



# Management of Construction of Railway Over Bridge at Pulgaon

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## Abstract:

Computer packages like Micro Soft Project (MSP) and planner are used in construction industry. MSP is used as a planning and management tool for Railway over bridge construction of Pulgaon. The comparative analysis is carried out in between the contractors manual planning and MSP for scheduling its various resources of construction management. These methods helps management in efficient and economic use of resources for completion of project objectives within the set project timeline, though it is observed that in real time the project scenario get change and timeline is not met as per schedule. It has been observed that the project delays occur due to insufficient supply of resources. In large scale projects, preparing an accurate and workable plan is very difficult. MSP can be used to resolve resource scheduling conflicts and also useful in minimizing the project duration within limited availability of resources to make the project profitable. The main aim of this study is to analyze the Project management techniques by scheduling various construction activities, allocation of resources and resource leveling using Microsoft Project 2013 for Railway over bridge construction at Pulgaon. This paper analyzes construction management activities using Microsoft Project 2013 by resource leveling and compares the time cost implications with scheduled time and estimated cost.

**Key words:** Micro Soft Project, Fly over, Railway Over Bridge, Pulgaon, Construction Management, Traffic Environment, management

## 1. INTRODUCTION

Vehicular traffic on roads has grown out of control over the years making travel disordered, tiring, time consuming and life risky. It is in the nature of occurrence that when two roads intersect, junctions appear and this is because both the intersecting roads are in the same horizontal plane. It is at these junctions where traffic from different directions (i.e Arvi, Pulgaon, Amravati) converge and cause traffic congestion and also accidents. The reason for this traffic congestion is overcrowding at junctions due to the increasing density of traffic from all directions. To avoid junctions and subsequent congestion, flyover or road over bridge were designed at Pulgaon Railway crossing to solve the problem of congestion and accidents. People of Pulgaon village are facing severe traffic problem at railway crossing road. The main reason for this problem is passage of more number of trains from here which results in closure of railway gate for longer periods of time. In order to solve this traffic problem, planning and constructing a flyover bridge over railway crossing may be a viable option at Pulgaon village. Therefore, a PWD proposed the Fly-over bridge over railway crossing to the State Government. The proposed ROB plays a major role in stream lining the traffic control system. The ROB crosses the rail passing through pulgaon –arvi road. This road is having a great importance as it connects to Arvi road side people who live in Pulgaon city. And it also connects with bypass to Amravati road state highway. The specific objective of the study is to

- To study the PWD Project Management Planning for Railway over Bridge & Road Construction at Arvi-Amravati-Pulgaon, Wardha District Maharashtra State.
- To Study the construction methodology used for the Railway over Bridge & Road work at Arvi-Amravati-Pulgaon, Wardha District of Maharashtra State .

- To study traffic at railway crossing at Arvi-Amravati-Pulgaon highway.
- To prepare an activity based planning for the Railway Over Bridge & Road Construction using Microsoft Planning Software to support PWD on effective construction Management.
- To Study the real time construction management and its analysis with respect to MSP Planning.
- To support PWD for construction management of the project using our prepared MSP planning. So as to complete the construction project effectively on the estimated schedule timeline.

## 2. METHODOLOGY

The proposed study work is mainly focused to find out the railway over bridge construction project management at Pulgaon. The following methodology is used for the study.

- Sampling of the PWD Project Plan and its related documents for study.
- First forecasting input and output is done in which the data wise requirement of project manpower, costly equipment, production costs, earned values of work done and expected outcome.
- Then planning the construction work force by determining the size of project work force, its structuring into functional groups and workers team and scheduling manpower recruitment to match task requirement.

