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Factors Affecting Rail Transportation by Enhancing the Quality of Railway, Increasing Safety and Reducing Accidents

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Abstract: *The present study tries to investigate some shortcomings and inefficiencies in rail transportation systems. It also tries to suggest an appropriate strategy to improve lines and technical buildings in order to have a safe and high-speed rail system. It is worth noting that using the knowledge and experience of some skilled and experienced people can solve many problems. There are many factors to promote the quality of railroads such as environmental factors, line geometry, atmospheric conditions, etc and each of these factors has an important role in enhancing safety. By considering these factors, we can now reach a high-quality bed and high-speed lines.*

Due to the several years of railway history and dramatic effects of climate change in different regions and the increased traffic of rail vehicles, it is the time to predict and perform some arrangements for the safe passage of floodwater and sediment in some establishments such as bridges. There was no passage of water in these bridges within a few years but today there is a good passage of high-discharge floodwater. These bridges were considered ordinary bridges a few decades ago and had not any significant problem for the passage of water and flood but they have created many difficulties in keeping and moving trains in recent years.

Keywords*: process and movement, enhancing quality, Line and technical buildings*

1. introduction

According to ahundred-year historyofrailroad in Iran, we observed many failures and difficulties and tried to solve them during these years. Today we have a railroad which is the result of trial and error. We were able to meet many shortcomings using the experiences of developedcountries in order to have an appropriate and usable railroad.
Thus we need the knowledge and updated skills in order to enhance the safetyand quality of lines.

2. Factors affecting the quality of lines

Here there are some importantpointsthathaveto beaddressed.Inspired by the experience and knowledge of qualified individuals, upgradedlinescan be achieved.

1. Removingtheconnectioninside the tunnel: we can prevent the repeated impacts which cause damage to facilities such as tunnels, bridges which also cause the displacement of Malone on the tunnel hull, because their healthcare and control were considered always by the Lines and technical buildings staff. (figure 1)

Figure 1– removing the connection using hermit welding

2. Removing the connection on bridges: connections on bridges, whether Farboton bridges or metal chassis bridges cause impacts from wheelsinto the junction. This impact hits to the bridge configuration and bridge slab. Its repetition and continuity in the long term crushes the slab Seaton the side base and impacts on the side base. It can also lose the Threading of Malone in Farboton bridges. These impacts also affecton screws and rivet in metal chassis bridges and also cause the movement of bridge components on each other. These impacts cause irreparable damages to the junction of chassis on the side slab which are different from each other. (figure 2)

3.

Figure 2– removing the connection using Thermit welding

4. changes in environmental and climatic conditions

Due to the several years' ofrailwayhistory anddramaticeffectsof climatechangeindifferent regions and the increased traffic of rail vehicles, it is the time to identify these areas and predict and perform arrangements for the safe passage of sediments through some bridges. (Figure 3 and 4) for example the sulfur bridge which is located at 800+933 Km in Tabriz–Razi which has created difficulties inmaintainingandthemovementof trainsinrecent years. Perhaps it was a typical bridge a few decades ago and did not have any significant problem against the water and flood passage.

Figure 3–Blocking the bridge opening when material collapsed in themonsoonrains

Figure 4-dredgingthe blocked bridge opening

A landslide which is occurred bychangingenvironmental conditions and increasing rainfall is another environmentalchangewhich bringsproblemsinrisk-prone areasfortraintravel. (Figure 5) the operations of reconstructionandinfrastructure are usually not performed in thrust areas. The reason is that the rush for lines to communicate each other is not usually standard. And this provides thefrequencyof this problem in thenextfew years.

Figure 5-landslides on the road

Trenches which have hard and impenetrablelayerduringconstructionof lines are another environmental factor. These trenches have been changed and collapsed during the time due to the Weathering factors. (Figure 6)today there is an urge to maintain and control daily thetrencheswhich is so expensive, While we can solve this problem and promote the train travel security by identifying these area s and Wideninganddecreasing the height of the trenches which are always risky.

Figure 6– trenches collapsed due totheerosion

Another factorthatmaycause problem during the time and under environmental conditions is the inlet and outlet of tunnels which have begun and ended Ina small trench for various reasons. (Figure 7) the erosion ofthetrenchabove the tunnel andfallingrocksonthe line, is one of the risky areas in therailwaysystem. However, by identifying and detecting and by lengtheningthetunnelsfor about20 to50 meters the risk will go away.

