A chronology of major tailings dam failures

2000 - 2020

K2fly's Dams & Tailings solution is trusted by Environmental, Tailings, Geotechnical and Management teams globally to help improve compliance and provide the visibility to reduce risks and support accurate disclosure to industry bodies.

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The risks and dangers of tailings

As you will see in this guide, these tailings failures and disasters can lead to:

- Fatalities
- Missing people
- Injuries
- Compromised transport routes including roads, bridges and railways
- Illness
- River pollution
- Flora and fauna damage and contamination
- Power disruption
- Utility damage
- Drainage contamination
- Flooding
- Water contamination
- Mud slides and spills
- Villages submerged
- Homes lost

Don't wait for this to happen. Be proactive and take preventative steps today.



Powerful monitoring and management rolled into one easy-to-use cloud platform

- · View real-time data and receive exceedance alerts
- Monitor land movement with remote sensing and InSAR datasets
- · Visualise real-time LiDAR data with insights into dam movement
- · Securely store and access all of your tailings data in the one place
- Upload and reference key documentation
- Visualise facilities across multiple sites in a single screen on a geospatial map
- Monitor your facilities with InSAR, LiDAR, DEM and more
- Capture a wide range of monitoring data and indicators such as surface and groundwater, decant pond water levels and quality, and embankment conditions
- Capture and track obligations and conditions around your license to operate to manage your key risks and actions
- Action and task delegation for data collection with reminders
- Maintain and track environmental monitoring compliance limits and exceedances
- Manage and engage with all of your stakeholders with one central repository
- Convert your engagements into actionable outcomes
- Forecast, plan and track your sites activities using IBM's Weather data
- Create corporate report templates and meet requests for data provision from industry groups such as ICMM, Global Tailings Portal, PRI, and UNEP
- Integration capability with third party systems or public portals such as the Global Tailings Portal

Reduce risk Improve safety Increase social license





Hpakant, Kachin State, Myanmar



Waste heap failure



Unknown **сомрану**



Jade ore type



Unknown Release (M³)

IMPACTS

Following heavy rain, mining waste collapsed into a lake, triggering a 6.1-meter (20 ft) wave of mud and water that buried many workers. At least 174 people were killed and 100 missing.





San José de Los Manzanos, Canelas, Durango, Mexico



Tailings dam failure



Exportaciones de Minerales de Topia SA (EMITSA)



Lead, Zinc



6,000 **RELEASE (М³)**

IMPACTS

The tailings spilled on a nearby road and 8,000 m2 of land, reaching the San Bernabé stream after 5km and the town of the same name



Tieli, Yichun City, Heilongjiang Province, China



Well overflow, release of water and tailings $\ensuremath{\mathsf{INCIDENT\ TYPE}}$



Yichun Luming Mining Co., Ltd



Molybdenum



2,530,000 RELEASE (M³)

IMPACTS

Water and tailings flowed through the surrounding area, reaching Yijimi river after 3km, threatening the drinking water of 68,000 people in Tieli City. By 4 April 2020, the pollution reached 208km downstream.





Nossa Senhora do Livramento, Mato Grosso, Brazil



Tailings dam failure INCIDENT TYPE



VM Mineração e Construção, Cuiabá **Сомрану**



Gold ore type



Unknown **release (<u>M</u>³)**

IMPACTS

Tailings flowed for 1-2km and included the disruption of a power line





Cobriza mine, San Pedro de Coris district, Churcampa province, Huancavelica region, Peru



Tailings dam failure



Doe Run Perú S.R.L. Company



Copper



67,488 **RELEASE (M³)**

IMPACTS

Tailings covered an area of 41,574m² and reached Mantaro River



Hpakant, Kachin state, Myanmar



Waste heap failure



Shwe Nagar Koe Kaung Gems Co. Ltd.



Jade ore type



Unknown Release (M³)

IMPACTS

3 workers killed, 54 workers missing





Muri, Jharkhand, India



Mud tailings pond failure



Hindalco Industries Limited



Bauxite ore type



Unknown Release (M³)

IMPACTS

Spill of red mud over 35 acres and a nearby railway line. The final number of casualties are unclear.