- After this plan the construction materials which involves identifying the materials required, estimating quantities, defining specifications, forecasting requirements, locating sources material sample approved, material inventory.
- Then planning construction equipment which aims at identifying the construction tasks to be undertaken by mechanical equipment, assessing the equipment required, exploring the equipment procurement and finally selecting the equipment. Planning the construction standard cost, the cost plan uses standard cost work packages, work items or activities. Then finally plan construction budget which involves structuring of project functional organization into

production, services and administration responsibility center, allocating resources with budgeted cost and finally compiling the project financial plan in the form of project master budget

- The literature study was carried out regarding the practices of manual handling of construction material, vendor and supply chain of material, Efficient material planning, Buying or Purchasing, Procuring and receiving, Storage and inventory control, Supply and distribution of materials, Good supplier and customer relationship, Improved construction efficiency, Labour relationship, communication skill, sources of finance.



### 3. THE FOLLOWING ARE THE CONSTRUCTION DETAILS & ITS HIGHLIGHTS

- The Total Length of the constructed bridge is about 1309 Meters
- The total R.C.C construction is about 22000 cum.
- R.O.B. Consist Of 31 Spans (8+23) Of 21.6 Meter Length (As Per MOST Type Drawing No. SD/220, RCC T Beam And Slab Super Structure 21.00 M Span Without Footpath )
- RAMP ( Total Length = 465 M )
- Improvement Of Existing Road Arvi Side (Length =738 M)
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- Totally Construction Of New Road. MILL SIDE(Length=890 M)
- Minor Bridges 7.00 M Span & 24.00 M Wide In Km 0/600 Arvi Side= (1 Nos)
- Pier Protection & Re Wall Protection , Pier Side Kerb
- Construction Of Cement Concrete Drain & Footpath of 2236 M
- Improvement To Panchadhara Road Total Length Of Road Is 2.400 Km
- Construction of Slab Culvert 3 Meters Span 24 M total 20Nos



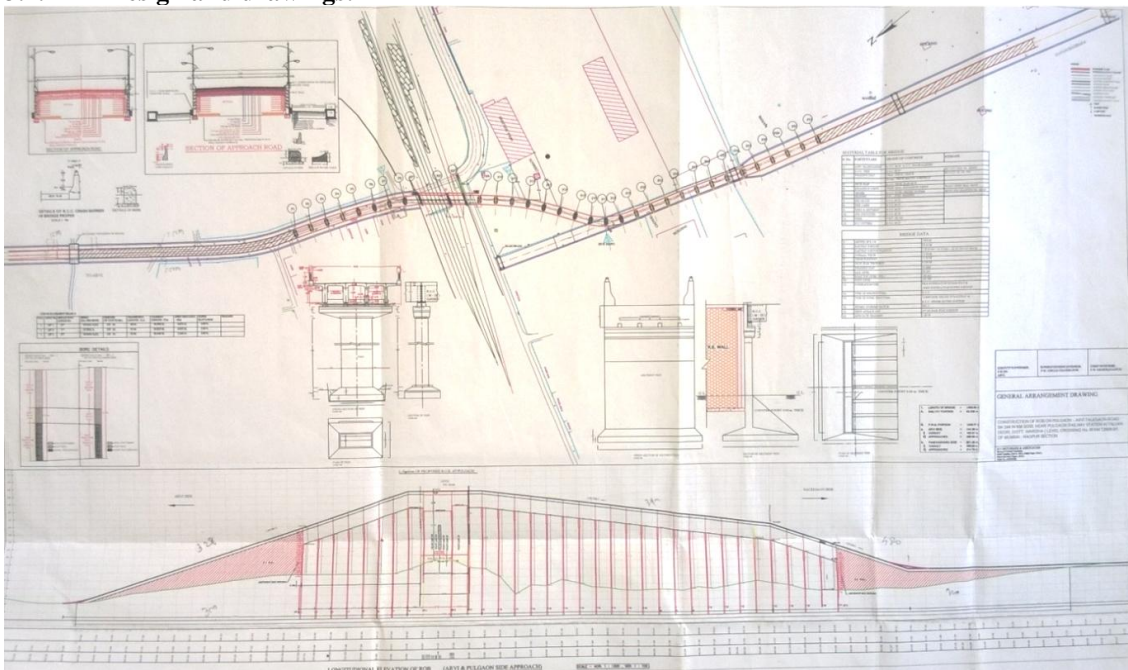
#### 4. MATERIAL TABLE FOR BRIDGE CONSTRUCTION

