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## Preservation and Re-use of the Blast Furnace Site – UNESCO World Heritage Site “Völklingen Ironworks”



The six blast furnaces for production of pig iron before they were shut down in 1986

### The Making of a Monument

In 1994 the Völklingen Ironworks, the “Völklinger Hütte”, was accepted as a UNESCO World Heritage site.<sup>1</sup> All the equipment needed to produce pig iron is concentrated here on a comparatively restricted site in a blast-furnace plant from the early 20<sup>th</sup> century. There are six furnaces, Cowper stoves, a coking plant, three dry gas-purification plants, an electric conveyor system, an ore preparation area with ore silos covered with large roofs, ore and dust bunkers and a four-story steel-framed structure with four slag conveyors, patent Dwight-Lloyd. The blowing engine hall consists of a vast building (150 m x 34 m), constructed between 1900 and 1938, which formerly contained ten blowing engines for the blast furnaces. Seven engines have been preserved.

The site with its manifold industrial structures covers about 200.000 m<sup>2</sup>. It was declared a national monument

in 1986, one week before production was shut down. At that time its economic value was reduced to the actual price of scrap, minus the costs for destruction and decontamination. The destruction of the plant would have been more expensive than its preservation as a monument. This served as a major argument against its destruction.<sup>2</sup> Two years later, in 1988, it was recommended for inclusion on the World Heritage List. Arguments in its favour included its unique significance in the field of the history of technology and its completeness and intactness<sup>3</sup> – an incomparably fast “career” for an industrial monument.

A testimony to the second phase of the Industrial Revolution, the Völklingen Ironworks was the youngest site (i. e. of most recent date) to be inscribed in the World Heritage List.

Since its inscription in 1994 this World Heritage site has been under the special protection of the German government, which signed the World Heritage Convention in 1972. According to this convention the government has “the duty of ensuring the identification, protection, conservation, presentation and transmission [of the cultural and natural heritage] to future generations”. It has the obligation to protect its monuments which are of “outstanding universal value from the point of view of history, art or science” and it must “do all it can to this end.”

The purpose of the following report is to discuss the preservation and the usability of the UNESCO World Heritage site “Völklingen Ironworks, European Centre for Art and Industrial Culture.” Some of the new architectural projects will also be presented. Because of the site’s gigantic scale, only some aspects, including those of most importance to the author, can be discussed here.

<sup>1</sup> N. Mendgen, “Monument der Industriegeschichte ist seit 10 Jahren Weltkulturerbe”, in: *Stahl und Eisen*, vol. 6, Düsseldorf 2004.

<sup>2</sup> N. Mendgen, “Völklingen und Birmingham USA, Überlebensstrategien für Hochofenwerke”, in: W. Buschmann (ed.), *Eisen und Stahl*, Klartext Verlag 1989; N. Mendgen, “Saarland, Völklingen”, in: *The Backwell Encyclopaedia of Industrial Archaeology*, Oxford (UK), Cambridge (USA) 1992.

<sup>3</sup> In 1988 unanimous resolution by the Subcommittee for Museums and Historic Preservation of the Conference of State Ministries of Culture to nominate the site for the World Heritage List following the presentation by the author:

## Preservation Strategy and Usability

The preservation strategy is conceived in several steps,<sup>4</sup> including protection of the site itself, its protection as a historic document and a landmark, and its re-evaluation in terms of cultural economic usability in the spirit of the “Venice Charter” (ICOMOS 1964). Article 5 of the charter says that the “conservation of monuments is always facilitated by making use of them for some socially useful purpose.” It also says that usability is of central importance when financing a monument’s preservation.



*Völklingen Ironworks. Detail view*

Today the Völklingen Ironworks heritage site is an authentic “museum” which documents the process of the production of pig iron. This complex chapter of the history of technology can be explored by visitors. As the “European Centre for Art and Industrial Culture” the site now also serves as a place for exhibitions and public and private events. Routes for visitors and places for exhibitions and events cover about 60% of the ensemble today.

The suitability of the different parts of the site for new functions is carefully analysed before documentation and/or restoration of a building takes place.

