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BAHRIA UNIVERSITY LAHORE

(A Project of Pakistan Navy)

PROJECT REPORT

For

"IMPLEMENTATION OF PMO IN NESPAK CONSTRUCTION MANAGEMENT DIVISION & EVM FOR DESIGNING OF HEATING VENTILATION & AIR CONDITIONING SYSTEM AT MOHMAND DAM HYDRO POWER PROJECT, MOHMAND AGENCY"

Submitted By: Awais Ghaffar 03-298162-004

Department of Management Sciences
Bahria University
(Lahore Campus)

CERTIFICATE

It is to certify that the report tilted as "**Implementation of PMO in NESPAK Construction Management Division & EVM for Designing of Heating Ventilation & Air Conditioning System at Mohmand Dam Hydro Power Project, Mohmand Agency**" is an original work of **Mr. Awais Ghaffar** and is submitted in partial fulfillment of the requirements for **MSPM632-Dynamics of PMO and EPM Server** course completion in **MS (Project Management) Semester II** at **BAHRIA UNIVERSITY LAHORE CAMPUS**. This is the record of the candidates own work. The matter embodied in this report is original and has not been submitted for the award of any other degree.

Mr. Ahsan Maqbool
(Course Instructor)

Mr. Farid Zafar

(Cluster Head, MSPM)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LIMITED
NESPAK HOUSE: 1-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE 54700 PAKISTAN
CONSTRUCTION MANAGEMENT DIVISION

Established in 1973

Ref: **June 15, 2017**

CERTIFICATE

This witness statement is issued to the applicant for the fulfilment of his/her MS (Project Management) program requirements being carried out at Bahria University Lahore Campus (BULC).

It is witnessed that **Mr. Awais Ghaffar** Enrollment: **03-298162-004** Class: **MSPM-II** Semester: **SPRING 2017** has contacted / visited / frequently utilized our premises /participated in our real-time projects for implementing project management skills using EPM as a leading software tool.

He, in case of participation in organization's project, has contributed fully / partially in the following project(s) and within the highlighted fields (planning, scheduling, earned value analysis, performance monitoring, claim debugging):

1. Up- gradation & Refurbishment of Units Mangla Power Station, Mangla

2. Designing and Construction Supervision of Elevator at NESPAK house Lahore

3. Designing of HVAC system at Institute of Urology, Rawalpindi

He, in case of visiting/ frequently utilized premises, has been found skillful in applying EPM in the following highlighted fields (planning, scheduling, earned value analysis, performance monitoring, report generation).

Additionally, It is noteworthy to mention that Mr. Awais Ghaffar demonstrated good ethical practices, enthusiastic approach to work, task convergence capabilities, professionalism while his stay / connection with this organization.

Name: Mr.Haris Farooqi
Designation: Project Manager
Company Name:NESPAK

Telephone: +92-42-9909000 Fax: +92-42-99231936
Email: cmdivision@nespak.pk, cmdividion@yahoo.com
P.O Box: 1351 Lahore
Website: www.nespak.com.pk

TÜV AUSTRIA

Department of Management Sciences
Bahria University
(Lahore Campus)

DECLARATION

I (**Mr. Awais Ghaffar– 03-298162-004**) Certify that this work contains no material which has been accepted for the award of any other degree or diploma in my name, in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person. In addition, I certify that no part of this work will, in future, be used in a submission in my name, for any other degree or diploma in any university or other territory institution without the prior approval of the Bahria University, Lahore campus and where applicable, any partner or institution responsible for the joint-award of this degree.

I give consent to this copy of my report, when deposited in the Bahria University, Library, being made available for loan and photocopying, subject to the provision of the Copyright Act.

I (**Mr. Awais Ghaffar– 03-298162-004**) also hereby declare that I produced the work presented in this study, during, the scheduled period of study. I also declare that I have not taken any material from any source except referred to whatever due that amount of plagiarism is within acceptable range.

Signature of Student

Mr. Awais Ghaffar
03-298162-004
MSP-632

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1 PREFACE

Bahria University Lahore Campus has a department of Management sciences under which a master level degree program namely "MS Project Management" is going on. This report is a product of knowledge and skill developed within ourselves by our Instructor Mr Ahsan Maqbool. The main focus of the report is implementation of Project Management Office in the Construction Management Division in NESPAK, Lahore for the better Delivery of the future projects of the National & International Clients and EVM implementation for the Ongoing Project of Designing of Heating Ventilation & Air conditioning System at Mohmand Dam Hydro Power Project, Mohmand Agency.

2 INTRODUCTION

2.1 COMPANY INTRODUCTION

National Engineering Services Pakistan (NESPAK) Governed by a number of Govt. Officials forming Board of Director. Chairman of BOD is Secretary of Ministry WATER & POWER. Managing Director is responsible to regularize and Control company affairs with the assistance of Vice presidents and Divisional Heads. Each Division is a Project Management division.

National Engineering Services Pakistan (NESPAK) is Pakistan's 1st Engineering Consultant Organization. Also stands among the top 100 highly qualified engineering consultancy organizations since its establishment in 1973.

Currently NESPAK have total strength of over 5000 employees. The Total estimated turnover for the year 2015-2016 is Rs. 7.4 Billion with the total combined cost of the projects done by NESPAK is US $ 243 Billion.

NESPAK carried out projects at many other parts of the world. A total of 522 projects costing US$ 46 billion have been undertaken by NESPAK in almost 37 different countries. NESPAK Foreign Offices are in Saudi Arabia, Oman, Iran, Afghanistan, Qatar, UK & UAE.

2.2 MISSION OF ORGANIZATION

"We at NESPAK are committed to provide quality Design and Engineering Consultancy services with professionalism and dedication to the complete satisfaction of our clients. The quality of our services is sustained through enhancement of technical know-how and proficiency of our staff. We allocate adequate resources for project implementation and seek improvement through a continuous system of Monitoring and Evaluation"

2.3 VISION STATEMENT

"The objective of creation to create a pool of talented engineers, attain self-reliance in engineering consultancy and replace foreign consultants."

2.4 STRATEGIC OBJECTIVES

Following are the strategies of the Organization

- Corporate Objective
- Strategy to Achieve

2.4.1 Corporate Objective and How to Achieve Strategic Objectives

2.4.1.1 Augmentation of Business

Following are the augmentation of business in NESPAK

- Overseas business to be increased through horizontal and vertical expansion by participating in business related to all fields of NESPAK expertise/services including strengthening of overseas offices through opening new design offices.
- NESPAK to start consultancy services in Alternative Energy Resources, being a field of future business potential, through hiring specialists in this field.
- Secure outstanding receivables amounts through concerted and expedient efforts by the top management and concerned divisions.

2.4.1.2 Core Experts in all Divisions

Hiring to provide replacements of core experts who left NESPAK, is inevitable to maintain the technical expertise along with review of salary package of such experts specially:

- Planning/ Scheduling Engineers

- Chartered quantity surveyors
- HSE specialists

2.4.1.3 Retention of Employees

- By granting interest free loans for house building and cars
- By commencing new housing Society for Employees
- By awarding laptops to competent employees
- By increasing salary packages
- By creating a positive working environment

2.4.1.4 Job Descriptions

A strategy should be implemented to define the Job Description after exploring the potential of an employee in a specific domain.

2.5 CONSTRUCTION MANAGEMENT DIVISION

Construction Management (CM) Division in the NESPAK was established in 1976 to date, it handled more than Tow Fifty Projects in the diversified sectors of Engineering, which includes the DAM construction, educational sector, high rise buildings, Irrigation, Flood protection, hospitals, bridges and housing/ infrastructure development.

Construction Management Division specializes in providing consultancy services during pre-construction, construction and post-construction stages of projects. The division has also achieved valuable experience and reputation in the field of valuation studies including asset valuation and composite schedule of rates.

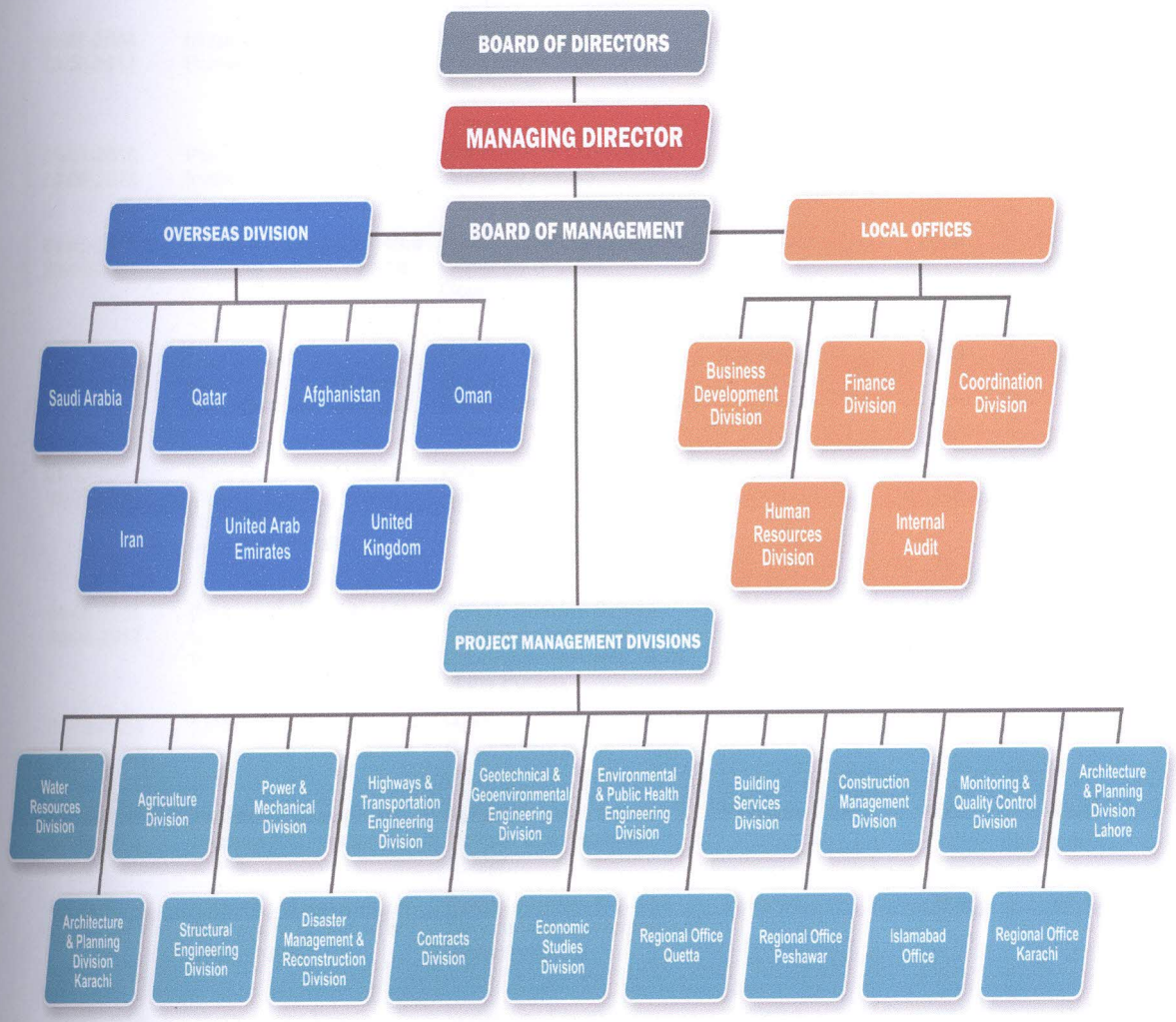
2.6 SERVICES

Following services are provided by construction management division.

