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Contents

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The Armstrong hydraulic crane in the Venice Arsenale was designed in1893 to help service the ironclad warships of the Italian navy. The rivetted steel structure, rollers, rails and rotation platform, is suffereing servere corrosion and needs urgent conservation treatment.-see Report on industrial rust
Photo: Philippe 2010, Venice in Peril

Opinion

Michigan Technological University's updated Industrial Heritage and Archaeology program.

Timothy James Scarlett, Associate Professor

The Michigan Technological University Industrial Heritage and Archaeology group is evolving and these are exciting times in Houghton, Michigan, USA. Our community has grown and changed as new faculty have come to join us and senior colleagues have retired from the university (including TICCIH President Patrick Martin, who transitioned from Professor and Department Chair to Research Professor). Our research group has both grown and diversified, in terms of academic disciplines, areas of expertise, and research directions. During the next few issues, people from Michigan Tech's IH&A program will write to explain the program's evolution, including the academic offerings and the research activities of our community.

Our faculty have been engaged in a wide-ranging series of dinner meetings and conversations about our curriculum design, degree offerings, and programmatic structure. Our graduate programs in Industrial Archaeology (M.S.) is now 25 years old. We initiated our Ph.D. in Industrial Heritage just over 10 years ago, which is still young for doctoral programs. In 2009, we completed a self-study that examined the performance of our MS program. We published the results of that study on our department's website, including such statistics of students enrolled vs. graduated, average time to degree completion, availability of financial support, and types of positions secured by graduates. The faculty are in the process of updating the study to include 2009-2015 and these results will replace the older statistics on our website as soon as we complete the task.

Opinion

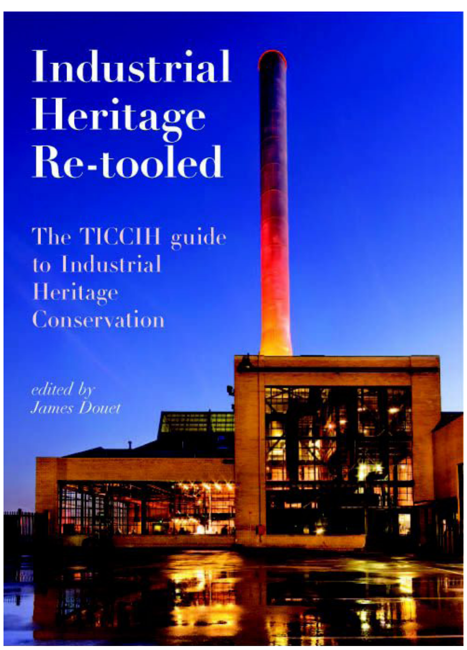
This process is helping us as we consider changes to our graduate degree programs, including the current degrees and course offerings. We are also in the process of developing an M.S.-level degree focused more directly on industrial heritage. This degree will serve a different student community than our current Industrial Archaeology M.S. while also opening new opportunities for international cooperative M.S. degree programs with our academic peer institutions within the TICCIH community.

In addition, we have already opened a new M.S. degree that extends our existing M.S. program. The OSM/ Americorps VISTA M.S. in Industrial Archaeology is built like Michigan Tech's widely recognized cooperative M.S. programs with the United States Peace Corps. This new degree is offered in collaboration with the United States Department of the Interior's Office of Surface Mining and Remediation and the Americorps Corporation for National and Community Service. Americorps puts more than 75,000 people into internships at non-profit organizations, schools, public agencies, and community groups throughout the United States and its territories. Since 1963, Americorps has operated Volunteers in Service to America (VISTA) as an anti-poverty program. In collaboration with the Office of Surface Mining (OSM), http://www.mtu.edu/social-sciences/graduate/osm-vista/ VISTA created specific programs to assist post-industrial communities dealing the environmental and social legacies of mining. The VISTA program places people in local organizations to build environmental stewardship, help communities create healthy futures, build local leadership capacity, and improve educational and economic opportunities. The AmericaCorps/VISTA program has expanded now beyond mining communities and landscapes to a broad engagement with the many types of rural and urban post-industrial communities around the country.

Michigan Tech's new degree program will allow volunteers to become trained in archaeology of industry, heritage policy and practices, environmental history, and other topics, then spend a year of service with community heritage organization. The volunteer will follow this experience by writing a thesis based upon their VISTA experience, completing their M.S. We hope this program will allow us to create more skilled industrial heritage professionals, with particular emphasis on community-based heritage work in cultural revitalization, economic redevelopment and planning, and education. Michigan Tech offers a number of degrees in this program beyond Industrial Archaeology and the placements are coordinated and funded by our partner The Bridge Network. http://www.gobridgenet.org/

In my next column, I will talk about some of the research programs ongoing at Michigan Tech, including the citizen-historian focused "Keweenaw Time Traveler" at Michigan Tech's Historical Environments Spatial Analytics Lab and other major developments in our work in industrial archaeology, heritage, communities, landscapes and enviroments.

http://www.keweenawhistory.com/about-the-project.html



Industrial Heritage Re-tooled: The TICCIH guide to Industrial Heritage Conservation.
James Douet (ed.). Lancaster: Carnegie. 2012.
71 colour photos. pp. 244.
ISBN 978-1-85936-218-1

The book is available at retail and online book sites and stores and directly from the Publisher.

This volume comprises the authoritative work from the International Committee for the Conservation of the Industrial Heritage – the international group dedicated to industrial archaeology and heritage – detailing the latest approaches to the conservation of the global industrial heritage. With contributions from over thirty specialists in archaeology and industrial heritage, Industrial Heritage Re-tooled establishes the first set of comprehensive best practices for the management, conservation, and interpretation of historical industrial sites. This book:-defines the meaning and scope of industrial heritage within an international context;-addresses the identification and conservation of the material remains of industry;-covers subjects as diverse as documentation and recording of industrial heritage, industrial tourism, and the teaching of industrial heritage in museums, schools, and universities.

Report

Corrosion alarm - know your enemy!

Judith Fait, engineer and photographer

Even in areas with an extremely dry climate corrosion will destroy steel over time. Coping with corrosion of steel structures - commonly known as rust - is a constant challenge.

Tsumeb in Namibia was Africa's richest lead and copper mine ever. Today, the 'Tsumeb Industrial Heritage Association' aims to preserve the ensemble and make it accessible to the public. The top priorities of all conservatory efforts are to ensure public safety and the conservation of relevant structures. Nowadays the mechanisms of corrosions are reduced to atmospheric influence like occasional rainfall and general air humidity. The structures affected are the De- Wet shaft, Tsumeb's hallmark, built in 1949, the connecting conveyor from 1950 and the Friedrich-Wilhelm shaft, built in 1924.

A great deal of information is available on the atmospheric corrosion of mild steel in the short and mid-term. Information on long-term exposure (10 - 20 years) is much less abundant, and no consistent data is available for exposure times over 50 years.

The so-called rust grade is the surface area ratio between the stainless surface and the surface affected by rust. This ratio is determined optically. Corrosion of iron and steel is categorized by rust grades for coated steel surfaces (grades Ri 0 – Ri 5) and uncoated surfaces (grades A – D) as defined in DIN EN ISO 4628-3, ISO 8501-1/2 and DIN 55928.

For a better understanding of the chemical reactions, the fundamental mechanisms of corrosion are these:

- Water corrosion (precipitation, average humidity, condensation) includes auto protolysis and produces iron (III) oxide. From this poorly soluble iron (III) oxide a hydroxide forms by water discharge which in turn deposits at the iron surface. The mixture initially formed from iron (II) hydroxide and iron (III) hydroxide is converted into a stable mixture of yellowish iron (II) oxide, reddish iron (III) oxide and crystalline water - colloquially referred to as rust.
- Corrosion by nobler metals (galvanic corrosion, see electrochemical series), here: copper and associated minerals. The difference in electronegativity of (Fe-26 , iron) -0.44 V and electronegativity of (Cu-29, copper) +0.34 V results in a continuous current furthering water protolysis.