Sr.No.	PARTICULARS	GRADE OF CONCRETE	REMARK
1)	ANTI CRASH BARRIER	R.C.C. M-40 R.C.C. CRASH BARRIER	
2)	R.C.C. CURB	R.C.C. M-30	M.O.S.T. DRG. No. SD/205
3)	WEARING COAT	50mm. THICK DBM & 20mm. THICK MASTIC ASPHALT	M.O.S.T. CL. No. 500
4)	DECK SLAB	R.C.C. DECK SLAB M-35	
5)	EXPANSION JOINTS	STRIP SEAL EXPANSION JOINTS	WABO STRIP SEAL SE400
6)	GIRDER	R.C.C. FOUR GIRDER SYSTEM	MOST STD DRAWING No. SD/220
7)	BEARING	POT – PTFE BEARING	
8)	BED BLOCK	R.C.C. M-35	
9)	PIER CAPES	R.C.C. M-35	
10)	PIERS & ABUTMENT	R.C.C. M-35	
11)	SUB STRUCTURE	R.C.C. M-35	
12)	STEEL	T.M.T.FE -500	
13)	RCC GUTTERS	R.C.C. M-35	

#### BRIDGE DATA

1)	LENGTH OF R.O.B.	1309.00
2)	RAILWAY PORTION	63.23 M
3)	RAILWAY PORTION VIADUCT	1 X 20.00 + 1 X 37.508 + 1 X 24.320 = 81.828 M.
4)	OVERALL WIDTH	12.00 M.
5)	CLEAR ROADWAY	11.00 M.
6)	DECK SLAB THICKNESS	0.336 M.
7)	WEARING COAT	75 MM
8)	RAIL LEVEL	99.290
9)	ROAD TOP LEVEL (RTL)	108.465
10)	SOFIT LEVEL	105.790
11)	FOUNDATION TYPE	PILE FOUNDATION IN RAILWAY & OPEN FOUNDATION IN PWD PORTION
12)	TYPE OF SUBSTRUCTURE	R.C.C.
13)	TYPE OF SUPER STRUCTURE	COMPOSITE GIRDER IN RAILWAY & R.C.C. GIRDER IN PWD PORTION
14)	SEISMIC ZONE/IMP FACTOR	III/1.5
15)	SKEW ANGLE IF ANY	20 <sup>0</sup> AT RAILWAY PORTION
16)	APPROACH GRADIENT	1 IN 30

#### 3.2. Design and drawings:



### **3.3. Introduction to Microsoft Project Software Construction Management using Microsoft project (MSP)**

MSP is a methodology that comprises a set of principles and processes for use when managing is programmed. A programmed is made up of a specific set of projects identified by an organization that together will deliver some defined objective or set of objective for the organization. The objectives or goals of the programmed are typically at a strategic level so that the organization can achieve benefits and improvements in its business operation.

#### **3.3.1. Program Management and Project Management**

A program is made up of a specific set of related projects identified by an organization that together will deliver some defined objective or set of objectives for the organization. The objectives or goals of the program are typically at a strategic level so that the organization can achieve benefits and improvements in its business operation. There is a close link between program management and project management because the program is made up of projects and is only successful if the projects within it succeed. The concept of programmed is that it should deliver more than the 'sum of its parts'. In other words, without program management, the project would probably still be able to deliver their particular outcomes but these would not be co-ordinate or integrated into achievement of a strategic business goal.

#### **3.3.2. The Principles in MSP**

- Organize people to ensure responsibilities and lines of communication are clear.
- Plan the work in a way which achieves results
- Ensure that the organization benefits from undertaking the program
- Ensure that all interested parties (the stakeholders) are involved
- Resolve issues which arise
- Ensure quality
- Keep up to date information which tracks the continually changing environment
- Audit a programmed to ensure standards are being followed

#### **3.3.3. The Processes in MSP**

- Identify the aim of the programme and envisaged benefits to the organization
- Define the programmer and specify how the organization will be different afterward
- Establish the programmed
- Monitor and co-ordinate the projects within a program to a successful conclusion

- Manage the transition between the 'old' and 'new' ways of working, ensuring benefit
- Close the programmed and ensure the 'end goal' has been achieved.

