

THE INDUSTRIAL HERITAGE OF MODERN IRON- AND STEELMAKING IN EUROPE: PRESERVATION BEFORE EXTINCTION

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Summary:

The preservation of modern large scale 20th-century ironmaking plants in Europe is developing in an amazing way – recently protected modern blast furnace works in Portugal, Spain, France, Luxembourg and the Czech Republic are favourably completing the already well known examples in Russia, Poland and Germany. Blast furnaces as monuments of industry seem to become a fashion, although measures for long time protection and conservation are just in their first experimental stages and have to be developed further.

On the other hand, the protection of technical processes like steel-making, either in Bessemer-, Thomas-, Siemens-Martin, Oxygen- or electric furnaces has not developed on the same scale. Also the first continuous casting machines, large format rolling mills and the remains of other related manufacturing processes have not been preserved as monuments of this fast changing and rapidly vanishing industry. The smaller examples of these works are just in the last stages of their production- and economic-life cycle, so the protection of at least one specific example of each type becomes an urgent matter. The scale of these works and the problems of their protection and conservation however demand a coordinated European approach.

A. Monuments of industrial pig-iron production:

The first preservation success in the iron producing industries had been the well known Sloss furnaces in Birmingham/Alabama in the USA and in Nishni Tagil in the Urals. The two blast furnaces with related installations in Sloss are owned by the town of Birmingham and are open to the public since 1983. The similar plant in Nishni Tagil is part of the museum of the local steel making complex and adhering town and became known in the West only after the liberalisation in Russia since 1990. Lesser known examples of early conservation are the Higashida furnace No. 1 in Yawata in Japan, dating from 1904 and restored in 1973 to become incorporated in a „Memorial Park“, and the small Starachowice furnace in Poland, owned formerly by the museum of the STAR-truck building company and now in the care of the regional conservation office. A recent surprising discovery is the „Parque Fundidora“ in Monterrey in Mexico, which uses the site of the former pig-iron and casting plant. The blast furnace No.3 is part of this recreational park and open-air museum.

In the last years many countries in Europe preserve blast furnace plants as protected monuments or plan to do so. In eastern France one blast furnace with cowpers, blowing engine and coke batteries of the Uckange plant is under protection. Future plans include the partial conservation for cultural and museological purposes. The two very large blast furnaces of the Belval plant in Southern Luxemburg belong now to a state-owned fund, that is to restore them as monuments of the industrial history of Luxemburg. This plant shall also become the centerpiece of a new development area for offices and living quarters. Two blast furnaces in the Basque industrial capital Bilbao in Northern Spain are protected as monuments, but their future fate is uncertain. In Sagunto a single

isolated blast furnace has been renovated for a total of 1.1 million Euros. It is the last reminder of the once important Altos Hornos Mediterraneo – Blast Furnaces of the Mediterranean – the site of this large plant today is a seaside industrial development. The only blast furnace of Portugal in Seixal, near Lisbon, was blown out in 2001. Plans for its protection as part of the ECO-Museum Seixal are in discussion.

In the Czech republic an outstanding example are the Vitkovice integrated Iron Works in Ostrava/Moravia. The Hlubina coal mine, the coke plant and three blast furnaces are protected monuments and in course of renovation, which should be finished in about six years. Other parts of the large area will be used for new industrial development.

Germany plays an important role in the conservation of blast furnaces. Following the examples set by Neunkirchen, Völklingen, Duisburg-Meiderich and Hattingen, two more plants are now protected or at least scheduled to be protected. Two blast furnaces in Dortmund-Hoerde's Phoenix-West plant survived the closure and partial dismantling and the transfer to China. Again the area around the furnaces and their associated installations is to become the center for a new industrial development. The structural framing of one of the furnaces is now being examined for new uses and additions. The small furnace of the Maxhütte in Bavaria could play an important role in a monument with a complete production line from raw iron to the final sales product, which will be discussed later.

There are now 15 large and modern industrial blast furnaces conserved in Germany, a nearly inflationary number. They have different sizes, but follow the standard pattern of the steel-cladded furnace with refractory bricks and independent scaffolding for maintenance and charging stages. Differences lie in the charging systems: While most of the furnaces use skip inclines, the Maxhütte used a bucket system with vertical elevator and Völklingen a complex suspended monorail system with powered skips. Also only Völklingen keeps the original sintering plant with four bands, a pioneer installation developed by the Lurgi company on the basis of the Dwight-Lloyd-process.

B. Conservation and reconstruction policies

Experience of the last twenty years shows a certain similarity in the saving, conservation and use of blast furnaces plants as monuments. After the end of production there is mostly some time of non-activity, with neglect or in the worst case cannibalisation and vandalisation of the plants. Some of the above mentioned examples still remain at this stage, others are kept well protected, but with no further conservation activities. In the second stage, after political discussions and final acceptance, the raising of funds and developing of long term plans, first activities for serious conservation and restoration works start. Some examples like Yawata, Sagunto and Hattingen were professionally rebuilt in a short time as monuments and museum-pieces, mostly in a „like new“-look. Other examples follow a different approach, as executed in Sloss, Nishni Tagil, Völklingen, Duisburg-Meiderich and Vitkovice: In a long-term program, step by step conservation and repair works are executed if and when necessary, either by jobless workers schemes or on demand by professionals. Both approaches can lead to different results, the second seems to be more „monument-sensible“ and is sometimes cheaper.

