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WIND PARK "NOVOAZOVSKYI"

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PROJECT INFORMATION:

CLIENT



"Novoazovsk wind farm"

CATEGORIES

Industrial construction

LOCATION

Novoazovsk, Donetsk region, Ukraine

PROJECT DESCRIPTION

Geodetic research

A reference plan-elevation geodetic network of 8 points was created, which served as a rationale for further design and cartographic work.

A topographic survey of the area was carried out on an area of 64 hectares (on a scale of 1: 1000) and 94 hectares (on a scale of 1: 500). On the basis of the received data, digital vector plans of the area were drawn up, on which the design institute designed places for the placement of 23 wind turbines, as well as routes of laying roads and cable power lines.GPS_03

The objects were positioned by dual-frequency GPS receivers of the company "TRIMBLE" R7 and R8 both in the world coordinate system WGS-84 and in the state SK-63, with an accuracy of up to 1 cm.



The planned position of the installation of the anchor bolts was checked by the "TOPCON" GPT-7501 and "SOKKIA" SET 330 RK tacheometers.

The height position of the anchor device installation was checked with a digital leveler of the company "Leica" DNA OZ. With a diameter of the anchor device of 4 meters, the maximum permissible error was 3 mm in plan and 1 mm in height.

At the request of representatives of the "Fuhrlander" company, work was carried out on the creation of a digital vector map on a scale of 1:10 LLC with a display of all su

of the under-construction and planned power plants located on the territory of Novoazovskyi Wind Park LLC.

Earth and drilling works



In the process of operation, wind power plants experience significant horizontal and vertical loads, which are transferred to the foundations. For this reason, the requirements for the strength and reliability of the foundations are the strictest. In order to meet these requirements, the construction project provided for the installation of bored piles. The execution of these works became one of the most important stages of project implementation. After carrying out geodetic surveys and determining the exact location of the wind generators, a foundation pit was dug under each installation (technique: JCB-225 and Daewoo Solar 220 excavators). Filling the wells with concrete mixture after submerging the rebars was carried out with the help of stationary Wazinger concrete pumps. M 600 concrete was

made by the industrial complex of the enterprise's building industry, and the excavation and drilling works at the facility were performed by the industrial construction department of PSP "Azovintex" LLC.



Fundamental works

Foundations for wind turbines were developed in accordance with the recommendations of the equipment manufacturer, taking into account the characteristics of the soil. In terms of shape, each foundation is a complex figure, the lower part of which is a cylinder, and the upper part is a truncated cone. The diameter of the foundation is 18 meters, the height is 3 meters, the volume is 556 m³. Such a foundation with a total weight of more than 1,000 tons is designed to ensure the stability and reliability of the hundred-meter giant. After the piling work was completed, the builders began



concrete preparation - pouring a monolithic slab with a diameter of 18 meters and a thickness of 260 mm, on which the reinforcing frame is installed. Special parts (retainers) for mounting and checking the anchor device are also laid in the concrete preparation. A distinctive feature of foundations for WPPs is the extremely high saturation of steel reinforcement. The step of reinforcement in the frame does not exceed 100 mm, which required the use of vibrators when laying concrete. Concreting of the foundations was carried out

simultaneously by two concrete pumps. The concrete mixture was transported by Volvo concrete mixers (the volume of the "pear" is 8m³). After concreting, measures were taken to care for the concrete, ensuring high-quality hardening of the mixture, with constant control over the temperature regime and set strength. Upon completion of these measures, waterproofing of the foundations was carried out. Thanks to the careful preparation of the work, the availability of modern equipment and the qualifications of the personnel, the foundations were installed in the shortest possible time and at a high quality level.

