

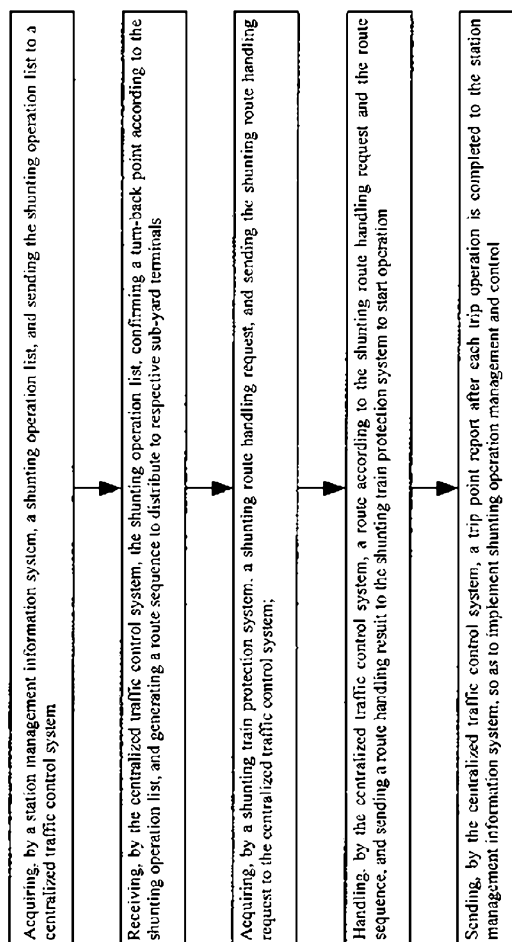
FASCICULE DE BREVET D'INVENTION

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54 Titre : Shunting operation management and control method and system.

57 **Abstré :** The present disclosure provides a shunting operation management and control method and system, including: acquiring, by a shunting train protection system, a shunting route handling request, and sending the shunting route handling request to the centralized traffic control system; handling, by the centralized traffic control system, a route according to the shunting route handling request and a route sequence, and sending a route handling result to the shunting train protection to start operation; and sending, by the centralized traffic control system, a trip point report after each trip operation is completed to the station management information system, so as to implement shunting operation management and control. The shunting operation management and control method and system open up connections among the station management information system shunting operation list, the centralized traffic control system route handling, the radio shunting locomotive signal and the shunting route request, which is a complete solution for the shunting operation flow. The solution takes full consideration of a multi-yard station shunting management mode, and implements one-point control and multi-yard interlocking.

Fig. 1



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SHUNTING OPERATION MANAGEMENT AND CONTROL METHOD AND SYSTEM

TECHNICAL FIELD

[0001] The present disclosure belongs to a field of rail traffic control, and more particularly, relates to a shunting operation management and control method and system.

BACKGROUND

[0002] A Centralized Traffic Control System (CTC) is widely used in railways, which vigorously promotes modernization of railway transportation management, and implements informatization of dispatching and commanding, automation of train operations, and centralization of signal device management. Especially since promulgation of the CTC3.0 technical conditions of the China State Railway Group Co., Ltd. in 2016, route mishandling prevention and plan management functions for trains in multi-track multi-direction large stations with passengers and freights mixed, and high-speed trains and ordinary trains mixed have been strengthened. However, with respect to shunting operation, the CTC is not doing enough; and due to low degrees of informatization and automation, as well as separation between a planning end and an executing end, the CTC can no longer meet shunting operation transportation needs.

[0003] At present, a shunting operation procedure of the CTC is as follows: a station dispatcher formulates a shunting operation list according to a daily operation plan, and an operator in a relevant position prints out a paper-form shunting operation list; an outdoor shunting driver contacts a station signalman by telephone, and requests to handle a designated shunting route; the signalman determines the route according to outdoor shunting route handling requirements and handles the shunting route by manually pressing beginning-ending terminal signal buttons. The process is highly dependent on people, so that accuracy and safety cannot be guaranteed. In the operation mode, the shunting operation list is not associated with the route, and the outdoor operation driver's request for the shunting route is not associated with route handling; these two disconnections are both made up manually, and manual participation **increases a risk** of errors.

[0004] In addition, the current use of existing devices for shunting operations has

disadvantages below: the outdoor shunting driver contacts the station signalman (or an attendant) by telephone to handle the shunting route (commonly known as requesting the shunting route), and the station signalman handles the shunting route by manually pressing the beginning-ending terminal signal buttons, so that the procedure is highly dependent on people and has potential safety hazards; conflicts between a train plan and the shunting operation cannot be predicted in advance; with respect to a multi-yard station, shunting operation coordination between respective yards is performed through manual contact without systematic flow control; a shunting plan is not associated with actual operation progress, and shunting operation progress relies on non-real-time manual records, resulting in untimely plan update, low formulation accuracy, and untimely present car update. Some marshalling stations or section stations will govern a plurality of yards, and a solution is needed to meet management and control of multi-yard station shunting operation.