- Feasibility Study
- Software Requirement Specification
- Project Planning
- Functional Specifications Document
- Map Digitization
- Detailed Design
- Software Development
- Global Positioning System Survey
- Construction Supervision
- Design Review
- Documentation && Training
- Map Analysis

- System Study Design
- Supervision
  - Resident Supervision
  - Top Supervision
- Inspection
  - Pre-Shipment Inspection
  - Port Inspection
  - Site Inspection
- Tender Documents

2.7 ORGANIZATION CHART



2.8 LIST OF ONGOING PROJECTS

a) Feasibility Study
b) Project Planning
c) Detailed Design
d) Tender Documents
e) Construction Supervision
f) Design Review
g) Software Requirement Specification
h) Functional Specifications Document
i) System Study Design
j) Software Development
k) Testing, Debugging && Implementation
l) Documentation && Training
m) Satellite Imagery
n) Map Digitization
o) Digital Terra in Model
p) Global Positioning System Survey
q) GIS Database && Model Development
r) Map Analyses

Sr. No.	Start Date/ Comp.Date	Name of the Project	Client	Location	Project Cost (m.Rs.)	Fee (m.Rs.)
1	01-07-2009 30-09-2019	Rehabilitation of Irrigation Systems in Punjab	Irrigation & Power Department, Government of the Punjab	Pakistan	28000	1600.000
2	01-06-2004 15-08-2017	Mega Irrigation Project, Punjab	Irrigation & Power Department, Government of the Punjab	Pakistan	52000	681.144
3	25-07-2016 30-06-2018	Pakistan Kidney & Liver Institute and Research Center (Package-C)	Infrastructure Development Authority Punjab	Pakistan	3000	150.000
4	01-05-2011 30-06-2017	Ashiana Housing Scheme at Attari Saroba, Lahore	Punjab Land Development Company (PLDC), Government of the Punjab	Pakistan	2600	140.000
5	01-01-2011 30-06-2017	Daanish Schools at Jand District Attock, Mianwali, D.G. Khan and Rajanpur	Punjab Daanish School System & Centers of Excellence Authority, Govt of the Punjab	Pakistan	2070	92.518
6	01-03-2011 31-05-2017	Third Party Validation of Various Building Works Under City District Government Lahore	City District Government, Lahore	Pakistan	N.A	80.760
7	01-05-2011 30-06-2017	Centres of Excellence in Various Districts of the Punjab	Punjab Daanish School System & Centers of Excellence Authority, Govt of the Punjab	Pakistan	1144	71.937
8	01-03-2008 30-10-2017	Fatima Jinnah Institute of Dental Sciences, Lahore	Health Department, Government of the Punjab	Pakistan	2600	62.790
9	01-12-2015 30-06-2017	Pakistan Kidney & Liver Institute and Research Center, Lahore	Pakistan Kidney & Liver Institute and Research Center	Pakistan	3000	42.600
10	01-09-2016 31-05-2017	Updating of Balochistan Composite Schedule of Rates 1998	Communication & Works Department, Government of Balochistan	Pakistan	N.A	33.161
11	01-02-2016 31-08-2019	Hydropower Training Institute at Mangla	Water and Power Development Authority	Pakistan	200	31.720
12	01-12-2016 30-06-2018	Innovation Centre and Innovation Park	University of Engineering & Technology, Lahore	Pakistan	1219	31.632

Designing of Ventilation & Air conditioning System at Mohmand Dam Hydro Power Project,

Sr. No.	Start Date/ Comp.Date	Name of the Project	Client	Location	Project Cost (m.Rs.)	Fee (m.Rs.)
13	01-11-2012 30-06-2017	Institute of Urology and Transplantation at Rawalpindi	Communication & Works Department, Government of the Punjab	Pakistan	3334	27.000
14	01-01-2015 30-06-2017	1000 Students Hostel and Punjab Bio-energy Institute at University of Agriculture, Faisalabad	University of Agriculture, Faisalabad	Pakistan	750	23.471
15	01-07-2016 30-04-2018	Construction of Hospital Complex of Pakistan Kidney and Liver Institute and Research Centre, Lahore	Infrastructure Development Authority Punjab	Pakistan	8000	23.050
16	01-01-2016 31-01-2018	Establishment of Sub-Campus of University of Agricultrure, Faisalabad at Depalpur, Okara	University of Agriculture, Faisalabad	Pakistan	334	16.950
17	15-10-2003 31-12-2017	Valuation of 20 Nos. Properties Throughout Punjab	Punjab Privatization Board	Pakistan	N.A	15.000
18	10-03-2014 30-06-2017	Physical Protection Exterior Laboratories at Chakri, Islamabad	International Atomic Energy Agency (IAEA)	Pakistan	244	13.500
19	01-08-2015 31-05-2017	Bankers Avenue Cooperative Housing Society (BACHS), Lahore	Bankers Avenue Cooperative Housing Society (BACHS), Lahore	Pakistan	298	8.700
20	01-12-2015 31-05-2017	Establishment of Model Drug Testing Laboratory, Lahore	Primary & Secondary Healthcare Department, Lahore	Pakistan	150	7.160
21	01-06-2015 31-05-2017	Upgradation of Major Sharif Shaheed (Nishan-e-Haider) R.H.C. Kunjab into 60-Bedded Tehsil Hospital, Gujrat	Works & Services Department, Gujrat	Pakistan	132	5.290

3 INTRODUCTION TO PROJECT MANAGEMENT OFFICE (PMO)

3.1 WHAT IS PMO

A Project management office is a Management Structure in the organization that provides the Governance of the On-going Projects, provided the methodologies related to the projects, provide the Motivation to the Project Staff, towards the Projects which leads them to success, and give the assurance to the strategic level, that all the project staff must compliance the all tools and techniques related to the On-going projects. It also help us to check the Health of the Projects, that we are getting the deliverables which meets the projects Scope.

3.2 FUNCTION OF PMO

Typically responsibilities of PMO to collecting, organizing & distribution of Project information at the organizational level. Another function of PMO to gather, review and develop the project templates. Pre-defined Project Plans, specification and actual deliverables, if you need the previous projects information you would go to PMO and they said yes the organization done this before. Template is reviewed, standardized, improved, certified and it's a good practices for the organization.

Corporate Project Management:

- Receive projects status Reports
- Produce Organizational Reports
- Coordinate resource Pool

PMO receive the status reports of the large number of projects, and after that they summarize it and produce the organizational report for the high level management in the organization in the form of DASHBOARD's in which Pie Chart, Bar Chart and Run Chart. These dashboards for the bigger picture of the ongoing projects in the Organization.

- Project Management Resource Pool
- Project Management Staff
- Peer Support Mentoring
    - Provide the Project managers
    - Support for the Organization to Entry Level to Maturity Level
    - Provide the Executing Facilities

- Training's for the Project Managers

- Corporate Project Management Best Practices
  - when not Directly assign as a Project Manager, in the spare time they produce/ develop Templates, Samples, Guidelines
- Corporate Project Management Tool Repository

3.3 PMO ROLES AND RESPONSIBILITIES

Project management office have several roles and responsibilities in the organization. They are some primary roles and some other roles in the organization.

3.3.1 Primary Roles of PMO

It provides the following

- Policies
- Methodologies
- Tools
- Templates

To manage the projects in the Organization. It also gives the support and trainings to organize in the Organization to manage the projects.

3.3.2 Some Other Roles

- Managing inter dependencies between the projects.
- Managing and Deploying dedicated Resources for the need of Projects.
- Arrange the trainings Sessions for the Resources to increase the vision about how they work in the team for the future assignments.
- Also manage the Lesson-learned from the previous projects.
- Maintain the Project management base Organization.

3.4 TYPES OF PMO

PMO have three types

- Supportive PMO
- Controlling PMO
- Directive PMO

3.4.1 Supportive PMO

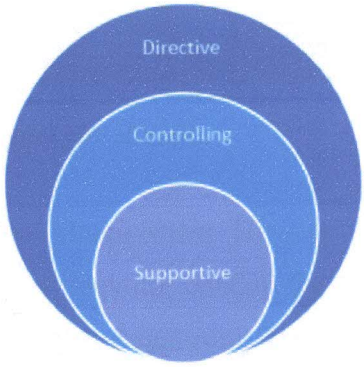
Supportive PMO also defines the consultative role in the organization. It provides the trainings, templates, best practices, exact information and the lesson learned from the previous projects in that particular Organization. This type of project office called the Project Repository. Repository means that directly accessible to the Users. Degree of Control of this type of PMO is Low.

3.4.2 Controlling PMO

This type of PMOs provide a Degree of Control at moderate level in the organization. The main theme of this type of PMOs is governance and conformance. It provides frameworks that is generic PMI's model.

