

Interior Design
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Lecture - 25
Interior Design: Summary and Discourse of week 5

Namaste, hello everyone. Welcome again to my NPTEL course on interior design. We are at lecture number 25, and it's the summary of week 5. I'll just run you through whatever we have discussed during the week in a very brief and overview manner. So, we are going to talk about green interiors. We were introduced to green interiors.

We saw a lot of details regarding that, some examples, and of course, a compiled list of references. So, we were introduced to rating systems during this week, and there are lots of details related to the rating systems. You know what different rating systems are seen across the world, across the globe. So, I am just summarizing that. So, we began by understanding what rating systems mean, and specifically, we also went on to understand what these rating systems are when we talk about interior design specifically. So, these systems are used all over the world, and there are some set standards.

And there are a lot of examples, like in Japan, you know, their CASBEE is followed. Then there is CBCS in Korea. There is LEED Russia in Russia. And there is Green Mark in Singapore. There is Green Star NZ in New Zealand.

There is LEED India. There is Green Star in Australia. Green Star also in South Africa. There is LEED Brazil in Brazil. And, you know, we have LEED Canada.

We have LiDAR-A in Portugal. And we have Eco Profile in Norway and then, you know, other cases in Scandinavian countries and what they follow. So we see all over the world there are these rating systems that have been, you know, developed and followed. And they help in understanding and designating, you know, green buildings and green interiors. So, when we talk about the green building certifying firms in India, we see these three mentions.

So, we saw the USGBC, IGBC, and TERI. We try to understand the rating systems used in India, and when we talk about these three certifying firms, what are these rating

systems that we see, you know, promoted and facilitated by them. So, we specifically talked about LEED CI, which is LEED Commercial Interiors, because we are talking about interior spaces. And this course focuses on interior design and interior architecture. And we also saw the mention of GRIHA, which is a very indigenous rating system that India has developed.

So all of these rating systems can be seen; they are available for us to refer to and then, you know, understand what the nuances of each one of these are, how they are applied, what the incentivization one gets, you know, after applying these rating systems and getting our buildings and projects designated as green. And what are the advantages of that? How do we convince the clientele? And how do we tell them why these are beneficial and so on? So, we discussed all of that.

And specifically regarding LEED CI, we had this broader understanding that it is formulated by USGBC. The version 3 came out in 2009. It's called LEED Version 3 or LEED 2009. Version 4 was enforced in 2015 and updated in 2019. So, currently, new projects have an option to register for LEED Version 4.

The first public comment draft for Version 5, which is V5, was released in April 24 and it's being worked upon. We understood the broad areas which are addressed by rating systems and why we should specifically focus on these and how this helps in achieving the goals. Rating of green building green interiors—so specifically regarding LEED CI, I'm talking about interior spaces—but it, of course, begins with site planning: site planning, water use, energy use, of course, the materials, and there is IEQ, which is the indoor environmental quality. We had a discussion on that. So, these are certain points which are assigned to each one of these, and this is the distribution, you know, for these different criteria. And after whatever points one is able to manage to achieve, you know, through their designs, then accordingly, based on the number of points.

which are achieved or collected, whether it is a silver rated building or a platinum that we try to understand. So there are points assigned for site planning, which is like quite high 21. And then this, of course, energy use 37 points and so on. And there's a total tally of 110 points that we see over here. So, if we are able to achieve anywhere between 40 to 49 points, there is a certification that the project is green interiors.

If we go beyond that, there is silver and then here this range is for gold and anywhere 80 to 110 points, we get a designation of a platinum green building, green interiors. Then we moved on to understand typical scope of work for interior fit out. What does that mean? And, you know, these scope, we tried to decode it in terms of lighting. Daylight is very, very important.

So natural light, artificial light, furniture, different kinds of finishes, flooring, services that we see, plumbing, fire safety, different systems which are installed. partition screens etc. So we discussed what is the typical scope of work for interior fit out and how each one of these play a role and what caution has to be taken and how each one of these actually contribute in terms of you know impacting the environment. So how lighting directly impacts the energy use and then how daylight you know it is related to site planning, site orientation and how we are trying to capture the daylight to the maximum possible way and then its impact in terms of energy use also, you know, on the overall IEQ.

So, we try to understand these interrelationships. So, huge crisscross of arrows over here, but we discussed that in great detail during our lectures. So we also try to understand the attributes of green interiors, specifically talking about indoor air quality, indoor environment quality, furniture. So that was the kind of discussion we had throughout. And we also try to see what are the credits and what, you know, particular standards are followed, keeping in mind these specific criteria and details.

