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PLANNING SCHEDULING OF GRADE SEPARATOR

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Abstract

Planning, scheduling plays a vital role in improving the prospects of successful implementation of infrastructure projects. Project planning involves defining and coordinating activities and work tasks, preparing work schedules, assigning and allocating resources to competing activities and developing an acceptable budget. The scheduling is just one of the tools will be used to manage activities and duration.. The scope of this work is to Consistent view of project status and issues, is to ensure that the project is completed within the allocated and approved budget; Work Break Down structure will be prepared, duration and predecessors for each activity will be assigned, Critical Path will be determined, Resource analyzing and leveling will be done for entire,. Estimating is to assign resources to each activity in the activity list. Total duration and cost will come to know by using Microsoft Project. Based on prediction of future traffic at junction on chord road the grade separator is been projected. Accordingly the planning scheduling of grade separator at junction on chord road is been prepared. An effective planning, scheduling will help in emerging problems and taking time correctively action.

Keywords: Planning, Scheduling, Resource, Activity, Duration and Microsoft Project.

1. INTRODUCTION

Planning involves a rational approach to achieving pre-selected objectives. It strongly implies managerial innovations in decisions making that is, choosing from among alternative future courses action. It involves defining and coordinating specific activities and work tasks, preparing work schedules, assigning and allocating resources to competing and developing an acceptable budget. . The various steps of planning during various stages of projects implementation are depicted in the following model:

1. Development of project plan objectives
2. Programming of action
    a. Define the scope of work
    b. Define the time frame
    c. Work Breakdown Structure and codification
    d. Sequence and priorities

e. Activity duration

f. Critical activities

3. Scheduling of resources and time(resource allocation)
    a. Make overall master schedule with milestone, completion dates and master budget.
    b. Assess resources requirement
    c. Time phased construction and resources schedule
4. Budgeting
    a. Detailed budget
    b. Cash flow segments

Risk analysis is a part of planning. For every risk identified, develop a contingency plan, when possible. The scheduling is just one of the tools will be used to manage activities and duration. The tool for scheduling projects is the bar chart. The Gantt charts which will show the show the progress of work.

1.1 Using the Work Break down structure to Plan a Project

The idea behind WBS is simple: a complicated task is sub divided into several smaller tasks. This process can be continued until the task no longer be subdivided, at which time we will probably find it easier to estimate how long each small task and how much it will cost to perform. The main idea of doing WBS is to capture all the tasks. The WBS should be developed before the schedule. The WBS is the device that ties the entire project together. It allow us to assign resources and to estimate costs and resources, and it shows the scope of the job in graphic form. Later we can track the project, we can identify the work as being such and such a box in the WBS.

1.2 Scheduling Project Work

The two methods of scheduling in the form of arrow diagrams (viz., CPM and PERT) are intended to capture the sequential and parallel relationship among project activities. One method is Critical Path Method (CPM) and other Performance Evaluation and Review Technique (PERT). The arrow diagrams will used to show the sequence in which is performance. The Critical Path Method (CPM) helps identify the activities that will determine the end date; it also offers guidance on how the project should be managed. The scheduling software handles resources allocation fairly well. The Critical Path is the longest path through a network and determines the earliest completion of project work. Once a suitable

network has been drawn, with durations to all activities, it is necessary to determine where the longest path is in the network and whether it will meet the target completion date.

2. OBJECTIVE

The most general objective of planning is to improve to provide a link between the establishment of an effective productivity measurement system and the human task of improving organizational performance by means of changes in all or several elements of the organization-the people, structure, culture and technology. Some more specific objective of the programme could be:

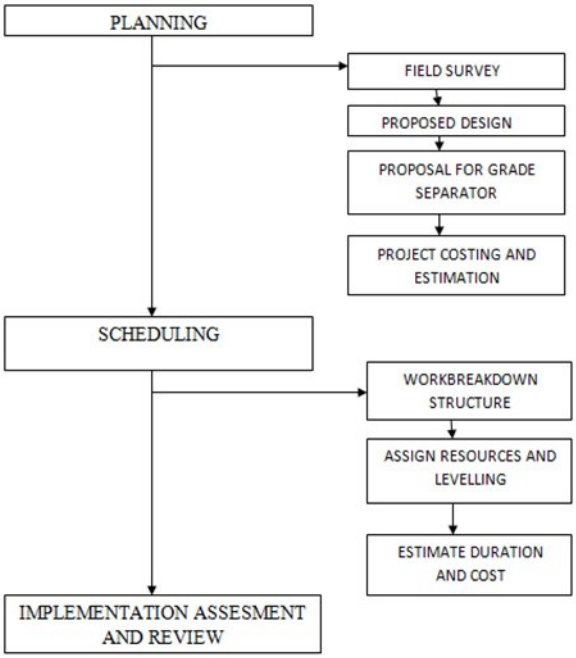
I. Preparing the Work Breakdown Structure specifies the breakdown of the project into tasks and sub tasks.
II. Estimating Activity Durations and Cost.
III. To identify Critical Task in the entire project.
IV. To improve team work and human relations.
V. To improve managerial, planning and problem solving skills.

3. SCOPE OF THE PRESENT STUDY

I. Consistent view of project status and issues.
II. Flexibility of the Project Team.
III. To have a clear picture of all the work that needs to happen on project, and as the project progresses.

4. METHODOLOGY

Present study involves developing a plan, assigning resources to tasks, managing budget and analyzing. A project involves numerous function independent activities to be completed in definite time span. It is therefore essential to carry out a detailed planning of the project activities keeping in view the sequence, time element, and frontage and resource availability. This planning forms the foundation for the execution of the project and also for monitoring and controlling the project activities.



5. CASE STUDY AT CHORD ROAD AT 10TH CROSSROAD JUNCTION IN RAJAJINAGAR 1ST BLOCK

The present scope of study is for the 10th main junction of Rajaji Nagar is located at the West of Chord Road, it is a four arm intersection presently operated by traffic signal. The key map of the project location is shown in the Fig 2

Fig 2 Key Map of the Junction

Chord Road and 10th Cross Road have four lane carriageways, whereas 12th cross road which is a narrow road has two lane carriageways. Chord road consists of light commercial vehicles, heavy commercial vehicular traffic, buses, cars, two wheelers and other type of vehicle. There is also the passenger traffic which constitutes a major chunk of the traffic during day time. The passenger traffic has increased beyond planned levels primarily because of development alongside and increase in population.

