

**Contemporary Architecture and Design**  
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**Lecture – 04**  
**Post-Industrial Revolution: For the Machine Movement**

Welcome students to the online NPTEL course, Contemporary Architecture and Design. In the previous lecture we have given a brief introduction about the modern world architecture in design. And today we will discuss... mainly on the post industrial revolution, and in post industrial revolution there were two parts as we discussed earlier, which was for the machine movement and another is against the machine movement. So, in the post industrial revolution and this is just a brush up of the what we have discussed earlier.

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**Evolution of New Schools of thought**

19<sup>th</sup> century Industrial Revolution

Dilemma between Old Traditional style and craftsmanship Vs. New Inventions (Material and Technology)

Old style can't be incorporated in steel structures.

Pre-fabrication & mass production Vs. Craftsmanship

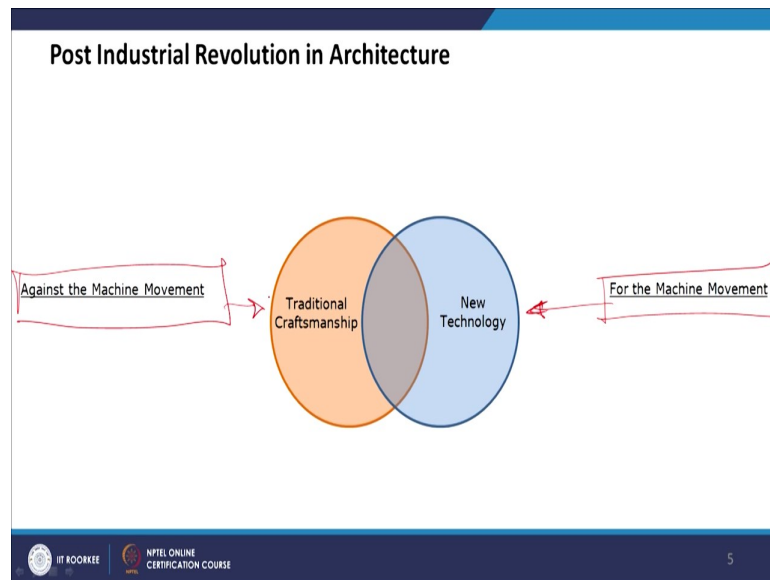
...crisis in Architecture, Art and Design  
Generation of two extreme radical styles

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The agriculture to industry was there and people started migrating from village to city. And then there was increase in steel, the new technology as for example, steel and glass and then new kind of products started evolving, and then there was a new requirement for new kind of buildings.

For example, commercial, residential and public amenities; In totality there was a crisis in architecture and art on designs style, and then the genesis of two extremely radical styles was evolved and then again we were discussing.

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There was one style was traditional craftsmanship, one set of architect's started following that and the another set of architect embraces the new technological aesthetics. So, two different style was there for the machine movement which was correlated with the new technological aesthetics, the machine aesthetics, and the another style was the against the machine movement which was following towards the corresponding to traditional craftsmanship.

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The slide is titled 'Post Industrial Revolution in Architecture' and has a sub-heading 'For the Machine Movement'. It lists several characteristics: 'Embraced the new technology - new style evolved from new technology', 'Steel frames, trusses as a beautifying elements ✓', 'Extensive use of glass on the facades', 'Prefabrication and mass production ✓', and 'Explored classicism to derive a structural paradigm, not to define aesthetics'. To the right of the text are three red hand-drawn sketches of building structures, including a dome and a truss system. The footer includes IIT ROORKEE and NPTEL ONLINE CERTIFICATION COURSE logos, and the number 6.

Now, in the for the machine movement what happened, what are the features of the for the machine movement. The embraced the new technology and new style evolved from the new technology. Then the steel, in architecture steel frames and trusses became the beautifying element. As we will also see and have discussed earlier as well in the crystal palace, the truss becomes the beautifying element and that is the form of the building and there was no other added element there.

So, that the... new technological style evolved from new technology, new style evolved from the new technology. The prefabrication and mass production was another plus point of this industrial revolution, and they started, there was a possibility of fabricating on the same design again and again. But that was in the opposition of the craftsmanship of the hand crafts of old craftsmanship and this, started opposing the old craftsmanship and then explored the classicism to derive a structural paradigm.