SUMMARY

[0005] In view of the above-described problems, the present disclosure proposes a shunting operation management and control method, the method including:

[0006] Acquiring, by a station management information system, a shunting operation list, and sending the shunting operation list to a centralized traffic control system;

[0007] Receiving, by the centralized traffic control system, the shunting operation list, confirming a turn-back point according to the shunting operation list, and generating a route sequence to distribute to respective sub-yard terminals;

[0008] Acquiring, by a shunting train protection system, a shunting route handling request, and sending the shunting route handling request to the centralized traffic control system;

[0009] Handling, by the centralized traffic control system, a route according to the shunting route handling request and the route sequence, and sending a route handling result to the shunting train protection system to start operation; and

[0010] Sending, by the centralized traffic control system, a trip point report after each trip operation is completed to the station management information system, so as to implement shunting operation management and control.

[0011] The present disclosure further provides a shunting operation management and control method according to a shunting route request, the method including:

[0012] Acquiring, by a shunting train protection system, a shunting route handling request, and sending the shunting route handling request to a centralized traffic control system;

[0013] Handling, by the centralized traffic control system, a route according to the shunting route handling request and a route sequence, and sending a route handling result to the shunting train protection system to start operation; and

[0014] Sending, by the centralized traffic control system, a trip point report after each trip operation is completed to a station management information system, so as to implement shunting operation management and control.

[0015] Further, the handling, by the centralized traffic control system, a route according to the shunting route handling request, includes automatically triggering the route and manually triggering the route.

[0016] Further, the manually triggering the route includes a step of route designated trip preview:

[0017] Wherein, the designated trip preview includes a handled route path, and conflict situations between the handled route path and a train plan.

[0018] Further, after the centralized traffic control system confirms a turn-back point and generates the route sequence, the method further includes a step of automatic route preview, wherein, after previewing the entire route list and confirming correctness thereof, the centralized traffic control system distributes the same to respective sub-yard terminals.

[0019] Further, the centralized traffic control system adopts a single-track configuration mode to confirm the turn-back point, wherein, a turn-back point priority is configured for each track according to a role of an ending track.

[0020] Further, after the manually triggering the route designated trip preview, the method further includes a step of changing the route; and the method for changing the route includes: changing the turn-back point and selecting a change button.

[0021] The present disclosure further provides a shunting operation management and control system according to a shunting route request, the system including:

[0022] A shunting train protection system, configured to acquire a shunting route handling request, and send the shunting route handling request to a centralized traffic control system;

[0023] A centralized traffic control system, connected with the shunting train protection system, and configured to handle a route according to the shunting route handling request and a route sequence, and send a route handling result to the shunting train protection system to start operation;

[0024] The centralized traffic control system is connected with a station management information system, and is configured to send a trip point report after each trip operation is completed to the station management information system, so as to implement shunting operation management and control.

[0025] The present disclosure further provides a shunting operation management and control system, the system including:

[0026] A station management information system, configured to acquire a shunting operation list, and send the shunting operation list to a centralized traffic control system;

[0027] A centralized traffic control system, connected with the station management information system, and configured to receive the shunting operation list, confirm a turn-back point according to the shunting operation list, and generate a route sequence to distribute to respective sub-yard terminals;

[0028] A shunting train protection system, connected with the centralized traffic control system, and configured to acquire a shunting route handling request, and send the shunting route handling request to the centralized traffic control system;

[0029] The centralized traffic control system is further configured to handle a route according to the shunting route handling request and the route sequence, and send a route handling result to the shunting train protection system to start operation;

[0030] The centralized traffic control system is further configured to sending a trip point report after each trip operation is completed to the station management information system, so as to implement shunting operation management and control.

[0031] Further, the centralized traffic control system is further configured to handle the route according to the shunting route handling request, including automatically triggering

the route and manually triggering the route.

[0032] Further, the centralized traffic control system is further configured to perform automatic route preview on the route sequence generated after confirming the turn-back point.

[0033] Further, the centralized traffic control system is further configured to adopt a single-track configuration mode to confirm the turn-back point, wherein, a turn-back point priority is configured for each track according to a role of an ending track.

