CLAIMS

[Claim 1] A method for displaying trains and moving bodies, wherein said method changes display positions and shapes of symbols indicating a train and a moving body in accordance with running states of the train and the moving body.

[Claim 2] The method for displaying trains and moving bodies according to claim 1, wherein the method modifies as said running states the shapes of the symbols indicating the train and the moving body in accordance with stopping and running conditions.

[Claim 3] The method for displaying trains and moving bodies according to claim 2, wherein shape change of the symbols indicating the train and moving body as said running states is alternation in length along time course.

[Claim 4] The method for displaying trains and moving bodies according to any one of the preceding claims 1 to 3, wherein alternation of shapes of said symbols indicating the train and moving body is displayed along movement directions of the train and moving body.

[Claim 5] The method for displaying trains and moving bodies according to any one of the preceding claims 1 to 4, wherein said symbols indicating the train and moving body are arranged to reflect delay situations or vehicle occupancy rates of the train and the moving body.

[Claim 6] The method for displaying trains and moving bodies according to any one of the preceding claims 1 to 5, wherein alteration of the display positions and shapes of the train and moving body includes calculating, for each of the train and moving body, positions at two different time points with an on-screen display time being as a reference and determining positions and shapes of the train and moving body to be displayed depending on the calculated positions of the train and moving body.

[Claim 7] The method for displaying trains and moving bodies according to any one of the preceding claims 1 to 5,

wherein the position of said train is calculated from an actually achieved diagram with a record of actual arrival and departure times at train-stop stations on a per-train basis.

[Claim 8] The method for displaying trains and moving bodies according to any one of the preceding claims 1 to 5,

wherein the position of said train is calculated from a predictive diagram with a record of predictive per-train arrival and departure times at train-stop stations, the arrival and departure times being forecasted at a given prediction time point.

[Claim 9] The method for displaying trains and moving bodies according to any one of the preceding claims 1 to 5,

wherein the position of said train is calculated from actual results of per-train

running positions in regard to already operated trains.

[Claim 10] The method for displaying trains and moving bodies according to any one of the preceding claims 1 to 5,

wherein the symbol shape is a line segment having a width connecting together said two train positions.

[Claim 11] The method for displaying trains and moving bodies according to any one of the preceding claims 1 to 5,

wherein the symbol shape is a line segment having a width coupling together said two train positions and is caused to vary in shape so as to make a one end distinguishable from an other end.

[Claim 12] The method for displaying trains and moving bodies according to any one of the preceding claims 1 to 5,

wherein alternation of the symbol shape causes an end on the movement direction side to have an acute angle.

[Claim 13] The method for displaying trains and moving bodies according to any one of the preceding claims 1 to 5, wherein display colors of the train and moving body are determined by delay times of the train and moving body.

[Claim 14] The method for displaying trains and moving bodies according to any one of the preceding claims 1 to 5, wherein a display color of the train is determined by a vehicle occupancy rate of the train.

[Claim 15] The method for displaying trains and moving bodies according to any one of the preceding claims 1 to 5, wherein display sizes of the train and moving body are determined by delay times of the train and moving body.

[Claim 16] The method for displaying trains and moving bodies according to any one of the preceding claims 1 to 5, wherein a display size of the train is determined by a vehicle occupancy rate of the train.

[Claim 17] An operation assessment device having a display device for displaying positions of a train and a moving body, comprising:

a train-running interstation calculation unit for inputting diagram information storing per-train departure and arrival times at each train-stop station, railway route information storing positions of stations constituting a railway route in accordance with route sequence and a display time for visual display of said diagram information on a screen of said display device and for calculating train-running interstation zones or train-stop stations,

a train position/shape calculation unit for calculating train positions and shapes

from either said interstation zones or train-stop stations and also from said route information and said display time, and

a train position display unit for calculating train positions at two different time points with the on-screen display time as a reference by means of said train position/shape calculation unit and for determining display positions and shapes of symbols indicating each train and a moving body from the two train positions calculated.

[Claim 18] The operation assessment device according to claim 17,

wherein said diagram information is an actually achieved train diagram with a record of actual arrival and departure times at each train-stop station on a per-train basis.

[Claim 19] The operation assessment device according to claim 17,

wherein said diagram information is a predictive diagram with a record of predictive per-train arrival and departure times at train-stop stations, the arrival and departure times being forecasted at a given prediction time point.

