CLAIMS

1. A process for detecting fluid addition into concrete contained within a delivery vehicle mixing drum, comprising:

(A) monitoring changes in a rheology property of a concrete mix contained within a delivery vehicle mixing drum on a continuous basis by means of a computer processor unit (hereinafter "CPU");

(B) detecting when a change in monitored rheology property of said concrete mix exceeds a predetermined minimum rheology change value which has been inputted into or made accessible to said CPU;

(C) determining, for each detected rheology change beyond said predetermined minimum rheology change value, whether such rheology change beyond said predetermined minimum rheology change value is due to fluid addition not added using pump, valve, or flow meter monitored by said CPU (hereinafter "sneak fluid") and is sustained beyond a predetermined minimum period of time, a predetermined minimum number of drum rotations, or both (hereinafter "sneak fluid condition"); and

(D) reporting the occurrence of a sneak fluid condition as determined in (C) or otherwise preventing or restricting further fluid additions by at least one of the following modalities: (i) initiating an audible alarm, a visual alarm, or both; (ii) providing an indication of the amount of the sneak fluid added into the mixing drum; (iii) providing an indication of total fluid amounts including said sneak fluid added into the mixing drum; and/or (iv) preventing or limiting further fluid additions using valve, flow meter, or fluid tanks on said delivery vehicle into the mixing drum.

2. The process of claim 1 wherein said rheology property is selected from slump, slump flow, and DIN flow.

3. The process of claim 2 wherein said predetermined minimum rheology change value is a positive number.

4. The process of claim 3 wherein said predetermined minimum rheology change value is 0.15-1.0 inch increase in slump.

5. The process of claim 3 wherein said predetermined minimum rheology change value is at least 0.25 inch increase in slump.

6. The process of claim 1 wherein, after a rheology change exceeding said predetermined minimum rheology change value has been sustained beyond a predetermined minimum period of time or predetermined minimum number of drum rotations, step (C) further comprises determining whether such sustained rheology change is due to a false alarm condition.

7. The method of claim 6 wherein said false alarm condition is caused by tilting of the mixing drum.

8. The method of claim 6 wherein said false alarm condition is caused by leakage of fluid from fluid dispensing equipment on the concrete delivery vehicle.

9. The process of claim 1 wherein said predetermined minimum period of time, as described in step (C), is at least 30 seconds in duration.

10. The process of claim 1 wherein said predetermined minimum period of time, as described in step (C), is at least 45 seconds in duration.

11. The process of claim 1 wherein said predetermined minimum period of time, as described in step (C), is at least 60 seconds in duration.

12. The process of claim 1 wherein said preselected minimum number of drum rotations is 5.

13. The process of claim 1 wherein preselected minimum number of drum rotations is 10.

14. The process of claim 1 wherein said rheology property monitored is slump flow.

15. The process of claim 1 wherein said rheology change is monitored using at least one sensor for measuring hydraulic pressure used for rotating said mixing drum.

16. The process of claim 1 wherein said rheology change is monitored using a sensor placed into the mixing drum.

17. A concrete rheology monitoring system effective for performing the process of claim 1.

18. A system for detecting fluid addition into concrete contained within a delivery vehicle mixing drum, comprising: an automated rheology monitoring system effective for monitoring changes in a rheology property of a concrete mix contained within a delivery vehicle mixing drum on a continuous basis by means of a computer processor unit (hereinafter "CPU"); said CPU being programmed to detect when a monitored rheological property of a concrete mix change exists due to fluid addition not added by pump, valve, or flow meter monitored by said CPU (hereinafter "sneak fluid") and is beyond a predetermined minimum rheology change value; said CPU being further programmed to determine for each detected rheology change beyond said predetermined minimum rheology change value whether such rheology change beyond said predetermined minimum rheology change value is sustained beyond a predetermined minimum period of time, a predetermined minimum of drum rotations, or both (hereinafter "sneak fluid condition"); and said CPU being programmed to report the occurrence of a sneak fluid condition, using at least one of the following modalities: (i) initiating an audible alarm, a visual alarm or display, or both; (ii) providing an indication of the amount of the sneak fluid added into the mixing drum; (iii) providing an indication of total fluid amounts including said sneak fluid added in the mixing drum; and/or (iv) preventing or limiting further fluid additions using valve, flow meter, or fluid tanks on said delivery vehicle into the mixing drum.

19. The system of claim 18 wherein said automated rheology monitoring system is effective to monitor slump changes and to provide a visual alarm or display of detected sneak fluid addition.