Machadinho d'Oeste, Oriente Novo, Rondônia, Brazil



Tailings dam disaster INCIDENT TYPE



Metalmig Mineração Indústria e Comércio S/A сомрану



Tin ore type



Unknown Release (M³)

IMPACTS

An inactive tailings dam was damaged after heavy ran. It resulted in damage to seven bridges, leaving 100 families isolated.





Córrego de Feijão mine, Brumadinho, Região Metropolitana de Belo Horizonte, Minas Gerais, Brazil



Tailings dam disaster INCIDENT TYPE



Vale SA



Iron Ore type



12,000,000 RELEASE (M³)

IMPACTS

The tailings wave devastated the mines loading station, its administrative area, and two smaller sediment retention basins. It then traveled approximately 7km downhill until reaching Rio Paraopeba, destroying a bridge of the mines railway branch, and spreading to parts of the local community Vila Ferteco, near the town of Brumadinho. The slurry was then carried further by Rio Paraopeba. 259 people were killed, and 11 were reported missing.





Cieneguita mine, Urique, Chihuahua, Mexico



Tailings dam failure



Minera Rio Tinto COMPANY



Gold, silver ORE TYPE



249,000 of tailings and 190,000 of embankment RELEASE (M³)

IMPACTS

Tailings release travelled 29km downstream; most of the tailings were deposited along the course of the Cañitas River. Three workers were killed, two wounded, and four were reported missing.





Cadia, New South Wales, Australia



Tailings dam failure INCIDENT TYPE

Newcrest Mining Ltd



Gold, copper ore type



1,330,000 **release (m³)**

IMPACTS

Embankment failure resulted in "limited breakthrough" of tailings material from the northern to the southern tailings dam. The breakthrough was contained within the southern tailings dam. The failure was attributed to the existence of a low-density foundation layer in the vicinity of the slump.





Huancapatí, Recuay province, Áncash region, Peru



Tailings collapse



Compañía Minera Lincuna SA сомраму



Gold, copper ore type



80,000 RELEASE (M³)

IMPACTS

The incident contaminated crops, the Sipchoc creek and the Santa river.





Barcarena, Pará, Brazil



Overflow of red mud basin INCIDENT TYPE



Hydro Alunorte / Norsk Hydro ASA



Bauxite



Unknown Release (M³)

IMPACTS

Highly alkaline and metal-laden liquids flooded the surrounding residential areas, rendering the drinking water supply in the area unusable.





Kokoya Gold Mine, Bong County, Liberia



Geo-membrane layer rupture and overflow INCIDENT TYPE



MNG Gold Liberia (Redwood Global Inc) сомрану



Gold Ore type

11,500 **RELEASE (M³)**



IMPACTS

30 people became ill as a result of pollution of the creek due to the chemical spill. Note: this cause for the illnesses reported was later disputed.





Mishor Rotem, Israel



Dam failure INCIDENT TYPE

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Rotem Amfert Negev Ltd., Israel Chemicals (ICL) COMPANY



Phosphate ore type



100,000 **RELEASE (M³)**

IMPACTS

The toxic wastewater surged through the dry Ashalim riverbed and left a wake of ecological destruction more than 20km long.





Tonglvshan Mine, Hubei province, China



Tailings dam failure

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China Daye Non-Ferrous Metals Mining Limited COMPANY



Copper, gold, silver, iron



200,000 RELEASE (M³)

IMPACTS

The tailings flooded the fish pond downstream of approximately 27 hectares. Two persons were reported dead and one was reported missing.





Satemu, Hpakant, Kachin state, Myanmar



Waste heap failure



Jade Palace Company сомрану



Jade ore type



Unknown RELEASE (M³)

IMPACTS

Approximately 50 workers went missing.





Antamok mine (inactive), Itogon, Benguet province, Philippines



Tailings flow through drain tunnel INCIDENT TYPE



Benguet Corp. **Сомрану**



Gold ore type



50,000 **RELEASE (M³)**

IMPACTS

The leaked tailings flowed into Liang, Ambalanga and Agno rivers.