[Claim 20] The operation assessment device according to claim 17,

wherein determination of a display position and shape by said train position display unit is for setting the display position and shape as a line segment having a width coupling together said two train positions.

[Claim 21] The operation assessment device according to claim 17,

wherein determination of a display position and shape by said train position display unit is for setting the display position and shape as a line segment having a width coupling together said two train positions and for causing the shape to vary so as to make a one end distinguishable from an other end.

[Claim 22] The operation assessment device according to claim 17,

wherein determination of a display position and shape by said train position display unit is for setting the display position and shape as a line segment having a width coupling together said two train positions and for causing an end point on the movement direction side to have an acute angle.

[Claim 23] The operation assessment device according to claim 17, further comprising:

a train information acquisition unit for acquiring train delay time information storing a delay time in each train-running interstation zone on a per-train basis and for obtaining said train delay time from the train delay time information,

wherein the train position display unit determines a display size of each train based on the train delay time acquired from said train acquisition unit and displays each train.

[Claim 24] The operation assessment device according to claim 17, further comprising:

a train information acquisition unit for acquiring train occupancy information storing a train occupancy rate in each train-running interstation zone on a per-train basis and for obtaining said train occupancy rate from the train occupancy information,

wherein the train position display unit determines a display size of each train based on said train occupancy rate acquired from said train acquisition unit and displays each train.

[Claim 25] The operation assessment device according to claim 17, further comprising:

a train information acquisition unit for acquiring train delay time information storing a delay time in each train-running interstation zone on a per-train basis and for obtaining said train delay time from the train delay time information,

wherein the train position display unit determines a display color of each train based on the train delay time acquired from said train acquisition unit and displays each train.

[Claim 26] The operation assessment device according to claim 17, further comprising:

a train information acquisition unit for acquiring train occupancy information storing a train occupancy rate in each train-running interstation zone on a per-train basis and for obtaining said train occupancy rate from the train occupancy information,

wherein the train position display unit determines a display color of each train based on said train occupancy rate acquired from said train acquisition unit and displays each train.

[Claim 27] The operation assessment device according to claim 17, further comprising:

a train information acquisition unit for acquiring train occupancy information storing a train occupancy rate in each train-running interstation zone on a per-train basis and for obtaining said train occupancy rate from the train occupancy information,

wherein the train position display unit determines a display color of each train based on said train occupancy rate acquired from said train acquisition unit and displays each train.

[Claim 28] The operation assessment device according to claim 17, further comprising:

a train information acquisition unit for acquiring train occupancy information storing a train occupancy rate in each train-running interstation zone on a per-train basis and for obtaining said train occupancy rate from the train occupancy information,

wherein the train position display unit acquires from said train acquisition unit train occupancy rates at two different time points with the display time as a reference, and determines two display colors of each train said train occupancy rate based on said train occupancy rates at the two different time points, and displays each train while alternately

changing said two display colors.

[Claim 29] The operation assessment device according to claim 17, further comprising:

a train information acquisition unit for acquiring train occupancy information storing a train occupancy rate in each train-running interstation zone on a per-train basis and for obtaining said train occupancy rate from the train occupancy information,

wherein the train position display unit acquires from said train acquisition unit train occupancy rates at two different time points with the display time as a reference, determines two display sizes of each train said train occupancy rate based on said train occupancy rates at the two different time points, and displays while alternately changing said two display sizes.

[Claim 30] An operation control system having an operation control device arranged in each track section, a commonly provided integrated operation assessment device, and a display device for displaying positions of trains and moving bodies,

wherein said display device is arranged to display a train operation situation using symbols indicating said trains and moving bodies by the display method defined in any one of the preceding claims 1 to 16.

[Claim 31] The operation control system according to claim 30,

wherein said operation control system includes a display terminal for displaying operation situations of said trains and moving bodies and an operation adjustment input terminal for inputting conditions used by a commanding staff member to perform operation adjustment.

[Claim 32] An operation control system having an operation control device arranged per track section, a commonly provided integrated operation assessment device, and a display device for displaying positions of trains and moving bodies,

wherein said display device is arranged to display a train operation situation using symbols indicating said trains and moving bodies, which symbols are determined by the train position display unit of the operation assessment device defined in any one of the preceding claims 17 to 29.

