



0. Introduction

The HECTOR programme aims at a training in industrial heritage for the tourist sector ed at developing a transnational tourism product mixing together culture, education, knowledge capitalization and entrepreneurship up-skilling. It is co-funded by the Erasmus+ programme of the European Union.

1. Industrial archaeology

Industrial archaeology is the study of the physical remains of past industrial activities and the industrialised society. Such activities can be concerned with the extraction and processing of raw materials, the use of new technologies and tools in farming and forestry, the production of all types of utensils and facilities - from needles and cloth till steam engines and motor cars - with transport in general, trade and commerce, and with other services such as gas, electricity and water supply. In brief: all those things that caused the most profound change in human life since the agricultural revolution in prehistory.

Industrial archaeology combines the evidences available from the material remains of the industrial past, with books, archives and other documentary sources, and also oral memories - to form a comprehensive understanding of the birth and growth of our industrial society, and the way industrialisation and technological change from the past influences our way of living and thinking.

Through industrialisation and technological progress it became possible for us to quickly and comfortably travel or communicate over great distances, to read a book in a cozy house in the evening when it's dark or to watch the news of what was happening elsewhere in the world, to keep food for a long time without it going bad or to import food from other continents. To prevent and cure diseases that less than a century ago would be fatal.

However, the industrial past is not always a beautiful and pleasant past, although today it is often (too often) presented to the public in a sanitised and gentrified form. A tourist visit to an underground coal mine cannot (and should not) be compared to the hard work of a miner.

But unbridled technology and the use of it also created new problems, traffic jams, air and soil pollution, the nuclear bomb, Chernobyl and Fukushima, ...

2. Industrial development, industrial society

After the invention of fire and sedentary agriculture by prehistoric man, the Industrial Revolution and industrialisation probably represented the greatest break and change in the history of mankind.

From the beginning of the 18th century, a number of phenomena occurred that transformed society and the environment faster and more profoundly than ever before. This process is characterised by fundamental changes in the material infrastructure of society, as a result of which the 'suprastructure' (which includes the socio-economic events, the social models of thought and behaviour) underwent equally drastic changes and adaptations.

These developments were driven by technological changes and changes in production methods, as well as by strong scientific progress. These changes first occurred in Britain, but subsequently affected other countries and continents. The 'globalisation' we talk about today already began in this period.

Measured in 'historical' terms, i.e. from the moment that man first appeared on the face of the earth, or from the so-called 'agricultural revolution' around 4000 BC, the changes that took place from the 18th century onwards occurred extremely rapid, accelerating, leaps and bounds, and always on an increasing scale.

In 1709, in Coalbrookdale, Great Britain, coke was used for the first time in the manufacture of pig iron. This indirectly meant the creation of a new raw material base for society, and also the start of a new way of thinking about materials and raw materials. Thomas Newcomen's 'Fire Engine' (1712) and James Watt's steam engine created a new energy base and prompted a new way of thinking about power and motion. In the middle of the 18th century, an imbalance between supply and demand in the textile sector led to the first forms of mechanised labour and mass production. Since then, new materials have followed one another: cast iron, steel, non-ferrous metals and concrete, composite materials and plastics. The natural sources of power (water, wind and the power of men and animals) were replaced by mechanical drives,

while the availability or absence of energy raw materials became a determining factor in the acceleration or deceleration of economic life. From the 18th century onwards, traditional craftsmanship with its centuries-old traditions and trades was replaced by mechanised and controlled factory work, by constant technological innovation, and by the organisational and production structures that we still largely know today.

The term '*Industrial Revolution*', first used by Friedrich Engels in 1844 ¹, is nowadays generally used to refer to the starting point, the take-off, of a chain reaction of elements and factors that led to enormous and continuous increases in scale and the transformation of the agrarian-craft society into an industrial-technological society.

From the beginning of the 19th century, more buildings were built in our cities and in the countryside than in all previous centuries put together. And since the middle of the last century until today, more than between 1750 and 1950...