[0034] The shunting operation management and control method and system according to the present disclosure open up connections among the station management information system shunting operation list, the centralized traffic control system route handling, the radio shunting locomotive signal and the shunting route requesting, which is a complete solution for the shunting operation flow. The solution takes full consideration of a multi-yard station shunting management mode, and implements one-point control and multi-yard interlocking. The present disclosure strengthens flow management of shunting operation, improves efficiency of shunting operation, enhances safety of shunting operation, reduces route mishandling risks, and improves levels of informatization and automation in all links of shunting operation. Relying on the existing mature CTC3.0 system, the present disclosure has low implementation costs, low risks, and good effects.

[0035] Other features and advantages of the present disclosure will be further explained in the following description, and partly become self-evident therefrom, or be understood through implementation of the present disclosure. The objectives and other advantages of the present disclosure will be achieved through the structure specifically pointed out in the description, claims, and the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0036] In order to clearly illustrate the technical solution of the embodiments of the present disclosure or the prior art, the drawings that need to be used in the embodiments or the prior art will be briefly described in the following; it is obvious that the described drawings are only related to some embodiments of the present disclosure; based on the drawings, those ordinarily skilled in the art can acquire other drawings, without any inventive

operation.

[0037] FIG. 1 shows a flow chart of a shunting operation management and control method according to an embodiment of the present disclosure; and

[0038] FIG. 2 shows a schematic diagram of connections between shunting operation roles according to an embodiment of the present disclosure.

DETAILED DESCRIPTION

[0039] In order to make objectives, technical details and advantages of the embodiments of the present disclosure apparent, the technical solutions according to the embodiments of the present disclosure will be described in a clearly and fully understandable way in connection with drawings of the embodiments of the present disclosure. It is obvious that the described embodiments are just a part but not all of the embodiments of the present disclosure. Based on the described embodiments herein, those ordinarily skilled in the art can acquire other embodiment(s), without any inventive operation, which should be within the scope of the present disclosure.

[0040] The present disclosure proposes a shunting operation management and control solution based on the CTC3.0 system, which is used to standardize a shunting operation flow, improve operation safety, and achieve a purpose of integrating management and control.

[0041] The present disclosure evolves procedures such as telephone communication, route determination, and route button selection in the shunting operation into respective flow links of the system; automatically generates a route sequence, according to a Station Management Information System (SMIS) shunting plan (i.e., a shunting operation list), so that it is only necessary to trigger the route sequence when handling the route; allows an outdoor shunting driver to send a shunting route handling request to the CTC through a Shunting Train Protection (STP) system, so that the CTC automatically handles the route after receiving the request; further calculates conflicts between each trip operation and a train plan in real time, to provide a route preview function so that conflicts are predicted in advance; and summarizes shunting plans for uniform management to distribute to respective yards for execution, so as to implement effects of one shunting locomotive, one plan, and multi-yard operations, which may be seen globally. The present disclosure further feeds back

actual execution progress of shunting operation to an SMIS planning terminal in real time, to replace the original manual recording mode, and implement integration of management and control.

[0042] An embodiment of the present disclosure provides a shunting operation management and control method; FIG. 1 shows a flow chart of a shunting operation management and control method according to an embodiment of the present disclosure; and in FIG. 1, the method includes steps of:

[0043] Acquiring, by a station management information system, a shunting operation list, and sending the shunting operation list to a centralized traffic control system;

[0044] Receiving, by the centralized traffic control system, the shunting operation list, confirming a turn-back point according to the shunting operation list, and generating a route sequence to distribute to respective sub-yard terminals;

[0045] Acquiring, by a shunting train protection system, a shunting route handling request, and sending the shunting route handling request to the centralized traffic control system;

[0046] Handling, by the centralized traffic control system, a route according to the shunting route handling request, and sending a route handling result to the shunting train protection to start operation; and

[0047] Sending, by the centralized traffic control system, a trip point report after each trip operation is completed to the station management information system, so as to implement shunting operation management and control.

[0048] In the embodiment of the present disclosure, a connection diagram of shunting operation performed by the personnel and the system cooperatively is provided; train shunting operation is managed and controlled through cooperation between the specific personnel and the system. In an actual application process, the personnel may also be a terminal system, etc., and not limited to a special type of personnel; terminals, devices, etc., as long as they can complete the management and control operation of the present disclosure, are all within the protection scope of the embodiment of the present disclosure.

[0049] As shown in FIG. 2, FIG. 2 shows a schematic diagram of connections between shunting operation roles according to an embodiment of the present disclosure;

wherein, the roles include operators and system devices, and respective connection lines represent normal actions of the roles.

