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Core Pile Defect Confirmation: Coring, UPV, Petrography

Core Pile Defect Confirmation interactive checklist for coring, UPV, and petrography; fully commentable and export as PDF/Excel with QR-secured evidence trails.

Project:

Date:

Filled by:

Pre-Assessment & Planning

1	Confirm pile IDs, suspected defect elevations, and required tests per approved project specifications and authority requirements; record in a test plan and obtain reviewer signature.
2	Complete a task-specific risk assessment and permits; define exclusion zones and PPE; capture signed forms and site map with access/egress routes.
3	Locate embedded reinforcement and services using a cover meter and GPR; confirm intended core path is free of steel within core diameter + 15 mm; attach scan images.
4	Mark proposed core locations with durable paint and grid references; photograph with a metric scale and include GPS coordinates for each pile.

Core Extraction

5	Set up and anchor the coring rig perpendicular to the surface; verify alignment within $\pm 2^\circ$ using a digital inclinometer; photograph the setup and bubble/angle reading.
6	Install a diamond core bit of 75–100 mm diameter as specified; record bit size, condition, and serial/lot number in the log.
7	Drill with continuous water cooling at approximately 2–4 L/min to control temperature and dust; collect slurry for proper disposal; retain waste manifest.
8	Advance to target depth/elevation; record penetration depth to ± 5 mm using a calibrated ruler; note breakthrough or obstructions; capture time-stamped video if feasible.
9	Extract the core intact; mark top, bottom, and orientation arrow; immediately cap ends to limit moisture loss; photograph the core on a measuring board.
10	Measure core diameter and length with calipers; log visible defects (voids, segregation, cracks); bag and label with pile ID, depth, date, and sampler signature.
11	Install temporary covers and barriers around openings to prevent trips and debris ingress; tag as 'temporary opening'; take safety photos.

Ultrasonic Pulse Velocity (UPV) Testing	
12	Calibrate the UPV instrument using the manufacturer's reference bar; confirm time-of-flight accuracy within $\pm 1\%$; photograph calibration screen and serial number.
13	Prepare test surfaces by light grinding/cleaning; apply uniform coupling gel; record surface condition and gel lot number; attach pre/post-surface photos.
14	Measure path length and transducer spacing with a steel tape to ± 1 mm; log ambient and concrete temperatures ($^{\circ}\text{C}$) and moisture condition.
15	Acquire three repeat UPV readings per path (direct, semi-direct, or indirect as feasible); accept if coefficient of variation $\leq 3\%$; store raw waveforms and m/s values.
16	Map velocities along the pile length; flag zones showing $>10\%$ reduction versus control piles or adjacent sound segments; highlight on annotated sketches.

Petrography & Lab Coordination	
17	Select slices (10–20 mm) from suspect zones for thin sections; wrap airtight and maintain 5–10 $^{\circ}\text{C}$; complete chain-of-custody with sampler and witness signatures.
18	Issue a lab request defining objectives (paste quality, microcracking, ASR indications, voids) and deliver photos; include sample IDs, depths, and handling notes.
19	Confirm laboratory receipt within 24 h; record condition on arrival and assigned lab job number; file acknowledgment email or portal screenshot.
20	Review lab QA details (microscope type, magnifications, staining); accept only reports with clear images, descriptions, and analyst sign-off; archive PDFs.

Data Analysis & Assessment	
21	Correlate core logs, UPV maps, and petrography findings to classify defect type and extent; write a rationale statement; obtain peer reviewer initials.
22	Determine if additional cores or UPV lines are required to close data gaps; propose precise locations and justification; secure engineer approval.

Documentation & Reporting	
23	Compile geotagged photos, UPV logs, core IDs, chain-of-custody, and lab reports; link evidence to pile IDs; generate a QR code for the dataset.
24	Issue an assessment report summarizing methods, results, limitations, and recommended next steps; clearly exclude remediation instructions; obtain approvals and distribution receipts.

Comments:

Filled by:

Signature:

Introduction	How to use this checklist
<p>Core Pile Defect Confirmation ensures suspected defects in concrete piles are verified using objective methods before any remediation is considered. This checklist focuses on concrete pile coring, ultrasonic pulse velocity (UPV) testing, and petrographic analysis to triangulate defect type and extent. It defines a clean, auditable workflow: plan sampling, extract representative cores, capture high-fidelity UPV data, and commission lab petrography. The scope excludes remediation methods, patch design, or structural strengthening, but it delivers the risk control you need—avoiding reinforcement strikes, biased sampling, damaged cores, or misinterpreted velocity results. Outcomes include traceable evidence, repeatable measurements, and defensible assessments aligned with approved project specifications and authority requirements. Use it on new builds, retrofits, or asset investigations to substantiate concerns like voids, segregation, microcracking, or alkali–silica reaction. Start in interactive mode to tick steps, add comments, and attach photos, then export to PDF/Excel with a QR-secured record.</p>	<p>1. Preparation: Assemble core drill and bits, coring rig, water supply, vacuum, UPV unit with reference bar, coupling gel, cover meter, GPR, metric scales, calibrated tapes, PPE, and permit/risk forms. 2. Open the checklist in interactive mode on a tablet or laptop; select the project, piles, and intended tests; assign roles and due dates for field and lab tasks. 3. During fieldwork, tick items as completed, add time-stamped comments, and attach geotagged photos, scans, and instrument screenshots directly to the relevant step. 4. Record measurements in SI units within the step fields (e.g., core diameter, UPV m/s, temperatures); link files to pile IDs and locations for rapid retrieval. 5. Export the checklist and evidence as PDF/Excel for review; share the QR-secured link with stakeholders to verify authenticity and dataset integrity. 6. Sign-Off: Collect digital signatures from the inspector, engineer, and lab representative; archive the approved package in the project folder and lock edits.</p>