Culturally Responsive Buit Environments
Dr. Ram Sateesh Pasupuleti
Department of Architecture and Planning
Indian Institute of Technology, Roorkee

Lecture – 32
Timber as Vernacular Building Material

Welcome to the course Culturally Responsive Built Environments. Today, we will be talking about Timber as a Vernacular Building Material. So, following upon our discussion on stone as a vernacular building material, I have introduced you to one of the important work of Brunskill's work on illustrated handbook of vernacular architecture which he discussed about different material techniques as well as a walling elements, the roofing elements, and how to study vernacular architecture, how to document a building. So, all these are especially in the focus of the English heritage which he talked about.

So, with this understanding and my personal living experiences in the Great Britain and, as well as my living experiences in Sweden and part of my various visits to Finland, Switzerland, and many other parts of European countries. So, I tried to bring a kind of small summary of the timber constructions. Especially, how they carry particular traditions and how it is a traditional building resource. So, on if you classify the timber constructions mainly you will find kind of 3 sets of constructions.

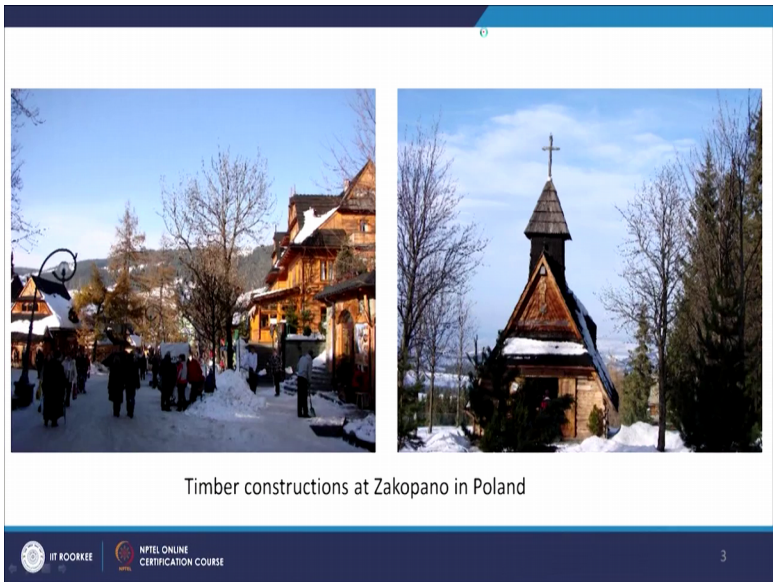
(Refer Slide Time: 01:59)

One is a horizontal log type construction. So, which is the second one, we see the post and plank construction and the third one the timber frame constructions.

So, if you see on the right hand side, this is actually a photograph when I visited Levi In fact, this is a small cottage house where we stayed. And, this is whole house is built of built with the wooden logs so, the whole the tree trunks because being a cold climate about we are talking about a temperature of minus 30 to minus 40 in the harsh winters. So; obviously, timber it is one of the best materials especially in the cold climates in winter, it makes you warm and in summer, it makes you cool.

So, you can see that all these horizontal the logs have been laid in a horizontal and then they have been interlocked at the junctions. And, that is how the whole house is made timber being an abundant resource in the Scandinavian countries. So; obviously, the way they grow the way they protect their forest is completely you know unmatchable with the kind of Indian context. So, that is how these particular countries even though timber I mean of course, the afforestation and deforestation was quite manageable and they do have a control of these resources. Especially the forest stewardship councils in UK and which have a supply chain management processes as well.

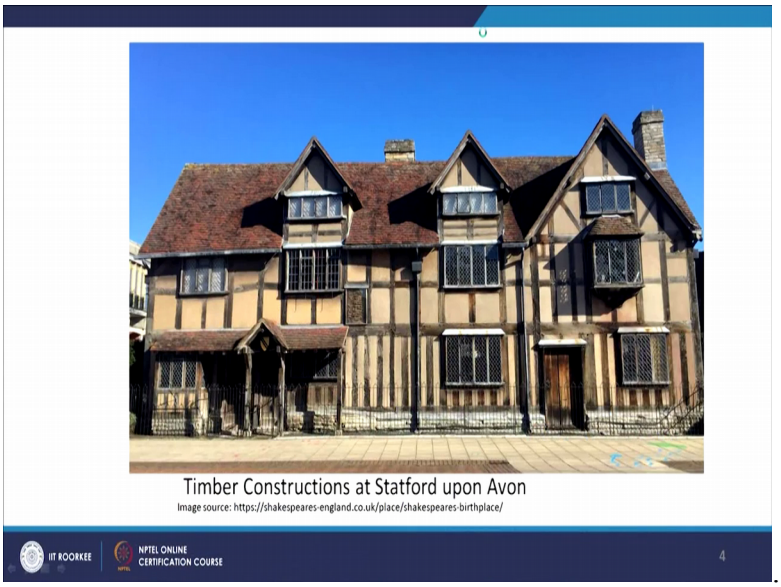
(Refer Slide Time: 03:49)