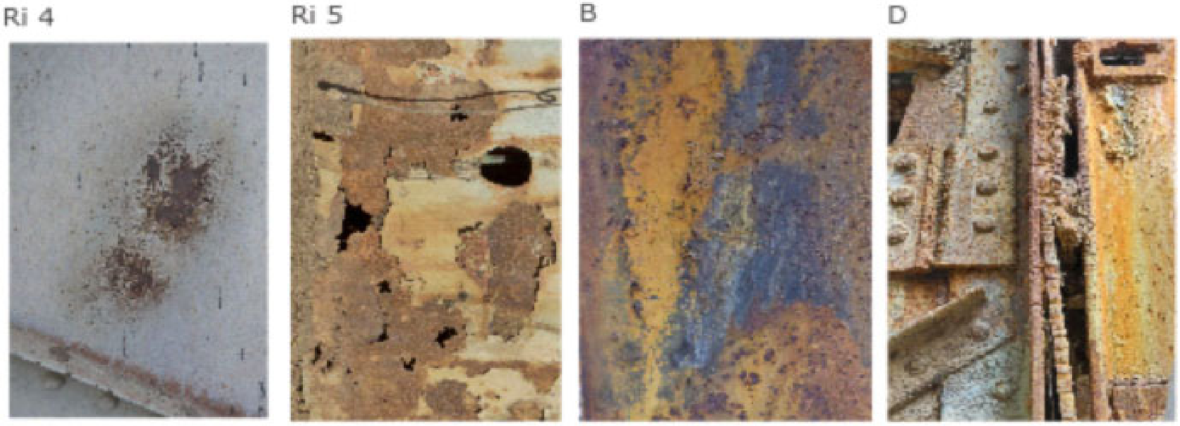
In Tsumeb, corrosion was promoted by finely dispersed copper which acts macroscopically as a corrosive nucleus for humidity induced corrosion and electrochemically as a cathode, thus being the iron's 'predator substance'. The oxide layers ultimately lead to a 'swell' of the iron surface, the resulting scales are brittle and porous and cannot contribute any longer to the stability of the structure. Thermal expansion exacerbates the problem because the chemically stable layers of rust which provide some protection rip and thus create new attack surfaces.

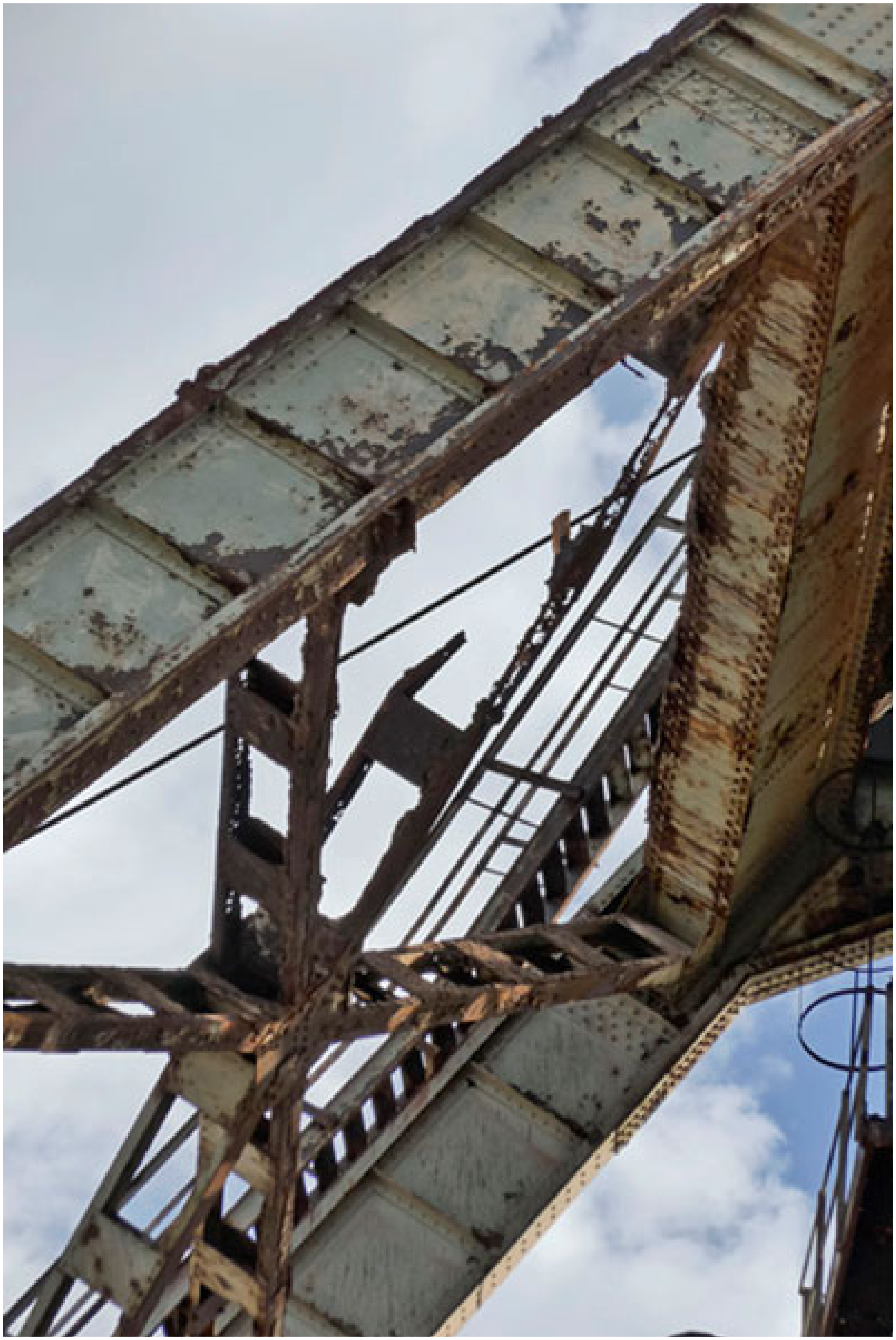
At both mine heads, the side facing the ore is much more corroded than the side facing away. On the other hand, the connecting conveyor exhibits consistently the same degree of corrosion. None of the head frames has a sacrificial anode in place. A thorough classification of corrosion types and grades helps to estimate efforts and cost. It can help save time, resources and - perhaps - your reputation.

[M. Morcillo, D. de la Fuente, I. Diaz, H. Cano, Atmospheric corrosion of mild steel, Revista de metalurgia, 47 (5)/ SEPT-OCT, 2011, 426-444.]

Rust grades on coated and uncoated surfaces

De Wet, lower part	De Wet, lower part	Friedrich- Wilhelm, lower part, possibly with parts of magnetite	Friedrich- Wilhelm, lower part with small remains of coating
Ri 4	Ri 5	B	D





Friedrich-Wilhelm shaft head frame. Surface and erosive corrosion grade B-D in the cross brace. Initial damage was by an operational accident in 1994

Brazil

Conservation of an iron road roller

Ronaldo André Rodrigues da Silva,
João Cura D'Ars de Figueiredo Júnior,
and Valquíria de Oliveira Silva.

The German Schwartzkopff steam road roller was built in the 1920s and remained operational throughout the 1940s and 50s at the construction works of the Federal University of Minas Gerais, Brazil. This article outlines a course of action for the preservation and conservation of this significant technical and cultural artifact.

The road roller was an important road engineering equipment in the city for levelling and preparing roads in the state capital and the modernization process with the exchange of stone coating for asphalt.

To prepare a suitable conservation intervention, technical analyses of preventive conservation (normal climatological variables), laboratory micro-chemical analyses (X-ray fluorescence spectroscopy and infrared vibrational spectroscopy) and microbiological analyses (mycology) were applied. The results confirmed the main deterioration and degradation factors in the object.

The conservation analyses to determine the intervention process consists of pre-established steps: advanced fixing, cleaning and neutralization of cleaning, desalting, drying, corrosion inhibition and application of protective films. However, it should be considered that the steps were determined by the previous tests which indicated the main agents of corrosion and led to the choice of instruments and products to be used in the conservation process.

A necessary observation refers to the need for a minimum environmental control for preventive conservation conditions, for example, a covering and side protection against natural weathering due to exposure conditions. On the basis of these results, it is sought to formulate a package of proposals for the preservation and conservation of the road roller. The aim is to emphasis the value of such industrial piece of machinery and make the existing historical relationship between the University and the city in question visible to the academic community and society.

Points for microsampling

Early steam engines and locomotives: a global exchange?

Stephen Hughes, TICCIH Secretary.

An unrealised synergy exists for many of the technical developments underpinning the development of the steam engine. Too often an invention is placed in a single national context with no attempt to evaluate globally based contributions. However, it is now possible to attain a fresh international perspective through online resources. The global reach of the *TICCIH Bulletin* has the potential to verify some of these sometimes ephemeral sources. A previous article in the *TICCIH Bulletin #65* surveyed a similar process of international technology transfer in relation to another core development which had often been assumed to be a British development: the development of structural cast-iron.

The origin of the realisation of the power of steam is in first century A.D. when Hero in Alexandria heated a simple water-filled device that rotated on an axle propelled by two angled nozzles. The earliest recorded practical applications were probably to drive an organ in Reims in France in 1125. In China, steam-jets had been recorded as experimentally driving a paddle-steamer in 1543. Taqi al-Din Muhammad Ma'ruf described a Hero-type simple turbine for rotating a cooking spit in 1551.