So, it is recommended to use low emitting materials, so using materials which have low vocs, volatile organic compounds for paints and coatings adhesives that we use, the flooring system that we use, if there are byproducts of the timber industry like composite wood laminates etc. their adhesives, system furniture and seating So, it is advisable that we have to reduce the VOC or we have to minimize it to the maximum possible or omit the possibility of VOCs for having a good IEQ. Then, you know, we try to see these kinds of documents to better our understanding, you know, in case of indoor carpet adhesives, wood flooring adhesives, rubber floor adhesives. What are these basemark limits that we see over here? And then how do we refer to these and try to shape our understanding and keeping them as benchmark?

We try to optimize, you know, these limits for our projects and try to reduce them to maximum possible. We also saw some kinds of charts and tables and documents to

understand the minimum fresh air requirements. So see, when we talk about interior spaces and interior design projects, it's a given that we are spending a lot of time inside those spaces, right? Maximum of our time during the day, across a season for several months. And it really matters that we have a proper ventilation, lighting and, you know, this kind of fresh air, good quality air, good environmental quality.

So, we try to understand the occupancy category, whether it's a day room or a guard station. And then, what are these datasets, details, and limits that one has to adhere to? So, continuing with that, we see more examples which are put over here and were discussed during the lecture. We also saw some interesting details regarding green product rating and the credits and points distribution system. For example, here we are talking about furniture, which is non-wood.

So again, what are these different credits? Product design, product performance, raw material, and green supply chain management. Within that, there are subcategories, and there are credit points assigned to each one of these. So these are already standard, market-adopted codes and methods which we refer to and then try to understand and apply in the projects. And the manufacturing process—all of these are some sort of criteria: renewable energy, water efficiency.

There is waste management over here. There is a life cycle approach, which is very, very important. When we talk about green interiors, we talk about sustainable aspects of making buildings and products. Product stewardship and, within that, extended producer responsibility, etc. Of course, there is also a credit for innovations.

Then we tried to understand the physics of light, daylight, artificial light, and we also tried to understand colors a bit and how all of these, you know, come together to contribute in achieving green interiors. So, we tried to understand daylight in great detail and, you know, which LEED CI credit emphasizes these daylight standards, etc. We saw that, you know, there are three ways we could either do software simulations, manual calculations, or use on-site measurements with a light meter and then work on the daylight. We also saw a prescriptive method where there is a compliant window and compliant floor, compliant window height, and compliant floor width. And this is H and this is 2H.

Through sections and drawings, we tried to understand, you know, how we can analyze daylighting using this prescriptive method. How much daylight is adequate, and what are the guidelines and standards for that? So, of course, the LEED commercial interiors that we are following in detail. There are also ASHRAE standards and there are NBC standards as well. Then we also saw some, you know, recommended values.

We saw different kinds of handbooks, values, charts, and tables. So these are recommendations. So if I talk about lux levels for passageways, the recommended one is 40, and all the way to the kitchen counter, it is around 750. And we had discussions on these values. We also talked about factors affecting daylight and how glazing plays a very important role in bringing daylight into the space.

Therefore, we talked about properties of glass. So, the properties concerned with heat gain or loss such as U-value or solar heat gain constant and the one which is concerned with light which is the visual light transmittance, the VLT. And these were the kinds of thumb rules that we could understand during our discussions, that ideally for a U value it is, you know, on a scale 0 to 1 closer to 0 is ideal. Same goes for the SHGC and for VLT it is closer to the 1 is ideal on a scale of 0 to 1. We also did some interesting quizzes which helped us understand these concepts.

So some visuals and then we try to, you know, solve them. Factors affecting daylight. When we talk about optimizing energy performance through lighting, these two are very important. Lighting design and lighting controls. And when we talk about lighting design, there is a very important role of LPD and one has to understand what is lighting power density and how it is calculated.

And, you know, what is its role in understanding all the green interiors and the concepts related to it, specifically focusing on the lighting aspect. Again, some recommended values and standards and then we try to have a look at the established standards and values. So, for the LPD, if for office it is 1, you know, in terms of watt per square feet and then different range, different typologies and hence the values change. Again, some quizzes and exercises, very interesting one trying to find out, you know, which building has efficient lighting design, based on the LPD calculations. We also tried to understand luminaire efficacies and then, you know, these very popular categories and then through these values, which ones are working more efficiently, etc.

What is a vision glazing? That is what we try to understand through our discussions. And how do we determine exterior views? Why are views very, very important for well-being and for good quality when one inhabits interior spaces for a longer duration? And you know how we try to determine these views.

