

TALLO LIKHU JALAVIDHYUT AAYOJANA (28.1 MW)



MONTHLY PROGRESS REPORT # 49

MAY, 2022

(18 Baisakh to 17 Jestha, 2079)

Prepared By:



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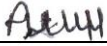


Site Office: Sirise, Ramechhap

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| | Signature | Date |
|--------------|-----------------------------------------------------------------------------------------------------------------------|------|
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1 PROJECT OVERVIEW AND INSTITUTIONAL ARRANGEMENT

Tallo Likhu Jalavidhyut Aayojana is a run-of-river (RoR) hydropower project which utilizes Gross Head 118 m and Design Discharge of 29.75 m³/s resulting to an installed capacity of 28.1 MW. The entire project area (headworks to powerhouse) is located in Likhu-Tamakoshi Rural Municipality (Saipu, ward no. 2 and Bijulikot ward no. 4) of Ramechhap, Bagmati Province of Nepal. Geographically, the project lies between Longitudes 86°15'38" E to 86°13'17" E and Latitudes 27°25'56" N to 27°22'47"N. Geologically, the project area belongs to the Lesser Himalayas.

The project's headworks area is accessible via two different road routes. One from Kathmandu-Dhulikhel-Charikot-Nayapul-Dhobi-Sirise (227 km) and another from Kathmandu-Dhulikhel-Khurkot-Manthali-Dhobi-Sirise (170 km).

CONSTRUCTION MANAGEMENT

| | |
|-------------------------------------------------------------|-------------------------------------------------------|
| The Employer/Owner | Swet Ganga Hydropower & Construction Ltd. (SGHCL) |
| The Engineer/ Consultant | Sanima Hydro and Engineering Pvt. Ltd. (SHEPL) |
| The Contractor (Civil Construction Works) | High Himalaya Hydro-Bavari Construction J.V. |
| The Contractor (Hydro-mechanical Works) | Machhapuchhre Metal & Machinery Works (P.) Ltd. (3MW) |
| The Contractor (Electro-mechanical Works) | Asia Pacific Power-Tech Co. Ltd., China |
| The Contractor (Transmission-line Works) | Aster Teleservices Nepal Pvt. Ltd. |
| Pre-construction works, camp facilities, social environment | Direct by the Employer |

2 KEY DATES

Table 1: Key dates of major events of the project

| Description | Date |
|--------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| Generation License issued by Department of Electricity Development (DoED), Ministry of Energy (MoE), Government of Nepal (GoN) | 2 Baisakh 2073 (14 April 2016) |
| | The license period of the project is from |
| | 28 Chaitra 2072 to 27 Chaitra 2107 B. S. |
| Power Purchase Agreement (PPA) with Nepal Electricity Authority (NEA) | 14 Poush 2073 (29 December 2016) |
| Financial Closure | 10 Falgun 2074 (22 February 2018) |
| Contract of Main Civil Works | 5 Chaitra 2074 (19 March 2018) |
| Contract of Hydro-mechanical Works | 9 Poush 2075 (24 December 2018) |
| Contract of Electro-mechanical Works | 18 Bhadra 2076 (4 September 2019) |
| Contract of Transmission Line Works | 8 Shrawan 2077 (23 July 2020) |
| RCOD | 15 Mangsir 2078 (1 December 2021) |

3 CONTRACT PACKAGES AND IMPLEMENTATION

| | |
|-------------------------------------------------------------|------------------------|
| Main civil construction works | Contract Package 1 |
| Hydro-mechanical works | Contract Package 2 |
| Electro-mechanical works | Contract Package 3 |
| Transmission Line works | Contract Package 4 |
| Pre-construction works, camp facilities, social environment | Direct by the Employer |

4 FINANCING

| | | |
|--------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Equity | Promoters | 25% of the total Project Cost |
| Debt | Consortium of Banks | 75% of the total Project Cost (Lead Bank: Laxmi Bank Ltd, Member Banks: Kumari Bank Ltd., Hydroelectricity Investment and Development Company Ltd. Century Commercial Bank Ltd., and Prabhu Bank Ltd.) |

