Supplement

Metaheuristic-optimized Machine Learning for Mechanical Property Prediction in Eco-friendly Rubberized Concrete

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1 Experimental data

In this research, a total of 315 different samples from existing literature were utilized to analyze models aimed at estimating the mechanical properties of rubberized concrete at 28 days, as presented in Table S1.

Table S1 List of collected experimental data for rubberized concrete

Ref.	Year	Num. of data	Rubber sizes (mm)	Rubber content (kg/m^3)	Cement (kg/m^3)	Water (kg/m^3)	Coarse aggregate (kg/m^3)	Fine aggregate (kg/m^3)	CS (MPa)	ME (GPa)	FS (MPa)	TS (MPa)
[1]	2024	7	0–5	0–150.7	465	195.3	742	332–849	26.3–38.9	21.5–37.83	–	–
[2]	2023	3	1–3	0–38.09	425	191	762	862–958	33.4–44.3	–	–	2.9–4.8
[3]	2023	4	0–4	0–44.5	400	160	1104	588.8–736	25.59–36.44	–	–	–
[4]	2021	5	0.075–4.75	0–81.4	400	203.96	1074.18	529.46–661.82	8.71–23	–	–	1.15–7.3
[5]	2021	3	0.5–4.75	0–53.5	400	200	1132	503–629	21.3–26.3	–	–	2.5–3
[6]	2021	4	0–4	0–89.6	489	230	1035	492.4–582	21.02–35.56	24.314–34.033	–	–
[7]	2021	2	0–1	0–25.50	391.5	148.8	1205.8	584.9–649.9	32.1–37.4	–	4.50–5.5	3.20–3.80
[8]	2020	4	0–4.75	0–91	390	175.5	1217	517–608	22.5–29.6	–	–	–
[9]	2020	5	1–3	0–213	425	235	610	852–1065	10.8–34.8	–	2.6–4.9	1.6–3.2
[10]	2020	5	2–3	0–146	500	188	1060	584–730	18–44.2	6.97–17.612	5.44–6.89	1.98–3.4
[11]	2020	5	#40mesh–5	0–53.30	333	213	899	655–818	24.3–41.2	–	–	–
[12]	2019	6	#20mesh	0–86	398	210	1183	305–609	17.91–50.22	19.6–32.2	6.45–10.35	–
[13]	2019	4	0–4.75	0–226.5	360	180	1066	528.5–755	12.3–34.2	–	–	1.2–4.1
[14]	2019	7	#40mesh–5	0–151	351	176	1042	522–869	13.7–50.9	–	–	1.9–4.9
[15]	2018	6	#20mesh	0–134	398	210	1183	305–609	17.91–50.12	19.3–33.2	–	2.21–4.6

Table S1 List of collected experimental data for rubberized concrete (continued)

Ref.	Year	Num. of data	Rubber sizes (mm)	Rubber content (kg/m^3)	Cement (kg/m^3)	Water (kg/m^3)	Coarse aggregate (kg/m^3)	Fine aggregate (kg/m^3)	CS (MPa)	ME (GPa)	FS (MPa)	TS (MPa)
[16]	2018	6	0–5	0–84.7	656.8	221.1	949.8	283.7–567.5	23.3–77.7	22.7–41.4	–	–
[17]	2017	4	1–2	0–143.1	290	163.4–166.1	972.6	810.8–953.9	15.36–51.63	–	–	–
[18]	2017	6	0–4	14.73–58.95	388	194	1202.8	556–885.85	31.93–46.23	25.36–31.13	3.99–5.12	2.97–4
[19]	2017	7	2–6	0–175	451	160	949	700–875	20–62.5	–	–	–
[20]	2016	5	2–4	0–56.3	430	180	1197	474.4–593	33.41–34.76	24.73–31.75	–	2.29–2.35
[21]	2016	2	1.18–2.36	0–55.50	350	175	1038	693–866	35.9–53.5	–	–	2.7–4.1
[22]	2015	18	2–5	0–80	364	127.4–200.0	1124	573–764	15.3–58.97	–	–	–
[23]	2015	4	0.2–1	0–66	335	190	1220	594–660	13.4–33.5	–	–	–
[24]	2015	4	0–3	0–46	621–632	230–234	996–1005	410–519	54.6–61.1	–	6.09–6.98	3.20–3.6
[25]	2015	5	0–1.18	0–49.24	592.68	243	673.35	543.18–775.96	15.98–39.68	–	–	–
[26]	2014	4	0–2.3	0–50.5	375	178	1065	697–820	24.3–40.4	27.3–38.6	–	2.3–3.5
[27]	2014	27	#30mesh–4	0–58.95	388	155.2–194	1202.8	558.72–698.4	17–42.5	–	3.76–5.32	–
[28]	2014	45	#30mesh	0–57.24	335.29–629.27	228–258	649.39–799.9	523.84–921.8	10.5–48.1	4–36	1.8–9.8	1–4.8
[29]	2014	5	#80mesh–4	0–61.4	405	158	1266	499–624	28.3–51.55	–	–	–
[30]	2014	4	#40mesh	0–39.71	471.74	195	1161.29	486.18–571.93	28.48–38.11	21.82–37.47	–	–
[31]	2014	2	0–2.36	0–40.8	425	148.8	1257	502–628	41.6–53.5	36.43–42.51	–	4.6–4.8
[32]	2014	26	0.173–4	0–42.44	424	209	1105	556–661	25.42–43.66	23.7–40.8	–	–
[33]	2013	3	0–4.75	0–31.75	213.188	117.934	907.1847	507.6–597.38	31.8–33.7	19.98–24.89	4.24–4.94	2.1–3.1
[34]	2013	5	#20mesh	0–101.2	458	206	1146	354–590	18.1–42.2	–	3–4.8	–
[35]	2013	13	#28mesh–8	0–156.2	477	191	1230	220.8–552	8–38.4	15.2–35.8	2.1–4.7	–
[36]	2013	12	#28mesh–5	0–240.2	483	195	1228	0–577	3.2–39.2	6.4–35.5	1.3–4.8	0.53–2.78
[37]	2013	4	2	0–34.66	420	131.5	1296	472–555	26.9–43.4	–	4.6–5.6	–
[38]	2013	4	0.4–0.9	0–39.7	395	190	973	638–797	27.73–37.15	22.24–28.83	–	2.61–3.36
[39]	2012	3	0–4.75	0–31.751	335.65	117.93	907.18	507.56–597.38	31.8–33.7	19.975–24.89	3.76–4.31	4.24–4.94
[40]	2011	4	#80mesh	0–34.66	420	131.5	1296	472–555	37.7–57.8	–	4.6–5.6	–
[41]	2010	3	0.425–4.75	0–350	350	122.5	980	0–588	4.29–26.9	–	–	–

Table S1 List of collected experimental data for rubberized concrete (continued)

Ref.	Year	Num. of data	Rubber sizes (mm)	Rubber content (kg/m^3)	Cement (kg/m^3)	Water (kg/m^3)	Coarse aggregate (kg/m^3)	Fine aggregate (kg/m^3)	CS (MPa)	ME (GPa)	FS (MPa)	TS (MPa)
[42]	2009	12	0–3	0–210.83	451	160	949	328–875	10–64.3	11.3–37.7	1.8–6.5	–
[43]	2008	6	0.15–4.75	0–337.6	446	252	961	0–585	2.5–25.33	–	0.64–3.68	0.22–2.82
[44]	2007	2	0–1	0–23.13	330–404	182	995	723–891	43.84–44.49	29.58–33.17	–	–

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