New Wales plant, Mulberry, Polk County, Florida, USA



Sinkhole in a phosphogypsum stack INCIDENT TYPE



Mosaic Co сомрану



Phosphate ore type



840,000 Release (M³)







Dahegou Village, Luoyang, Henan province, China



Tailings failure



Luoyang Xiangjiang Wanji Aluminium Co., Ltd. сомрану



Bauxite ore type



Unknown Release (M³)

IMPACTS

Village totally submerged in red mud, around 300 villagers evacuated, and many farm and domestic animals were killed.





Lamaungkone, Hpakant, Kachin state, Myanmar



Waste heap failure



Tun Tauk Zabu jade mining company **COMPANY**



Jade ore type



Unknown Release (M³)

IMPACTS

1 worker killed, approximately 20 others missing.





San Kat Kuu, Hpakant, Kachin state, Myanmar



Waste heap failure



Hlan Shan Myonwesu, Yadanar Yong Chi, Yadanar Aung сомрану



Jade ore type



Unknown Release (M³)

IMPACTS

At least 113 people killed





Germano mine, Bento Rodrigues, distrito de Mariana, Região Central, Minas Gerais, Brazil



Tailings failure



Samarco Mineração S.A.



Iron Ore type



32,000,000 RELEASE (M³)

IMPACTS

Slurry wave flooded town of Bento Rodrigues, destroying 158 homes, at least 17 persons killed and 2 reported missing. The slurry polluted the North Gualaxo River, Carmel River and Rio Doce over 663km, destroying 15 square kilometers of land along the rivers and cutting residents off from potable water supply.





Herculano mine, Itabirito, Região Central, Minas Gerais, Brazil



Tailings dam failure



Herculano Mineração Ltda



ORE TYPE



Unknown Release (M³)

IMPACTS

Two workers killed and one missing.





Buenavista del Cobre mine, Cananea, Sonora, Mexico



Tailings collapse



Southern Copper Corp



Copper ore type



40,000 release (m³)

IMPACTS

Flow into the 420km-long Bacanuchi river waterway, a tributary of the Sonora River, directly affecting 800,000 people.





Mount Polley mine, near Likely, British Columbia, Canada



Tailings dam failure



Imperial Metals Corp



Copper, gold



7,300,000 RELEASE (M³)

IMPACTS

Tailings flowing into adjacent Polley Lake and, through Hazeltine Creek, into Quesnel Lake (Mitchell Bay).





Dan River Steam Station, Eden, North Carolina, USA



Tailings collapse



Duke Energy **сомрану**



Coal ash ore type



82,000 **RELEASE (M³)**

IMPACTS

Ash flowing through drainage pipe into Dan River.





Zangezur Copper Molybdenum Combine, Kajaran, Syunik province, Armenia



Tailings pipeline damage



Cronimet Mining AG



Copper, molybdenum



Unknown Release (M³)

IMPACTS

Tailings flowing into Norashenik River for several days.





Obed Mountain Coal Mine, northeast of Hinton, Alberta, Canada



Breach of wall in containment pond INCIDENT TYPE



Sherritt International



Coal ore type



670,000 **RELEASE (M³)**

IMPACTS

Plume of slurry containing fine coal particles, clay and heavy metals into the Apetowun und Plate creeks and eventually the Athabasca River.





Former Gullbridge mine site, Newfoundland, Canada



Embankment dam failure



Unknown **сомрану**



Copper ore type



Unknown release (m³)

IMPACTS

Non-consumption water advisory was issued for the Town of South Brook.





Sotkamo, Kainuu province, Finland



Leak from gypsum pond INCIDENT TYPE



Talvivaara Mining Company Plc COMPANY



Nickel, Uranium (by-product planned) **ORE TYPE**



Unknown Release (M³)

IMPACTS

Nickel and zinc concentrations in nearby Snow River exceeded the values that are harmful to organisms tenfold or even a hundredfold, uranium concentrations more than tenfold.





