Bituminous Road Construction

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Abstract— Construction planning and execution is a fundamental and challenging activity in the management of construction projects. It involves the choice of technology, the definition of work tasks, the estimation of the required resources and durations for individual tasks, and the identification of any interactions among the different work tasks. A good construction plan is the basis for developing the budget and the schedule for work. Developing the construction plan is a critical task in the management of construction, even if the plan is not written or otherwise formally recorded. In addition to these technical aspects of construction planning, it may also be necessary to make organizational decisions about the relationships between project participants and even which organizations to include in a project. The extent to which subcontractors will be used on a project is often determined during construction planning. Construction time performance (CTP) and flexibility in approaches to project time planning have been shown to be significantly associated. This raises interesting questions about how effective planning and control to facilitate flexibility in overcoming unexpected problems may be achieved. Various tools and techniques such as Gantt chart, activity diagram and Work Breakdown Structure (WBS) have aided the road construction projects in an effective manner.

Keywords: Bituminous Road Construction, Construction time performance (CTP), Work Breakdown Structure (WBS)

I. INTRODUCTION

Roads are an integral part of the transport system. A country's road network should be efficient in order to maximize economic and social benefits. They play a significant role in achieving national development and contributing to the overall performance and social functioning of the community. It is acknowledged that roads enhance mobility, taking people out of isolation and therefore poverty. In China for instance, the government has popularized this belief by emphasizing that for any economy to develop, transport must start off first which will later stimulate other sectors to develop in an orderly fashion.

The most important factors which are needed in the developing country are economics, political and military. Each of them play great role in the respective part but they cannot perform an excellence job without proper communication and transportation. There are three main kinds of transportation, they are by air, land and water .There are two main transportations on land, they are trains and cars but roads are necessary for both of them. Cars can be driven without roads but it is difficult and very dangerous. Trains cannot travel with railroads. It is very hard to travel in tropical country such as Myanmar in raining season without a road. There are muds everywhere and they always cause trouble for cars and trains. Thus our government is building roads and railroads around the country for the safety of the citizens. The basic of economic is trading and when people trade, the transportation will be needed. The country economic will develop when people travel to different the places and do businesses. When the politic ants travel around the country to meet the public, they will also need a road. When the military officers receive an order to check an area for the safety of the citizens, they will need roads to get there as soon as possible. By that way people can stay at their houses safe and sound. So people will love the leader and obey the laws of our country.

II. HISTORY OF ROAD DEVELOPMENT IN INDIA

A. The Early History of roads around the world

- The origin of roads dates back to the period before the advent of recorded history. As civilization advanced, the growth of agriculture took place and human settlements began to be formed. From one settlement to another, tracks were formed. These tracks might have been the skeletal framework of modern highways.
- The invention of wheel in early Mesopotamian Civilization– Obsidian culture (approx. 3500 – 5000 B.C.) was a revolution in the transport system. Man soon learned the art of joining two wheels to get the advantage of an axle and thereby built two-wheeled and four-wheeled carts and chariots. The art of road building soon began with the need to provide a hard durable surface to withstand the abrading effects of the wheels

1) The mention of road buildings in Early Civilizations

- Indus – Valley Civilization (2600 – 2800 B.C.) flourished with well-planned towns having an elaborate street and drainage system. The streets were laid out in regular order in straight lines (modern grid pattern). The biggest street in Mohenjo-Daro was half a mile long and about thirty feet wide. It is likely that the wheeled carts were in existence then.
- The Roman Civilization (8th Century B.C.) was well known for good road system it built. About 1,00,000 km. road network served military and administrative purposes of the Roman Empire extended over vast regions. Rome was the focal point from where 29 major roads radiated in all directions. This is the basis of the famous saying: "All roads lead to Rome." The top layers of the pavement consisted of flat stones. Lime mortar was used to cement the stones. Bridges were built across the rivers with stone blocks. With the decline of the Roman Empire, the road building received a setback in Europe.

B. The Roads in India during later part of Ancient History

- The Maryann Emperors (321 to 185 B.C.) built very good roads. Chandragupta Maury constructed around 2400 km. long road across the sub-continent connecting Pataliputra (Modern Patna) to Takshashila (Now in Pakistan). It touched cities like Varanasi, Kausambhi,

Mathura, Indraprastha (Modern Delhi) and Kurukshetra. This road is more or less of the same alignment of the present NH-2 – the G. T. Road.

- Kautilya, the great administrator of that time and the author of Arthasastra, laid down the standard widths of various classes of roads.
- Magesthenes, a Greek Ambassador visited India during the period, mentioned that Maryann rulers were great road builders. Special care was taken to repair the roads, trees were planted along the roads to give shades, wells were dug and rest houses were provided for the comfort of the travelers. At large river crossing, ferry services were provided by the state.
- The art of building long and durable bridges was speciality of Roman civilization.
- During Egyptian Civilization (3000 B.C.), the construction of Pyramids was facilitated because of a good road for transporting huge stone blocks. Pic.3.Bridge built during Roman Civilization. Pic.4.Egyptian Civilization

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- In Gupta period (270 A.D. to 467 A.D.) which was considered to be the golden era of Indian History, roads received a great impetus.
- Fahien, a Chinese pilgrim who visited India in 405 A.D. (Gupta Period), traveled widely on India's roads and has left impressive accounts of the roads system. He was particularly impressed by the security and comforts provided to the travelers.
- Another Chinese traveler, Hiuen-Tsang, visited India in the first part of Seventh Century A.D. during the reign of Harshavardhana (606 A.D. – 647 A.D.). He mentioned about the good maintenance that the roads received because the king personally travelled on the roads on a wide scale.

