KATHMANDU UNIVERSITY
School of Engineering
Department of Civil Engineering

Hydropower Internship Program : Kabeli – A Hydroelectric Project (37.6 MW)

Introduction

The Kabeli-A Hydroelectric Project (KAHEP) is a 37.6 MW Run-of-river plant located in Panchthar and Taplejung districts of Nepal. It lies between 27°10'–27°13'N latitude and 87°53'–87°55'E longitude, using a gross head of 120.50 meters. The project costs about NPR 7.5 billion and generates 216.4 GWh annually. It is developed by Kabeli Energy Limited, a subsidiary of Butwal Power Company Ltd and Arun Valley Hydropower Development Company Ltd .

Salient Features

Project Name	: Kabeli –A HEP
Type Of Development	: Cascade ROR
Location	: Panchthar and Taplejung
Installed Capacity	: 37.6 MW
Gross Head	: 120.50 m
Rated Head	: 115.28 m
Catchment area at Intake	: 713.90 km^2
Design Discharge (Q_{40})	: 37.23 m^3/s
Design Flood ($Q_{100\ year}$)	: 1020 m^3/s
Type of Additional Intake	: Side Intake (With 3 intake gates)
Settling Basin	: Simple Rectangular with Sedicon Flushing System
Headrace Canal	: RCC Box Culvert (4.25 m x 4.25 m)
Head pond	: Rectangular Concrete lined
Headrace tunnel	: Inverted D shaped (4657 m long)
Water Conveyance System	: Headrace canal and Headrace Tunnel (Inverted D Type)
Surge Shaft	: Underground and Exposed to surface Semi Surface
Penstock	: Mild steel (3.8 m dia)
Powerhouse	: Surface
Turbine	: Horizontal Axis Francis (3 units)
Project Cost	: NRs. 7.5 billion
Developer	: Kabeli Energy Ltd. (KEL)
Consultants	: Units Engineering Consultancy
Contractor	: Zambala Construction Pvt Ltd, Paramax Constructions, Sherpa Hydro Constructions

Objectives

1. To get exposure to engineering duties and responsibilities .
2. To develop the proficiency to function in diverse engineering and managerial setting based on core knowledge, skills , attitude and aptitudes acquired during the in-campus semester .
3. To be aware of engineering norms ,values and ethical practices .
4. To be familiar with site work and inspection .