5 RESOURCES AT SITE

5.1 MANPOWER FROM EMPLOYER AND ENGINEER'S SIDE:

Table 2: Human Resource at site from the Employer and Engineer's side

| Description | Number |
|----------------------------------|-----------|
| General Manager | 1 |
| Resident Engineer | 1 |
| Environment and Social Officer | 2 |
| Finance/Admin Officer | 1 |
| Civil Engineer | 3 |
| Electrical Engineer | 2 |
| Mechanical Engineer | 1 |
| Engineering Geologist | 1 |
| Safety Coordinator | 1 |
| Civil Overseer/Sub-overseer | 4 |
| Mechanical Overseer | 6 |
| Electrical Overseer/Sub-overseer | 7 |
| Surveyor | 2 |
| Social Mobilizer | 3 |
| Admin Assistant | 2 |
| Driver | 4 |
| Cook | 3 |
| Office Helper | 5 |
| Construction Helper | 6 |
| Store keeper | 1 |
| Total: | 56 |

5.2 MANPOWER FROM CIVIL CONTRACTOR'S SIDE:

Table 3: Human Resource at site from the Civil Contractor's side

| Description | Number |
|-----------------------------------------------------------------|--------|
| Technical Manpower | 19 |
| Financial and Administrative manpower | 25 |
| Skilled workers(Machine Operators, Electricians, Heavy Drivers) | 30 |
| Semi-Skilled workers(Light Drivers, Civil workers) | 24 |
| Unskilled workers(Helpers, Kitchen workers, Pump operators) | 22 |

| Description | Number |
|-------------------------------------------------------------|------------|
| Security guards | 21 |
| Total (A) | 141 |
| Other Workers (Sub-Contractors) | |
| DL/Bhimeshwor Construction (Headworks, Seti and Powerhouse) | 36 |
| Karan-Arjun Construction (Main Inlet) | 11 |
| Dreamland construction (Seti Outlet) | 35 |
| Gaiya Devi Construction (VB02) | 28 |
| Total (B) | 110 |
| Grand Total (A+B) | 251 |

Note: Data as per weekly report provided by the Main Civil Contractor on 31st May2022.

5.3 MANPOWER FROM HYDRO-MECHANICAL CONTRACTOR'S SIDE:

Table 4: Human Resource at site from the Hydro-Mechanical Contractor's side

| Description | Number |
|------------------------|-----------|
| Site Project Engineer | 1 |
| Site Supervisor | 3 |
| Safety Officer | 1 |
| Store In-charge | 1 |
| Quality Controller | 1 |
| Electrician | 1 |
| Sand Blasting Operator | 1 |
| Hydra Operator | 1 |
| Tractor driver | 1 |
| Fitter | 4 |
| Welder | 6 |
| Helper | 11 |
| Cook | 3 |
| Total | 35 |

5.4 EQUIPMENT MOBILIZED BY CIVIL CONTRACTOR

Table 5: Equipment mobilized by the Civil Contractor

| S.N. | Equipment Name | Number | S.N. | Equipment Name | Number |
|------|----------------------|--------|------|-----------------------|--------|
| 1 | Generator 62.5KVA | 2 | 24 | Pusher leg | 37 |
| 2 | Generator 30KVA | 1 | 25 | Blaster (Exploder) | 6 |
| 3 | Generator 125KVA | 1 | 26 | Siren | 6 |
| 4 | Generator 25 KVA | 1 | 27 | Core Cutting machine | 2 |
| 5 | Generator 160 KVA | 3 | 28 | Hand drilling machine | 3 |
| 6 | Generator 250 KVA | 2 | 29 | Air compressor | 7 |
| 7 | Air Receiver tank | 4 | 30 | Vibrators | 8 |
| 8 | Ohm meter | 6 | 31 | Water pump 10" | 2 |
| 9 | Excavator | 4 | 32 | Water pump 12" | 1 |
| 10 | Dump Truck | 11 | 33 | Water Pump 1.5" | 6 |
| 11 | Transportation Truck | 1 | 34 | Water pump 6" | 4 |
| 12 | Backhoe Loader (JCB) | 3 | 35 | Grinding machine(4") | 6 |

