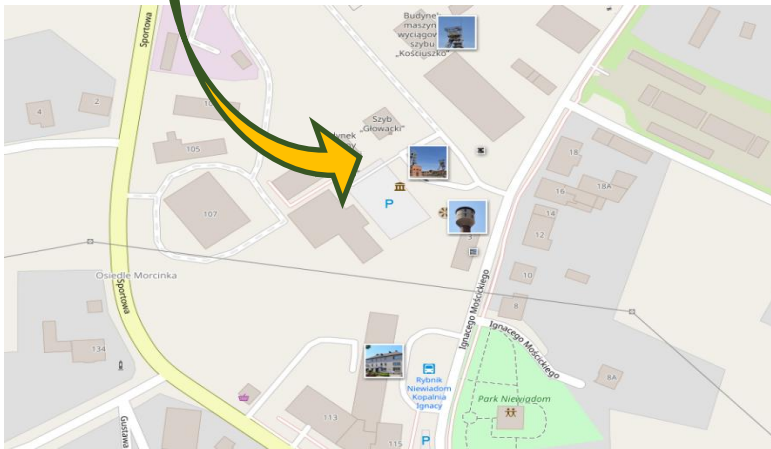
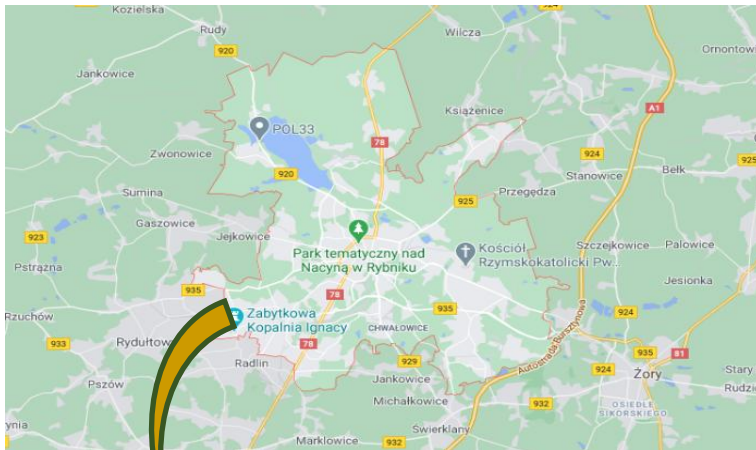


Within TEXMIN project, **an application in pilot scale the remedial measures for stabilization of sealed shaft in situation of extreme weather events occurrence**, has been planned.

The Głowacki shaft is located in Rybnik-Niewiadom, on the site of the former Ignacy Coal Mine, which was incorporated into the Rydułtowy Coal Mine in 1968. Currently, the Głowacki shaft has been separated from the structures of PGG S.A. and is the property of SRK S.A.



The "Głowacki" shaft is located approximately 50 meters on the SWW from the already closed "Kościuszko" shaft. The area where the shaft is located is covered with dense, linear and industrial buildings. Underground the Shaft is hydrologically connected to active mines and this fact was considered during the shaft liquidation method development. It is also worth to be noted that proposed liquidation method could not affect the historical building of shaft tower.

The technical design for the liquidation of the Głowacki shaft was aimed to determine the technically optimal, safe and compliant with applicable regulations method of liquidation, taking into account the existing technical condition of the shaft support, geological and

hydrogeological conditions, threats resulting from the occurrence of extreme weather phenomena, including in particular long periods of drought and short-term intensive rainfall, occurring in the area of the liquidated shaft and technological limitations regarding the execution of works.

As a first step, the technical design for the shaft sealing has been prepared, including following aspects:

- technical characteristics of the Głowacki shaft, including its connections with mining excavations, as well as the conditions and method of water drainage,
- description of mining, geological, hydrogeological engineering conditions, land morphology and natural hazards occurring in the area of the shaft,
- description and recommendations concerning identified impacts connected with extreme weather events, especially short-term intensive rainfall,
- description of the liquidation method of the Głowacki shaft with the selection of the structure and materials of the backfill column ensuring adequate water permeability and stability during the process of backfilling,
- calculations regarding the stability of the backfill column and the amount of the material,
- description of the method of preparing the shaft for liquidation.

As a result of the analyses, the technical solutions applied for the decommissioning of the Głowacki pit shaft in Rybnik was adjusted to the existing hydrogeological conditions and changing meteorological conditions. The project for the liquidation of the Głowacki shaft takes into account the variability of hydrogeological conditions in its area as well as the impact of climate change in the years 1995-2018. These changes were characterized based on the data from the Institute of Meteorology and Water Management on the amount of annual precipitation. Changes in the amount of water flowing into the area of the Głowacki shaft during the exploitation period, after its completion, after the liquidation of the adjacent Kościuszko shaft until now, were analyzed in relation to the amount of precipitation recorded at rainfall stations in Rydułtowy and Rybnik. Also forecasts of water inflow to the shaft were taken into account while analyzing at the same time trends in precipitation.

Based on these design and necessary calculation metallurgical aggregate has been designed appropriately. The proposed material for shaft decommissioning was subjected to laboratory tests at Central Mining Institute, which included:

- determination of the grain degradation of the used metallurgical aggregate,
- determination of compressibility and water permeability coefficient,
- study of the leachability of soluble substances in metallurgical aggregate with the use of underground water.



The backfilling works started in March 2021 and will last until August 2021. It was planned to construct a permeable backfilling column in the shaft and to use the shaft pipe filled with permeable backfill material as a water flow route from the upper levels to the level of 600 m.

More detailed information concerning technical results are available upon request.

Photo documentation of first works:



Source: Project *TEXMIN* archive,
Photos: Jan Szymała, Central Mining Institute (GIG)

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