

Researchers suggest coal ash and tailings dam disasters could be prevented

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A trio of researchers from the King Abdullah University of Science and Technology, the University of the Witwatersrand and Geosyntec has published a Perspectives piece in the journal *Science*. Carlos

Santamarina, Luis Torres-Cruz and Robert Bachus note in the article that many lives are lost each year when coal ash or tailings dams fail, causing mudslides. Many such failures are preventable.

Iron mining produces a [waste product](#) known as tailings. Tailings are typically dumped into man-made ponds, which are more often than not dammed up to prevent them from oozing downhill when it rains. Similar ponds are constructed to contain [coal ash](#) waste produced by coal power plants. Besides representing a pollution problem, the ponds are also mudslide hazards. The researchers point out that thousands of people around the world have been killed by such mudslides over the past century. They suggest it is time that governments engage more fully with those building and maintaining such ponds.

The researchers note that mudslides from tailings or [coal](#) ash occur when the dam holding the material gives way. Many people believe that the reason such dams give way is because of the [pond](#) contents and what happens to them. Evidence of liquefaction of pond materials is almost always in evidence along mudslide routes. But prior study has shown that liquefaction almost always happens after the dam gives way, not before. Instead, the researchers suggest that the major reason for most of the disasters is failure to follow best engineering practices in building and maintaining the dams.

One of the biggest problems, the researchers point out, is that proper action is not taken during heavy rain causing overflow, which puts excess stress on the dam. Another problem is layering on the bottom of such ponds that result in deposits with different hydromechanical properties—this usually leads to weaknesses in the system. Also, cementation can loosen sediment structures, which can also weaken the system. And problems can also develop when material is compressed near the dam. They note also that preexisting weaknesses in the foundation of the dam can lead to failure later, and so can piping erosion

or mineral buildup.

The researchers conclude by suggesting more attention to such ponds, because the mudslides that can result when they fail appear to be far more preventable than many in the field have suggested.

More information: J. Carlos Santamarina et al. Why coal ash and tailings dam disasters occur, *Science* (2019). [DOI: 10.1126/science.aax1927](https://doi.org/10.1126/science.aax1927)

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