comprises a second conduit operably connected to the holding tank, wherein the second conduit is configured to transport concrete wash water to the holding tank. The second conduit can, e.g., transport concrete wash water from a sedimentation pond to the holding tank.

[0013] In certain embodiments, provided is a composition comprising (i) a hydraulic cement; (ii) mix water for the hydraulic cement, wherein the mix water comprises carbonated concrete wash water.

[0013a] In certain embodiments, provided is a method of preparing a concrete mix comprising (i) adding concrete materials to a mixer; (ii) adding mix water to the mixer, wherein the mix water comprises carbonated concrete wash water, and wherein the carbonated concrete wash water is prepared by a method comprising transporting concrete wash water from a holding tank holding the concrete wash water into a recirculation loop operably connected to the holding tank, introducing carbon dioxide into the wash water in the recirculation loop, and moving the wash water back into the holding tank via the recirculation loop; and (iii) mixing the water and the concrete materials to produce a concrete mix.

INCORPORATION BY REFERENCE

[0014] All publications, patents, and patent applications mentioned in this specification are herein incorporated by reference to the same extent as if each individual publication, patent, or patent application was specifically and individually indicated to be incorporated by reference.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] The novel features of the invention are set forth with particularity in the appended claims. A better understanding of the features and advantages of the present invention will be obtained by reference to the following detailed description that sets forth illustrative embodiments, in which the principles of the invention are utilized, and the accompanying drawings of which:

[0016] Figure 1 shows set acceleration in concrete produced with wash (grey) water at various specific gravities and ages, where the water was with and without carbon dioxide treatment. See Example 1.

CLAIMS

What is claimed is

1. A method of preparing a concrete mix comprising

(i) adding concrete materials to a mixer;

(ii) adding mix water to the mixer, wherein the mix water comprises carbonated concrete wash water, and wherein the carbonated concrete wash water is prepared by a method comprising transporting concrete wash water from a holding tank holding the concrete wash water into a recirculation loop operably connected to the holding tank, introducing carbon dioxide into the wash water in the recirculation loop, and moving the wash water back into the holding tank via the recirculation loop; and

(iii) mixing the water and the concrete materials to produce a concrete mix.

2. The method of claim 1 wherein the carbonated concrete wash water comprises at least 10% of the total mix water.

3. The method of claim 1 wherein the carbonated concrete mix water comprises at least 40% of the total mix water.

4. The method of claim 1 wherein the carbonated concrete wash water has a density of at least 1.10 g/cm^3.

5. The method of claim 1 wherein the concrete mix is sufficiently workable for its intended use, and the carbonated wash water is of an age that the same mix made with the wash water of the same age in the same proportions, but without carbonation would not be sufficiently workable for its intended use.

6. The method of claim 1 wherein the mix water comprises carbonated wash water in an amount that results in a concrete mix that is at least 5% stronger at a time after pouring than the same concrete mix made without carbonated wash water.

7. The method of claim 6 wherein the time after pouring is 1 day, 7 days, 28 days, or any combination thereof.

8. The method of claim 1 wherein the mix water comprises carbonated wash water in an amount that allows the concrete mix to contain at least 5% less cement than, and retain a compressive strength after pouring of within 5% of, the same concrete mix made without carbonated wash water and with the extra 5% cement.

9. The method of claim 1 further comprising transporting carbonated wash water from the holding tank to a concrete mixer.

10. The method of claim 1 wherein the method of preparing the carbonated wash water further comprises monitoring at least one of pH, specific gravity, carbon dioxide in air above the holding tank, or temperature of the wash water.

11. The method of claim 1 further comprising contacting the concrete mix with additional carbon dioxide while it is mixing.

12. The method of claim 1 wherein carbon dioxide is introduced into the wash water in the recirculation loop in the first half of the loop only.

13. The method of claim 1 further comprising controlling the introduction of carbon dioxide into the recirculation loop by a control system, wherein the control system monitors one or more conditions comprising at least activity of a pump that pumps new wash water into the holding tank, determines whether or not to add carbon dioxide, and sends a signal to a valve controlling carbon dioxide addition to the recirculation loop based on the determination of whether or not to add carbon dioxide.