

Design, Planning, Scheduling and Resource Allocation for Slaughter House

Gomathi R, Rajeeva S.J, Sharada S A, G. Narayana

Abstract- This paper deals with the structural Design, Planning, Scheduling and Resource allocation of a proposed slaughter house in Chamrajanagar. It contains analysis, design of the slabs, columns, beams, footing, staircase, Planning, Scheduling and Resource allocation for the project phases of slaughterhouse. Keeping in view the requirement and utilities of the structure dead load and live load have been considered for the analysis and design of the structure. The planning details for the project will be given by experts by comparing previous projects. The dead load, live load and load combination is taken according to IS 875-1893(part 1), IS 875-1893(part 2) and IS 875-1893(part 5) respectively. The design of structural members like slab, beam, column, footing and staircase is carried out as per IS 456-2000. Design and analysis is carried out by a Design and Analysis software i.e STAAD PRO. The Planning, scheduling and Resource allocation for the slaughter house is done to complete the project economically on time by using the Microsoft project software. Scheduling helps to find out the critical path in the project which will help to start the work earlier or find out the alternate solution to avoid the critical path.

Index Terms: Design, Planning, Scheduling, Resource location.

I. INTRODUCTION

City Municipal Council, Chamrajanagar was set up for the development of City and civil social infrastructural services in the city of Chamrajanagar, Chamrajanagar District. Chamrajanagar City is one of the fastest growing cities in Karnataka. The Chamrajanagar city is divided into 31 wards covering 18.75 sqm km area. The Chamrajanagar City Municipal Council has population of 69,875 of which 34,783 are males while 35,092 are females as per report released by Census India 2016. Due to increasing number of local population and tourists, the state government and Chamrajanagar City Municipal Council have expressed grave concern for the environmental pollution and pressures on infrastructure in the city, mainly the sewage, sanitation and drainage components.

In view of the poor hygienic condition of the existing practice of manual slaughtering of Animals in open area in meat markets and individual meat shops (Both for Large Animal S and Small Animal) in open area the subsequent nuisance being caused to the environment, City Municipal Council Chamrajanagar has intended to establish the New Modern Slaughter House for Large Animals and Small Animals at the proposed site of Gaalipura, Kasba Hobli, measuring around 2.0 Acre of Land. The setting up of the plant shall ensure availability of wholesome hygienic meat to the people of Chamrajanagar City and surrounding areas. City Municipal Council Chamrajanagar has proposed to set up a Service Oriented Modern Slaughter House equipped with standard facilities to slaughter large animal 60 heads per day and Small Animal 450 heads per day as per Halal Method followed by the required utilities and ETP facilities along with Blood Rendering Plant.

II. LITERATURE REVIEW

1. Aman, Manjunath Nalwadgi, Vishal T, Gajendra "ANALYSIS AND DESIGN OF MULTISTORAGE BUILDING USING STAAD PRO"

In this paper the author is explaining the need to design the structures which can with stand the complex design and different loading conditions. Earlier days they use to consider the static load on a structure and design it but structure will have different load coming on it which leads to unsafe structure. By using software's and finite element method the design analysis for a project is made easier. The author had selected the STAAD pro software to complete a project Bharat Pride.

2. P M Wale, N D. Jain, N R Godhani, S R Beniwal, A A Mir "PLANNING AND SCHEDULING OF PROJECT USING MICROSOFT PROJECT (CASE STUDY OF A BUILDING IN INDIA)"

This paper mainly focus on management of construction projects. In olden days some traditional methods were used in construction projects which will lead to uneconomical, time consuming, and heavy confusion. Present days project planning engineers of a construction projects use project management software's (MSP) which helps to provide accurate planning and scheduling with reasonable profit effective planning, scheduling and execution of work which will help to complete the project on time. Project deals with identifying problems, data collection, analysis and final conclusion.

