ft	1480 ft	78 ft
36"	3600	0.720"	1491 ft	65 ft	1732 ft	91 ft
42"	4200	0.840"	1702 ft	74 ft	1984 ft	105 ft
48"	4800	0.960"	1913 ft	84 ft	2235 ft	118 ft

GEOENGINEERS

DESIGN BASIS

ENTRY ANGLE = 10 OR 12 DEGREES

EXIT ANGLE = 8 OR 10 DEGREES

L1 = 60 ft, L2 = 90 ft

MINIMUM WALL THICKNESS, W.T. FOR D/T = 50

HML = HORIZONTAL MINIMUM LENGTH

MD = MINIMUM DEPTH AT TANGENT

ENTRY / EXIT ELEVATIONS ARE EQUAL

CALL (801) 307-0217 FOR MORE INFORMATION

When selecting a site for an HDD, keep in mind the required minimum length for an HDD. The chart to the left shows a range of minimum length HDD lengths for several pipe diameters. The design basis for these lengths include:

- Entry and exit points are at the same elevation.
- The entry angle is either 10 or 12 degrees.
- The exit angle is either 8 or 10 degrees.
- The entry tangent (L1) is 60 feet
- The bottom tangent is 90 feet.
- The radius in feet of the vertical curves is 100*D measured in inches.
- There are not horizontal curves.

If any of these requirements are different from the site conditions, the HDD length will be longer. Often the actual length of a particular HDD is much longer because the entry and exit elevations are different or the HDD must be deeper than the minimum depth to provide enough cover. Subsurface conditions can also make the HDD length longer and the depth deeper.

Other circumstances that could increase the HDD length include:

- Width and depth of obstacle crossed by the HDD.
- Elevation difference between entry and exit sides.
- Subsurface conditions