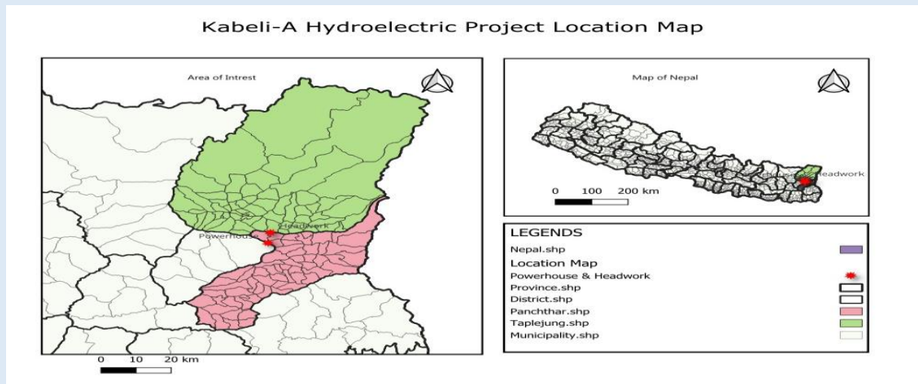

Photo 1: Project Location

Photo 2: Interconnection Chamber

Photo 3: Additonal Intake Gate

Photo 4: Approach Canal

Photo 5: Headrace Canal

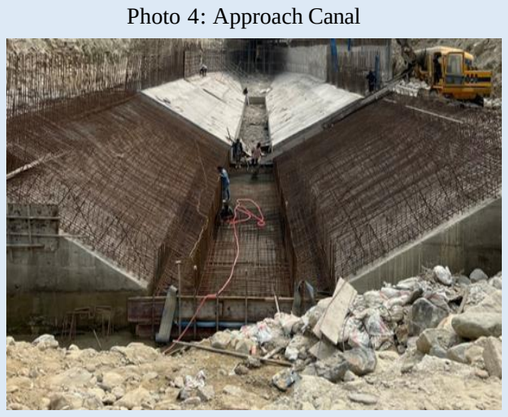

Photo 6: Settling Basin

Photo 7: Headpond

Photo 8: Scaffolding Placement

Photo 9: Plum Concreting

Photo 10: HRT Inlet portion

Photo 11: Tunnel Failure Section

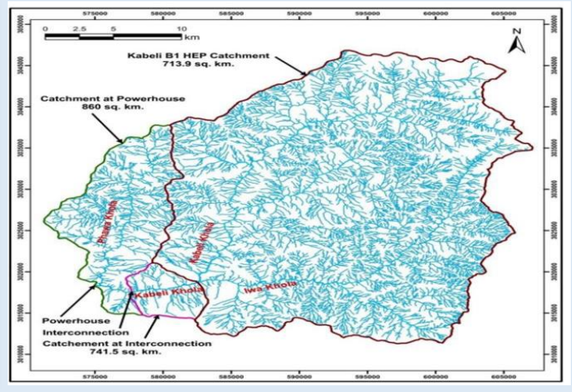

Photo 12: Catchment Area

Photo 13: Base Concreting

Photo 14: Saddle Support

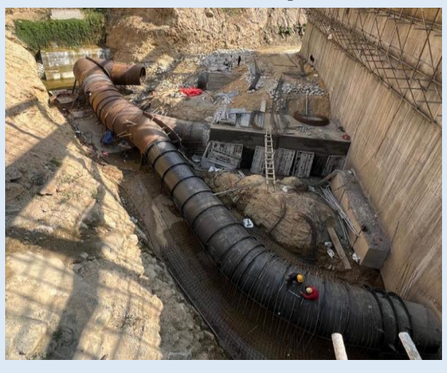

Photo 15: Penstock Unit Bifurcation

Photo 16: Surge shaft

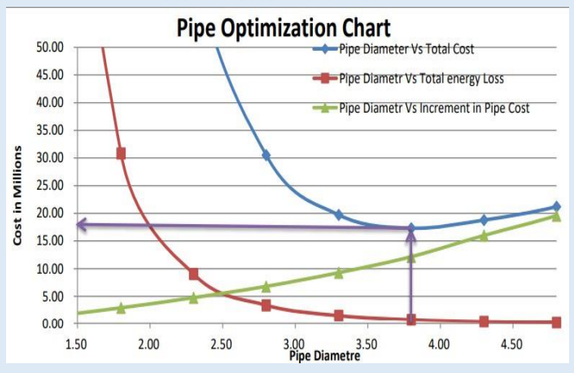

Photo 17: Pipe Optimization Chart

Photo 18 : Powerhouse

Photo 19 : Tailrace

Task Performed

- Monitored construction stages of key components: intake, settling basin, tunnels, surge shaft, penstock, powerhouse, and tailrace.
- Inspected reinforcement, formwork, and embedded parts before concrete placement.
- Observed concrete works including plum concreting, compaction, and finishing to ensure quality standards.
- Study of cad drawing (Civil , Structural and Mechanical)
- Performed lab tests such as:
- Slump test and compressive strength test for concrete.
- Ultrasonic Testing (UT), Dye Penetration Test (DPT), and welding inspections for penstock pipe
- Studied Bar Bending Schedule (BBS) to review reinforcement detailing and estimate steel quantities.
- Gained office experience in Cost estimation, project documentation, and construction drawing interpretation.

Analysis

- Analysis defined roles and coordination among client, consultant, and contractor. Delegation and supervision between contractor and subcontractor.
- Use of technical terms and site-specific procedures (e.g., MCT, BBS).
- Contractor-side delays in procurement and material management.
- Design alterations due to local geological, topographical, and community issues.
- Economic-driven modifications in construction planning and methods.
- External interferences, accidents, and site accessibility challenges.
- Field learnings, adaptive lifestyle, and hardships of remote site deployment.

Conclusion

- Kabeli-A is a 37.6 MW run-of-river hydroelectric project providing real-world engineering exposure.
- Gained hands-on experience in construction activities like concreting, BBS analysis, and surveying.
- Applied academic knowledge in practical settings, enhancing technical and professional skills.
- Internship objectives were successfully fulfilled, preparing us for future roles in the engineering field.

References

- Final DPR KAHEP Report. (n.d.). [PDF document].
- Kabeli Energy Limited. (n.d.). Kabeli-A Hydroelectric Project. https://www.kel.com.np/
- Butwal Power Company Ltd. (n.d.). Kabeli-A Hydroelectric
- Project. https://www.bpc.com.np/projects/kabeli-a-hydro-electric-project

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