The first application of steam for a useful task was by Edward Somerset, Lord Raglan, who brought the Schleswig-Holstein engineer Caspar Kalthoff to England to help with steam-engine experiments from about 1627-28. In 1601 Giovanni Battista della Porta built simple fountains similar to a percolator by using steam to create pressure or a vacuum. In 1606, Jerónimo de Ayanz y Beaumont received a patent for a steam-powered device for draining mines and may have tried his machine in mines near Seville. Raglan worked with Casper Kalthoff and William Youlden and had a model of his steam-pump erected in the Tower of London in 1639 and a two-storey high chamber at the Lambeth Works contained two models of the steam pump.

Raglan returned to England with the English Civil War in 1641 and Kalthoff fled to the Netherlands where he patented a steam-pump. Raglan erected a full version of the steam-pump that could raise water 36.6m to the top of Raglan Castle. The unprecedented noise it made so alarmed Civil War attackers that they abandoned their attack. The installation may have been a triple-lift set of pumps. In 1655 Raglan wrote *Century of Inventions,* showing a pump consisting of two bored barrels alternately filled with steam by pipes running from a haystack boiler encased in brick. He was the first to inject condensing water to cool the steam. The water and steam pipes were manually controlled by stop-cocks and the steam-engine was capable of forcing water up to 12 m.

In 1629, Giovanni Branca published a spheroid boiler with a tapered neck that emitted a powerful air jet that could be directed to the blades of a paddle wheel and so drive a stamping mill. With proper gearing, rods and shafts it could be used to power grinders, stamping machines, timber mills and to pump water. An example of this type of boiler was used for the first steam-powered vehicle around 1665 by Ferdinand Verbiest. The Chinese Emperor appointed this Jesuit missionary head of the Beijing Astronomical Observatory. In 1687 Verbiest published an account in *Astronomia Europaea* and the events are also recorded in contemporary Chinese sources.

In 1690 Denis Papin designed a simple one-cylinder atmospheric steam engine, an account of which he published in the *Acta Eruditorum*. In 1696 he moved to the landgrave's court at Kassel, where his principal occupation was to design a pumping machine to raise water from mines and after 1707 he had limited success with steam boats.

Thomas Savery in London had developed an improved steam-pump and demonstrated it in 1699. His 'Miner's Friend' (patented 1698) was similar to Raglan's steam-pump in having twin copper barrels which alternatively received steam from the boiler below but their alternative use at the base of the pumping-column was determined by automatic valves. By 1712 Thomas Newcomen was sharing Savery's patent and using Denis Papin's earlier published idea for a steam-operated piston to produce a beam pump using atmospheric pressure that could be put into economically sustainable operation pumping mines. Some 600 atmospheric engines were built in mining areas overall and by 1720-21 were being erected in Flanders, France, Sweden, Spain, Hungary and North America.

The first recorded device for converting the reciprocating motion of a steam piston into rotary motion was for winding from the world's largest copper-mine at Falun in Sweden by Marten Triewald in 1730. A series of experimental atmospheric rotary engines followed, certainly in coalfields such as south Wales in the period 1763-83.

The first application of steam (using atmospheric pressure) to successfully drive rotary motion in a full size locomotive was with Captain Nicolas-Joseph Cugnot's road locomotives of 1769-70, the second of which was full size. This used a simple ratchet and pawl motion to produce rotary power by the front driving-wheel. It was essentially a steam-driven lorry to carry cannon into battle, but it had to stop to refuel every fifteen minutes. Trials were made before the French military put the machines permanently into storage.

News of the success of the transfer of steam to rotary motion may have crossed the Atlantic for in the same year 1760 the American gunsmith William Henry used a Newcomen engine in a river boat at Lancaster, Pennsylvania, which unfortunately sank before trials were completed. The next recorded application of steam (using a double-acting engine) to achieving rotary motion was on the paddle-steamer Pyroscaphe, built by the Marquis de Jouffroy d'Abbans in France in 1783.

Worldwide

At about the same time the Scottish engineer William Murdoch was developing designs for a steam road carriage driven for his employers, the pumping-engine manufacturers Boulton and Watt. His first of four working road locomotives was built between 1783 and early 1784, initially as a working model in the Cornish copper and tin mining area. In 1785-86 he learnt that James Sadler was experimenting with wheeled carriages driven by steam and also William and George Symmington with John Taylor at Wanlockhead Lead Mines in Scotland. In 1786 Murdoch gave the first public demonstration of a steam vehicle in Britain at a hotel in Truro.

Over the next years there was a succession of steam propulsion experiments in the United States. In 1786 Oliver Evans was granted the rights to design steam carriages to move over public roads but it took years to raise finance to build a successful amphibious vehicle (a dredger) that used high-pressure steam and propelled itself in the Schuylkill River. In 1787 Evans's collaborator John Fitch launched two steamboats. The second, designed by James Rumsey, was driven along the Potomac River by a steam pump ejecting a stream of water from its stern. Three years later Fitch ran an 18 m)boat carrying 30 passengers on numerous trips between Philadelphia and Burlington, New Jersey.

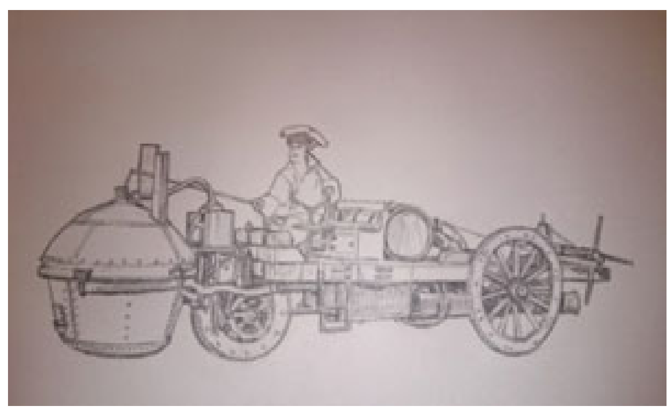
In October 1788 William Symmington's work on roads was superseded by his 7.6m twin-hulled paddle-steamer achieved 5mph on Dalwinton Loch in Scotland. Fifteen years later his steam propelled boat the *Charlotte Dundas* was the first steamship to pull a train of boats.

In 1790 Nathan Read of Salem Massachusetts patented model steam road locomotives and boats that used a multi-tubular boiler of his own devising and was developing high-pressure steam.

Two years later William Murdoch had developed a locomotive driven by high-pressure steam and demonstrated it in 1794 to Richard Trevithick and Andrew Vivian. In 1801 Trevithick built and ran his full-size road locomotive the 'Puffing Devil' and a year later he was experimenting with the construction of the first railway locomotive at the Coalbrookdale Company's Ironworks in Shropshire.

What next?

The extent of TICCIH membership in over 50 countries means that the often ephemeral online sources that have been used for this international overview can be checked by members. National members will also have a greater knowledge about the technical performance evaluations being carried out on a growing number of highly accurate replicas of the da Vinci, Cugnot, Murdoch and Trevithick machines. This has the potential to transform the story of international synergies contribution to the early development of the steam engine and steam propulsion. More specific questions remain to be answered: were the steam vehicles of Verbiest and Grimaldi Chinese one and the same? What did some of the lesser known steam locomotives and boats look like? Was Beaumont's mine pumping engine a success? How many Savery engines were put to industrial use and what was the extent of coalfields use of rotary Newcomen engines? Answers to from other TICCIH members are welcomed to help clear these research questions.



Author's drawing of the successful running of the American replica of Cugnot's road locomotive, fitted with some necessary additions.

Left image: A replica of Trevithick's 1801 road locomotive the 'Puffing Devil'

Worldwide

Mexico

The Saxon Steam Engine of La Dificultad Mine

Belem Oviedo Gámez and Marco A. Hernández Badillo

Steam engines were integrated into Mexican mining after the second decade of the 19th century. In Pachuca and Real del Monte, engines manufactured in Cornwall, UK, prevailed during almost the whole era, but near the end of the century, German technology started to be acquired. In 1885, the Paschker und Kaestner company, in Freiberg, built a water column machine to drain Morán Mine; and after a study conducted by the executives of Real del Monte and Pachuca Company (CRDMyP), which included visiting German factories in Chemnitz, a machine was acquired for La Dificultad Mine even though it was more expensive that an offer from Cornwall, justified due to the fuel savings that they would achieve.

In May 1887, Oëtling Brothers from Hamburg, representing the CRDMyP, signed a contract with the Great Machine Factory in order to build a complex of machines able to pump water and sink the mineshaft at the same time. This complex included, among other elements, a Rittinger system 900 hp pump, a drilling pump to sink the shaft up to 485 meters and a complete Eschwingel device. The equipment had a total weight of 310 tons and a cost of 130 950 German Marks. A contract was signed to hire personnel; between September, 1888 and February, 1890, assemblers, carpenters, engineers, pump workers, construction workers, miners and machine operators arrived to Real del Monte from Germany.

