

Analysis For Development of Deferment Bituminous Roads in Kolar District

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Abstract:

rural road is basically defined as the road connecting rural areas with population less than 500 or population between 500 to 1500. In Karnataka “NAGAROTHAMA PROGRAMME (PHASE-2)” provides rural connectivity to all habitations under the Ministry of Rural Development. The objective of this project is to find the shortfalls in the construction of various types of bituminous roads in kolar district (Karnataka) by analysis of estimation, tender scheduling, and time scheduling and also by the various factors and conditions affecting the construction of bituminous roads. This project helps to find the shortfalls in the project and also rectify the late duration of the project so that we can reschedule the project from actual schedule of the project and also we can make simultaneous works to finish the project in the given time and in a correct way.

Keywords:

Bituminous roads, estimation, scheduling, rescheduling, shortfalls, recommendations.

I. INTRODUCTION:

Rural roads play vital role in socio economic development and poverty reduction in rural areas. Rural road construction helps in increasing agricultural output, Economic growth and poverty reduction. It brings development by creating opportunities to access goods and services located in nearby villages (or) major towns. Rural roads provide alternative sources of income to the poor people and help them to increase their income, improve their living standards. The rural roads in India are in poor condition therefore Indian government has lunched “nagarothama programme (phase-2)”, September 2012-13 for the development of the rural road.

It provides connectivity to rural areas have population between 500 to 1500. Public private partnership is another option for construction of rural roads, in this type of construction private and government invest together for road construction. Here the privates sector is attracted by giving some long term profit on investment. For this paper planning of rural road is done following IRC code books and morth table have provided an estimation of the cost of construction the rates could vary for different places.

II.OBJECTIVE:

Accounting shortfalls by analysis of road estimates, tender scheduling, time scheduling, various factors and conditions affecting the construction of bituminous roads.

III.SCOPE:

- i. Total details about the project for planning the construction of bituminous roads.
- ii. Analyzing the road estimates, tender scheduling, time scheduling.
- iii. Accounting shortfalls by road estimates, tender scheduling, time scheduling, various factors and conditions affecting the construction of bituminous roads.

IV PROJECT DETAILS FOR PLANNING THE CONSTRUCTION OF BITUMINOUS ROADS:

Rural development department envisaged for improvements of 211 small and medium urban local bodies spread across the Karnataka state. The hon'ble chief minister has announced the scheme in the budget speech 2012-13. The government of Karnataka has approved the proposal vide government order No-UDD 25 SAMASA 2012 dated: 13-09-2012, the allocation for the RLBs are as follows.

Table 1- scope of work

Sl no	Category	No	Amount per town (Rs in crore)	Total amount (Rs in crore)
1	District head quarter city municipal council	21	30.00	630.00
2	Other city municipal council	23	15.00	345.00
3	Town municipal council	94	5.00	470.00
4	Taluk head quarter town panchayat	49	5.00	245.00
5	Other town panchyat and notified area committee	24	5.00	120.00
	Total	211		1810.00

The government has proposed to take up road work to extent of 80% of the allocation to give the face lift to the towns.

The balance 20% is earmarked for side drains and culverts. In this regard, directorate of municipal administration (DMA) has appointed consultants to act as project management consultancy (PMC) for undertaking the responsibility of

- Preparation of detailed project report (DPR)
- Assisting in works tender process and tender evaluation
- Supervision of works
- Quality control and supervision Assistance in preparation of work bills

A.HISTORY, GEOGRAPHY AND CLIMATE:

Kolar is located at 13.13°N 78.13°E. It has an average elevation of 822 meters. It is located at a distance of about 72 kilometers from Bangalore and 32 kilometers from kolar gold fields. The city is located on the southern median (plains) region of Karnataka. The Ammerallikere, a tank, forms its eastern boundary. To the north is the kodikannur tank, the main source of water supply to the city.

The nearest railway junction is bangarpete at a distance of about 15kms. It is situated on the Bangalore to Chennai national highway-4. The gangas sovereignty lasted from about 350 to 550, initially ruled from kolar as their capital city. The founding king of the ganga dynasty was konganivarman madhava who made kolar his capital around 350 and ruled for about twenty years.

