Development of Train Running diagram Optimization

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Abstract

This item from aentire new viewpoint on existing lessons was categorized, from the particular concern slectured by initial on two key matters of new train preparation plan: train running diagram and train process correction. Resolutions, simple ideas and investigates are argued in aspect. Between them, the train working diagram is separated into single and double path units and Passenger Train Running Diagram. And the train process correction contains the real-time correction, the service of train attachment and the conflict calculation. This paper announces automatic train operation transmitting system in preparation applications, and discusses the train scheduling problems and the future way of growth.

Keywords *-Train Running Diagram, Train Operation Adjustment, Train Scheduling*

I. INTRODUCTION

Today, all the nations are energetically emerging railway construction, growing train speed, and the thickness is growing, so extra complex railway network in railway actions process and many new difficulties have occurred. So, it is essential to encapsulate the newest development in the investigation on train operation preparation in order to extra obviously display for the growth of train arrangement condition.

A. Train Running Diagram

Train Running Diagram of train process is mostly based on business necessities and train schedule historical data on pre-scheduled. Currently the trains are consecutively faster and faster, so track time is receiving smaller by the limited number of steps, so responsible a feasible and real operation system develops extra important. Presently the train running diagram investigation is mostly separated into two features, single and double path segments, which two features of train consecutively diagram signify the central direction of the research.