3.4.3 Directive PMO

These types of PMOs have Degree of Control is very high. It means that, they directly manage the projects. Most of the times they include strong governance frameworks. This type of PMO derives the project teams and project managers in the ongoing project in the organization.. they have fully command on the project.



3.5 IMPLEMENTATION OF PMO IN THE ORGANIZATION

3.5.1 NEED of PMO

1. Limited Visibility into project Performance
2. Methodology for Project delivery is not Consistent
3. Project is Over Budget and late
4. Several PMs have different ways and tools to manage the Project's
5. Govt. Projects is a Major Business drives for your Organization

6. Structure of Organization is Matrix
7. Multiple Reporting Officers
8. Seniority Difference Between Project Managers and Project Teams
9. Business Benefits ignore by Project Managers
10. Consistency of the same Mistakes being observed in different Projects.
11. Uneven deployment of Resources in the Organization
12. Communication Gap Between the Project Manager and Project Team
13. Several PMs have different ways and tools to manage Project's

3.5.2 Implementing PMO in NESPAK Construction Management Division

Implementation of PMO requirement in the Construction Management Division was discussed with the Vice president/ Head of Division, because they does not contain the PMO structure. In Construction Management Division we implement the Supporting type PMO because there are several reason for this, they have large number of On-going projects and their chances of Schedule and Cost overrun very much. The benefits of PMO setup would be that surge the projects performance. PMO defines the Project process and practices evolve to start project management. PMO approach should be good enough to team up the organizational behavior and culture.

3.5.3 PROPOSED PMO TYPE

3.5.3.1 Controlling PMO

The Controlling PMO provides the Supportive Role and Compliance of adapting the framework and methodologies of the project management within the organization structure. It provides you the specific Tools, Techniques and forms for the implementation in the projects. The Controlling PMO audit your projects and lead to the Organization to the good maturity level. All the Project Managers and Project Coordinator must report to the PMO about the progress and performance of the projects in details, accordingly their requirement. PMO in the Construction Division of NESPAK reports/ share the performance VP/Head of Division and Managing Director.

Here I again listed the functions of the Controlling PMO:

1. Support and Compliance
2. Provide the Framework for how to Manage the project
3. Tools
4. Governance
5. Provided the methodology techniques and how to use it

3.5.4 Scope of PMO

- The PMO should be control in the Construction Management division and show the performance of the all projects to the higher management includes the Vice president/head of division and Managing Director of NESPAK.
- PMO provide Governance and tools for the projects in the Division.
- PMO must provide the real time meaning full information about the expected outcome of the Ongoing projects in the Division.
- PMO Provide the Framework for the Projects.
- PMO Provides the methodologies and their use differ project to project with respect to the need of the projects in the Division.

3.5.5 Vision of PMO

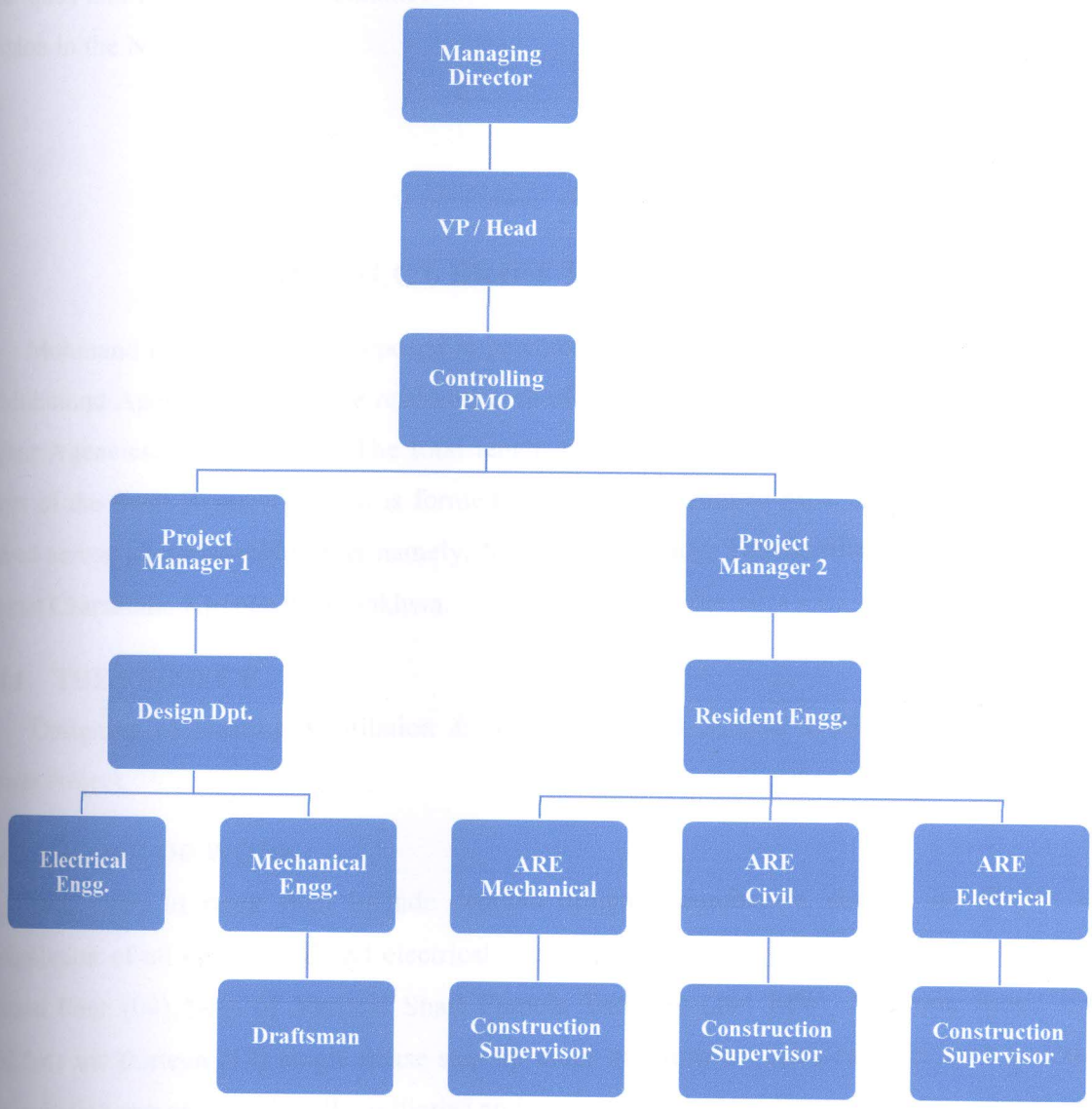
The vision of the PMO in Construction management Division is to

"Become the no.1 project management division among the NESPAK".

3.5.6 Mission of PMO

"By implementing PMO in Construction management division empowers growth of a strong & common project controlling culture, supporting environment and makes every project a success in terms of Triple Constraints to achieve strategic objectives".

3.5.7 Proposed Structure of PMO for CM Division



3.6 BENEFITS OF PMO IN NESPAK CONSTRUCTION MANAGEMENT DIVISION

After the Implementation of PMO in the Construction Management division we will overcome the problems, which we faced now, in the projects. PMO provide support and compliance, framework to the project manager and project team, by also using the tool and techniques from our previous projects experience. The PMO deployed the recourses on the

roject as per need of the projects. Communication gap between the project manager and project eam will be reduce because PMO act as a Governing body for the Project. By applying the PMO echniques and methodologies, enhance the Business benefits for the construction management ivision in the NESPAK.

4 PROJECT BRIEF INTRODUCTION

Mohmand Dam Project is proposed to be constructed on Swat River 48 km from Peshawar n Mohmand Agency, FATA. The reservoir area of the dam extends upstream to Mohmand and Bajaur Agencies, in the FATA. The total length of the reservoir is about 56 km in the rocky gorge of the Swat River. The area is formed by barren and rugged hills. The command area is spread across administrative units namely, Mohmand Agency, Tehsils Shabqadar and Tangi of district Charsadda, Khyber Pakhtunkhwa.

4.1 THE PROJECT

Designing of Heating Ventilation & Air conditioning System at Mohmand Dam Hydro Power Project,

4.2 SCOPE OF WORK

The scope of work shall include detailed design, manufacture, supply, installation and commission of all mechanical and electrical equipment for the project. The power plant should consist Four (04) Nos. of Vertical Shaft Francis Turbines (204 MW, 200 rpm, Rated Head 162.5m) and thirteen (13) single phase step up main transformer (three each for each generator set including one spare) with all auxiliaries and other associated equipment. The equipment to be designed, installed and commissioned shall include, but not be limited to, the following;

1. Francis type vertical shaft turbines, main inlet valve, governing system, and associated systems.
2. Generators, Exciters and Generator Condition Monitoring System.
3. Generator step up transformers.
4. Mechanical auxiliary equipment and systems.

5. Electrical auxiliary equipment and systems.
6. Control center and control systems.
7. Powerhouse Overhead Cranes.

The mechanical auxiliary equipment and systems to be designed, manufacture, supply, installed and commissioned shall include as a minimum following;

1. Drainage and dewatering System.
2. Cooling water and service water system.
3. Water treatment system.
4. Sewage treatment and disposal system.
5. High and Low pressure compressed air system.
6. Oil handling and purification system.
7. Fire protection system.
8. Heating, Ventilation and air conditioning systems.
9. Powerhouse Elevators.
10. Overhead Cranes and hoisting equipment

The electrical auxiliary equipment and system to be designed, installed and commissioned shall be include as a minimum the following:

11. Station Auxiliary Transformers (SAT)
12. Unit and Station Auxiliary Power Supply System (MV & LV Switchgears)
13. Protection and Relay Equipment
14. Synchronization System
15. DC Supplies & Uninterruptible Power Supply System (UPS)
16. Lighting & Small Power Services
17. Earthing System
18. Control and Instrumentation System
19. Emergency Diesel Generating Unit (EDG)
20. Fire Detection & Alarm System
21. Security surveillance system
22. Water level monitoring and sensing system at inlet and outlet.
23. Access control system.
24. Cables

25. SCADA System.

5 PROJECT CHARTER AND PROJECT SCOPE STATEMENT

5.1 PURPOSE OF PROJECT

To meet the energy crises in the Pakistan, a new hydropower project named Mohmand Dam Hydropower project, Capacity 800MW is being established in Mohmand Agency. The Dam structure includes the Power House Building, Control Building, Dam Control Building, Inlet Gate Control Building, Left irrigation Tunnel, Right Irrigation tunnel, Spillway Weir Section and Spillway drainage galleries. As per Pakistan's Ambient Conditions for Summer/Winter the Cooling and Heating System is required in the above mentioned buildings to achieve the comfort zone.

