
Analysis of Industrial Architectural Heritage – Iron and Steel Plants as a Development Potential

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Abstract

The urgency of recording and preserving the physical evidence of Slovakia's disappearing industrial heritage is prompted by the recent dramatic demolitions of many production buildings and even whole industrial sites. Accompanying architectural discussion confirmed the lack of systematic mapping and evaluation of our industrial heritage and furthermore that the traditional heritage conservation approaches do not offer sufficient tools to preserve and evaluate this remains of our industrial history.

This study is focused on the industrial architecture of historical iron and steel plants that were in operation in the territory of Slovakia between the years 1800 – 1948. The aim of this paper is to analyse the architectural and urban characteristics and common features of observed historical ironworks as a support for the protection and interpretation activities. The paper is divided into several parts: 1. A description of the architectural and urban development of the iron industry in Slovakia with regard to the development of technical and technological processes; 2. A categorisation and an analyse of typological characteristics; 3. A report on the current state of 127 historical locations of iron production.

For many centuries, iron production was contributing to a social and economic development of all of the current Slovak state formations. Although the history of this industry in Slovakia is relatively well explored and published, the architectural and urban characteristic of these industrial sites is practically unknown. Nowadays, the abandoned buildings and sites of this production sector are a new attribute of our settlements. All of them offer the opportunity for reuse. The potential of their successful urban reintegration is subject to the understanding of their historic and heritage values accompanied by the complex research.

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Peer-review under responsibility of the organizing committee of WMCAUS 2016

Keywords: metallurgy; industrial architecture; industrial heritage; ironworks;

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doi:10.1016/j.proeng.2016.08.769
1. Introduction

The issue of industrial heritage and its preservation is today quite often discussed and actual topic, not just among professionals. The industrial heritage sites link the contemporary world to the work of the past [1] and they are the authentic documents of the progress of civilization. Industrial sites are important milestones in the history of humanity [2] referring to the economical, technical and architectural development of our cities [3]. Although the monumental industrial buildings are an integral part of the identity of many cities, they face vexing questions regarding conservation and reuse after the cessation of production. Industrial buildings are often situated in areas threatened by redevelopment through high land values or urban decay [4]. Given this situation, strategies for conservation and management must be developed to ensure that these values are not needlessly lost [5].

The paper deals with the identification, documentation and basic evaluation of iron and steel historic complexes in Slovakia, in order to highlight the need for a comprehensive research for their future preservation and revitalisation. Industrial heritage in Slovakia is characterized by many controversial demolitions of industrial buildings and sites on the one hand, and the successful revitalization projects on the other hand. One of the basic problems is the lack of public awareness about the values and qualities of the preserved industrial architecture [6]. Even though the industrial tradition in Slovakia are among the oldest in Europe, the preserved industrial heritage is still underestimated in the public consciousness [7].

The iron industry of the territory of present-day Slovakia played an important role in the former Kingdom of Hungary especially in the 19th century (Slovakia was a part of the Kingdom of Hungary until 1918). Although this is a historically significant industry, the existing technical publications focus especially on the development and history of iron metallurgy. The publications dealing with the architectural and urban development of this industry are absent.

Accordingly, this paper has several aims. The first aim is to describe the architectural and urban development of the iron industry in Slovakia with regard to the progress of technical and technological processes. The second aim is to present a categorization of architectural forms of iron-making complexes and the last aim is to advance the results of a survey of the current state of approximately 127 historic complexes of iron production in Slovakia.

2. Methodology

The iron and steel industry in Slovakia held an important role, especially during the 19th century. In the years between 1800 and 1948, about 127 iron and steel plants were in operation in Slovakia. Since the beginning of the 19th century, the development of iron and steel industry was accompanied by a number of changes, renovations or even demolitions of the iron-making complexes. Many reminders of the old ironworks are irretrievably destroyed, but few of them still exist. In many places, there are only ruins without adequate historical research, elsewhere there are remarkable historical buildings preserved which provide the opportunity for reuse. In order to evaluate the cultural and historical values and architectural qualities, it is necessary to identify the significance of the preserved ironworks in the wider context of industrial architecture development that is inextricably linked with the technology development.

2.1. Description of technological development in relation to the architectural development

In the early 19th century, the iron was produced in the so-called Slovak furnaces and a subsequent iron process was held in small shops called hamors. The hamor consisted of three separate parts: a smelting furnace, a heating hearth and a water powered forging hammer [8]. It was a stone, wood or brick building of square or rectangular shape with a gabled wooden roof.