So, I will also introduced to some other places where I was in Zakopane in Poland.

And, you can see all the whole setting is the whole village setting and the whole town setting completely built with the timber frames. And, here you can see the see the post and the shingles onto the facade and the historic churches and the whole context itself it is matched with the kind of landscape setting. And, one of the important aspect is in some part of geography is like for example, in assets where the termite aspect is also a crucial.

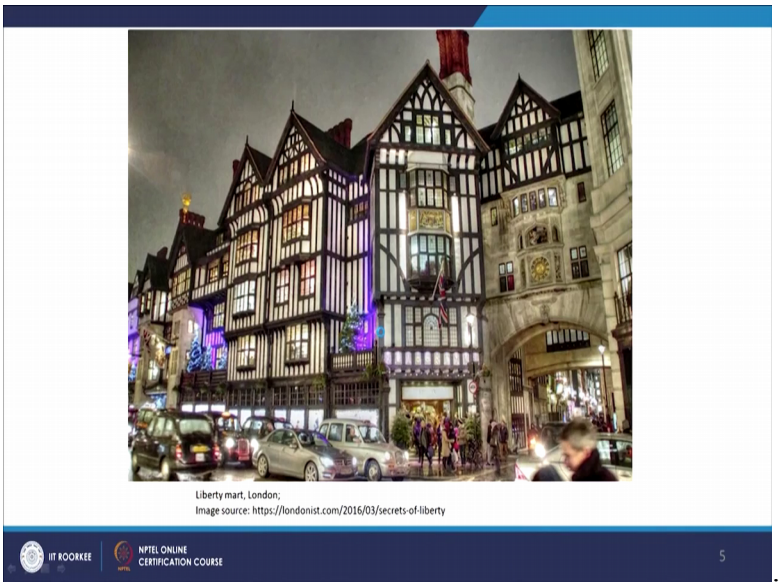
(Refer Slide Time: 04:27)



And; obviously, certain specific of timber grades are used there and this is again in back in England this is actually the Shakespeare's house, his dwelling where he lived and what you see is a kind of post in plank construction techniques.

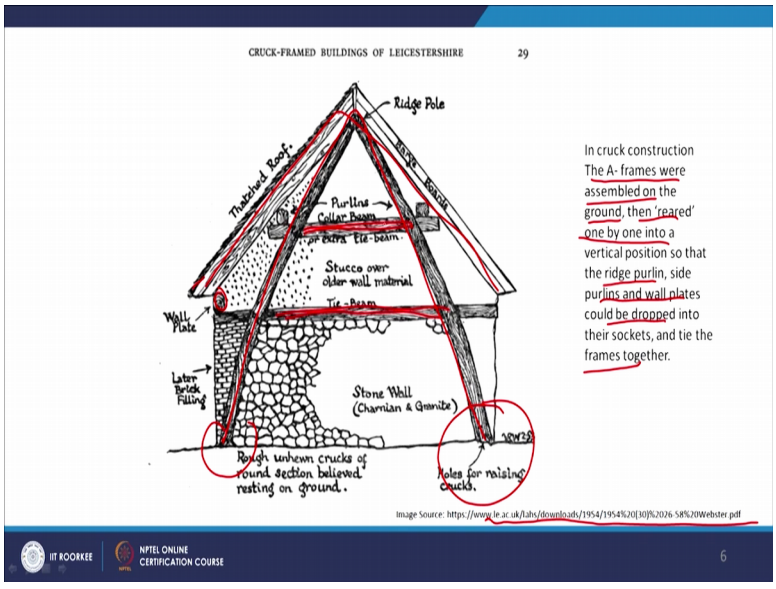
So, here you can see these are the vertical post and you have these planks and the huge and that adds to the English help and so, this is in Statford upon Avon. So, similarly in the heart of London you see if you go to the oxford street and that is where you see the liberty mart where the whole building is of this timber construction. And, it is how they have renovated it and how still it is have your requalified these old houses for the new uses, this is of one of the best examples.

