I recently returned from two week’s travel in India, conducted independently and as member of the Board of TICCIH Sweden. It resulted in a number of contacts and initiatives that I would like to explain. I believe the time is ripe for a collected effort to deepen and extend TICCIH’s contacts with Asia. This is especially urgent since the long-expected TICCIH conference in China had to be cancelled.

In the spring of 2006, Divay Gupta, our representative in India who works at the Indian National Trust for Art and Cultural Heritage (INTACH), proposed an intermediate TICCIH conference in his country, but nothing came of it. That proposal still stands, though as an NGO, INTACH’s economic resources are limited. I am quite convinced that an excellent conference can be carried out in India.

Two prime candidates are firstly Mumbai, which has a rich industrial heritage with several areas of international importance including the textile mills and the port, today under extreme threat from change, and secondly the former Union Carbide factory site in Bhopal, Madhya Pradesh. In both cities there are active local actors and scholars engaged in preserving and developing former industrial sites, and are easily accessible by air. The conference could combine a workshop in Bhopal with a more general program in Mumbai.

The opportunities – and challenges – in the area of industrial archaeology and heritage in Asia are immense. In the rapid growth of cities, heritage in general is subjected to irreversible damage, and so is industrial heritage. This is a joint concern for all of us. The roots of industrial heritage in Asia have global connections on a political, economic, cultural and social level in all periods of time, but especially in pre-independence or colonial times.

One possibility that should be considered is for collaboration with the Modern Asia Architecture Network (mAAN). The organizational structure, agenda, and action plan of mAAN were adopted at its first international conference in Macau, 2001. Yearly conferences have been arranged since.[http://www.m-aan.org] Reviewing the results of previous mAAN workshops, not least the one in Shanghai in 2003, it is evident that mAAN has valuable experience in arranging this kind of work. One step in creating ties between TICCIH and mAAN could be to join forces for an intermediary TICCIH conference in India in 2010. Another great opportunity will be the 2011 mAAN conference in Seoul, to be dedicated to industrial heritage.

Finally I would like to add to the call for TICCIH to contribute to the preservation of the former Union Carbide factory site in Bhopal. The disaster in 1984 shocked the world. Today the site of that disaster ought to be preserved. This calls for international attention. There are few industrial heritage sites anywhere which embody such wide and extensive immaterial values.

In 2005 the State of Madhya Pradesh proposed to redevelop the factory land as a memorial, but the administration has lately threatened to pull it down. The Union Carbide works has recently been nominated to the 2010 World Monuments Watch List of the 100 most endangered cultural heritage sites.

Having visited the factory in Bhopal in February and inspected the structures and the site and discussed it with several of the involved parties I would like to strongly endorse preservation of the structures. This will involve a thorough on-site mapping and safeguarding of external archival material, and other tangible and intangible material relating to the site. Preservation and future use call for international cooperation and assistance in the practical fields of industrial archaeology, conservation and heritage studies. Expertise is needed to evaluate, document, analyse, critique, clean, conserve, communicate, market and support this cause.

It should be possible to have plans for both an Indian workshop/intermediary conference and the Seoul conference ready in advance of the XIV TICCIH Congress in Freiberg. Both initiatives would project TICCIH into a new territory and fill it with a new purpose. I would be pleased to help set up a working group as a first step.

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The TICCIH General Assembly is held every three years, and this year will be on the last day of the Freiberg conference, Saturday, 5 September, at 2:00 pm.

This is the occasion for the elections to choose who will be on the TICCIH Board for the next three years as well as the new president and treasurer. The following are the names of the Board members: Stuart B Smith (secretary) and Stuart B Smith OBE, ‘Chygarth’, 5 Beacon Terrace Camborne, Cornwall TR14 5BJ, UK, t: +44 01209 612142, e: stuartbsmith@chygarth.co.uk. For any queries concerning the elections, either email (ticcih@gencat.cat) as well as any other lists or compilations of important sites that the project team could include.