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3. Rhuta Joshi, Prof. V. Z. Patil “RESOURCE SCHEDULING OF CONSTRUCTION PROJECT: CASE STUDY”

In this paper the importance of using management technique's such as critical path method , program evaluation and review techniques as been implemented .To manage several construction activities within limited funds and time project management software in beneficial for effective scheduling and resource allocation. The paper focus on improper supply of resources which will end up with more than specified amount of time. This paper focus on resource allocation, scheduling using Microsoft project software.

III. METHODOLOGY

The methodology adopted for this project was to study the master plan, collect the data required for designing and doing the structural analysis using the STAAD Pro software on the other hand we had started with defining the activities, duration, linking the activities to find the critical path which can be found out during the progress of the project which will help to assign the resources which is available in company using the MS project software to achieve the goal. The steps involved in designing and analysis are as follows

- Model generation
- Support specification
- Specifying member properties
- Specifying loads
- Analysis
- Concrete design
- STAAD editor review
- 3D model
- Drawings of master plan and all layouts involved in the project.

The steps involved in management software as follows

- Planning
- Scheduling
- Resource allocation

IV. DESIGN AND ANALYSIS USING STAAD-PRO

In this project to attain accuracy to level best we have used STAAD PRO software for analysis and design of slaughter house because the manual methods are tedious and laborious.

Steps to analyze the space frames using STAAD PRO is as follows;

- Model Generation
- Support Specification
- Specifying Member Properties
- Specifying Loads
- Analysis
- Concrete Design
- Staad Editor Review
- 3d Model

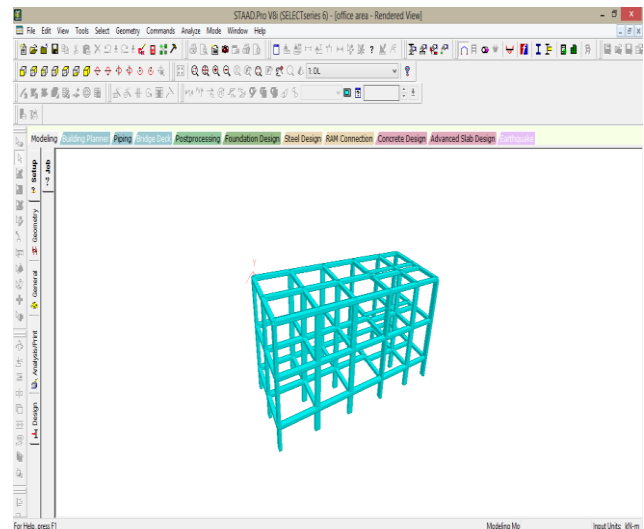


Fig1: Rendered view of office area

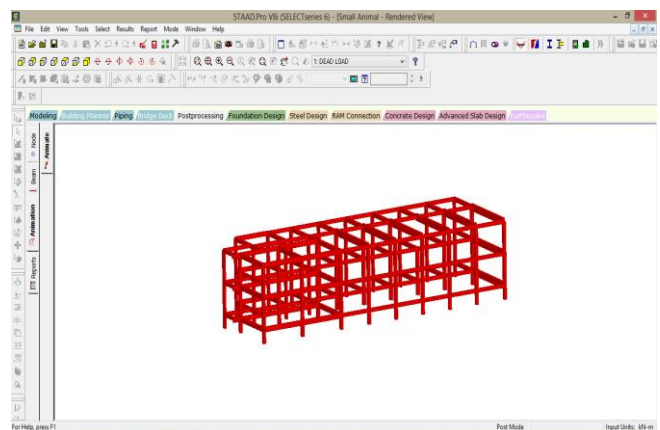


Fig 2: Rendered view of small animal slaughter house

V. PLANNING FOR SLAUGHTER HOUSE

Planning is a process to arrange the activities in sequence to complete the project within the budget and fixed time. Planning plays the huge role in construction projects which help to reduce the cost of project by using maximum available resources, project progress can be identified easily which in turn builds the competitive strength, cash flow statement's can be easily obtained, also encourages the creativity and innovation among the construction planning engineers.