6. DATA COLLECTION

In order to arrive at a feasible traffic improvement measure at 10th main junction, Rajaji Nagar, various field surveys and investigations were conducted in month of March 2012.Traffic Survey includes Turning Movement Volume Count at the junction. The Surveys were conducted covering the intersection under study and major roads in the near vicinity of project area.

6.1 Reconnaissance Survey

- The Junction is a four armed junction formed by chord road (main road) and 10th /12th cross (cross road)
- All arms of the junction have bidirectional traffic
- The traffic at junction is controlled by a automatic traffic signal.
- Chord Road is a 4 lane divided carriageway

- 10^{th} Cross Road has divided carriage way.
- 12^{th} Cross Road has two lane carriage way.
- Width of all arms varies throughout the length.
- Bus stops are situated near the junction on both side of the chord road.
- Ground Profile on Chord Road is in Valley forming an inverted parabola.
- Level difference between 10^{th} cross road and 12^{th} cross road is around 2m.

Road Inventory

Preparation of road inventory of the project road was undertaken first. The purpose of the survey was to obtain the necessary information regarding the road features along the project road, condition and performance of drainage structures and other ancillary road features like footpath, median, kerbs etc. An integrated program to carry out surveys and investigations were developed, using IRC SP -19 as a general guide.

A few traffic sign boards and a couple of direction sign boards were noticed at the junction. Pavement marking was noticed which was not very clear and the same was not observed on other cross roads. There are no edge lane markings or direction markings on the carriageway. Width of main carriageway and service road given in Table 1:

Direction : From Junction towards ISCKON (LHS)						
Distance (m)	Main road (m)		Wall (m)	Service road (m)		Remarks
	Road Width	Footpath		Road Width	Footpath	
0	15.8	0		7	1.7	Gap between service road and main road is 0
50	16.3	0		8.5	1.6	Gap between service road and main road is 5.0
100	16.9	0		7.5	2.5	Gap between service road and main road is 6.2
150	9.4	2.4		-	-	-
200	10.6	2.4		-	-	-
250	11.6	2.8		-	-	-
300	10.3	1.8		-	-	-
Direction : From Junction towards ISCKON (RHS)						
Distance (m)	Main road (m)		Wall (m)	Service road (m)		Remarks
	Road Width	Footpath		Road Width	Footpath	
0	10.4	3.35	0.6	8.2	1.7	
50	9.8	3.25	0.6	8.0	1.4	
100	9.75	3.10	0.6	7.8	1.2	
150	9.3	2.8	0.6	7.0	2.0	
200	9.7	2.0	0.6	7.7	1.45	
250	9.6	2.8	-	6.5	1.7	
300	10.4	2.6	-	5.6	2.2	

6.2 Topographic Survey

Topographical surveys were conducted to capture the site features with total station and leveling data was collected using auto level. The GTS bench mark was transferred to the site by carrying out fly leveling and the bench marks were established at site. Entire leveling was carried out using GTS bench mark.

6.3 Traffic Survey

Classified traffic volume count was carried out at the junction during March 2012. Vehicles recorded were classified based on its category for each turning movement at the junction timed at an interval of 15 minutes. The traffic survey was carried out for 12 hours covering the morning and evening peak hours. The following categories of vehicles were recorded during the survey:

6.3.1 PCU Values Adopted

Vehicle Category	PCU Values Adopted as per IRC:106-1990
Two-Wheeler	0.75
Three-Wheeler	2.0
Car/Jeep	1.0
Mini-Bus	1.0
Bus	2.2
LCV	1.4
2-Axle	2.2
3-Axle	2.2
MAV	4.0
Tractor With Trailer	4.0
Cycle	0.4
Cycle Rickshaw	1.5
Animal Drawn Vehicles	1.5

Table 3 PCU Values

6.3.2 Traffic Survey Results

The classified turning movement survey was conducted for a total duration of 12 Hours on working day accounting for Morning Peak and Evening Peak Time at the above mentioned location given in Table. From the present traffic survey, morning peak hour and evening peak hour was estimated for the junction. The details of the hourly variation of the traffic at junction, the present peak hour (morning & evening) traffic for the junction are given below.

Based on the present traffic survey, the morning and evening peak hour traffic details were estimated and the details of peak hour time for morning & evening, number of vehicles and PCUs are mentioned in Table

Morning Peak Hour Details			Evening Peak Hour Details		
Peak Hour Time	No. of Vehicles	PCUs	Peak Hour Time	No. of Vehicles	PCUs
9.00- 10.00	7036	8021	18.00 - 19.00	6935	8195

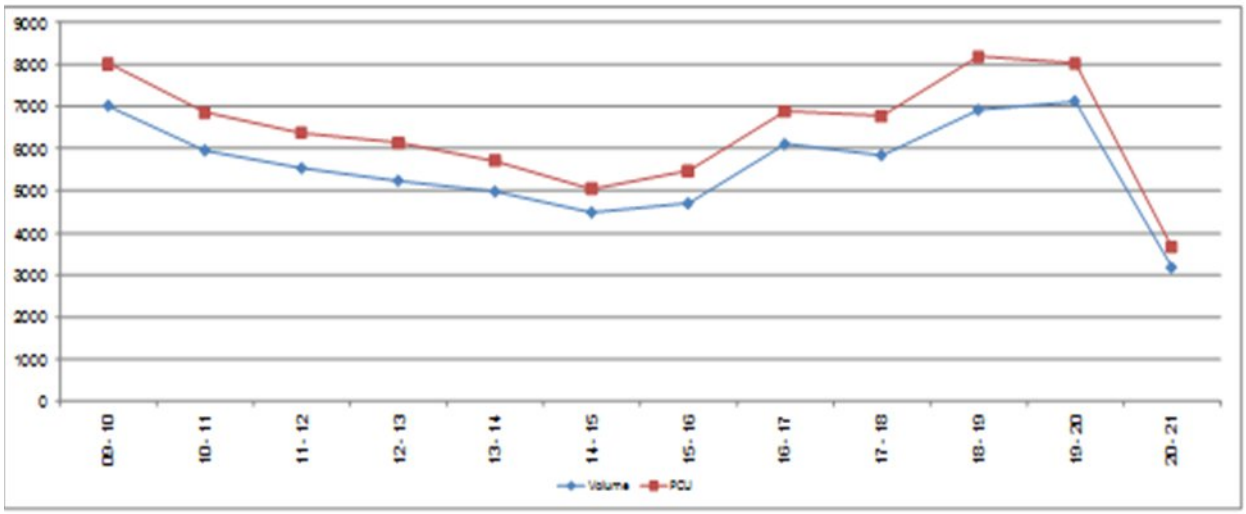


Figure 3 Hourly Variations at the Junction

6.3.3 Peak Hour Vehicle Composition Details at Junctions

The peak hours for both morning and evening at all the junctions have been presented in the following tables and pie charts for easy understanding below.