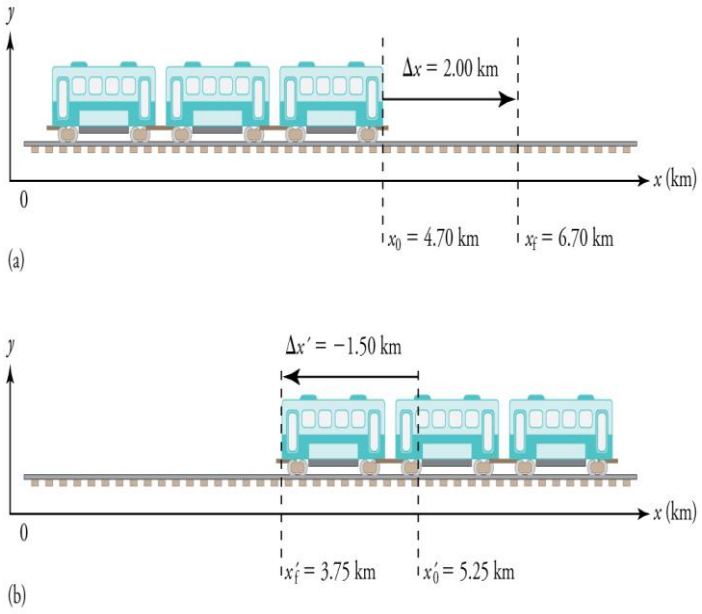


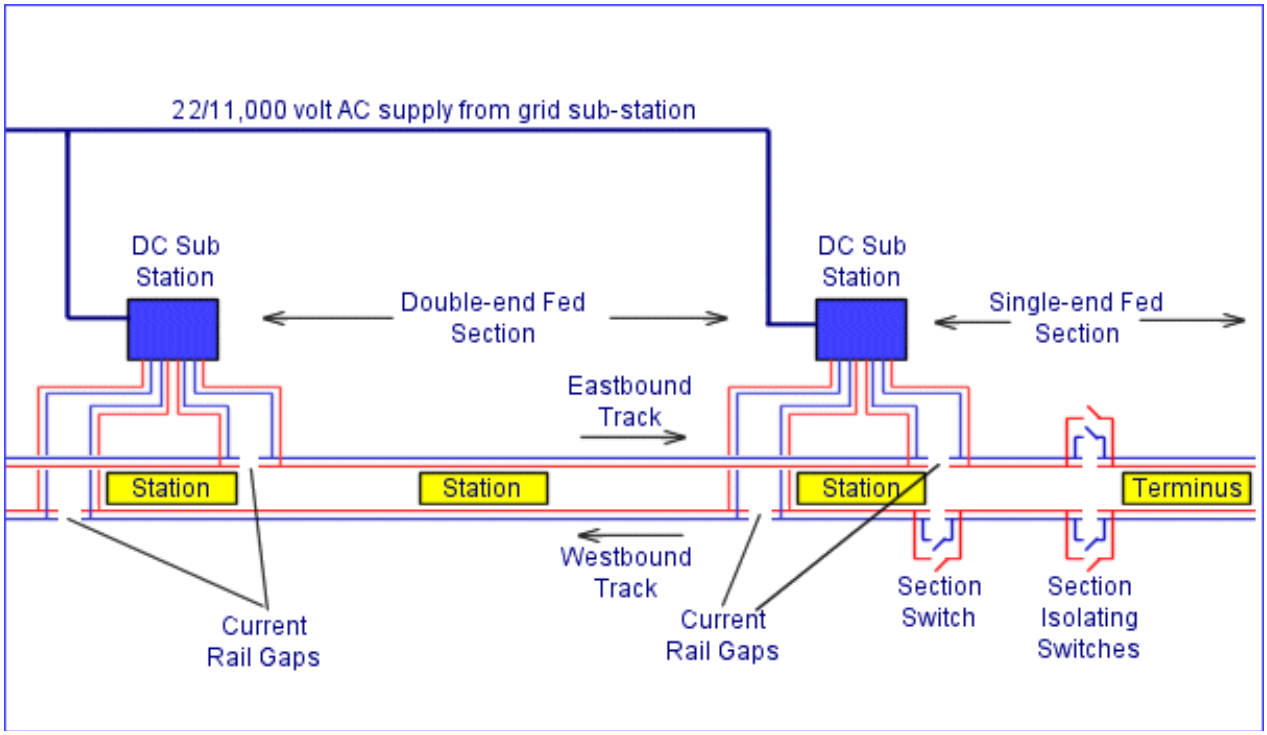
Fig 1 Train Running Diagram

B. Single and Double Track Sections of the Running Diagram

The mainly of railways operating lines can be separated into single-track railway, double-track railway, but near are three and four track railways. Consequently, a single and double track unit of the train running diagram is aattention of the study. Single-track railway has lone one main line of the railway, in the similar interval or obstructionof the similar area, at the similar time permitting only one train running. Double-track unit of the railway line has two central lines which are separated into uplink and downlink. Below usual conditions, up and down trains are driven in the uplink and downlink line, respectively.

It founds the train operation diagram optimization typical for a solitary track section and plans a freight train strategy optimization technique. Operation diagram phased optimization approaches can successfully decrease the solution space and the difficulty of the algorithm.

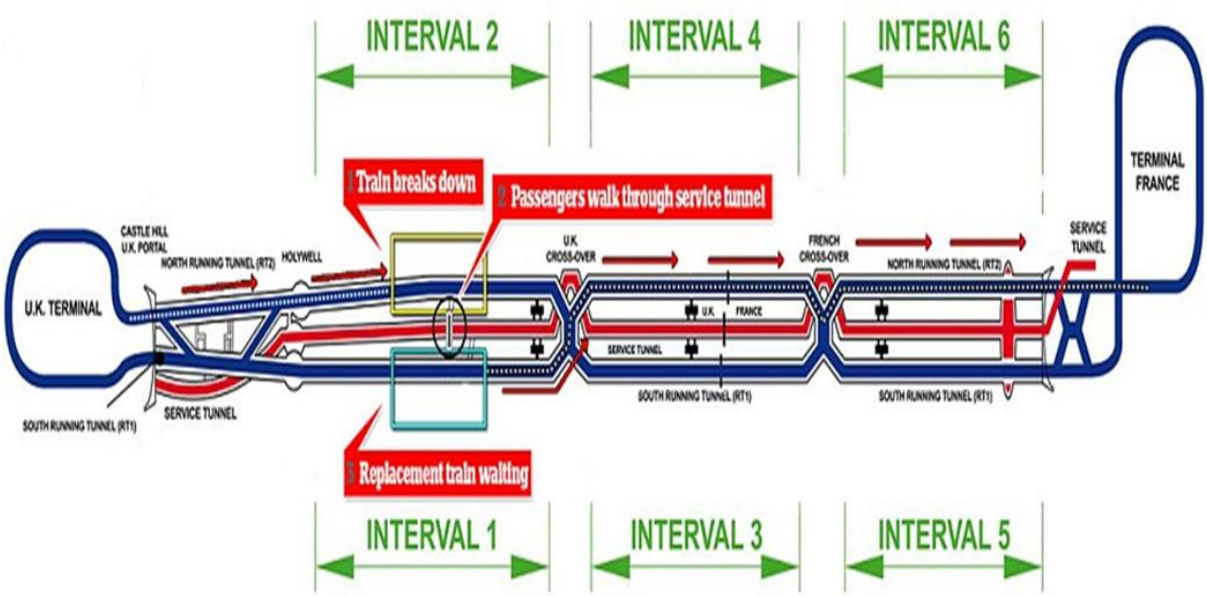
To through the whole running time in a solitary train route, you can procedure a lesser bound for the Quadratic Task Difficult founded upon a semi certain relaxation and a wounding planes method to reducing the answer space, and use division and bound method to attain a possible schedule. For the two-lane you essential to alteration the Way Traffic blocking conditions, and design dissimilar time periods among stations built on Way Traffic Lanes switching method. This technique can increase the transport capability of the line and driving safety by consuming Automatic Block for two passenger trains which are consecutively in together sides of solitary line. This technique can recover passenger and freight train consecutively done the section of line capacity. Presently, best train process diagrams are arranged individually for a single and a double-lane, it is intended instantaneously in a single one. The flexible request of double path line train working diagram procedure is of important implication.