(Refer Slide Time: 05:09)



So, when we talk about this timber houses, one of the important constructions which we need to discuss here is the; cruck frame buildings. Especially, they are very popular and less spoilage I am giving you a small document link here.

(Refer Slide Time: 05:26)

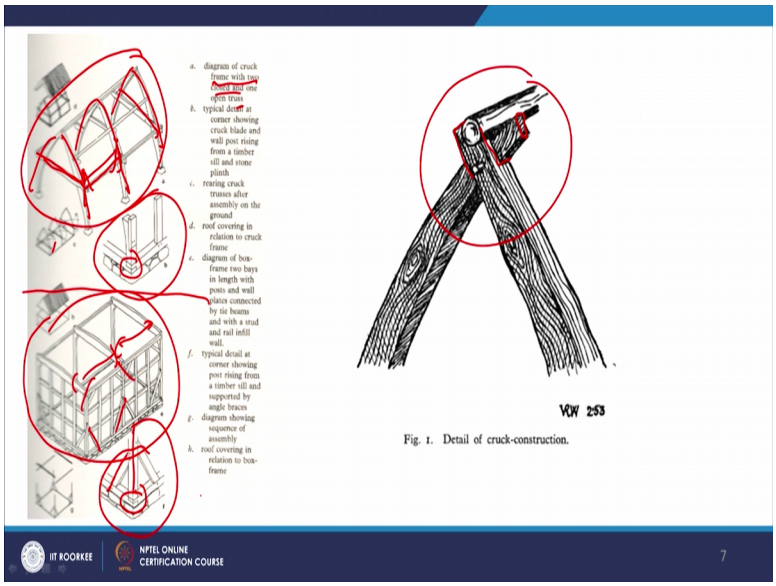


So, you can actually download this and these will a very useful, especially it deals with the whole cruck framed buildings especially in the Leicestershire. So, basically in this cruck frame this is a kind of a shaped frames assembled on the ground basically they are assembled here. And, then they lifted like this like this and then they are tied up with

these tie beams the collar beams and that is how you know they set up these kind of they call is a barge boards boats and as well as the wall plates.

So, this whole skeleton is even much grandeur in nature and they are all basically laid on the ground and they lift it and they fix it to the ground here right. So, one basic thing you have to see the a frames were assembled on the ground then reared one by one into a vertical position. So, the ridge purlins the side purlins and wall plates could be dropped into their sockets and tie frames together. So, basically the time so, basically the one you raise it and the tie actually binds together. So, there is a little tension created on it and basically the load actually distributes from this inclined members.

(Refer Slide Time: 06:46)



So, how they join the detail of a cruck constructions? So, what they to do is normally in the traditional methods? So, they take a huge bark of a tree and sometimes cut into the half and exactly reverse it. So, basically it actually overlaps in a different direction and sometimes it matches and sometimes they have to cut bring another pieces into it. So, that is how they do a trial and error process. And, what you can see here is a kind of lap joint. And so, have it fixes onto the top. So, here you can see that one stay a laid and then bring up and at the same time this is how and this particular space which they referred as a kind of bays.

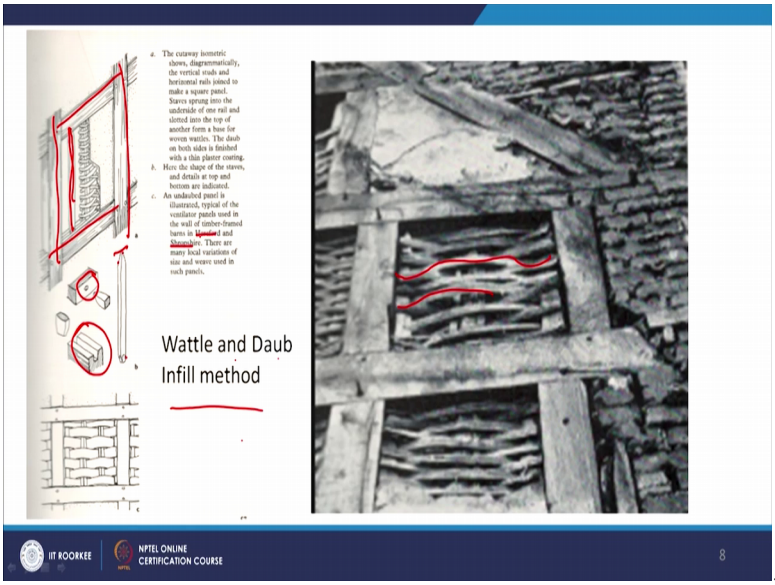
So, if this is in between these 2 post and then that is referred as a bay. And in fact, what you see in the in this diagram is with 2 closed and open truss. So, you can see here there