| S.N. | Equipment Name | Number | S.N. | Equipment Name | Number |
|------|-------------------------|--------|------|----------------------------|--------|
| 13 | Wheeled loader | 4 | 36 | Grinding machine(7") | 1 |
| 14 | Tractor | 3 | 37 | Welding machine | 8 |
| 15 | Light vehicle | 6 | 38 | Ply cutter machine (8"/7") | 1 |
| 16 | Concrete Batching Plant | 1 | 39 | Prism with tripod set | 5 |
| 17 | Concrete mixer | 10 | 40 | Leveling staff (5m) | 4 |
| 18 | Grouting pump | 4 | 41 | Total station (Topcon) | 3 |
| 19 | Concrete pump | 3 | 42 | Auto level with tripod set | 4 |
| 20 | Transit mixer | 4 | 43 | Shotcrete machine PZ5 | 3 |
| 21 | Blower fan set | 2 | 44 | Compressive test machine | 2 |
| 22 | Pull out test machine | 1 | 45 | Lubricator | 43 |
| 23 | Shotcrete Robot (Jacon) | 1 | 46 | Diesel Tank 16000Ltr | 3 |

5.5 EQUIPMENT MOBILIZED BY HYDRO-MECHANICAL CONTRACTOR

Table 6: Equipment mobilized by the Hydro-Mechanical Contractor

| S.N. | Equipment | Number |
|------|-----------------------------|--------|
| 1 | Hydraulic Crane | 1 |
| 2 | Excavator | 1 |
| 3 | Tractor | 1 |
| 4 | Diesel Generator (200 KVA) | 1 |
| 5 | Diesel Generator (40 KVA) | 1 |
| 6 | Diesel Generator (12.5 KVA) | 1 |
| 7 | Welding Machine | 14 |
| 8 | Compressor | 1 |
| 9 | Grinding Machine (7") | 14 |
| 10 | Grinding Machine (4") | 8 |
| 11 | Master Oven | 1 |
| 12 | Portable Oven | 14 |

5.6 CONSTRUCTION MATERIALS STORED BY CIVIL CONTRACTOR AT SITE:

Table 7: Construction material stored by the Main Civil Contractor

| Materials | Unit | Balance Quantity |
|-------------------|--------|------------------|
| Diesel | Litres | 13,420 |
| Rebar (25mm dia.) | Ton | - |
| Rebar (20mm dia.) | Ton | 2.80 |
| Rebar (16mm dia.) | Ton | 4.00 |
| Rebar (12mm dia.) | Ton | 28.50 |
| Cement | Bags | 5,714 |
| Plasticizer | Kg | 1,680.00 |
| Steel Fibre | Kg | 125.00 |
| Micro Silica | Kg | 400.00 |
| Accelerator | Kg | 275.00 |

Note: Data as per weekly report provided by the Main Civil Contractor on 31st May 2022.

6 CIVIL CONSTRUCTION WORK PROGRESS

6.1 HEADWORKS

The civil work progress at headworks in May, 2022 is as follows:

- Base concreting and rebar installation work has been carried out simultaneously at the stretch between chainage 0+050.00 to 0+087 of the fish passage.

Table 8: Work progress at headworks in May, 2022

| S. N. | Description | Unit | Quantity | Remarks |
|-------|-------------------|----------------|----------|---------|
| 1 | C25 concrete | m ³ | 15.00 | |
| 3 | 1:6 Stone masonry | m ³ | 20.00 | |
| 4 | Rebar | Ton | 5.00 | |



Figure 1: Headworks view from settling basin side



Figure 2: View of fish passage



Figure 3: Construction of headrace pipe saddle supports in crusher area

6.2 HEADRACE TUNNEL, SYPHON CROSSING AND SURGE SHAFT**HRT FROM MAIN INLET PORTAL TO SETI OUTLET PORTAL**

The full concrete lining work has been completed in this stretch in May 2022 and pipe installation works is going on. The plug block construction at main inlet portal side has been completed and is ongoing at Seti outlet portal side along with saddle supports and pipe erection.

