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Original article

Lime kilns as an element of the post-industrial cultural landscape of the Silesian Upland, Poland

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ABSTRACT

In the Silesian Upland in southern Poland there are many objects related to previous economic activities, mainly from the mining of minerals occurring in a geological basis. In Mikołów Mokre there is the largest group of closed lime kilns in Poland. They constitute a material trace of the quicklime production industry for the construction industry, which operated in this area for almost 200 years. These closed and decaying post-industrial objects are closely related to the presence of limestone and dolomite in the substrate rocks that were obtained from nearby quarries. The aim of the article was to present the current state of these lime kilns and to assess the possibility of using them for tourism purposes. Currently, only two lime kilns are components of the educational trail of the Silesian Botanical Garden established in 2003. Using the example of the Mikołów lime kilns, the opportunities and possibilities for changing the industrial function of these objects to a tourist function are outlined.

KEY WORDS: lime kilns, post-industrial facilities, cultural landscape, Silesian Upland, Poland

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1. Introduction

The Silesian Upland, due to the richness of the mineral resources found in its substrate, is an area known for its intensive mining activities, mainly from the exploitation of hard coal, limestone and dolomite and the accompanying zinc and lead ores, as well as backfilling sands (TKOCZ, 1998; DULIAS & HIBSZER, 2004; LAMPARSKA, 2013a; DULIAS, 2018). The extraction of these raw materials has already been completed in many places in the Upper Silesia region. In the landscape of the Silesian Upland, however, numerous material traces have remained, testifying to the mining history of the region: mine buildings (including post-mining shafts), mining housing estates, railway embankments and heaps (related to hard coal mining), quarries, drifts and lime kilns (a remnant of exploitation and processing of carbonate rocks) (TYRNA ET AL., 2019).

There are also numerous sand pits filled with water – water reservoirs, thanks to which the area became known as the "anthropogenic lake district" (RZĘTAŁA & MACHOWSKI, 2014). Post-industrial and post-mining facilities constitute an important element of the cultural landscape of the Upper Silesian region. Those that have been officially recognized as technical monuments are perceived as important components of the post-industrial heritage, or even of their Upper Silesian identity, that can be used for tourism and promotion of the Upper Silesia region (DWUCET & PUKOWSKA-MITKA, 2007; LAMPARSKA-WIELAND, 2007; LAMPARSKA-STOBIECKA, 2008; RUSZKOWSKI, 2010; LAMPARSKA, 2017, 2019). The cultural landscape is a historically shaped fragment of geographical space (after MYGA-PIĄTEK, 2012), formed as a result of the link between its environmental and cultural influences. It has created a specific structure that manifests itself in regional

distinctiveness, and it can be perceived as having specific physical characteristics. Thus it can be concluded that the Silesian Upland, due to the exploitation of the mineral resources found there, can be characterized by a unique cultural landscape closely related to the mining activities carried out in this area from the Middle Ages to the present day.

The aim of this article was to present the current state of disused limestone kilns, i.e. shaft kilns which were used for burning limestone in order to obtain quicklime, as an example of the post-industrial heritage of the Silesian Upland. The author's intention was to valorization, i.e. assessment of the landscape value of these objects, in order to assess the possibility of making them available for touristic purposes. By describing their attractiveness and didactic value this may be one of the most important arguments for giving them legal protection, as well as for their restoration, or protection, against further destruction, and then – using their value for tourism and educational purposes to show the post-industrial heritage of the region.

2. Materials and methods

The basic method of the research was to compile an inventory of objects in the field, combined with the preparation of photographic documentation and a description of their current state of preservation. A GPS receiver was used to accurately locate the objects on the map and to determine their geographical coordinates. Field studies and observations were carried out in March 2021. In order to more fully characterize the state of preservation of a given object and the possibility of its use for educational and tourism purposes, the following evaluation criteria were adopted:

- 1) degree of preservation of the object (assessed on a point scale from 0 points to 3 points; assuming: 3 points – very good condition, 2 points – good condition, 1 point – poor condition, partially damaged object, 0 points – very bad condition, significantly damaged, in danger of collapsing);
- 2) direct surroundings of the object (3 points – open, with easy access, partially protected against devastation, e.g. a fence; 2 points – access difficult, but observation of the object possible, 1 point – significantly impeded access, bushes and trees hindering the observation of the object);
- 3) route to the facility (3 points – free, without obstacles, location of the facility by a paved road or dirt path; 2 points – accessed with difficulty, but possible, 1 point – difficult access, numerous trees or bushes on the route);

- 4) aesthetic and visual values of the facility (3 points – very good, 2 points – good, 1 point – poor, not attractive).