While in Chemnitz they were facing the challenge to build a powerful steam machine for a mine located on the other side of the Atlantic, in Real del Monte they were working hard to create the conditions to receive and operate it. Mexican and foreign labor, knowledge and experience united to install and operate the new machine. In October, 1888 Russian assembler Anatolio Mertzenfeld reported that he could finish shaft refurbishment work, with personnel from the workshops located in Real del Monte without requiring contracting more workers from Germany.

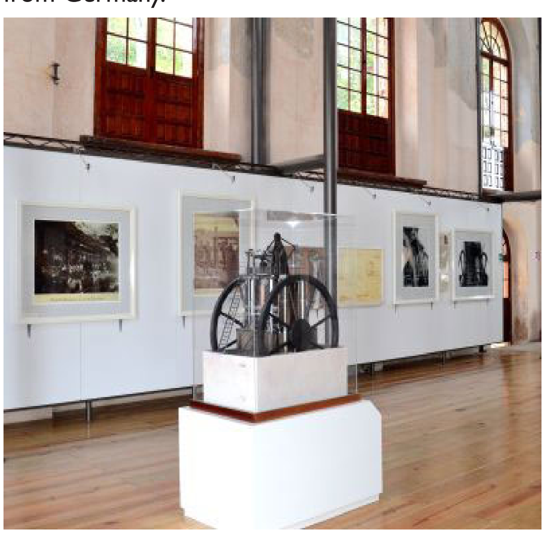
The engine room constructed was a building of dimensions never before seen in the town: 14m width, 26m long and 20m high, with an iron roof structure covered with corrugated sheet, and three rows of windows. A 40 m octagonal shaft was located alongside, also unique in the area.

Drainage work conducted by this engine in La Dificultad had a total cost –including transporting it from Germany to Real del Monte, site conditioning and installation- of $423,036 and allowed exploration and exploitation works to continue into the new century; it provided peace of mind and profits to company shareholders, increasing revenues from $153 319 in 1889 to $529 018 in 1891. It also provided the insurance to keep workers' source of income, and relief to the town because people knew that their lives depended, as in all mining towns, on the continuity of production; that is why a big party was organized when the engine started operating.

La Dificultad engine inauguration was a huge event for the town, civil and ecclesiastic authorities, company executives, miners and their families. Felipe N. Barros captured in words the moment when the priest of Real del Monte, P. García, blessed the engine and immediately 'the operator opened the faucets, moved the levers and the great engine, in the middle of a round of excited applause and the notes of the national anthem, started operating, in such a majestically sublime manner, that the deepest emotion was felt in that sea of people. Once this event was concluded, so awesome in itself, the concurrence filled the enormous church, decorated with magnificent and rich ornaments; a solemn Te Deum finished the festivity leaving people full of good memories that will be with them forever as a portrait of this charming, happy and enchanted celebration.'

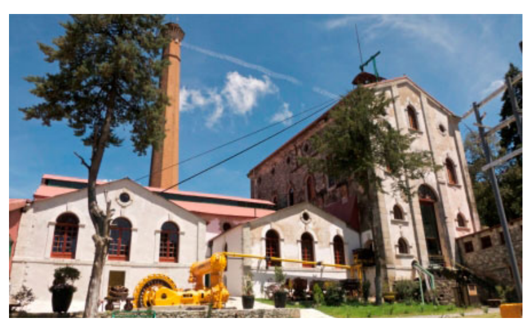
The installation, inauguration and commissioning of the Saxon Steam Engine of La Dificultad Mine in Real del Monte, had an impact that can still be seen in the landscape, economy, work relationships, ore production, and life of this town. Maybe those who worked to make this project possible and posed on the engine room access stairs for a now historical photo knew this, showing us that, at the end of the story, foreign and Mexican workers learned to live together, to exchange experiences and knowledge, and to overcome difficulties while looking for the precious metal.

A few years after this (1897), central power was installed in La Dificultad and it continues supplying electricity to the CRDMyP mines.



Left image: The Site Museum and Interpretation Center with a model of the Oëtling Brothers engine was a Woolf-system double-acting machine of 580 hp, with Rittinger pumps, hydraulic counterweight and an 80 hp winch

Right: image: The history of La Dificultad mine can be seen in the Site Museum and Interpretation Center located inside its facilities and open to the public by the Historical Archive and Mining Museum, A.C., in 2011.



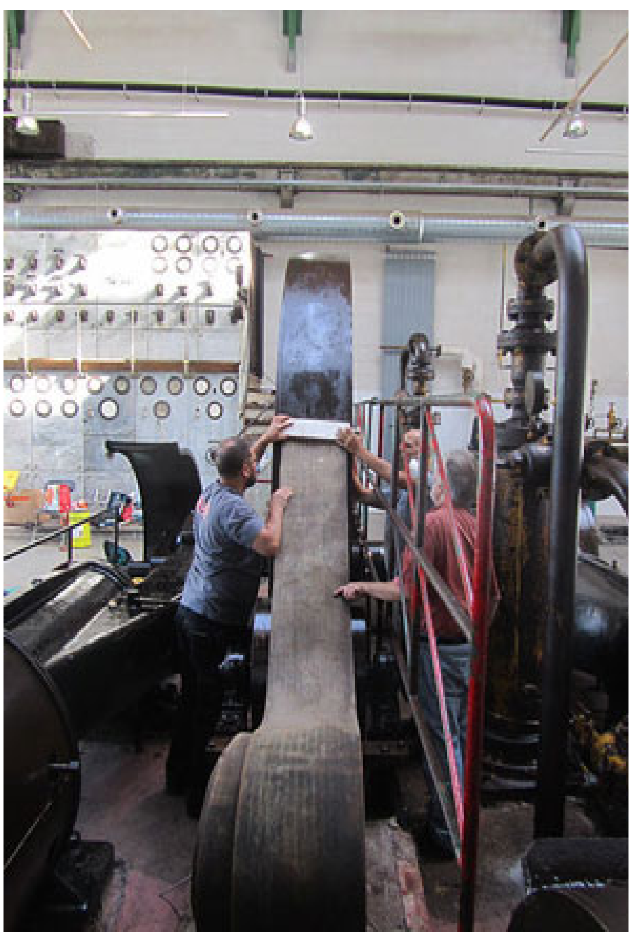
Belgium

Steam plant restoration at the Wielemans-Ceuppens brewery

Joaquín de Santos Barbosa

The restoration of the machinery of the old Brussels brewery by the BruxellesFabriques association, completed in the beginning of September, concerned machines that are unique in Belgium, and one of them is unique in the world. The works were based on a study realised by Guido Vanderhulst, President of the association, and included the recruitment and the training of a team of technicians who carried out the restoration work.

The Wielemans-Ceuppens machines were built in 1894 and 1905 and constituted a powerful refrigeration system for large-scale production of Pilsner, an originally Czech beer. The machines – located in the lavish engine room of the former brewery – were at the then cutting edge of modernity. Nowadays, this listed heritage not only preserves the memory of the brewery but also presents the evolution of science applied to beer production, including its evolution in relation to technological progress and new energy sources.



The system has been thoroughly documented and assessed by Guido Vanderhulst and it includes: an American compressor, the De La Vergne, designed and built for Wielemans-Ceuppens in 1894 in New York; the Swiss compressors Sulzer, driven by two steam engines Carels & Frères, from Ghent, Belgium – unfortunately, only one of which remains in place; a fully mechanical overhead crane, driven by chains; two Ingersoll Rand compressors powered by electricity; and an impressive electrical board with marble panels.

The first phase of restoration concerned the De La Vergne compressor, as well as the two Ingersoll Rand compressors, the gas pipes, the overhead crane, and the electrical board. The restoration of these elements took place over two months, between end December 2015 and early March 2016 and achieved outstanding results. Our team scrubbed off the non-adherent rust of the machines, so that the original colours are preserved. Then, they cleaned the machines with soap and water. Once the machines were dry, they applied two layers of a special anti-rust coating. In addition to this process, the team of technicians managed to set in motion both the overhead crane and the De La Vergne compressor, whose last known operation was nearly 100 years ago.

The second and final phase started in July and was concluded in the beginning of September. It focused on the Carels steam engine and the Sulzer horizontal compressor. After several trials, the team managed to overcome 60 years of immobility as well as water infiltration suffered by the steam engine, and set it back into motion. An achievement that led to the project's goal of putting both the Carels engine and the Suzer compressor – built on the same axis – back in motion again. It is worth mentioning that the Sulzer compressor kept working until the brewery closed down in September 1988.

Following this success, the Carels and Sulzer received the treatment mentioned above, with a deep but gentle cleaning and the application of a special anti-rust protective coating.

The project has received the essential support of the Baillet Latour Fund and the Brussels Capital Region as well as the support of the Europa Nostra Industrial and Engineering Heritage Committee chaired by Pierre Laconte, and the collaboration of the Forest Commune and the Forest Cultural Centre – BRASS.