More energy and raw materials have been consumed than ever before. More products have been sold to more consumers than previous generations ever dreamed of. But the soil and the air were also polluted more, and greater heaps of waste were generated than could have been imagined ²

¹ Fr. Engels: *Die Lage der arbeitenden Klasse in England* (Leipzig, 1845)

Die industrielle Revolution hat für England dieselbe Bedeutung wie die politische Revolution für Frankreich und die philosophische für Deutschland, und der Abstand zwischen dem England von 1760 und dem von 1844 ist mindestens ebenso groß wie der zwischen dem Frankreich des ancien régime und dem der Julirevolution. Die wichtigste Frucht aber dieser industriellen Umwälzung ist das englische Proletariat.

² Read the book on consumerism and its effects, published Vance Packard, *The Waste Makers* (David McKay Publishing, 1960, 306 p.). It was in 1960 a bestselling pioneering work on how the rapid growth of disposable consumer goods was degrading the environmental, financial, and spiritual character of American society.

No period in history has seen comparable growth in population, production, energy consumption, transport, and so on.

If we take Belgium, one of the most industrialised countries in the 19th century, as an example, and 1831 as a reference point (100%) ,

	1880	1900
population growth	137 %	167 %
production of coal	713 %	1018 %
pig iron production	675 %	1113 %
pig iron production	2300 %	3500 %
HP supplied by steam engines	957 %	8000 %

We produce more, consume more, therefore produce more to consume more, which means we have to produce more... It becomes the viscous circle of the 'Brave New World' (1932) by Aldous Huxley *"Every man, woman and child compelled to consume so much a year. In the interests of industry."*³

What is striking about this is that, for the first time in history, the concept of 'growth' begins to determine human behaviour. From the industrial age onwards, 'growth' became the credo, a model developed top-down. It is the ideology first propagated by an entrepreneurial class that was prepared to risky investments in the hope that they would 'grow' and thus yield a return. From the 19th century onwards, 'growth' and profitability became an ideology adopted by all kinds of economic and political movements and organisations. It is an ideology that still dominates the political-economic conceptual framework today - although questioned since the early 1970s⁴

The industrial development of the past two centuries has also thoroughly determined our social and cultural pattern. The construction of new types of buildings that

³ In Huxley's book the *World State* is an enormous system of production and consumption in which humans are turned into machines for further production and consumption.

⁴ See the report of The Club of Rome, *The Limits to Growth*, 1972. Its computer simulations suggested that economic growth could not continue indefinitely because of resource depletion. The 1973 oil crisis increased public concern about this problem, and recently the results of global warming since the industrial revolution

dominate the skyline of our cities, the modern acrylic paints used by our artists, art forms such as photography, video art and virtual reality, the ability to communicate simultaneously with people of different skin colours and in different parts of the world, travelling outside our atmosphere or going on holiday on an island paradise (and even the phenomenon of 'holiday') and countless other things that we now experience as 'normal' would have been regarded with disbelief or as magic two centuries ago.

Two centuries ago, a journey from Paris to Brussels was an uncomfortable undertaking taking many days, over bad and sometimes even unsafe roads. Nowadays, we whiz in a high speed train and do the trip in one hour and thirty minutes.

Two centuries ago, preserving food was a task in itself (an average ham contains 10 to 15% salt as a preservative), 'cooking' meant a labour-intensive activity for the woman at the hearth, while the household absorbed all the attention and time. In the years 1845-1846, we experienced the last famine in Western Europe, and until part of the 20th century, food was the main item in the budget of a working-class family - which was forced to maintain a very monotonous diet. Today, we eat fish from Lake Victoria and kiwis from New Zealand, drink wine from Chile or Australia. We have a problem of obesity, anorexia, too much cholesterol, etc. We quickly put a frozen meal in the microwave, and the plates and cutlery in the dishwasher afterwards - in the USA they build flats without kitchens, only with a microwave, because people don't cook anymore and they eat out of cardboard plates...

