XXIII Conference of PhD Students and Young Scientists
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POLSKA AKADEMIA NAUK ODDZIAŁ WE WROCŁAWIU
KOMISJA NAUK GÓRNICZYCH

The activity of the Geoscience Research Group exemplified by the study using ground penetrating radar (GPR) method of the Slup water dam in the Męcinka.

Marcin Jakubowicz[1]

Kamil Gromnicki[2]

Makary Musiałek[1, 2]

Dominika Ciapka[2]

Mateusz Szczęśniewicz[2]

Karolina Szostak[2]

Jarosław Wajs[2]

Anna Gogolewska[2]

[1] Remote Sensing Business Solutions, Jana Długosza 60A, 51-162Wrocław, Poland
[2] Faculty of Geoengineering, Mining and Geology, Wrocław University of Science and Technology, Na Grobli 15, 50-421 Wrocław, Poland)

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Geoscience Research Group

Figure 1. Student organization's logo.

The Geoscience Research Group is a student scientific team operating at the Faculty of Geoengineering, Mining, and Geology of the Wroclaw University of Technology (W6). The primary aim is to develop competencies in the field of geophysics, but students also engage in geoinformatics and geothermal studies. They are particularly interested in operating instruments such as ground-penetrating radar and magnetometer.

The ground-penetrating radar allows one to analyze the substrate structure without damaging the environment, while the magnetometer is an invaluable tool for identifying magnetic anomalies in the earth. Our team consists of dedicated students at various stages of education, representing various disciplines of geological sciences. The group often take advantage of the help of experienced scientific staff at the Wrocław University of Technology (Group Geoscience Research, 2023).

Figure 2. QR code for LinkedIn profile.

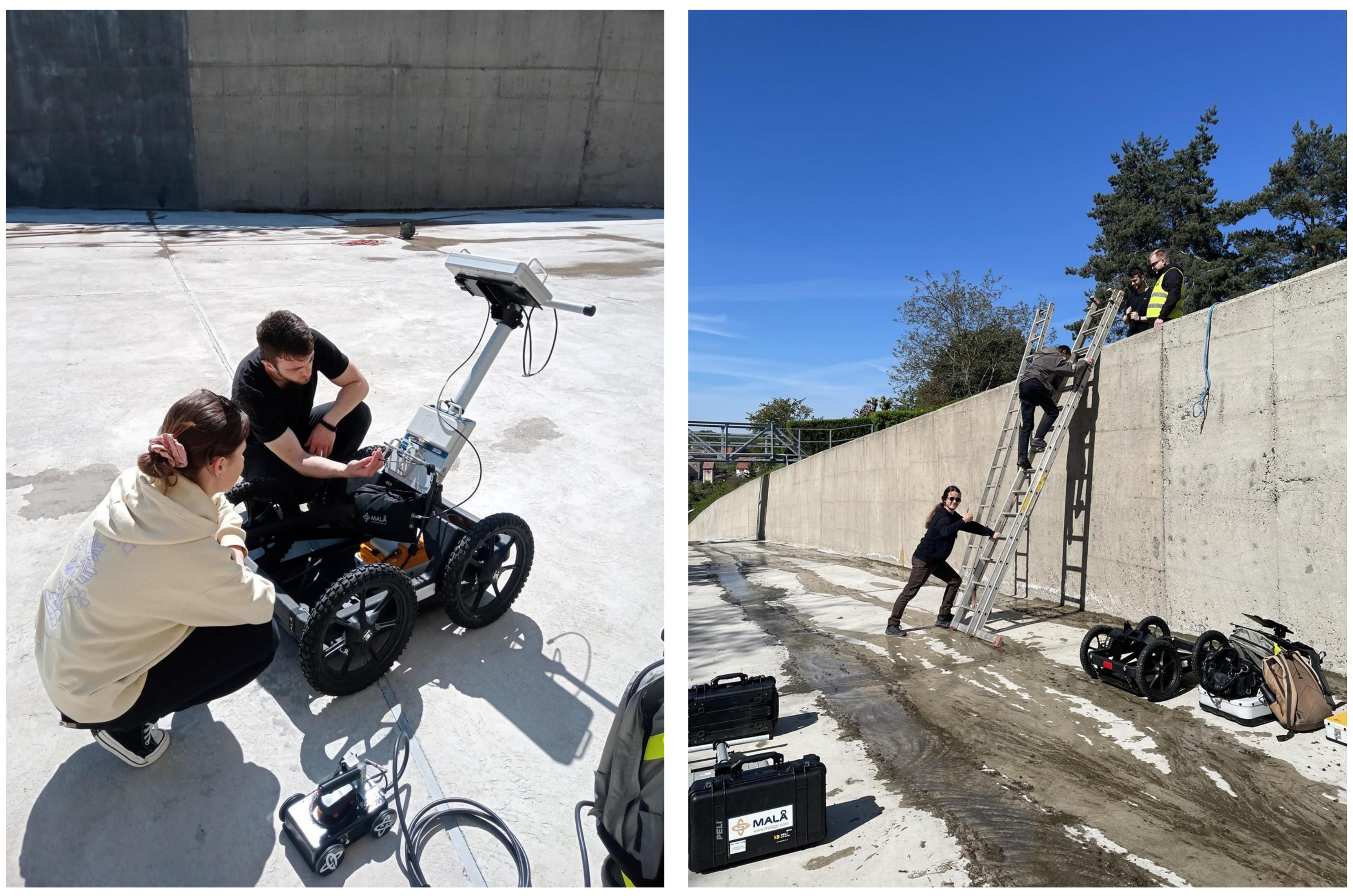

Figure 2. Photos from the day of the measurements..