The Freiberg conference is only four months away and from the number of registrations it looks as if it will be a great success. The conference organisers are urging you to sort out your accommodation as soon as possible. The conference web site, which is automatically updated when you either join or renew your membership. Only paid-up National Representatives are entitled to vote at the General Assembly. For any doubts concerning the elections, either read the TICCIH Statutes, sections E to I (www.mnactec.cat/ticcih/ticcih_statutes.htm) or write to the Secretary, Stuart B Smith (duartbott@chygarth.co.uk).

The TIFCIH Bulletin is published four times a year and is sent to all members. If you have not received an issue, please contact the editor for a replacement.

The TICCIH Bulletin welcomes news, comment and (shortish) articles from anyone with something they want to say related to our field. The Bulletin is the only international newsletter covering the global state of the field of industrial heritage. The TICCIH Bulletin is published four times a year and is sent to all members. If you have not received an issue, please contact the editor for a replacement. Both issues can be downloaded as a pdf file from the TICCIH web site.

The Congress news

There were no new Congress news entries in the last issue, so this section is empty.
A tail of two Spanish cast-iron bridges

Josuín Carcamo Martínez
Surveyor
TOCH Spain and the Basque Industrial Heritage & Public Works Association

The Isabel II bridge in Bilbao in 1876. Photo: Museo de Bilbao

The re-used spans of the Bilbao bridge over the river Udondo at Lejona

The Isabel II bridge in Seville today

As Bilbao in the Basque Country, Spain, began to grow, its two bridges become inadequate: the old bridge of San Antón and the San Francisco chain suspension bridge by architect António de Goicoechea (1827, the second built in Spain). The process of building a new bridge began with the presentation of a plan by the same architect at a city council meeting on 20 May, 1844. Spain’s Ministry of the Interior later imposed a series of technical conditions concerning abutments and piers. Above all, the Ministry insisted that the central arch be raised.

Construction work on what was originally known as the Isabella II bridge began in mid-1845. It was under the provisional direction of Goicoechea until Pedro Cadierno Espinosa, appointed by the Corps of Civil Engineers, arrived to take over. The bridge was not opened until January, 1848. The four cast-iron arches, each spanning 11 m over the river, and the mobile central section rested on stone piers and abutments. Each arch comprised six (heavily-braced) ribs consisting of a lower arch (the arch is best suited for cast iron, which basically resists compression) formed by five I-beam section segments assembled and jointed with transversal braces, an upper beam to support the deck and a succession of three circular rings of varying diameters in each span. Also, both parts and mutually braced by 9 iron rods.

In subsequent years the condition of the bridge deteriorated, particularly in 1874 when Bilbao came under siege during the third Carlist civil war. Bombs and the work of the river left the bridge unusable and it was rapidly replaced.

Construction work on the new stone bridge lasted from 1875 to 1878 and was the work of the liberal engineer Adolfo de lozamá. Until recently, all traces of the bridge were believed to have disappeared completely. However, not long ago I had the opportunity of examining a small road bridge with a single, 11-metre arch spanning the mouth of the Udondo, a tributary of the Bilbao river estuary.

The re-used spans of the Bilbao bridge over the river Udondo at Lejona.

Until recently, all traces of the bridge were believed to have disappeared completely. However, not long ago I had the opportunity of examining a small road bridge with a single, 11-metre arch spanning the mouth of the Udondo, a tributary of the Bilbao river estuary. The Udondo flows into the estuary at Lejona, not far from the port of Bilbao and the famous Transporter Bridge at Portugalete. My examination led me to the conclusion that the arch was in fact one of the original arches of the bridge in Bilbao. In 1876, an engineer called Francisco Landa, Head of Public Works, asked the Bilbao City Council for permission to use one of the arches to reconstruct the small bridge dynamited by the Carlist troops. For the last 133 years, the arch has remained in use, "hidden" from public view.