So, classical architecture style as we were discussing earlier was also evolved from the structure. So, if you look at the Parthenon, which is trabeated structure, which is like this and the pantheon which is just a dome and placed and in front of there was again structure like this. So, these evolved from a structural design which is also there in the for the machine movement.

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**Post Industrial Revolution in Architecture**

After Neo-classical and before Modern

1. For the Machine
  - ✓ Crystal Palace; London (1851); Joseph Paxton
  - ✓ Eiffel Tower; Paris(1889); Alexander Gustave Eiffel
2. Against the machine ✓
  - ✓ •ART and CRAFT MOVEMENT: England (predominantly in art) ✓  
Edward Schroeder Prior & Ernest Gimson's work
  - ✓ •ART NOUVEAU: rest of the Europe ✓  
Hotel Tassel(1893) & Hotel Solvay(1894); Brussels; Victor Horta  
Casa Batllo(1904) & Casa Mila(1910); Barcelona; Antonio Gaudi

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So, in the for the machine movement these two are the very important building one, one is Crystal Palace, London designed by Joseph Paxton and Eiffel tower in Paris designed

by Alexander Gustave Eiffel. And then also... this mainly started in Europe and also it percolated in America as well.

So, in America the... the statue of liberty was designed by Bartholdi, but then structure design was done by again Gustave Eiffel himself. So, in against the machine movement we will discussed in the next class. There was two different movements art and craft movements and art nouveau which was extremely opposite to for the machine movement. And then there were artisans and ornate design was the key features, artisan's craftsmanship and ornate features was the key feature of these two art movement, art and architecture movement.

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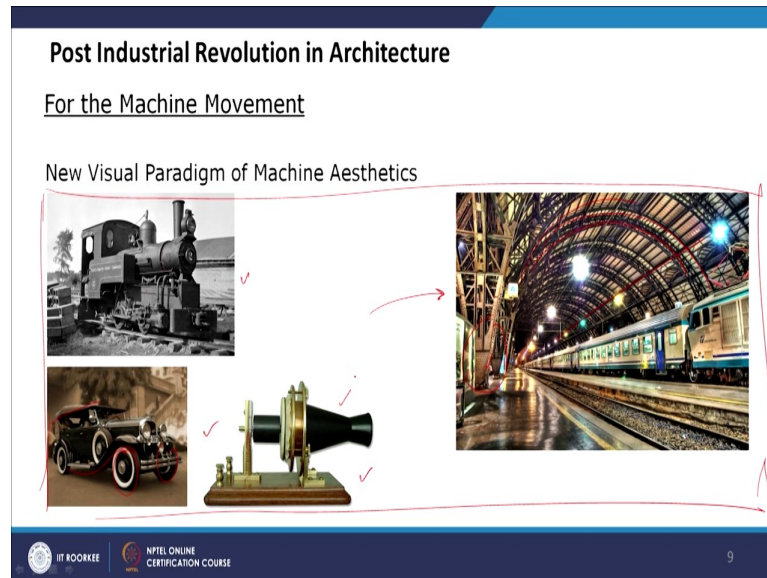


So, here some example of for the machine movement; so, this is crystal palace if you look at the crystal palace, what we were discussing in the form evolved from the structure. And the structural elements are actually the beautifying elements, these are the steel trusses and the steel members which are visible from outside and that is the ornamentation, no other added ornamentation was superficially added.

Then again if you look at the Eiffel tower, this celebrates the structural innovation and this was that time the tallest tower and Gustave Eiffel designed it and that time achieving this height was a marvel. And this was only possible because of the invention of the steel and new technology. So, and if you look at the design style, they also evolved if you look

at carefully, they also evolved a particular style of design through the structural members and the structural straining members.

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So now if you look at the style which was there even the rebates and the trusses which creates particular aesthetic pattern. And this a rail station during that time and then if you look at what was there in the industrial design actually the industrial design elements came first and then this was also percolated in the architecture... architectural style. And then from these styles which was evolved based on the engineering marvel was adopted as a visual element.



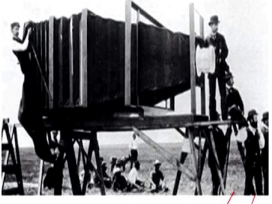
First this came as a engineering requirement because all these deviates and everything, this for the requirement of engineering. And then everything was found based on the function requirement. This was the hood and all this element this was absolutely function element and no other design elements were added this is the Alexander Graham Bell's first telephone. Now, if you look at these style of architecture... industrial design and architecture and that evolved later.