[0050] When the personnel and the system according to the present disclosure cooperate to manage and control the shunting operation:

[0051] Step 1: a station dispatcher formulates a shunting operation plan in the SMIS according to a daily shift plan, that is, formulates a shunting operation list;

[0052] Step 2: the SMIS sends the shunting operation list to the CTC;

[0053] Step 3: a station duty officer receives the SMIS shunting operation list at the CTC, confirms the turn-back point according to the shunting operation list and generates a route sequence; and after previewing the entire route list and confirming correctness thereof, the CTC distributes the same to signalmen/attendants of respective sub-yards;

[0054] Step 4: the shunting driver initiates a shunting route handling request to the STP device;

[0055] Step 5: the STP forwards the driver's shunting route handling request to the CTC;

[0056] Step 6: under normal circumstances, the CTC automatically handles the route after receiving the request; and the sub-yard attendant only needs to monitor that the shunting route is handled correctly; under special circumstances where the route cannot be automatically triggered according to the driver's shunting route handling request, the sub-yard attendant needs to intervene manually to complete route handling;

[0057] Step 7: the CTC feeds back a route handling state and a handling result to the STP, and the shunting driver confirms that a route signal is ready and start operation;

[0058] Step 8: after completion of each trip operation, the CTC sends a completion time point (briefly referred to as a trip point report) to the SMIS, and the SMIS converts the shunting plan to actual performance according to the trip point report, so as to implement integration of management and control.

[0059] Specifically, when the sub-yard attendant manually intervenes to trigger the route, he/she may preview the route; when manually triggering the route, he/she may preview the handled route path and a conflict situation between the route and the train plan; when there is a conflict situation, in order to enhance flexibility and availability of the system, the

system provides the user with a set of change routes, and the change route may be selected manually by changing the turn-back point and selecting the change button.

[0060] The present disclosure designs the “1+N” mode to solve the multi-yard shunting operation management and control problem, so as to implement effects of one shunting locomotive, one plan, and multi-yard operations, which may be seen globally. There is 1 master shunting plan management terminal, which is responsible for unified management of shunting plans of respective shunting locomotives. The duty officer is responsible for receipt and confirmation of trip plans, including checking trip plans, controlling an inter-yard train order, confirming a shunting turn-back point, coordinating train shunting conflicts, maintaining an accurate executable trip plan and distributing the same to N sub-yard signalman terminals. Signalman terminals of respective yards may view details and execution situations of all operation lists, timely understand a location and operation progress of the shunting locomotive, make preparation in advance when the shunting locomotive is to operate in the present yard, and complete confirmation and handling of the route path of the present yard. On the premise of not changing the plan, the signalman may adjust a basic route to a change route, and may adjust the turn-back point if necessary; and adjusted route information may be displayed on each terminal synchronously.

[0061] Specifically, N in the 1+N mode may be 0, which represents that there is only one attendant at the station to control the shunting route; at this time, the attendant has full authority, that is, when there is only one attendant at the station, the attendant has authorities of previewing the handled route path and a conflict situation between the route and the train plan when manually triggering the route, and directly changing the conflicting route, so as to enhance flexibility and availability of the system.

[0062] In the embodiment of the present disclosure, the CTC may also perform: shunting operation list receiving and processing, turn-back point calculation, route search, route preview, route triggering, trip point report, shunting operation list management, etc.

[0063] In the embodiment of the present disclosure, when the CTC receives the shunting operation list, the CTC and the SMIS belong to two independent systems; in order to avoid communication obstacles due to different data definitions thereof during signal transmission between the CTC and the SMIS, in the embodiment of the present disclosure, an

SMIS data dictionary is converted into a CTC data dictionary, which mainly includes information such as station code, yard number, head-tail direction, and operation track, etc.; such conversion is necessary for background calculation, but the operation list information displayed to the user remains consistent with the original operation list, because naming of the SMIS is more in line with production habits, while CTC continues naming of an interlocking signal system, which is standardized and rigorous, but inconsistent with customary naming, and is not favorable for communication.

[0064] In the embodiment of the present disclosure, when the CTC calculates the turn-back point: one sheet of shunting operation list contains a plurality of trip operation plans; the CTC finds out a most suitable turn-back point C according to beginning track A, head-tail direction, and ending track B of each trip plan; meanwhile, since the turn-back point may be changed during manual triggering according to the present disclosure, the CTC further provides a set of all optional turn-back points for manual selection. The turn-back point refers to that after the shunting locomotive moves out from A, a direction needs to be changed at the turn-back point so as to reach B. The optimal turn-back point C and other optional turn-back points need to be determined by the train personnel according to actual operation habits on site, and then entered into the system after confirmation. There are a huge number of combinations of beginning tracks and ending tracks, so an effective and feasible turn-back point calculation method must be found.