B.PLANNING AND DESIGN CONSIDERATION:

Since the project roads lies in urban areas, widening/ improvements will be achieved by constructing additional carriageway concentrically with respect to the central line of the existing carriageway. For the improvements, options of flexible pavement with alternatives of full/partial reconstruction and concrete pavements are proposed based on economically most viable designs. The new pavement using these options has been designed for the different project road sections depending upon the site conditions and other applicable design parameters.

C.STUDY OF RELEVANT MAPS:

The study of relevant maps and the secondary database collected on the project area include details of submergence, details of soil erosion, landslides, slope failure in the recent past, study of data base on road and rail networks, socio-economic profile of the project area, demographic profile etc. are reviewed.

D. HYDROLOGICAL DATA:

Maps of survey of India are collected and used for hydrological data. Since the project roads are in the towns and developed areas, the implications of HFL and catchment area effects would be minimal. Data required for local drains is the HFL. The overflow details over these roads have been collected from local inquiry and has been ascertained that these bridges have not submerged in the past

E. METEOROLOGICAL DATA:

As per the Indian meteorological department, the district rainfall for last five years is given in the table and average yearly rainfall for kolar town is given in table 2

Table 2- Kolar district 5 years rainfall data

Year	Month wise – Rainfall in mm											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2008	0	0.6	0	27.5	118.6	77.3	112.6	143.3	165.6	120.1	24.6	49.8
2009	0	14.7	90.4	0.4	112.4	40.6	147.8	126.2	192.6	121.2	37.7	2.1
2010	0.1	0	9.9	14.4	67.2	78.9	18	120.6	228.8	32.6	66.5	9.8
2011	0.6	1	0	67.8	139.6	147.4	143.1	76.3	109.7	40.8	178.6	16
2012	0	21.1	0	88	69.3	45.2	120	133.9	50.4	146.5	48.6	11.4

Source- Indian meteorological department, 2013

Table 3- Kolar annual rainfall data

Yearly Rainfall in mm										
Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Rainfall	1105.6	540.1	548.8	930.8	1269.4	629.8	701.8	1061.8	728.9	1004

Source: Kolar district at a glance 2011-12

F. TRAFFIC DATA:

In absence of relevant traffic data, one day traffic surveys was conducted on main road (bangarpete main road to kurubara road) and in ward 7, 8th main road. All work packages lies around these roads. The summary of traffic data is given in the following table 4

I. Traffic intensity was calculated based on the vehicles passing through those particular areas.

II. Based on no of vehicles passing, the roads considerations were made.

III. Vehicle passing is classified into two forms which are motorized and non-motorized vehicles.

Table 4- Traffic survey details

Motorized vehicles											Non Motorized Vehicles			Volume			PCU			
Two wheelers	Auto rikshaw	Car/jeep	Bus		Trucks					Agriculture tractor	Animal drawn	Hand drawn	Cycle	Motorized vehicles	Non-Motorized	Total	Motorized vehicles	Non-Motorized	Total	
			M	S	L	2	3	A	M											ul

Location 1: Bangarpete main road to kurubara beedi road																		
1785	791	583	52	0	46	10	0	0	61	23	11	0	3328	34	3362	3886	57	3042

Location 2: In ward 7, 8 th main road																		
1286	819	504	131	17	20	10	0	0	60	67	2	0	2961	69	3030	3797	105	3901

G.Pavement composition survey:

The sample is collected from the existing road through trail pits.

Each test pit has recorded the information, viz , test pit reference, pavement composition details, sub grade type and condition.

V.EXISTING BITUMINOUS ROADS

Work No	Sub No	Road description	Length In m	Width In m	Pavement	CBR
1	Kol- 1.1	Road work from valmiki road to venkatadri nilaya	270	4.5	Bituminous surface	8
2	Kol-1.2	Road work from shivaji rao house road	150	5.5	gravel	7

VI.ESTIMATION OF ROADS: ESTIMATES:

The quantities worked out based on length, breadth and depth for different items of work as per the format were multiplied with unit rates to get the construction costs. Further, the total project cost includes construction cost, contingencies viz

utility relocation cost and others at 6% of construction cost, PMC costs at 4% of construction costs.