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**Post Industrial Revolution in Architecture**

For the Machine Movement

Machine Aesthetics



Design for everyday use

**The Kodak Camera**  
"You press the button,  
we do the rest!"  
The only camera that anybody  
can use without instructions. As  
convenient to carry as an ordinary  
field glass. World-wide success.  
The Kodak is for sale by all Photo stock dealers.  
Send for the Primer, free.  
The Eastman Dry Plate & Film Co.  
Rochester, N. Y.

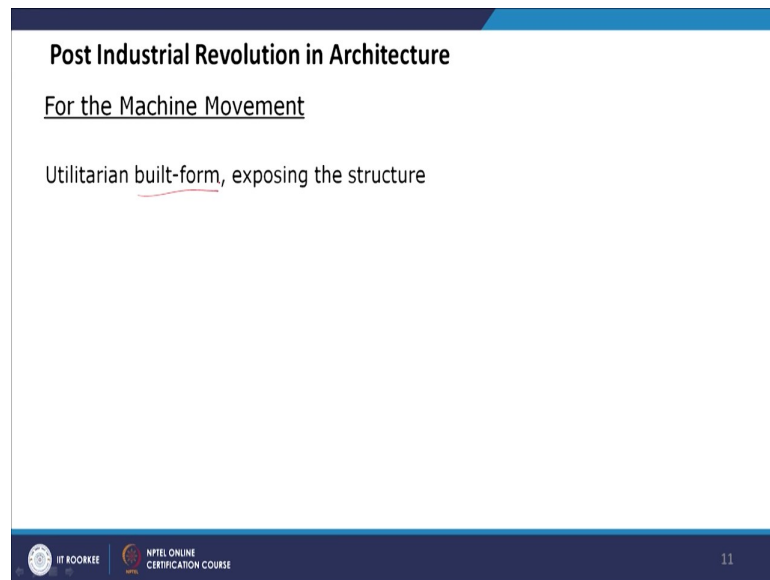
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And why this started evolve... evolving because if this was confined only in some few design, this could not have been spread so much for example, in the earlier architecture. This was only confined into the cathedral palaces and building of rich people. But in... after industrial evolution there was few product which was for daily usage and everybody started using that for example, this was earlier camera which was huge in length and Kodak designed a new camera which was very handy. And this was the caption... you press the button and we do the rest and it was to capture common peoples notice and they were the customers for this camera. And earlier this was definitely common people were not able to buy this camera.

And with the invention of telephone and car many of the people started using it. Even the railway was for everybody and the printing press of Woodenburg and all most of the inventions was spread to the bottom of the pyramid. It was earlier it was only for the top of the pyramid if this is the Maslow's pyramid. And now after industrial revolution, it percolates and it captures the total pyramid of the society.

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**Post Industrial Revolution in Architecture**  
For the Machine Movement  
Utilitarian built-form, exposing the structure

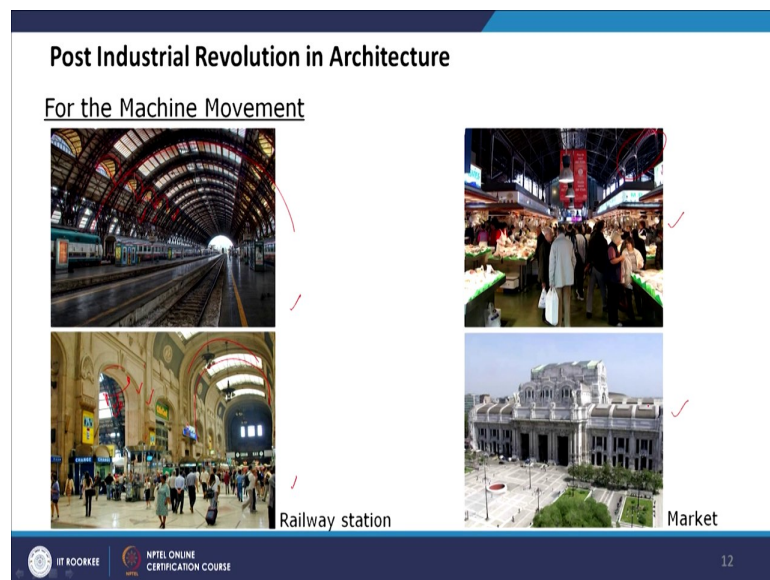


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Now, if you look at the styles utilitarian built form in architecture exposing the structure was a style.

