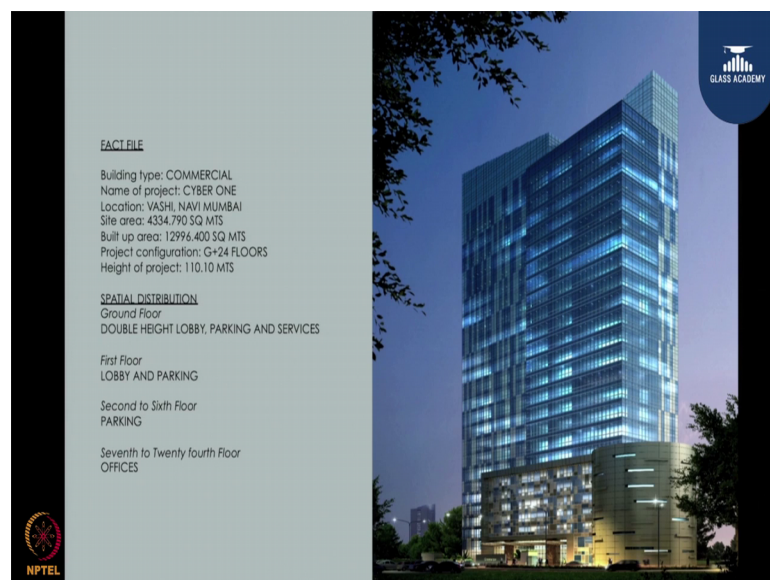


**Glass in Buildings: Design and Application**  
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**Lecture - 84**  
**Case Study: Commercial Buildings\_Part II**

We can move to the next project that we have done and the project that we did post this project is a project that is in Vashi Navi Mumbai, again right next to the entrance of New Bombay.

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You have this beautiful building that we designed around 2010, 2011. And it is a building that is a ground plus 24 storage structure that is basically something that was built for IT purposes. Now, the challenge on this plot was the FSI, because we had a lot of area that we had to accommodate within the building. And because we had to accommodate lot of area within the building, we had to kind of go up vertically.

Over and above which our clients were not very keen on having a basement in the building, because of which the car parking started piling up on to the outside or on the upper floors of the building. With 450 odd cars to park and a building that goes up 24, 25 storage we had quite a bit of a facade area that we had to deal with as far as this building was concerned.

So, this building in terms of facade was actually broken down into 3 different areas. One was the lobby which was at the base and 2 were the 5 floors of car parking that actually occurred on the upper floors. And from the 7th floor onwards we had the offices starting and going up vertically right up to the 24th floor.

Over and above which we had a crown on the building which kind of occupied another 4 or 5 floors basically the crown was in place to accommodate the name board of the project and things like that. And of course, to add the aesthetical value to the project since this was a very wide building, we want make it look tall hence the crown on the building to add the extra height.

Now, what happens in this building is that there are like I mentioned there are 3 levels which we are looking at the good part or the easy part about this building was that the facade faced north east; which was something that we were desiring for a very long time earlier we had dealt with facades which were westerly facing south westerly facing and we were struggling with the performance of the glass. Here fortunately we were lucky enough to have the main facade of the building faced the north east, which was a brilliant thing to occur, because we had to absolutely take in all the reflected light that came in from the north eastern part of the land that existed on north east.

And there was no direct sunlight that got in the office. It meant that I could further neutralize the glass and go even for more neutral glass than I had attempted earlier and that led us to use much more lighter, much more less reflective glass which let in as much daylight as possible making it a beautiful building to work with in something that would be an enjoyable experience to work within; because you had absolutely no direction light. And the light that comes in from the north and the east north east was something that was absolutely indirect reflected light, which made the insides of the building a pleasure to be in somewhere you would love to go and work in.

So, in this building we were very, very lucky to have that kind of situation. We added in all the kind of neutral glasses that we wanted to make the main facade of the building. And of course, here we got a little bit more experimental with the glass, because I mean that is where you know architects and designers have to put in their efforts to kind of create something that is and just above, not just the ordinary, something that is going to be above the ordinary, something that people like to visually see also.