Transport support

The overall success of the project implementation depends not least on the organization of transport support for each of its stages. Timely delivery to the installation site of individual modules of the wind power plant, as well as the mechanisms and devices used, contributes to the coordination of works and





compliance with the deadlines provided for in the schedule. The possibilities of the car fleet of the design and construction enterprise "Azovintex" allowed to fully solve the issue of transportation for construction, installation and lifting works at the facility. The following equipment was used for delivery to installation sites:

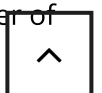
:: tractors VOLVO FH 12, VOLVO FH 16, MERCEDES-BENZ ACTROS 4154;

:: semi-trailers: NOOTEBOOM EURO 124-35 (r / n 89 tons), COMETTO XA3DAP (r / n 48 tons), FAYMONVILLE VARIO Z2 (r / n 91 tons).

The logistics of the project provided for two stages of delivery of individual parts of the wind power plant to the facility: **1st stage** – delivery of equipment from the port of Mariupol to a temporary warehouse, where, if necessary, large-scale assembly was carried out. 2nd stage – delivery of wind turbine parts from the temporary warehouse directly to the assembly sites.

Installation of a wind turbine

Considering the great height of the wind power plant and the considerable weight of its individual parts, it was decided to use the Terex Demag 2800 SS crawler crane with a load capacity of 600 tons and a jib reach of 132 meters as the main lifting device. The total weight of the assembled crane reaches 500 tons. For the installation and safe operation of the crane, a 30x40-meter work area was previously prepared. According to technological requirements, the surface of this platform should be practically horizontal (with a surface slope of no more than 0.3 °) and withstand the necessary pressure. To do this, after planning the soil, a double backfilling of the territory was carried out with layer-by-layer compaction with a vibrating roller. After delivery to the work site of the sector, the towers were tilted (guided into a vertical position) with the help of two cranes: Terex Demag and Grove, as well as special equipment. The tower sections were lifted one by one by a Terex Demag crane and bolted to each other. The joints of the sections were treated with a sealant. Communication between the installers and the crane driver was maintained by walkie-talkie. The motor gondola was delivered to the work site in an assembled form. The total weight of the motorized gondola is 96 tons. With the help of the super-lift device, the gondola was lifted and installed in the design position. During this operation, additional counter-loads with a total weight of 90 tons were used on the crane. Due to its large dimensions, the "Rotor with Blades" assembly was delivered to the work site in parts (rotor assemblies, blades). The rise was preceded by a number of preparatory operations:



Installation of a support stand for rotor assembly.

The conclusion of the rotor in the protective casing.

Alternate connection to the rotor of the blades (the operation was carried out with the help of two cranes).

Before lifting, the finished unit weighing 68 tons was moved to a vertical position with the help of two cranes. Then - climbing to the place of connection with the gondola and installation. The tower consists of 6 parts of different heights and weights (from 27 to 67 tons), which are connected to each other with the help of bolts. Five sections are cylindrical in shape, the top one is a truncated cone. The diameter of the tower (five sections) is 4300 mm, the upper part is a transition from 4300 to 3200 mm. The total height of the tower is 95 meters. The total weight of the tower is 298.6 tons. The final stage of arrangement of wind turbine foundations is waterproofing. In order to protect against moisture, the "body" of the foundation is covered with a layer of special mastic.



Before lifting, each section of the tower is removed from the car trailer and cantilevered (translated into a vertical position) using two cranes. Then it is lifted and installed in the design position (height - 15-22 m, weight - 56-61 tons).

VOLUMES OF COMPLETED WORK

7006

The device of pile foundations (m3)



12441

Reinforced concrete foundations (m3)

1949

Armature (m3)

41863

Construction of roads (m2)

37406

Arrangement of sites (m2)

16650



Road repair (m2)

7035

Installation of equipment (tons)

14

Laying of cable lines 35 kV (km)

2889

Feasibility study of imported goods (tons)

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ABOUT THE COMPANY

Design and construction company "Azovintex" carries out the construction of objects of any level of complexity in the coke-chemical, metallurgical, machine-building and energy industries

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