Table 9: Civil work progress for the tunnel stretch from main inlet portal to Seti outlet portal

| Lining Type | Face | Design length (m) | Completed length (m) | Remaining (m) |
|----------------------|--------------|--------------------------|-----------------------------|----------------------|
| Shotcrete | Face 1 | 528.32 | 528.32 | - |
| | Face 2 | 292.80 | 292.80 | - |
| | Total | 821.12 | 821.12 | - |
| | | | | |
| Wall concrete | Face 1 | 528.32 | 528.32 | - |
| | Face 2 | 292.80 | 292.80 | - |
| | Total | 821.12 | 821.12 | - |
| | | | | |
| Full concrete | Face 1 | 263.00 | 263.00 | - |
| | Face 2 | 602.00 | 602.00 | - |
| | Total | 865.00 | 865.00 | - |
| | | | | |
| Pipe Section | Face 1 | 37.00 | 20.00 | 17.00 |
| | Face 2 | 25.00 | 8.00 | 17.00 |
| | Total | 62.00 | 28.00 | 34.00 |



Figure 4: Saddle support construction at the main inlet portal side

HRT FROM SETI INLET PORTAL TO POKU OUTLET PORTAL

All civil works have been completed.

HRT FROM POKU INLET PORTAL TO MAIN OUTLET PORTAL

All civil works have been completed.

SETI CROSSING

All civil works have been completed.

POKU CROSSING

All civil works have been completed.

SURGE SHAFT, ROCK TRAP AND CONNECTING TUNNEL

All civil works have been completed.

6.3 PENSTOCK, PPV HOUSE, POWERHOUSE AND TAILRACE

PENSTOCK ALIGNMENT:

Plum concreting work of anchor block VB01 has been completed up to the bottom of the pipe. Further concreting shall be done after bend pipe installation by the HM contractor.

The civil construction of the saddle supports of panel 3 and 4 have been completed. Reinforcement installation is ongoing for the panel 5.

Plum concreting work of anchor Block VB02 have been completed and the access road has been diverted through this block.

PPV HOUSE:

The construction of the RCC frames of the PPV house have been completed. Installation of the roof truss has been started.

POWERHOUSE:

All concreting works of the powerhouse have been completed and Electro-Mechanical installation works is ongoing. Painting works, surface drainage works and septic tank construction works of powerhouse are ongoing.

CONTROL ROOM AND OFFICE BUILDING:

The block masonry construction of control room building and the office building have been completed. Painting works is ongoing.

TAILRACE:

All civil works of the tailrace culvert have been completed.

SWITCHYARD:

All civil works of the switchyard have been completed.

Table 10: Progress at penstock and powerhouse in May, 2022

| S.N. | Description | Unit | Quantity (Powerhouse and control building) | Quantity (Penstock alignment) |
|------|-------------------|----------------|--------------------------------------------|-------------------------------|
| 1 | C25 concrete | m ³ | - | 190.00 |
| 2 | Re-bar | ton | - | 10.00 |
| 3 | C25 Plum concrete | m ³ | - | 50.00 |



Figure 5: View of the penstock pipe saddle supports and PPV house



Figure 6: Surface drainage and painting works ongoing in the powerhouse



Figure 7: Roof truss installation initiated in the PPV house

7 HYDRO-MECHANICAL WORKS

The progress of hydro-mechanical installation works achieved in May 2022 is listed below:

- Pipe installation works of the rock crusher area is ongoing.
- Pipe installation work in the main inlet portal side is ongoing.
- Erection of bellmouth has been completed at the Seti outlet portal side and pipe installation work is ongoing.
- Installation of tailrace stoplog and draft tube gate is ongoing.