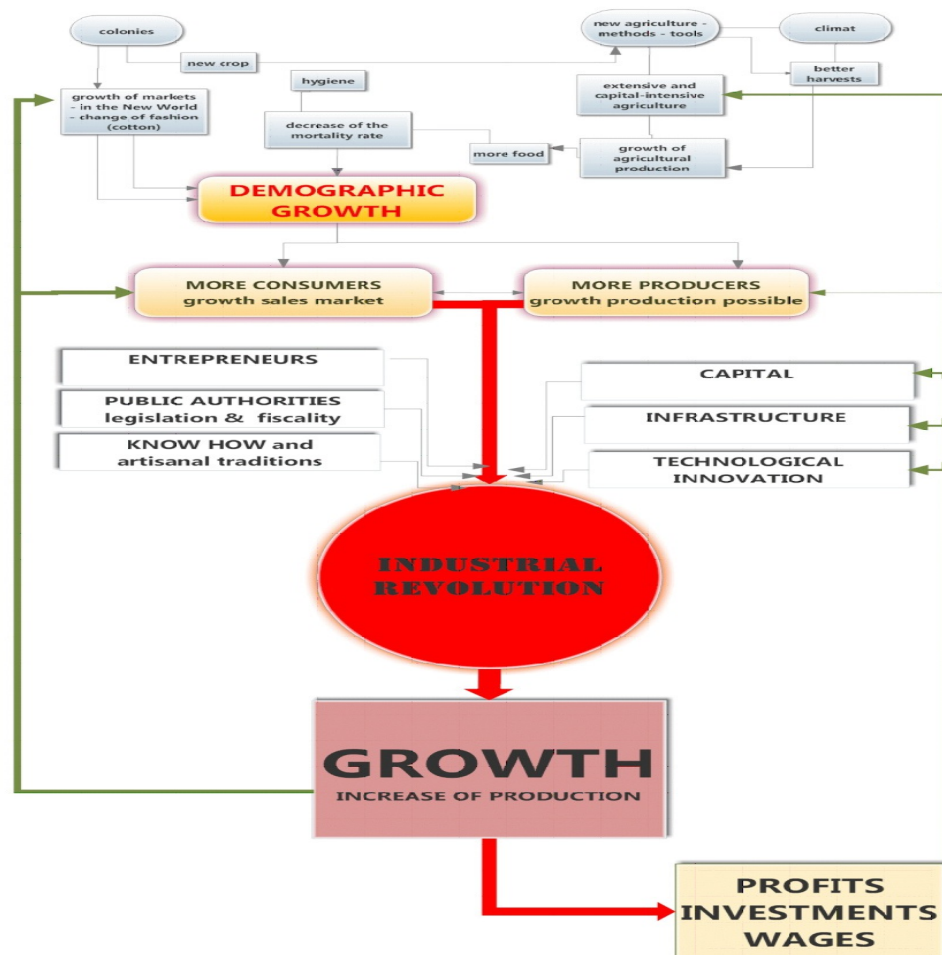
Two centuries ago, the day began when the sun rose and ended when it got dark. The rhythm of life continued with the rhythm of the seasons, with their short and long days. That someone would watch the world news of the day (or a horrible reality soap) in the middle of the night in a cosily lit room in front of a box, our ancestors could not (and did not dare to) even imagine.

2. A clockwork

The preservation, interpretation, the presentation and the opening to the public of industrial and technical heritage includes a number of aspects and issues that are often difficult to compare with other forms of heritage - taking into account the fact that each form of heritage has its specifics and each one needs a specific approach. Interpreting a church or a manor house is different from visiting an old textile mill or a row of workers houses.