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**Post Industrial Revolution in Architecture**  
For the Machine Movement



Railway station Market

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Now, this is the Milan railway station. And here you look at the ornamentation here and this part is actually this part is clubbed with the and can be clubbed with each other. This is not for the machine movement because if you look at this is a manifestation of the previous architecture movement and then which is clubbed with the railway station's main area. So, this was the platform and here because here it requires a larger span. And

larger span cannot be designed with stone and this is concrete building. So, cannot be designed by concrete so you have to use steel.

But steel elements are used and that was juxtaposed with the concrete design. And again this is the market of... European markets you can see the similar elements where there in the design. So, if you look at the styles of industrial revolution... for the machine movement after industrial revolution.

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**Post Industrial Revolution in Architecture**

For the Machine Movement

Genesis of high modernism: ✓

- Geometry and Mass production
- Purity of material, colour
- Structure as aesthetics
- Services as aesthetics

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So, genesis of high modernism came from the industrial revolution for the machine movement; because in the late modern if we look at, all the many of the movements started embracing the machine aesthetic. And the aesthetic new aesthetic which is generated with the evolution of machine; and then there was cutoff as we were discussing earlier from the earlier style which was more figurative and more on it and then the modern become very abstract and geometric; which was also there from the for the machine movement.

For the machine movement if you look at the crystal palace is this was absolutely geometric. And then this was a vault, this was a cuboid. And then in Eiffel tower it was also there was much more geometry than the previous architecture styles. And the new designs like this camera is absolutely a cuboid and then even the designs truss if we design the truss which is like biomorphic if you then much difficult to design.



So, they have designed truss which is a pure vault. So, geometry and mass production ,geometry was a style and because it was geometry, mass production was easy. If that was a biomorphic and ornate style mass production could have been much difficult which will relate to craftsmanship of artisans, which were related to the oldest styles. Then purity of material and color this we will discuss further in detail that material as it was... it was exposed.

For example, in the truss it was not they did not the paint truss in different color. And the material of the truss the steel was exposed and they wanted to show the power and the beauty of the steel, which was also there in the internationally style which was in the late modern style. And the color the pure color of the material was also there followed in the internationalist style which was there in the for the machine movement.

And then in Bauhaus there was another colors were added only the primary color and the materials color and the white and white, gray and black which was the neutral color was added. Then structure as aesthetic, as structure was designed that was kept as the aesthetic element which was there in the Eiffel tower itself is the just a structural member. And then services as aesthetics, the services which was there was exposed and those were became the aesthetic elements. Now, we will discuss... see how these different style which was there.

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**Post Industrial Revolution in Architecture**

For the Machine Movement


Genesis of high modernism:

Geometry and Mass production

Purity of material, colour

Structure as aesthetics

Services as aesthetics



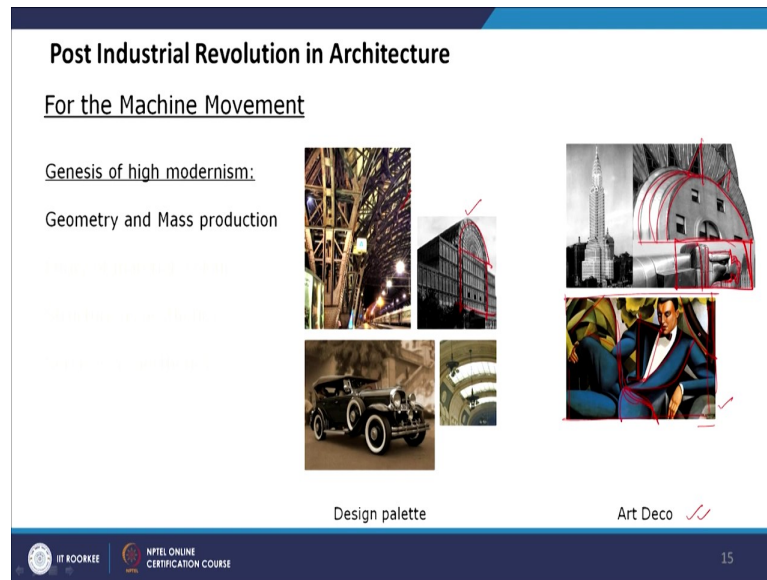
Design palette

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If you look at the design palette these was the design palette of for the machine movement. And how these designs where later translated in the architecture style of the later phases.

