

INDEPENDENT ENGINEER

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MONTHLY REPORT

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Appendix: The current time schedule for the construction of foundation (BRIV Company, 21/07/2022)

1 INTRODUCTION

1.1 PURPOSE

This document is issued on basis of the Independent Engineer Services contract signed between IPSA Institute, Government of Montenegro and Žičara Kotor - Lovćen Ltd. Podgorica, number 8854 (IPSA Institute), as a report on monitoring and supervision of works on construction of the Kotor – Lovćen Ropeway, on weekly level.

1.2 SCOPE

All major aspects of the construction process are commented within different chapters of the document. Proposals are given for eventual open issues between the participants of the project. Any ongoing process relevant for further development of project is analysed and its potential to impede the time schedule assessed.

2 GENERAL UPDATE AND THE TIME SCHEDULE

2.1 MAJOR ACTIVITIES

- During August, Contractor's site activities were mostly focused on construction of line foundations and station foundations for the ropeway facility.
- Some excavation works were performed for foundations of both station buildings.

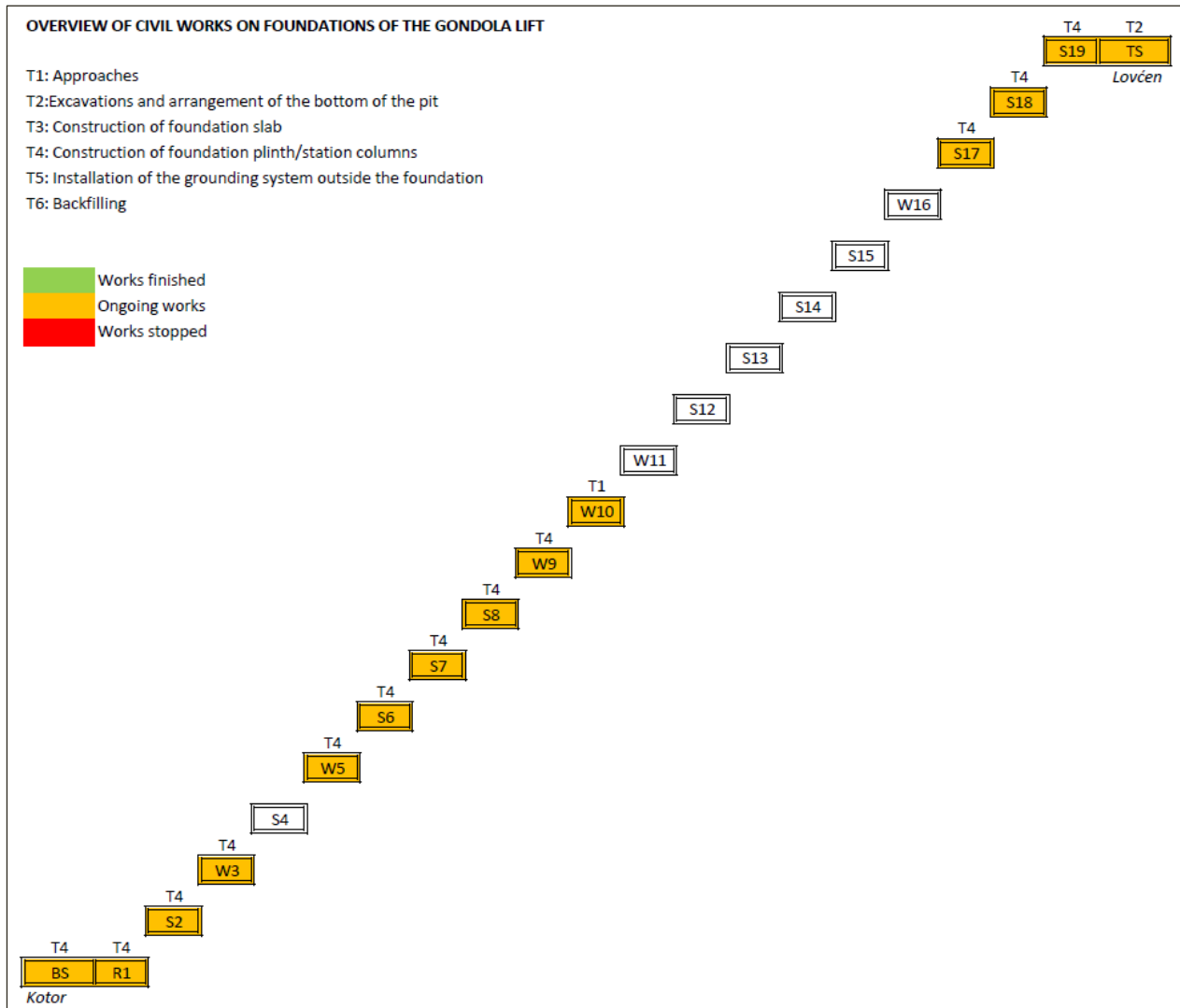


Figure 2-1: Overview of civil works on the ropeway facility, as of CW 35

2.2 PROGRESS OF WORKS ON THE ROPEWAY FACILITY

2.2.1 CIVIL WORKS

Comparisons between planned and realized activities are made with respect to the current time schedule prepared by BRIV Company and issued on 21/07/2022. Progress of works (ahead, in line with or behind the schedule) is assessed on monthly level. The overview is shown below.

