CLAIMS

1. A method for assessing aggregate moisture probe accuracy in concrete manufacture, comprising:

(A) comparing currently monitored slump values of a slurried concrete mixture prepared from aggregates dispensed from a hopper or conveyor belt, with slump values predicted for the slurried concrete mixture, based on the aggregate moisture levels as detected by a probe in the hopper or conveyor belt from which the aggregates were dispensed to make the concrete mixture, monitored slump values of the slurried concrete being currently monitored in a concrete mixer in the mixer drum of a concrete delivery truck using an automated slump monitoring device during in-transit delivery to a construction site, the slump monitoring system having a processor programmed to ensure that the concrete mix in the truck mixer drum is homogenously uniform when slump values are recorded; and

(B) initiating from the automated slump monitoring device on the concrete delivery truck at least one or more of the following actions, when the difference between expected and currently monitored slump values meets or exceeds a predetermined threshold value:

(i) sending a signal or alarm, to a concrete plant at which the aggregates were dispensed from the hopper or conveyor belt, indicating that the predetermined threshold value was met or exceeded;

(ii) sending a signal or alarm, to a construction site at which a concrete mixture prepared from the aggregates dispensed from the hopper or conveyor belt is scheduled to be delivered, indicating that the predetermined threshold value was met or exceeded;

(iii) sending a signal or alarm, to a computer processor unit that is monitoring the slump of a concrete mixture prepared from the aggregates dispensed from the hopper or conveyor belt, indicating that the predetermined threshold value was met or exceeded,

wherein the processor unit adjusts the amount of water, the amount of chemical admixture, or the amounts of both water and chemical admixture introduced into the concrete mixture being delivered to the construction site; or

(iv) performing a combination of any of steps (i) through (iii).

2. The method of claim 1 wherein the initiation of at least one or more actions in Step (B) is also based on data resulting from monitoring for changes in (i) previous slump changes achieved by a given unit volume or mass of water added per unit volume of concrete, (ii) previous slump changes achieved by a given unit volume or mass of chemical admixture added per unit volume of concrete, (iii) previous ratios between the slump and aggregate moisture readings, or (iv) combinations thereof.

3. The method of claim 2 wherein a signal or alarm is sent to the concrete plant indicating that a material change has occurred if there were changes in (i), (ii), (iii), or (iv) of claim 2.

4. The method of claim 1 wherein, in step (B)(i), the signal is sent to a visual or audible alarm to indicate at the concrete plant that the aggregate moisture sensor probe requires calibration or that the concrete plant computer processor unit used for batching the concrete mixture requires adjustment.

5. The method of claim 4 wherein the aggregate moisture sensor probe is calibrated based on (i) the difference between expected and currently monitored slump values, (ii) previous slump changes achieved by a given unit volume or mass of water added per unit volume of concrete, (iii) previous slump changes achieved by a given unit volume or mass of chemical admixture added per unit volume of concrete; or (iv) combinations thereof.

6. The method of claim 1 wherein, in step (B)(i), the signal is sent to a concrete plant computer processor unit used for batching the concrete mixture, whereby an adjustment is made in the amount of aggregate dispensed from the hopper or conveyor belt for a subsequent concrete load, an adjustment is made in the amount of water or chemical admixture used for making mixture subsequent concrete load, or adjustments are made in

the amounts of both aggregate and water and/or chemical admixture used for making mixture subsequent concrete load.

7. The method of claim 1 wherein, in step (B)(ii), the signal is sent to a hand-held mobile device located at the construction site at which the concrete mixture prepared from the aggregates dispensed from the hopper or conveyor belt is scheduled for delivery, the signal enabling a construction site foreman to understand whether chemical admixtures, water, or mixture thereof can be added into the concrete mixture.

8. The method of claim 1 wherein, in step (B)(iii), the signal is sent to a computer processor unit which is continually monitoring the concrete mixture in-transit during delivery of the concrete mixture from a concrete plant to a pour event at a construction site, the concrete monitoring computer processor unit being programmed to receive the signal and to adjust the amount of water, the amount of chemical admixture, or the amounts of both water and chemical admixture into the concrete mixture being delivered to the construction site.

9. The method of claim 1 wherein, in step (B)(iii), the signal is sent to a computer processor unit which is continually monitoring the concrete mixture in-transit during delivery of the concrete mixture from a concrete plant to a pour event at a construction site, the concrete monitoring computer processor unit being programmed to receive the signal and to adjust the maximum limit of water allowable for the concrete mixture being delivered to the construction site.

10. The method of claim 8 wherein the amount of added water or chemical admixture is determined based on (i) previous slump increases achieved by a given unit volume or mass of added water per unit volume of concrete; (ii) previous slumps achieved by a given total water amount added per unit volume of concrete; or (iii) a combination thereof.

11. The method of claim 10 wherein the amount of water or chemical admixture added is calculated based on (i) information contained in an electronic ticket regarding the design of the concrete mixture as provided by a computer processor unit at the concrete plant to the slump monitoring computer processor unit of the concrete delivery truck, (ii)

currently measured slump or other rheology property of the slurry state concrete mixture, (iii) ambient temperature or relative humidity, or (iv) a combination thereof.

12. The method of claim 11 wherein, the electronic ticket contains information concerning the amounts of cement, aggregates, and water in the batch concrete mixture, including any corrected amounts.

13. The method of claim 8 wherein the computer processor unit, which is monitoring the slump of the concrete mixture in-transit during delivery of the concrete mixture from a concrete plant to a pour event at a construction site, is located on a concrete delivery truck, the slump monitoring computer processor unit being connected to at least one sensor on the truck, the at least one sensor providing a signal corresponding to the hydraulic pressure required to rotate the concrete mixture within a rotatable mixer drum located on the delivery truck or to the force of the concrete mixture being rotated against the sensor during rotation within the mixer drum, whereby slump values of the concrete mixture are monitored on a continual basis and in real time during delivery.

14. The method of claim 1 wherein, in step (A), the aggregate moisture level probe measures surface water content of the aggregates, pore water content, or both, of the aggregates in the hopper or conveyor belt.

15. The method of claim 1 wherein, in step (B), the expected slump values are based on laboratory tests, where the slump is measured and all aggregate moisture is accounted for.

16. The method of claim 1 wherein, in step (B), the expected slump values are based on concrete slump data produced using aggregate moisture meters calibrated to within the manufacturer tolerances.

17. The method of claim 1 wherein the expected and currently monitored slump values are determined using a slump monitoring computer processor unit that is programed to take into account the absorptivity of the aggregates used for making the concrete mixture.

18. A system having a computer processor unit programed to monitor concrete slump and to perform the method of claim 1.