Vehicle Type	Morning		Evening	
	No.	%	No.	%
Two Wheelers	3474	49.38%	3023	43.59%
Auto Rickshaw	1342	19.07%	1517	21.87%
Car/ Jeep	1458	20.72%	1635	23.58%
Mini Bus	169	2.40%	169	2.43%
Stand. Bus	295	4.19%	293	4.23%
LCV	201	2.86%	217	3.13%
2-Axle	68	0.96%	43	0.62%
Multi Axle	2	0.03%	8	0.11%
Tractor	2	0.03%	1	0.02%
Cycle	26	0.37%	29	0.42%
Total	7036	100.00%	6935	100.00%

Table 3 Peak Hour composition

The salient feature of the traffic at the junction is summarized below. This is a four arm junction, with West of chord is being a main road at the junction. The other cross road is connecting the Dr. Raj Kumar road to Nandini layout. The morning peak hour is 9.00am to 10.00am with 7036 vehicles and 8021 PCUs with maximum composition of two wheelers (49.38%) followed by four wheelers (20.72%) and Auto Rickshaws (19.07%) are being third maximum when compared with rest of the other vehicles

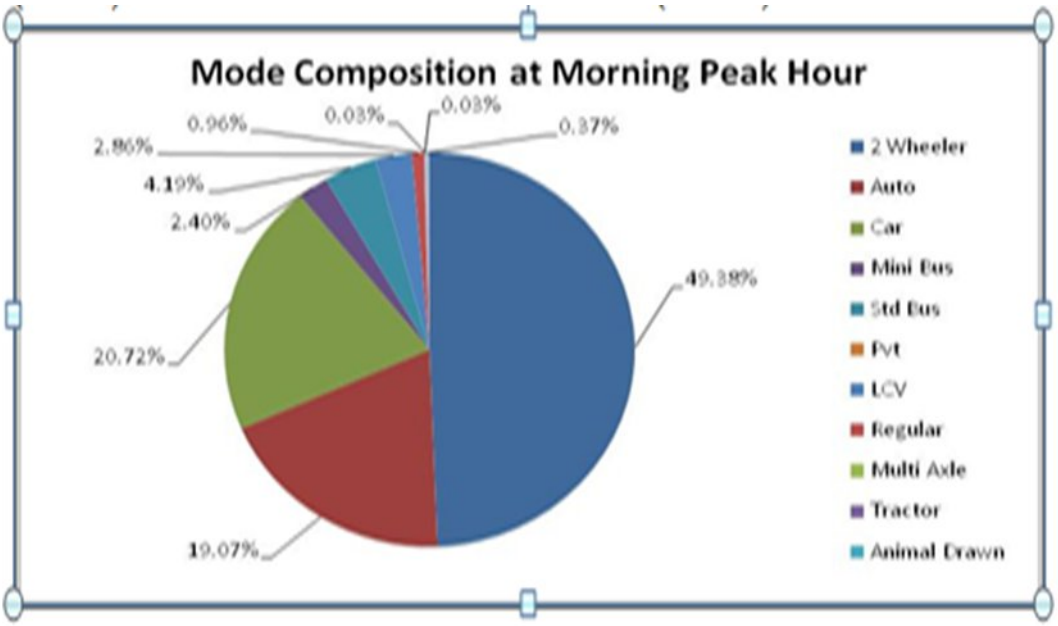


Fig 4 Mode Compositions at Morning Peak Hour

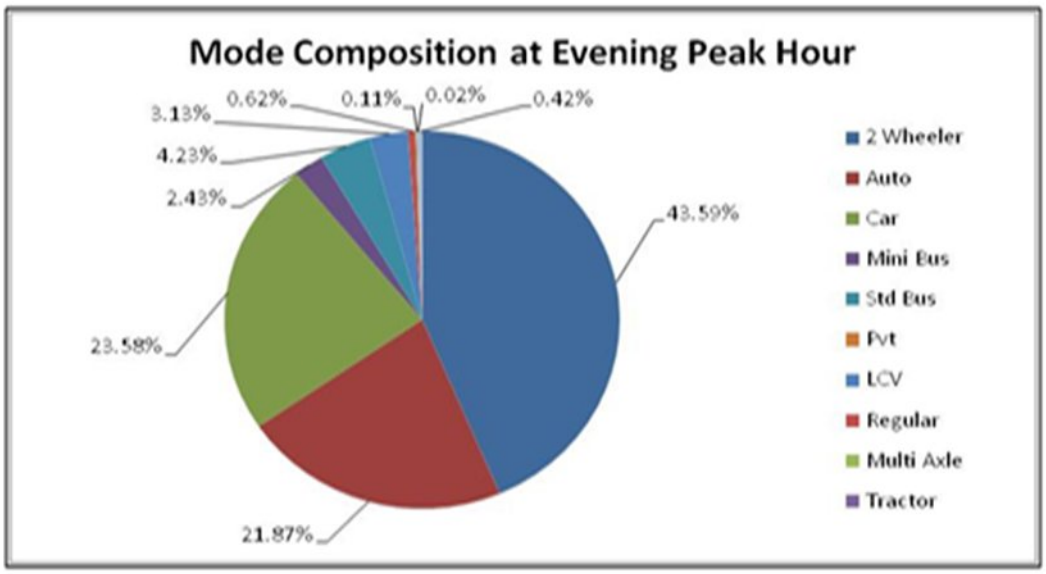


Fig 5 Mode Compositions at Evening Peak Hour

6.3.4 Projected Peak Hour Traffic at Intersection

Morning and Evening peak traffic has been considered for the purpose of projecting for next 10 years with average annual growth rate of 7.5% for all the categories of vehicles in general. The projected traffic at the junction is presented in Table below.

