CLAIMS

1. An on-board device loaded on a moving vehicle traveling on a track, and comprising a control device configured to control the traveling of the moving vehicle, wherein the control device comprises:

an operation data acquiring section configured to acquire failure data indicating a failure on the track;

a route determining section configured to determine a traveling route in case of occurrence of the failure based on the failure data;

a traveling route securement determining section configured to determine securement of the traveling route based on station related data that is acquired from a station interface device of a station to which a branch on the route belongs, and which indicates data of the branch, and different moving vehicle related data that is acquired from a different moving vehicle competing in at least a part of the traveling route and that indicates data of the different moving vehicle; and

a traveling determining section configured to determine the traveling of the moving vehicle on the secured traveling route based on the different moving vehicle related data.

2. The on-board device according to claim 1, wherein the traveling route securement determining section comprises:

a different train state checking section configured to inquire the different moving vehicle related data to the different moving vehicle; and

a station state checking section configured to inquire the station related data to the station to which the branch belongs.

3. The on-board device according to claim 2, wherein the different moving vehicle related data contains a request time data which indicates a time when the different moving vehicle outputs a command of switching of the branch,

wherein the traveling route securement determining section:

checks whether the traveling route has been secured, based on the station related data and the different moving vehicle related data,

stands by at a predetermined stand-by position, if there is request time data that is earlier than the time when the branch switching command is outputted from the moving vehicle and if the traveling route has not been secured; and

outputs the branch switching command for the traveling route to be secured after the different moving vehicle travels.

4. The on-board device according to claim 3, wherein the traveling route securement determining section makes the moving vehicle travel to the predetermined stand-by position in case of the stand-by when the traveling route has not been secured.

5. The on-board device according to any one of claims 1 to 4, wherein the different moving vehicle related data contains traveling permission limit position data which indicates a range where the moving vehicle is permitted to travel in case of the failure around the different moving vehicle, and

wherein the traveling determining section determines the traveling of the moving vehicle in the range where the moving vehicle is permitted to travel, based on the traveling permission limit position data.

6. A signaling system comprising:

a plurality of on-board devices, each of which is specified in any one of claims 1 to 5 and is loaded in one of a plurality of moving vehicles traveling on a track; and

a plurality of station interface devices, each of which is bi-directionally communicable with each of the plurality of on-board devices, is arranged in one of a plurality of stations provided along the track, and controls one of a plurality of branches that belongs to the one station.

7. A control method of a moving vehicle traveling on a track, comprising:

acquiring failure data indicating a failure on the track by an on-board device of the moving vehicle;

determining a traveling route in case of occurrence of the failure based on the failure data by the on-board device;

securing the traveling route by the on-board device based on station related data that is acquired from a station interface device of a station to which a branch on the traveling route belongs and which indicates data of the branch, and different moving vehicle related data that is acquired from a different moving vehicle competing in at least a part of the traveling route and that indicates data of the different moving vehicle; and

determining the traveling of the moving vehicle on the secured traveling route based on the different moving vehicle related data by the on-board device.

8. The control method of the moving vehicle according to claim 7, wherein the securing the

traveling route comprises:

inquiring the different moving vehicle related data to the different moving vehicle by the on-board device; and

inquiring the station related data to the station to which the branch belongs by the on-board device.

9. The control method of the moving vehicle according to claim 8, wherein the different moving vehicle related data contains a request time data which indicates a time when the different moving vehicle outputted a command of switching of the branch,

wherein the securing the traveling route comprises:

checking whether the traveling route has been secured, based on the station related data and the different moving vehicle related data;

standing by at a predetermined stand-by position, if there is request time data that is earlier than the time when the branch switching command is outputted from the moving vehicle and if the traveling route has not been secured; and

outputting the branch switching command for the traveling route to be secured after the different moving vehicle travels.

10. The control method of the moving vehicle according to claim 9, wherein the securing the traveling route comprises:

making the moving vehicle travel to the predetermined stand-by position in case of the stand-by when the traveling route has not been secured.

11. The control method of the moving vehicle

according to any one of claims 7 to 9, wherein the different moving vehicle related data contains traveling permission limit position data which indicates a range where the moving vehicle is permitted to travel in case of the failure around the different moving vehicle, and

wherein the determining the traveling route comprises:

determining the traveling of the moving vehicle in the range where the moving vehicle is permitted to travel, based on the traveling permission limit position data.