2.1. Understanding the industrial (r)evolution

The notion 'industrial (r)evolution' represents a real clockwork where all the gears have to work together, a network where all the elements do influence each other. They are the material foundations, the infrastructure for a social suprastructure - material working and housing conditions define the way of acting and thinking



The so-called 'Industrial Revolution' was not caused by the steam engine. The cause was a decreasing mortality rate and therefore a strong demographic growth. This was the result of a new agriculture with new crops (e.g. potatoes), and also of the knowledge of hygiene. The efficiency gains in agriculture allowed a larger part of the population to move to other sectors - ranging from an increase in the employees at royal and noble families, to entering a new labour market, or to produce products themselves.

2.2. More than mills and machinery

The notion '*industrial heritage*' deals with the material foundations of the industrialised societies, the material infrastructure for a social suprastructure. The material world and the surroundings and conditions in which one is working, and the housing conditions and environment in which one is living, define his way of acting and thinking.

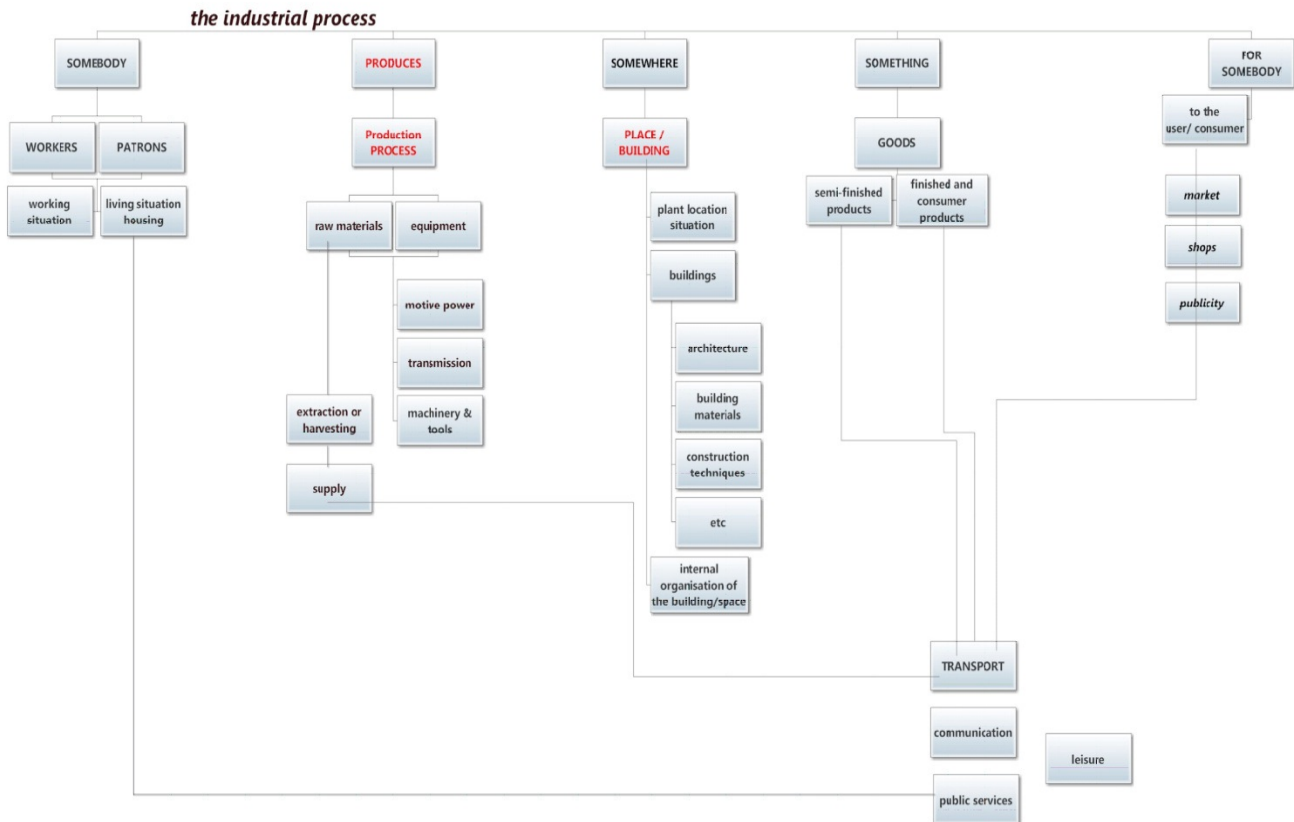
It's the heritage of an industrial culture. It is not the history of science and technology, but rather how these changed and shaped society.