Restoration of the last Carels & Frères horizontal engine. The team is focusing on finding the missing elements for the Carels steam engine and the Sulzer compressor

Albania

The Laç Superphosphate factory

Boriana Vrusho, Department of Architecture, Epoka University, Albania

The industrialization of Albania began at the end of 19th century, based mostly on investments from foreign countries. Most started with mining, energy and petroleum concessions by Austrian, French, English and Italian companies. However, the industrialization effected by the 1945-1990 communist regime gave Albania a total different character, basing the local economy not only in agriculture but also industry. The country' development was organized in 2- and 5-year plans. The first (1951-1955) targeted the creation of an industrial economy with the help of the Soviet Union (USSR). The second (1956-1960) was the application of agricultural collectivization and creation of cooperatives.

The third (1961-1965) plan marked the break of cooperation the USSR and a new one with the Republic of China. The forth plan (1966-1970) is the most visible transformation of Albania into an industrial country. The Chinese alliance helped the construction of many important heavy industrial sites as the Metallurgical complex in Elbasan, the Superphosphate factory in Laç, the Fertilizer plant in Fier and the Textile factory in Berat. Unfortunately, in 1978 Albania ended relations with China and closed its borders. The sixth (1976-1980), seventh (1981-1985) and eighth plans (1986-1990) dealt mostly with investments in food, chemical and defence industry - almost 170,000 bunkers were built all over the country.

After the fall of communism in 1991, with disastrous consequences for the society and economy, many industrial sites suffered serious damages and robbery. Most of them were abandoned and left without investments for many years. With the new democratic regime small state-owned factories were privatized, but a few managed to continue. The second devastating moment was in 1997 when the economy collapsed again because of failure of pyramid schemes and abolition of private and public investments.

From that moment, Albania has made huge steps to restructure its economy and assure a better place for its citizens. Foreign investments and loans, combined with political policies, have improved the situation intensively. However, the situation of industrial plants in the country is very sensitive. Industrial heritage is still not part of the heritage typology cited in Albanian laws so industrial sites cannot be listed as protected monuments.

Two types of site can be distinguished: the large ones of national interest (which are being taken in consideration at the national level for possible transformations to benefit the country) and many small ones which are in very bad conditions and there is no interest in their renovation. On the other hand, the new Law on Spatial Planning has facilitated the process. Specialist are drafting General Local Plans for all cities of Albania and the next steps will be the projection of Detailed Local Plans. This process shall facilitate the regeneration of deteriorated industrial sites, operating as generators of their cities.

Located in north-west Albania, the factory was the first one of its kind, constructed between 1965-1970. The construction was facilitated by the realization of the Laç-Vlora railway. The factory operated for almost 35 years, from 1966 until 2001, when it was closed because of low productivity and inability to face competition. As result, the factory suffered severe structural damages through years because of vandal invasions. Nowadays, according to the Ministry of Energy and Industry, the Laç Superphosphate Factory is an enterprise in liquidation.

Taking in consideration national politics for regeneration of superphosphate complex in Laç and its reuse as industrial site, it is important to impose some restrictions in order to improve the conditions of the surrounding environment. Furthermore, the vast urban connectivity from industrial area to the urbanized ones could be supplied with sport facilities and green areas. On the other hand, renovation of industrial activities is expected to encourage work abilities. Finally, transformations should also include some parts of the previous memory. Of course this will need further studies and accurate urban and architectural transformations.

Laç Phosphate Complex in September 2016

Austria

The Linz Railway Bridge – Demolished!

Guenter Dinhobl

Many years of efforts of experts and citizens' action groups to prevent the demolition of the Linz Railway Bridge failed (see *TICCIH Bulletin #62*). The demolition started in August 2016. The bridge fabric was largely authentic. No substantial damages and replacements had been necessary over time. The bridge had survived World War II without any destruction, too.

The bridge was built 1897 to 1900 with an overall length of 399,5 m and completely riveted. As the last example of historic Danube bridges in Austria, it was protected by Federal Law (following a 2003 decision of the Monuments Authority). Although Rolf Höhmann from Germany, as an international expert, recommended the preservation of the bridge in 2010, underlined by written evidence from independent and experts of the Advisory Board for the Preservation of Monuments (Denkmalbeirat, the members are appointed by the responsible Minister) in 2013, the Federal Monuments Authority issued the "permission for destruction" without further consultation in September 2013.

The Linz Railway Bridge carried both rail and road transport: while horsedrawn vehicles were allowed to pass the bridge in the time of the opening, in recent years road traffic increased heavily. In the case of a train's passing over the bridge, road traffic was stopped by light signals like on a level crossing. This 'multimodal' use was very rare but resulted in heavy corrosion problems due to the use of salt as defrost substance for the road every winter. While the railway company was responsible for maintenance, and finally stopped the railway line itself, the City of Linz as responsible for road maintenance, and refused to pay for preservation of the bridge. A public poll was undertaken in Linz in September 2015, where 68% of the delivered votes opted for a completely new bridge for all modes of transport instead of a solution with clear separation of the transport modes by a combination of conservation of the historic bridge in combination with a new bridge.

Obviously a new bridge was political will since years and even an architectural competition was held in 2014. The jury chose the blueprint of Marc Mimram Architecte from Paris. The costs of the project are estimated with 47 m €, the demolition up to 3,5 m €, while the complete costs including financing will reach up to 60 m €. At the moment the cost allocation between the City of Linz and the state of Upper Austria is still under negotiation. Austria has lost its last authentic bridge across the river Danube.

The bridge combined three lattice-girder bridge segments with curved top boorn and 83 m span each for crossing the river, accompanied by four lattice-girder bridge segments with parallel top boom and 26,6 / 36,3 m span each.

Foto: Lorenz POTOCNIK, 2016

Germany

New life for the Zollern colliery machine hall

Patrick Viaene

With its impressive red facades and opulent gables, the Zollern colliery, built between 1898 and 1904 in Dortmund-Bövinghausen by the 'Gelsenkirchen Bergwerks Aktien Gesellschaft', is one of the finest examples of the industrial heritage in the Ruhr region and in Germany. Because of its exceptional mix of styles (eclecticism and art nouveau) and huge dimensions, the machine hall (the central part of this colliery) has been called a the 'industrial cathedral of the Ruhr'.

It was also the first coalmine of the region powered by electricity and important parts of the original technical equipment in the hall can from now on be demonstrated for the visitors! The power hall has another particularity: it was built for the important Industrial Exhibition in Düsseldorf in 1902 and designed by Bruno Möhring. The hall was removed soon afterwards and re-assembled about 100 km away. The relocated hall is an early example of such an operation, about 50 years after the London Crystal Palace, the first 'mobile building' worldwide composed by prefabricated structural elements.

The Zollern mine was closed in 1966, as many other collieries during the economic recession during the 1960's and 1970's. "Civil associations and experts prevented the demolition of this exceptional ensemble and saved this industrial monument in 1969, a crucial moment in the cultural history and heritage conservation in Germany. That year can be considered as the start of the industrial heritage movement in the Ruhr-region and in Germany", explained Alex Föhl, one of the keynote speakers during the opening ceremony held on 4 September this year in the fully restored Power Hall. The ceremony was animated with miners choirs and by the expressive sounds of a solo saxophone player. Axel Föhl said: "In 1981, the Zeche Zollern II - IV was the first large scale industrial ensemble of Germany, listed as a historical monument".

Later on the mine was integrated in the network of the LWL - Industriemuseum, www.lwl-industriemuseum.de also called "Westfälisches Landesmuseum für Industriekultur", one of the leading industrial and technical museums in the world. This fully restored monument can start now its second youth.

Erected in Dusseldorf for the 1902 Industrial Exhibition, the hall was dismantled and moved 100 km to Dortmund where it was re-erected with the famous Jugendstil entrance.

Photo: LWL - Industriemuseum

Spain

Industrial digital-lab workshop: overlapping meanings: industrial heritage and active register, organized by INCUNA

Andalucía Transversal / Universidad de Sevilla

The workshop will analyze data from the project "100 Elements of Industrial Heritage in Spain", recorded, produced and edited by TICCIH-España, to generate stories, maps, routes and visual-conceptual nuclei of interest through its visible and invisible layers (geodata, sociodata, ecodata, cliodata), its initiatives, its potential and the possibility of applying this methodology (concepts, processes and tools) to the management of semi-used or abandoned productive spaces for public use (cultural, productive, housing).

Sweden

Lessebo hand paper works

The Swedish Industrial Heritage Association (SIM/TICCIH Sweden) www.sim.se awarded the Lessebo hand paper works the Industrial Heritage Site of the Year "for the preservation of a unique cultural heritage by a combination of careful renewal and modern enterprise". Lessebo handpappersbruk can trace its origins to 1719. It is one of only a few handmade-paper mills in Europe that is still in commercial operation.

