Review on Standard Gauges Adaptation in India & World

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Abstract:-

One of the world's largest rail networks is the Indian Railway. More than two tonnes of freightand around fifteen million people are transported there each day. The government receives a sizable percentage of its income from Indian suburban train services. Metropolitan areas in India feature extensive suburban rail networks that link vital components of human-powered land transportation. Through their services, suburban trains offer amenities to the public, such as inexpensive fares, quick travel times, speed, passenger security, ticket availability, and carriages for passengers. Through the use of a questionnaire and any relevant recommendations based on the current study work, the opinions and attitudes of a select group of passengers towards the railway services were ascertained.

Key Words: - Alluvial soil; high-speed track ballasted and ballast-less track formation.

Introduction: -

The lack of a railway network in a region of Gujarat's saurashtra province is currently caused by certain political, social, economic, and practical issues. Westerner Railway is currently converting Dhasa-Jetlsar to a different gauge. This line passes by the village of Chittal, which is 15 km away from Amreli, but there is no railway network that will connect Amreli to Chittal.If this line is built, however, Amreli will be able to connect to a network of railways and will be able to easily access all trains that go to major cities like Rajkot, Baroda, Ahemdabad, Surat,and others. Therefore, our goal is to build a new, 15 km-long railway track.

Chennai's Electric Multiple Unit (EMU) service covers a sizable amount of the suburbs. The then-British government decided that a connection between the primarily business north and

the primarily residential south of the city was necessary in the 1920s. Two Meter Gauge (MG)lines were built in 1928 to provide services using steam locomotives between the harbour andTambaram, a southern suburb.

The manual approach of choosing route alignment designs is laborious, expensive, and time- consuming. To get over these issues, we use a geographic information system (GIS). Geographic information systems (GIS) are powerful tools for tackling common engineering issues, but they are still underutilised in this region of the world. For instance, route selection has long been done manually using costly and ineffective approaches that analyse analogue maps and require ground surveying techniques. The purpose of this study is to show how useful GIS can be as a tool for choosing railroad routes.

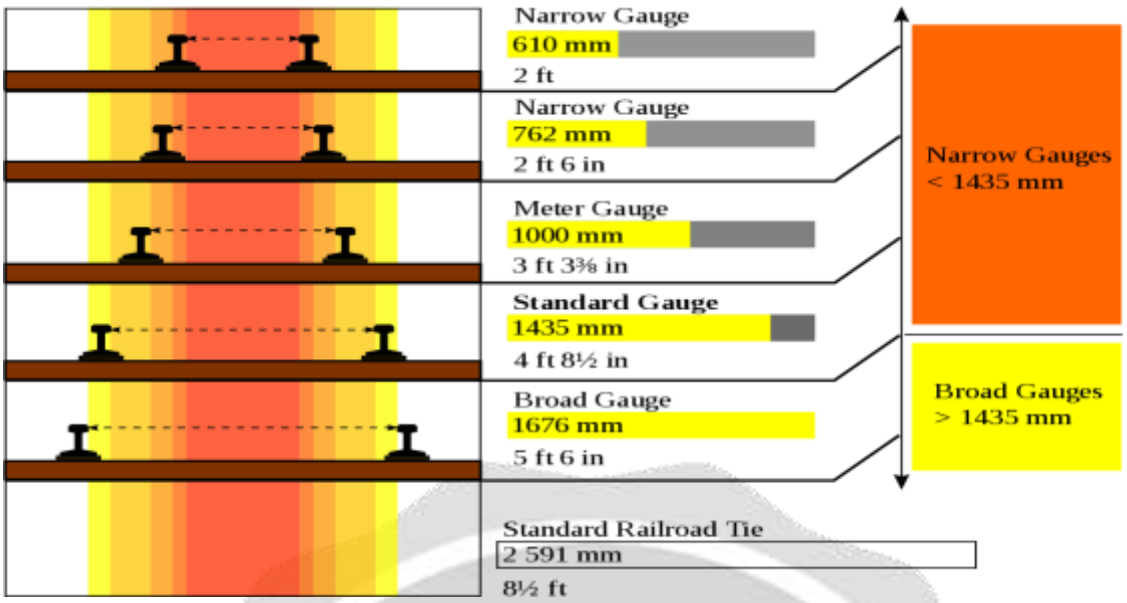

Fig:- Gauge Difference

India is falling behind because it lacks even one high-speed route. Six high-speed routes will be planned by the Indian government within Indian Territory. The majority of that corridor runs across alluvial soil accumulations. Since 1964, high speed rail lines have been one of the most creative components impacting passenger transportation. It is obvious that high speed railsystems cost a lot to build and have an impact on the economy and society. The installation ofa high-speed rail system is dependent on a number of complicated elements that are not in the rail line's advantage. Sometimes it is impossible to directly manage certain elements, such as natural topography and the state of the nation's economy.