Purpose and location of the study

The study conducted on May 4, 2023, aimed to locate the reinforcement in the concrete structure of a hydraulic structure at the dam on the Slup reservoir. In order to preliminarily estimate the depth of the reinforcement in the concrete structure of the dam, profiles were outlined in regions that showed noticeable damage based on initial inspections. During the research, 84 profiles were carried out, with some serving as test cases to adjust the equipment parameters. The start and end points of the profiles were marked using GPS equipment, and echograms were processed and visualized using the GPRPy software. A variety of tools, including the Mala ProEx GPR with an 800 MHz and 1.6 GHz antenna, were used for the research. A grid of perpendicular profiles was created to survey with the 1.6 GHz antenna, too. This report presents the interpretation of selected echograms intended to provide a general view of the depth of the reinforcement in the concrete structure. A detailed analysis will be performed in the future (Jakubowicz i in., 2023).

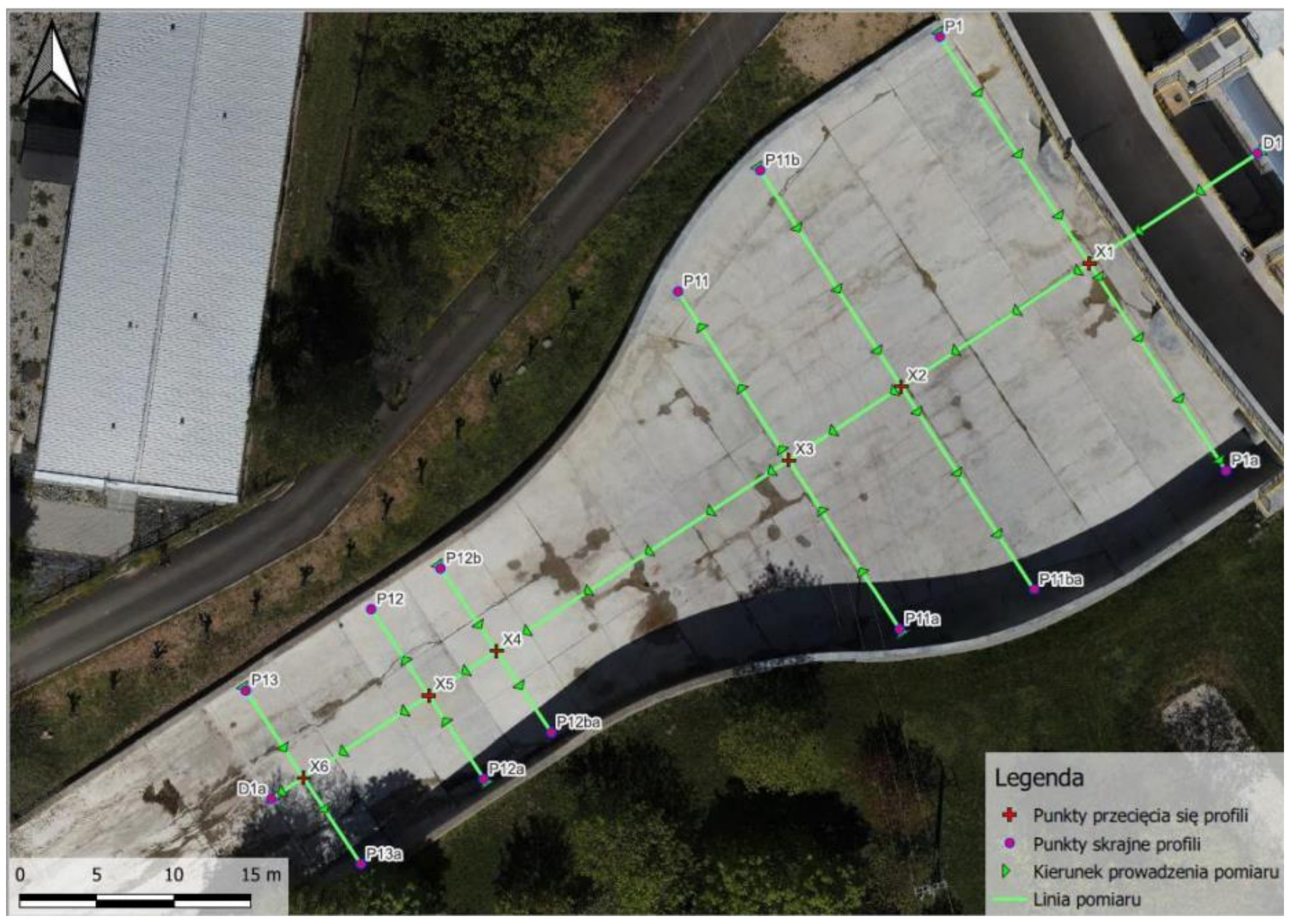

Figure 4. Profiles against orthophotos compiled from the results of the drone raid.

Summary

The survey was conducted using a Mala ProEx ground penetrating radar (GPR) to detect reinforcement elements beneath the concrete layer of a hydraulic structure. Preliminary findings suggest an irregular depth of reinforcement on each of the completed profiles. The depth of reinforcement varies between approximately 9 to 15 cm, and the results obtained from both the longitudinal (280) and transverse profiles are consistent. Although the results presented might contain a degree of error due to the experimental nature of the measurements and the difficult interpretation of echograms, yet they provide valuable insights for consideration (Jakubowicz i in., 2023).

References

[1] Group Geoscience Research. About us [Internet]. 2023. Available from: https://www.linkedin.com/company/geoscience-research-group/

[2] Jakubowicz M, Musiałek M, Ciapka D, Wajs J, Gogolewska A. Wstępny raport z badań metodą georadarową (GPR) zapory wodnej Słup w gminie Męcinka (powiat Jaworski). SKN Geoscience Research Group (GReG). Wrocław; 2023.