CLAIMS

1. An on-board device loaded in a moving vehicle traveling on a track, and comprising a control device configured to control the traveling of the moving vehicle,

wherein the control device comprises:

an operation data acquiring section configured to acquire failure data indicating a failure on the track from a station interface device;

a route determining section configured to determine a temporary traveling route to be traveled at a time of occurrence of the failure based on the failure data;

a traveling route securement determining section configured to receive station related data related to a branch on the temporary traveling route and acquired from a station interface device of a station to which the branch belongs, and different moving vehicle related data related to a different moving vehicle competing in at least a part of the temporary traveling route and acquired from the different moving vehicle and to determine whether the temporary traveling route has been secured without competing with the different moving vehicle, based on the station related data and the different moving vehicle related data, when the failure data is acquired;

wherein the station related data comprises data indicating a switching position of the branch, data indicating whether or not the branch is locked, and branch traveling permission limit position data indicating a range where the moving vehicle is permitted to travel, and the different moving vehicle related data comprises data indicating a position of the different moving vehicle and vehicle traveling permission limit position data indicating a range where the moving vehicle behind the different moving vehicle is permitted to travel; and

a traveling determining section configured to determine the traveling of the moving vehicle on the secured temporary traveling route based on the station related data and the different moving vehicle related data, when the failure data is acquired.

2. The on-board device according to claim 1, wherein the traveling route securement determining section comprises:

a different train state checking section configured to inquire the different moving vehicle related data to the different moving vehicle; and

a station state checking section configured to inquire the station related data to the station to which the branch belongs.

3. The on-board device according to claim 2, wherein the different moving vehicle related data contains request time data indicating a time when the different moving vehicle outputs a branch switching command, and

wherein the traveling route securement determining

section:

checks whether the temporary traveling route has been secured, based on the station related data and the different moving vehicle related data,

stands by at a predetermined stand-by position, when there is request time data that has been outputted earlier than the time when the branch switching command is outputted from the moving vehicle so that the temporary traveling route has not been secured; and

outputs the branch switching command for the temporary traveling route to be secured after the different moving vehicle travels.

4. The on-board device according to claim 3, wherein the traveling route securement determining section makes the moving vehicle travel to the stand-by position predetermined based on the branch traveling permission limit position data and the vehicle traveling permission limit position data when the temporary traveling route has not been secured.

5. The on-board device according to any one of claims 1 to 4,

wherein the traveling determining section determines the traveling of the moving vehicle in the range where the moving vehicle is permitted to travel, based on the vehicle traveling permission limit position data.

6. A signaling system comprising:

a plurality of said on-board devices, each of which is specified in any one of claims 1 to 5 and is loaded in one of a plurality of said moving vehicles traveling on the traveling route or the temporary traveling route; and

a plurality of station interface devices, each of which is bi-directionally communicable with each of the plurality of on-board devices, is arranged in one of said ~~a~~ plurality of stations provided along the temporary traveling route, and controls said branch that belongs to the one station.

7. A control method of a moving vehicle traveling on a track, comprising:

acquiring failure data indicating a failure on the track by an on-board device of the moving vehicle from a station interface device;

determining a temporary traveling route to be traveled at a time of occurrence of the failure based on the failure data by the on-board device;

securing the temporary traveling route without competing with a different moving vehicle, by the on-board device, based on station related data related to a branch on the temporary traveling route and acquired from a station interface device of a station to which the branch belongs, and different moving vehicle related data

acquired from the different moving vehicle competing in at least a part of the temporary traveling route and related to the different moving vehicle, when the failure data is acquired;

wherein the station related data comprises data indicating a switching position of the branch, data indicating whether or not the branch is locked, and branch traveling permission limit position data indicating a range where the moving vehicle is permitted to travel, and the different moving vehicle related data comprises data indicating a position of the different moving vehicle and vehicle traveling permission limit position data indicating a range where the moving vehicle behind the different moving vehicle is permitted to travel; and

determining the traveling of the moving vehicle on the secured temporary traveling route based on the station related data and the different moving vehicle related data by the on-board device, when the failure data is acquired.

8. The control method of the moving vehicle according to claim 7, wherein the securing the temporary traveling route comprises:

inquiring the different moving vehicle related data to the different moving vehicle by the on-board device; and

inquiring the station related data to the station to which the branch belongs, by the on-board device.

9. The control method of the moving vehicle according to claim 8, wherein the different moving vehicle related data contains a request time data indicating a time when the different moving vehicle outputs a branch switching command, and

wherein the securing the temporary traveling route comprises:

checking whether the temporary traveling route has been secured, based on the station related data and the different moving vehicle related data;

standing by at a predetermined stand-by position, when there is request time data that has been outputted earlier than the time when the branch switching command is outputted from the moving vehicle so that the temporary traveling route has not been secured; and

outputting the branch switching command for the temporary traveling route to be secured after the different moving vehicle travels.

10. The control method of the moving vehicle according to claim 9, wherein the securing the temporary traveling route further comprises:

making the moving vehicle travel to the stand-by position predetermined based on the branch traveling permission limit position data or the vehicle traveling permission limit position data when the traveling route has not been secured.

11. The control method of the moving vehicle according to any one of claims 7 to 9, wherein the determining the traveling comprises:

determining the traveling of the moving vehicle in the range where the moving vehicle is permitted to travel, based on the vehicle traveling permission limit position data.