A. Creating A Calendar

Before beginning the Planning in MS project it is important to create a calendar that represents the default working days for slaughter project tasks. MS project is set to 8-hours per day, 6 day per week.

- Select the tools menu
- Click on the change working time
- Select the number of working days and working hours required for the project
- Set it as a default for the whole project.

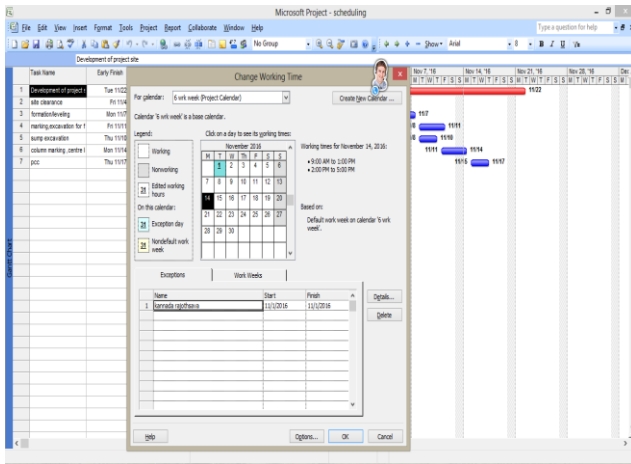


Fig 3: Project calendar

B. Activities

Activity can be defined as the individual tasks required to complete the project within the estimated time. Activity will include the start date and finish date of the individual task,

it is also linked with the other tasks to get the critical path if involved in the project.

The sequencing and duration for the activity will be taken by referring the previous projects which had been successfully completed. Activities plays an important role in construction planning to deliver the project on time.

- Click on the task name and define the activities or tasks.
- The indent and outdent of the activities should be done.
- Sequence the activities in the required order
- Scheduling can be done

VI. SCHEDULING FOR SLAUGHTER HOUSE

Scheduling is a process of fitting of the work plan to the time scale. It is also used for sequencing the activities, assigning duration for the individual task. Work break down structure (WBS) will be formed after sequencing the activities. Gantt charts and network diagram will be formed based on the inputs entered in the software.

A. Scheduling of Activities

- Click on the task name and enter the activities or tasks.
- The indent and outdent of the activities should be done.
- In the duration column we have to specify the number of working days required to finish the task.
- Ms Project automatically show start and finish dates for that particular task.

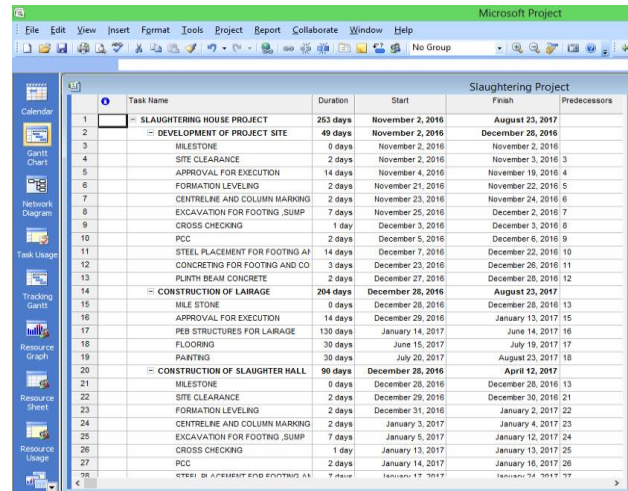


Fig4: Scheduling of activities

VII. RESOURCE ALLOCATION FOR SLAUGHTER HOUSE

Resource allocation is a process which is used to distribute the resources available in a company in which is required to carry the task and complete the project without any delay. The resource allocation can be done by two processes

- Labor resource: This type of resource will include manpower that is labors, site engineers, project managers, supervisors etc.
- Non Labor resource: This type of resource will include materials, equipment's (machines used for construction) and the money.

