In one aspect, there is provided a method for controlling a treatment apparatus arrangement (3) in a treatment plant (1), the treatment plant being arranged to treat liquid comprising solid matter such as waste water, the treatment plant (1) comprising

- a basin (2) housing a basin content constituted by a liquid comprising solid matter, the operating condition in said basin (2) being anoxic and/or anaerobic, and
- said treatment apparatus arrangement (3) that comprises at least one mixer machine (4) located in said basin (2), the mixer machine (4) having a treatment plant depending pre-determined suspension speed adapted to keep solid matter suspended in the liquid, and a variable speed drive (5) operatively connected to said mixer machine (4),

the method being **characterized** in that the variable speed drive (5) operates the mixer machine (4) alternately in

- a Normal Operation Mode, in which an operational speed of the mixer machine (4) is controlled in real-time to be the highest of said suspension speed and a basin throughput rate depending process speed, said basin throughput rate being determined continuously and is based on at least a basin input, a basin output and adequate blending of the basin input and a basin content, said process speed is predetermined for each combination of different process load situations and different process criteria in the specific basin (2) to be as low as possible without adversely affecting the treatment results and still providing adequate mixing of the liquid comprising solid matter, wherein the process load is constituted by a hydraulic load and a waste load, and
- a Reduced Operation Mode, in which the operational speed of the mixer machine (4) is below said suspension speed.

According to one embodiment of the present invention, there is provided a method for controlling a treatment apparatus arrangement in a treatment plant, of the initially defined type, which method is characterized in that by means of the variable speed drive operating the mixer machine alternately in

- a Normal Operation Mode, in which an operational speed of the mixer machine is at least the highest of said suspension speed and a basin throughput rate depending process speed, said basin throughput rate being determined consecutively, and
- a Reduced Operation Mode, in which the operational speed of the mixer machine is below said suspension speed.

According to another embodiment of the present invention, there is provided a treatment apparatus arrangement, as well as a treatment plant comprising such a treatment apparatus arrangement, arranged to be alternately operated in a Normal Operation Mode and a Reduced Operation Mode, respectively.

Thus, the present invention is based on the inventor's insight that a "basin content inertia" entail that the solid matter is kept in suspension in the liquid also some time after the mixer machine is turned off, and that accumulated solids are easily and instantly re-suspended when the mixer machine is re-activated. Thus, the invention is based on the conclusion to drive the mixer machine, during a process step that requires mixing, at an as low speed as possible during Normal Operation Mode and every now and then enter a Reduced Operation Mode, in which the operational speed of the mixer machine is reduced, and thereby saving energy consumed by the mixer machine without jeopardizing the process results. The present invention is also based on the inventor´s insight that the process speed cannot only be dependent on the influent waste load.

In a preferred embodiment of the present invention, the operational speed of the mixer machine in the Reduced Operation Mode is below 10Hz, and according to a yet more preferred embodiment the operational speed of the mixer machine is equal to zero.

Claims

1. A method for controlling a treatment apparatus arrangement (3) in a treatment plant (1), the treatment plant being arranged to treat liquid comprising solid matter such as waste water, the treatment plant (1) comprising:

- a basin (2) housing a basin content constituted by a liquid comprising solid matter, the operating condition in said basin (2) being anoxic and/or anaerobic, and
- said treatment apparatus arrangement (3) that comprises:
    - at least one mixer machine (4) located in said basin (2), the mixer machine (4) having a treatment plant depending predetermined suspension speed adapted to keep solid matter suspended in the liquid, and
    - a variable speed drive (5) operatively connected to said mixer machine (4),

the method being **characterized** in that the variable speed drive (5) operates the mixer machine (4) alternately in

- a Normal Operation Mode, in which an operational speed of the mixer machine (4) is controlled in real-time to be the highest of said suspension speed and a basin throughput rate depending process speed, said basin throughput rate being determined continuously and is based on at least a basin input, a basin output and adequate blending of the basin input and a basin content, said process speed is predetermined for each combination of different process load situations and different process criteria in the specific basin (2) to be as low as possible without adversely affecting the treatment results and still providing adequate mixing of the liquid comprising solid matter, wherein the process load is constituted by a hydraulic load and a waste load, and
- a Reduced Operation Mode, in which the operational speed of the mixer machine (4) is below said suspension speed.

2. The method according to claim 1, wherein the operational speed of the mixer machine (4) in the Reduced Operation Mode is below 10Hz, preferably equal to zero.

3. The method according to claim 1 or 2, wherein the process speed of the mixer machine (4) is proportional to the basin input.

4. The method according to any preceding claim, wherein the mixer machine (4) is operated in the Normal Operation Mode at least 5 minutes each turn, preferably at least 10 minutes.

5. The method according to any preceding claim, wherein the mixer machine (4) is operated in the Reduced Operation Mode at least 5 minutes each turn, preferably at least 10 minutes.

6. The method according to any preceding claim, wherein the treatment apparatus arrangement comprises at least two mixer machines (4), which are operated mutually independent of each other.

7. The method according to any preceding claims, wherein the basin (2) comprises at least one inlet (7) and at least one outlet (8) for liquid.

8. The method according to claim 7, wherein a basin input via said at least one inlet (7) and a basin output via said at least one outlet (8), respectively, are continuous.