So there are some areas which are not included, you know, in the LEED boundary. What are those? We had a discussion on that. And regularly occupied spaces versus non-regularly occupied spaces. And after doing this entire demarcation and mapping, how does one determine exterior views and how does it help in the well-being and achieving certain rating system or points for your green interiors?

Moving on to the color, we started with understanding the Munsell color system and you know how it specifies colors based on three color dimensions. So, there is a hue which is a dominant wavelength or the overall appearance of the color and it's usually understood in terms of red, yellow, green, blue and purple. Value is basically the lightness when we talk about The intensity of the colour then there is chroma, the colour purity or the colourfulness. So lower chroma being less pure that is more washed out as in the case of pastels.

So we saw this Munsell color system. We also tried to understand reflectance. So what are brightness, dark color, and light color? A broad understanding of these important concepts is needed because we are talking about the physics of light and the chemistry of colors. There was a small experiment discussed to identify the fact that different color surfaces reflect different amounts of light, and then a small exercise associated with it.

We also saw details like this, where we had a discussion on reflectance again through these visuals and infographics. And there was a little discussion also on policies, incentives, materials, and finishes when we talk about green interiors. Sources involved in drafting the policy say green buildings will be incentivized based on benchmarks prescribed by green building certification systems such as LEED, IGBC, GRIHA, and EDGE. So they are already prescribing benchmarks, and they are influencing the policy decisions, of course. Green buildings with a five-star or platinum rating would get a 10% discount in property tax for three years.

So this kind of incentivization is already happening, and the designers and the clientele are getting encouraged through such incentives to think about green buildings and green interiors because we have to think collectively about climate change, the environment, and this planet. So how can we reduce the harm and impact on the environment? Similarly, it will be 7.5% for buildings with 4 star or gold rating and 5% for 3 star or silver rated properties. So, these kinds of policies and incentives are already in place. There is much discussion also on recycled content, where the intention is to minimize the use of raw materials, to recycle, to reuse, to reduce circularity—you know, all of that.

Materials with recycled content should comprise at least 10% of the total material cost. And there are extra points for 20%, 30%, and more. So we also tried to understand what recycled content actually is, what pre-consumer and post-consumer recycled content are, why it is important to understand them, how to conduct a market survey, and how to learn about these values and concepts. These are some common materials which are known to have recycled content. Plywood, gypsum, aluminum, steel, carpets, and modular furniture.

Throughout this course, we have been seeing some of these, we are going to see some of these and there is a discussion on recyclability and circularity and sustainability throughout our discussions. There are also credits for water use, you know, and its reduction. So that's very, very important. How do we reduce water use? So the intent is to increase water efficiency and reduce the burden on municipal water supply and wastewater systems.

Reduce building water use by 20% from the baseline. And there are also credits for reducing it by 30%, 35% or even greater than 40%. There are also acoustic requirements that we talked about, and what are the ABCs of acoustic design. Absorbing, for example, through ceiling tiles; blocking through cubicle partitions; and covering, which is sound masking. So, these kinds of interesting discussions we have had throughout the week.

We talked about stakeholders—you know, architects, interior designers, interior architects, design. What is the design stage, and what is the role of each stakeholder—contractor, owner—and then the interrelationships among all of these? Now, the relationship matrix between or amongst the stakeholders has drastically changed, you

know, and currently it is very, very different than what it used to be even five years ago or forget 10 years ago. There's also a lot of influence from media, a lot of awareness that the client will have, and then lots of changes in policies. Lots of changes in the way we think about the environment and all the new, interesting, innovative methods coming up.

So this stakeholder dynamic is constantly evolving and changing. We also saw the example and the format for the environmental assessment matrix—you know, putting materials like lighting, wood, vitrified flooring, partitions, and then this table, which has energy saving, water saving, recycled content, regional material. And then, how do we do this total—you know, crediting and costing? And then this helps us understand the overall impact on the environment, and this can be done for the projects that we are working on.

So with that, I'm going to start the next lecture, focusing on interior design technology because we are talking a lot about innovation, changing technology, changing times, new concepts, new challenges, new ways of living. Even, you know, concepts like tiny houses, reducing our carbon footprint, reducing the overall blueprint of the houses, etc. Interesting ways of using techniques like origami and materials like paper, papier-mâché, and how we can have innovative designs and innovative spaces, keeping in mind all these aspects. So we will talk about innovative trends and technologies, and these are some references that specifically focus on the summary of week 5. Thank you so much.

See you next time.