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So, in art deco we will discuss these in detail when we will discuss these architecture style later. But here you can quickly relate, this is the for the machine movement which was which came from pure construction which is crystal palace and this is art deco Chrysler building.

And here you can see the similarity of the design, and again the structure members were added, but there was some ornamentation as we were discussing art deco has the connection with the art Nouveau as well if you look at the gargoyle's face. So, this have some ornamentation which was definitely not in the for the machine movement which was added, but there was this similarity of geometric... geometrically breaking the form. So, this eagle's face of the gargoyle's face could have been figurative element that was broken in geometry so, it can be in produced in a industry.

And again if you look this is Tamara De Lempicka's painting. This is a man which could have been painted in a figurative way, but it has broken in a machine made structure. So, so that you can look at this is like a folded metal. So, his wardrobe is like a folded metal and you can shine see the shine. And then face and all elements are broken in somewhat similar to geometric form which is not as biomorphic as it should be. So, the lines are


following each other. And this line is continuing and this is line is following and then some lines which you can draw which breaks the composition in geometry. So, this was examples from Art Deco.

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**Post Industrial Revolution in Architecture**  
For the Machine Movement

Genesis of high modernism:

Purity of material, colour ✓



Design palette



Internationalism ✓

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Then in the later stages internationalism style this is chair or sofa designed by Le Corbusier and this is Farnsworth house by Van Der Rohe. You can see the elements just the structure element where there and this is the pure box and this sofa is also a like a pure box, which has a some stylistic value was borrowed from there and the purity of material. This steel stainless is not painted, and pure black and pure white and glass was used. And also if you look at Bauhaus, Bauhaus also has the pure color in their visual style.

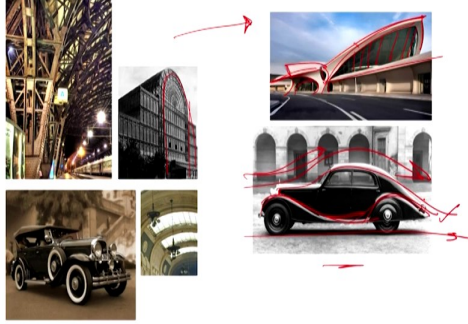
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**Post Industrial Revolution in Architecture**

For the Machine Movement

Genesis of high modernism:

Structure as aesthetics



Design palette

Tensile structure, Stream lining

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The structure has aesthetic here as you see the structure is as expose as aesthetic, but here later the structural technique and construction technique evolved. And then they could have they had the option to curve the structure into different aesthetic form.

But the structure is itself created the form, but there was no other facade treatment to create a form. So, this is actually a structural member so if you and this is taking the load of the building and that is creating the TW terminal's form, which look like a bird which will about which is kind of about to take off. And then this is stream line design, this is this is from the face of stream line design. There was this curve and all these things which were a ergonomic or functionally generated.

So, this curve is there for the for the ease of movement and this is... this came from the fluid dynamic so that the air can pass properly, but still you can see the curvature and all these things are there. Now another thing is services as aesthetic. So, this again in the structural aesthetic this was the structure of the chassis of the car and that was left as it is, and that was exposed and that creates the form of the car.

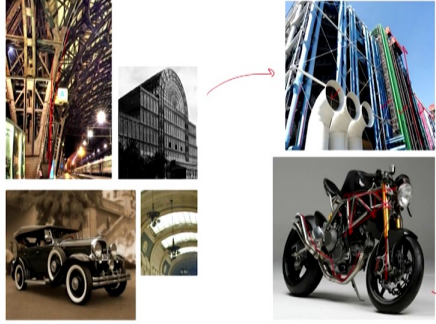
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**Post Industrial Revolution in Architecture**  
For the Machine Movement

Genesis of high modernism:

Industrial Revolution  
The Industrial Revolution  
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The Industrial Revolution

Services as aesthetics



Design palette

Servant and Served

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Now, services as aesthetics if you look at the all the services here and rain water pipelines and everything will be exposed over here, and that part was translated in the Pompidou centre of Paris. This is all the services which were color coded to exposed... accentuate at the their presence and exposed in the building facade. So, this building facade which all the services are exposed, and that became the style of the building; And then again if you look at the nude bike design, again the services and all the elements on structure element were visible.

So, this was also has some connection with the for the machine movement. In the next class we will discuss about the against the machine movement, which is art and craft movement and Arts Nouveau.

Thank you.