So, in that sense we had to kind of work on this facade and we had to work on the external facade of the building; where we kind of added in again in this building we had 3 colours of glass that we added in. So, there was one cuboid of the building that was made with a single colour and the other cuboid of the building that kind of took up 3 different glass glasses that had near to identical performances most of them had similar performances.

Of course, when you are very, very neutral on the facade the other advantages that when you are sitting on the insides you do not see too much of variation in terms of the glass colour from the inside. So, that gave us the idea to kind of use in at least 2 or 3 different varieties of glass and from the inside of the office, it would all look more or less the same and you would not be able to identify between one glass and the other, even though they were of 2 different shades and 2 different colours. So, this building got built like I said facing the north most of the offices were facing the north like you can see in the plan out here.

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Most of the plan most of the buildings here, most of the offices here are all facing the northern facade. And on the south end of the building we had mainly the service core of the building and the lifts and the air conditioning system. The other half that I mentioned to you was about the lobby and the car parking lot area which was on the upper floors so, on the ground in 6 upper floors.

So, if you look at probably the kind of light that comes into the lobby it is something that is very, very reflected light, nothing that is direction light. And the lobby is also maintained in terms of temperature, it is very, very cool throughout the day it does not heat up so, it kind of reduced energy costs for the building. On the upper floors as far as the car parking was concerned is concerned, if you see the facade on the car parking section, it was also done up in glass.

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Now, this is something where we moved one step beyond from what we were doing earlier to just using glass as an performance feature or something that was the meant to be looked out from was no longer being used that way and the lower floors. So, we experimented with the car parking lot. And if you see the car parking lot we have used coloured glass which was PVDF film that was sandwiched between 2 clear glass materials to create fins of different colours. And then at the back the main facade of the car parking is done up with a colour which is like a translucent white glass.

So, the translucent white glass allows in the light during the day it kind of lightens up the car parking area that is right behind the coloured glass facade. And the coloured glass facade basically forms the aesthetical entrance to be building; it kind of forms the inviting section; where people see a bit of colour when they entering the building and it kind of makes the entire parking lot exciting to look at rather than just a dull drab facade.

So, in terms of aesthetics we have moved a step further, we kind of experimented with coloured glass and at what we have been doing with most of our projects is that at every project that we work on we try to move one step ahead. And we ensure that when we move one step ahead, we ensure that what we are doing is something that is going to be good for the building. We do not want to actually get into something that would actually be so, over engineered that we would find trouble building.

So, most of our design fundamentals and design decisions have been simple and they have been put across in a very, very simple format on the facade of the building. Because, we were learning the process of how to use glass, how it works how it bends, how it moves around corners how to control the gap between the glass and the building, and where do leakages start from and how do leakages effect buildings and how the entire structure including the system that is holding the glass in place performs.

So, being or being over enthusiastic and trying to move somewhere, where or into a region or into a territory which we were not familiar with we were not willing to do. We just moved one step at a time very, very slowly and we experimented step by step to actually progress slowly and gradually into facade design right from the sizing of glass like I mentioned earlier to the structural design of the building to coordinate with the glass sizes. To adding from one colour to 2 colours 3 colours on glass in our 3rd building and then adding a lot of colour at the base of the building to make it really exciting in that sense.

So, this was a journey that took us around 4 or 5 or 6 years when we designed building number 1 to building number 3, that we came up maybe 7 or 8 years later, we had progressed and we were gradually doing buildings which were more complex. And using glass that was far different from what we were using back in 2004 in 2011 and 12 we were actually using glass which had very, very good performance criterias gave you absolutely beautiful light on the inside of the building control the heat dramatically.

Of course, in this building we did not have to use the second glass with DGU glass with the inner glass also as a performance because performance oriented glass, because the facade actually received hardly any light direct sunlight. And it was a building that actually the orientation of the building actually performed for the building more than actually the glass really adding anything.

