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The Initial Process of Dam Construction is Seen from a Topographical Perspective (Bench Mark Coordinates and Control Point Coordinates): Case study of D.I. Bajayu Kab Serdang Bedagai

Tika Ermita Wulandari[1], Indri Dayana[2], and Habib Satria[3]

[1,2,3]Engineering Faculty, Universitas Medan Area, Medan, Indonesia

ABSTRACT- The research aims to determine the initial process of dam construction is seen from a topographical perspective (bench mark coordinate and control point coordinates: case study of D.I. Bajayu kab. Serdang Bedagai. The aim and objective of this topographic survey is to collect topographical data from the field in order to produce supporting data in the form of a topographical/situation base map including cross-sectional and longitudinal cross-sectional images along the measurement location. Measurement 20 data of topographi for BM coordinat and CP coordinat, so: measurements are made up to 50 meters from the left and right bank of the river, measurement lengthwise (long section) of ± 8.2 km was carried out from the confluence of the Padang river with the Bah disappeared river to the Bajayu free intake location, measurement benchmark interval for 100 meters straight area and 50 meters turning area,conduct measurements on the linking route/trace from the planned main building to the free intake of D.I Bajayu and the first building for D.I Paya Lombang, measuring 50 meter intervals, the length of the measurement path from the axle of the weir to the Bajayu free intake is 3,600 m following the embankment to the right of the Padang river, the length of the canal trace from the axle of the weir to the building for the first Paya Lombang is 4,600 m following the existing road.

KEYWORDS- Initial process; Dam contruction; Topographical perspective; Bench mark coordinate;Control point coordinate; case study of D.I. Bajayu kab. Serdang Bedagai.

I. INTRODUCTION

Topography is the natural or cultural (artificial) relief or appearance of the earth's surface in a three-dimensional shape which includes the differences in the elevation of the earth's surface from sea level (relief), the shape of the area, the slope and the shape of the slope. Topography is characterized by the existence of contour lines, which are imaginary lines that connect places that have the same elevation [1].

Contour lines that are densely packed indicate areas that are steep and steep, while areas that are sloping are depicted with sparse contours. Topographic scale is divided into three, namely small, medium, and large scale. The larger the scale of the map, the more accurate the position data can be presented [2].Topographi Functions Display planimetric data in the form of topographical elements, namely natural (rivers, forests, etc.), and man-made (roads, markets, airports, etc.) in a correct, precise, clear, attractive, and economical manner [3]. Displays elevation data such as elevation point data and topographic contour data displays information about presence, location, and distance, such as population locations, travel routes, and communications, Displays area variations, contour elevations, and vegetation cover levels determine the slope for the construction of business facilities to public facilities, such as ponds and reservoirs determining the appropriate location for the construction of cultural objects such as roads and railroads[4]. The aim and objective of this topographic survey is to collect topographical data from the field in order to produce supporting data in the form of a topographical/situation base map including cross-sectional and longitudinal cross-sectional images along the measurement location [10].

The failure of water to enter through the Bajayu free-take building located in the Padang Tebing Tinggi watershed (DAS) is a major problem. The discharge or water level of the Padang River has continued to decrease in recent months due to the long dry season.

Approximately 1300 hectares of agricultural area in the villages of Paya Lombang and Kuta Baru, Tebing Tinggi District, Serdang Bedagai Regency, North Sumatra are dry. The condition of the rice is now starting to deteriorate, even the soil in the rice fields is dry and cracked. If the dry season continues, thousands of hectares of rice farming areas will experience crop failure[5].

The repair or construction of the Paya Lombang weir around Tanjung Marulak Hilir Village, Rambutan District, Tebing Tinggi City is not beneficial for farmers. This is because the Beronjongan, which was built decades ago, is now in very poor condition[6].

On the other hand, the people of Tebing Tinggi have the paradigm that the weir at Paya Lombang is the main cause of the rising water level of the Padang river so that if the water discharge of the Padang river increases, flooding in the city of Tebing Tinggi cannot be avoided.

Therefore, careful planning is needed which is able to increase agricultural production through increased irrigation and the unification of several irrigation areas in the Bajayu irrigation area, the Paya Lombang irrigation area and the Langau irrigation area into one unified system with the main Bajayu building as the intake building for the three irrigation areas. The design of the D.I Bajayu weir accommodates

irrigation interests (D.I Paya Lombang 1558 Ha, D.I Langau 2000 Ha and D.I Bajayu 4000 Ha) and Flood Control in Tebing Tinggi City.Broadly speaking, as stated in the TOR, that the detailed design of the Bajayu Weir must accommodate the interests of Tebing Tinggi City Flood Control and Irrigation, namely obtaining the location and type of main building that can function for irrigation and flood control.

This is what makes topography very important before making a building design such as this bridge design, so that it is known that the resistance of the building is ready to be built[7].

II. RESEARCH METHODS

Methods measurement and analyze.This work includes administrative and permit preparation activities for related agencies, preparation of personnel and equipment, base camp and local personnel, making stakes, preparing materials, logistics and other needs[9].

This activity includes mobilization and demobilization of equipment and personnel needed during measurement activities[8].

Bench Mark (BM) is installed in a safe place, easy to see and reach. In addition to control points, CP (Control Point) markers are installed at certain places between the 2 (two) BM stakes. Polygon measurements are carried out to determine the location and position of the coordinates of each stake. Waterpass measurements are carried out to determine the difference in height of each point. After the polygon and waterpass measurements have been carried out, the coordinates and elevation calculations for each point are then carried out. After calculating the coordinates and elevation, the results are obtained, then a delineation/mapping is carried out according to the planning requirements[7].