GAUGES ON INDIAN RAILWAYS VARY:-

The 1435 mm standard gauge was intended to be used in India as well by the East India Company. W. Simms, Consulting Engineer to the Government of India, disagreed with this idea and suggested a larger gauge of 1676 mm (5'6 "). The East India Company's Court of Directors agreed to follow Simms' advice and 5 '6 "eventually became the standard gauge in India. In order to build less expensive railroads for the nation's growth, the 1000 mm metre gauge was created in 1871. Two further gauges with widths of 762 mm (2'6") and 6 10 mm (2'0") were also developed for mountain trains, sparsely inhabited areas, and other unrelated uses.

With the goal of moving quicker and more traffic, railroads have developed the technology and procedures for designing, building, and maintaining tracks over time. Since the first railway line was inaugurated in 1853, IR has built a nationwide network of 74,460 route kilometres that, as of March 2016, was being used by almost 13,500 trains per day. 37 All Zones Railwaysare in charge of carrying out the track building operations.

Literature review:-

According to J.B.K. Kiema et al., at least 80% of all public and private decision-making is based on some geographical or geographic considerations (FIG, 2001). Originally created in the 1980s to aid in the management of natural resources and the conservation Today, GIS is now a tool that finds use in the majority of human endeavours at local, regional, and global levels, including urban planning, disaster management, monitoring desertification, and agricultural soil suitability assessments.

Darvishsefat et al, In their study, they created a railroad line in Iran from Rasht to Anzali using the MCE and least expensive pathway characteristics. They took into account a numberof factors in their analysis, including geology, land cover, rivers, and highways. In a minor portion of the projected Caspian oil pipeline, (Feldman et al., 1995) employed remotely senseddata and GIS for pipeline routing.

Jacobs and Vuong, In Minnesota Province, USA, high-speed rail was routed using GIS.Yourself Shafahi and M. J. Shahbazi, optimum railway alignment,:-
They attempt to frame the planning of railroad alignments as an optimization issue in their study. due to the numerous complicated restrictions and the vast number of variables (alternative alignments).

Ali Esmailian et al,

They showed how a creative strategy, supported by a GIS, was used to analyse the many route choices and choose a suitable corridor. GIS technology and spatial data were crucial components of the study's option assessment process. Each proposed track section's constraintsand quantities were noted, added up, and assessed, after which the sections were assigned to aroute. In order to estimate the initial capital and operational expenses, cost estimators retrieved,structured, and communicated the quantity analysis findings to the research team. These findings, coupled with other factors including land use, engineering, environment, geography, ground condition, and existing infrastructure, were utilised to choose the optimum corridor.

Objectives of the Study

- To identify the socio economic background of suburban Railway Passengers.
- To measure the passengers attitude and satisfaction towards services offered bysuburban Railways.
- To suggest suitable measure for improving the suburban railways services in thestudy area.

METHODOLOGY

The character of this study is both descriptive and analytical. Both primary and secondary dataare included.

Formation for High Speed Railway Track

The design takes into account the soil matrices, topography, and hydrological conditions to offer a viable and economical erosion control system. Factors like life cycle cost, building time, accessibility, and formation durability are crucial when it comes to railway line design. In regions with relatively weak subgrade, wave propagation under train velocity is a significant problem during high speed operation. This frequently determines the stable formation. Due tohigh installation costs, non-ballasted track concepts are now being used on a limited scale across the world. The reinforced pre-stressed concrete slab measuring 4.93m x 2.34m x 0.19m, cylindrical stoppers to prevent lateral and longitudinal motions, and sub layer stabilised with cement make up the Shinkansen slab track.

Key elements of a track:

The rail-road that trains travel on is called a track or permanent way. It comprises of two parallel rails with a certain gap between them and fasteners that are attached to sleepers that are buried beneath a specific thickness of ballast that has been spread out throughout the formation. The rails are connected to one another using fish plates, bolts, or welding, and are subsequently secured to the sleepers using a variety of fittings, including keys and spikes.

Sleepers: keep the rails in place and give a good gauge while transferring the load to the ballast.Connect sleepers to rails using fittings and fasteners.

Ballast - provides drainage, levels the surface uniformly, and distributes the weight across a broader area of the formation.

Formation - creates a flat surface on which the ballast sits and supports the entire weight of thetrack as well as the weight of the trains that travel over it.