Some decades ago, the road was widened and another, modern bridge of pre-stressed concrete construction was attached and superposed a self-supporting deck on the cast-iron arches. Although destroying the structural essence of the bridge, the measure guaranteed it would remain in use, preserved the look of the bridge and maintained the original features.

In Europe (and in fact the world), cast-iron bridges were a British monopoly from the construction of the original Iron Bridge in Coalbrookedale until approximately 1850. After this date they were also widely developed in France, up to the end of the 19th century. One final point. Although both bridges were cast in Spain, one by the Santa Ana de Bolueta foundry in Bilbao and the other by the Nancio Bonaplata foundry in Seville, the technology did not catch on. The use of iron, which gradually imposed itself from 1850 on, was popularized by foreign firms until towards the end of the century, largely because of the weakness of the national iron and steel industry and despite the high technical level of Spanish civil engineers.

Contact: juancarmo@tikifanica.net
Translation: Mark Gardner
The Malleco viaduct is the highest railway bridge in South America. It was opened by President José Manuel Balmaceda on October 26, 1890 and stands 115 m above the river Malleco, representing one of the great feats of iron engineering.

The state of Chile made the Chilian engineer Lattaria Victorio Anselmo, head of the Ferrocarriles de Argentina, responsible for the design. After a public tender in which the French companies Gustave Eiffel, the Sociètie Anonyme des Anciens Establissements Cail and Schneider et Cie of Le Creusot all took part, the latter won the tender and production of the viaduct went ahead in France at a cost of 830,000 francs. Alexandre Eiffel’s proposal was almost double, 1,500,000 francs. Production of the pre-fabricated viaduct lasted from 1886 to 1888. It was transported by sea from France to Chile. Erection started in 1889 and finished before the inauguration ceremony the following year. The total weight of the structure is 1,400 tons and construction of the foundations was technically very complex for its time. Total length is 347.5 m and the viaduct is divided into 5 equal sections of 69.5 m each. The first and the fourth pillars are 43.7 m high, the second is 67.7 m high and the third 79.7 m. The rail tracks are 102 m above the bottom of the gorge. The gauge of this railway is 1,680 mm wide.

In 1910, increases in the weight of the locomotives to 20 tons per axle meant that the bridges had to be strengthened to be able to resist properly. The responsibility for the solution was initially given to the engineer Francisco Mandones and was completed in 1923 by another Chilean engineer, Jorge Erweck. Those works were also by Le Creusot, started in 1923 and were completed in 1926. The magnificent viaduct was declared a Historical Monument in 1990 and was completely renovated in 2006.


The Malleco viaduct. Construction of the structure in 1889

The Ojuela suspension bridge in Mexico

Sélim Ocepe Gómez, President of TICCHI México Miguel Ángel Hernández, Natl. Representative of TICCHI México

The Ojuela bridge was built by the firm of John A. Roeding Sons Company, New York and completed in 1898. It was constructed in steel and wood in order to connect a railway that served to transport the mineral from the mines to the smelting plant located in the other side of the canyon, besides the town of Ojuela, so that instead of ringing the mountains, the carts filled with rocks crossed a canyon 180 m deep through this bridge 318 m long and 1.75 m wide, with a suspended weight of more than 112 tons. This bridge was supported by huge steel towers and six steel cables. Unfortunately, during the early 1990’s the steel towers were removed and replaced by new concrete towers that were later covered with wood panels. The original towers were taken to the city of Durango and placed at the main entrance of the Fairgrounds. It was in this same period in which Ojuela, a ghost town, and the bridge began to appear in tourist guides. Today, the suspension bridge is one of the main tourist attractions of the region. The visitor can stroll through the streets of the ghost town and cross the bridge towards the entrance of one of the mines.