Architectural projects which not only serve a historic purpose but also are supposed to increase the site’s value are a main target of the re-evaluation strategy. For instance, the strategy emphasizes new target groups and is concerned with extending the length of a visitor’s stay at the site and stimulating visitors to return often.

## Planning Strategy/Documentation

The site’s state of preservation varied enormously, in part because of the different ages of many parts of the site and in part because large segments had already been neglected for years before the ironworks were shut down. Thus as early as 1986 the state of preservation ranged from “good” to “endangered.” The need for renovation and redevelopment was – and still is – enormous. A concept of preservation in several steps, especially to stop the accelerated process of decay and thereby reduce the cost

of redevelopment and maintenance, was agreed upon for the initial investment.

Monitoring and condition reports initially focussed on the development of the site. The reports range from examination of parts of the site to recommendations for renovation measurements.

Within this context priority is given to:

- reduction of destructive climatic effects, protection of static structures, and confinement of the rate of decay;
- opening up for visitors, together with a re-evaluation through the public;
- new utilization as a cultural economic location;
- re-evaluation as a historic monument, protection of structures that are important testimonies to the ironworks’ technical history without an obligation for public utilization, and preservation of ruinous parts of the site for later generations.

Specialized knowledge of the history and functions of all parts of the site is required for qualified planning and in order to prevent irrecoverable losses. site-specific research and systematic documentation to accompany the process of redevelopment are required.

A study group on the history of technology (AG Technikgeschichte in der Denkmalbauhütte) with qualified architects and specialists on industrial history has been commissioned for the systematic documentation and inventory of the site. In addition architects are documenting the process of building and restoration; if needed, they also deliver on-site findings.

The work includes reports on the site’s condition in accordance with World Heritage Convention requirements. It also encompasses individual inventories (such as one on the suspension track), a documentation of the production process with flow diagrams (for instance for the sinter plant), and continuous reports with drawings which document the different ages of the various parts of the site.

The final goal is a complete inventory of the site in accordance with World Heritage Convention requirements.

Re-utilization is not only a financial problem but also a challenge for engineers, technicians and preservationists alike, as the site’s buildings are far from conforming to modern standards. For instance the needs of the façade of a modern building differ greatly from the much less rigid requirements a historic factory building had to fulfil at the time it was built.

Therefore the general suitability of such historic factory buildings for new functions had to be examined as early as possible, even before a usability concept or a space allocation plan was developed.

<sup>4</sup> N. Mendgen, “Hot Ideas from Cold Furnaces”, in: *Interpretation, Manchester 1988.*

In addition, the documentation and analysis of parts of the site or of a historic building within it – designated for a special, new function – can prevent partial or, in the worst case, complete destruction through ignorance (for instance the removal of now useless historic equipment which might only seem in the way today), and can even help avoid a large-scale misinterpretation of the monument (e. g. as a kind of “Disneyland”).

### Development Concept for the Site

Former now historic functions such as the rail system and supply channels were interpreted as a guidance system for development of the site and especially for the visitors’ routes. A major goal of the development concept is to intervene as little as possible into the now historic operational sequences. But there also has to be acceptance of the fact that re-use of the historic road and path networks as routes for visitors implies alterations, in order to adequately meet safety requirements

The historic, multifaceted road and path network offers visitors a firsthand experience of the blast furnace site. Aesthetic views are offered along the historic routes of production, in combination with additional information on functions, site history, etc. (see multiple usability). The visitor can either join a guided tour or explore the site

independently. As restoration and building progresses, the routes are also gradually being extended in quantity and quality.

The starting point for the visitors’ routes, the museum path, is the triangle from the ore and coke rails with “Ore Square” (formerly the scrap square) and “Carpenter Place,” the historic rail route for the delivery of the raw materials for the blast furnaces. It is now the entrance square for the site. The rails lead directly to the blast furnaces (one is tempted to compare that situation to straight roads leading to baroque castles).

Seen from “Ore Square,” the blast furnace square is situated at the back of the blast furnaces, beneath the rails for the pig iron with the pig iron canal. The entrance square and the blast furnace square are supposed to offer spatial orientation and context to the visitor who is exploring the site on foot, as do the “pipe bridge” and an observation deck.