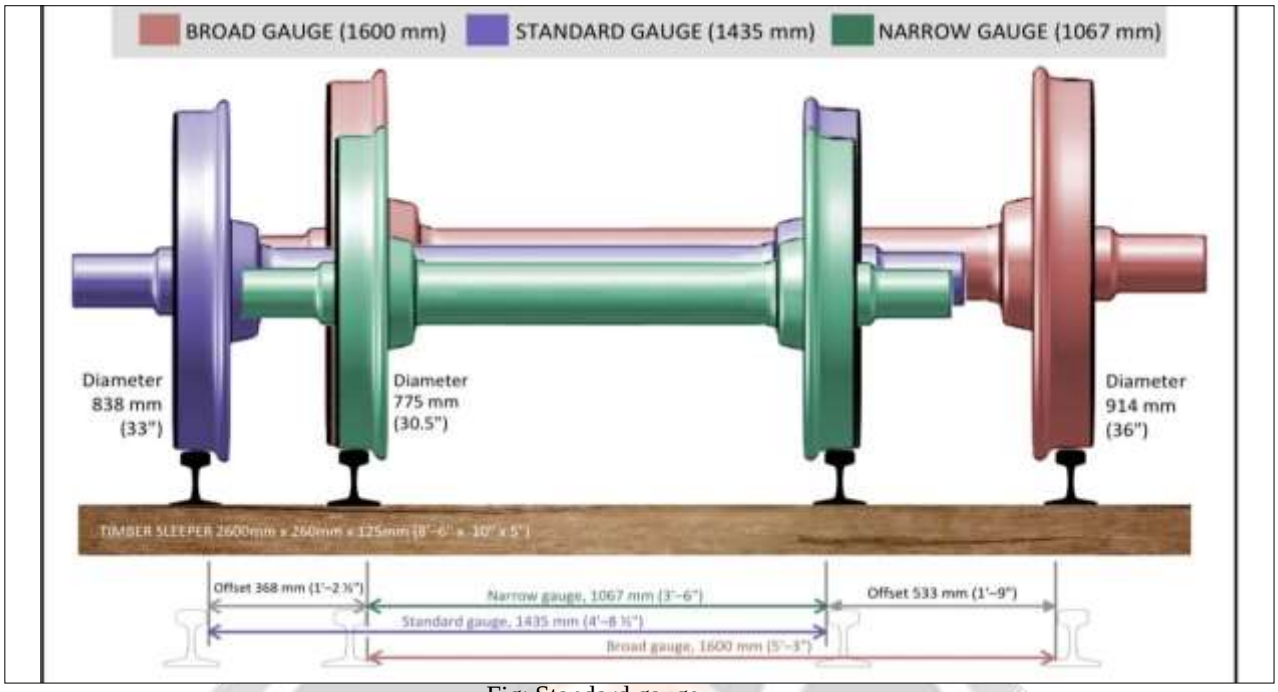

Fig: Standard gauge

Modern methods of designing of railway alignment:-

1. GIS study

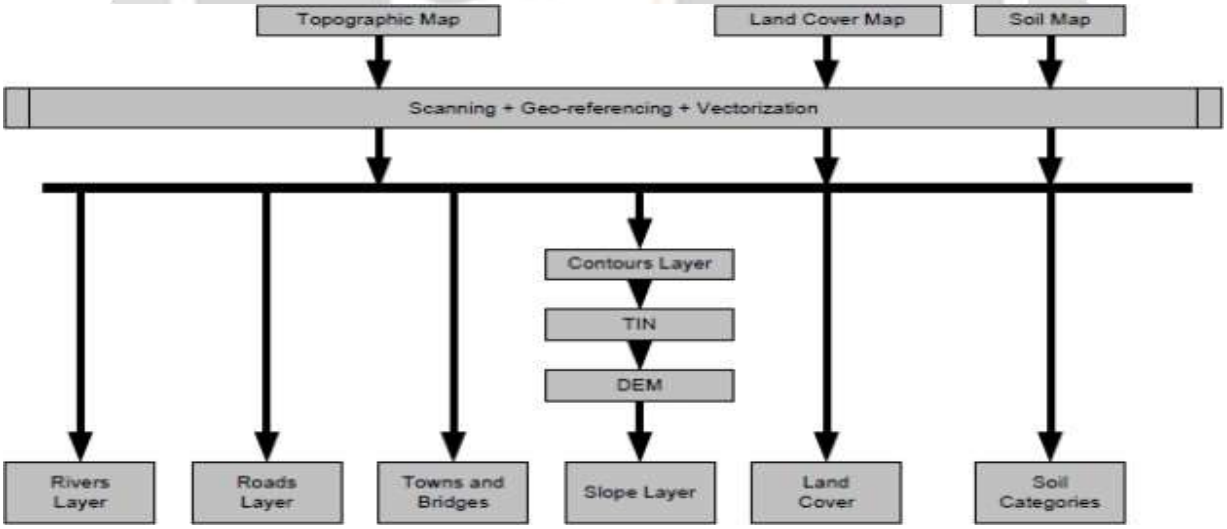

Figure layout of GIS study

Conclusion

Millions of travellers in India use trains as a convenient form of transportation. The services that Indian Railways provides are essential to its expansion. the meeting of the need for In orderto compete with other modes of transportation, passengers are crucial.

Nearly 67,45% of the railway lines in the world use the standard gauge of 1,435 mm, which isnow considered to be an international standard. It is very appropriate to adopt standard gauge of 1,435 mm to meet the need for transportation in the future, especially with the expansion ofthe Trans Sumatera Railway and additional lines.

When connecting new rails with a 1,435 mmstandard gauge to existing lines with a narrow gauge.

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