Figure 8: Pipe installation at the Seti Outlet portal side



Figure 9: Pipe installation between anchor block VB01 and VB02 of penstock

8 ELECTRO-MECHANICAL WORK PROGRESS

The work progress of the electro-mechanical installation works in May 2022 is below:

Machine Unit 1:

- Turbine main erection works have been completed.
- Stator, rotor and upper bracket have been lowered to position.
- Thrust head installation has been completed.
- Manual turning of turbine and runner is ongoing.
- Machine aligning work is ongoing.

Machine Unit 2:

- Installation of top cover of generator is ongoing.
- Brushless excitation generator installation has been completed.
- Radiator fitting at stator has been completed.
- Installation of oil cooling pipe has been completed.
- Neutral grounding terminal (NGT) and high voltage terminal works are ongoing.
- Electrical connection of RTD sensor, smoke detector and fire detector has been completed.

Control room:

- High voltage cable termination works have been completed.
- Control cable laying works have been completed. Preliminary works before the termination works are ongoing.

Switchyard:

- Installation of main switchyard equipment has been completed.

New Khimti Substation:

- Double bus bar gantry structure has been delivered to site.

PPV house:

- Installation of EOT crane has been completed.



Figure 10: Top cover installation at machine unit 1



Figure 11: Cable tray and cooling pipeline of machine unit 2



Figure 12: Switchyard



Figure 13: Control room



Figure 14: Powerhouse machine hall

9 CONSTRUCTION POWER

The 12 km long construction power line has been erected from headworks area to Sangutar in coordination with NEA and the public. The line has been charged from a 6 MVA transformer at Manthali on 16th of Mangsir, 2076. The NEA's dedicated line has been made available to all working fronts. Regular monitoring and bush-cutting is ongoing.

10 TRANSMISSION LINE WORKS (132 KV)

In May 2022, the erection of one tower (AP57) has been completed. Including this, the erection works have been completed for 61 tower locations. Conductor stringing works have been completed for 20.10 km stretch and OPGW cable has been installed for 20.86km.



Figure 15: View of AP04 and AP03

Table 11: Transmission line work progress

| S.N | Description of Work | Design quantity | Completed till date | Remaining | Remarks |
|-----|--------------------------|-----------------|---------------------|-----------|---------|
| 1 | Foundation Excavation | 62 Nos. | 61 Nos. | 1 No. | |
| 2 | Foundation concreting | 62 Nos. | 61 Nos. | 1 No. | |
| 3 | Tower Erection | 62 Nos. | 61 Nos. | 1 Nos. | |
| 4 | ACRS Conductor stringing | 22 km | 20.10km | 1.90km | |
| 5 | OPGW cable stringing | 22km | 20.86km | 1.94km | |

11 SOCIAL AND PUBLIC

The major social activities undertaken in May 2022 are:

- Office vehicle has been provided to the locals during emergency situations for transportation to hospital.
- Water spraying has been continued in the market area using tractor mounted tank.

12 OCCUPATIONAL SAFETY AND HEALTH (OSH)

In addition to the construction activities, Occupational Safety & Health (OSH) has also been considered as one of the major prospects of the project. The OSH team at site promotes a safe and sound working environment at the working fronts by implementing safety and health standards and safe working procedure through awareness and monitoring. The OSH team ensures preparedness in mishaps and emergencies. Regular meeting with the contractors and workers are conducted for the enhancement of safety culture. The OSH team routinely screens the construction fronts to guarantee safe practice and deter the safety non-compliance.

The company has also hired an external consultant team (SMS Environment and Engineering Pvt. Ltd) for monitoring the safe working environment. The external consultant regularly performs safety audits at site to ensure the consistence of OSH and provide essential restorative methods.