But, the beauty was that the glass actually kind of that we chose was something that became neutral and kind of something that we really wanted the facade to be where we did not want it to be very, very reflective. And that is what we achieved at the end of this project. So, this is the 3rd project that I am sharing with you, and something that I would say is was another milestone that we achieved as an office in those 7 or 8 years that we built; since the onset of building commercial projects began in New Bombay.

We I would like to move a little ahead from here and then on to our next project that we did a little later than this post this. That is a project that is this is an image of the same project with the completed photographs.

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And if you see the left hand side of the facade is got all the multiple use of glass which were 3 different glasses. And the right hand side is actually just a plain single glass that we used to kind of create the contrast between the 2 towers of the building.

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So, we move ahead from here and now we could move to one of the buildings that basically was the building that people both love and hate.

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Now, why I would say that people both love and hate this building is because, I have had mixed reactions from various people on this project. People have had diverse reactions, some people who like my work actually did not like this project, other people loved it to no end but that is what architecture is all about. You are going to get both the reactions,

you are going to get all the kind of criticisms from different people based on their viewpoints on their idea of aesthetics, and their idea of architecture ok.

So, to start off with we the we when we started this building project it was a building, it was a large plot of land and we had to we had a restriction as far as the height of the building was concerned, because we had to adhere to the aviation norms our building had to kind of fit into the height restrictions imposed on us by the Airport Authority of India.

So, in view of the same we land up with a restricted height something we could not build beyond 45 meters tall. So, this became a building that had to be short and long. And since this was a large plot of land again it overlooked a busy highway where we wanted the main facade to look in the direction of the highway and the viewing direction was the highway and the bay and the landscape beyond it; which was very, very interesting in terms of the viewing direction for the building.

So, the plan kind of generated for this building kind of focused on looking in the direction which was south and southwest. So, here again we was faced with the challenge, because we were trying to build a building that look south west but there was no choice in terms of redirection in the offices to better alternatives so that we would have better light and better performance. But, considering the fact that we were again stuck against the south and the west for our facade, we were looking for something different our clients were looking for something different.

They wanted something that was; something that was new, something that was not used before in India, something that was exciting. We were only initially not thinking too much on in terms of the glass, we were thinking in terms of how to get the FSI fitted and how things should be oriented in terms of the facade of the building.

And we got once we got the plans going and we started working on the facade of this particular building we realized that we were looking at we that we were no longer looking at neutral glasses, because if I use neutral glass on a facade that was south and southwest. We would struggle with trying to keep the heat out of the building and we would have a lot of heat and lot of direction light coming straight into the building with neutral facades.

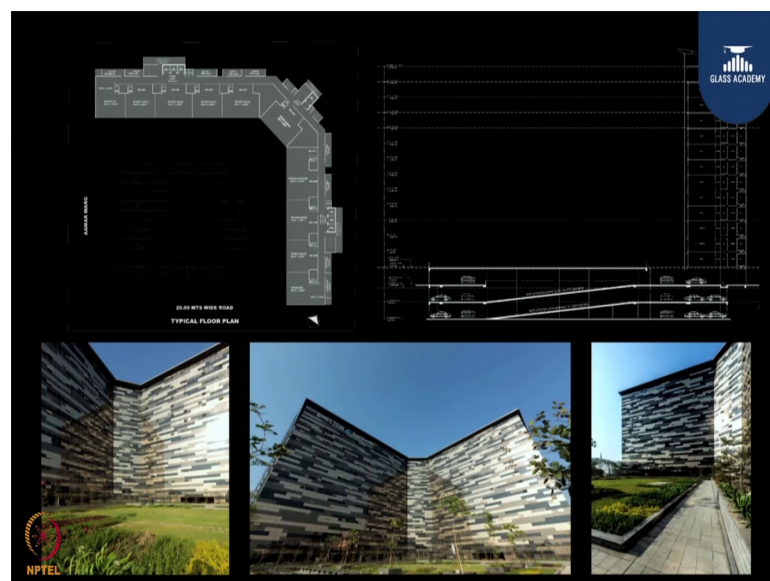


Which would kind of create a problem for the work environment, people would draw their shades down, people would do all kinds of thing to control the amount of light getting into the building. And things that we really did not want people to do, we want people to look south and southwest and still be in a controlled environment where light did coming, but it was controlled. So, we had to work on controlling the amount of light that actually entered the building.