5.2 HIGH LEVEL REQUIREMENT

To achieve the comfort zone for the working staff and operating Mechanical Equipment by using the Heating Ventilation & Air Conditioning System in the mentioned buildings. Also using the International Standards for Designing and Equipment Certified of the HVAC system which includes ASHRAE standards, AHRI Certified Equipment, Eurovent Equipment, and SMACNA standards.

5.2.1 Success Criteria

- Designing of all the required buildings to meet the Triple Constraints of the project management (Time, Cost, and Scope).
- All the works done according to the international standards.
- Quality of all design works must meet the requirement of the ISO Standards.

5.2.2 Estimated Duration

The Estimated duration for the Detail designing of HVAC works in the Dam Structure was 7months.

5.2.3 High Level Risks

- Climate condition at the Mohmand Agency, one of the big risk to develop a model for the control environment.

- Coordination gap between the Structure Engineers and the Mechanical HVAC Engineer.
- Geographical location is also a Risk

5.2.4 Milestone

- Project Management Documents
- Concept Design Report
- Approval From Client
- Detail Design
- Quality Assurance
- Approval of HVAC Design
- Submission

5.3 ROLES & RESPONSIBILITIES

5.3.1 Project Sponsor

General Manager of the WAPDA is the project sponsor of the Mohmand Dam Hydropower Project. Project Sponsor is the responsible for the authorization of the legal documents, approval of Project Charter and he responsible to the authorized the Project Manager to act on his for the Technicalities if the proposed project. Any change in the Scope, Time, Cost cannot be change unless his approval.

5.3.2 Project Manager

Principal Engineer NESPAK will act as a project manager for the HVAC works. He is responsible, accountable and authorized to overlook the triple constraints of the project management to ensure also the quality of HVAC works. He is responsible to collect the progress reports, release the payments, and control the Quality of Works and equipment Selection/approvals.

5.3.3 HVAC Contractor

HVAC contractor is the responsible for the supply and installation of the equipment in the Dam Structure Buildings, up to the satisfaction of the Client/sponsor

5.4 BUDGET

Allocated budget for the HVAC Works is 270Million Pak Rupees with Equipment and 5Million Pak Rupees for the Design Fee.

5.4.1 Major Stakeholder's

- Project Sponsor
- Project Manager
- Project Team
- HVAC Contractor

5.5 APPROVAL/SIGN OFF

The undersigned make sure that we have checked the project charter, authorize and fund the Designing and construction supervision of HVAC System Works at the Mohmand Dam Hydropower Project, located at Mohmand Agency. Any changes required in this project charter will be approved and reviewed by us.

Signature: _____ Date: _____

Print Name: _____

Title: _____

Role: _____

Signature: _____ Date: _____

Print Name: _____

Title: _____

Role: _____

6 PROJECT SCOPE STATEMENT

6.1 PROJECT SCOPE

Project Scope is to meet the Climate Conditions in the Dam Structure Buildings. In the Summer/Winter cooling and heating load of the Buildings, in which mechanical and electrical equipment use and the load of the working staff to provide them a comfort zone for the proper working.

Here I explain the all Dam Structure building which includes the

- Power house Building
- Control Building
- Left Irrigation Tunnel
- Right Irrigation Tunnel
- Inlet Gate Control Building
- Dam Control Building
- Spillway Weir Section
- Spillway Drainage Galleries

In the above mentioned buildings, the Heating Ventilation & Air Conditioning System is to be Design in the Detail, also provide the Tender Document for the procurement, in the tender document the rules and regulation we provided to the project sponsor. And we also provide the equipment rate estimate which we proposed/ design for the buildings. It should be meet to the international Standards.

6.2 ACCEPTANCE CRITERIA

- Designing of all the required buildings to meet the Triple Constraints of the project management (Time, Cost, and Scope).
- Quality of all design works must meet the requirement of the ISO Standards
- All the works done according to the international standards.

6.3 PROJECT DELIVERABLES

- Conceptual design Report
- Coordination Drawings

- Detail Design of HVAC System at each buildings
- Tender Drawings
- Tender Documents
- Equipment Selection
- Equipment Schedule
- Rate Estimates
- Schedule of Prices
- Manufacturers Approved List for the Equipment

6.4 CONSTRAINTS

- Geographical Location barrier in the Coordination
- Language barrier
- Hypothetical Data
- Schedule Change with the influence of the Govt. Officials
- Manage the Triple constraints of the project management is quiet difficult due to the involvement of the government officials

6.5 ASSUMPTIONS

- Structures layout plans (Drawings) are final
- Location of the powerhouse and Control buildings cannot be vary
- Heating load of the Electrical Equipment cannot be vary

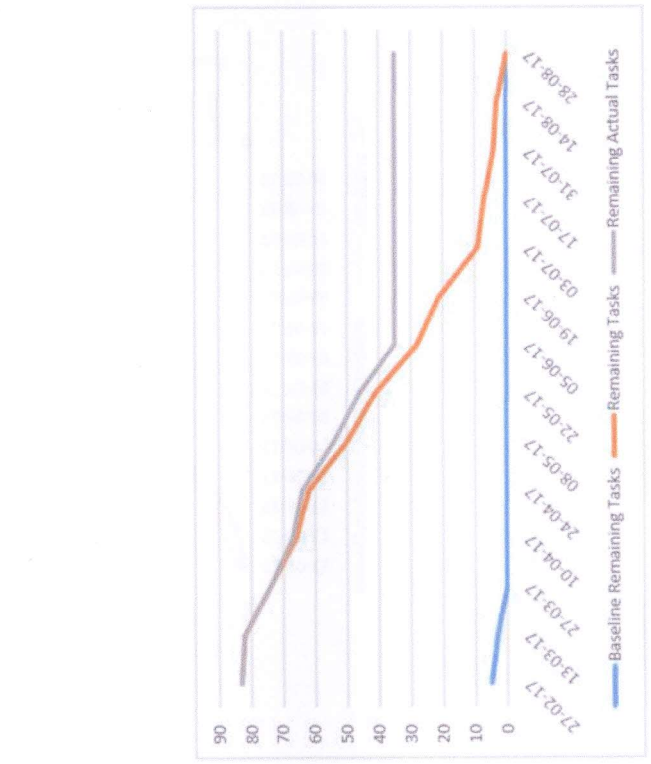
7 MICROSOFT PROJECT SHEET

The project plan for the selected project has been prepared in Microsoft Project. This section contains views and reports generated from Microsoft Project for project.

Following sections contain the following:

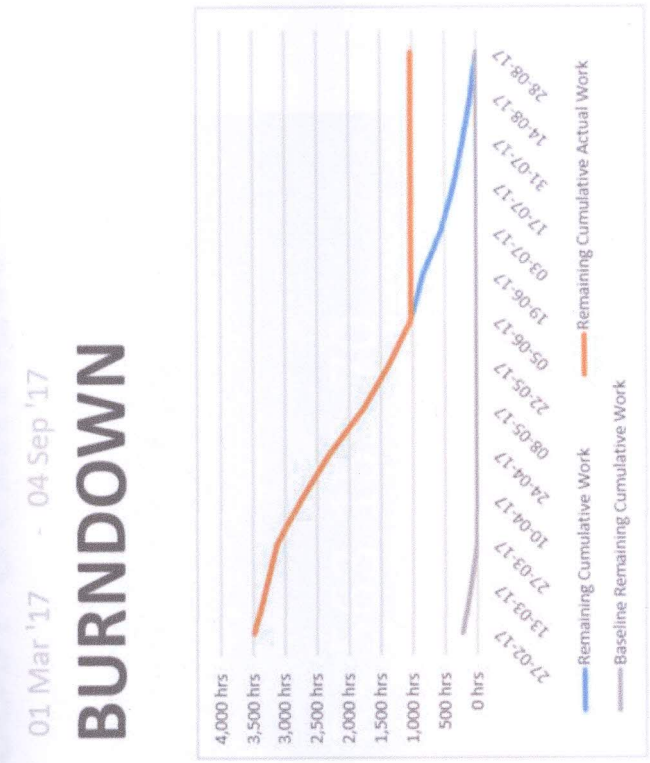
1. Burn Down Report
2. Cost Overview Report
3. Project Overview
4. Over Allocated Resources
5. Resource Overview
6. Cash Flow
7. Earned Value Report
8. Resource Cost Overview
9. Milestone Report
10. GANTT Chart
11. Network Diagram
12. Critical Task
13. S-Curve

7.1 BURNDOWN REPORT



TASK BURNDOWN
Shows how many tasks you have completed and how many you have left. If the remaining tasks line is steeper, then your project may be late.

Learn more



WORK BURNDOWN
Shows how much work you have completed and how much you have left. If the remaining cumulative work line is steeper, then the project may be late. Is your baseline zero?

Try setting a baseline

COST OVERVIEW

01 MAR '17 - 04 SEP '17

COST

Rs 2,338,188.90

REMAINING COST

Rs 563,153.70

% COMPLETE

73%

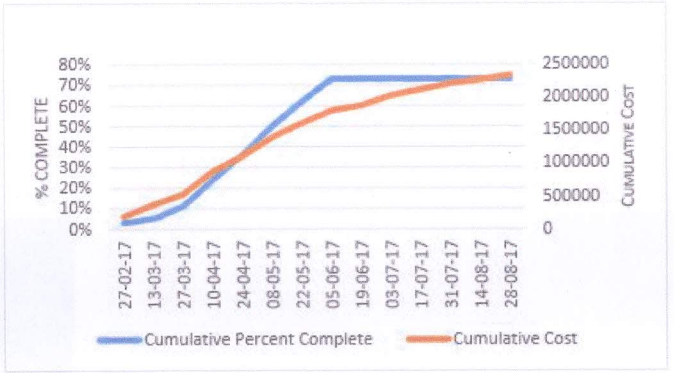
COST STATUS

Cost status for top level tasks.