- Bottom station: ahead of the schedule.
- R1: behind the schedule.
- S2: behind the schedule.

- W3: ahead of the schedule.
- S4: in line with the schedule.
- W5: ahead of the schedule.
- S6: ahead of the schedule.
- S7: ahead of the schedule.
- S8: ahead of the schedule.
- W9: behind the schedule.
- W10: in line with the schedule.
- W11: in line with the schedule.
- S12: in line with the schedule.
- S13: in line with the schedule.
- S14: in line with the schedule.
- S15: in line with the schedule.
- W16: in line with the schedule.
- S17 ahead of the schedule.
- S18 ahead of the schedule.
- S19 ahead of the schedule.
- Top station: ahead of the schedule.

2.2.2 DELIVERY AND INSTALLATION OF COMPONENTS

- No time schedule prepared and submitted to date.

2.2.3 LAGGING ACTIVITIES AND/OR EVENTS THAT CAN IMPEDE THE COURSE OF WORKS

- Delays with deliveries of anchor bolts already caused delays with civil works.
- Issues over expropriation at the location of the tower S4 have not been resolved yet. This will probably result in delays of civil works on the tower foundation.

2.3 PROGRESS OF WORKS ON THE BOTTOM STATION BUILDING

- No time schedule prepared and submitted to date.

2.4 PROGRESS OF WORKS ON THE TOP STATION BUILDING

- No time schedule prepared and submitted to date.

3 OVERVIEW OF WORKS ON THE ROPEWAY FACILITY

3.1 CIVIL WORKS

3.1.1 BOTTOM STATION

Task No.	Description	Status	Remarks
1	Approaches	Finished (CW 30)	
2	Excavations and arrangement of the bottom of the pit	Finished (CW 31)	
3	Construction of the foundation slab	-	Date of casting: 26/08/2022
4	Construction of columns	-	
5	Installation of the grounding system outside the foundation	-	
6	Backfilling	-	

3.1.2 TOWER R1

Task No.	Description	Status	Remarks
1	Approaches	Finished (CW 30)	
2	Excavations and arrangement of the bottom of the pit	Finished (CW 34)	
3	Construction of the foundation slab	Finished (CW 34)	Date of casting: 27/08/2022
4	Construction of the plinth	-	
5	Installation of the grounding system outside the foundation	-	
6	Backfilling	-	

3.1.3 TOWER S2

Task No.	Description	Status	Remarks
1	Approaches	Finished (CW 30)	
2	Excavations and arrangement of the bottom of the pit	Finished (CW 31)	
3	Construction of the foundation slab	Finished (CW 34)	Date of casting: 27/08/2022
4	Construction of the plinth	-	
5	Installation of the grounding system outside the foundation	-	
6	Backfilling	-	

3.1.4 TOWER W3

Task No.	Description	Status	Remarks
1	Approaches	Finished (CW 32)	
2	Excavations and arrangement of the bottom of the pit	Finished (CW 34)	
3	Construction of the foundation slab	Finished (CW 35)	Date of casting: 29/08/2022
4	Construction of the plinth	-	
5	Installation of the grounding system outside the foundation	-	
6	Backfilling	-	

3.1.5 TOWER S4

Task No.	Description	Status	Remarks
1	Approaches	-	
2	Excavations and arrangement of the bottom of the pit	-	
3	Construction of the foundation slab	-	
4	Construction of the plinth	-	
5	Installation of the grounding system outside the foundation	-	
6	Backfilling	-	

3.1.6 TOWER W5

Task No.	Description	Status	Remarks
1	Approaches	Finished (CW 32)	
2	Excavations and arrangement of the bottom of the pit	Finished (CW 34)	
3	Construction of the foundation slab	Finished (CW 35)	Date of casting: 30/08/2022
4	Construction of the plinth	-	
5	Installation of the grounding system outside the foundation	-	
6	Backfilling	-	

3.1.7 TOWER S6

Task No.	Description	Status	Remarks
1	Approaches	Finished (CW 32)	
2	Excavations and arrangement of the bottom of the pit	Finished (CW 34)	
3	Construction of the foundation slab	Finished (CW 35)	Date of casting: 31/08/2022
4	Construction of the plinth	-	
5	Installation of the grounding system outside the foundation	-	
6	Backfilling	-	