[0065] The present disclosure adopts a mode of configuring the turn-back point according to a single track, to configure a turn-back point priority for each track according to a role of an ending track. From A to B, it is only necessary to select a turn-back point from the turn-back point set in B according to a priority order; if there is a communicative shunting route from A to the turn-back point, then the turn-back point is the optimal turn-back point C. Such a mode not only satisfies functional requirements, but also simplifies a turn-back point configuration strategy, and also reduces communication costs with the train personnel.

[0066] Route search is calculated according to the turn-back point; in the embodiment of the present disclosure, after the turn-back point C is determined, shunting routes from A to C and C to B are determined; the CTC system generates a basic route by default; in order to enhance flexibility and availability of the system, the system provides the user with a set of

change routes; and the change route may be selected manually by changing the turn-back point and selecting a change button.

[0067] Specifically, when changing the route, one sheet of operation list contains a plurality of trip operations. When each trip operation is completed, the system generates a time point to indicate that the trip operation is completed. One trip plan generally generates 1 to 2 routes. The route generation logic is as follows:

[0068] Step a: finding out a beginning terminal button B1 of a first route according to A and the head-tail direction;

[0069] Step b: finding out an ending terminal button E2 of a second route according to B;

[0070] Step c: checking whether there is a route in the buttons of the beginning terminal B1 and the ending terminal E2; if there is, search is completed, and taking the route as a generated route;

[0071] Step d: finding out a set of all routes with the beginning terminal button B1 as the beginning terminal from the route table, traversing each route R, and checking whether there is a route R2 at the ending terminal of R and the ending terminal E2 of the second route;

[0072] Step e: if there is not R2, judging whether R is a long shunting route: if R is a long shunting route, checking whether there is a route R3 in the button on each short shunting route section contained and E2; if there is, adding R and R3 to the route sequence; if R is a short shunting route, check whether there is a route R3 in the button on the route section and E2; if there is, adding R and R3 to the route sequence;

[0073] Step f: if there is R2, adding both R and R2 to the route sequence, and checking whether there is a route R3 in the button on the R section and E2; if there is, adding R3 to the route sequence.

[0074] The route triggering according to the embodiment of the present disclosure includes two modes: manual triggering and automatic triggering:

[0075] Automatic triggering: the shunting driver sends a shunting route handling request through the STP terminal, the CTC automatically triggers the route after receiving the request; and if the route cannot be triggered temporarily or only a portion of the route may be triggered temporarily, the remaining route will be automatically triggered when trigger

conditions are met. Manual triggering: trigger timing is selected manually, and the system tries to handle once.

[0076] In the embodiment of the present disclosure, a midway turn-back situation during the triggering process is also described, and a triggering rule of a midway turn-back route is disclosed: when handling the shunting route, a mode of moving out to a farthest end is generally adopted to prevent an excessively short route from affecting shunting operation. In such a mode, a situation that the shunting locomotive turns back midway without taking a complete path often occurs. In the case of midway turn back, the system recalculates a route that can be triggered according to an occupied position of the shunting locomotive and completes triggering. Complete shunting sub-routes from the occupied position to the ending track or the destination turn-back point are triggered one by one; if the shunting locomotive occupies a portion of the route, so that the route does not meet the interlocking conditions and cannot be triggered, in order to make up for the signal, the system will automatically perform single lock on the switch of the route and automatically unlock after the shunting operation is completed. For the sake of safety, in the case of midway turn back, it must be ensured that the switch position occupied by the shunting locomotive is consistent with the switch position of the return route; otherwise, route triggering and automatic single lock operation on the switch cannot be performed.

[0077] The CTC may implement preview of shunting route; the CTC has functions of entire list automatic preview and designated trip preview; and may preview the handled route path and a conflict situation between the route and the train plan when manually triggering the route; which “discovers in advance and corrects in time”, and effectively reduces the mishandling problem that may be caused by “confirming while executing”.

[0078] Specifically, in the embodiment of the present disclosure, the CTC further generates and processes the trip point report. After each trip operation is completed, the CTC timely notifies the SMIS of the completion time point, which is taken as the shunting trip point report, indicating that the trip plan has been converted into actual performance. Due to frequent midway turn back during the shunting operation, unlike the train route, it is impossible to judge an operation completion state through a route unlocking state. The CTC according to the present disclosure takes an execution state of a route of a next trip as a

judgment basis, automatically sets a previous trip as a completed state, and takes the moment as trip point report information to send to the SMIS. With respect to a last trip operation, manual point report is adopted and execution of the entire list plan is completed after point report.