Name	Actual Cost	Remaining Cost	Baseline Cost	Cost	Cost Variance
Designing of Heating Ventilation & Air conditioning System at Mohmand Dam Hydro Power Project,	Rs 1,775,035.20	Rs 563,153.70	Rs 2,338,188.90	Rs 2,338,188.90	Rs 0.00
Project Completion	Rs 0.00	Rs 0.00	Rs 0.00	Rs 0.00	Rs 0.00

PROGRESS VERSUS COST

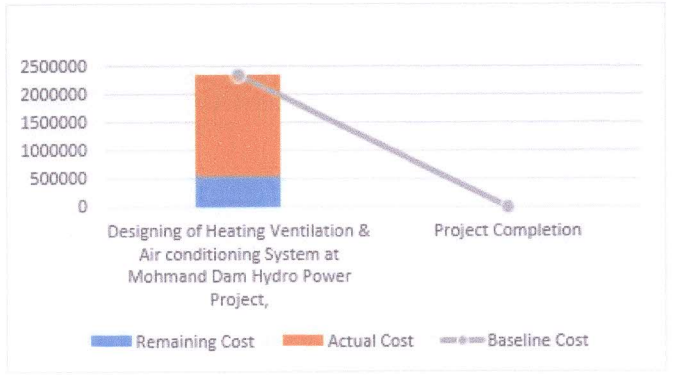
Progress made versus the cost spent over time. If % Complete line below the cumulative cost line,your project may be over budget.



COST STATUS

Cost status for all top-level tasks. Is your baseline zero?

Try setting as baseline



7.3 PROJECT OVERVIEW

PROJECT OVERVIEW

01 MAR '17 - 04 SEP '17

% COMPLETE

73%

MILESTONES DUE

Milestones that are coming soon.

Name	Finish
Detail Designing of All Building	27 Jul '17
Technical Specification Completed	08 Aug '17
Incorporate the Comments completed	13 Jul '17
Project Completion	04 Sep '17

% COMPLETE

Status for all top-level tasks. To see the status for subtasks, click on the chart and update the outline level in the Field List.

LATE TASKS

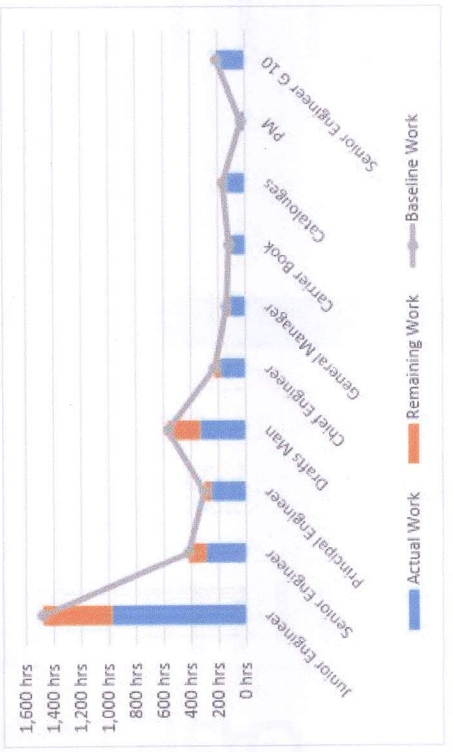
Tasks that are past due.

Name	Start	Finish	Duration	% Complete	Resource Names
HAP Software	17 Apr '17	21 Apr '17	5 days	99%	Software[Rs 5,000.00],Junior Engineer[150%],Senior Engineer[50%]

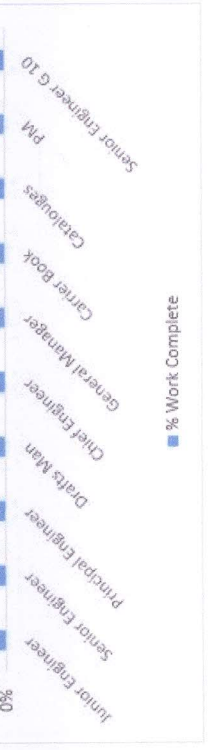
7.4 RESOURCE OVERVIEW

RESOURCE OVERVIEW

RESOURCE STATS
Work status for all work resources.



WORK STATUS
% work done by all the work resources.



RESOURCE STATUS
Remaing work for all work resources.

Name	Start	Finish	Remaining Work
Junior Engineer	01 Mar '17	04 Sep '17	500.38 hrs
Senior Engineer	24 Mar '17	30 Aug '17	126.25 hrs
Principal Engineer	01 Mar '17	04 Sep '17	50.13 hrs
Drafts Man	07 Apr '17	16 Aug '17	232 hrs
Chief Engineer	01 Mar '17	04 Sep '17	42 hrs
General Manager	01 Mar '17	04 Sep '17	24 hrs
Carrier Book	01 May '17	27 Jun '17	24 hrs
Catalouges	24 Apr '17	13 Jul '17	29.63 hrs
PM	07 Apr '17	12 Apr '17	0 hrs
Senior Engineer G 10	13 Apr '17	02 Jun '17	0 hrs

7.5 CASH FLOW

Actual Cost	Baseline Cost	Remaining Cost	Cost Variance
Rs 1,775,035.20	Rs 2,338,188.90	Rs 563,153.70	Rs 0.00

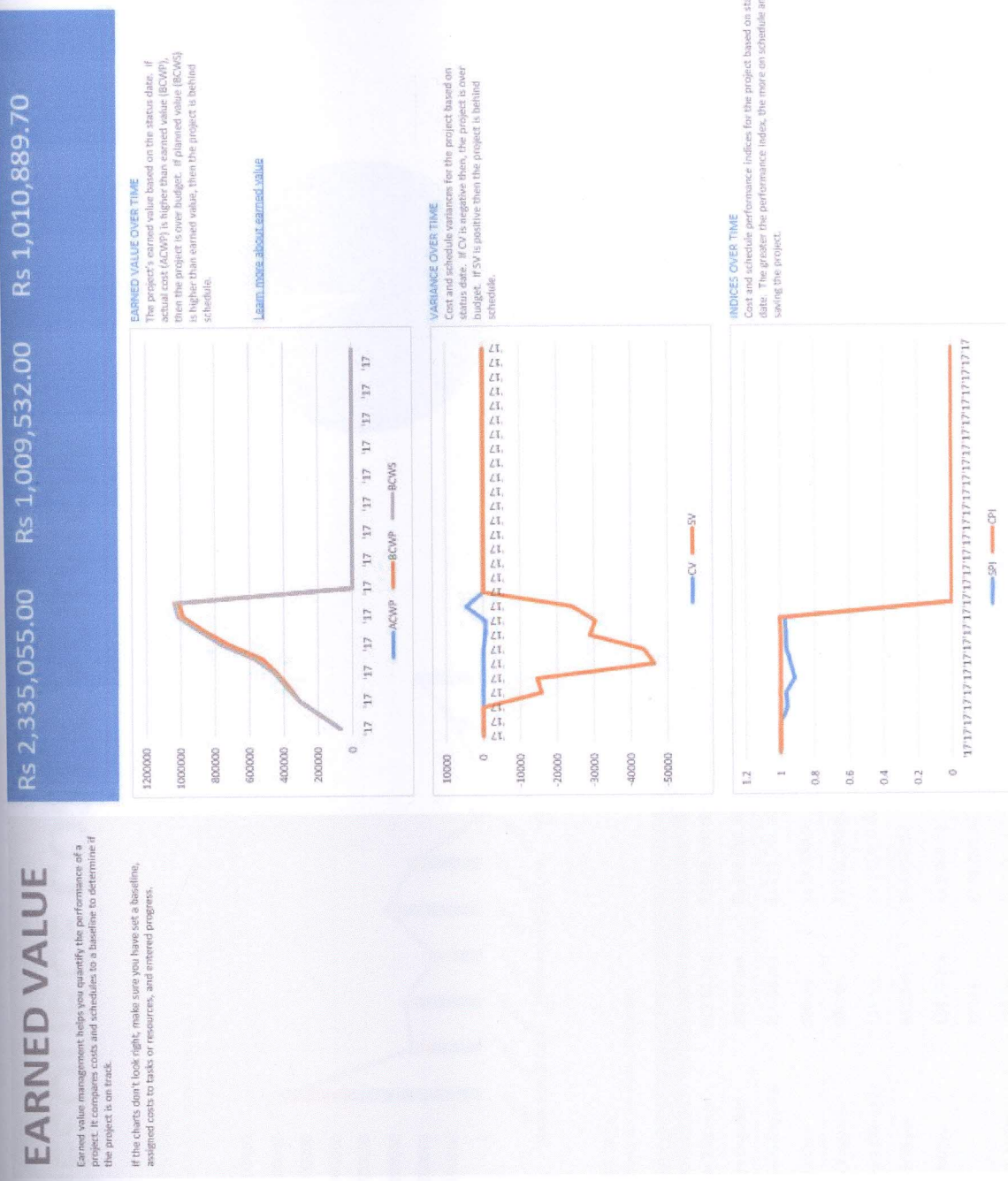
The chart shows the project's cumulative cost and the cost per quater.
To see the costs for a different time period, select the Edit option from the Field List.

The table below shows cost information for all top-level tasks.
To see cost stats for all tasks, set the Outline Level in the Field List.

Name	Remaining Cost	Actual Cost	Cost	ACWP	BCWP	BCWS
Designing of Heating Ventilation & Air conditioning System at Mohmand Dam Hydro Power Project,	Rs 563,153.70	Rs 1,775,035.20	Rs 2,338,188.90	Rs 1,009,532.00	Rs 1,010,889.70	Rs 1,038,196.00
Project Completion	Rs 0.00	Rs 0.00	Rs 0.00	Rs 0.00	Rs 0.00	Rs 0.00

CASH FLOW

7.6 EARNED VALUE REPORT



7.7 RESOURCE COST OVERVIEW

RESOURCE COST OVERVIEW

COST STATUS

Cost status for work resources.