#### **3.3.4. Scheduling**

Construction scheduling is a graphical representation, which shows the phasing, rate of construction activities with the starting and completion dates and the sequential relationship among the various activities or operations in a project so that work can be carried out in an orderly and effective manner.

##### **Advantages of Scheduling**

- By studying the schedule of any work and the many alternatives methods of execution, we can choose the best one
- It gives a clear idea regarding the required men, materials and equipment at different stages of work
- Since the starting time of each work is known, proper arrangement and the requirement can be done prior to the starting of the work.
- Resources utilization is optimized.
- Actual progress of the work is monitored with the actual plan. If there is any delay, proper remedial measures can be taken to avoid such delays
- Total duration of the complete project is known.

#### **3.3.5. Methods of Scheduling**

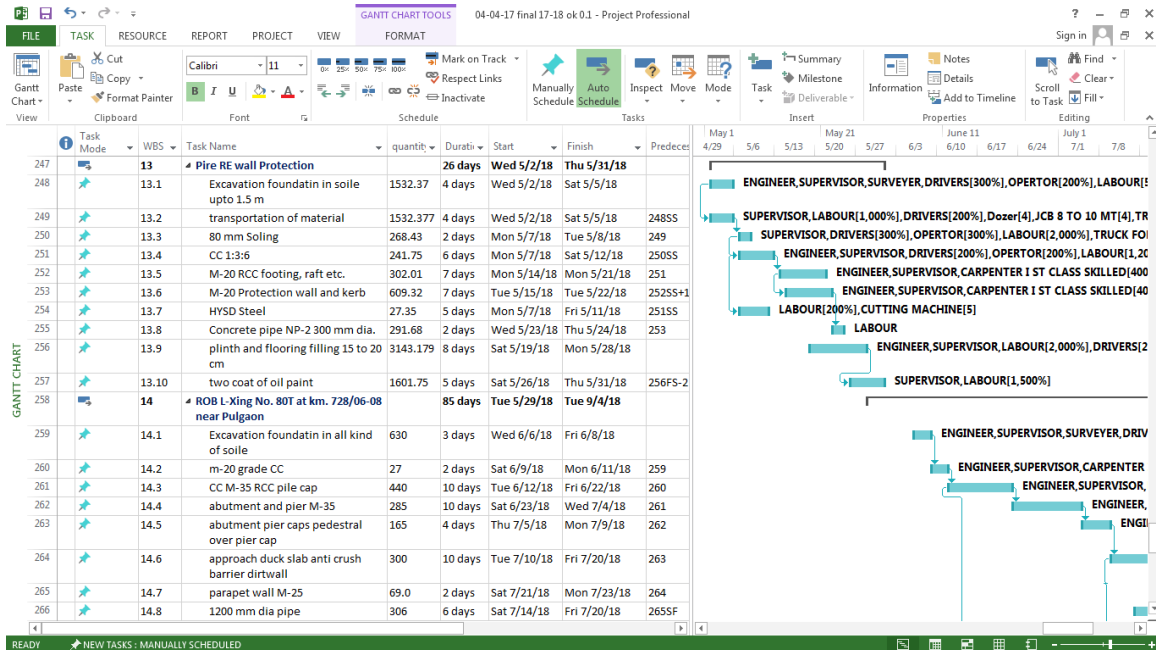
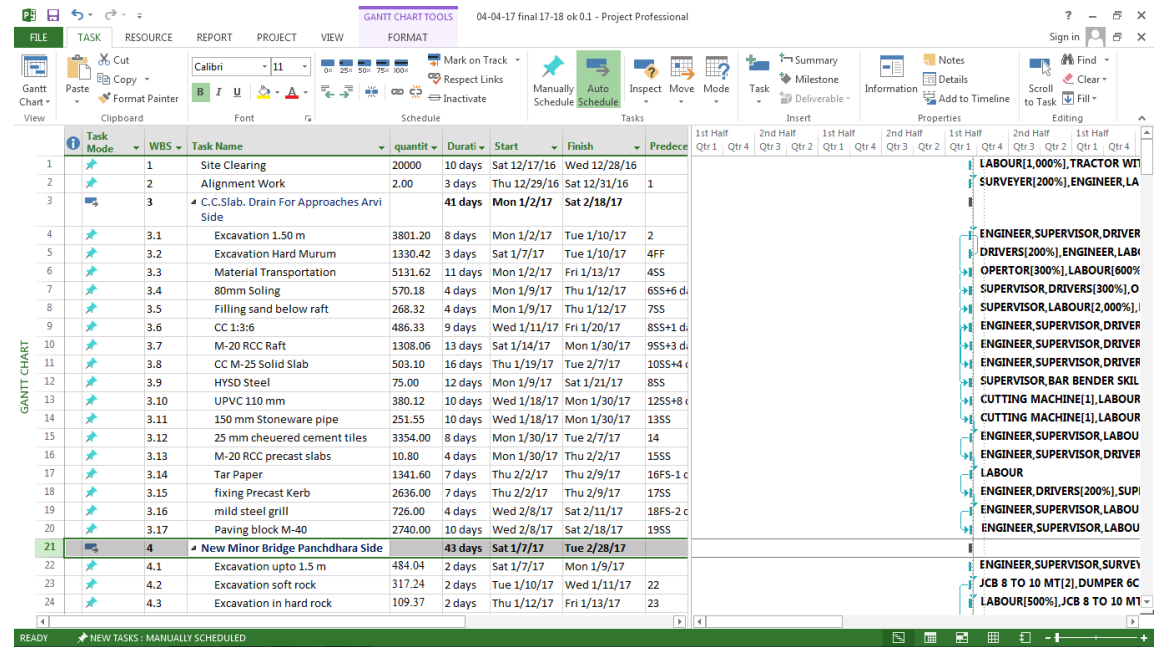
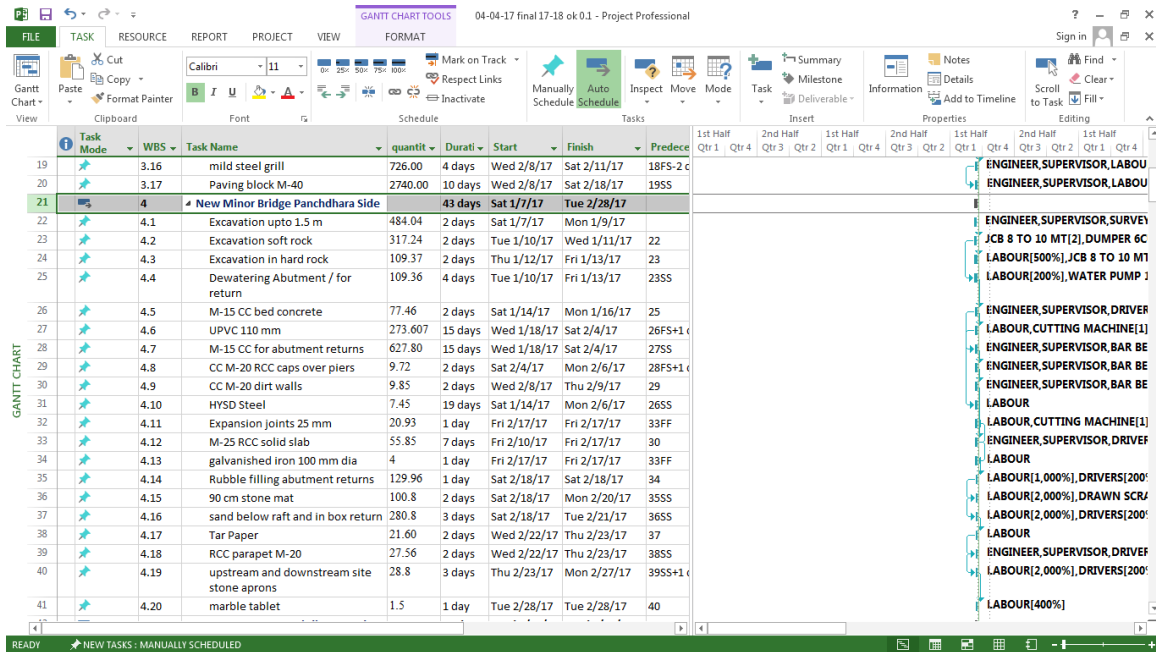
- Bar charts or Gantt charts
- Milestone charts
- Network analysis