3.1.8 TOWER S7

Task No.	Description	Status	Remarks
1	Approaches	Finished (CW 32)	
2	Excavations and arrangement of the bottom of the pit	Finished (CW 34)	
3	Construction of the foundation slab	Finished (CW 35)	Date of casting: 31/08/2022
4	Construction of the plinth	-	
5	Installation of the grounding system outside the foundation	-	
6	Backfilling	-	

3.1.9 TOWER S8

Task No.	Description	Status	Remarks
1	Approaches	Finished (CW 32)	
2	Excavations and arrangement of the bottom of the pit	Finished (CW 34)	
3	Construction of the foundation slab	Finished (CW 35)	Date of casting: 01/09/2022
4	Construction of the plinth	-	
5	Installation of the grounding system outside the foundation	-	
6	Backfilling	-	

3.1.10 TOWER W9

Task No.	Description	Status	Remarks
1	Approaches	Finished (CW 33)	
2	Excavations and arrangement of the bottom of the pit	Finished (CW 34)	
3	Construction of the foundation slab	Finished (CW 35)	Date of casting: 02/09/2022
4	Construction of the plinth	-	
5	Installation of the grounding system outside the foundation	-	
6	Backfilling	-	

3.1.11 TOWER W10

Task No.	Description	Status	Remarks
1	Approaches	Ongoing	
2	Excavations and arrangement of the bottom of the pit	-	
3	Construction of the foundation slab	-	
4	Construction of the plinth	-	
5	Installation of the grounding system outside the foundation	-	
6	Backfilling	-	

3.1.12 TOWER W11

Task No.	Description	Status	Remarks
1	Approaches	-	
2	Excavations and arrangement of the bottom of the pit	-	
3	Construction of the foundation slab	-	
4	Construction of the plinth	-	
5	Installation of the grounding system outside the foundation	-	
6	Backfilling	-	

3.1.13 TOWER S12

Task No.	Description	Status	Remarks
1	Approaches	-	
2	Excavations and arrangement of the bottom of the pit	-	
3	Construction of the foundation slab	-	
4	Construction of the plinth	-	
5	Installation of the grounding system outside the foundation	-	
6	Backfilling	-	

3.1.14 TOWER S13

Task No.	Description	Status	Remarks
1	Approaches	-	
2	Excavations and arrangement of the bottom of the pit	-	
3	Construction of the foundation slab	-	
4	Construction of the plinth	-	
5	Installation of the grounding system outside the foundation	-	
6	Backfilling	-	

3.1.15 TOWER S14

Task No.	Description	Status	Remarks
1	Approaches	-	
2	Excavations and arrangement of the bottom of the pit	-	
3	Construction of the foundation slab	-	
4	Construction of the plinth	-	
5	Installation of the grounding system outside the foundation	-	
6	Backfilling	-	

3.1.16 TOWER S15

Task No.	Description	Status	Remarks
1	Approaches	-	
2	Excavations and arrangement of the bottom of the pit	-	
3	Construction of the foundation slab	-	
4	Construction of the plinth	-	
5	Installation of the grounding system outside the foundation	-	
6	Backfilling	-	

3.1.17 TOWER W16

Task No.	Description	Status	Remarks
1	Approaches	-	
2	Excavations and arrangement of the bottom of the pit	-	
3	Construction of the foundation slab	-	
4	Construction of the plinth	-	
5	Installation of the grounding system outside the foundation	-	
6	Backfilling	-	

3.1.18 TOWER S17

Task No.	Description	Status	Remarks
1	Approaches	Finished (CW 32)	
2	Excavations and arrangement of the bottom of the pit	Finished (CW 34)	
3	Construction of the foundation slab	Ongoing	
4	Construction of the plinth	-	
5	Installation of the grounding system outside the foundation	-	
6	Backfilling	-	

3.1.19 TOWER S18

Task No.	Description	Status	Remarks
1	Approaches	Finished (CW 32)	
2	Excavations and arrangement of the bottom of the pit	Finished (CW 34)	
3	Construction of the foundation slab	Finished (CW 35)	Date of casting: 03/09/2022
4	Construction of the plinth	-	
5	Installation of the grounding system outside the foundation	-	
6	Backfilling	-	

3.1.20 TOWER S19

Task No.	Description	Status	Remarks
1	Approaches	Finished (CW 32)	
2	Excavations and arrangement of the bottom of the pit	Finished (CW 34)	
3	Construction of the foundation slab	Finished (CW 35)	Date of casting: 03/09/2022
4	Construction of the plinth	-	
5	Installation of the grounding system outside the foundation	-	
6	Backfilling	-	

3.1.21 TOP STATION

Task No.	Description	Status	Remarks
1	Approaches	Finished (CW 34)	
2	Excavations and arrangement of the bottom of the pit	Ongoing	
3	Construction of the foundation slab	-	
4	Construction of columns	-	
5	Installation of the grounding system outside the foundation	-	
6	Backfilling	-	

3.2 INSTALLATION OF COMPONENTS

3.2.1 DELIVERIES

- No components were delivered during August.