Indeed, it was a common practice to use coke blast furnace and steam blower in Western European countries in the early 19th century. In Slovakia, the situation was mainly in terms of natural conditions very different. Due to the high quality of ductile iron produced in the Slovak furnaces and the poor road conditions (the old iron-making plants were located near the sources of raw materials, that is in the mountainous areas of Slovakia), the Slovak furnaces coexisted with the blast furnaces until the mid-19th century [9].
The organisation of the iron-making complexes was significantly changed after the application of new smelting technologies – the puddling (the process was patented by Henry Cort in 1784, in 1839 in Slovakia [10]), the Bessemer process (the process was patented by Henry Bessemer in 1855 in England and in 1879 was introduced in Slovakia [11]) and also by the introduction of rolling. In addition to the blast furnace, the production area consists of several specialized production buildings: a smelting hall for the puddling or Bessemer process, rolling mill, foundry, warehouses and workshops. Perhaps the biggest change technically and architecturally was the introduction of coke blast furnaces and new Siemens-Martin procedure that caused the concentration of iron production into several modern factories (Hronec, Podbrezová, Likier, Krompachy and Prakovce). Thenceforward the general arrangement of the ironworks has remained practically unchanged.

![Fig. 1. Categorisation of iron-making complexes (category 1 – 3 relate to the period 1800 – 1948).](image)

2.2. Categorisation

Based on the above observations, the iron and steel plants in Slovakia could be divided into five categories according to the stage of technological development as well as into three types of the factory production (Figure 1).
Many ironworks have changed their category or type since the beginning of 19th century. Today, the industrial sites of ironworks are the mixture of architectural styles influenced by material and design progress as well as by the development of architectural forms. This development is subordinated to the progress of production technology.

This categorization is inspired by the fundamental changes in ferrous metallurgy in Slovakia in the 19th and early 20th century [11]. The most influential is the blast furnace development (from the simple Slovak furnaces through the charcoal blast furnace to the coke blast furnace) and the development of the process of iron refining (from smelting in forges through the puddling to the Siemens-Martin procedure). The categorization of the complexes was processed also on the basis of the accompanying archival research.
2.3. Current state

For a description of the current state the following cases were defined: 1. The industrial complex is demolished or not identified yet; 2. Ruins of the industrial site are preserved; 3. Some non-production building of the industrial site are preserved; 4. Some production buildings of industrial site are preserved; 5. Both production and non-production building are preserved; 6. Reconstruction of historical production buildings; 7. Remarkable industrial site is preserved. Figure 2 shows the percentage of industrial sites of each mentioned case. The repetitive reconstructions of the industrial sites due to technological progress and also the cessation of the production caused that today there is no intact historic complex of iron and steel industry in Slovakia. In addition, the numerous and repetitive renovations remain one of the typical features of the industrial sites until today. Only tree historic complexes from the period from 1800 to 1948 are in operation in the original function today (the ironworks in Podbrezová, the foundry in Hronec and the foundry in Trnava). In Slovakia there are approximately 18 historical buildings of iron production that are not in use and have a high architectural and historical value. Unfortunately, this study showed that only four production buildings of the surveyed time period are law-protected today.

3. Results and Discussions

The output of this work is the categorisation (Figure 1) of the historical iron and steel plants and the diagrams of their spatial characteristics (Figure 3). Such elaborated results of the research serve as an illustrative tool presenting the development of the architectural and technological characteristics of iron and steel industry in Slovakia. The diagrams of the sites demonstrate the changes in architecture and urban design that have been determined by the technological development of the iron and steel production.

4. Conclusions

This article describes the architectural development of the iron and steel industry in Slovakia between 1800 and 1948, with regard to the development of technical and technological processes. This work considered the progress of iron-making technologies to be the basic and essential condition for the architectural development of these industrial complexes. Therefore, the blast furnace development and the development of the process of iron refining are the main aspects of the above mentioned architectural development. The tables and schemes of architectural forms and categories are the basis outline for understanding of a comprehensive development influenced by many different factors (ownership (state or private - company, noble family), financial strength of owner, the scale of production, trade links of factories, date of establishment and degree of technological progress of iron production). Because of the numerous renovations and demolitions, the historic industrial buildings are preserved only in 21% of all the surveyed iron-making complexes. The industrial buildings provide the physical evidence of the history and considering that, there is only a fragment of industrial architecture preserved, the protection and research of this heritage is necessary today more than ever before.

References