A. Resource Defining

- Adding the resource in the resource sheet is called resource defining.
- Click the resource sheet and add the resources available in a company.
- Enter the number of units available in a company.
- Material type and cost for the projects should be defined per unit

Resource Name	Type	Material Label	Initials	Group	Max Units	Std Rate	Cost Rate	Cost Type	Account At	Base Calendar
1 ACCOUNTANT	Work		A		40	Rs300.00/day	Rs3.00/hr	Rs3.00	Projected	Slaughtering Days
2 masons	Work		m		40	Rs400.00/day	Rs4.00/hr	Rs4.00	Projected	Slaughtering Days
3 CARPENTERS	Work		C		10	Rs400.00/day	Rs4.00/hr	Rs4.00	Projected	Slaughtering Days
4 SKILLED LABOUR	Work		S		70	Rs400.00/day	Rs4.00/hr	Rs4.00	Projected	Slaughtering Days
5 SEMI SKILLED LABOUR	Work		S		20	Rs300.00/day	Rs3.00/hr	Rs3.00	Projected	Slaughtering Days
6 UNSKILLED LABOUR	Work		U		45	Rs300.00/day	Rs3.00/hr	Rs3.00	Projected	Slaughtering Days
7 PROJECT MANAGER	Work		P		7	Rs1,250.00/day	Rs12.50/hr	Rs12.50	Projected	Slaughtering Days
8 Project engineer	Work		P		9	Rs800.00/day	Rs8.00/hr	Rs8.00	Projected	Slaughtering Days
9 SUPERVISOR	Work		S		25	Rs700.00/day	Rs7.00/hr	Rs7.00	Projected	Slaughtering Days
10 HELPERS	Work		H		100	Rs200.00/day	Rs2.00/hr	Rs2.00	Projected	Slaughtering Days
11 TYPERS	Work		T		10	Rs7,000.00/day	Rs70.00/hr	Rs70.00	Projected	Slaughtering Days
12 JCB	Work		J		11	Rs7,000.00/day	Rs70.00/hr	Rs70.00	Projected	Slaughtering Days
13 CRANE	Work		C		2	Rs5,000.00/day	Rs50.00/hr	Rs50.00	Projected	Slaughtering Days
14 CEMENT	Material	BAGS	C			Rs280.00		Rs280.00	Projected	Slaughtering Days
15 STEEL	Material	TONNES	S			Rs45,000.00		Rs45,000.00	Projected	Slaughtering Days
16 COARSE AGGREGAT	Material	LOAD	C			Rs8,000.00		Rs8,000.00	Projected	Slaughtering Days
17 M SAND	Material	LOAD	M			Rs16,000.00		Rs16,000.00	Projected	Slaughtering Days
18 BAR BENDERS	Work		B		60	Rs400.00/day	Rs4.00/hr	Rs4.00	Projected	Slaughtering Days
19 SECURITY GUARDS	Work		S		6	Rs200.00/day	Rs2.00/hr	Rs2.00	Projected	Slaughtering Days
20 ELECTRICIAN CUR OF WORK	Work		E		6	Rs600.00/day	Rs6.00/hr	Rs6.00	Projected	Slaughtering Days
21 PLUMBERS	Work		P		20	Rs500.00/day	Rs5.00/hr	Rs5.00	Projected	Slaughtering Days
22 SITE ENGINEER	Work		S		30	Rs800.00/day	Rs8.00/hr	Rs8.00	Projected	Slaughtering Days
23 GRAVITE	Material	SCM	G			Rs80.00		Rs80.00	Projected	Slaughtering Days
24 PAINT	Material	LTR	P			Rs80.00		Rs80.00	Projected	Slaughtering Days

Fig5: Resource sheet

B. Assigning Resource To Activity

- Click on the activity then select the resource column.
- Right click and select the task information.
- Add the required resources from resource sheet to complete the task or activity.
- Select the number of units required to complete task or activity.
- For the given units and the standard rates the cost will be calculated