Table 4 Projected Peak Hour Traffic Details at the Junction

Peak Hour	Total	YEARS										
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Morning	Vehicles	7036	7564	8131	8741	9396	10101	10858	11673	12548	13489	14501
	PCUs	8021	8623	9270	9965	10712	11516	12379	13308	14306	15379	16532
Evening	Vehicles	6935	7455	8014	8615	9261	9956	10703	11505	12368	13296	14293
	PCUs	8195	8810	9470	10181	10944	11765	12647	13596	14615	15712	16890

Table 5 Projected Peak Hour Traffic Details On10th/12thcross Road

Peak Hour	Total	YEARS										
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Morning	Vehicles	2626	2823	3035	3263	3507	3770	4053	4357	4684	5035	5413
	PCUs	2796	3006	3231	3474	3734	4014	4315	4639	4987	5361	5763
Evening	Vehicles	2406	2586	2780	2989	3213	3454	3713	3991	4291	4613	4959
	PCUs	2886	3102	3335	3585	3854	4143	4454	4788	5148	5536	5948

Table 6 Projected Peak Hour Traffic Details on Chord Road

Peak Hour	Total	YEARS										
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Morning	Vehicles	2152	2314	2487	2674	2874	3090	3321	3571	3838	4126	4436
	PCUs	2419	2601	2796	3006	3231	3473	3734	4014	4315	4639	4986
Evening	Vehicles	1977	2125	2285	2456	2640	2838	3051	3280	3526	3790	4075
	PCUs	2294	2466	2651	2849	3063	3293	3540	3805	4091	4398	4727

Cross Road Capacity

Cross Road		5000 PCU/hr					
Peak Hour	Total	YEARS					
		2012	2013	2014	2015	2016	2017
Morning	Vehicles	2626	2823	3035	**3263**	3507	3770
	PCUs	2796	3006	3231	**3474**	3734	4014
Evening	Vehicles	2406	2586	2780	**2989**	3213	3454
	PCUs	2886	3102	3335	**3585**	3854	4143

Junction Capacity

Cross Road		2 Lane Divided	1500PCU/hr			5100 PCU/hr	
Chord		4 Lane Divided	3600 PCU/hr				
Peak Hour	Total	YEARS					
		2012	2013	2014	2015	2016	2017
Morning	Vehicles	7036	7564	8131	**8741**	9396	10101
	PCUs	8021	8623	9270	**9965**	10712	11516
Evening	Vehicles	6935	7455	8014	**8615**	9261	9956
	PCUs	8195	8810	9470	**10181**	10944	11765

6.3.5 Guideline Grade Seprated Intresrction

The intersections will be provided with grade separated facility considering the following guidelines as stipulated by Indian Road Congress (IRC92-1985). The junctions warrant for a interchange if it fulfils any of the following criteria: Interchange will be required;

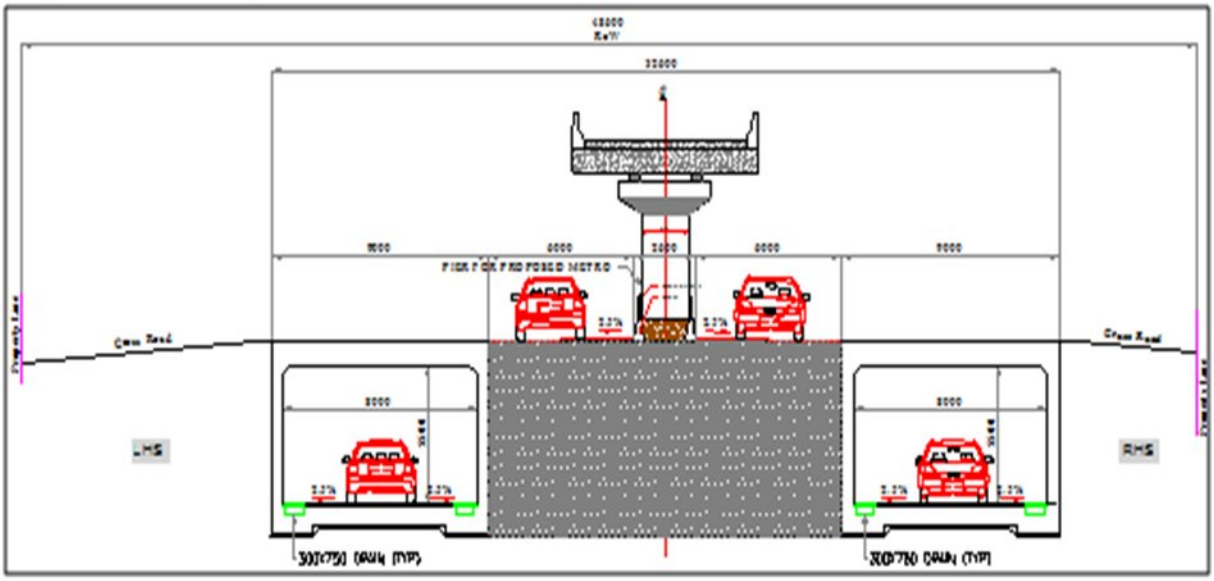
i. At all crossings of a highway which is to be developed to completely access controlled standard. Similarly, interchanges will also be required at all major crossings on highways developed to expressway standard
ii. At the crossing of a major arterial road with another road of similar category carrying heavy traffic
iii. When an at-grade intersection fails to handle the volume of traffic resulting in serious congestion and frequent choking of the intersection. This situation may arise when the total traffic of all the arms of the intersection is in excess of 10,000 PCU's per hour
iv. High and disproportionate rate of fatal and major accidents at an intersection not found to respond to other traffic control or improvement measure may warrant an interchange
v. The topography is such that interchanges are the only type that can be constructed economically

Based on the above guidelines, junction has been analyzed and found that the traffic in the junction exceeds 10000PCUs/hour in the year 2015; also, there exists a severe congestion and delay at junction in peak hours. Hence the junction warrants for a grade separated facility in order to avoid the delay at intersection and smooth flow of traffic.