The “pipe bridge” connects the entrance square and the coke rails with the blowing engine hall on the other side of the public Rathaus Street, which divides the site into two parts.

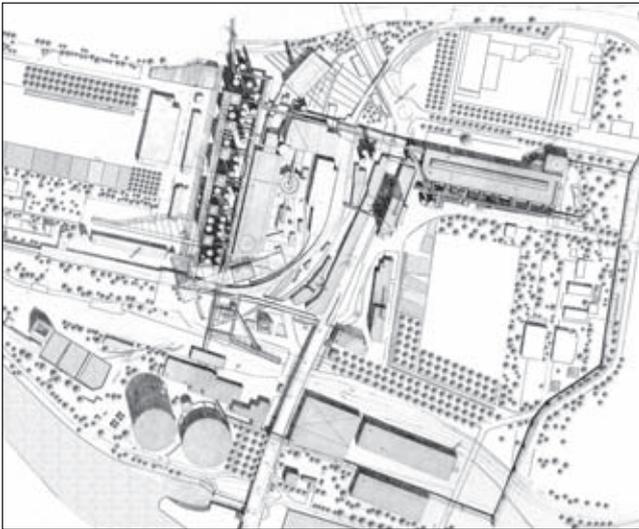
From the observation deck on two of the Cowpers of blast furnace No. 5 one has a great view over the industrial landscape of the Saar Valley from Saarbrücken to Saarlouis. The terrain of the Saarstahl AG can be seen below with the modern steelworks, the old slag hills,



*The World Heritage site seen as part of the industrial landscape of the Saar Valley, together with “Saarstahl AG” factory buildings; the modern steelworks are in the foreground*



*Sinter plant: the planned re-use as office space was given up in 2001 when research revealed that too many interventions into the historic substance would have been required*



*Master plan, survey, c. 2000*

and the “Nauweiler Gewinn” rolling mill – an area which is about twelve times as big as the area of the historic site.

### Preservation of the Equipment

The equipment on the site consists of manifold machines and means of transport. It is almost completely preserved. The poor condition of some parts is due to age, as well as to moderate vandalism which took place shortly after the factory was shut down. In addition to restoration of parts of the site, a major goal is preservation of those parts that are in ruinous condition (for later research) – unless the costs of preservation are not reasonable. Dismantlement of parts of the equipment is possible in cases where the relevant parts are multiples and the intervention does not affect the substance of the entire ensemble.

### Steel

The dominant material in the construction of the iron-works has been steel, coated with paint. Steel is also the material which is being used today in the conservation and re-use of the site. Historic steel elements are being restored, based on the results of documentation and research. They are sandblasted only if the costs of scaffolding prove to be exceedingly high, and are newly coated to limit subsequent costs in the future.

New structures, such as parts of the visitors’ routes and static additions, are instead hot-dip galvanized with zinc. These new surfaces clearly differ from the old ones. They are a reserved silver-grey. In contrast to the coated surfaces the galvanized ones have better durability, produce lower subsequent costs and therefore support long-term preservation in the sense of the World Heritage Convention.

### Building projects

After the blast furnaces were shut down in 1986, initial conservation work (dependent on the finances that were available) involved first the blowing engine hall and then the coke rails (visitors’ route). Since 2000 a systematic securing and re-use of the site has taken place. The most important projects within this context are:

#### *Preventive conservation programme for the roofs*

The first project was the preservation and conservation of the site’s larger roofs, undertaken to reduce and ideally prevent decay. In addition, preventive measurements were taken to secure the museum paths and to reduce the costs of long term preservation.

#### *Museum paths/visitors’ routes*

All projects which are initiated to protect and enlarge the visitors’ routes are supposed to provide the visitor with the best insights possible. The visitor can understand the site by actually seeing it, but he is also given information on its technical and social history. The visitors’ centre, in the former transformer station, is located at the beginning of the coke rails; the ticket office and museum shop are here.

### Sinter Plant

The sinter plant connects the most important visitors’ routes, the coke and the ore rails at the entrance to the plant. Initially the conservation programme targeted protection of the roofs, followed by conversion of the most prominent building of the sinter plant into an area for information and lectures.