AMENDED CLAIMS

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[Claim 1] (Cancelled)

[Claim 2] (Cancelled)

[Claim 3] (Cancelled)

[Claim 4] (Cancelled)

[Claim 5] (Cancelled)

[Claim 6] (Amended) A method for displaying moving bodies,

wherein said method changes display positions and shapes of symbols indicating a moving body in accordance with running states of the moving body,

wherein alteration of the display positions and shapes of the train and moving body includes calculating, for each of the moving body, positions at two different time points with an on-screen display time being as a reference and determining positions and shapes of the moving body to be displayed depending on the calculated positions of the moving body.

[Claim 7] (Cancelled)

[Claim 8] (Amended) The method for displaying trains and moving bodies according to claims 6,

wherein the moving bodies are trains and the position of said train is calculated from a predictive diagram with a record of predictive per-train arrival and departure times at train-stop stations, the arrival and departure times being forecasted at a given prediction time point.

[Claim 9] (Cancelled)

[Claim 10] (Amended) The method for displaying trains and moving bodies according to claim 6,

wherein the moving bodies are trains and the symbol shape is a line segment having a width connecting together said two train positions at two different time points.

[Claim 11] (Amended) The method for displaying trains and moving bodies according to claim 6,

wherein the moving bodies are trains and the symbol shape is a line segment having a width coupling together said two train positions and is caused to vary in shape so as to make a one end distinguishable from an other end.

[Claim 12] (Cancelled)

[Claim 13] (Cancelled)

[Claim 14] (Cancelled)

[Claim 15] (Cancelled)

[Claim 16] (Cancelled)

[Claim 17] (Amended) An operation assessment device having a display device for displaying positions of a train, comprising:

a train-running interstation calculation unit for inputting diagram information storing per-train departure and arrival times at each train-stop station, railway route information storing positions of stations constituting a railway route in accordance with route sequence and a display time for visual display of said diagram information on a screen of said display device and for calculating train-running interstation zones or train-stop stations,

a train position/shape calculation unit for calculating train positions and shapes from either said interstation zones or train-stop stations and also from said route information and said display time, and

a train position display unit for calculating train positions at two different time points with the on-screen display time as a reference by means of said train position/shape calculation unit and for determining display positions and shapes of symbols indicating each train and a moving body from the two train positions calculated.

[Claim 18] The operation assessment device according to claim 17,

wherein said diagram information is an actually achieved train diagram with a record of actual arrival and departure times at each train-stop station on a per-train basis.

[Claim 19] The operation assessment device according to claim 17,

wherein said diagram information is a predictive diagram with a record of predictive per-train arrival and departure times at train-stop stations, the arrival and departure times being forecasted at a given prediction time point.

[Claim 20] The operation assessment device according to claim 17,

wherein determination of a display position and shape by said train position display unit is for setting the display position and shape as a line segment having a width coupling together said two train positions.

[Claim 21] The operation assessment device according to claim 17,

wherein determination of a display position and shape by said train position display unit is for setting the display position and shape as a line segment having a width coupling together said two train positions and for causing the shape to vary so as to make a one end distinguishable from an other end.

[Claim 22] The operation assessment device according to claim 17,

wherein determination of a display position and shape by said train position

display unit is for setting the display position and shape as a line segment having a width coupling together said two train positions and for causing an end point on the movement direction side to have an acute angle.

[Claim 23] The operation assessment device according to claim 17, further comprising:

a train information acquisition unit for acquiring train delay time information storing a delay time in each train-running interstation zone on a per-train basis and for obtaining said train delay time from the train delay time information,

wherein the train position display unit determines a display size of each train based on the train delay time acquired from said train acquisition unit and displays each train.

[Claim 24] The operation assessment device according to claim 17, further comprising:

a train information acquisition unit for acquiring train occupancy information storing a train occupancy rate in each train-running interstation zone on a per-train basis and for obtaining said train occupancy rate from the train occupancy information,

wherein the train position display unit determines a display size of each train based on said train occupancy rate acquired from said train acquisition unit and displays each train.

[Claim 25] The operation assessment device according to claim 17, further comprising:

a train information acquisition unit for acquiring train delay time information storing a delay time in each train-running interstation zone on a per-train basis and for obtaining said train delay time from the train delay time information,

wherein the train position display unit determines a display color of each train based on the train delay time acquired from said train acquisition unit and displays each train.