US

Michigan Tech research

Dr. LouAnn Wurst joined the faculty at Michigan Tech in 2014. For the past two years, Dr. Wurst has been studying the lives of workers in cordwood lumber camps operated by the Cleveland Cliffs Iron Company in Michigan's Upper Peninsula. The camps are located in what is now the Hiawatha National Forest, just south of Munising, Michigan. During the first season in the summer of 2014, the fieldwork team concentrated on the town of Coalwood, where more than 200 workers lived and worked from 1900-1912. They mapped the site and conducted excavations examining the overseer's house, the company store, three worker's houses, and the community sauna. During the 2015 field season, Dr. Wurst, her students, and United States Forest Service "PIT" volunteers returned to work in Coalwood and expanded their study to two other cordwood lumber camps: Zerbal (1906-1910) and Roscoe (1904-1910). While Finnish workers lived in both Coalwood and Zerbal, Roscoe housed seven Slovenian families that the company recruited from Pennsylvania in reaction to labor shortages following strikes in camps along the railroad. Dr. Wurst's research interest at these towns is focusing on the impact of heavy site looting to archaeological integrity and subsequent research potential. She is also examining workers' experiences in the northern forest, developing collaborative studies of lumbering in European regions in order to provide comparisons to the workers' lives in Michigan. As the laboratory analyses progress, Dr. Wurst will write a more detailed update about the project for the next *TICCIH Bulletin*.

The paper is produced by the sheet, using professional expertise that has been handed down across generations

Industrial Museums

Rivers of Steel Heritage Area - USA

The Rivers of Steel Heritage Area was designated in 1996 and is managed by the Rivers of Steel Heritage Corporation. It is a National Heritage Area (NHA) referred to by the National Park Service, which advises the NHAs, as a 'grassroots, community-driven approach to heritage conservation and economic development'. They are a way of managing heritage landscapes that puts a lot of emphasis on partnerships and retaining a strong local influence, as Ron Baraff explains.

As we move further into the post-industrial era, it is incumbent on us as public historians and museum professionals to keep the history of our industrial past alive and relevant. National Heritage Areas are places where natural, cultural, and historic resources combine to form a cohesive, nationally important landscape. Designated by the US Congress, NHAs are lived-in landscapes that, through their resources, tell nationally important stories that celebrate our nation's diverse heritage.

Rivers of Steel Heritage Corporation conserves, interprets and develops historical, cultural and recreational resources throughout western Pennsylvania, including the eight counties that comprise the Rivers of Steel National Heritage Area. This extends beyond the greater Pittsburgh area and along the Monongahela, Allegheny and Ohio River valleys, the very places that gave birth to the most powerful industrial heartland the world has ever seen. The dynamic and powerful story of the region's evolution from colonial settlement to "Big Steel" to the modern era is evident in its many artifacts, buildings, vibrant communities and industrial sites.

Rivers of Steel seeks to link our colonial and industrial heritage to the present and future economic and cultural life of the region and the communities it serves. Its vision is to become a nationally recognized brand that not only celebrates our past but also embraces our future, by connecting people to their environs. To achieve these ends, it fosters and promotes resource conservation and development, heritage tourism, cultural and educational programs and economic revitalization in partnership with hundreds of local communities.

Our approach has been mainly from a philosophy of representing the communities around us. We try to integrate what is familiar and visceral for audiences and connect with them as members of an industrial and post-industrial community.

With very few exceptions we plan and design our exhibitions in-house. Drawing upon our extensive (and thankfully ever growing) collections, we frame the narrative around a basic premise: Can our patrons relate to this story – does it resonate with them as western Pennsylvanians? This is true whether we are telling it from the corporate, labor, or community based point of view.

Ronald Baraff, Director of Historic Resources and Facilities, Rivers of Steel Heritage Corporation

Our greatest priorities for collecting and conserving the material culture of the region's industrial past are to ensure that the people and the "culture of steel" are honestly reflected within our collections. We do not emphasize the corporate story as much as we do the stories of the people and their communities. Much of our sizable collections are obtained a few pieces at a time from individuals and reflect the daily life of the worker and the community. This is the heritage that we as a region must protect – that of the hardworking men and women who worked in the iron and steel industries (and their supporting industries as well) – those who fought to make a better life for themselves and their families and to achieve the "American Dream." These people and their heritage and culture are what makes our region unique and the common bond that we all share. They along with the companies that they worked for built this country and created America's 20th century.

Our funding is very much a mix of private and public monies. We receive some federal and state dollars, but are increasingly reliant on private foundations, etc. for funding. We are also, especially in the case of the Carrie Furnaces, moving more into fundraising through special events and tourism. This approach is rapidly becoming the standard in which we must survive and focus. The more doors we open to the public through programming and events the more interest and in turn dollars we are able to attract.

Employing tourism, the arts, interactive programming, environmental programming, and public events, among others, we are able to open doors to larger and more diverse audiences. These audiences while originally attracted to alternative options of interaction, in turn almost to a person walk away from the museum or historic site with a much greater understanding of our history, legacy, and personality as a region. We have taken the approach of understanding that our past is what frames our present and future. By introducing new and exciting elements into our programming, we have the good fortune of not being restrained (or constrained) by a "box." This approach has allowed us to explore alternative methods of bringing the public to the history and legacy of our region.

A Rivers of Steel tour of the Carrie Blast Furnaces Nos. 6 and 7. Since passage of the National Historic Preservation Act in 1966, conventional practice has stressed designation of related multiple properties rather than individual buildings in order to provide a richer sense of context.

The US Steel coke plant in 1973 on the Monongahela River, 20 miles south of Pittsburgh. The Carrie furnaces, with Andrew Carnegie's Homestead Works which stood on the opposite bank of the river, were formerly part of a National Steel Heritage Centre project.
Photo: John L Alexandrowicz, Wikipedia Commons

Cultural heritage routes

Industrial Valleys ERIH Regional Route, Germany

Eberhard Illner, Chairman Bergisches Land Industrial Heritage Network and Stephan Sensen, Chairman WaterIronLand - Industrial Heritage in South Westphalia

South of the world-famous Ruhr (Ruhrgebiet) in Germany is the Regional Route of the European Route of Industrial Heritage (ERIH) *Industrial Valleys* (Täler der Industriekultur). It combines the low mountain areas of Bergisches Land, Sauerland and Siegerland, one of the oldest commercial and industrial areas in Germany - even older and more important for its role in the birth of industrialization than the Ruhr. 2,300 years ago Celts smelted iron ore in the Siegerland. In the Middle Ages the entire region became one of the most important mining areas in Europe. From the 16th century, the naturally limited resources of waterpower, charcoal and ores led to specialisation in manufacturing: iron and steel produced in the Siegerlands´s blast furnaces were processed into tools, blades and cutlery in the Bergisches Land and into wire, needles and other products in the Sauerland.

From the 16th century textiles have been processed along the River Wupper. Since about 1820, production was located in industrial mills with close links to Lancashire and Manchester. Of relevance to this is the biography of Friedrich Engels, member of a successful Barmer textile dynasty, who - together with Karl Marx - in the *Communist Manifesto* in 1848, considered the development of industrial work. At the same time the rapidly growing heavy industry in the Ruhr area outperformed the Siegerland and Sauerland. The Ruhr area experienced an organisational symbiosis in the form of specialization. Steel and iron from there were processed in the 'Industrial Valleys' into semi-finished and finished products. In return, the Siegerland supplied the Ruhr area with iron ore; the reservoirs of the Sauerland supplied water; and the Bergisches Land supplied lime for the production of steel, as well as special textile products.

In contrast to today's largely de-industrialized Ruhr area, the Bergisches Land, Sauerland and Siegerland in the industrial heart of North Rhine-Westphalia is still beating. Numerous world market leaders can be found among the predominantly medium sized and highly specialized industrial companies in the automotive, mechanical engineering, tool engineering, chemical, pharmaceutical, electronics and hardware industries: global players such as Bayer, Vorwerk, Zwilling, Grohe, Trilux or ERCO and 'hidden champions' such as Knipex , Coroplast, Knorr, BPW, Hella, Kostal and SMS. The region is regarded as one of the strongest, most innovative and most robust industrial regions in Europe.

At the same time, the region has a rich industrial heritage. 30 heritage highlights are included in the *Industrial Valleys* regional route. 15 sites in the Bergisches Land belong to the Netzwerk Industriekultur Bergisches Land e.V. (Bergisches Land Industrial Heritage Network)", and 15 sites in the Sauerland and Siegerland are linked to the association WasserEisenLand – Industriekultur in Südwestfalen e.V. (WaterIronLand - Industrial Heritage in South Westphalia). This classification takes into account the historically and geographically-related orientation of the Bergisches Land to the western part of the Rhine area and the orientation of the Sauerland and Siegerland region to Westphalia and the Ruhr area.

