[CLAIMS]

1. A support device for supporting an operation manager of a water treatment apparatus having a membrane filtration device with a filtration membrane, the support device comprising:

an acquirer configured to acquire data indicating water quality information of water to be treated, a pressure to supply the water to be treated to the membrane filtration device, a transmembrane pressure at the filtration membrane, a permeation flux at the filtration membrane, a frequency and cleaning conditions for cleaning the filtration membrane with cleaning water, a frequency for cleaning the filtration membrane with chemicals, types of chemicals, combinations of chemicals, and concentrations of chemicals to be used when the filtration membrane is cleaned with the chemicals; and

an outputter configured to output an optimum value of a current permeation flux from a viewpoint of energy saving and membrane clogging, a frequency and cleaning conditions for cleaning the membrane filtration device with the cleaning water in the future, a frequency for cleaning the membrane filtration device with chemicals in the future, the types of chemicals, the combinations of chemicals, and the concentrations of chemicals to be used when the filtration membrane is cleaned with the chemicals based on the data indicating the water quality information of the water to be treated, the pressure to supply the water to be treated to the membrane filtration device, and the transmembrane pressure at the filtration membrane, the frequency for cleaning the filtration membrane with chemicals, the types of chemicals, the combinations of chemicals, and the concentrations of chemicals to be used when the filtration membrane is cleaned with the chemicals, that have been acquired by the acquirer, by using a learned determination model acquired by performing learning processing using the data acquired by the acquirer.

2. The support device according to claim 1, further comprising:

a learning section configured to acquire the determination model by performing the learning processing using the data acquired by the acquirer.

3. The support device according to any one of claims 1 to 2,

wherein the cleaning conditions comprise supply pressure of cleaning water when the membrane filtration device is cleaned with cleaning water.

4. The support device according to claim 1,

wherein the learned determination model is a model for determining a frequency at which online chemical cleaning or offline chemical cleaning needs to be performed on the membrane filtration device in the future, and information on chemicals to be used when the online chemical cleaning or the offline chemical cleaning is performed on the membrane filtration device.

5. The support device according to claim 1,

wherein the learned determination model is a model for determining a time at which the filtration membrane of the membrane filtration device needs to be replaced.

6. The support device according to claim 1,

wherein the outputter is configured to output a graph indicating a relationship between a number of days of filtration and the transmembrane pressure as support information.

7. A support method for supporting an operation manager of a water treatment apparatus having a membrane filtration device with a filtration membrane, the support method comprising:

an acquiring step of acquiring data indicating water quality information of water to be treated, a pressure to supply the water to be treated to the membrane filtration device, a transmembrane pressure at the filtration membrane, a permeation flux at the filtration membrane, a frequency and cleaning conditions for cleaning the filtration membrane with cleaning water, a frequency for cleaning the filtration membrane with chemicals, types of chemicals, combinations of chemicals, and concentrations of chemicals to be used when the filtration membrane is cleaned with the chemicals; and

an outputting step of outputting an optimum value of a current permeation flux from a viewpoint of energy saving and membrane clogging, a frequency and cleaning conditions for cleaning the membrane filtration device with cleaning water in the future , a frequency for cleaning the membrane filtration device with chemicals in the future, the types of chemicals, the combinations of chemicals, and the concentrations of chemicals to be used when the filtration membrane is cleaned with the chemicals based on the data indicating the water quality information of the water to be treated, the pressure to supply the water to be treated to the membrane filtration device, the transmembrane pressure at the filtration membrane, the frequency for cleaning the filtration membrane with chemicals, the types of chemicals, the combinations of chemicals, and the concentrations of chemicals to be used when the filtration membrane is cleaned with the chemicals, that have been acquired in the acquiring step, by using a learned determination model acquired by performing learning processing using the data acquired in the acquiring step.

8. The support method according to claim 7, further comprising:

a learning step of acquiring the determination model by performing the learning processing using the data acquired in the acquiring step.

9. The support method according to any one of claims 7 to 8,

wherein the cleaning conditions comprise supply pressure of cleaning water when the membrane filtration device is cleaned with cleaning water.

10. The support method according to claim 7,

wherein the learned determination model is a model for determining a frequency at which online chemical cleaning or offline chemical cleaning needs to be performed on the membrane filtration device in the future, and information on chemicals to be used when the online chemical cleaning or the offline chemical cleaning is performed on the membrane filtration device.

11. The support method according to claim 7,

wherein the learned determination model is a model for determining a time at which the filtration membrane of the membrane filtration device needs to be replaced.

12. The support method according to claim 7,

wherein the outputting step comprises outputting a graph indicating a relationship between a number of days of filtration and the transmembrane pressure as support information.

13. A support program for causing a computer of a support device for supporting an operation manager of a water treatment apparatus having a membrane filtration device with a filtration membrane to execute:

an acquiring step of acquiring data indicating water quality information of water to be treated, a pressure to supply the water to be treated to the membrane filtration device, a transmembrane pressure at the filtration membrane, a permeation flux at the filtration membrane, a frequency and cleaning conditions for cleaning the filtration membrane with cleaning water, a frequency for cleaning the filtration membrane with chemicals, types of chemicals, combinations of chemicals, and concentrations of chemicals to be used when the filtration membrane is cleaned with the chemicals; and

an outputting step of outputting an optimum value of a current permeation flux from a viewpoint of energy saving and membrane clogging, a frequency and cleaning conditions for cleaning the membrane filtration device with cleaning water in the future, a frequency for cleaning the membrane filtration device with chemicals in the future, the types of chemicals, the combinations of chemicals, and the concentrations of chemicals to be used when the filtration membrane is cleaned with the chemicals based on the data indicating the water quality information of the water to be treated, the pressure to supply the water to be treated to the membrane filtration device, and the transmembrane pressure at the filtration membrane, , the frequency for cleaning the filtration membrane with chemicals, the types of chemicals, the combinations of chemicals, and the concentrations of chemicals to be used when the filtration membrane is cleaned with the chemicals, that have been acquired in the acquiring step, by using a learned determination model acquired by performing learning processing using the data acquired in the acquiring step.

14. The support program according to claim 13, further causing the computer to execute:

a learning step of acquiring the determination model by performing the learning processing using the data acquired in the acquiring step.

15. The support program according to any one of claims 13 to 14,

wherein the cleaning conditions comprise supply pressure of cleaning water when the membrane filtration device is cleaned with cleaning water.

16. The support program according to claim 13,

wherein the learned determination model is a model for determining a frequency at which online chemical cleaning or offline chemical cleaning needs to be performed on the membrane filtration device in the future, and information on chemicals to be used when the online chemical cleaning or the offline chemical cleaning is performed on the membrane filtration device.

17. The support program according to claim 13,

wherein the learned determination model is a model for determining a time at which the filtration membrane of the membrane filtration device needs to be replaced.