Supplementary Materials

Table S1. Earth-Rock Dam Failure Accident Dataset.

Serial Number	Name	Description of Accident Cause	Safety Status
1	Alba'ate Dam	Flooding occurred, with water level rising rapidly; the discharge from the spillway increased. Additionally, the reservoir suffered from severe siltation, reduced flood regulation capacity, and lack of maintenance and management.	breached
2	Kurakhov Reservoir Dam	River water level rose.	breached
3	Kiev Hydropower Dam	Subjected to an attack.	non-breached
4	Lake Livingston Dam	Heavy rainfall.	non-breached
5	Teestav Hydropower Dam	Landslide	non-breached
6	Rapidan Dam	Heavy rainstorm	non-breached
7	Albilad Dam	Hurricane attack and exceedance flood	breached
8	Abu Mansour Dam	Hurricane attack and exceedance flood	breached
9	Kiyalimskoye Reservoir Dam	Exceedance flood.	breached
10	White Sea-Baltic Canal Dam	Exceedance flood	breached
11	Konkhoy Dam	Exceedance flood	breached
12	A Dam in California	Water level rose rapidly, excessive flow in the spillway, seepage occurred, and partial damage to the dam structure.	non-breached
13	A Dam in Southern Brazil	Heavy rain caused water level to exceed the warning line, and cracks appeared in the dam body.	non-breached
14	A Dam in Montana	Snowmelt and heavy rain led to dangerous conditions such as seepage and dam slope instability.	non-breached
15	A Dam in Kenya	Earth-Rock Dam | Heavy rainfall caused rapid rise in water level, with dangerous conditions like dam leakage and landslides.	non-breached
16	A Dam in Hawaii, USA	Dry cracks in the dam body.	non-breached
17	Dalnerechensk Town Dam	Overtopping.	breached
18	A Dam in Kerala, India	Heavy rain led to leakage and partial collapse of the dam body.	non-breached

19	A Dam in Washington State, USA	Foundation seepage and surface cracks in the dam body.	non-breached
20	Sardoba Reservoir Dam	The dam material had low clay content, poor impermeability and erosion resistance, resulting in seepage problems.	non-breached
21	A Dam in British Columbia	Heavy rain caused rapid rise in water level and dam leakage.	non-breached
22	Yong'an Reservoir	Extreme rainfall.	breached
23	Guojiazui Reservoir	Extreme rainfall.	non-breached
24	Steinbach Reservoir	Heavy rainfall.	non-breached
25	Xigou Reservoir	Extreme rainfall caused overtopping, and partial collapse of the dam body.	non-breached
26	Nantang Reservoir	Insufficient flood control capacity and structural aging.	non-breached
27	Yapo Reservoir	Leakage and insufficient flood control standards.	non-breached
28	Dapo Reservoir	Leakage and insufficient stability of the dam body.	non-breached
29	Edenville Dam	Extreme rainfall, deep sliding and breaching of the left dam section due to seepage failure.	breached
30	Sanford Dam	Exceedance flood	breached
31	Sardoba Reservoir	Poor impermeability of dam materials and exceedance flood.	breached
32	Teton Dam	Design and construction defects, including substandard filling materials in the key trenches of the dam's cut-off wall, led to internal rupture, seepage, and subsequent internal erosion.	breached
33	Dunlap Lake Dam	Accidental collapse of the spillway.	breached
34	Sayano-Shushenskaya Dam	Turbine explosion caused flooding in the powerhouse.	breached
35	Otsego County Dam	Continuous heavy rain caused a sharp rise in reservoir water level, with mud flow and valve failure in the dam.	non-breached
36	Myitkyina Reservoir	Continuous heavy rain caused cracks in the dam body and water leakage from the reservoir.	non-breached
37	Brumadinho Tailings Dam	Sudden breach due to structural defects.	breached
38	Whalley Bridge Dam	Heavy rainfall caused collapse of the top of the outer slope.	non-breached
39	Mettur Dam	Dam leakage due to construction quality defects.	non-breached
40	Palo Alto Dam	Shrinkage cracks in the dam body, with leakage risk.	non-breached
41	Spence Dam	Extreme rainfall caused structural instability of the dam body, and breach after overtopping.	breached
42	Sangpian-Sannannei Dam	Foundation seepage instability of the auxiliary dam due to construction quality defects and extreme rainfall.	breached