Figure 7-Input andOutputtrenches of the tunnel

5. monitoring andcoordinationwith other organizations

Another factor in lines security is monitoring and coordination with otherorganizations, For example establishing the traveled way in the downstream of the railway line which causes the destruction of embankments or the removal of materialfromthe mountain footandtrenchfoot. Due to climatic conditions, such as riversandmountains, and havingcrossedboth waysinoneplace, this issue may causeinjuriesand itis impossible to compensate it in the next few years if the executives of the traveled way ignore the ideas of the line experts at the time of making contract and Surveying. For example at 933+050 Km ofTabriz-Razi, the river bedheightwasincreased due to the trenchingofroadsandthrowingrocksin the river. (Figure 8) Aftera few years' thebe height reached to the SulfurBridgeopening because the river was full of sediments and it became another factor for filling this bridge with sediments. It caused a lack of no movement for these sediments in the bridge, while it was possible to prevent such a problem at the beginning by providing a useful approach in establishing the traveled way.

Figure8 - fillingtheopeningof sediments due to trenching

6. converting at-grade passageways into grade passageways

At-grade passageways are keypointson the railsystem. Most of the time there are accidents and disasters due to the train collision with roadvehicles.This may lead to the train stop and disruption. Recently some operations have been conducted in converting at-grade passageways into grade passageways which is an important step toestablishsecurity in the movement of trains.

7. Controlling Operations of Railways

The linemeasuringmachines is one factor inline controlling which is done according to the amount of traffic in each axis.Thisincreases the quality lines, Provided that the defectsdetectedby the device can beremovedbythemaintenanceareas andgroups.Resolving the problem should be done carefully and this is an important issue related to a domain.(Figure 9).In the case of landslides, a surveyor group should be sent to those areas. Also the authorities should report any increase in connections or shakes from line to the vehicles. These are Warning that the areas should be controlled, it is necessary to give a report in order to troubleshoot the problem and to return the line into its initial state.

Figure 9–Controllingline and needle parameters (width, disability, Deylam, away) as manualandmechanized

8. Maintenance of Building

New materials that can be used to perform maintenance task son the lines is another factor to enhance the Linequality.For example it strengthens the quality of concretetraversesand it may result in a better performance. Thus specialarrangementsshouldbe made due to the weather conditionsandtemperatureandfreezingtemperature which are effective factors of concretedegradation. And enough accuracy shouldbetakenin thetransportand handling of the traverse.

9. embankment geometry:

Theembankmentgeometry form is the most importantfactorin establishing the line. (Figure 10).For example sidewalk son both sides of the line are responsible for traveler's traffic during the route. The sidewalk height prevents the entry of rainfall; it also prevents the subsidence of line due to the Loosening under the traverses. Allitemslisted in this section are factors that have asignificantimpactonworseningthedamage of the line. Adperson in chargeofthetechnical buildings should monitor and inspect and pays attentiontothesepoints.

Figure 10-Geometry of the embankment

10. protective walls:

Protective walls including crater walls, tunnel opening walls and coastal wall sare the other factor in enhancing the line security. These walls mustbecontrolled. The risk of damage ontheline should be reduced by discharging behind retaining wallsand inspecting foundationsandbasement of surety walls and also by controlling the flood at the coastal walls.

11. human factors

According tothe government policyof divestingthe public sectorto the private sector, it is likely to have newrecession inthecorrect maintenance waywith the arrival of newcomers who have no experience.It may causeirreversibledangerandinjuryonthebody of organization.So as we haverecentlywitnessed, the formation of educationalclasses and theircontinuity can preventaccidentsand playan importantrole in performing the issues.

Re-using experienced people and experts with updated knowledge can be useful in overcoming the problems and enhancing the quality of train traveling alongside the lines. Thiswillcreatethe necessaryincentives forindividualsand will provide areas forimprovementand progressthisorganization.On the other hand job securityis somethingthatcan makemotivationin theperson and he would besuccessfulinhis affairs. We hope to have defect-freeandhigh quality Maintenanceoflines andtechnical buildings which is oneof factorsoftherailwayin a near future to serve our valuable and importantcommunity.

3. conclusion

According to the description of the factors the tin crease quality and reduce accidents, we can conclude that enhancing the trafficsafetyintrainsusingtechnical knowledge and experience is an important principle that executives must keep in mind in order to become successful in implementinglargeprojects.Using experienced people with high technical knowledge and providing solutions and using the knowledge of the leading countries in therailindustryand purchasing machinery and materials with international standards we can pass one hundred yearswithina short time and we can develop this industry inourown country.

References

[1] From many years ofexperienceinTabriz-Raziline and collaborating in lengtheningthetunnelproject– participating in the embankment repair and installing line in thrust areas...

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