Padcal mine, Itogon, Benguet province, Philippines



Tailings pond breach INCIDENT TYPE



Philex Mining Corp.



Copper, gold ore type



20,600,000 RELEASE (M³)

IMPACTS

Tailings discharged into the Balog River, which flows to the Agno River.





Mianyang City, Songpan County, Sichuan Province, China



Tailings dam damage INCIDENT TYPE



Xichuan Minjiang Electrolytic Manganese Plant COMPANY



Manganese ore type



Unknown Release (M³)

IMPACTS

Tailings damaged residential roads and houses, forcing 272 people to leave. Tailings were washed into the Fujiang River, leaving 200,000 people without drinking water supply.





Bloom Lake mine, Fermont, Québec, Canada



Dam beach of tailings pond



Bloom Lake General Partner Ltd.



Iron Ore type



200,000 RELEASE (M³)







Kolontár, Hungary



Tailings dam failure



MAL Magyar Alumínium



Bauxite ore type



700,000 **RELEASE (M³)**

IMPACTS

Several towns flooded, 10 people killed, approximately 120 people injured and 8 square kilometres flooded.





Huancavelica, Peru

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Unidad Minera Caudalosa Chica сомраму

Tailings dam failure INCIDENT TYPE



Unknown ore type



21,420 **release (m³)**

IMPACTS

Contamination of Río Escalera and Río Opamayo 110km downstream.





Karamken, Magadan region, Russia



Tailings dam failure INCIDENT TYPE



Karamken Minerals Processing Plant



Gold ore type



150,000 tailings and 1,000,000 water RELEASE (M³)

IMPACTS

Eleven homes were carried away by the mudflow and at least one person was killed.





Huayuan County, Xiangxi Autonomous Prefecture, Hunan Province, China



Tailings dam failure



Unknown **сомрану**



Manganese ore type



Unknown Release (M³)

IMPACTS

The landslide set off by the tailings dam failure destroyed a home, killing three and injuring four people.





Barcarena, Pará, Brazil



Overflow of drainage channels



Hydro Alunorte / Norsk Hydro ASA Сомрану



Bauxite ore type



Unknown **release (m³)**







Kingston fossil plant, Harriman, Tennessee, USA



Retention wall failure



Tennessee Valley Authority



Coal ash



5,400,000 RELEASE (M³)

IMPACTS

The ash slide covered 400 acres [1.6 square kilometres] as deep as 6 feet [1.83 metres]. The wave of ash and mud toppled power lines, covered Swan Pond Road and ruptured a gas line. It damaged 12 homes, and one person had to be rescued, though no one was seriously hurt.





Taoshi, Linfen City, Xiangfen county, Shanxi province, China



Waste-product reservoir collapse INCIDENT TYPE



Tashan mining company



IFON ORE TYPE



190,000 **RELEASE (M³)**

IMPACTS

A mudslide several metres high flowed 2.5 km downstream, buried a market, several homes and a three-storey building. 277 people were killed and 33 injured.





Miraí, Minas Gerais, Brazil



Tailings dam failure



Mineração Rio Pomba Cataguases Ltda сомрану



Bauxite



2,000,000 RELEASE (M³)

IMPACTS

The mud flow left about 4,000 residents of the cities of Miraí and Muriaé in the Zona da Mata homeless. Crops and pastures were destroyed and the water supply was compromised in cities in the states of Minas Gerais and Rio de Janeiro.





Nchanga, Chingola, Zambia



Tailings slurry pipeline failure



Konkola Copper Mines Plc (KCM) Vedanta Resources plc сомрану



Copper ore type



Unknown release (m³)

IMPACTS

Release of highly acidic tailings into Kafue river; high concentrations of copper, manganese, cobalt in river water; drinking water supply of downstream communities shut down.





Near Miliang, Zhen'an County, Shangluo, Shaanxi Province, China



Tailings dam failure INCIDENT TYPE



Zhen'an County Gold Mining Co. Ltd.