43	Patel Mirmet Dam	Continuous heavy rain triggered structural instability of the dam body, and breach after overtopping.	breached
44	A Dam in Maharashtra	Cracks and seepage problems in the dam body.	non-breached
45	Oroville Dam	Abnormal drop in water level due to prolonged drought, exposing foundation settlement issues.	non-breached
46	Oroville Dam	Spillway damage and design defects.	non-breached
47	Tabqa Dam	Dam body damage due to attack.	non-breached
48	Dam in Xaysomboun Province	Exceedance flood.	breached
49	Lake Mead Dam	Sharp rise in water level due to spring snowmelt and heavy rain, leading to overtopping and breach.	breached
50	A Dam in Germany	Structural damage to the dam body caused by freeze-thaw cycles.	non-breached
51	Reservoir Group in Gujarat	Insufficient flood control standards and blocked spillway.	non-breached
52	A Small Reservoir in China	Foundation leakage	non-breached
53	Oroville Dam	Severe erosion and collapse of the main spillway.	non-breached
54	Samarco Reservoir	Overloading of wastewater and equipment failure.	breached
55	Zhengjiahe Reservoir	Exceedance flood, spillway floor scoured and destroyed, leakage at the junction of main and auxiliary dams.	non-breached
56	Hongyan Reservoir	Dam landslide caused by heavy rainfall.	breached
57	Conakry Reservoir	Water level exceeded the warning line due to blocked spillway, with cracks appearing in the dam body	non-breached
58	Tarbela Dam	Foundation leakage and structural aging	non-breached
59	Tehran Reservoir	Heavy rain caused partial landslide of the dam body and blocked spillway.	non-breached
60	Itabirito Hekurano Mine Dam	Breach due to improper maintenance and structural defects.	breached
61	Mosul Dam	Foundation erosion.	non-breached
62	Baiyun Dam	Severe leakage.	non-breached
63	Jiayan Dam	Leakage problems.	non-breached
64	Renzonghai Dam	Leakage problems.	non-breached
65	Laxiwa Dam	Large deformation of the right bank slope.	non-breached
66	Nantang Reservoir	Damage to the wooden gate of the irrigation tunnel.	non-breached
67	Yuxi Reservoir	Failure of the wooden gate blocking the diversion bottom outlet.	non-breached
68	Quting Reservoir	Collapse of the top of the water conveyance tunnel leading to piping in the downstream dam body, aging and scouring of the culvert, and collapse of the dam body.	breached