[0079] The embodiment of the present disclosure further provides a shunting operation management and control system, the system including:

[0080] A station management information system, configured to acquire a shunting operation list, and send the shunting operation list to a centralized traffic control system;

[0081] A centralized traffic control system, connected with the station management information system, and configured to receive the shunting operation list, confirm a turn-back point according to the shunting operation list, and generate a route sequence to distribute to respective sub-yard terminals;

[0082] A shunting train protection system, connected with the centralized traffic control system, and configured to acquire a shunting route handling request, and send the shunting route handling request to the centralized traffic control system;

[0083] The centralized traffic control system is further configured to handle a route according to the shunting route handling request, and send a route handling result to the shunting train protection system to start operation;

[0084] The centralized traffic control system is further configured to sending a trip point report after each trip operation is completed to the station management information system, so as to implement shunting operation management and control.

[0085] Specifically, the centralized traffic control system is further configured to handle the route according to the shunting route handling request, including automatically triggering the route and manually triggering the route; the centralized traffic control system is further configured to perform automatic route preview on the route sequence generated after confirming the turn-back point; and the centralized traffic control system is further configured to adopt a single-track configuration mode to confirm the turn-back point, wherein, a turn-back point priority is configured for each track according to a role of an ending track.

[0086] Although the present disclosure is explained in detail with reference to the

foregoing embodiments, those ordinarily skilled in the art will readily appreciate that many modifications are possible in the foregoing respective embodiments, or equivalent substitutions are made for part of technical features; however, these modifications or substitutions are not intended to make the essences of the corresponding technical solutions depart from the spirit and the scope of the technical solutions of the respective embodiments of the present disclosure.

CLAIMS

1. A shunting operation management and control method according to a shunting route request, comprising:

acquiring, by a shunting train protection system, a shunting route handling request, and sending the shunting route handling request to a centralized traffic control system;

handling, by the centralized traffic control system, a route according to the shunting route handling request and a route sequence, and sending a route handling result to the shunting train protection system to start operation; and

sending, by the centralized traffic control system, a trip point report after each trip operation is completed to a station management information system, so as to implement shunting operation management and control.

2. A shunting operation management and control method, comprising:

acquiring, by a station management information system, a shunting operation list, and sending the shunting operation list to a centralized traffic control system;

receiving, by the centralized traffic control system, the shunting operation list, confirming a turn-back point according to the shunting operation list, and generating a route sequence to distribute to respective sub-yard terminals;

acquiring, by a shunting train protection system, a shunting route handling request, and sending the shunting route handling request to the centralized traffic control system;

handling, by the centralized traffic control system, a route according to the shunting route handling request and the route sequence, and sending a route handling result to the shunting train protection system to start operation; and

sending, by the centralized traffic control system, a trip point report after each trip operation is completed to the station management information system, so as to implement shunting operation management and control.

3. The shunting operation management and control method according to claim 2, wherein, the handling, by the centralized traffic control system, a route according to the shunting route handling request, comprises automatically triggering the route and manually triggering the route.

4. The shunting operation management and control method according to claim 3, wherein, the manually triggering the route comprises a step of route designated trip preview:

the designated trip preview comprises a handled route path, and conflict situations between the handled route path and a train plan.

5. The shunting operation management and control method according to claim 3 or 4, wherein, after the centralized traffic control system confirms a turn-back point and generates the route sequence, the method further comprises a step of automatic route preview,

after previewing the entire route list and confirming correctness thereof, the centralized traffic control system distributes the same to respective sub-yard terminals.

6. The shunting operation management and control method according to claim 2 or 4, wherein, the centralized traffic control system adopts a single-track configuration mode to confirm the turn-back point, wherein, a turn-back point priority is configured for each track according to a role of an ending track.

7. The shunting operation management and control method according to claim 4, wherein, after the manually triggering the route designated trip preview, the method further comprises a step of changing the route; and the method for changing the route comprises: changing the turn-back point and selecting a change button.

8. A shunting operation management and control system according to a shunting route request, comprising:

a shunting train protection system, configured to acquire a shunting route handling request, and send the shunting route handling request to a centralized traffic control system;

a centralized traffic control system, connected with the shunting train protection system, and configured to handle a route according to the shunting route handling request and a route sequence, and send a route handling result to the shunting train protection system to start operation;

wherein, the centralized traffic control system is connected with a station management information system, and is configured to send a trip point report after each trip operation is completed to the station management information system, so as to implement shunting operation management and control.