Road type-1
Existing of bituminous road
Road work from valmiki road to venkatadri nilaya-270mx4.5m

S.no	Description of work	unit	no	Length In m	Breadth In m	Depth In m	quantity	Amount In Rs	Total amount (quantity x amount)
1	Clearing and grubbing road land	Sqm	1	270	1	-	270	4.20	1134
2	Scanifying top bituminous surface (or) surface dressing (or) premix carpet	Sqm	1	270	4.50	-	1215	16.60	20169
3	Construction of sub grade and earthen shoulders with approved material grave/murum	Cum	1	270	1	0.30	81	162	13122
4	Providing, laying, spreading and compacting graded stones aggregate to wet mix macadam	Cum	1	270	4.50	0.150	182.25	981	178787.25
5	Providing primer and tack coat	Sqm	1	270	4.50	-	1215	78.30	95134.50
6	Providing and laying semi dense bituminous concrete	Cum	1	270	4.50	0.025	30.38	6678.50	202892.83
7	Retro-reflectorised traffic signs								

	i. 60cm equilateral triangle	No					1	2716	2716
	ii. 60cmx45cm rectangular	No					1	2673	2673
								Total	516628.58

Road type-2

Existing gravel road

Road work from shivaji rao house road- 150mx5.5m

S.no	Description of work	unit	no	Length In m	Breadth In m	Depth In m	quantity	Amount In Rs	Total amount (quantity x amount)
1	Clearing and grubbing road land	Sqm	1	150	2	-	300	4.20	1260
2	Loosening of the ground up to a level of 500mm below the sub grade level	Cum	1	150	5.50	0.15	123.75	48	5940
3	Excavation for road way in soil by mechanical means	Cum	1	150	5.50	0.45	371.25	65	24131.25
4	Construction of embankment with approved material grave/murum	Cum	1	150	5.50	0.20	165	136	22440
5	Construction of granular sub base	Cum	1	150	5.50	0.15	123.75	884	109395
6	Providing, laying, spreading and compacting graded stones aggregate to wet mix macadam	Cum	1	150	5.50	0.225	185.63	981	182103.03
7	Providing and applying primer and tack coat	Sqm	1	150	5.50	-	825	78.30	64597.50
8	Providing and laying semi dense bituminous concrete	Cum	1	150	5.50	0.025	20.63	6678.50	137777.46
9	Retro-reflectorised traffic signs								
	i. 90cm equilateral triangle	No					1	3165	3165
	ii. 60cmx60cm square	No					1	3991	3991
								Total	554800.24

VII. TOTAL COST ANALYSIS

Road type-1

Existing of bituminous road

Road work from valmiki road to venkatadri nilaya- 270mx4.5m

S.no	Cost of civil works	Amount
1	Construction cost of road and drain works (if needed)	5.17
2	Utility relocation cost contingencies @ 6% of civil work cost, Rs	0.31
3	Project preparation and management (PMC) @4%	0.20
	Grand total, Rs lakhs	5.68

Road type-2

Existing gravel road

Road work from shivaji rao house road- 150mx5.5m

S.no	Cost of civil works	Amount
1	Construction cost of road and drain works (if needed)	5.55
2	Utility relocation cost contingencies @ 6% of civil work cost, Rs	0.33
3	Project preparation and management (PMC) @4%	0.22
	Grand total, Rs lakhs	6.10