[Claim 26] The operation assessment device according to claim 17, further comprising:

a train information acquisition unit for acquiring train occupancy information storing a train occupancy rate in each train-running interstation zone on a per-train basis and for obtaining said train occupancy rate from the train occupancy information,

wherein the train position display unit determines a display color of each train based on said train occupancy rate acquired from said train acquisition unit and displays each train.

[Claim 27] The operation assessment device according to claim 17, further comprising:

a train information acquisition unit for acquiring train occupancy information storing a train occupancy rate in each train-running interstation zone on a per-train basis and for obtaining said train occupancy rate from the train occupancy information,

wherein the train position display unit determines a display color of each train

based on said train occupancy rate acquired from said train acquisition unit and displays each train.

[Claim 28] The operation assessment device according to claim 17, further comprising:

a train information acquisition unit for acquiring train occupancy information storing a train occupancy rate in each train-running interstation zone on a per-train basis and for obtaining said train occupancy rate from the train occupancy information,

wherein the train position display unit acquires from said train acquisition unit train occupancy rates at two different time points with the display time as a reference, and determines two display colors of each train said train occupancy rate based on said train occupancy rates at the two different time points, and displays each train while alternately changing said two display colors.

[Claim 29] The operation assessment device according to claim 17, further comprising:

a train information acquisition unit for acquiring train occupancy information storing a train occupancy rate in each train-running interstation zone on a per-train basis and for obtaining said train occupancy rate from the train occupancy information,

wherein the train position display unit acquires from said train acquisition unit train occupancy rates at two different time points with the display time as a reference, determines two display sizes of each train said train occupancy rate based on said train occupancy rates at the two different time points, and displays while alternately changing said two display sizes.

[Claim 30] (Amended) An operation control system having an operation control device arranged in each track section, a commonly provided integrated operation assessment device, and a display device for displaying positions of trains and moving bodies,

wherein said display device is arranged to display a train operation situation using symbols indicating said trains and moving bodies by the display method defined in claim 6.

[Claim 31] (Amended) The operation control system according to claim 30,

wherein said operation control system includes a display terminal for displaying operation situations of said moving bodies and an operation adjustment input terminal for inputting conditions used by a commanding staff member to perform operation adjustment.

[Claim 32] (Amended) An operation control system having an operation control device arranged per track section, a commonly provided integrated operation assessment device, and a display device for displaying positions of moving bodies,

wherein said display device is arranged to display a train operation situation using symbols indicating said trains, which symbols are determined by the train position display unit of the operation assessment device defined in claims 17.

CLAIMS

[Claim 1] A method for displaying moving bodies,

wherein said method changes display positions and shapes of symbols indicating a moving body in accordance with running states of the moving body,

wherein alteration of the display positions and shapes of the train and moving body includes calculating, for each of the moving body, positions at two different time points with an on-screen display time being as a reference and determining positions and shapes of the moving body to be displayed depending on the calculated positions of the moving body.

[Claim 2] The method for displaying trains and moving bodies according to claims 1,

wherein the moving bodies are trains and the position of said train is calculated from a predictive diagram with a record of predictive per-train arrival and departure times at train-stop stations, the arrival and departure times being forecasted at a given prediction time point.

[Claim 3] The method for displaying trains and moving bodies according to claim 1,

wherein the moving bodies are trains and the symbol shape is a line segment having a width connecting together said two train positions at two different time points.

[Claim 4] The method for displaying trains and moving bodies according to claim 1,

wherein the moving bodies are trains and the symbol shape is a line segment having a width coupling together said two train positions and is caused to vary in shape so as to make a one end distinguishable from an other end.

[Claim 5] An operation assessment device having a display device for displaying positions of a train, comprising:

a train-running interstation calculation unit for inputting diagram information storing per-train departure and arrival times at each train-stop station, railway route information storing positions of stations constituting a railway route in accordance with route sequence and a display time for visual display of said diagram information on a screen of said display device and for calculating train-running interstation zones or train-stop stations,

a train position/shape calculation unit for calculating train positions and shapes from either said interstation zones or train-stop stations and also from said route information and said display time, and

a train position display unit for calculating train positions at two different time points with the on-screen display time as a reference by means of said train position/shape calculation unit and for determining display positions and shapes of symbols indicating each train and a moving body from the two train positions calculated.

[Claim 6] The operation assessment device according to claim 5,

wherein said diagram information is an actually achieved train diagram with a record of actual arrival and departure times at each train-stop station on a per-train basis.