Theoretically, each lime kiln could score a maximum of 12 points. The summed assessment points of individual lime kilns made it possible to create a ranking, which was the basis for identifying those objects that could be proposed for a possible tourist route or educational trail showing the post-industrial heritage of Mikołów Mokre.

3. A geographical overview of the research area

3.1. The research area

The research area was the Mokre region. Since 1975, it has been one of the districts of Mikołów – a town located approximately 20 km south of Katowice – the capital of the Silesian voivodeships, in the central part of the Silesian Upland – the most western part of the Polish Highlands in southern Poland (Fig. 1). Mokre is a former village with a rich economic history related to the conditions of the natural environment. In the past, there were many industrial plants here, such as: salt works, ironworks, forges, glassworks, and hard coal mines (PRUS, 1932). A noticeable element of the post-industrial landscape of Mokre are field kilns for burning lime – the largest collection of them in the Silesian Upland. The agricultural landscape dominates within the administrative boundaries of the village, with a few farms and arable land. The residential landscape, represented by the Leśna Bryza residential estate in the northern part of Mokre, and the new development of single-family houses along Grudniowa Street, is increasingly noticeable. A new type of village landscape (it appeared at the beginning of the 21st century) is the recreational landscape, which is made up of the facilities of the Silesian Botanical Garden established in 2003 (with an area of about 100 ha) and a 56 hectare golf course in the southern part of the village (ŚLĄSKI OGRÓD BOTANICZNY, 2021).

3.2. Location of the area against its geological structure

Mikołów is situated on a tectonic hump (framework) of the same name, which is a fragment of the Mesozoic cover of sedimentary rocks over-lying an older Palaeozoic substrate. The Mesozoic cover of this part of the Silesian Upland, once uniform, has now survived only in patches, as it was partially destroyed because of denudation and erosion processes. As a result of these processes, the less resistant Carboniferous

and Permian rocks form depressions, while the resistant dolomite and Triassic limestone form the elevations of the area. The largest of such patches, made of Triassic rocks, covers the area with the highest elevation in Mokre – Fiołkowa Góra (340 m above sea level). In these small patches of Middle Triassic limestone lying directly below the surface, a

number of quarries were established from which the limestone was extracted (Fig. 2). The rock layers exposed in the quarries are primarily limestone (Fig. 3). In the upper parts of the quarries there are also limestone, dolomite, marl and conglomerate (GADEK & GADEK, 1994).



Fig. 1. Location of Mikołów Mokre in Poland

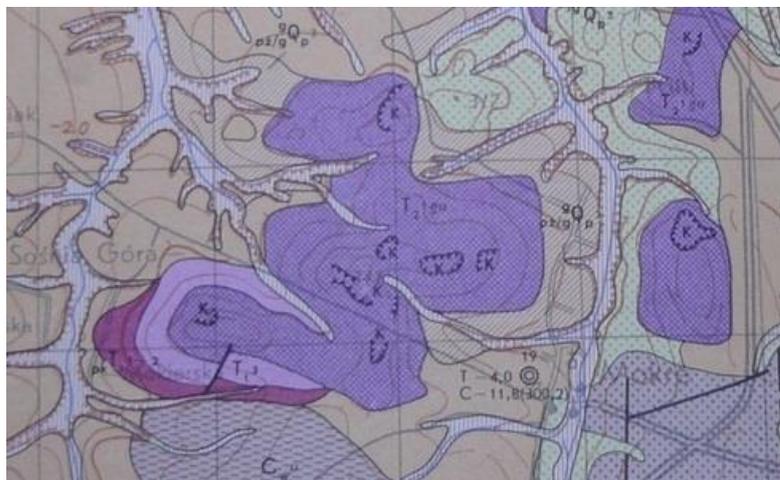


Fig. 2. Location of limestone quarries (K) in Mikołów Mokre against the geological map of the area. Explanations: violet colour – Triassic formations, grey colour – Carbon deposits, others colours – Pleistocene formations) (Source: Szczegółowa mapa geologiczna Polski, 1960)