Road type-2

Existing gravel road

Road work from shivaji rao house road- 150mx5.5m

s.no	Description of work	Actual duration In days	Work proceedings	shortfalls	Extended duration In days	Actual+extended duration
1	Clearing and grubbing road land	1 day	Next work to start immediately	No shortfall	-	1day
2	2 days for wet mix and 1 week for compaction by rolling and watering	9days	Next work to start after 1 week of compaction	Due to lorry strike work halted for 1 week	7days	16days
3	Prime and tack coat (binder material)	½ day	Next work to start immediately	Due to heavy traffic prime and tack coat was done at holidays or weekends	2days	2 ½ days
4	Semi dense bitumen concrete and immediate rolling for 1 time until it gets compacted	½ day	Next work to start immediately	Work halted for 7days due to cloudy climate	7days	7 ½ days
5	Earthen shoulders (gravel or sand)	2 days	Next work to start immediately	No shortfall	-	2days
6	Retro –reflectonized traffic signs	½ day	Next work should start immediately	No shortfall	-	½ day
7	thermoplastic	1 day	End of the works	Due to heavy traffic we plan to do at nights which extend to 1day	1day	2days
	Total-	14 ½ days			17days	31 ½ days

Road type-2

Existing gravel road

Road work from shivaji rao house road- 150mx5.5m

s.no	Description of work	Actual duration In days	Work proceedings	Shortfalls	Extended duration In days	Actual+extended duration
1	Clearing and leveling road land	1 day	Next work to start immediately	2days extended due to unavailability of machinery	2days	3days
2	Loosening of ground and excavation	2days	Next work to start immediately	No shortfall	-	2days
3	2days for embankment and minimum 3 days for rolling and watering	5days	Next work to start after 3 days of rolling and watering	No shortfall	-	5days
4	1 day Granular sub base and 7 days for rolling and watering	8days	Next work to start after 7 days of rolling and watering	No shortfall	-	8days
5	Prime coat	½ day	Next work to start immediately	Due to traffic work extended for 1 day	1day	1 ½ day
6	2 days for wet mix and 7 days for rolling and watering	9days	Next work to start after 7 days of rolling and compaction	Due to traffic at week days work extended for 7 days and done at	7days	16days

				weekends or holidays		
7	Tack coat	½ day	Next work to start immediately	Due to traffic work extended for 2 days	2 days	2 ½ days
8	Semi dense bitumen concrete and immediate rolling for 1 time until it gets compacted	½ day	Next work to start immediately	No shortfall	-	½ day
9	Earthen shoulders (gravel or sand)	2 days	Next work to start immediately	No shortfall	-	2 days
10	Retro-reflectorised traffic signs	½ day	Next work to start immediately	No shortfall	-	½ day
11	thermoplastic	1 day	End of the works	Due to heavy traffic we plan to do at nights which extend to 1 day	1 day	2 days
	Total-	30 days			13 days	43 days

*EOT- Extension of time (permission taken from super dent engineer for major and climatic reasons)

IX. RECOMMENDATIONS TO AVOID SHORT-FALLS IN THE PROJECT

I. During wet mix time work may extend due to lorry strike and work halted for 1 week, so we have to start work at holidays or weekend to avoid this problem or reschedule the work on non-lorry strike days.

II. Due to heavy traffic prime coat, tack coat and semi dense bitumen concrete works should be done on week end or holidays. Since we cannot divert traffic in certain roads.

III. During semi dense bitumen concrete, temperature should be maintained for laying at 120 to 170 °C and for rolling at 90-120 °C.

IV. Semi dense bitumen concrete work may postpone for 7-10 days due to cloudy climate. At that time we have to take Permission for extension of time (EOT) by super dent engineer.

X. CONCLUSION:

1. Now a day's construction of bituminous roads is taking place in all parts of India for development of areas and for connection between one place to another.

2. My project was done at kolar district in Karnataka, where Karnataka government has proposed for phase-2 development of existing roads or construction of new roads on existing roads for development of their areas and provides basic needs to public and also for fast moving of vehicles without creating traffic or other problems.

3. During my project I have found shortfalls in the construction of bituminous roads which gives late duration of the project, a project is said to be successful when it completes in a given time and in a satisfactory way.

4. So I have recommended some recommendations to complete project in a given time or extended time.

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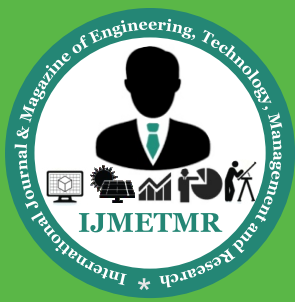
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