C. Passenger Running Diagram

Passenger train speed mutual with great mixed passenger trains run at dissimilar speeds and extra individualities of Passenger train diagram gathering principles and procedures, idea another path line plant path chart planning and holidays particularized. Conferring to traffic on weekdays and outings traveler travel dissimilar definite condition, the passenger line consumption plan is distributed into weekdays and holiday's utilization plan is working diagram PDL a big exploration focus. through analysis of the EMU Passenger numerous application procedures, established a Passenger EMU cyclical utilization plan.

Passenger trains on China's style and grade, run chart cycle, run chart simple parameters and resting plans to run sequence diagram gathering values such as are designated, put accelerative China Passenger traffic-intensive subdivision map for recurring process mode. Dedicated Passenger Lines instant, stop programs moderately secure in both period, reliability rate, consecutively time is recurring characteristics, joint with China's passenger line running lines of the real condition is future founded on the interrupted ordering train process diagram model. Passenger occasionally run is really an estimated cycle mode, the actual condition should grow a combination of cyclical and non-cyclical run chart design. Passenger Railway from the real condition, considered created on better genetic algorithm Passenger train diagram optimization strategy planned train diagram plant zoned coveredinter section model. Passenger train process diagram for the simple model and type of planning, preparation.



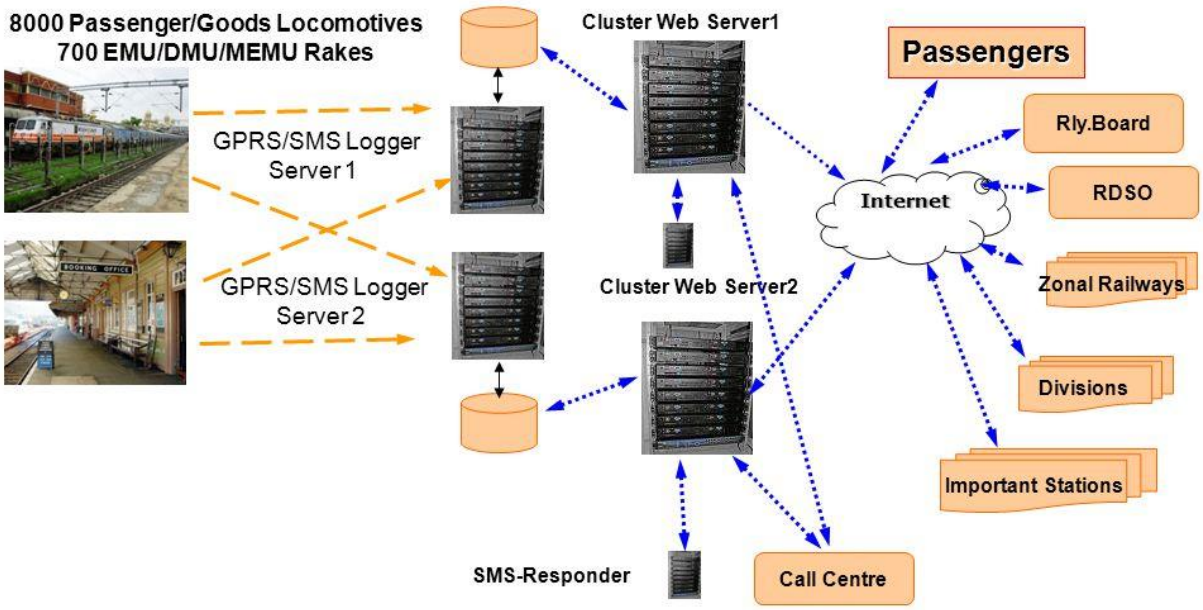
principles, significant technologies and associated processes such as the preparation of the chief problems remained examined. At current, China's Passenger Train Employed Figure of the concept and procedures is to study from the prevailing single path making train diagram concept and calculation technique, a novel set of working appearances happen the PDL planning concept worthy of further study. A single Passenger train diagram model and algorithm growth to full-sized passenger special line network, as well as the Passenger train diagram classical and existing mutual across the line train process diagram models joint with great investigation worth and request value.