III. TYPES OF ROADS

The different types of roads are classification into two categories, depending on whether they can be used during different seasons of the year:

1) All-whether roads
2) Fair-whether roads.

All whether roads are those which are negotiable during all whether, except at major river crossings where interruption to traffic is permissible up to a certain extent, the road pavement should be negotiable during all weathers. Roads which are called fair weather roads, on these roads, the traffic may be interrupted during monsoon season at causeways where steams may overflow across the road.

- Based on the type of the carriage way or the road pavement, the roads are classified as:
  - Paved roads.
  - Unpaved roads.
  - Surface roads.
  - Un-surfaced roads.

The classification based on location and function should therefore be a more acceptable classification for a country as they are defined-clearly. The Nagpur Road Plan classified the road in India based on location and function into following five categories.

1) National Highway (NH)
2) State Highway (SH)
3) Major District Roads (MDR)
4) Other District Roads (ODR)
5) Village Roads (VR)

Global Road Technology is proud to be a recognized industry leader in the road building and construction industry, and carries the torch of this proud engineering tradition forward in modern times. They are experts in both traditional construction methods as well as the application of their own cutting edge techniques that rely on soil stabilization and dust control. Let's take a look at several of the traditional types of construction techniques and materials in use

- Asphalt– One of the most popular types of construction ever since its inception in the early 1920s is asphalt paving. In this construction technique, a layer of asphalt is laid on top of an equally thick gravel base. Advantages of this form of road construction are that the pavement produces relatively little noise, its relative low cost compared to other materials, and that it is relatively easy to repair and maintain as well. However, asphalt is known to be significantly less durable and strong than most other choices, and isn't the best for the environment either.

- Concrete– Concrete is another popular choice for roadways, though it is typically only used for local roads and not other types of construction. There are three major types of concrete road surfaces, JPCP, JRCP, and CRCP; the distinguishing feature between the three being the joint system that is used to help prevent cracks from forming. Concrete is more long-lasting than asphalt and significantly stronger as well, but is quite expensive to lay and maintain.
- Composite– Composite materials are often used in types of construction that are more related to maintenance, recycling, and rehabilitation. Composite materials are combinations of both asphalt and concrete, and are typically employed in one of two methods. Asphalt overlays literally are placed over a damaged surface, or alternatively pavement may be cracked and seated instead, forming a true new surface.
- Recycling– There are three typical types of construction techniques related to recycling the surface of distressed or damaged pavement. Rubblizing, Cold/Hot in-place Recycling, and Full-depth Reclamation. Rubblizing involves reducing the road to gravel and then applying a new surface, both hot and cold in-place recycling relies on using bituminous pavement to reinforce the road (at different temperatures and admixtures, of course), and Full-depth reclamation involves both total pulverization and the addition of binding agents or other additives.
- Bituminous Solutions– Bituminous and other temporary solutions are types of construction that are only suitable for use on very low-traffic thoroughfares. Chipsealing techniques, thin membrane surfacing, and Otta sealing are all examples of bituminous surface options. These are all more commonly employed as sealing coats or finishes than as full road surfaces.

"Queensland's road network forms a vital link connecting communities with goods, services and leisure activities. As you drive through Queensland, you will notice that all roads are not the same. That is because we need different roads for different purposes. Roads for different purposes."

An easy way to identify the various types of roads is:

- Local roads
- Collector and distributor roads
- Sub-arterial and arterial roads - these are the major highways, motorways and freeways.

"Also, while not technically a road, bikeways provide the general community with an alternative means of travel."

A. Local roads

Local roads are largely the neighbourhood street system. These roads are relatively free of through traffic and mostly handle local traffic. The challenge in these areas is to provide a high level of safety and adequate access to neighbourhood services and facilities. Local roads are typically maintained by the local authority.

B. Collector and distributor roads

Collector and distributor roads are the roads that connect communities to the major sub-arterial and arterial roads in Queensland. Typically, they allow for the transport of agricultural goods and the like, to major highways for transport to markets. Similarly, in an urban environment they tend to be the roads connecting suburbs to the major freeways.

C. Sub-arterial and arterial roads

Sub-arterial and arterial roads are the major connecting roads across Queensland. They include highways, freeways and motorways. On an average day, they handle large volumes of freight and passenger vehicles.

STATUS OF MAIN ROAD

National Highway (NH)	58,112
State Highways (SH)	1,37,119
Major District Roads (MDR)	4,70,000
Village and Other Roads (ODR & VR)	26,50,000
Total Road Length	33,15,231

NHs is less than 2% of network but carry 40% of total traffic

Table 1: Indian road network-current status

Carriage Way	National Highway		State Highway	
	Length KM	Percent	Length KM	Percent
Four-lane	1800	4	1200	1
Two-lane	23700	66	238800	19
One-lane	1500	30	100500	80
Total	49500	100	125500	100

Table 2: Status of main highways

IV. CONCLUSION

This paper presents a scheme for fault detection and diagnostics in transmission line. The input values of the transmission line are injected in the image and it is transmitted in a network. The obtained image values are processed by the Neigh Shrink SURE function. And if a fault is observed or any noise is occurred in the image it tends to change the characteristics of the image. Thus the changes can be proceeding by the Neigh Shrink SURE function and the original values of the input are obtained. Thus it assure that

the location fault can be identify and diagnosed. The diagnostics tool complete showed itself as a powerful tool to identify fault.

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