Steel in modern architecture history essay

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Along came the industrial revolution which was between the periods of the 18th and the 19th century after ages and ages of ignorance and poverty. The industrial revolution had a dramatic growth in every field of life. These revolutionary changes took place in whole Europe especially Great Britain and the power of steam (which was discovered by James Watt in 1783) was the number one reason behind it next to the manpower; the workers have worked hard between mines and factories. It started with the mechanization of the textile industries instead of the animal and agricultural work only. The industrial revolution which began around the 1800 was followed by a second industrial revolution in 1850. a lot of discoveries were witnessed by this era including electricity and the development of all the machine tools. The following era was the machine age which had a noticeable change in the history of technology, agriculture and architecture due to the discovery of more power resources as coal and trade expansion was enabled by the introduction of canals, roads and railways and mostly the discovery of the iron ore. The discovery of iron moreover the ability of shaping it considered a big achievement. Types of iron will be discussed later. Followed by discovery of steel which is another form of iron alloy containing less carbon and other metals are added to give it extra properties like manganese, silicon and chromium. Iron and Steel are found in the earth crust in the form of alloys as they are not deep hidden in the earth and such materials are reactive with the air oxygen. After extracting steel and being cleaned from the impurities . although, impurities sometimes could be useful for enhancing the strength of iron or steel. The final steel products always contain small percentages of metallic impurities like silicon, manganese, sulphur and phosphorus besides iron and carbon. The whole idea of introducing steel goes back to Hennery

Bessemer in1858 depending on coal and the furnace. Many techniques were devised for steel treatment and many types were derived too (examples will be discussed). After introducing these kinds of materials to the 18th century nothing was left for the thinkers and the ambiguous inventors but to seize the opportunities think, document and produce, and that was the 18th century all about. Expansion took place in all branches of life the industrial, the agricultural, economic, population and most importantly in the construction and architectural strategies. A lot of achievements were done like building factories, bridges, rail ways, habitats instead of poor work shops and small cottages. The research is discussing the steel role in the development of building construction and architecture especially the means of transportaion of this era, the various options and privileges given by steel at the age.

From iron which is the second available metal in the earth right after aluminun till steel it was quite a time and journey discoveries as it was previously discussed. The discoveries of iron consecutively:

Pig iron: basic row iron obtained from molten iron ore in the furnace and appears in the form of blocks called pigs. It is hard but not on daily basis use.

Cast iron: cast iron is liquid molten iron which is shaped by pouring in mould to have iron units and structural shapes. Cast iron is hard, brittle, reactive with air and hard to shape.

Wrought iron: is the mix of liquid iron and slag. The out come is a much less tough, easy to shape and relatively easy shaping alloy.

Besides, the discovery of steel and its types:

Mild steel: low carbon steel ductile, malleable, elastic.

Carbon steels: which depends mainly on high carbon levels which varies from 1. 55% to 0. 55% which is very strong more elastic than mild steel

Alloy steels: basically steel mixed with iron and reinforcing metals,

tool steel: harder than the alloy steel used for making the machines and daily used tools.

stainless steel discovered in 1911 by the British scientist Harry Brearley which is the best of its kind due to the high corrosion resistivity due to the presence of the high proportionality of chromium rather than steel contain carbon ferrous 88% and cementite 12%. Stainless steel used on a very large scale in many western buildings and sky scrapers.

It is believed that, steel has contributed so much to the building industry over all. The development of the buildings and the variety of their purposes kept in crystallizing. The start was green houses made out of glass and steel. Building rail ways and bridges to transport iron to the factories to extract and produce iron then building the workers habitats to be near their work and that is how wheel of construction kept on going forward. which derived the idea of multi story building using the skeleton steel frames. If anybody thought about the wonders of the 19th century e. g. the statue of liberty, the Eiffel tour, the capitol the first thing that comes to the mind is the construction material which is the steel. For a lot of people the most

important steel achievement was the railways and bridges they played such an important role to get the whole country but the whole of Europe.

The first railway station shed to herald the forthcoming art of engineering during the pioneering phase of the rail ways was Charles fox’s Euston station in London 1835-1838 sets an exact example of the new type of buildings in cities which means that the industrial engineering had begun and stopped encouraging quoting monumental buildings. Euston station was the point of departure of Birmingham a line that was built by Robert Stephenson while the spatial structure concept was the work of Charles fox and it was his first work. The station was the first sign of the upcoming modern engineering. The entire front of the station was designed by Philip Hardwick (Victorian architect). the railway created a new impression because of the different structure and a new field of design emerged featuring over wider spans. One new concept of the work of Richard turner which was the design for the lime street station in Liverpool 1847-1849, an interpretation of the trussed frame work divided into three angles by compression members and tie rods that Camille polonceau had first developed for his thesis at Ecole des arts et manufactories in Paris in 1837. Railway architecture considered the primary school of modern architecture. Two schools of culture struggled to lend station their appearance as it could not be know whether to apply the style oriented by the Ecole de Beaux-Arts or the technical methods of the championed engineering prestigious schools of the Victorian, Napoleonic, Haussmann and Wilhelminaian era there light, airy sheds that reflect the industrial side of the constructions. Clearly there were no standards no visions or references so they had to strife for the fascination of new places

and technology in the era with the iron and glass that influenced a new perception of space and time. The two schools could not get along.

Euston station pictures:

From the most important means transportation are bridges and there joints. Bridges connected the whole country to gather which made it easier for practicing all the activities without being delayed from agriculture or business. The joint was the key to the second revolution in the bridge building the break through to lightness. The transfer from stone arch techniques to cast and wrought iron was quite important. The pliable structure was introduced by German engineer Johann Wilhelm in1865 and the engineer Armand Moisant used for 115-meter-span machine hall at 1889 world exhibition in Paris. Which represented a transition from engineering to architecture, also the amazing frame work le tour d’ Eiffel created a new image of space.

Three building types are to be examined in detail: bearing wall, cage frame, and skeleton frame. Skeleton frames, which use a system of columns and beams to support a building’s interior floors and exterior walls, turned previous logic on its head: masonry walls were reduced in importance from the element that carried all structural loads and defined buildings’ appearance and construction quality to decorative weather screens with no structural purpose.

Because all three building types include steel beams carrying fire-resistant floors, all represent latenineteenth century building technology. The introduction of new building materials and systems. based on the

mechanization of mines, foundries, and mills began in the United States in the 1830s. One of the great technological changes of the nineteenth century was the introduction of skeleton framing as the common method of supporting large buildings.

To sum up, before the dawn of the Industrial Revolution Britain was a quite different place with respect Britain that exists today. So before the Industrial Revolution it was very hard to keep in touch with people in other parts of the country Industrialisation brought with it new types of roads, trains and many other forms of communications which simply did not exist prior to industrialisation. Industry created a need for new types of buildings, and at the same time new building materials and techniques were being made available by industry huge spaces, unobstructed by bulky vertical supports and hard steel. If it weren’t for steel the industrial revolution would not have launched with such success. Thanks to steel the people of England became more active in there society and helped raising there nation. Every country should take example of what the English hard labour achieved, the adaptation of its factory system.

Last but not least, apparently the style of this architecture is modern and for the architects this considered the modernization phase. it is believed that choosing the term revolution is inaccurate as these changes did not happened in a day and night but it was the labour of hard working and experimenting for many years. Although, after seeing such astonishing inventions could give this era the term revolution.

Finally, the machine age had its modern impact on the architecture; in the third millennium architecture will be developed more and more. Who can imagine life without these important changes and do not try to react with it. Frankly, the development of any society measured only as how is strong its manpower