The Junction is analyzed for traffic capacity analysis to select the number of lanes required. The though traffic that will use the grade separator only is considered in capacity analysis. The traffic volumes are projected for 5, 10, 15 and 20 years. The traffic volume at the end of 10 years is considered for recommending the lane requirement. Based on the traffic projection, the grade separator requires a 4 lane divided carriageway.

6.3.6 Grade Separator Options

Option 01: Underpass for West of Chord Road

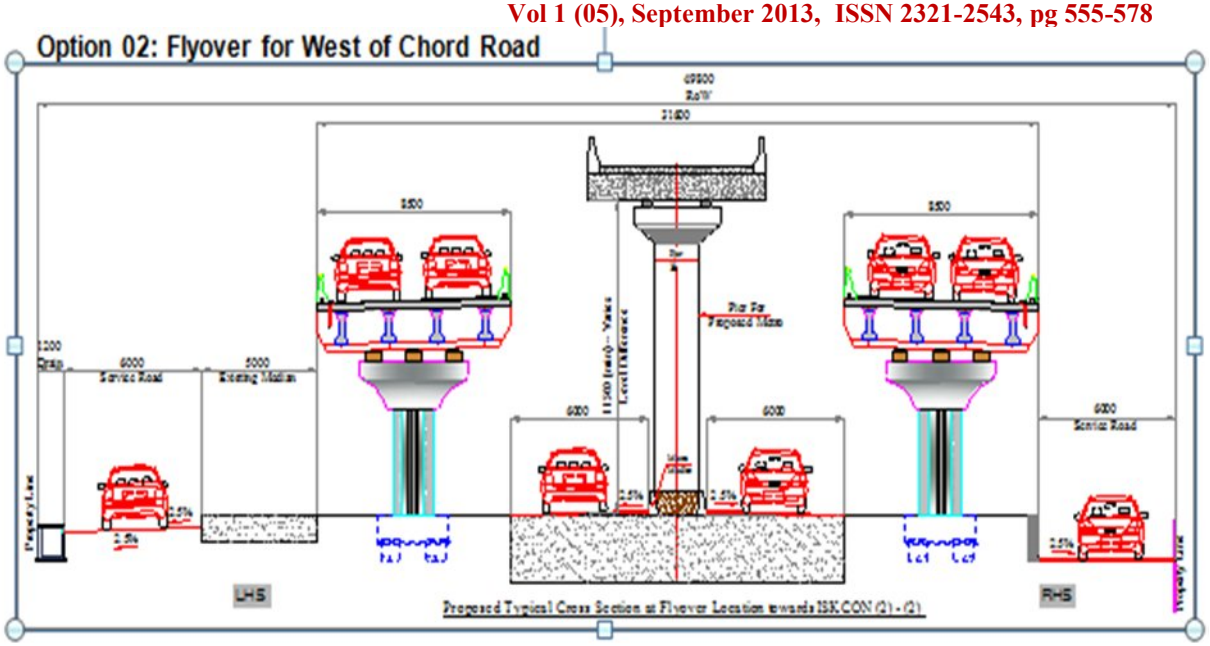


Advantages

- Through movement on Chord Road will become signal free.
- All major turning movements will have enough space.

Disadvantages

- Existing road profile of Chord Road at this location is not suitable for an Underpass because it is in valley curve shape.
- Existing road Gradient of Chord Road itself is over 4% which makes the underpass approach lengths too long.
- Total length of underpass including approaches will be about 960m (Approach Length on ISKCON side is 440m and on Vijayanagar side is 490m)
- Increase in Approach Length towards ISKCON side will require land acquisition on LHS.
- Construction cost will be more due to increase in approach length.
- Existing bus stop on RHS and bus bays on LHS has to be relocated to either service road or towards Metro piers.



Advantages

- Through movement on Chord Road will become signal free.
- All major turning movements will have enough space.
- Additional Carriageway available near Metro Line on either side can be converted into dedicated bus lane and it can also be utilized for right turning traffic
- Existing Gradient on Chord Road suites the requirement for the construction of Flyover.
- Length of Approaches on either side on Chord Road will be reduced due to existing ground profile on Chord Road.
- Total Length of flyover including approaches will be about 380 m (Length of Approach towards ISKCON side is 90m and towards Vijaya Nagar side is 80m and 210 m flyover)
- Construction cost will be less due to reduction in Approach length.

Disadvantages

- Nil

6.3.6 Comparison Of Options

After deliberating the outcome of the options analysis and considering the site constraints of land acquisition, option-2 is recommended as most feasible and favorable option. The same is being discussed with the client and the preliminary plan, costing is prepared for the flyover on chord road option.

6.3.6 Proposal At: Flyover On Chord Road (Iskcon – Vijayanagar Direction)

The Flyover consists of structural and ramp portion. The structural details are given below.

STRUCTURAL DATA

Length of Flyover	: 380M
Length of Approaches	: 260M
Flyover total Width	: 8.5M (Each Direction)
Vertical clearance	: 5.5M
No of Lanes	: 4
Type of structure	: PSC I Girder structure
Portion Concrete grade	: M 40
Type of Crash barrier	: New Jersey RCC cast-in-situ
Concrete grade	: M 30
Grade of Steel	: Fe-500 TMT bars
Expansion joint	: Strip seal joint and PVC water stoppers

6.3.7 Pavement Design

Flexible pavement design has been carried out using "IRC: 37-2001: Guidelines for the Design of Flexible Pavements".

6.3.7.1 Design Life

A 15-year design life (2015-2030) has been used in the design of flexible pavement.

6.3.7.2SUB-GRADE STRENGTH

It is proposed to use borrow soil having CBR (4 day soaked) 8% in the preparation of sub grade. Few locations of quarries have been identified and samples collected from them are being tested for CBR strength confirms that the recommended CBR strength is available near to the project road.

6.3.7.3. Design Thickness for Pavement

The pavement has been designed for a minimum sub-grade CBR of 8 %, the expected traffic loading at the end of 15 year design life and the correspondingly recommended pavement layers as per IRC 37 for the main carriageway, slip roads and approaches of proposed Grade separator is given in Table 7.