The preparation of visitors has now replaced the preparation, or sintering, of ore, and in 2005 the former in-

dustrial facility was converted into a multimedia facility. Since 2003 the ticket office and museum shop have been located in the former electric power station in front of this building.

### Blowing Engine Hall, Compressor Hall

The main attraction of the World Heritage site, the blowing engine hall, can be reached via the pipe bridge (the former converter gas pipes which provided the machines with gas). Conservation started even before the machines were shut down in 1986, which explains the extremely good state of preservation. At the beginning of the 1980s machines 6, 7 and 8 at the top end of the machine hall were removed. A few years later their fundamentals began serving as an event area.

Renovation of the compressor hall began in 2003 and it will soon become the foyer for the event area in the blowing engine hall.

With that development it will finally be possible to clearly separate the event area which is accessible from the compressor hall from the visitors' area with its ensemble of historic machines, accessible via the pipe bridge.

### Ore Preparation Area

The roofed silos – two for ore and one for coke – with a length of more than 240 meters are the largest ensemble of halls on the site. The “Ferrodrom” science centre with an exhibition about iron and ore is located in the basement of the former ore preparation area, at the level of the suspension track. Above, at the level of the silo, a visitors' route which leads beyond the ore rails makes the Ferrodrom's exhibition and event areas accessible. The coke silo, located between the ore preparation area and the two ore silos, was preserved in 2004. It now offers another route for visitors. Since 2005 it has also contained a new exhibition hall with 800 m<sup>2</sup> at the silo level, which is also suitable for events. This allows a relocation of the exhibitions from the machine hall, the main attraction of the World Heritage site.

An analysis of the historic facilities preceded the planning process for the new functions. A qualified historian of technology and the Office for the Preservation of Monuments and Historic Buildings were responsible for the analyses, together with former engineers who specialized in blast furnaces and plant construction (“AG Technikgeschichte in der Denkmalbauhütte”).

First the historical parts of the plant were studied in regard to their suitability for functions needed by the World Heritage site in the future, and in order to minimize necessary alterations/additions to the historic fabric. Thanks to this procedure interventions into the original fabric could be minimized – as could the building costs.

The decision to dispense with heating and additional insulation in almost all areas supports a cautious concept of preservation and conservation and enables the preservation of many historic details and surfaces.

The result is an “additive” one: The site remains to a large extent authentic; it preserves its high value as a historic monument and it also serves a challenging new function which can clearly be recognized as such, here as a visitors' route, there as an exhibition area or science centre.

The entrance to the science centre is located in the basement of the former ore silo, behind the front of its pediment. This creates a roofed outside area with a direct connection from the historic monument outside to the science centre inside. The visitor experiences the space inside which is simultaneously an authentic setting and an exhibition space.

The visitors' paths are covered with red-coated mastic asphalt. The rails were preserved and covered with steel plates in the former area of the suspension tracks. Spatial orientation is supported by cross views and longitudinal views. Thus the facility's dimensions can still be perceived. Views open to the blast furnaces and its offices or to the former suspension track station; in addition to spatial orientation they encourage thematic connections.

### Blast Furnaces

Seen from the point of view of town planning, the blast furnaces with the charging platform and the hot blast engines are the most impressive parts of the blast furnace site. The charging platform – 27 meters above the ground and about 240 meters long – was first preserved as “roof.” Two hot blast engines for blast furnace No. 5 are now serving as a viewing platform, located 45 meters above the ground.

### Industrial Ruin

The most challenging preservation project of the Völklingen Ironworks World Heritage site is the handling of the rusty-to-ruinous parts of the site, or the “scrap heap” as it is called by some who have no knowledge of the characteristics of steel or perhaps from the point of view of a wrongly interpreted professional ethos: “A proper industrial plant doesn't show any rust, an industrial ruin is a blemish.” The importance and function of the industrial ruin need objective discussion and evaluation.

The potential of rust as a peril for steel depends on its various qualities, the thickness of materials and exposure to weather. But it is also dependent on perception and communication; consider for example the World Heritage site at Ironbridge or the Eiffel Tower. The acceptance by the public and the growing numbers of visitors to Völklingen provide hope for a similar positive status of the partly ruinous site and its philosophy of preservation.