COST DISTRIBUTION

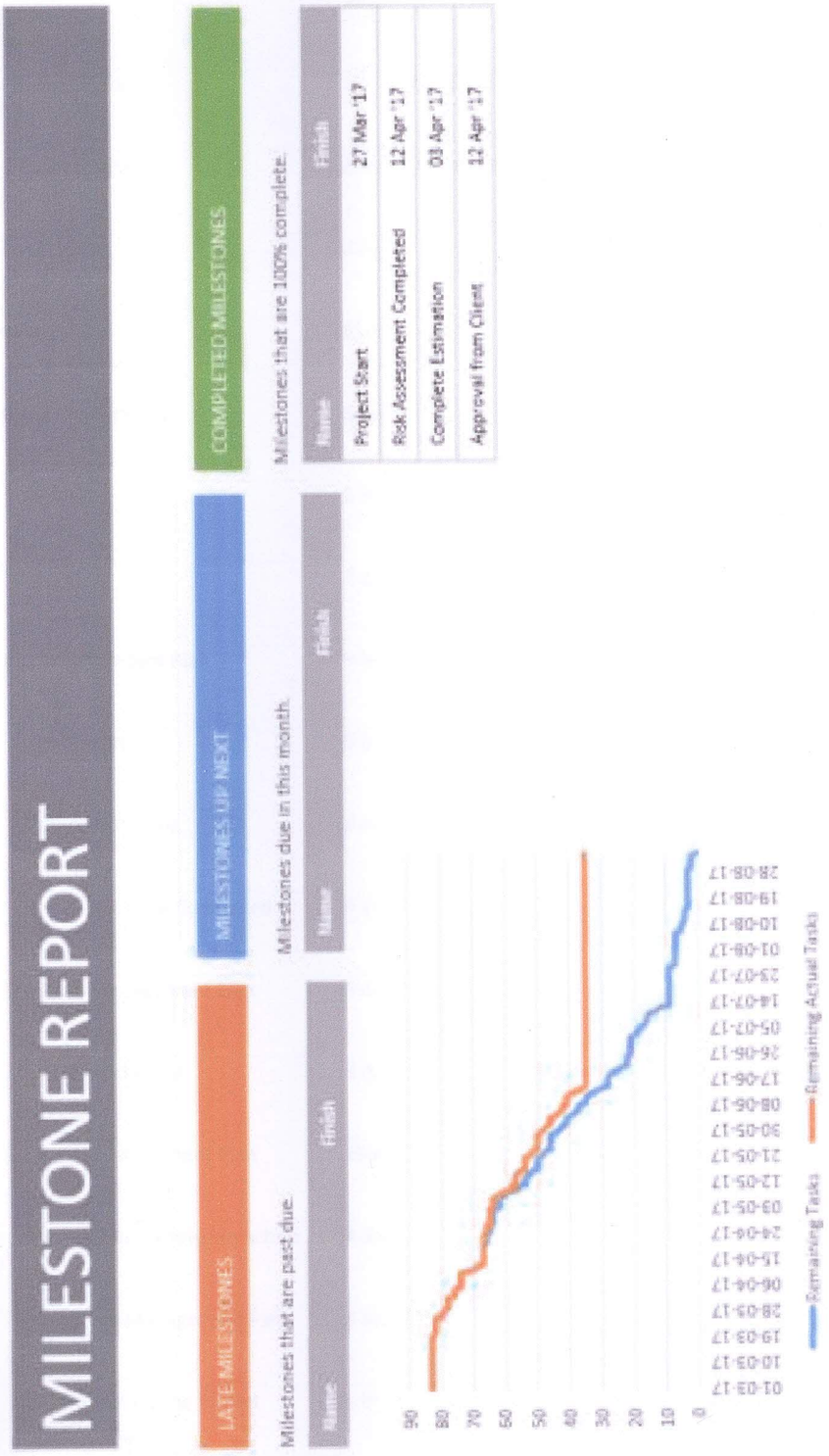
How costs are spread out amongst different resource types.

COST DETAILS

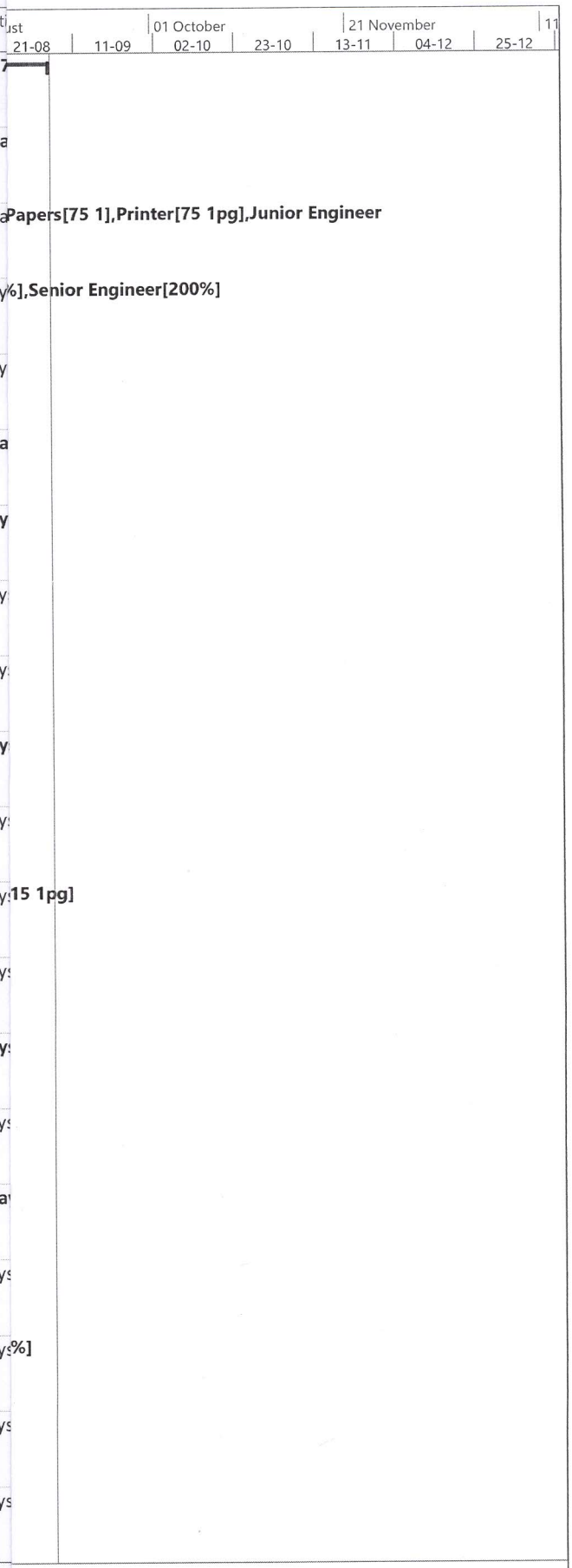
Cost details for all work resources.

Name	Actual Work	Actual Cost	Standard Rate
Junior Engineer	977.62 hrs	Rs 449,700.60	Rs 460.00/hr
Senior Engineer	295.77 hrs	Rs 168,583.20	Rs 570.00/hr
Principal Engineer	254.98 hrs	Rs 219,291.40	Rs 860.00/hr
Drafts Man	336 hrs	Rs 94,080.00	Rs 280.00/hr
Chief Engineer	184 hrs	Rs 261,280.00	Rs 1,420.00/hr
General Manager	114 hrs	Rs 193,800.00	Rs 1,700.00/hr
Carrier Book	96.03 hrs	Rs 4,000.00	Rs 0.00/hr
Catalouges	134.37 hrs	Rs 9,000.00	Rs 0.00/hr
PM	32 hrs	Rs 80,000.00	Rs 2,500.00/hr
Senior Engineer G 10	208 hrs	Rs 208,000.00	Rs 1,000.00/hr

7.8 MILESTONE REPORT

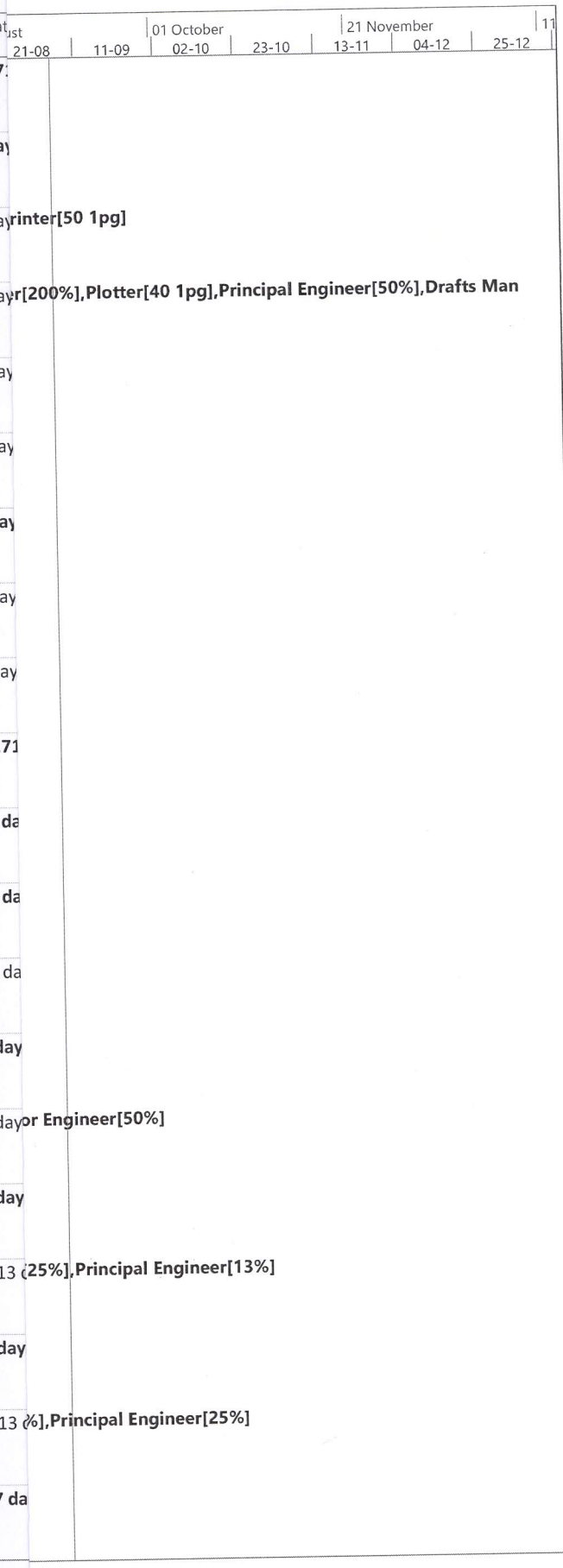


		Task Mode	Task Name	Durati
1			**Designing of Heating Ventilation & Air conditioning System at Mohmand Dam Hydro Power Project,**	**126.7**
2	✓		**Initiation**	**18 da**
3	✓		Project Charter	15 da
4	✓		Kick Off Meeting	2 day
5	✓		Project Start	0 day
6	✓		**Planning**	**35 da**
7	✓		**Designing Strategy**	**3 day**
8	✓		OPA's	2 day
9	✓		EEF	2 day
10	✓		**Risk Management Plan**	**9 day**
11	✓		Risk Register	5 day
12	✓		Response Planing	3 day
13	✓		Risk Assessment Completed	0 day
14	✓		**Schedule Management Plan**	**9 day**
15	✓		Develop Schedual	5 day
16	✓		**Resource Management Plan**	**19 da**
17	✓		Resource Breakdown Structure	4 day
18	✓		Procurement Management Paln	4 day
19	✓		Rate Estimate for the Project	3 day
20	✓		Complete Estimation	0 day