#### **3.3.6. Steps Involving in MSP**

- Start project
- Plan the task
- Assign resources
- Project baseline set up
- Update progress
- Forecast information
- Step by step to S curve
- Visual report
- Close

### **3.4. Construction Management Project Planning of Railway Over Bridge at Pulgaon using MSP.**

In this section we have planned detail activities of construction management using MSP. This will be used as a supporting construction management plan for the contractor to follow the schedule activities of construction, overlapping process, material management as per requirement at site, resource management and project completion time line etc. Following are the planning for execution or reference during 'Railway Over bridge construction at Pulgaon.



#### 4. CONCLUSION

The PWD Railway over bridge construction management pulgaon reveals the following observations of which are as follows:

- As per the manual Planning of Contractor the project completion was estimated in 24-Months. But due to various factors the project was delayed by 12-Months in actual execution of work. And on 01-01-2016 the ROB construction was started and completed the drainage work, improvement of Panchadhara Road, and formation of Piers by 31<sup>st</sup> March-2017. On the current scenario the real time construction management is observed and its results are mention in chapter-5 from fig.5.1 to 5.24.
- Similarly the same project planning is done using the MSP software which shows that the same project can be completed in 20 Months & 04 days.
- This clearly signifies that if the Construction Management is carried out as per the MSP. The ROB project will be completing in 20 Months & 04 days. The total time can be saved upto 03 Months & 26 days. This is remarkable period in completion of the project timeline.
- If we compare the current status of ROB Construction Management and its work execution we can see the remarkable findings. Which justifies that MSP planning is efficient as compare to the manual planning of the contractor at ROB. Pulgaon. Following are the highlights of three months construction management & its execution.
- In three months real time assessment of construction Management of ROB:

##### **C.C Slab Drain at Arvi Side of ROB construction:**

- ✓ The total target length of drain construction is 2236m in 41days for the cost of INR.2029785 as per MSP Planning.
- ✓ Wherein case the total length covered in real time construction is only 880m in 25 days for cost of INR.1023759.
- **Road Construction at Panchdhara Side**
- ✓ The total target length of Road Construction at Panchdhara is 2.4 Km in 34 days for the cost of INR.756764 as per MSP Planning.
- ✓ Wherein case the total road length covered in real time construction of road is 2.4 Km in 58 days for cost of INR.1009644
- **Minor Bridge of Panchdhara Side**
- ✓ The total target quantity of Minor Bridge of Panchdhara side is 627.80 cum at in 23 days for the cost of INR.211399 as per MSP Planning.
- ✓ Wherein case the total areas covered in real time construction of Minor Bridge of Panchdhara side is 627.80 in 48 days for cost of INR.291583.
- **Minor Bridge Widening of Arvi Side**
- ✓ The total target quantity of Minor Bridge widening of Arvi side is 723.83 cum at in 28 days for the cost of INR.242838 as per MSP Planning.
- ✓ Wherein case the total area covered in real time construction of Minor Bridge of Arvi side is 723.83 cum in 43 days for cost of INR.232197.

With the above observations in real time construction management scenario. It can be concluded that in order to significantly increase chances of successful project management by the contractor. Contraction must follow our given MSP Planning for ROB It will help in effective management of construction task, cost, labour, time.

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