69	Lianfeng Reservoir	Illegal water storage leading to leakage and collapse of the dam body	breached
70	Yixing Reservoir	Exceedance flood	breached
71	Chalin Reservoir	Severe cracks and leakage in the dam body.	non-breached
72	Longtoujing Reservoir	Poor construction quality.	non-breached
73	Fujinuma Dam	Earthquake	breached
74	Daguan Reservoir	Low construction standards and poor quality.	non-breached
75	Huize Reservoir	Aging of the dam body with leakage problems.	non-breached
76	Qingkeng Reservoir	Heavy rain caused overtopping, with damage to the left dam shell	breached
77	Yuekouchong Reservoir	Seepage in the culvert-pipe and poor vegetation on the dam.	non-breached
78	Bizhitang Reservoir	Dam leakage and collapse of the diversion canal.	non-breached
79	Shanmei Reservoir	The dam has problems such as leakage and cracks.	non-breached
80	Fujinuma Dam	Earthquake caused structural damage to the dam body, with partial collapse of the main and auxiliary dams.	breached
81	Huangcai Reservoir	Foundation leakage and aging of the spillway.	non-breached
82	Songhuaba Reservoir	Foundation leakage and structural aging of the spillway.	non-breached
83	Luoquangou Dam	Extreme heavy rain caused overtopping of the reservoir.	breached
84	Huolushan Reservoir	Breach due to heavy rain.	breached
85	Lake Delhi Dam	Continuous heavy rain caused a sharp rise in water level, with a breach in the dam's protection embankment.	breached
86	Bofeng Reservoir	Breach due to improper water release operation.	breached
87	Zipingpu Reservoir	Panel cracks and joint leakage caused by earthquake.	non-breached
88	A Dam in Nepal	Breach due to poor management.	breached
89	Xe Pian-Xe Namnoy Dam	Construction quality issues and extreme weather.	breached
90	Xiaohaizi Reservoir	Foundation seepage failure due to damage to the clay layer of the downstream drainage ditch and improper treatment of the upstream blanket defects, leading to collapse and breach of the dam body.	breached
91	Missouri Tom Sauk Lake Dam	Loss of control of the device leading to overcapacity of the reservoir.	breached
92	Longmen Reservoir	Breach due to heavy rain and engineering aging.	breached
93	Dalongtan Dam	Cofferdam collapse caused by flood peak impact.	breached
94	Bayi Reservoir	Seepage failure in the cracks of the newly filled soil at the junction of the new spillway culvert and the original earth dam, leading to breach.	breached
95	Xiaohaizi Reservoir	Foundation seepage failure.	non-breached
96	Fern Ridge Dam	Abnormal sediment in the seepage collection ditch	non-breached
97	Shibaping Reservoir	Foundation leakage	non-breached

98	Dayingjiang Dam	Cofferdam washed away by flood during construction.	breached
99	Liangcheng Reservoir	Low design standards, poor construction quality, and breach during flood season.	breached
100	Xiaoxiang Reservoir	Dam leakage and structural aging.	non-breached
101	Gadanki Dam	Breach due to cracks caused by heavy rain	breached
102	Scholottwitz Dam	Breach caused by heavy rain.	breached
103	La Benitia Dam	Breach due to heavy rainfall.	breached
104	Dasht Dam	Breach triggered by debris flow.	breached
105	Zeyzoun Dam	Breach caused by heavy rain	breached
106	Xiker Reservoir	Breach due to overtopping by flood.	breached
107	Ahmednagar Dam	Leakage	non-breached
108	Dalugou Reservoir	Structural damage to the dam body due to termite infestation.	breached
109	Kajaki Hydropower Dam	War damage	breached
110	Niuxinshan Reservoir	Overtopping and breach caused by exceedance flood.	breached
111	Dahaibo Reservoir	Dam landslide	non-breached
112	Nishan Reservoir	Severe foundation leakage.	non-breached
113	Xiaomeigang Reservoir	Overtopping and breach caused by exceedance flood	breached
114	Landong Reservoir	Diffuse seepage and local leakage in the foundation.	non-breached
115	Chashankeng Reservoir	Complete breach of the auxiliary dam during heavy rain due to poor construction quality and mismanagement.	breached
116	Xiaohexi Reservoir	Overtopping and breach caused by exceedance flood	breached
117	Shengshui Reservoir	Breach due to overtopping by flood.	breached
118	Kengjing Reservoir	Breach due to structural defects of the dam body and flood pressure.	breached
119	Sifangshan Reservoir	Overtopping and breach triggered by heavy rain due to insufficient flood control standards.	breached
120	Xiaozhaizihe Reservoir	Breach due to foundation leakage and overtopping by flood.	breached
121	Yangchun Reservoir	Breach caused by exceedance flood	breached
122	Shibianyu Reservoir	Foundation leakage and construction defects	non-breached
123	San Roque Dam	Partial landslide	non-breached
124	Hankazitan Reservoir	Breach of the left dam abutment due to poor construction quality and flood pressure.	breached
125	Baishuisi Reservoir	Overtopping and breach caused by exceedance flood	breached
126	Xiaomeigang Reservoir	Breach due to poor construction quality and flood pressure.	breached
127	ZheMeng Dam	Heavy rain	breached
128	Deliji Dam	Continuous rainfall, piping, and collapse of earth and stone on the dam crest and wave wall.	breached