7.9 GANTT CHART

	Task Mode	Task Name	Durat
		Execution	**85.7**
✓		**Conceptual Design Report**	**3 da**
✓		Submitt to the Client	3 da
✓		Coordination Drawings	5 da
✓		Approval	4 da
✓		Approval from Client	0 da
✓		**Design Criteria**	**1 da**
✓		ASHRAE Handbook	1 da
✓		ASHRAE APPLICATION	1 da
		Detail Designing of Each Building	**68.71**
		Power House	**19 da**
		Cooling /Heating Load	**12 da**
		HAP Software	12 da
✓		**Ducting**	**4 da**
✓		Ductulator	4 da
		Piping	**3 da**
		Carier HandBook of Piping	3.13 d
✓		**Equipment Selection**	**3 da**
✓		Catalogues	3.13 d
		Control Building	**17 da**



Project: Designing of HVAC sys
Date: 16 Jun '17

Task
Split
Milestone
Manual Progress

Designing of Heating Ventilation & Air conditioning System at Mohmand Dam Hydro Power Project,

	Task Mode	Task Name	Duration
		Cooling /Heating Load	**5 day**
		HAP Software	5 day
✓		**Ducting**	**3 day**
✓		Ductulator	3 days
✓		**Piping**	**3 days**
✓		Carier HandBook of Piping	4 days
✓		**Equipment Selection**	**12 da**
✓		Catalogues	9 days
		Inlet Gate Control Building	**9 days**
		Cooling /Heating Load	**3 days**
		HAP Software	3 days
✓		**Ducting**	**3 days**
✓		Ductulator	3 days
✓		**Piping**	**4.01 d**
✓		Carier HandBook of Piping	4.13 d
✓		**Equipment Selection**	**2 days**
✓		Catalogues	2 days
		Dam Control Building	**9.2 da**
		Cooling /Heating Load	**4 days**
		HAP Software	4 days

21-08 | 11-09 | 01 October 02-10 | 23-10 | 21 November 13-11 | 04-12 | 25-12 | 11

ineer[50%]

er[25%]

%],Principal Engineer[25%]

Engineer[25%]

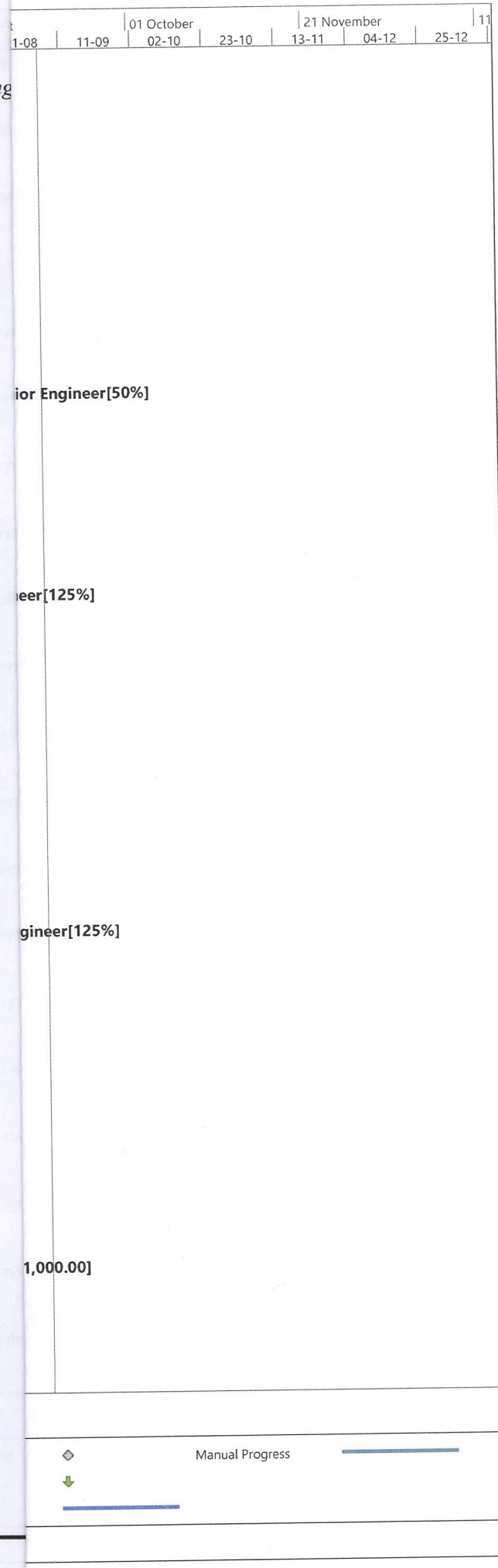
Engineer[25%]

125%],Senior Engineer[25%]