The Netzwerk Industriekultur Bergisches Land includes the southeastern right bank area of the Rhine in the very densely populated industrial conurbation of Rhine-Ruhr, accessible to around three million inhabitants within one hour. Several locations of the Rhineland Industrial Museum, a series of urban industrial museums and numerous craft and industrial museums operated by dedicated volunteers, offer a broad selection at which to experience authentic industrial culture.

The commercial and industrial structure of the region has evolved in a fragmented and unplanned manner. Thanks to public funding, this structure could be preserved - the industrial monuments have been restored and equipped with tourist infrastructure to present their history to the public. Based on a masterplan, a common information system has been developed which presents the individual sites in an up-to-date way, and books, leaflets, maps and flyers have been published.

The network's main objectives are now to maintain the momentum of the work to date; to encourage the exchange of experience between professionally managed museums and those run by volunteers; and also to present the region's industrial and technical history in locations other than museums, for example by organising company visits. For information, there is www.bergnetz.net and a hotline which operates during museum hours.

A popular tour programme comprising about 25 dedicated tours has been established. It is updated annually and the tours are guided by experts in the industrial history of a range of historically interesting places, establishments and companies. The programme's success is based on the professional and well-informed way that it has been planned and delivered. Often, there are only a few specialists that still have the skills to operate the often complicated processes in historical manufacturing. To maintain historical equipment in working order requires continuous effort. Only a machine in motion can convey an authentic impression of technology and production in history.

Increasingly popular is the combination of "experience industry culture" with outdoor activities for young and old. This is based on hiking and cycling trails along disused railway lines such as the *Sambatrasse* in Solingen and the *Nordbahntrasse* in Wuppertal and also expanding theme routes into the bicycle network of North Rhine-Westphalia. Again, the network provides appropriate tours. A guide to industrial monuments on the *Nordbahntrasse* of Wuppertal will be available soon.

Cultural heritage routes

Since 2009, the network has presented the travelling exhibition With Fire & Water in twelve selected museums of the Bergisches Land. Each of these museums preserves one specific aspect of the wide variety of industrial and technological history of the region. The presentation is of high quality, designed in a modular format so that it can be adapted for use in different locations and spaces. It has been used to promote industrial culture in many places including shopping malls, financial institutions and companies.

In the region there is another attractive opportunity to visit industrial heritage sites, which is probably unique in Germany: from April to October the Bergischer Ring, an association of mainly transport museums, offers trips by vintage buses, trams, railways and the Wuppertal Suspension Railway to industrial monuments and museums in the Bergisches Land. In addition, tours can be organised to meet individual requirements.

The association WasserEisenLand - Industriekultur in Südwestfalen www.wassereisenland.de was founded in 1996 and supports and advices over 350 technical monuments and museums of commercial and industrial history in the Sauerland and the Siegerland. Around 50 of them are marketed as cultural tourism venues and as such are additionally promoted with information booths at major events, in a free overview map and a paperback guide. Outstanding objects are also indicated by roadside tourist information panels.

These include the 15 South Westphalia locations selected for the *Industrial Valleys* ERIH Route. Eight are museums operated as technical monuments, for example a coal mine and an iron ore mine, two pre-industrial ironworks and foundries, a high-end industrial blast furnace plant, a factory town with a brass foundry and needle museum and a museum railway. Also there are seven museums including the open air museum for craft and technology, special museums on the subjects of wire, salt and the generation of steam and water power, a technical museum, the town museum of an industrial city and finally departments in museums displaying iron smelting and forging craft in the Middle Ages as well as the button industry. These 15 venues currently attract around 600,000 visits a year.

Together with local partners eight of these 15 locations form the cultural route Eisenstraße Südwestfalen (Iron Road South Westphalia www.eisenstrasse-suedwestfalen.de). This 500-year-old trade route demonstrates the specialisation of manufacturing industries in the Siegerland and Sauerland. There are also events, brochures and a paperback book of experiences.

Five of the 15 Sauerland and Siegerland locations of "Industrial Valleys" are also involved in the South Westphalian Industrial Culture Festival 'Live in the Fabrikskes'. In 2016, the annual event will be presented for the tenth time. A wide range of events will be offered to the audiences at industrial heritage locations - from cabaret to classical concerts, choir performances, opera and drama through to the presentation of industrial monuments as works of art involving light art, theatre performances and experimental music.

The three-year EFRE project Cooperation Industrial Heritage Trail / Water Iron Land is planned for 2016-2019. The neighbouring industrial cultural regions of the Ruhr area and South Westphalia want to highlight and present their closely linked history. There are plans for an information centre, the development of regional links by railways and cycle paths, cross-regional thematic routes, collaboration between the festivals Extraschicht and Live in the Fabrikskes as well as common publishing formats.

Over the last 16 years, ERIH www.erih.net has become the largest tourism network for industrial heritage in Europe with 1,315 sites in 45 countries. Its backbone is the 99 Anchor Points, starting points for 20 Regional Routes, and 13 thematic routes also illustrate the breadth of European industrial history. ERIH currently has more than 200 members. Its objective is to foster a growing awareness of our shared European industrial heritage and the mutual exchange of experiences in conferences and meetings.

The Luise heizt ein event at the Luisenhütte in Balve-Wocklum within the festival series Live in the Fabrikskes of 2007.

Photo: Stephan Sensen.

At ERIH's Anchor Point Hendrichs Drop Forge in Solingen, families can experience scissors production.

Photo: LVR Industrial Museum

Publications

Industrial Cultural Landscapes in the World Heritage Context, Kokerei Hansa, Dortmund, Germany, February, 2015 (German with summaries of the discussions in English), ICOMOS and TICCIH Germany

Ursula Mehrfeld, Marita Pfeiffer and Sigrid Brandt

This publication reflects the results of the symposium hosted by ICOMOS Germany and TICCIH Germany, together with the Foundation for Industrial Heritage Preservation and Historical Culture (Stiftung Industriedenkmalpflege und Geschichtskultur) and its project partners . The symposium was part of the current qualification process of the project "Ruhr Area Industrial Cultural Landscape", a proposal for the Tentative List of the Federal Republic of Germany to update the UNESCO List of the World Cultural and Natural Heritage.

The symposium was a sequel to the workshop "Industrial and Mining Landscapes within World Heritage Context" held in 2013 at the University of Technology Mining Academy Freiberg (Technische Universität Bergakademie Freiberg). The focus of the conference in Dortmund was a more precise definition of the term *industrial cultural landscape* and its use within the framework of the UNESCO World Heritage Convention. Another objective was to receive impulses and recommendations for action for the World Heritage project "Ruhr Area Industrial Cultural Landscape" from international experts of various disciplines present at the conference.

As an introduction, Rolf Höhmann outlined the very different cultural landscape approaches, using examples of industrial and mining sites already inscribed on the World Heritage List. He shows their great range from simple linear structures (e.g. canals and railway lines) to landscapes characterised by one or several industries. For him, an ever-increasing complexity and spatial expansion can be a great opportunity, but may also lead to conflicts, especially in the case of management plans for World Heritage sites.

Using the example of the World Heritage site "Mines of Rammelsberg, Historic Town of Goslar and Upper Harz Water Management System", Gerhard Lenz introduced new concepts for the development and communication of a World Heritage consisting of several extensive components in an area measuring 200 km2. These enable visitors to gain knowledge and at the same time show great respect for the cultural landscape to be preserved.

With 33 km2, the historic industrial landscape of Blaenavon in Wales appears to be positively easy to survey. Peter Wakelin explained the genesis and justification for the explicitly landscape-oriented approach of this World Heritage site, offering thought-provoking impulses for similar projects. Also his statements regarding another Welsh World Heritage site, the "Pontcysyllte Aqueduct and Canal", may be read as practical instructions. What is more, they give cause for optimism that local people have learned to accept and to feel no longer ashamed of its mining and steel-producing past in view of the worldwide appreciation of these outstanding landscapes and monuments. For the first time, people there may even be proud of this heritage.

Using the examples of the Belgian World Heritage sites Le Grand Hornu, Bois-du-Luc, Le Bois du Cazier and Blegny-Mines, Jacques Crul explained the pros and cons of a serial nomination. Not considerations of content, which would have justified a cultural landscape approach, but rather pragmatic reasons as the short period of time for the application were crucial for a serial nomination. With regard to the Ruhr area project, he recommended that one should look at landscape comprehensively, i.e. in combination with projects that are socially relevant and forward-looking.

Birgitta Ringbeck explained the great importance and the dynamics of the Operational Guidelines complementing the World Heritage Convention adopted by the General Assembly of UNESCO in 1972. With regard to "cultural landscapes" she advocated a revision of this sub-category in the Guidelines and proposes an orientation on the UNESCO Recommendation on the Historic Urban Landscape of 2011.