Despite the influence of tourists, there is a lack of awareness of the need to protect these important landmarks. The Ojuela suspension bridge deserves a better future as it is one of the most important legacies of industrial activity in Mexico.
In March 2008, the Digital Design Studio at the Glasgow School of Art, the Planning & Transportation Department at Dundee City Council and the Technical Conservation Group at Historic Scotland began a collaborative project to digitally document and represent virtually the Linlathen East Bridge, east of Dundee, Scotland. The bridge, which spans the Dighty Burn, is the oldest cast-iron bridge in Scotland. Built in 1804, the Arlind structure is to be restored as part of a planning gain agreement with a housing developer, at a cost of £390,000.

The purpose of the project was to accurately document the bridge’s current physical condition, to show a disassembly process, and to propose virtual restoration options. Although complete 2D CAD plans, sections and elevations were required, the 3D model was the most effective way to represent the well-worn structure.

From a technical standpoint, 3D laser scanning was immediately proposed to properly capture the twisted metal, burnt timbers and irregular terrain. Informally, the project was a test between 3D terrestrial laser scanning vs. the traditional survey. A two-person scan team utilising a Leica ScanStation, captured 9 individual ‘scan-worlds’. The scanning system has the capability of capturing data up to 300 meters, but for this project it was placed within 20 to 40 meters from the bridge. The bridge was scanned from various positions around, above and under - completely surrounding the bridge.

For 3D texture purposes, the bridge was extensively photographed using a Nikon D2X digital camera and wide angle lens. The ScanStation’s built-in digital camera was only used for reference imagery. Considering the stand-alone nature of this project, no additional survey control or global coordinate system was used. Both survey targets and feature registration markers were used to combine the scans into one master point-cloud database. Typically the scan resolution for the bridge was 1 - 2 mm with the surrounding terrain at 1 cm. Unlike a traditional survey, no hard measurements or additional survey control or global coordinate system was used.

The results that the Council was given included the 2D drawings, a series of photorealistic 3D renderings and a 40-second 3D animation depicting the current state of the bridge dissolving to a proposed disassembly. To provide the Council and contractors with a better understanding of how the bridge will be repaired and modified, it is intended that the proposed restoration plans and alterations be incorporated into the 3D model. A final animation will be developed showing the before and after state of the bridge.

This project was presented at a digital documentation conference in Glasgow in April, and the animation can be viewed on the conference web site: www.digitaldocumentation.co.uk/linlathen

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**Bridges of iron**

**The Linlathen East Bridge digital scanning project**

Douglas Pritchard

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**Publications**

**Bridges of the World – an illustrated history**

Tim and Anne Locke, introduction by Eric Delony


This lavish publication has fabulous photographs and starts with an illustrated history of bridge building. There then follow separate sections describing bridges in Europe, Africa, Asia, Australia, North America and South and Central America, covering altogether more than 65 beautifully photographed examples. If the geographical coverage is rather uneven - 13 from the UK, nine in the US, six from France, South and Central America have five, only two in Africa and Japan, none in Russia, but four in China and one in India - this reflects the large scope of the book. The authors are bridge writers and archaeologists and are concerned about the significance of architectural achievements.

The introduction was first published in the ICOMOS/TICCIH joint thematic study ‘Context of World Heritage Bridges’ in 1996, and was used with the permission of the author, TICCIH and ICOMOS.

Stuart B. Smith
Mixed site on Norwegian Tentative World Heritage Site List

Stuart B. Smith
National Representative of the Russian Federation

Norway

Tentative World Heritage Site List

Professor V.V. Zapary
National Representative of the Russian Federation

Russia

The National Program for the Preservation of the Industrial Heritage

Professor V.V. Zapary
National Representative of the Russian Federation

In Russia as in the rest of the world, interest in the problems of preservation and rehabilitation of the industrial heritage has grown since the beginning of the new millennium. A reflection of this process has been found in the growth of the number of publications, of the variety of conferences, of the creation of new museums and museumisation of memorable places. In some universities, courses of lectures on the history of science and technology have been organised.