oject: Designing of HVAC sys
ate: 16 Jun '17

Task
Split
Milestone

Manual Progress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eer[125%]
gineer[125%]
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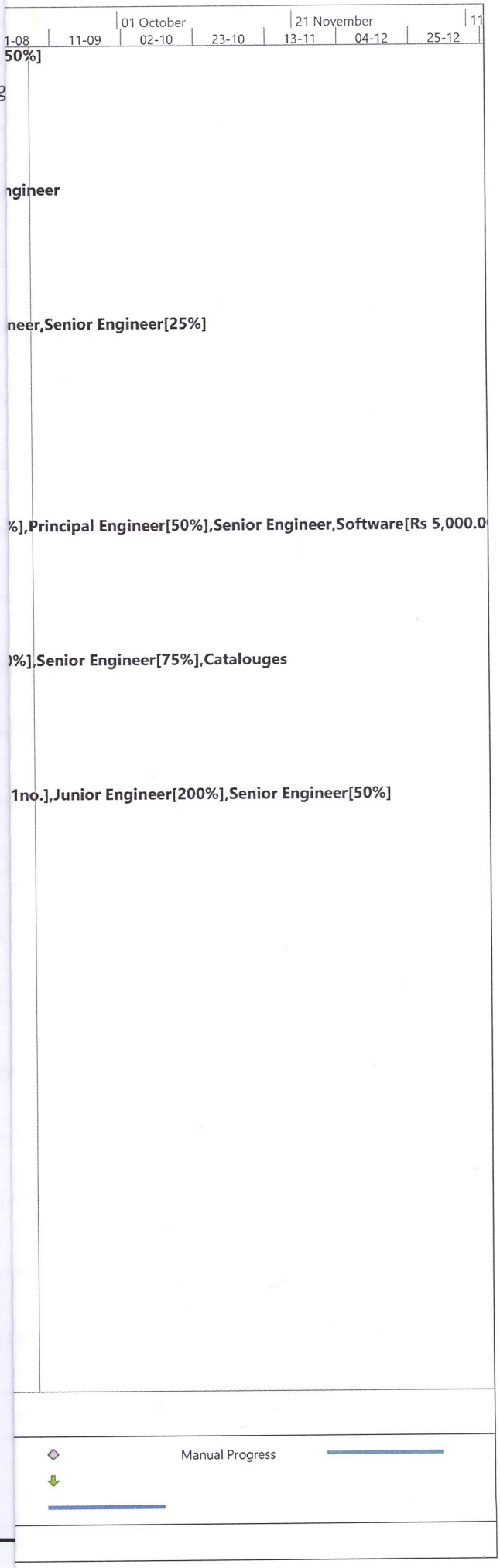
Manual Progress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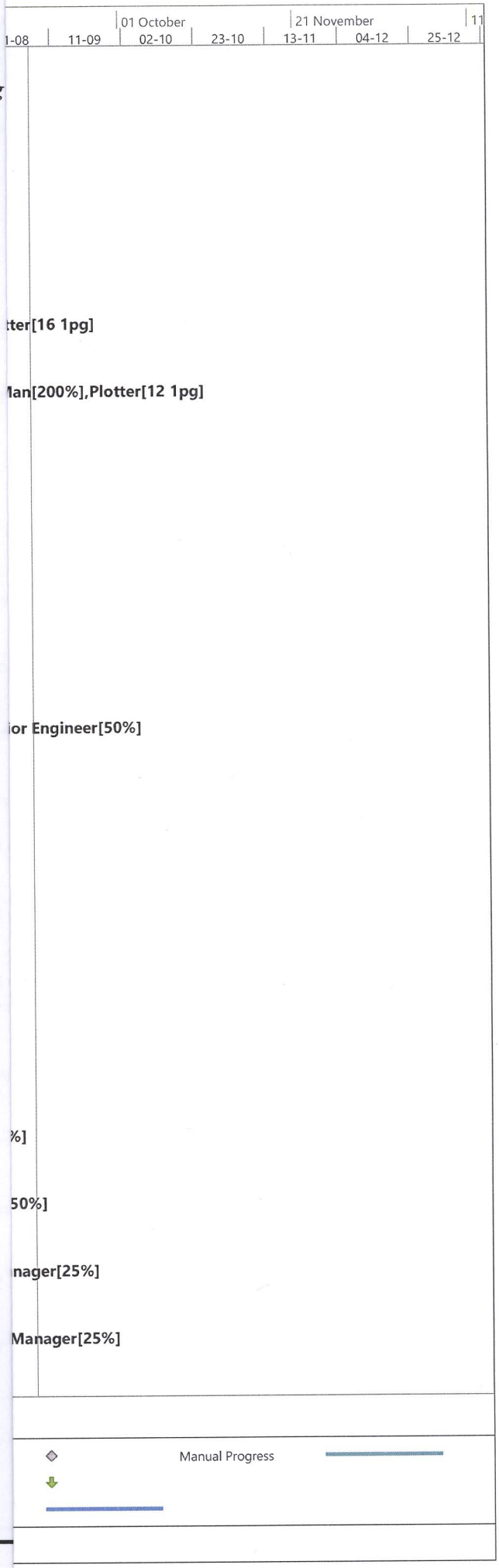
neer,Senior Engineer[25%]
%],Principal Engineer[50%],Senior Engineer,Software[Rs 5,000.0
)%],Senior Engineer[75%],Catalouges
1no.],Junior Engineer[200%],Senior Engineer[50%]
Manual Progress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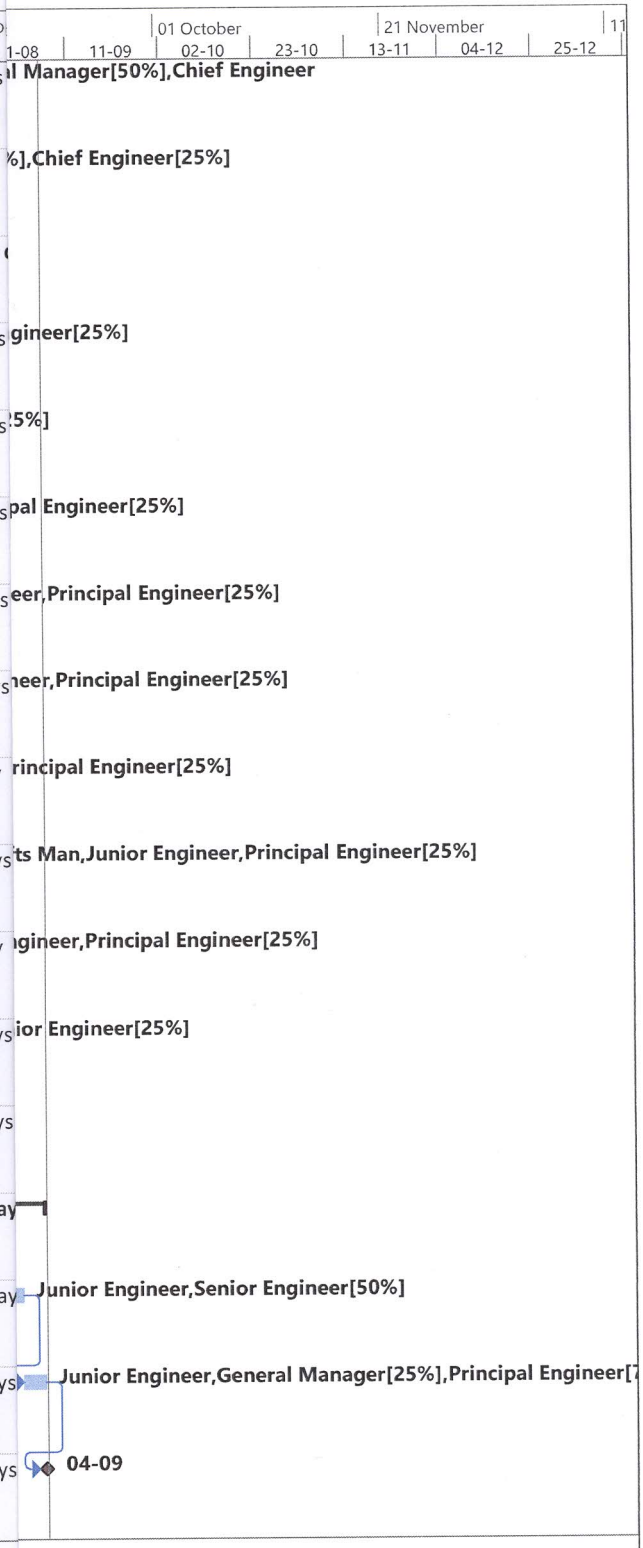
25-12
tter[16 1pg]
lan[200%],Plotter[12 1pg]
ior Engineer[50%]
%]
50%]
nager[25%]
Manager[25%]
Manual Progress

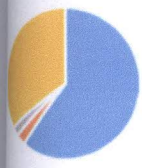
	Task Mode	Task Name	Duration
2		Spillway Drainage Gallery	3 days
3		Spillway Wier Section	1 day
4		**Incorporate the Comments**	**64.71**
5	✓	Power House	4 days
6	✓	Control Building	2 days
7	✓	Inlet Gate Control Building	2 days
8		Dam Control Building	4 days
9		Right Bank Irrigation Tunnel	2 days
30		Left Bank Irrigation Tunnel	1 day
31		Spillway Drainage Gallery	2 days
32		Spillway Wier Section	1 day
33		Finalize the Design	2 days
34		Incorporate the Comments completed	0 days
35		**Closing**	**13 day**
36		Quality Doc	10 day
37		Quality Performa	3 days
38		Project Completion	0 days



roject: Designing of HVAC sys
ate: 16 Jun '17

Task
Split
Milestone
Manual Progress

7.10 CRITICAL TASK

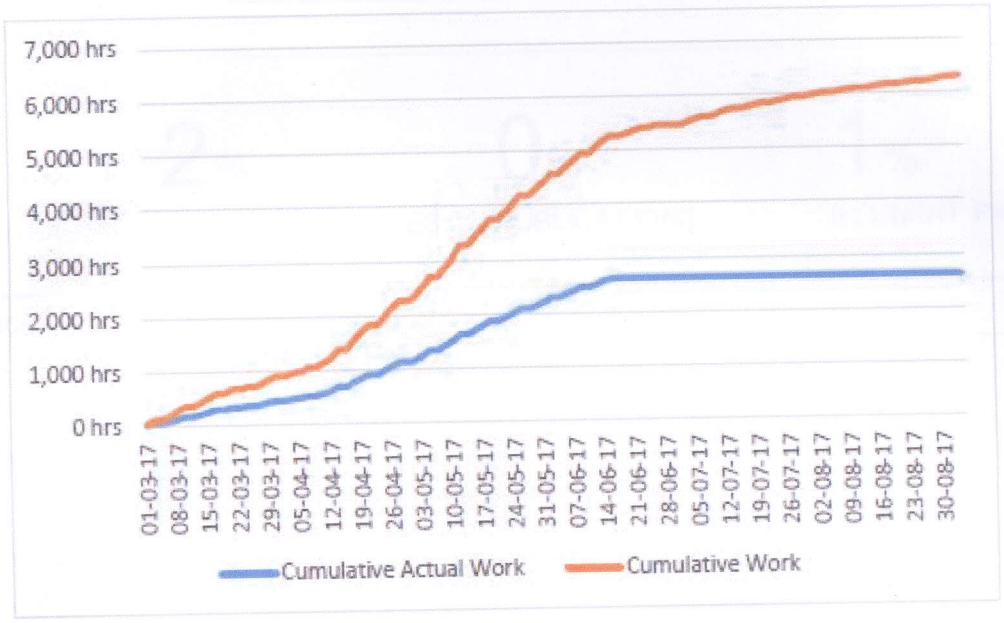


- Status: Complete
- Status: On Schedule
- Status: Late
- Status: Future Task

A task is critical if there is no room in the schedule for it to slip.
Learn more about managing your project's critical path.

Name	Start	Finish	% Complete	Remaining Work	Resource Names
HAP Software	13 Jun '17	15 Jun '17	99%	0 hrs	Software[Rs 1,000.00],Junior Engineer[125%]
Catalogues	15 Jun '17	19 Jun '17	84%	4.28 hrs	Catalouges,Junior Engineer
HAP Software	19 Jun '17	21 Jun '17	0%	16 hrs	Junior Engineer,Software[Rs 1,000.00]
Catalogues	21 Jun '17	22 Jun '17	0%	30 hrs	Catalouges,Junior Engineer[150%]
Carier HandBook of Piping	22 Jun '17	03 Jul '17	0%	54 hrs	Carrier Book,Junior Engineer,Senior Engineer[25%]
HAP Software	03 Jul '17	11 Jul '17	0%	40 hrs	Junior Engineer[300%],Principal Engineer[50%],Senior Engineer,Software[Rs 5,000.00]
Catalogues	11 Jul '17	13 Jul '17	0%	36 hrs	Junior Engineer[200%],Senior Engineer[75%],Catalouges
Ductulator	13 Jul '17	27 Jul '17	0%	200 hrs	Ductulator[11no.],Junior Engineer[200%],Senior Engineer[50%]
Spillway Drainage Gallery	27 Jul '17	08 Aug '17	0%	128 hrs	Drafts Man[200%],Plotter[12 1pg]
Spillway Drainage Gallery	08 Aug '17	11 Aug '17	0%	36 hrs	General Manager[50%],Chief Engineer
Spillway Drainage Gallery	11 Aug '17	16 Aug '17	0%	36 hrs	Drafts Man,Junior Engineer,Principal Engineer[25%]
Quality Doc	16 Aug '17	30 Aug '17	0%	120 hrs	Junior Engineer,Senior Engineer[50%]
Quality Performa	30 Aug '17	04 Sep '17	0%	60 hrs	Junior Engineer,General Manager[25%],Principal Engineer[75%],Chief Engineer[50%],Printer[5 1pg]
Project Completion	04 Sep '17	04 Sep '17	0%	0 hrs	

7.11 S-CURVE


7,000 hrs
6,000 hrs
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31-05-17
07-06-17
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21-06-17
28-06-17
05-07-17
12-07-17
19-07-17
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23-08-17
30-08-17
Cumulative Actual Work
Cumulative Work

Report

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