The Stiftung Industriedenkmalpflege und Geschichtskultur and its partners have also chosen an interdisciplinary approach for their project to propose the Ruhr Area Industrial Cultural Landscape for the World Heritage List. However, before attention is given to the landscape of the Ruhr area Winfried Schenk invited us to reflect on the development and differentiation of the terms "landscape", "culture" and "cultural landscape". In an easily comprehensible way he outlined the development from the medieval living and administrative space to the formation of an industrial cultural landscape as it exists nowadays in the Ruhr area.

Afterwards, the focus of attention was on the Ruhr area itself. Hans-Werner Wehling described the Ruhr area industrial landscape as the result of a history of use characterised by a functional and process-oriented system context. He considers a series of roughly 20 partly very different cultural landscape areas as representative of the aspects and characteristics which are relevant for a comprehensive definition of the Ruhr area industrial cultural landscape.

Marius Röhr described how cultural landscape transformation mapping can contribute to the analysis of industrial cultural landscapes, using the example of a certain restricted area around the former Gutehoffnungshütte in Oberhausen. The layers of time of the historic shaping process becoming visible in this particular section exemplify the processes of change in the Ruhr area industrial cultural landscape.

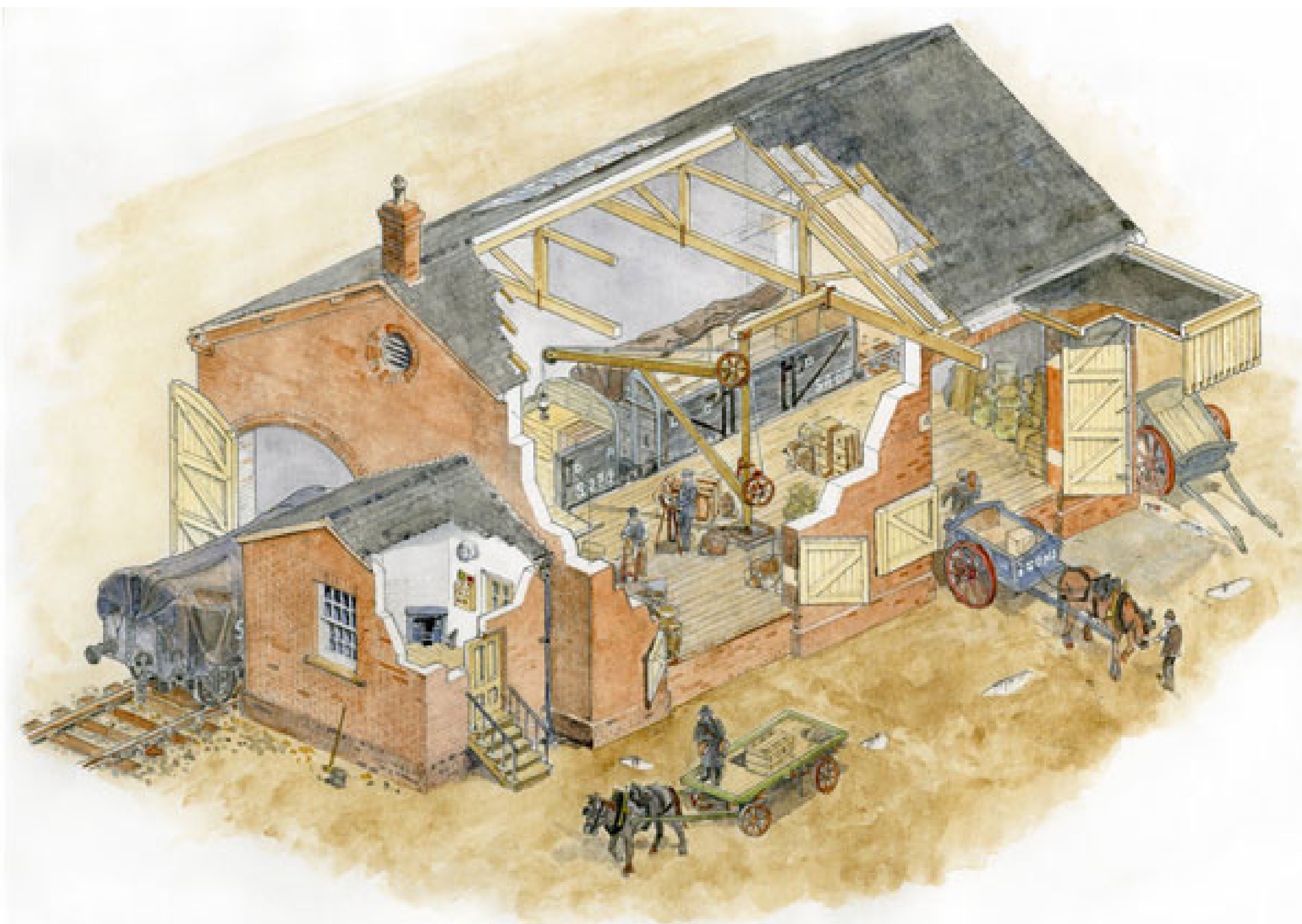
The photos by Peter Liedtke are intended to serve as a special invitation to the Ruhr area. Interspersed in the publication and without focus on certain examples of the great number of impressive monuments, these photos are meant to give an idea of the characteristic features of the Ruhr area industrial cultural landscape with its rivers, canals, railway lines, and tips. The editors would like to thank all the sponsors and participants for their support and contributions. They hope readers will find this publication a stimulating read.

Publications

***The Railway Goods Shed and Warehouse in England*, John Minnis, Historic England, 2016, pp 128.**

The latest title in the Informed Conservation series from the English historic environment agency highlights the development and particular character of the railway goods shed, and its particular significance for us. Now obsolete and so needing protection and new uses, they were an essential point of transhipment for all the material being moved through the rail-based industrial economy as it extended throughout the British Isles from the 1830s, until displaced by the motorway warehouse .

John Minnis' compact and attractive book explains this essential role and how they functioned, temporarily holding goods between one journey and the next: stacks of coal or sand, all of which had to be moved by hand with a shovel, while everything else was loaded on and off the goods wagons either in cardboard boxes, wooden barrels or wicker baskets. Richly illustrated with a full gazetteer of the surviving examples, now used for everything from a bike shed to a university library.



A reconstruction of a typical small goods shed in the early 1860s.

Allan Adams/Historic Engalnd

Upcoming

2016

Spain
1st International Congress on Industrial Heritage and Public Works,
Foundation for Andalusian Industrial Heritage,
26 - 28 October, Huelva
http://www.fupia.es/index.php?option=com_content&view=article&id=692&Itemid=97

Portugal
ERIH Annual Conference, "European Industrial Heritage - How to tell the International Story?
26-29 October, Porto

2017

UK
IHBC Annual School 2017: Historic Transport Infrastructure - the backbone of civilisation
22 - 25 June, Manchester
http://www.ihbc.org.uk/branches/nwest/index.html#sthash.avfyZI1h.dpuf

India
ICOMOS 19th Triennial General Assembly and annual Advisory Committee,
International Scientific Symposium on Heritage & Democracy (working title)
19 - 25 November, Delhi

2018

Chile
XVII TICCIH Congress, the first in Latin America.
13-15 September: Universidad Central de Chile, Santiago.

Opinions expressed in the Bulletin are the authors', and do not necessarily reflect those of TICCIH. Photographs are the authors' unless stated otherwise.

TICCIH
President: Professor Patrick Martin,
Research Professor of Archaeology
Michigan Technological University, Houghton, MI 49931, USA
e: pemartin@mtu.edu, t: +1 906-487-2070

Secretary: Dr. Stephen Hughes
e: secretary@ticcih.org, t: +44 1970 621215

Editor: Articles and news of recent and future events should be sent to the Editor, James Douet, C. Bruc, 176, 2. 4., Barcelona 08037, Spain, e: editor@ticcih.org

Bulletin layout & design: Don Durfee e: ticcih@mtu.edu
TICCIH Membership: Don Durfee e: ticcih@mtu.edu
TICCIH Website: Don Durfee e: ticcih@mtu.edu

TICCIH is the world organization for industrial archaeology promoting conservation, research, recording and education in all aspects of industrial heritage. It holds a triennial conference and organises interim conferences on particular themes. Individual membership is $30 (USD), corporate membership $65, and student membership. $15

There is an online membership form on www.ticcih.org

The **TICCIH Bulletin** welcomes news, comment and (short-ish) articles from anyone who has something they want to say related to our field. The Bulletin is the only international newsletter dedicated to industrial archaeology and the conservation of the heritage of industrialisation. The TICCIH Bulletin is published online to members four times a year.

Back issues can be downloaded as a pdf file from the **TICCIH** web site, www.ticcih.org.

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