The industrial heritage not only includes industrial buildings and machinery, but also the relics associated with the *industrial process*..

It is the heritage of

- somebody who
- produces
- something
- somewhere
- for somebody

It thus also includes the transport heritage (waterways and waterfront heritage, railways, bridges, ...), the housing of those involved in the industrial process (eg, workers housing, inner courtyard and back-to-back houses and garden cities - and in comparison the luxurious homes of factory owners) and parts of the distribution and selling system for industrial goods, etc.



Somebody

It are the material remains and witnesses of *the life and living conditions of men and women* who invest and run the enterprise, of men and women who are employed and work in the mill

Where did the workers come from ? In the 19th c there was an important migratory flow from the countryside to the industrial towns. In towns always had been living a large number of ‘marginal’ people who could be employed at cheap cost in the early urban mills, and who competed with the immigrants on the labour market. A 19th c. situation which easily can be compared with situations in Africa, Asia and South-America today.

Where and how where these workers housed and who built and owned these rows of houses ? Where did the workers could wash themselves (the appearance of public baths in workers quarters) and since when baths and central heating appeared in one’s dwelling, depending on his wealth? How was health and safety organised in the mills ? What were the social welfare services if an accident happened in the mill ? And when could one retired? What could be the life of a widow when the husband died?

Producing

It is the *production system* transforming raw material, through handicraft or machinery.

It is the story of the changeover from natural energy (the power of animals, man, water and wind, sun) to artificial energy (steam, gas, oil, electricity, nuclear energy) and back to the natural - or 'sustainable' energy.

It is also the story of the changeover from hand tools to a mechanised system.

Products

It are *goods and products* they produce.

This is the story of the products themselves - the design and the material from which they were made, their quality and strength, the easiness or difficulties for producing them. Cotton cloth is less wear-resistant than linen or wool - but is easier and cheaper to produce. Printed cotton (the 'indienneries') became fashion and popular in the 18th c - copying a design coming from the East - thus promoting the use of cotton. Flax is a tough fibre and was difficult to spin till Philippe Henri de Girard (1775-1845) solved the problem (1810)⁵. Before 1860 linen and woollen cloth could seldom compete with cotton, which was very cheaply imported from North America. This changed after the American Civil War, which prevented the transport of cotton from the southern states to the export ports in the north. The law of supply and demand caused the price of cotton on European markets to explode.

Somewhere

It is the *place* where the production happens, be it in a separate room in the house (as the weavers room in a weaver's cottage), a simple workshop or a large mill.

While in the pre-industrial period production happened in or close to the house of the producer, from the early years of industrialisation a separation is taking place between the places where one lives and where one works.

Workforce is hired by the owners to work in their '*manufactures*'. It are the precursors of the '*Satanic Mills*'⁶ surrounded by the houses in which workers

⁵ However - because of financial and political problems - he had to leave France. In 1825 he was hired by the government of Poland to develop the Polish textile. He started business in the village of Ruda Guzowska, which became a great success and brought fame and. In his honour the village was renamed to Zyrardów, a toponym derived of the polonised spelling of de Girard's name.

⁶ See the book *Satanic Mills. Industrial Architecture in the Pennines* (London, SAVE, 1979) on the textile mills of Yorkshire's West Riding and South Lancashire, once the grandest series of buildings the Industrial Revolution produced.

live⁷. Today work is again moving to the ‘home office’ - not only as a result of COVID-19.