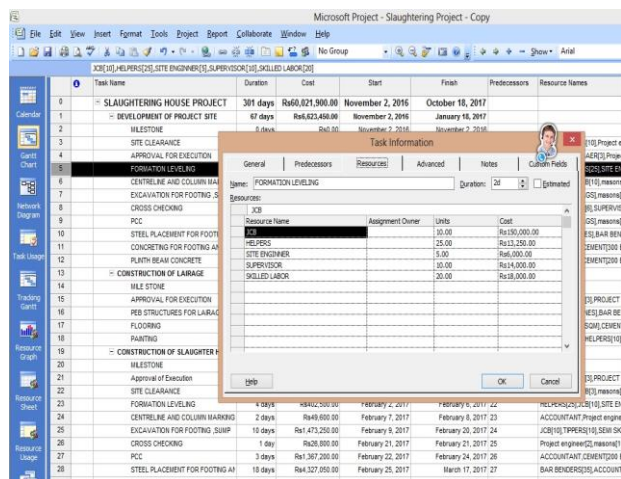


Fig6: Assigning of resource

VIII. RESULTS AND DISCUSSION

A. Gantt Chart

Gantt chart is used for the graphical representation of the individual task with respect to the duration i.e. start and finish dates will be shown.

The critical path can be easily identified by viewing gantt chart which will be in red colour on the left hand side in the MS project software. Gantt chart will also help to learn the relationships formed between the activities linked in the project.

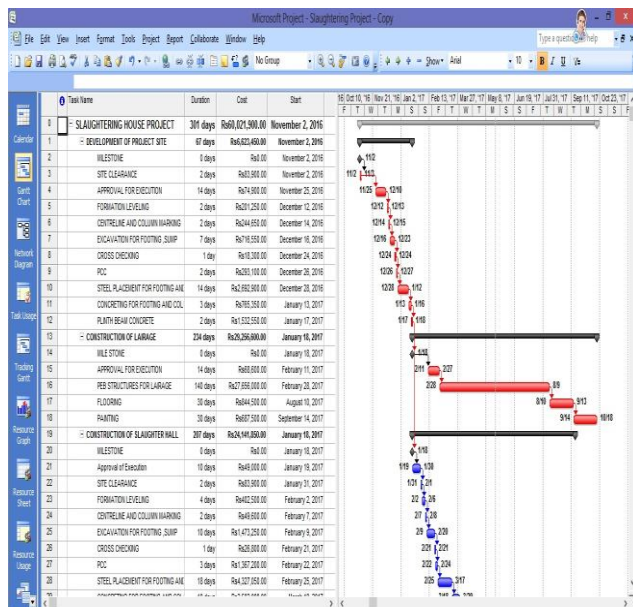


Fig7: Gantt chart

B. Network Diagram

Network diagram is represented by the flowchart which will inter connect the activities in the project. In network diagram we can also find out the critical activities which is represented in red color and non-critical activities in the blue color boxes. Network boxes will also include the start and finish dates of the activity or task.

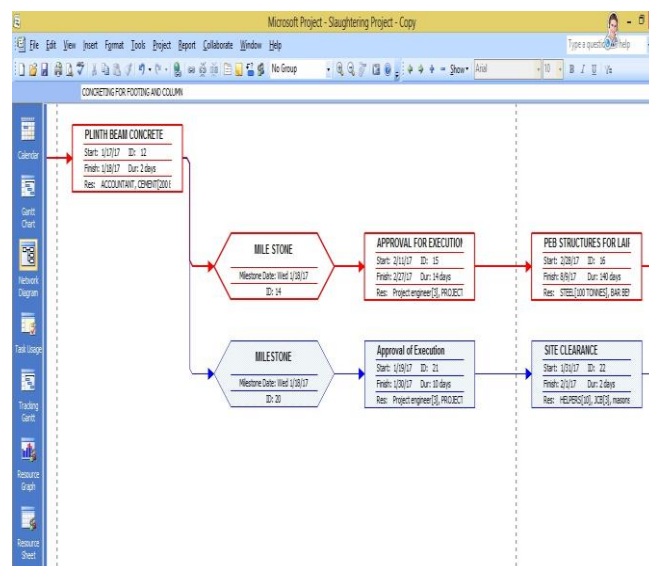


Fig8: Network diagram

C. Resource Graph

It is the graphical representation of the resources allocated to the individual task or activity by providing maximum units available in the resource sheet for the completion of the project. Resource allocation graph will be of two type