129	A Reservoirs in Gongzhuling City	Heavy rain	breached
130	A Reservoirs in Fangzheng City	Flood breach	breached
131	A Reservoirs in Inner Mongolia	Breach caused by exceedance flood	breached
132	Xinqiao Reservoir	Exceedance flood, with cracks appearing in the dam body.	non-breached
133	Dongkoumiao Reservoir	Partial landslide and breach of the auxiliary dam due to poor construction quality, overly steep dam slope, and mismanagement	breached
134	Chashankeng Reservoir	Breach of the auxiliary dam caused by exceedance flood	breached
135	Huibaoling Reservoir	Low flood control standards and poor engineering quality.	non-breached
136	Santaicheng Reservoir	Long-term lack of management, with dam breach caused by heavy rain	breached
137	Shangsankeng Reservoir	Severe leakage and piping.	non-breached
138	A Reservoir in Jiangxi Province	Overtopping and breach caused by exceedance flood	breached
139	Kangshan Reservoir	Low flood control standards, with cracks in the dam body	non-breached
140	Meijiang Dam	Structural damage due to termite nesting in the embankment, leading to severe flooding during extreme heavy rain	breached
141	Xiwudou Reservoir	Overtopping and breach caused by exceedance rainstorm	breached
142	Beiguanzhuang Reservoir	Overtopping by flood caused by heavy rain, leading to dam breach	breached
143	Liujiatai Dam	Insufficient flood discharge capacity due to heavy rainfall	breached
144	Ganggang Dam	Seepage erosion damage between the flood discharge and sediment flushing tunnel and the original dam material	breached
145	Yingde'er Dam	Cracks due to uneven foundation settlement, no impermeability measures, and contact seepage erosion damage between the spillway gate and the surrounding soil.	breached
146	Shihuie Dam	Poor filling quality, with seepage interception by the culvert in the dam	breached
147	Tianchenghu Dam	Seepage damage caused by mink burrows and root growth of wave protection slope vegetation	breached

148	Lijiazui Dam	Insufficient flood discharge capacity due to heavy rainfall	breached
149	Shijiagou Dam	Heavy rainfall, with waves by left bank landslide increasing water pressure on the dam body, leading to overtopping	breached
150	Shimantan Dam	Subjected to extreme heavy rain, with weak flood control capacity.	breached
151	Banqiao Dam	Subjected to extreme heavy rain, with weak flood control capacity.	breached
152	Tiefosi Dam	The dam was closed in advance without a diversion channel, leaving no way for flood discharge when flood came. In addition, the dam construction quality was poor, eventually leading to overtopping and breach	breached
153	Tiangang Dam	Large inflow from the upstream	breached
154	Zhugou Dam	Subjected to extreme heavy rain, with weak flood control capacity	breached
155	Dongchuankou Dam	Inflow far exceeding the design standard and poor engineering quality.	breached
156	Shangshi Dam	Leakage on the downstream slope of the dam.	non-breached
157	Teton Dam	Piping caused by well-developed joints in the right bank foundation	breached
158	Caoxieling Reservoir	Poor filling quality of the dam body	breached
159	Yujiahaizi Reservoir	Poor quality of dam filling soil, insufficient compaction, and sudden breach	breached
160	Guan'ercha Water Conservation Dam	Leakage and structural aging due to design defects and construction quality issues	non-breached
161	Ras Al Khaimah Earth Dam	Earth dam collapse due to continuous heavy rain	breached
162	A Reservoir in China	Cracks in the irrigation culvert with soil	non-breached
163	Heilongdang Reservoir	Low design standards, poor construction quality, and breach caused by extreme flood disaster.	breached
164	Moyang Dam	Gap caused by termite infestation	non-breached
165	Duijiang Reservoir	Breach due to poor construction quality and long-term lack of maintenance.	breached
166	Hengjiang Dam	Over-planned water storage, low design standards, poor construction quality, poor performance of dam materials, and lax engineering management.	breached