Products have to be transported

They produce *goods and semi-finished products* used for manufacturing and processing or to be sold to users and consumers

How to get these to the place where they are further processed or how to get them to the consumers: how is trade, wholesale and retail distribution organised ?

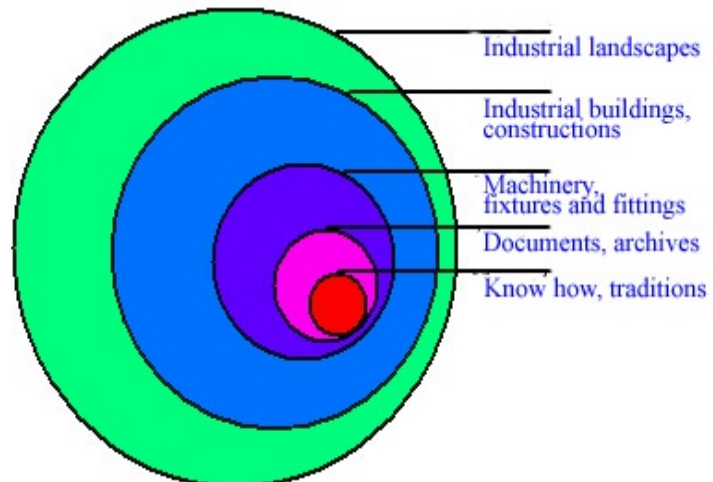
How are they - and raw materials - moved from one place to another. Without the development of new transport systems - the railways and transatlantic shipping - the so-called ‘Second Industrial Revolution’ probably never would have taken place.

⁷ “Every great city has one or more slums, where the working-class is crowded together. True, poverty often dwells in hidden alleys close to the palaces of the rich; but, in general, a separate territory has been assigned to it, where, removed from the sight of the happier classes, it may struggle along as it can. These slums are pretty equally arranged in all the great towns of England, the worst houses in the worst quarters of the towns; usually one or two-storied cottages in long rows, perhaps with cellars used as dwellings, almost always irregularly built. These houses of three or four rooms and a kitchen form, throughout England, some parts of London excepted, the general dwellings of the working-class. The streets are generally unpaved, rough, dirty, filled with vegetable and animal refuse, without sewers or gutters, but supplied with foul, stagnant pools instead. Moreover, ventilation is impeded by the bad, confused method of building of the whole quarter, and since many human beings here live crowded into a small space, the atmosphere that prevails in these working-men’s quarters may readily be imagined. Further, the streets serve as drying grounds in fine weather; lines are stretched across from house to house, and hung with wet clothing.” (From ***The Condition of the Working Class in England***, by Friedrich Engels, 1845).

Comparable texts do exist for Ghent, see: J. HEYMAN & J. MARESKA, *Enquête sur le travail et la condition physique et morale des ouvriers employés dans les manufactures de coton à Gand*. (Gand, F. & E. Gyselynck, 1845, 267 p.)

3. A holistic approach

The industrial and technical heritage is ‘more’ than a collection of protected buildings reused and emptied to adapt them to their new use. It is ‘more’ than a collection of rare objects in museum stores or on exhibit.



The industrial heritage includes both

- the **industrial environment** (eg the so-called 'Flax Valley ", the Ruhr industrial landscape or the landscape with the textile mills and ‘coloniès’ on the Llobregat river in Catalonia, urban landscapes and cityscapes associated with typical industries (textiles) or infrastructure (a railway town as Swindon, or a harbour town with its landscape composed by docks, cranes and warehouses);
- **industrial buildings** where the interior (construction, spatial layout, process organization) are often more important than the façade;
- the **facilities and equipment associated** with the industrial process: a watermill is in fact only a watermill when she has retained her going and standing work, a crushing plant only when the plant is maintained for pressing and filtering the linseed or olive oil, a brewery when the tubs, fermentation bins and barrels are still present;
- the **documentary evidences** that learn and inform us about backgrounds and relationships, and often also about what has been lost
- the **knowledge and experience** to deal with and operate these systems: only in the sector of the mills could be found a solution through the training of volunteer millers, but we protect and maintain steam engines and boilers while the knowledge for the maintenance and operation of them are rapidly lost. As concerns the flax heritage flax scutching mills were protected in different regions and countries, while the number of real ‘flax scutchers’ is almost reduced to zero.