9. A shunting operation management and control system, comprising:

a station management information system, configured to acquire a shunting operation list, and send the shunting operation list to a centralized traffic control system;

a centralized traffic control system, connected with the station management information system, and configured to receive the shunting operation list, confirm a turn-back point according to the shunting operation list, and generate a route sequence to distribute to respective sub-yard terminals;

a shunting train protection system, connected with the centralized traffic control system, and configured to acquire a shunting route handling request, and send the shunting route handling request to the centralized traffic control system;

wherein, the centralized traffic control system is further configured to handle a route according to the shunting route handling request and the route sequence, and send a route handling result to the shunting train protection system to start operation;

the centralized traffic control system is further configured to sending a trip point report after each trip operation is completed to the station management information system, so as to implement shunting operation management and control.

10. The shunting operation management and control system according to claim 9, wherein, the centralized traffic control system is further configured to handle a route according to the shunting route handling request, comprising automatically triggering the route and manually triggering the route.

11. The shunting operation management and control system according to claim 10, wherein, the centralized traffic control system is further configured to perform automatic route preview on the route sequence generated after confirming the turn-back point.

12. The shunting operation management and control system according to claim 9 or 10, wherein, the centralized traffic control system is further configured to adopt a single-track configuration mode to confirm the turn-back point, wherein, a turn-back point priority is configured for each track according to a role of an ending track.