Gold



Unknown Release (M³)

IMPACTS

The landslide buried about 40 rooms of nine households, killing 17 residents. Five injured people were taken to hospital. More than 130 local residents were evacuated. Toxic potassium cyanide was released into the Huashui river, contaminating it approximately 5km downstream.





Bangs Lake, Jackson County, Mississippi, USA



Phosphogypsum stack failure INCIDENT TYPE



Mississippi Phosphates Corp



Phosphate ore type



17,000,000 **RELEASE (GALLONS)**

IMPACTS

Liquid poured into adjacent marsh lands, causing vegetation to die.

Mississippi Phosphates Corporation® PASCAGOULA PLANT





Riverview, Florida, USA

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Collapse of a dike at the top of a stack INCIDENT TYPE



Cargill Crop Nutrition



Phosphate ore type

227,000 RELEASE (M³)



IMPACTS

60,000,000 gallons of acidic liquid spilled into Archie Creek that leads to Hillsborough Bay.





Partizansk, Primorski Krai, Russia



Dike break resulting in a hole in the dam **INCIDENT TYPE**



Dalenergo сомрану



Coal ash

160.000

RELEASE (M³)



IMPACTS

The ash flowed through a drainage canal into a tributary to the Partizanskaya River which empties in to Nahodka Bay in Primorski Krai (east of Vladivostok).





Malvési, Aude, France



Dam failure INCIDENT TYPE



Comurhex (Cogéma/Areva) сомраму



Uranium ore type



30,000 **RELEASE (М³)**

IMPACTS

Release led to elevated nitrate concentrations of up to 170 mg/L in the canal of Tauran for several weeks.





Cerro Negro, Petorca prov., Quinta region, Chile



Tailings dam failure



Cia Minera Cerro Negro



Copper ore type



50,000 RELEASE (M³)

IMPACTS

Tailings flowed 20 kilometers downstream the río La Ligua.





27 August / 11 September 2002

San Marcelino, Zambales, Philippines



Tailings collapse



Dizon Copper Silver Mines, Inc.



Unknown ore type



Unknown Release (M³)

IMPACTS

On 27 August, some tailings spilled into Mapanuepe Lake and eventually into the Sto. Tomas River. On 11 September, low lying villages were flooded with mine waste. 250 families were evacuated.





Sebastião das Águas Claras, Nova Lima district, Minas Gerais, Brazil



Tailings collapse INCIDENT TYPE



Mineração Rio Verde Ltda



ORE TYPE



Unknown Release (M³)

IMPACTS

Tailings wave traveled at least 6km, killing at least two mine workers. Three workers went missing.





Nandan Tin mine, Dachang, Guangxi province, China



Failure of upstream dam



Unknown **сомрану**



Tin ore type



Unknown Release (M³)

IMPACTS

28 people killed; more than 100 houses destroyed.





Inez, Martin County, Kentucky, USA



Tailings dam failure



Martin County Coal Corporation



Coal ORE TYPE



950,000 **release (m³)**

IMPACTS

About 75 miles (120 km) of rivers and streams turned an irridescent black, causing a fish kill along the Tug Fork of the Big Sandy River and some of its tributaries. Towns along the Tug were forced to turn off their drinking water intakes.





Aitik mine, Gällivare, Sweden



Tailings dam failure



Boliden Ltd сомрану



Copper ore type



2,500,000 RELEASE (M³)

IMPACTS

Release of 2,500,000m³ of liquid into an adjacent settling pond, subsequent release of 1,500,000m³ of water (carrying some residual slurry) from the settling pond into the environment.





Borsa, Romania



Tailings dam failure



Remin S.A. **сомрану**



Cyanide ore type



22,000 Release (tonnes)

IMPACTS

Contamination of the Vaser stream, tributary of the Tisza River.





Baia Mare, Romania



Tailings dam crest failure



Aurul S.A. (Esmeralda Exploration)



Gold ore type



100,000 **RELEASE (M³)**

IMPACTS

Contamination of the Somes/Szamos stream, tributary of the Tisza River, killing tonnes of fish and poisoning the drinking water of more than 2 million people in Hungary.