12.1 OSH IMPLEMENTATION BY THE CONTRACTORS

Table 12: OSH implementation by the Civil Contractor

| Particular | Description | Remarks |
|------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|-----------|
| Fencing at Seti Camp | Fence at Seti camp has been repaired. The worn out fence has been replaced. | |
| Compliance of PPE at all working fronts | Workers have been provided with appropriate PPE. The use of PPE is well monitored. | |
| Electric bulb installation | Additional electric bulbs have been installed at the main inlet tunnel for enhancing visibility. | Continued |
| Labour Day | Motivational speech and awareness was provided to the workers on 1 st of May (International Labour Day) | |

Table 13: OSH implementation by the Hydro-mechanical contractor

| Particular | Description | Remarks |
|-----------------------------|-------------------------------------------------------------------------------------------------------------|-----------|
| PPE | Appropriate PPE has been provided to the welders, fitters, helpers and site supervisors as per work nature. | |
| Railing installation | Railings have been installed as per design at the Settling basin and intake area for safety of visitors. | Completed |

Table 14: OSH implementation by the TL contractor

| Particular | Description | Remarks |
|-----------------------------------------|-----------------------------------------------------------------------------------------------|---------|
| Toolbox talk and safety briefing | Toolbox talks and safety briefings have been organised regularly before start of work. | Ongoing |
| Use of drone | Drone has been used for stringing of conductor at relatively unsafe areas. | Ongoing |
| Use of safety harness | The workers have been provided with safety harness and it is utilized during stringing works. | Ongoing |

12.2 TEST RESULTS

Table 15: Illumination Intensity in the Tunnel

| S. N. | Location | Readings at working face (LUX) | Min. Light required, (LUX), Nepal | Readings inside tunnel (LUX) | Min. Light required, (LUX), Nepal | Status |
|-------|-------------|---------------------------------------------|-----------------------------------|------------------------------|-----------------------------------|--------|
| 1 | Main inlet | 120 | 100 | 70 | 50 | Normal |
| 2 | Set outlet | 125 | 100 | 64 | 50 | Normal |
| 3 | Seti inlet | Work Completed, the tunnel has been closed | | | | |
| 4 | Poku outlet | | | | | |
| 5 | Poku inlet | | | | | |
| 6 | Main outlet | | | | | |
| 7 | Surge shaft | Work Completed, Surge shaft has been closed | | | | |

Table 16: Oxygen level in the tunnel

| S.N | Locations | Status |
|-----|-------------|-----------------------------------------------|
| 1 | Main inlet | Natural air circulation between Face 1 and 2. |
| 2 | Set outlet | |
| 3 | Seti inlet | Natural air circulation between Face 3 and 4. |
| 4 | Poku outlet | |
| 5 | Poku inlet | Natural air circulation between Face 5 and 6. |
| 6 | Main outlet | |
| 7 | Surge shaft | Work Completed. |

Table 17: Sound intensity in the tunnel

| S.N. | Locations | Measured Noise Level (dBA) | Status |
|------|-------------|--------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 1 | Main inlet | Breakthrough on 2078-02-13. No loud noise after breakthrough | After Breakthrough, generally noise level does not exceed 85dBA. Workers are provided noise protection PPE |
| 2 | Set outlet | | |
| 3 | Seti inlet | Breakthrough on 2076-08-30. No loud noise after breakthrough | |
| 4 | Poku outlet | | |
| 5 | Poku inlet | Breakthrough on 2077-02-20. No loud noise after breakthrough | |
| 6 | Main outlet | | |
| 7 | Surge Shaft | Breakthrough on 2077-04-20 No loud noise after breakthrough | |