The holistic approach of the industrial and technical heritage has a series of important repercussions on the way we approach and have to approach it:

- The presence of the machinery, fixtures and fittings, which are not (or only partly) removed can complicate re-adapting this heritage to new uses and hamper the accessibility to the public, especially when it concerns sites of SME or (semi) artisanal scale. Many of these sites can only be maintained if they function as a site museum or heritage centre.
- Most regions don't have (yet) suitable structures for the management of industrial sites, either the short or long term, nor in the built heritage sector, nor in the sector movable heritage. Legal protection is often still geared to traditional forms of heritage and therefore inadequate for industrial heritage
- Industrial and craft sites pose a significant additional problem, that of transfer of craft and (old, outdated) technical expertise - this intangible heritage, however, is crucial for the further life and the experiencing of immovable heritage and of the industrial and artisan processes
- The presence of working equipment can cause danger to visitors and to those operating them
- Modern laws and regulations on safety, hygiene and environmental pollution are often a hindrance to the preservation and accessibility of industrial heritage

4. The TICCIH-definition

In 1978, when in Sweden TICCIH (The International Committee for the Conservation of the Industrial Heritage) was established, a preamble was adopted, defining for the first time the 'industrial heritage'.

This preamble says:

The study of the Industrial Heritage is concerned with an epoch in man's evolution characterized by industrialization.

Industrialization implies the onset of a fundamental change in the structure of an economy and a fundamental redeployment away from agriculture, with emphasis on industrial and mechanical innovation advances in the techniques of production; and the mechanization of processes in a single industry leading to 'massproduction' - all on the basis of large plants driven by other than human power.

The study of Industrial Heritage should be concerned with the society as well as the physical evidence of industrialization, taking into account of men and women, past and present.

In view of the multiplicity of industrial phenomena throughout the world, the Industrial Heritage should further be taken to mean:

1. all immovable goods (landscapes, sites and buildings), and movable goods (plant, equipment, and other fixtures and fittings), which provide evidence of

the industrial activities of economically advanced or developing societies, including sources of energy and raw materials, working places, housing, transport facilities, and relating machinery;

2. all written, graphic, and other documents and records of industrial activities; and of industrial sites, structures, and equipment, including documents as refer to the commissioning and construction; together with such technical, legal, administrative, and other text as deal with the industrial heritage in general;

3. industrial products, to the extent that they are essential to the understanding of such activities.

This first definition was modified in July 2003 when the The Nizhny Tagil Charter For The Industrial Heritage was adopted.

It now defines the industrial heritage as

Industrial heritage consists of the remains of industrial culture which are of historical, technological, social, architectural or scientific value. These remains consist of buildings and machinery, workshops, mills and factories, mines and sites for processing and refining, warehouses and stores, places where energy is generated, transmitted and used, transport and all its infrastructure, as well as places used for social activities related to industry such as housing, religious worship or education.

Industrial archaeology is an interdisciplinary method of studying all the evidence, material and immaterial, of documents, artefacts, stratigraphy and structures, human settlements and natural and urban landscapes [2], created for or by industrial processes. It makes use of those methods of investigation that are most suitable to increase understanding of the industrial past and present.

The historical period of principal interest extends forward from the beginning of the Industrial Revolution in the second half of the eighteenth century up to and including the present day, while also examining its earlier pre-industrial and proto-industrial roots. In addition it draws on the study of work and working techniques encompassed by the history of technology.