3.2.2 PROGRESS OF INSTALLATION

- Installation of components has not started yet.

4 THE BOTTOM STATION BUILDING

4.1 CIVIL WORKS

- Excavation of ditches for strip foundations.

4.2 ARCHITECTURE

- Works have not started yet.

4.3 HYDRO TECHNICAL WORKS

- Works have not started yet.

4.4 ELECTRO TECHNICAL WORKS

- Works have not started yet.

4.5 MECHANICAL WORKS

- Works have not started yet.

5 THE TOP STATION BUILDING

5.1 CIVIL WORKS

- Excavation of ditches for strip foundations.

5.2 ARCHITECTURE

- Works have not started yet.

5.3 HYDRO TECHNICAL WORKS

- Works have not started yet.

5.4 ELECTRO TECHNICAL WORKS

- Works have not started yet.

5.5 MECHANICAL WORKS

- Works have not started yet.

6 QUALITY CONTROL

6.1 GENERAL OVERVIEW

- The Contractor prepared checklists for construction of foundations. These are to be submitted to the Supervisor for control and approval.
- LEITNER specification W 00040 e, which prescribes tolerances for the installation of anchors and anchor rings, shall be strictly followed for all the site work related to the ropeway facility.
- For all built-in materials, products and the equipment installed, proper certificates and/or test results are to be submitted to the Supervisor.

6.2 QUALITY ASSURANCE DOCUMENTS, TEST RESULTS AND CERTIFICATES OF MATERIALS

- Check lists for civil works on foundations (survey control of position) – submitted for all works executed as so far on foundations and signed/approved by the Supervisor.
- N22/52 (18/08/2022) – Test results for compaction of bedding below foundations R1, S2, W3 and the bottom station.
- N22/53 (01/09/2022) – Test results for compaction of bedding below foundations W19, S17, S18 and S19.
- N22/54 (01/09/2022) – Test results for compaction of bedding below foundation of the top station and strip foundation of the top station building.
- Certificates for reinforcement are missing or not made available to IE.
- Certificates for grounding bands are missing or not made available to IE.

7 HSE

- No severe HSE incidents noted.
- Personal protective equipment is not used by all workers present on the site.

8 NON-CONFORMITIES

- The strategy for construction of foundations S11 and S12 has not yet been defined, as well as the installation procedure (mobile cranes or helicopters).
- The Contractor will proceed with works downhill from S17 towards S16 following the concept given in the Main Design. However, the Contractor intends to make adjustments of geometry and position of the approach road.
- Delay in delivery of anchors lead to delays of civil works.
- Works at the tower S4 location cannot be performed due to unresolved issues with expropriation.
- The equipment delivery schedule and the installation schedule are missing.
- Time schedules for construction of station buildings are missing.

9 REMARKS (ISSUES FOR FURTHER CLARIFICATION, PROPOSALS)

- The time schedule for construction of foundations should be updated since the course of works does not match with the current schedule.
- Approaches to tower locations from S13 to W16 will most likely be constructed along the ropeway line, going down from W16 to S13. 60 m wide corridor reserved for the ropeway must be respected.
- Smaller departures from the Main Design, due to some specific conditions on the site, always have to be checked and approved by the Designer of the Main Design before performing any site activities.
- Casting of plinths and/or station columns can only be allowed upon submittal and acceptance of the LEITNER specification W 00040 e, which prescribes tolerances for the installation of anchors and anchor rings.
- Missing time schedules for delivery and installation of ropeway facility components, the bottom station building and the top station building should be prepared and submitted as soon as possible. These schedules have to be harmonized in order to avoid unnecessary delays of work and to enable easier recognition of possible bottlenecks.
- **The overall progress of civil works can be deemed satisfactory as so far.**

10 PHOTOS



Figure 10-1: The bottom station



Figure 10-2: R1 and S2



Figure 10-3: W3



Figure 10-4: S5 and S6 after excavation and placement of concrete underlay



Figure 10-5: S5 and S6 after casting





Figure 10-6: Casting of S7 foundation slab and placement of reinforcement at S8



Figure 10-7: S17 after excavation and S18 after casting



Figure 10-8: Excavations at S19 and the top station, compaction of soil at the top station