Fig. 3. One of the limestone quarries in Mikołów Mokre (author's own photo 2.03.2021)

3.3. The limestone industry in Mokre

The beginnings of the exploitation of the limestone rock in Mokre date back to the mid-18th century. At that time, the first kilns for burning lime, used for construction and industrial purposes, were built. Their owner was Krzysztof Gotfred von Cochenhausen or Mikołaj von Raiswitz (GADEK ET AL., 1998). The exploitation of limestone started on the north eastern slopes of Fiołkowa Góra. Extraction of limestone was carried out using the

adit method. The cut limestone was transported to the lime kilns by a narrow-gauge railway that ran across the southern edge of the Fiołkowa Góra Mountain. Out of the first, and oldest lime kilns, only one remains currently at Sosnowa Street (lime kiln No. 14 is located outside the area of the aerial photograph in Fig. 6).

Quicklime production flourished mostly at the end of the 19th century and the beginning of the 20th century. This was related to the development of brick construction in Poland. In 1880, 10 new lime

kilns were built. They belonged to the owners of the surrounding land, from which the limestone was mined in the quarries. For each lime kiln, limestone was obtained from its own small quarry. One lime kiln employed about 10 people (Fig. 4). Workers extracted limestone in the quarry, transported it to the furnace by narrow-gauge railway, fired it, and then transported the finished product to the railway station in Mikołów by carts (in winter – sleighs). Lime burnt in Mokre was delivered to distant towns by wagons. On average, each lime kiln burned 12 tons of limestone per day. Most often, lime kilns were operated seasonally, i.e. from March to December, six days a week. If the lime kilns had an agreement with the steelworks, they operated all year round, weather conditions permitting. Each year, each lime kiln processed (fired) about 2,800 tons of limestone (HIBSZER & HIBSZER, 2002).

After World War II, around 1950, the furnaces were modernized by adding a metal chimney to the top of the lime kiln. The chimney was introduced to regulate the access of oxygen, and thus combustion took longer. Around 1960, mills were built at each lime kiln, which produced hydrated lime from the waste.

The owner of the largest four lime kilns in Mokre was the Prince of Pszczyna – von Pless. These limestone plants, located at Lange street, were nationalized after World War II. Around 1960, they stopped burning limestone and were then dismantled (Fig. 5), due to the lack of sales of calcined limestone and the high cost of hard coal needed to burn the lime. In the years 1975–1980 other lime kilns also ceased working. In the years following, they underwent a process of destruction.

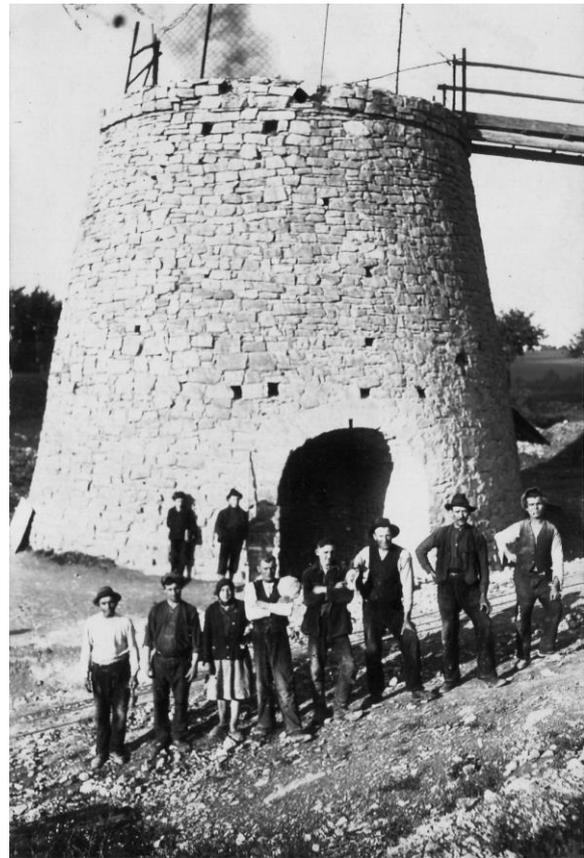


Fig. 4. Workers in front of a lime kiln in Mokre – first half of the 20th century (Source: <https://polska-org.pl/8505977,foto.html?idEntity=8505979>)

Most of the limestone kilns still in existence in Mokre are located at the opening of the quarries, on their south eastern side (Fig. 6). The information collected from field work showed that these are objects from the turn of the 19th and 20th centuries, and that the production of burnt lime finished in the second half of the 20th century.