is a 2 closed and the third one is an open truss. And, similarly if you see the bottom right on here you can see how the corner and, how the cruck blade and the wall post rising from a timber still and stone plinth. So, basically you have the plinth, which is leveled and then again you have a corner like this you it sits on to the lap joint and then the post comes, and then from it again the cruck starts moving onto the other direction.

So, in the box type constructions you what you see here is the box type box frames. Here, you can see the kind of 2 bays right and then length and the wall plates are connected in tie beams and you have these cross bracings, which actually holds these kind of frames. Which is very common this particular technique you can even find in Mediterranean countries I was in Cyprus and even there I could able to find some of these constructions, and how the intermediate things are filled with a kind of insulation materials.

So, here you can see, how a corner rising you know; the similar technique what you see here and what you see here, and then how this is supported on either sides and then how it frames a frame. Then, we come to what are the alternative methods of you know because each it is just not a box we are building for a dwelling, but it is. So, each place has it is own character based on it is resources available and based on it is historical futures or because it also adds on to the heritage of it.

(Refer Slide Time: 09:35)



So, one of the construction which I would like to bring to you is the wattle and daub infill method. So, in fact, here you can see that you have the vertical studs and the horizontal rails. So, you can see, there is a vertical studs here. So, how it fixes in the top and how it is fixes in the bottom and, then that gives a kind of framing and then these wattles have go like this one above the another. So, what you can see here is like this inside to outside to inside and that is actually again you fill with a kind of daub. So, this is one of the techniques. And, this is very frequently you can observe in basically in Hereford and Shropshire and many local variations in the way they view, in the way the size of the panels they are using.

(Refer Slide Time: 10:37)

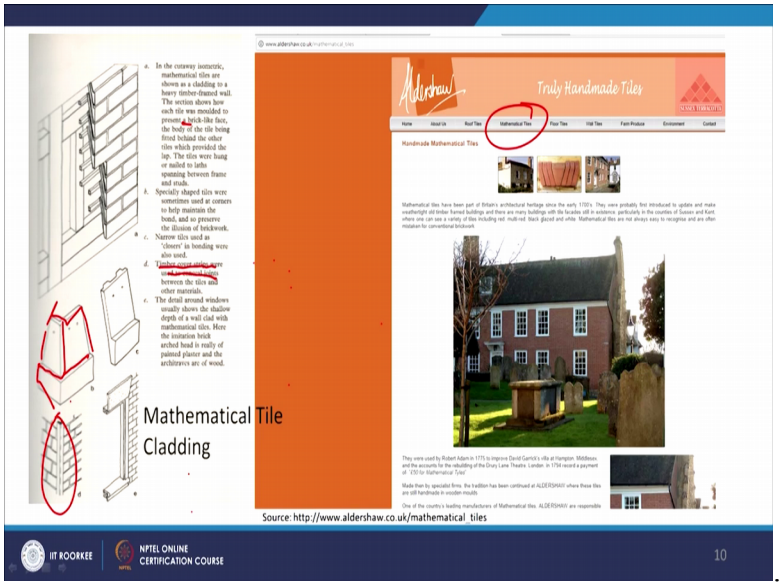
So, another one this is a very quiet common technique when especially with the tiles is the handmade tiles. So, you can see that the same frames you have a small battens going on the horizontal directions and these handmade. So, what you see here is the overlapping of the handmade tiles. So, basically that the tiles are hung on laths or a small battens, which are going so, that to give a triple lap you can see here 1 2 3. So, there is a triple lap each tile covering to others.