Carrying out of the scientific conferences on industrial heritage has become an appreciable phenomenon. It is traditional (since 1996) to hold a conference on "Industrial Heritage" in Ekaterinburg (member-correspondent of the Russian Academy of Sciences). It is not a coincidence that the National Representative of the Russian Federation in ICCOM, Professor V.V. Zapary, takes direct part in the organization and carrying out of this conference.

The organization of a series of three scientific conferences on the basis of the Montonian state university of Ulyanov by Professor N.M. Arentsov (member-correspondent of the Russian Academy of Sciences) is another important phenomenon. They were devoted to problems of economic history and to industrial heritage. These conferences were organized and held in a number of Russian cities: in 2005 in Saransk, in 2006 in the Goose Hustulstv and in 2007 in Vyks, under the aegis of the Russian Academy of Sciences and national representation of Russia in ICCOM.

The big interesting work done by the Moscow Institute of steel and alloys, which regularly conducts conferences devoted to problems of studying the history of metallurgy and questions of the museumisation of the monuments of metallurgy. The project head is P.I. Chechouvsky and they have close contacts with the mining academy in Freiberg, Germany.

One essential event is the creation in Nizhny Tagil of the memorial estate on the basis of the old Demidov factory. On its base the old Demidov factory. On its base the Institute of history and archeology of the Ural Branch of the Russian Academy of Sciences in Ekaterinburg has prepared a computer model of the Ural metallurgical works of a 19th century. This model, with added animation and sound, creates a unique sensation, helping to present before the kind of factory of that time, and to understand the operation of metallurgical melting. With a computer drawing it is possible to show how mechanisms of that time functioned.

Work of increasing scope is proceeding on new museums of objects of the industrial
heritage in many regions of the Russian Federation. The major work in this direction is being done in Vyks, the Nizhniy Novgorod region, where works are being conducted at the Verkhnyovkonsky blast furnace factory. There have remained a number of objects such as a fragment of an 18th century blast furnace, most of the workshops of the same time, factory shops from the mid-18th to early 19th century and others objects. World exhibitions of modern art in Moscow recently became an interesting realization of the use of industrial heritage. One of them has taken place, for example, in the 2000 m² basement water basins of the «Winery». In the middle of the 19th century, workshops and warehouses around Kursk station belonged to the «Moscow Bavaria» brewery from the beginning of the 20th century–the Moscow wine industrial complex. After the bankruptcy of the winery at the beginning of 2000, seven dilapidated buildings (more than 20,000 m²) have been converted to the largest Russian wine industrial complex. After the bankruptcy of the winery at the beginning of 2000, seven dilapidated buildings (more than 20,000 m²) have been converted to the largest Russian industrial centre of the modern art «Winery». The group of designers led by A. Brodsky decided not to make profound changes to the architecture and as much as possible to underline an industrial glamour of the ancient constructions.

Similar projects exist in many big cities of the world. So the London gallery «Tate Modern» is a former power station, and a widely-known Paris museum of impressionists is located in a building of the former railway station, the «Muzej d’Orsay». As to Moscow, the first steps in this direction are the rehabilitation of the former «Red Rose» cotton-mill, where a centre of design is now placed. The «Red October», a former confectionary factory is another new cultural centre.

Toronto Union Station Rehabilitation

Dr Christopher Andreae
Historica Research Limited

When finally completed in 1931, most of the traffic through Toronto’s new Union Station consisted of intercity passenger travel; commuter traffic was limited. This changed in 1967 when a provincial rail authority – GO Transit – introduced a new commuter service. Today, on a typical day over 180 trains carry 150,000 commuters through the station. It can no longer efficiently handle the volume of traffic. In preparation for upgrading the service, in 2000 the City purchased the building from the railway owners and GO Transit purchased the approach tracks, platforms, and trainshed.