Fig. 5. The already non-existent lime kilns in Mokre – a fragment of a postcard from the 1940s (Source: <https://polska-org.pl/7718250,foto.html>)



Fig. 6. Location of lime kilns in Mikołów Mokre. Explanations: 1, 2, ... - 12 – numbers of lime kilns corresponding to the numbering in Table 1 (Note: Lime kiln no. 13 is located approx. 550 meters to the north-west of lime kiln no. 12, while lime kiln no. 14 is located approx. 1900 meters west-south-west from lime kiln 12)

4. Results and discussion

The inventory of lime kilns in Mikołów Mokre showed that they are currently the only visible remnants of the former industrial activity in this area. There are no other buildings left in Mokre that existed in the past: no longer any coal mines, ironworks or forges. Due to the unique nature of these objects – with so numerous an accumulation in a small area, in the vicinity of former quarries, these furnaces are worthy of legal protection and available for educational and tourism purposes – as good examples of the post-industrial heritage of this part of the Silesian Upland.

In the ranking prepared by the author, only four of the lime kilns, ie No. 1, No. 2, No. 8 and No. 13, gained the maximum number of 12 points; and one (No. 6) gained 11 points. Five lime kilns scored less than half of the possible points, mainly due to their inaccessible environment and difficult access (Table 1, Fig. 6).

Currently, only two limestone kilns (No. 1 and No. 2) have been renovated, and fenced and then integrated into the educational trail in the Silesian Botanical Garden. Lime kiln No. 13, (located about 0.6 km from lime kiln No. 12, beyond the range of the aerial photograph in Fig. 6) which is also surrounded by a fence, is the property of the city

of Mikołów, as it is located in the vicinity of a reclaimed municipal waste dump which was established in a former quarry. The remaining facilities are located on private land and are easily accessible both for enthusiasts of the economic history of the region, as well as vandals who obtain scrap metal from them.

Although most of the lime kilns are significantly damaged, these objects are worth preserving for future generations. They can be made available for tourism purposes after careful conservation renovation, appropriate development of the immediate vicinity (e.g. by cutting out overgrown bushes and trees blocking their visibility) and after marking out the routes to reach them (also with the possibility of an entrance to the interior or to the top of some of the lime kilns). An interesting action would also be to provide information boards, e.g. with a topographic map or an aerial photo with the location of lime kilns and information thus providing a visualization of the lime burning process in the lime kilns. Another idea for the use of these objects could be to prepare a video about the process of obtaining quicklime. A suitable place for presenting the video would be in a room in one of the buildings belonging to the Silesian Botanical Garden in Sośnia Góra in Mokre.



1 50°10'48"N 18°50'56"E **12 pkt**
A - 3 B - 3 C - 3 D - 3



2 50°10'50"N 18°50'55"E **12 pkt**
A - 3 B - 3 C - 3 D - 3



3 50°10'55"N 18°50'55"E **5 pkt**
A - 2 B - 1 C - 1 D - 1



4 50°10'55"N 18°51'01"E **11 pkt**
A - 2 B - 3 C - 3 D - 3



5 50°10'57"N 18°51'00"E **6 pkt**
A - 2 B - 1 C - 1 D - 2



6 50°11'00"N 18°51'05"E **11 pkt**
A - 3 B - 2 C - 3 D - 3



7 50°11'01"N 18°51'06"E **8 pkt**
A - 1 B - 2 C - 3 D - 2



8 50°11'02"N 18°51'07"E **12 pkt**
A - 3 B - 3 C - 3 D - 3



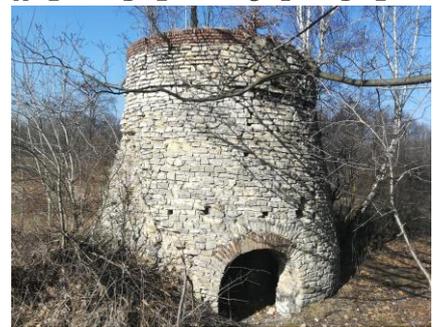
9 50°11'04"N 18°51'07"E **7 pkt**
A - 2 B - 2 C - 1 D - 2