So, we kind of land up with options on the glass which were very, very reflective blues very, very reflective greens and things like that. But, those were not something that kind of excited our clients, because they were used to seeing a lot of blues and greens and they were wanting to see something totally different.

After a lot of contemplation we land up working on a facade that had again 3 varieties of glass in this case. So, we had 3 colours shown in, we had brown, we had a black and we had a gold. Of course, all 3 colours that we chose were based on the fact that they would perform on a southwest facade, they would do their job in trying to control the amount of light that was actually getting into the building and the amount of heat that was getting into the building. Because that was our major concern as far as this building was concerned.

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We had all the offices facing this direction and we had absolutely nothing facing the north of the east, and we had to take good care of the heat and the light, that was actually

heating the facade of this building. So, in terms of what this facade did was that it kind of controlled the amount of light, because gold being a very reflective surface brown being a reflective surface and black also performing and not letting in too much of the heat or the direct light inside the building was something that formed the triangle on which we had to build our facade. And when we started the initial work on this people had different reactions like, I mentioned people were not very, very keen to do this in the first place within my office. We had lots of discussions on whether we should go ahead with something that looked as dramatic as this.

Of course, once we decided that we had liked the output of the 3D work and we were kind of matching the performances we just simply went ahead and built the building the way we thought it had to be built. Our clients loved the idea, they kind of fell in love with the entire idea of putting in these colours that were never seen before on a facade out here in India. So, they were excited; they were very excited when we actually presented to them the idea of doing a building with this kind of colour scheme as far as the facade was concerned.

Of course, in this we had to also over perform, we had to kind of land up building the internal glass which was again a high performance glass. So, we will end up building the facade with 2 glasses, both on the outside and the internal clear glass which was in a performance glass, ensuring that we further cut down the heat that got into the building.

So, in this case yes we move one step ahead from where we were the last time around in cyber 1 we had used just a clear glass on this on as the 2nd glass for the DGU. Here we actually put in a performance glass on the DGU so that we could actually have a better performance for the insides of the building.

Of course, there are some problems that we started facing once the facade has been completed it does create a few problems because, the sun shines directly on the facade of the building and the golds and the blacks and the browns and whatever is on the facade kind of starts getting very reflective. And it has it does create a huge amount of reflection on the outside. But, that is something that we had to live with, because we wanted to do something that was aesthetically good looking, something that people looked at from the outside and said wow what a building. But we have had reactions which are to be negative also it is not that we have had all positive reactions on this one.

But, yes in terms of what we wanted to achieve in terms of performance, yes it has been achieved. In terms of aesthetics we feel we have done a great job, as an office we have experimented and we love experimenting, I mean, the idea whole idea of experimenting is to learn. And if you do not sit down and get down to experimental architecture, you would not be able to move forward. You just be stuck doing the same old thing and not being able to graduate from where your offices and to move level 2 or level next or whatever you call it.

So, yes we had by now got by the 4th the 5th project, we had got a very, very strong grip on how to use glass and what we need to do and how we need to use it. And that is why our level of experimentation began to move in an upward direction we have been able to move ahead and build and think of buildings which are beyond the standard facades and create facades that are exciting. Of course, this would land us up at the next project that we have done, this project is something that we have completed and we are over and out with this.

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The offices overlook this beautiful landscape garden and you do not have to put your blinds down, because the glass simply performs for you. It allows enough light in, but controls the amount of heat and the direct light is also controlled because of the reflective nature of the glass.

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So, it was like an something that worked very well for this building specifically. So, here you see probably the sunlight that is falling on the facade of the building is creating a reflective glare in that in that space that you see out there. And that is what basically is something that I mentioned earlier that it does create some amount glare. But, you need to take some decisions that are aesthetical and then those are decisions that we took specifically, because we want to create something that was exciting.

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