Supplementary Materials

Table S2. PRISMA 2020 reporting checklist mapped to the revised manuscript

The checklist is used as a transparency framework for this structured systematic critical review. Items that presuppose meta-analysis, prospective protocol registration, or a fully documented report-retrieval stage are marked not applicable or are explained explicitly rather than reconstructed retrospectively.

Item	Topic	PRISMA reporting element (adapted)	Location in revised manuscript	Status/note
1	Title	Identify the report as a systematic/structured review.	Title; Section 1	Reported as a structured systematic critical review.
2	Abstract	Provide a structured summary of objectives, methods, main findings and implications.	Abstract	Addressed in revised abstract.
3	Rationale	Describe the rationale in the context of existing knowledge.	Introduction	Addressed.
4	Objectives	State the review question/objectives.	End of Introduction	Research question and five objectives stated.
5	Eligibility criteria	Specify inclusion/exclusion criteria and grouping for synthesis.	Section 2; Table 3	Addressed at record level.
6	Information sources	Specify databases and date last searched.	Section 2; Table 3	Scopus and Web of Science; 20 September 2026.
7	Search strategy	Present search strategies and restrictions.	Section 2; Table 3; Supplementary Search Strategy S5	Five S1–S5 sets and database-specific expressions supplied in S5. WoS S1, S2, S4 and S5 are reconstructed equivalents from the retained field-substitution rule, not authenticated verbatim executed strings; the original WoS search history was unavailable. No database-stage year, language, subject or document-type filters are reported.
8	Selection process	Describe how records were screened and selected.	Section 2; Table 3; Figure 2	Staged record-level screening was conducted at the record level. Independent duplicate screening was not prospectively implemented; consequently, no inter-rater reliability statistic is reported.
9	Data collection process	Describe extraction/collection procedures.	Section 2	Structured record-level registry procedure described; Supplementary Table S1 documents bibliographic information, search-set membership, evidence directness, and selection/evidence basis for retained records.
10a	Data items: outcomes	List outcomes sought.	Section 2; Table 8	Hydration, setting, early cohesion, mechanical, moisture, ionic, functional and durability outcomes.
10b	Data items: other variables	List other variables sought.	Section 2; Table 2	Material-system relevance and evidence directness were recorded at registry level; study-specific formulation, dosage, curing, and outcome details are reported in the manuscript only where established from the cited source.
11	Risk of bias / methodological appraisal	Describe appraisal approach.	Section 2.1; Table 2	Appraisal domains were specified, but a complete study-by-study methodological appraisal was not performed; Supplementary Table S3 documents the available information and verification gaps.
12	Effect measures	Specify effect measures for synthesis.	Section 2; Section 2.2	No pooled effect measure; qualitative direction-of-effect synthesis due to heterogeneity.
13a	Synthesis eligibility	Describe how studies were assigned to syntheses.	Section 2; Table 3	Evidence directness and relevance to predefined synthesis question.
13b	Data preparation	Describe data preparation.	Section 2	Record-level deduplication and structured extraction described.
13c	Tabulation/visualization	Describe display methods.	Tables 4–8; Figures 1–5	Narrative, tables, PRISMA-style flow and conceptual diagrams.
13d	Synthesis methods	Describe synthesis methods and rationale.	Section 2; Section 2.2	Systematic qualitative synthesis; no meta-analysis.
13e	Heterogeneity exploration	Describe exploration of heterogeneity.	Sections 2.1–2.2; Discussion	Wood source, dosage, cement, curing and system directness explicitly considered.

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13f	Sensitivity analyses	Describe sensitivity analyses.	Section 2.2	Scenarios 1 and 2 are described as directness-based evidence restrictions; the source-level methodological restriction in Scenario 3 is specified but was not completed study by study.
14	Reporting-bias assessment	Describe assessment of missing/selective results.	Section 2.1	Outcome completeness included as an appraisal domain; no statistical publication-bias model.
15	Certainty/confidence	Describe how confidence in conclusions was assessed.	Tables 4–5; Sections 2.1–2.2	Based on directness, methodological interpretability and sensitivity, without a numerical certainty score.
16a	Study selection results	Report records identified, screened and included.	Figure 2; Table 3	3153 database records identified; 1155 duplicates removed; 1998 screened; 180 at strict adjudication; final audit excluded or consolidated 56 records, leaving 124 retained registry records of varying evidence directness.
16b	Excluded studies	Cite/describe exclusions at the relevant eligibility stage.	Table 3; Supplementary Table S1 / review records	Categorical reasons reported. Supplementary Table S1 also provides a retrospective metadata-based audit of the seven records removed between the 131-record and 124-record registry versions. The final audit also consolidated two duplicate database records referring to the same publications and removed one clearly secondary state-of-the-art assessment. A retrospective full-text exclusion list is not claimed because systematic report retrieval was not documented.
17	Study characteristics	Present characteristics of included studies.	Supplementary Table S1	A 124-record evidence registry with varying application directness is supplied; source-level details are reported only where verified.
18	Risk-of-bias results	Present appraisal results.	Section 2.1; narrative synthesis	No complete study-level risk-of-bias assessment is reported. Supplementary Table S3 documents available descriptive information and domains requiring further source-level verification.
19	Individual-study results	Present study results used in synthesis.	Tables 5–6; Sections 3-5	Key quantitative/qualitative findings reported where established.
20a	Synthesis: contributing studies	Summarize contributing evidence.	Tables 4–6; Supplementary Table S1	Addressed.
20b	Synthesis results	Present results of each synthesis.	Sections 3-7	Narrative synthesis; no pooled estimate.
20c	Heterogeneity results	Present relevant heterogeneity.	Discussion	Addressed qualitatively.
20d	Sensitivity results	Present sensitivity implications.	Section 2.2; Discussion	Directness-based implications are presented for Scenarios 1 and 2; Scenario 3 remains unadjudicated across the full registry.
21	Reporting biases	Present assessment of reporting bias.	Section 2.1	Outcome completeness considered; formal funnel-plot/statistical assessment not applicable.
22	Certainty of evidence	Present confidence/certainty assessment.	Tables 4–5; Discussion	Qualitative confidence only; directness is not treated as quality.
23a	Discussion: interpretation	Interpret results in context of other evidence.	Section 7	Addressed.
23b	Discussion: evidence limitations	Discuss limitations of included evidence.	Sections 6-7	Addressed.
23c	Discussion: review-process limitations	Discuss limitations of review process.	Section 2; Figure 2 caption; Discussion	Record-level basis and absence of systematically documented full-text retrieval explicitly disclosed.
23d	Discussion: implications	Discuss implications for practice/research.	Section 8	Engineering implications and future research priorities stated.
24a	Registration	Provide registration details.	Section 2	No prospective registration; no registration number claimed.
24b	Protocol	Indicate where protocol can be accessed.	Section 2	No prospectively registered protocol; revised methods documented in manuscript/supplements.
24c	Amendments	Describe amendments to protocol.	Section 2	Search and reporting were revised in response to peer review; not presented as prospective amendments.
25	Support	Describe financial/non-financial support.	Funding	Reported.

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26	Competing interests	Declare competing interests.	Conflicts of Interest	Reported in manuscript.
27	Availability of materials/data/code	State availability of review materials.	Data Availability; Supplementary Tables S1–S4 and Search Strategy S5	A 124-record evidence registry, reporting checklist, appraisal traceability matrix, sensitivity matrix and search expressions are supplied; no new experimental dataset generated.