10 50°11'05"N 18°51'08"E **5 pkt**
A - 0 B - 2 C - 2 D - 1



11 50°11'07"N 18°51'08"E **4 pkt**
A - 1 B - 1 C - 1 D - 1



12 50°11'09"N 18°50'55"E **9 pkt**
A - 1 B - 3 C - 3 D - 2



13 50°11'25"N 18°50'39"E **12 pkt**
A - 3 B - 3 C - 3 D - 3



14 50°11'01"N 18°49'19"E **8 pkt**
A - 2 B - 2 C - 2 D - 2

Table 1. Lime kilns in Mikołów Mokre – description and evaluation of their current state

Explanations:

A – degree of preservation of the object

B – access from immediate surroundings

C – condition of access route

D – aesthetic and visual values of the facility

0, 1, 2, 3 – points

Note: other explanations in the text (section 2 – Materials and methods)

(All photos taken by author)

These proposals are part of the increasingly common activities taking place in post-industrial areas around the world – the revitalization of industrial areas and facilities, giving them a "new lease of life" thanks to their change of function: from industrial to tourism and educational (MURZYN, 2008; RIEDEL, 2010; LAMPARSKA, 2013b; KISIEL, 2020).

Patterns of the proper use of old lime kilns for tourism purposes can be found both in Poland and abroad. Definitely the best examples of the proper development and tourist use of such facilities in Poland are the lime kilns in Gogolin in Opole Silesia (POLSKA NA FOTOGRAFII, 2021) and also a set of lime kilns in Złoty Stok in Lower Silesia (ZNACZKI TURYSTYCZNE, 2021). It is also worth noting the interesting development of a single lime kiln, which is located in Stara Morawa in the Śnieżnik Kłodzki massif in the Sudetes (ONET PODRÓŻE, 2021). A small art gallery was organized in this building and it has become a place for organizing artistic events and workshops, as well as artistic printing and paper drawing workshops.

Examples of the proper management of lime kilns in other European countries are those located relatively close to the Polish border, called "wopienki" in Wendrynia near Trzyniec in Cieszyn Silesia (Czech Republic) (WANDER BOOK, 2021). Among the many lime kilns that bear witness to the industrial heritage of Great Britain, it is worth mentioning the development of such buildings in the holiday park in Kiln Park near Penally in Wales (ANCIENT MONUMENTS, 2021), which has been listed as a cultural heritage site since 1996; and is part of the tourist route in that region. Also the limestone kiln in Oldendorf in Lower Saxony (Germany) (WANDERN IN UND UM OSNABRÜCK, 2021).

Outside Europe, the most famous objects of this type are in Lime Kiln Park near Milwaukee in the USA (GRAFTON WEBSITE, 2021), where next to the renovated limestone kiln there is information about the history of the local industry, generally accessible walking and cycling routes, as well as catering facilities and a large car park for tourists.

Almost all of the above-mentioned objects can be used as a model for the possible correct development of the remaining post-industrial buildings in Mikołów Mokre.

5. Conclusions

Currently, 14 lime kilns remain in Mikołów Mokre. Although closed, they are an inseparable element of the cultural landscape of Mikołów. Unfortunately, these objects are not currently covered by legal protection, the implementation of which would certainly help to protect them

against further devastation, or the threat of complete destruction. The limestone kilns and the quarries located in their immediate vicinity, are integrated into the picturesque surroundings of Mokre, and could become part of an open-air museum of the artisanal method of burning lime, and could serve to realize the learning outcomes assumptions of the curriculum of the regional schools' education policy.

For this purpose, it is necessary to provide them with legal protection. It would also be advisable to purchase the land from private owners, fence each one and secure it permanently against further destruction. The next step should be to mark the route of the educational trail with appropriate information boards and to promote them by including these lime kilns in the Industrial Monuments Route of the Silesian voivodeship. The facilities located in Mikołów Mokre certainly merit this. By taking these proposed actions (changing the functions of post-industrial facilities) this would be in line with similar trends taking place both in Poland and in other countries. In this case, it would be a change in the former industrial function of these facilities into both a tourism and educational function. It is worth adding that examples of such desirable changes in the functions of these post-industrial objects, by giving each object a new function and thereby saving the buildings from destruction, can already be found in many places in the Silesian voivodeship.

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