C. Monuments of industrial steel production

The development of modern steel production went from puddling furnaces to Bessemer and Thomas converters, Siemens-Martin furnaces, oxygen converters and electric furnaces. Nearly two thirds of the steel worldwide is produced in oxygen-blowing-processes, the other third mostly in electric furnaces using scrap iron and steel.

Only some puddling furnaces have survived. The reerected one in Blists Hill Open Air Museum near Ironbridge can be used. Bessemer and Thomas converters might still survive in production in eastern Europe. The last chance to protect a complete Thomas plant in the west was missed as late as in 1995 in Unterwellenborn in Eastern Germany. Some converters survive as isolated objects in museums or as open air monuments. Also Siemens-Martin furnaces might still be producing in Eastern Europe, in Russia, the Ukraine and Roumania (Huneodora), but their future fate is of course uncertain. The Brandenburg steel works near Berlin, erected after the Second World War consisted of an impressive line of 12 large SM-Furnaces. One of these today survives in the original building and forms the center of an Industrial Museum.

The modern Oxygen-blowing-process, developed and introduced in Linz and Donawitz in Austria since the year 1952 („LD-process“), was able to substitute most of the former steel production methods. Although relatively new, only little remains of the pioneering installations. The hall of the first LD-plant was dismantled in the spring of 2000, only one of the 30 ton-converters was transferred to the Vienna Technical Museum.

The preservation of modern steel-producing-plants in Germany has not been finally successful. Four sites were in discussion:

1. The combined Oxygen- and Electric Furnace steel work in Hattingen. Although an ideal addition to the already existing museum with its blast furnace, this plant has been scrapped.
2. The large scale oxygen-steelwork in Dortmund-Hoerde, formerly Hoesch's Phoenix-East plant, was documented and evaluated as technical monument, but was due to political and economical reasons dismantled and sold to China.
3. The two electric furnaces of the Guthoffnungshuette Oberhausen-Ost plant are still existing, more than ten years after closure. Concepts for incorporating the furnaces into a theme park, as attraction for the nearby giant „CentrO“ merchandise market, are still under consideration.
4. The steelworks of the closed Maxhuetten in Sulzbach-Rosenberg in Bavaria would be ideal for protection and display. Its small size (three 60 tons converters), location in a full production line and special technique (bottom blowing) makes it especially valuable.

All these plants also feature modern continuous casting machines – one of the most important innovations in the steel production of the last 40 years. The caster in Hattingen, built 1967, was one of the oldest of its kind in the world.

D. Monuments of rolling mills

Informations about older rolling mills in Europe are scarce. Complete industrial rolling mills preserved in situ are very rare. Again Blists Hill features a translocated small working mill beneath the puddling furnace. Parts like frames and rolls are collected in several industrial museums all over Europe, for example in Fond de Gras in Luxemburg, in Gyöngyös in Hungary, in Sweden e.a. Three old rolling mill streets are still in use in Völklingen, dating partly from the beginning of the 20th century. The Maxhütte in Sulzbach also used its older lines until the end of production in 2002.

Many early rolling mills were driven by extremely powerful steam engines. Many of these engines are preserved and translocated to different places. But two are still working in Völklingen: One is a double-compound-three-cylinder engine with a maximum output of 14.200 hp and another double-compound-two-cylinder machine with 8.300 hp. Maxhütte in Sulzbach used until 2002 two double-compound-two-cylinder engines from 1911 and 1913 with a maximum output of 14.660 hp, which still remain in their original place.

E. Conclusion

Monuments of raw iron production, especially blast furnaces are spread all over Europe. Curiously neither England nor Sweden, once the most important iron producing countries in Europe, possess industrial-sized and complete blast furnaces as monuments. Germany has the largest number and probably now the most experience in the conservation and renovation of blast furnaces plants.

Missing parts in a complete documentation of the iron and steel industry are the steel production with its various methods and the adjoining processes like casting and rolling of slabs, profiles and sheets. Chances for conserving such industries still exist, partly in Germany and other West European countries and possibly in eastern Europe. But the political and economic changes in the Eastern countries make conservation projects of this scale very improbable. A survey of the existing plants of historical interest has yet to be carried out.

Even in more wealthy countries like Germany, the conservation and protection of important examples is not always possible. The Maxhütte in Sulzbach-Rosenberg could be the ideal object for a linear presentation of all processes, beginning with the raw iron production in a blast furnace, mixing of the iron in a 1.200 tons mixer, reducing to steel in three modified oxygen-bottom-blowing converters, pouring into a continuous caster and rolling of rails and profiles in a mill, driven by steam engines from 1911, all very compact on a small site. The small size of all installations would be very favourable to conservation and reconstruction measures. But problems with the owners, the state bodies, political and also economical difficulties leave the protection of this site uncertain, although Maxhütte already is a listed monument.

Informations about valuable objects in this field should be spread in conferences or for example in the TICCIH-Bulletin. Exchange of experiences in the documentation, evaluation and conservation of large industrial monuments should develop further. After the opening of the eastern European countries, more informations about their once secreted industries must be collected and published.

Corrections and further informations are always welcome!

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Sources:

The standard book on blast furnace sites still is Rainer Slottas Volume 5 of the series „Technische Denkmäler in der Bundesrepublik Deutschland“, published by Deutsches Bergbaumuseum Bochum 1988. Naturally by now, it needs actualisation.

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