DRAWINGS

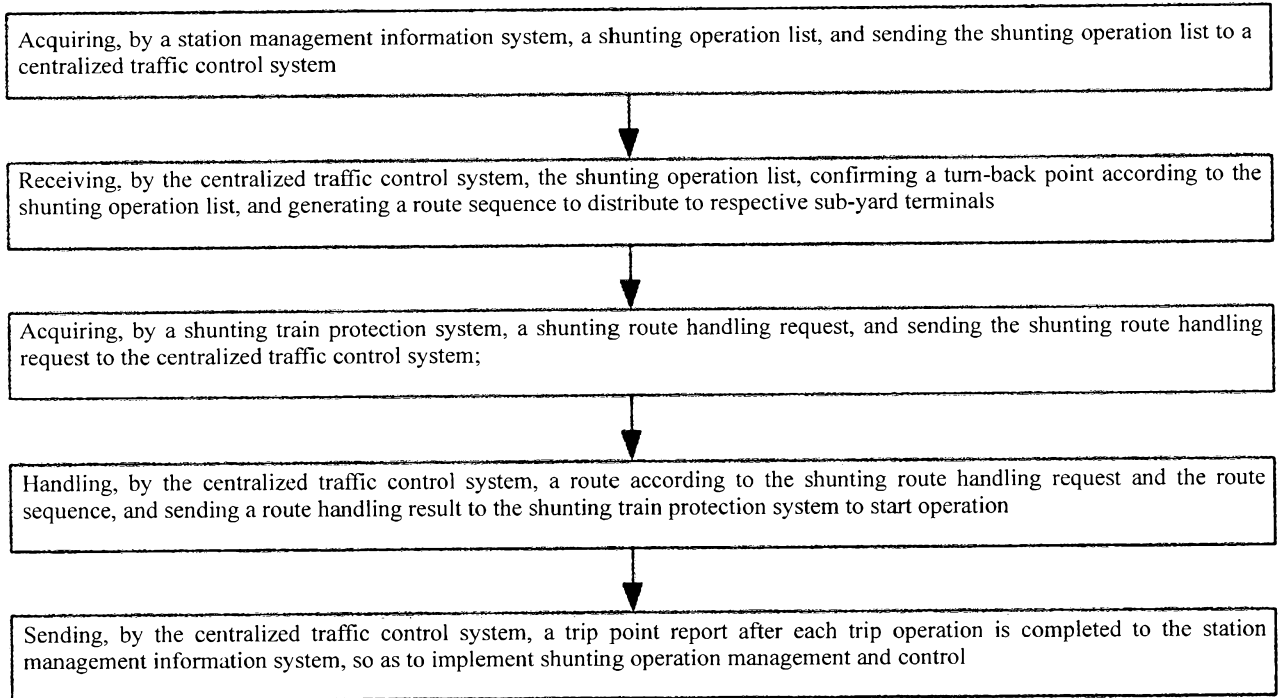


FIG. 1

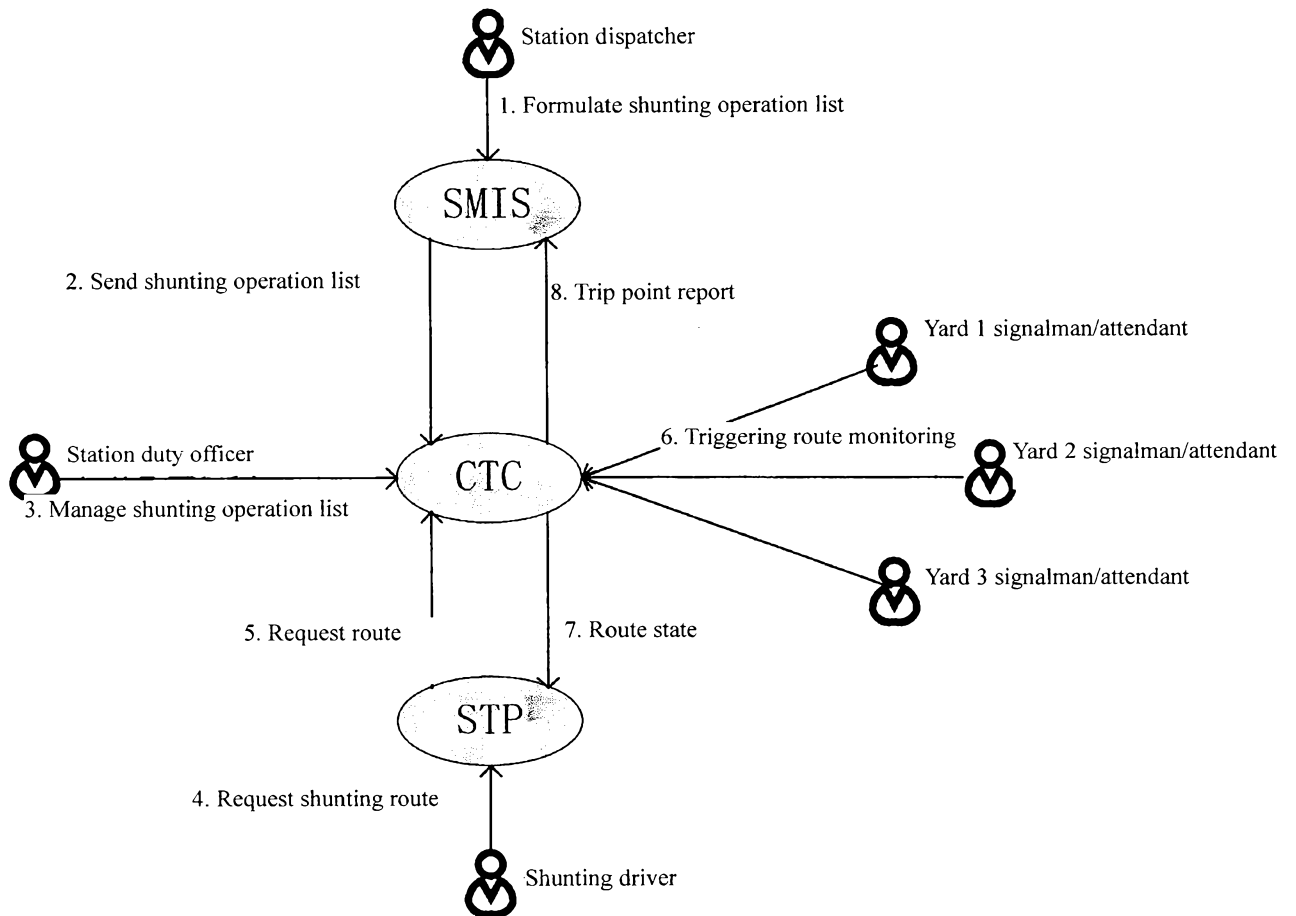


FIG. 2

ABSTRACT

The present disclosure provides a shunting operation management and control method and system, including: acquiring, by a shunting train protection system, a shunting route handling request, and sending the shunting route handling request to the centralized traffic control system; handling, by the centralized traffic control system, a route according to the shunting route handling request and a route sequence, and sending a route handling result to the shunting train protection to start operation; and sending, by the centralized traffic control system, a trip point report after each trip operation is completed to the station management information system, so as to implement shunting operation management and control. The shunting operation management and control method and system open up connections among the station management information system shunting operation list, the centralized traffic control system route handling, the radio shunting locomotive signal and the shunting route request, which is a complete solution for the shunting operation flow. The solution takes full consideration of a multi-yard station shunting management mode, and implements one-point control and multi-yard interlocking.

PLANCHE DE L'ABREGE