[Claim 7] The operation assessment device according to claim 5,

wherein said diagram information is a predictive diagram with a record of predictive per-train arrival and departure times at train-stop stations, the arrival and departure times being forecasted at a given prediction time point.

[Claim 8] The operation assessment device according to claim 5,

wherein determination of a display position and shape by said train position display unit is for setting the display position and shape as a line segment having a width coupling together said two train positions.

[Claim 9] The operation assessment device according to claim 5,

wherein determination of a display position and shape by said train position display unit is for setting the display position and shape as a line segment having a width coupling together said two train positions and for causing the shape to vary so as to make a one end distinguishable from an other end.

[Claim 10] The operation assessment device according to claim 5,

wherein determination of a display position and shape by said train position display unit is for setting the display position and shape as a line segment having a width coupling together said two train positions and for causing an end point on the movement direction side to have an acute angle.

[Claim 11] The operation assessment device according to claim 5', further comprising:

a train information acquisition unit for acquiring train delay time information storing a delay time in each train-running interstation zone on a per-train basis and for obtaining said train delay time from the train delay time information,

wherein the train position display unit determines a display size of each train based on the train delay time acquired from said train acquisition unit and displays each train.

[Claim 12] The operation assessment device according to claim 5', further comprising:

a train information acquisition unit for acquiring train occupancy information storing a train occupancy rate in each train-running interstation zone on a per-train basis and for obtaining said train occupancy rate from the train occupancy information,

wherein the train position display unit determines a display size of each train based on said train occupancy rate acquired from said train acquisition unit and displays each train.

[Claim 13] The operation assessment device according to claim 5, further comprising:

a train information acquisition unit for acquiring train delay time information storing a delay time in each train-running interstation zone on a per-train basis and for obtaining said train delay time from the train delay time information,

wherein the train position display unit determines a display color of each train based on the train delay time acquired from said train acquisition unit and displays each train.

[Claim 14] The operation assessment device according to claim 5', further comprising:

a train information acquisition unit for acquiring train occupancy information storing a train occupancy rate in each train-running interstation zone on a per-train basis and for obtaining said train occupancy rate from the train occupancy information,

wherein the train position display unit determines a display color of each train based on said train occupancy rate acquired from said train acquisition unit and displays each train.

[Claim 15] The operation assessment device according to claim 5', further comprising:

a train information acquisition unit for acquiring train occupancy information storing a train occupancy rate in each train-running interstation zone on a per-train basis and for obtaining said train occupancy rate from the train occupancy information,

wherein the train position display unit determines a display size of each train

based on said train occupancy rate acquired from said train acquisition unit and displays each train.

[Claim 16] The operation assessment device according to claim 5, further comprising:

a train information acquisition unit for acquiring train occupancy information storing a train occupancy rate in each train-running interstation zone on a per-train basis and for obtaining said train occupancy rate from the train occupancy information,

wherein the train position display unit acquires from said train acquisition unit train occupancy rates at two different time points with the display time as a reference, and determines two display colors of each train said train occupancy rate based on said train occupancy rates at the two different time points, and displays each train while alternately changing said two display colors.

[Claim 17] The operation assessment device according to claim 5, further comprising:

a train information acquisition unit for acquiring train occupancy information storing a train occupancy rate in each train-running interstation zone on a per-train basis and for obtaining said train occupancy rate from the train occupancy information,

wherein the train position display unit acquires from said train acquisition unit train occupancy rates at two different time points with the display time as a reference, determines two display sizes of each train said train occupancy rate based on said train occupancy rates at the two different time points, and displays while alternately changing said two display sizes.

[Claim 18] An operation control system having an operation control device arranged in each track section, a commonly provided integrated operation assessment device, and a display device for displaying positions of trains and moving bodies,

wherein said display device is arranged to display a train operation situation using symbols indicating said trains and moving bodies by the display method defined in claim 1.

[Claim 19] The operation control system according to claim 18,

wherein said operation control system includes a display terminal for displaying operation situations of said moving bodies and an operation adjustment input terminal for inputting conditions used by a commanding staff member to perform operation adjustment.

[Claim 20] An operation control system having an operation control device arranged per track section, a commonly provided integrated operation assessment device, and a display device for displaying positions of moving bodies,

wherein said display device is arranged to display a train operation situation using symbols indicating said trains, which symbols are determined by the train position display unit of the operation assessment device defined in claims 5.