Table 7 Pavement Thickness

Pavement Thickness	Approach Road	Ramp	Slip Road
BC	40	40	40
DBM	90	85	75
WMM	250	250	250
GSB	200	200	200

6.3.7.4 Recommended Pavement Thickness

Since there is a small difference in thickness in pavement layers between approach, ramp and slip roads. Based on construction consideration all these locations are given a uniform pavement thickness. The recommended pavement layers for the approach, ramp and slip roads of proposed Grade separators is as given in Table 8

Pavement Thickness	Approach Road
BC	40
DBM	90
WMM	250
GSB	200

7. ANALYSIS

The construction of flyover with according to program using MS Project Software:

- Plan will be prepared for construction of flyover including road work, drain work.
- Work Break Down structure will be prepared.
- Duration and predecessors for each activity will be provided.
- Critical Path will be determined.
- Resources will be assigned for each activity.
- Resources analyzing and leveling will be done for entire project.
- Total duration and cost will come to know.
- Report will be generated.

After project is approved and initiated, it is time to put it together using scheduling software. Activities that occur at this time include:

1. Adding tasks to a schedule.
2. Creating relationships between tasks using outlining and task linking.
3. Assigning people and other resources to tasks.

All the projects come to an end, but this doesn't mean that work is finished. If don't record the success and challenges of the project, doomed to repeat the problem in the next project. Activities that occur at this time include:

1. Reporting project success and challenges to team and stakeholders.
2. Archiving project so that it can be used to help measure the success of future project.

All the activities is manually scheduled. Manually schedule activities can be placed anywhere in schedule.

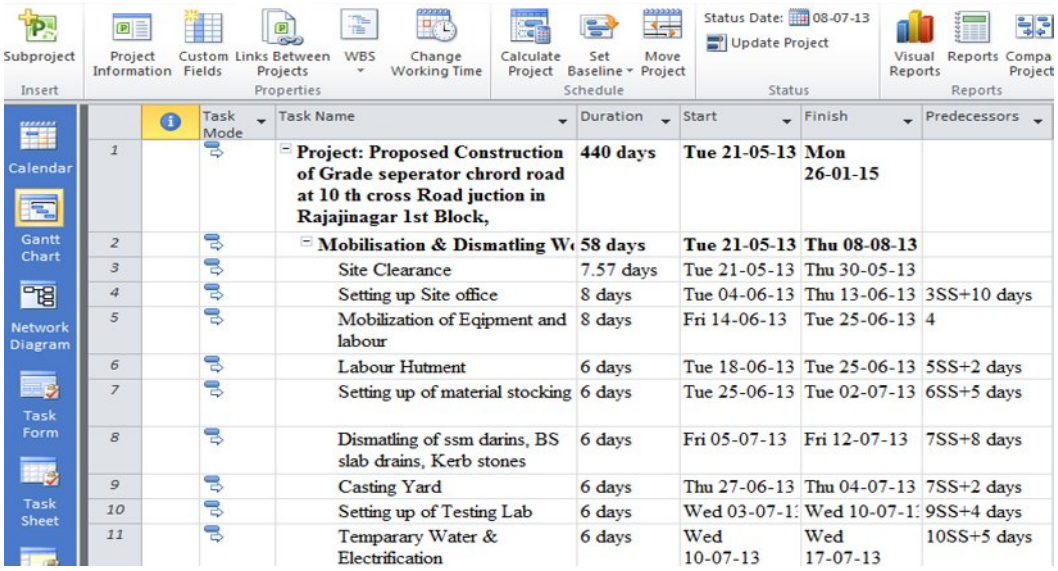
7.1 Task and Its Relationship

Task is an activity performed to achieve the required work and is the basic unit of the project. The first level of creating a project in Microsoft Project is to enter the task name and the duration. The task duration is the amount of time expects it will take to complete the task. Project can work with task duration of work with task duration that range from minutes to month.

7.2 Work Breakdown Structure

Every project has an identification that reflects the task's location in hierarchy of the project. Work breakdown structure is a hierarchical structure that is used to organize tasks for reporting schedules and tracking costs. A WBS chart displays and defines the product, to be developed and / or produced. It

relates the elements of work to be accomplished to each other and to the end product. WBS is also called as an organized method of dividing a product at lower level of detail.



	Task Mode	Task Name	Duration	Start	Finish	Predecessors
1		**Project: Proposed Construction of Grade seperator chrord road at 10 th cross Road juction in Rajajinagar 1st Block,**	**440 days**	**Tue 21-05-13**	**Mon 26-01-15**	
2		**Mobilisation & Dismatling W**	**58 days**	**Tue 21-05-13**	**Thu 08-08-13**	
3		Site Clearance	7.57 days	Tue 21-05-13	Thu 30-05-13	
4		Setting up Site office	8 days	Tue 04-06-13	Thu 13-06-13	3SS+10 days
5		Mobilization of Eqipment and labour	8 days	Fri 14-06-13	Tue 25-06-13	4
6		Labour Hutment	6 days	Tue 18-06-13	Tue 25-06-13	5SS+2 days
7		Setting up of material stocking	6 days	Tue 25-06-13	Tue 02-07-13	6SS+5 days
8		Dismatling of ssm darins, BS slab drains, Kerb stones	6 days	Fri 05-07-13	Fri 12-07-13	7SS+8 days
9		Casting Yard	6 days	Thu 27-06-13	Thu 04-07-13	7SS+2 days
10		Setting up of Testing Lab	6 days	Wed 03-07-1	Wed 10-07-1	9SS+4 days
11		Temparary Water & Electrification	6 days	Wed 10-07-13	Wed 17-07-13	10SS+5 days

Fig 6 Workbreak Down Structure

7.3 Critical Path

A critical path is the series of tasks that will push out the project's end date if the tasks are delayed. The word critical in this context importance of these tasks are to the overall project. It refers only to how their scheduling will affect the project's finish date. The project finish date is of great importance in most of the projects. Over the life of a project, the projects critical path is likely to change from time to time as tasks are completed ahead of or behind schedule.