13 PROGRESS PHOTOGRAPHS



Figure 16: View of weir and undersluice from downstream side



Figure 17: Bhangale Kholsi crossing under construction



Figure 18: View of settling basin



Figure 19: Powerhouse and switchyard from VB02 area



Figure 20: Transport of pipe inside main inlet tunnel using hydraulic crane

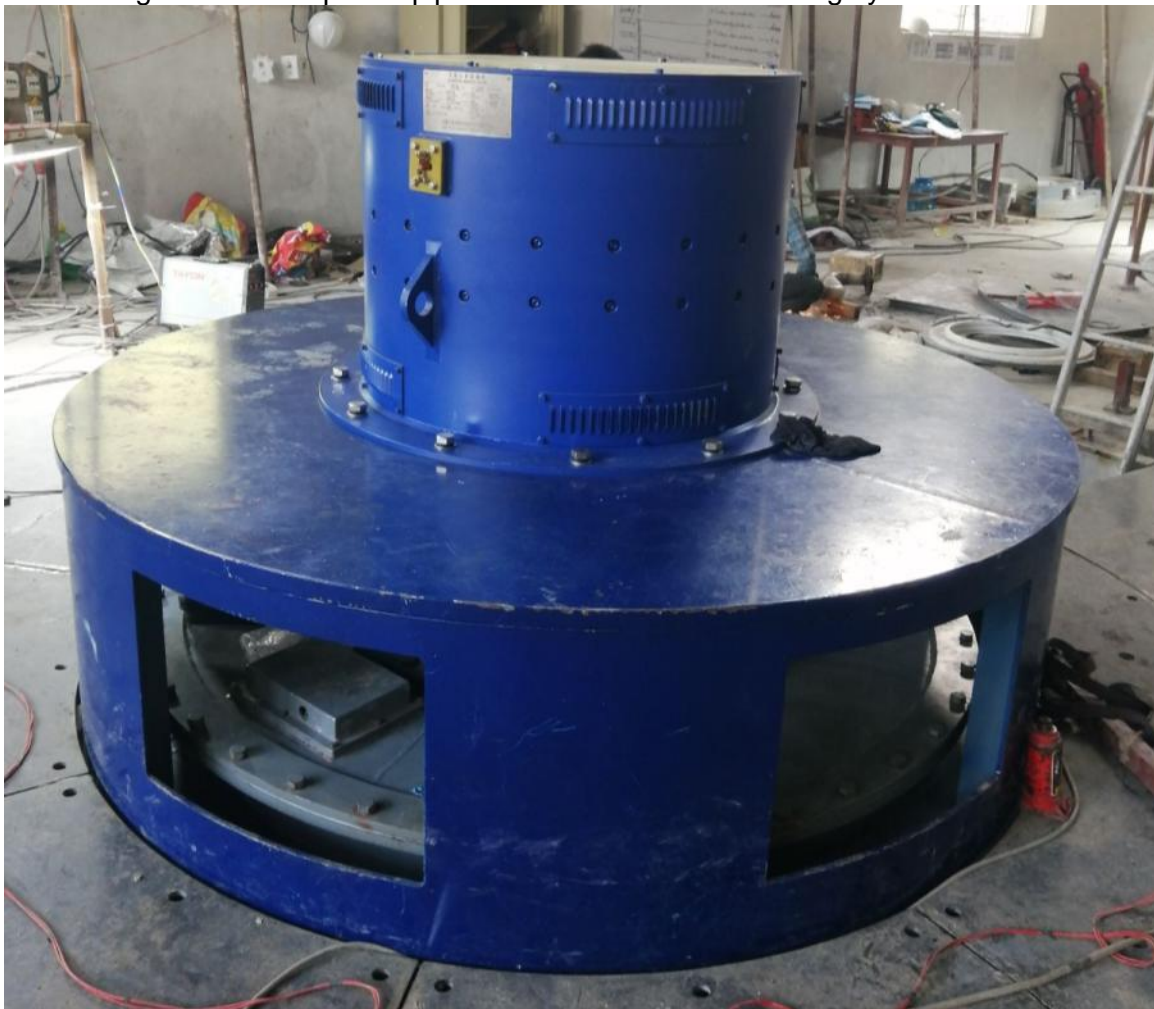


Figure 21: Generator cover installation at machine unit 2



Figure 22: Stair for access to the intake gate operation platform



Figure 23: Railing installation at the intake area

14 PROGRESS CHART