- Resource over allocated
- Resource leveling

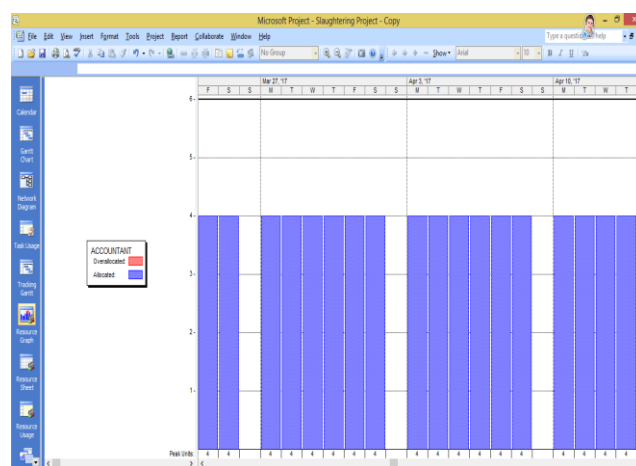


Fig9: Resource leveled graph

IX. CONCLUSION AND FURTHER SCOPE

CONCLUSION

- Planning the project by sequencing the activity and scheduling the activities will help to complete the project in time.
- Resource allocation helped to distribute the resources available in the company for the completion of the project on time which in turn will become economical.
- Documentation of project will be helpful for the further references.
- Cash flow statements, work progress of the project is easy and beneficial.

FURTHER SCOPE

- Tracking of the project can be done in MS project.
- Construction, planning, scheduling, resource allocation and tracking of Effluent treatment plant and Blood rendering plant can be done.

REFERENCES

1. P M Wale, N D. Jain, N R Godhani, S R Beniwal, A A Mir "PLANNING AND SCHEDULING OF PROJECT USING MICROSOFT PROJECT (CASE STUDY OF A BUILDING IN INDIA)" ISRO-JMCE volume 12 Issue May-June 2015.
2. Rhuta Joshi, Prof. V. Z. Patil "RESOURCE SCHEDULING OF CONSTRUCTION PROJECT: CASE STUDY" IJSR volume 5 Issue 5 May 2015.
3. Sneha M. Raut, Sumit B. Bhosale, Chetan D. Patil, Aniket R. Pawar, Ganesh D. Dhone "PLANNING AND SCHEDULING USING MSP" International Engineering Research Journal (IERJ) Volume 2 Issue 3 Page 1359-1362, 2016.
4. Aman, Manjunath Nalwadgi, Vishal T, Gajendra "ANALYSIS AND DESIGN OF MULTISTORAGE BUILDING USING STADD PRO" International Research Journal of Engineering and Technology (IRJET) Volume: 03 Issue: 06 June-2016.
5. Anoop .A, Fousiya Hussian, Neeraja.R, Rahul Chandran, Shabina.S, Varsha.S Anajali A "Planning Analysis And Design Of Multi Storied Building Using Staad Pro" International Journal of Scientific & Engineering Research, Volume 7, Issue 4, April-2016.
6. IS 456:2000, "Reinforced and Plain Concrete" Code of Practice, ISI New Delhi 2000.
7. IS 875 part 1, "Code of Practice for Design Loads (Other than Earthquake) for Building and Structures, Dead Loads" BIS New Delhi 1987.
8. IS 875 part 2, "Code of Practice for Design Loads (Other than Earthquake) for Building and Structures, Imposed Loads" BIS New Delhi 1987.
9. IS 875 part 5, "Code of Practice for Design Loads (Other than Earthquake) for Building and Structures, Special Load and Load Combination" BIS New Delhi 1987.

BIBLIOGRAPHY



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