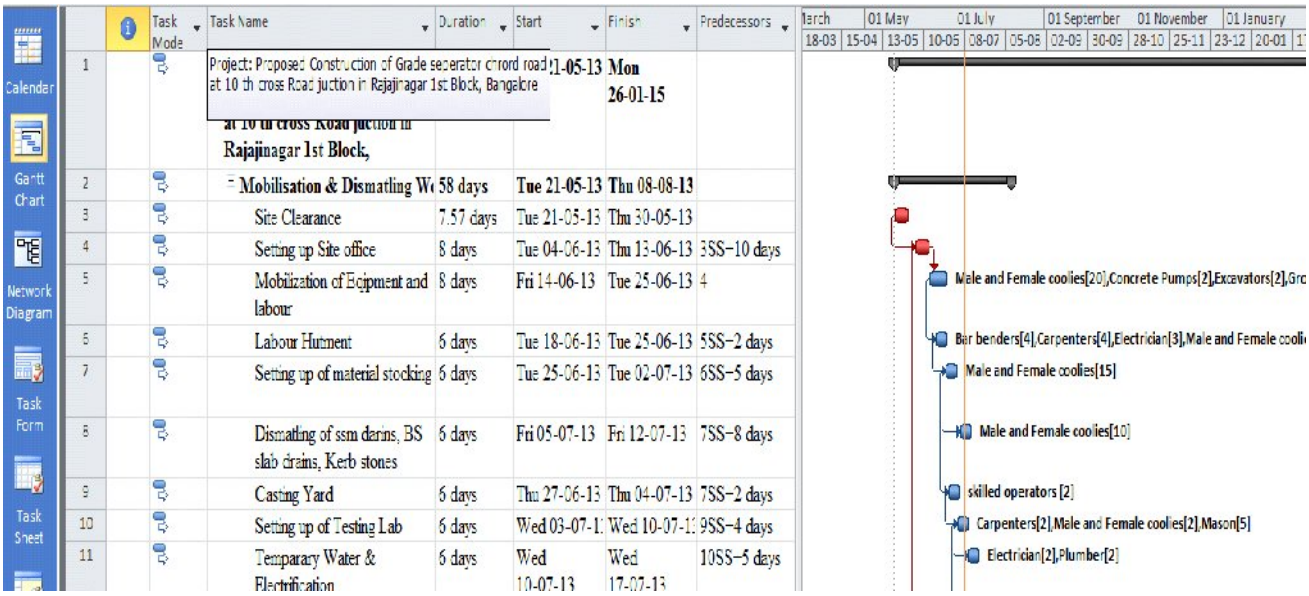


Fig 7 Critical Path

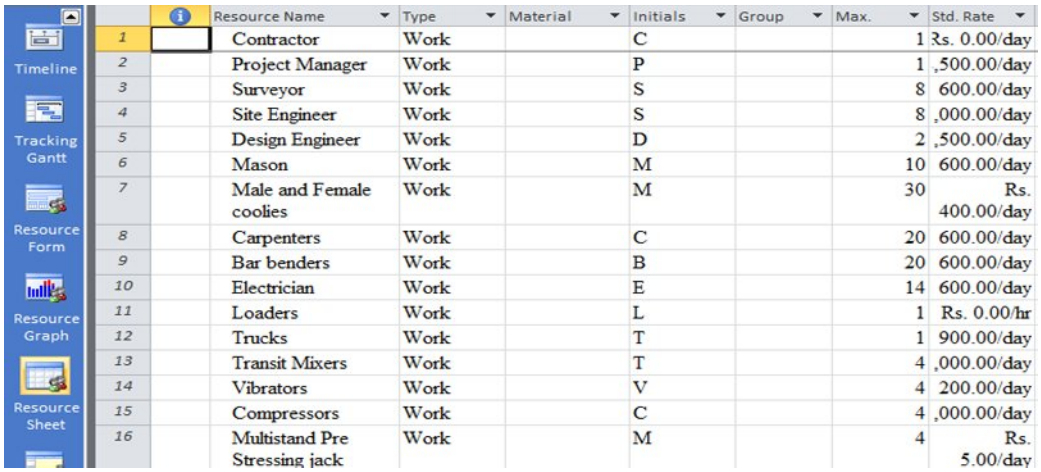
7.4 Constriants

Restriction set on the start or finishes date of the task. Constraints tie tasks to the project start or end to specific dates, dependencies, tie tasks to the timing of the other tasks in the project.

7.5 Resources

The derived quantity will be utilized in Resource sheet and cost will be providing for each resource.

Microsoft project supports three types of resources. These are work resources, as well as two special – purpose resources: cost and material. Resources are the people, supplies and equipment that enable you to complete the task in your project.



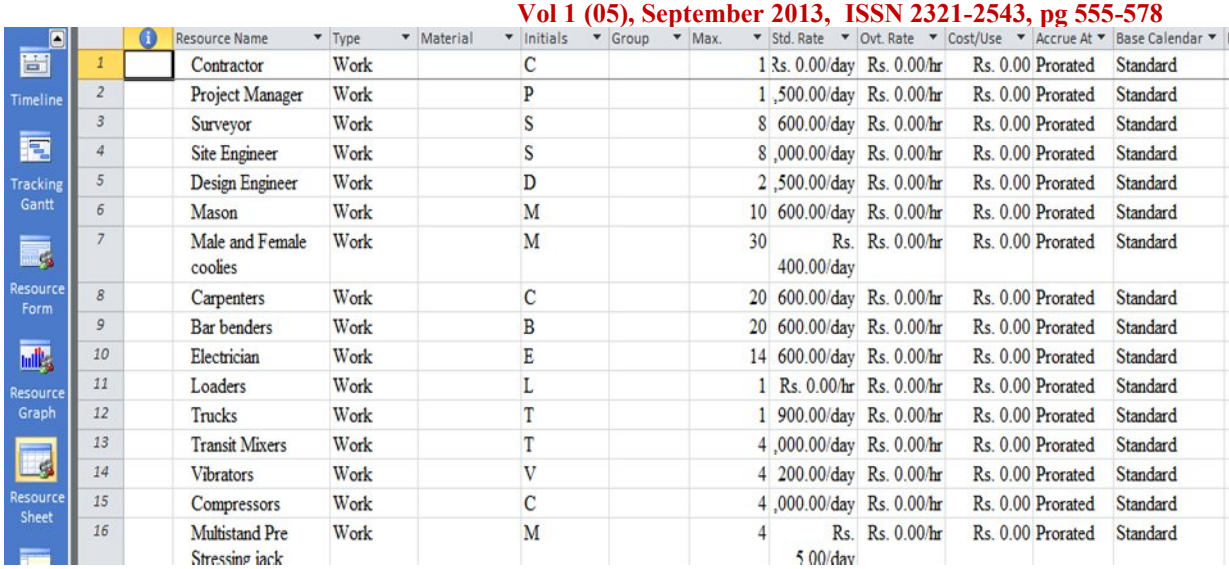
	Resource Name	Type	Material	Initials	Group	Max.	Std. Rate
1	Contractor	Work		C		1	Rs. 0.00/day
2	Project Manager	Work		P		1	,500.00/day
3	Surveyor	Work		S		8	600.00/day
4	Site Engineer	Work		S		8	,000.00/day
5	Design Engineer	Work		D		2	,500.00/day
6	Mason	Work		M		10	600.00/day
7	Male and Female coolies	Work		M		30	Rs. 400.00/day
8	Carpenters	Work		C		20	600.00/day
9	Bar benders	Work		B		20	600.00/day
10	Electrician	Work		E		14	600.00/day
11	Loaders	Work		L		1	Rs. 0.00/hr
12	Trucks	Work		T		1	900.00/day
13	Transit Mixers	Work		T		4	,000.00/day
14	Vibrators	Work		V		4	200.00/day
15	Compressors	Work		C		4	,000.00/day
16	Multistand Pre Stressing jack	Work		M		4	Rs. 5.00/day

