

Pipeline Water Crossings

Industry best practices ensuring safe and reliable installations, maintenance and operations

Frequently Asked Questions

How do pipelines cross water bodies?

Pipelines cross rivers and other water bodies primarily in buried trenches, or in more recent construction are drilled underground below the water body. They can also sometimes travel along bridges or be anchored to the bottom of a water body.

How often do pipeline incidents occur in water crossings?

In rare circumstances, flooding can wash away a portion of a riverbed leaving a pipeline exposed and susceptible to breakage. This is sometimes called scouring. A recent PHMSA study found 0.3% of pipeline incidents over the last 20 years had loss of cover at a water crossing as a contributing factor.

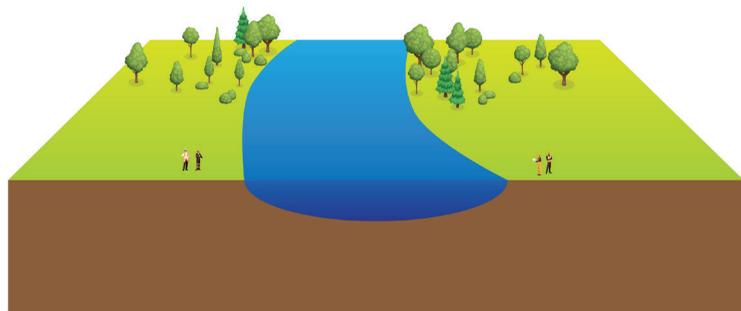
What regulatory requirements address risks at water crossings?

- 49 CFR § 195.401(b) – PHMSA regulations require pipeline operators to address any conditions, including flooding and a lack of depth of cover, that may adversely impact the safe operation of the pipeline
- 49 CFR § 195.452 – PHMSA integrity management regulations require pipeline operators to assess all threats to their pipelines, including flooding and hurricanes and take appropriate preventative and mitigative actions
- 49 CFR § 195.412(b) – PHMSA regulations require operators at intervals not exceeding 5 years to inspect each crossing under a navigable waterway to determine the condition of the crossing
- PHMSA's hazardous liquids NPRM proposes 49 CFR § 195.414, which would require operators inspect pipeline facilities within 72 hours of an extreme weather event such as flooding

Pipelines cross rivers and other water bodies along their routes. Pipelines are buried in trenches, anchored, or drilled beneath water crossings.

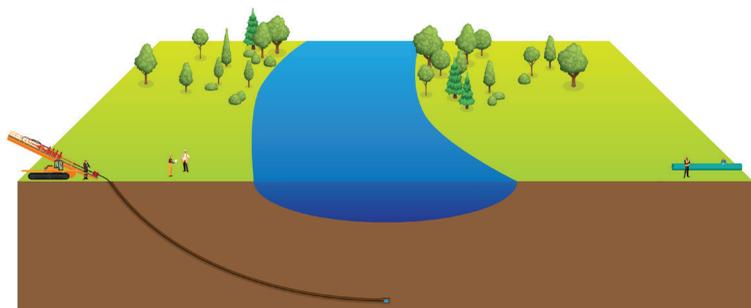
Horizontal Directional Drilling

Horizontal directional drilling (HDD) is an advanced method used in limited situations for installing underground pipelines without digging a surface trench. Specialized equipment is used to drill a path for the pipe from a single surface location to a single exit point, to enable installation of a continuous segment of underground pipe. This pipe installation method limits disturbances to roads, buildings, waterways or sensitive areas.



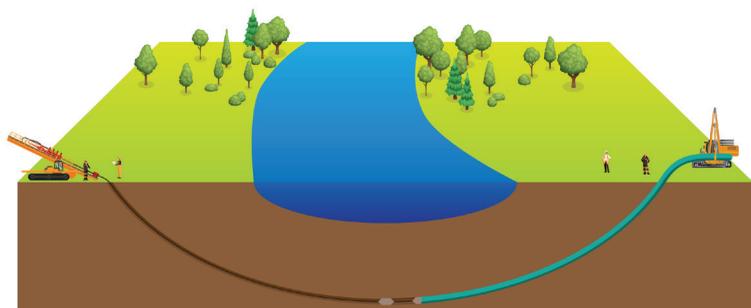
1 Consultation and Planning

Safety, cultural, environmental and infrastructure considerations are addressed in consultation with landowners and local communities before plans are finalized and drilling activity begins. Ground conditions are carefully evaluated before a precise path is determined. Utilities, cultural sites and natural features are located, surveyed and mapped before a precise path is surveyed and determined to avoid disturbing such locations.



2 Pilot Hole

A directional drilling machine bores a small-diameter hole along the predetermined path. Drilling fluid, sometimes also known as "drilling mud," is used to aid the drilling of pilot holes.



3 Pulling the Pipe

The hole is then enlarged and the pipe is pulled back through the bore hole.

What actions are operators taking to reduce water crossing risks?

Many operators with a significant number of water crossings are implementing programs to survey their crossings and take appropriate actions including:

Survey crossings to determine depth of cover and identify those prone to erosion and waterchannel changes – annually on priority crossings, post significant flood events and all crossings re-surveyed at least every 5 years

- Develop metrics to determine priority crossings based on: depth of cover, channel migration & scour potential, debris potential and consequences
- Choose permanent mitigation action and execute according to priority ranking: Horizontal Directional Drills (HDDs), new trenched crossings below scour depth, additional fill, rock drops or concrete matting and/or bank stabilization
- On-going real-time monitoring program for flood events using USGS Water Alert System where available, proactive monitoring of snow levels prior to runoff, with pre-established flow rate triggers
- On-going pipeline integrity management with in-line inspection ILLI “smart pig” tools to scan for dents or other damage to pipelines
- Constant leak detection monitoring of pipelines for changes in pipeline pressure or flow rates

What industry-wide actions are underway to reduce water crossing risks?

The pipeline industry is currently updating its industry-wide recommended practice for water crossings API RP 1133 to include the latest best practices from operators at the forefront of this issue. Executives of the pipeline members of the American Petroleum Institute and the Association of Oil Pipe Lines recently designated as a Strategic Initiative updating industry-wide guidance for water crossings, ensuring it receives the necessary support and resources for an expedited completion. The updated document will include extensive new guidance on surveying, monitoring and protecting water crossings.

Bottom Line:

PHMSA regulations and pipeline operator integrity management plans require monitoring and protecting pipeline water crossings. Pipeline operators are updating an industry-wide recommended practice for ensuring the safety of water crossings.

