

# How do pipeline companies inspect and repair operating pipelines?

*About Pipelines* is a series, dedicated to sharing the facts about transmission pipelines in Canada and their role in Canadians' lives. This information is provided by the Canadian Energy Pipeline Association (CEPA).

1

**DID YOU KNOW?**

**Pipeline monitoring and inspection**

Pipelines are monitored 24/7, 365 days a year. If a change is detected, the pipeline system is managed quickly from sophisticated control rooms.

2

Diagnostic tools called smart pigs, travel through pipelines using magnetic sensors to detect pipeline anomalies.

3

Aircraft, like helicopters or drones, and people are used to monitor the pipeline right-of-way, looking for signs of erosion or other issues.

**Canada's transmission pipelines would circle the earth two and a half times if they were laid end-to-end. Our underground pipeline system may be extensive, but so are the pipeline integrity programs operators use to monitor, inspect and maintain their pipelines.**

**Keeping close watch**

In the pipeline industry, integrity is about preventing spills and leaks from occurring in the first place by making sure pipelines are built and operated to be as safe as possible.

That's why – from the moment construction begins until the day it is retired – a pipeline is subject to regular and thorough inspections, including:

- Examining pipelines with visual, x-ray, ultrasound and magnetic particle inspections
- Using aerial surveillance
- Having employees walk the right-of-way
- Inspecting inside the pipeline with diagnostic tools called smart pigs

These inspections look for anomalies, such as metal loss or corrosion, both inside and outside the pipeline wall, which are generally caused by

welding defects, damage from unauthorized third-party digging, unstable slopes or corrosion.

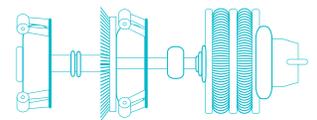
When an inspection detects an anomaly, the operator evaluates the anomaly and takes the required steps to ensure the continued integrity of the pipeline.

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**Unearthing the issues**

This is where an integrity dig comes in. A section of pipeline is excavated to give pipeline operators an up-close view of the pipeline to determine if a repair or replacement is required.

The process – which includes cleaning the pipe segment, conducting tests to determine the source of the anomaly and recoating the pipeline to prevent corrosion or damage – is one of the most effective ways to proactively prevent a spill or leak.



**Intelligent design**

Smart pigs are like tiny submarines, travelling inside the pipeline using sophisticated magnetic sensors to look for anomalies on both the inside and outside of the pipeline wall. Not only can smart pigs measure the size and location of these anomalies, they also monitor them over time to see if they are changing or growing in severity.

## Integrity Digs

### Steps in an integrity dig

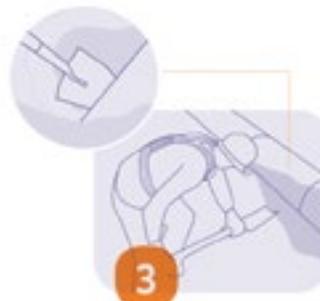
An integrity dig is a precise operation that spans several days. Here's what the process looks like.



**1** Determine the exact location of integrity dig using information from the in-line inspection. Notify and cooperate with affected landowners to ensure their circumstances are considered.



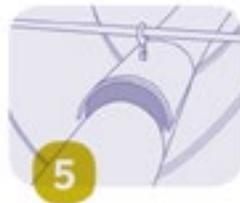
**2** Create a safe work environment – including using a One-Call service to have location of buried facilities marked, establishing a route to the site and setting up protection from the weather, like snow fences.



**3** Strip the top soil, followed by the other soil layers – carefully preserving each layer to be re-used later. Excavate to expose the pipe using a procedure that ensures the safety of the pipe. Confirm the precise location of the anomaly.



**4** Remove the coating, clean the pipe surface, and visually inspect any anomalies with magnetic particle inspection and ultrasonics. Divert the product around the segment that's being repaired.



**5** Maintain or repair the pipe segment, if necessary. This may require placing a protective sleeve over the anomaly or replacing the short segment. Recoat the pipe with a high performance coating.



**6** Backfill the excavation carefully, removing any rocks or other objects that could damage the pipe. Clean up and return the land to its original state.



### What's an 'anomaly'?

When we talk about pipeline anomalies, we are referring to anything that seems out of the ordinary on the line. It includes:

- corrosion
- dents
- metal loss
- geotechnical issues

Disturbing the land to conduct an integrity dig is something pipeline operators take very seriously. That's why planning and preparation for this type of inspection includes environmental assessments, reviewing agreements and consulting with impacted landowners, Aboriginal communities and municipal authorities on the timelines, construction methods and other key considerations.

Integrity digs also follow the strict regulations and standards of the appropriate regulator. If the

pipeline crosses provincial or international borders, it's the National Energy Board; otherwise it's the provincial regulator.

These regulations, along with the high safety standards of the pipeline industry, mean that thousands of safety inspections are conducted each year – ensuring our pipeline systems are operating safely, energy is delivered reliably and Canadians and the environment are protected.

[www.aboutpipelines.com/en/safety/pipeline-integrity](http://www.aboutpipelines.com/en/safety/pipeline-integrity)

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