Fig 8 Resource Sheet

7.6 Resource Analysis

Once resources are assigned for each task in a project, it is necessary to check whether there is any over allocated resources. The over allocation is indicated in an indicator field in Gantt table, it is also indicated in resource sheet, resource graph, resource usage, task sheet, task usage and team planner.

During construction the resources should be utilized as per requirement.



	Resource Name	Type	Material	Initials	Group	Max.	Std. Rate	Ovt. Rate	Cost/Use	Accrue At	Base Calendar	Peak
1	Contractor	Work		C		1	Rs. 0.00/day	Rs. 0.00/hr	Rs. 0.00	Prorated	Standard	
2	Project Manager	Work		P		1	,500.00/day	Rs. 0.00/hr	Rs. 0.00	Prorated	Standard	
3	Surveyor	Work		S		8	600.00/day	Rs. 0.00/hr	Rs. 0.00	Prorated	Standard	
4	Site Engineer	Work		S		8	,000.00/day	Rs. 0.00/hr	Rs. 0.00	Prorated	Standard	
5	Design Engineer	Work		D		2	,500.00/day	Rs. 0.00/hr	Rs. 0.00	Prorated	Standard	
6	Mason	Work		M		10	600.00/day	Rs. 0.00/hr	Rs. 0.00	Prorated	Standard	
7	Male and Female coolies	Work		M		30	Rs. 400.00/day	Rs. 0.00/hr	Rs. 0.00	Prorated	Standard	
8	Carpenters	Work		C		20	600.00/day	Rs. 0.00/hr	Rs. 0.00	Prorated	Standard	
9	Bar benders	Work		B		20	600.00/day	Rs. 0.00/hr	Rs. 0.00	Prorated	Standard	
10	Electrician	Work		E		14	600.00/day	Rs. 0.00/hr	Rs. 0.00	Prorated	Standard	
11	Loaders	Work		L		1	Rs. 0.00/hr	Rs. 0.00/hr	Rs. 0.00	Prorated	Standard	
12	Trucks	Work		T		1	900.00/day	Rs. 0.00/hr	Rs. 0.00	Prorated	Standard	
13	Transit Mixers	Work		T		4	,000.00/day	Rs. 0.00/hr	Rs. 0.00	Prorated	Standard	
14	Vibrators	Work		V		4	200.00/day	Rs. 0.00/hr	Rs. 0.00	Prorated	Standard	
15	Compressors	Work		C		4	,000.00/day	Rs. 0.00/hr	Rs. 0.00	Prorated	Standard	
16	Multistand Pre Stressing jack	Work		M		4	Rs. 5.00/day	Rs. 0.00/hr	Rs. 0.00	Prorated	Standard	

Fig 8 Resources Leveling

7.7 Generating Reports

Reports deals with printing views and the use of reports for presenting the project information.

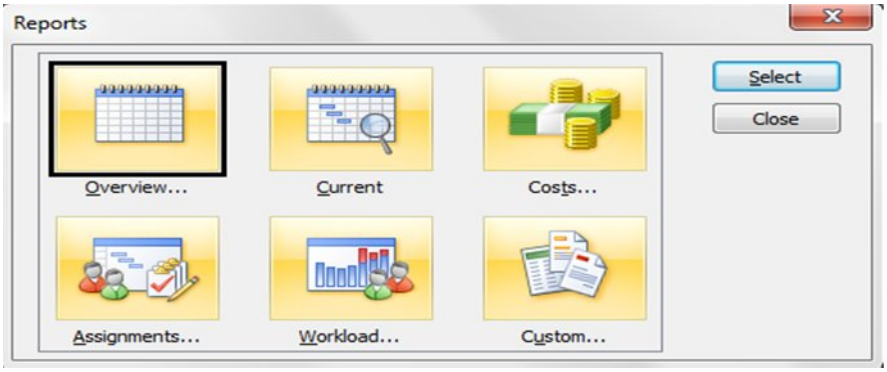


Fig 9 Reports

As per MS Project report the work will be implemented. It gives directive to carry out the work in sequence. Based on the report, the Execution authority can carry out the work and project can be completed within the stipulated time.

7.8 Discussion:

Using MS Project software for planning and scheduling, it gives the total cost of the project, duration and critical task in the entire project. The resources assigned to each activity and also balance the allocated

resources. It gives list of tasks showing actual and finish dates. It shows deficiency and excess of resources during the project.

8.CONCLUSION

After conducting various surveys and analyzing we came to know to conclusion that

- Heavy traffic movement will be there in future at chord road junction. So, grade separator is necessity.
- Land acquisition and approval from various departments further increases the complexity.
- Delay in land acquisition, procurement and utility shifting, redesigning of project for value addition in time and cost.
- Critical task is been identify through MS project for the entire project work. Accordingly critical task will be completed in time through additional resources.
- Resources will be assigned as per requirement of task. This will avoid excess budget and delay in project.
- Budget is to be approved in time. So to avoid delay in completion of project.
- The project involves multiple sub projects, several contracts works and multiple tasks. Any delay in one the sub project or task will severely impact the project.

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