II. TRAIN OPERATION ADJUSTMENT

Program schedule restrictions is that even if the timetable to catch the prime solution, trains running regularly happening turbulences can also create preparation tough plan strictly imposed, then you essential to regulate the consecutively position of the train. Train Operation Modification mentions to the method in train operation in a diversity of turbulences under the inspiration of the real train consecutively off a prearranged value, the train turns finished the timely change of position, creation it as far as conceivable plans to run. Train Operation Modification is arranged trains running investigation priorities, producing extensive concern in academic circles. According to the real condition and for dissimilar railway trepidation method, Train Operation Alteration investigation into real-time alteration of train operation.

A. Trains Running Real-Time Adjustment

Presently, the mainstream of train operation modification is offline approaches, real-time technique is moderately small. Real-time alteration of train process is growing with the better difficulty of the railway network and the growth of computer technology. For the transport of weighty task, the line through the high ability of the line, the transport of minor variations are probable to disturb a wide range of usual process of the train. So, the train runs real-time alteration difficulties of great implication and applied value. Literature proposed a railway crossing train running real-time preparation programming model by model combination into assessment provision system, operators can create use of the perfect proposed responses to alteration the direction of train ways and to avoid conflicts of train process and postponements. Literature for a static or moving block signaling scheme of large-scale railway system, offerings an progressive traffic organization system (Traffic Management System, TMS). TMS contains two real-time models, model train dispatching and line speed encoding model. The former alternate built graph model to deliver solutions to resolution the conflict; latter by altering the speed of trains running to perform the former resulting modification program. TMS can prevent and carry real time restraints delay with space and decrease train delays, recover the competence of train process.



III. AUTOMATIC TRAIN CONTROL SYSTEM

Trains run manual preparation procedure is difficult, incompetent. Without the aid of artificial preparation automatic development sustenance system in the occasion, the chief asset of earlier involvement to control. Knowledge able correspondents can forecast variations in train schedules and grow alteration plan, so that timely corrective action. In order to increase the proficiency of train process manual preparation intended an automatic preparation system, finished the organization of train hurry to resolution the fight .is that this automatic preparation system developments, has complete in real-time emphasis on. Author of two fixed speed and adjust ablespeed train operation scheme are examined and conversed, with an importance on speed train posting system showing examination the train process alteration and adjustment program routinely produces a complete analysis, the model built on multi-agent preparation system solutions attentive and appropriate wire section committed bright transmitting system. by examining the procedure of alteration of train process strategy, the growth of technology-based business procedure organization system routinely regulates the train process plan. Automatic Train Control System is a resolution sustenance system, and its grow this not envisioned to substitute the train dispatcher, but as the railway network arranging system is a key constituent to the train dispatcher to provide appropriate decisions for their choice and make the best scheduling scheme. Real-time decision sustenance schemes essential to cooperate with each other and the train dispatcher, the train

Consecutively program preparations. Experienced train correspondent decision provision system by means of which derived from the pack ages obtainable, you can rapidly and professionally control the alternative reply events to improve the competence of train process schedule.

IV. CONCLUSIONS

In this paper, the investigation growth train planning for a more complete impression of the current research into the train planning train working diagram, train process modification and automatic preparation system was approved out, in agreement with the problematic of the train working diagram and train procedure correction was classified decoratively. Even after periods of growth, the train procedure preparation investigation has made a lot of accomplishments, but for some problems still comparatively slight study, it is value further study, Applies to both solitary and double zone preparation model are moderately rare; the flexibility to adjust to a single two-lane unit of the scheduling algorithm has great investigation value. Train run real-time modification technique is used to train the dynamic limits; dynamic limits necessity to improve the watching of train running correctness and decrease monitoring data mistakes and increase the correctness of real-time modification solutions. Automatic Train Control System as a assessment sustenance system that can answer the train running manual preparation inadequacies is to accomplish automation of railway traffic transmitting key. Automatic Train Control System to advance appropriateness and cleverness is a main investigation way. Of May, November and spring holidays such as traffic flow top holiday train process in case of scheduling problems has stayed the effort of theoretical care, but real preparation arrangement is still relatively small. Certify that the unique program schedule train running time on the

foundation of near, as much as conceivable into the extra passenger trains, the real solution to answer this problem, but additional investigation is needed characteristics of holidays and the conforming train traffic into facility scheduler algorithms.

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