GO has focused on two broad areas for improvements: increasing the efficiency of train operations into the station and improving the movement of passengers on and off the platforms. Improving train efficiency is the least controversial upgrade and has negligible impact on the historical integrity of the station. The approach tracks are being realigned and the track signals modernized to provide for simpler, faster train routings through the terminal. However, the platforms have to be rebuilt because they were designed primarily for intercity passenger use. As built, each of the ten tracks (later increased to 12) under the trainshed were flanked by a passenger platform on one side and a service platform on the other. The service platform contained freight elevators for car supplies, baggage, express and mail, and utility connections for water, electricity and steam. Since none of these services are needed any more, the platforms are being converted to passenger use, doubling the available number of platforms in the trainshed.

The trainshed roof has proved to be more challenging. It is an immense structure of about 30,000 m² (three hectares) of steel framing and timber decking. Initially the roof was simply going to be refurbished because it was functionally adequate to protect travellers. But then GO discovered in traveler surveys that commuters found being in the trainshed was the least pleasant part of their trip. All of this was going to be changed. Still, its airy-ness requested by commuters while not affected by its development. No one is yet sure of what will happen except that its architectural qualities will not be altered.

The trainshed ambiance became a problem with the growth of commuters. Historically, Canadian practice was not to allowing passengers onto platforms until shortly before the train left. Intercity passengers therefore waited in comfort in the waiting room and a brief trot along a “dark” trainshed platform was a minor event. GO passengers are permitted to wait on the platform and experience the trainshed for a relatively long period. Building a new, light, airy trainshed was not feasible because the shed is a listed National Historic Site. The 1931 structure is the last, and one of the few surviving, Bush trainsheds in North America. The first was designed by Lincoln Bush and completed at Hoboken, New Jersey in 1906 – and is still in service. In the intervening years about twenty such sheds were built. Rather than an open, vaulted roof, platform protection is provided by low canopies separated from each other by a smoke slot over the centre of the rail. The design was, and still is, an efficient way to provide protection against the weather even if Toronto commuters disagree.

The compromise solution is to erect a raised, glass atrium across the centre third of the trainshed. This will allow the brightness and airy-ness requested by commuters while preserving a significant component of the historic trainshed. Meanwhile the city, as owner of the station building proper, has taken a more “relaxed” approach to redevelopment. Most of the GO operations are now independent of the station and not affected by its development. No one is yet sure of what will happen except that its architectural qualities will not be altered.

Cross-section through station and trainshed.
Source: Canadian Railway and Marine World Oct 1927
Heritage care through active citizenship

Pam Moore

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This two day event funded through the European Union Europe for Citizens programme, with support for the Flemish Authorities, brought together almost 200 participants from voluntary organisations in 30 countries.

Contributions varied from a moving account of the problems of NGOs in Azerbaijan to the inspiring success story of the Transylvania Trust’s community building heritage project at Banffy Castle, Romania, and an encouraging account of change in attitude to volunteer work in Hungary’s Folk Culture. Organisations large and small took part, with papers from the English National Trust on their new approach to caring for the landscape and the problems of NGOs in Azerbaijan to the inspiring success story of the Transylvania Trust’s community building heritage project at Banffy Castle, Romania, and an encouraging account of change in attitude to volunteer work in Hungary’s Folk Culture. Organisations large and small took part, with papers from the English National Trust on their new approach to caring for the landscape and the problems of NGOs in Azerbaijan to the inspiring success story of the Transylvania Trust’s community building heritage project at Banffy Castle, Romania, and an encouraging account of change in attitude to volunteer work in Hungary’s Folk Culture. Organisations large and small took part, with papers from the English National Trust on their new approach to caring for the landscape and the problems of NGOs in Azerbaijan to the inspiring success story of the Transylvania Trust’s community building heritage project at Banffy Castle, Romania, and an encouraging account of change in attitude to volunteer work in Hungary’s Folk Culture.