III. RESULT AND DISCUSSION

Even though the BM coordinates have been determined by GPS observations, in carrying out the measurements for this work, the BM within the work location is re-measured polygonally using electronic Total Station (TS), Theodolite (T0) and Waterpass measuring instruments to obtain a fixed XYZ position automatically [1]. Terrestrial fixed stakes are the basic reference (position and elevation) to provide guidelines for measuring implementation. In connection with the implementation of the work, the consultant determined 17 BM and 17 CP along the work location. Tabel 1 to 2 below will present the coordinates and elevation used as measurement aids.

Table 1: Koordinat Bench Mark

BM	Cordiant		
	Easting = X (m)	Northing =Y (m)	Elevasi (Z) datum TTG
BM.BJ.1	521811,633	370500,642	14,507
BM.BJ.2	521569,753	370490,147	15,413
BM.BJ.3	521457,19	370672,424	15,442
BM.BJ.4	521609,529	370819,758	13,812
BM.BJ.5	521557,923	370374,814	13,528
BM.BJ.6	521467,139	372195,331	12,999
BM.BJ.7	523050,700	368989,800	23,000
BM.BJ.8	521547,637	370263,217	14,543
BM.BJ.9	523323,205	368909,077	19,826
BM.BJ.10	525909,435	368846,354	10,486
BM.BJ.11	523172,749	370351,11	13,993
BM.BJ.12	521759,576	370590,832	14,959
BM.BJ.13	521401,634	370553,014	15,663
BM.BJ.14	519499,571	370028,152	15,476
BM.BJ.15	518104,412	368287,731	16,396
BM.BJ.16	519083,0	369477,748	16,504
BM.BJ.17	518757,522	368855,94	15,936
BM.BJ.18	521339,178	373420,551	12,821
BM.BJ.19	517339,815	368773,809	17,65
BM.BJ.20	521636,842	370583,949	15,079

Figure 1: BM.BJ 0

Figure 2: BM.BJ 01

Table 2: Koordinat Control Point

CP	Coordinat		
	Easting = X (m)	Northing =Y (m)	Elevasi (Z) datum TTG
CP.1	523336,618	368963,928	20,644
CP.2	525900,335	368883,660	11,214
CP.3	523122,796	370353,355	12,894
CP.8	519107,900	369521,100	16,400
CP.9	518729,16	368814,923	16,126
CP.11	517306,591	368748,116	17,623
CP.12	521612,583	370583,954	15,138
CP.13	521641,793	370540,237	14,438
CP.14	521820,519	370452,048	14,381
CP.15	521554,459	370470,371	15,246
CP.16	521471,066	370635,379	15,305
CP.17	521607,167	370844,029	14,083
CP.18	521511,024	370348,084	14,276
CP.19	521508,488	372156,977	13,251

Figure 3: CP.CP 02

Figure 4: CP.CP 03

The result is measurements are made up to 50 meters from the left and right bank of the river, measurement lengthwise (long section) of ± 8.2 km was carried out from the confluence of the Padang river with the Bah disappeared river to the Bajayu free intake location, measurement benchmark interval for 100 meters straight area and 50 meters turning area,conduct measurements on the linking route/trace from the planned main building to the free intake of D.I Bajayu and the first building for D.I Paya Lombang, measuring 50 meter intervals, the length of the measurement path from the axle of the weir to the Bajayu free intake is 3,600 m following the embankment to the right of the Padang river, the length of the canal trace from the axle of the weir to the building for the first Paya Lombang is 4,600 m following the existing road.

IV. CONCLUSION

Measurement 20 data of topographi for BM coordinat and CP coordinat, so: measurements are made up to 50 meters from the left and right bank of the river, measurement lengthwise (long section) of ± 8.2 km was carried out from the confluence of the Padang river with the Bah disappeared river to the Bajayu free intake location, measurement benchmark interval for 100 meters straight area and 50 meters turning area,conduct measurements on the linking route/trace from the planned main building to the free intake of D.I Bajayu and the first building for D.I Paya Lombang, measuring 50 meter intervals, the length of the measurement path from the axle of the weir to the Bajayu free intake is 3,600 m following the embankment to the right of the Padang river, the length of the canal trace from the axle of the weir to the building for the first Paya Lombang is 4,600 m following the existing road.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

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ABOUT THE AUTHORS

Tika Ermita Wulandari received S.T. degree in civil engineering education from Universitas Medan Area in 2018, and M.T. degree in civil engineering from Universitas Sumatera Utara, Indonesia.

Indri Dayana received S. Si degree in Physic from Medan State University in 2004, and M.Si. degree in Physic from University Sumatera Utara, Indonesia, in 2015 and Dr. degree from Universitas Sumatera Utara in 2021. She is currently a lecture in Dept. of Electrical Engineering, Universitas Medan Area, Indonesia. His research interests are physic, material, energy and electro.

Habib Satria received B.Sc degree in electrical engineering education from Padang State University in 2016, and M.T. degree in electrical engineering from University Andalas, Indonesia, in 2018and Engineer professional (Ir). degree from UniversitasDiponegoro in 2022. He is currently a lecture in Dept. of Electrical Engineering, Universitas Medan Area, Indonesia. His research interests are new and renewable energy, concerning about solar power plant, automatic control system, real- time simulation and power system.He is a member of the IAENG (International Association of Engineers) and The Institution of Engineers Indonesia.