So, basically every tile is covering to other tiles, where members of the heavy frame were a far part intermediate studs are needed to help carry the laths. So, basically they have a particular distances and then especially near the window, you can see the details

of it and what you can see is the reality of how even the walling material is completely cladded with tiles.

Now, coming to we just discussed about the handmade cladding, but now if you go for the mechanical cladding or in other words, we also refer as the mathematical cladding tile cladding.

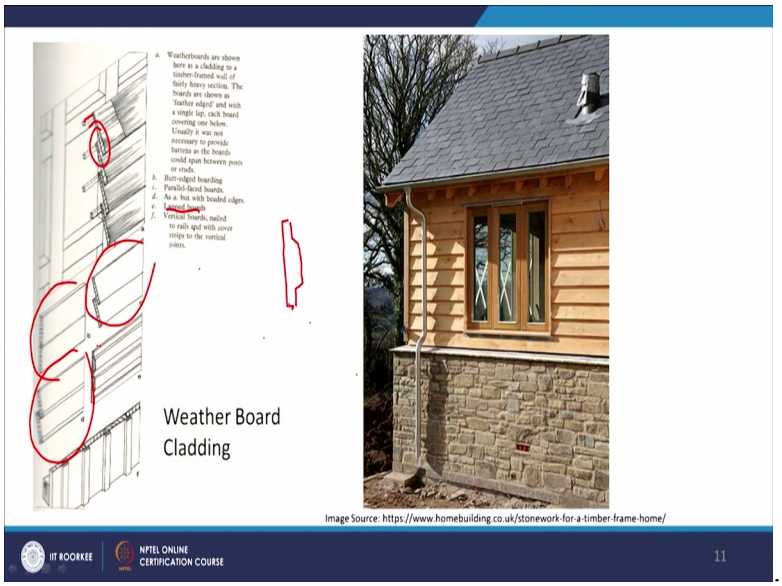
(Refer Slide Time: 11:45)



So, here one important aspect is. In fact, there are many companies I am just giving a website of one of the company, which actually do the mathematical tiles. In fact, these could be done in kind of desired formats as well as for example, if you take the corners. So, how a tile could be made in a desired format and it also gives a kind of brick like face it gives a kind of brick like face skin. And, these tiles were normally hung or nailed to laths spanning between the frames and studs.

So, narrow tiles are used with the closers because at the edge. And, similarly you have timber covered strips were used to conceal joints. So, here you can see you have the vertical members so, where if you want to cover the joints because on one side you are keeping the tile and then you get a very abrupt. So, then they cover with a kind of timber cover strips so, or any other material. So, that is one of the techniques in the cladding.

(Refer Slide Time: 12:58)

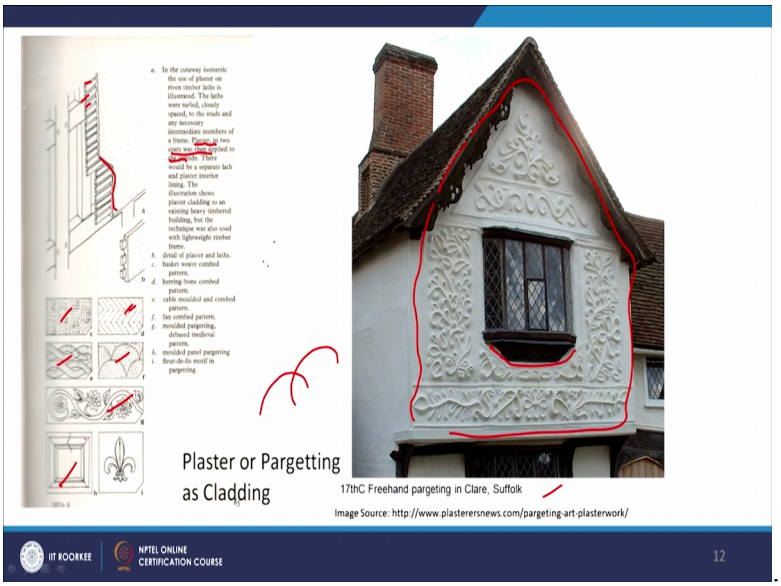


And, whereas, the weather board cladding is also used. In fact, in this weather board techniques the similar kind of for cladding, what you use is kind of any advanced material because these things are also quite common from 17th 18th centuries also. And, but nowadays if you look at it in the modern construction they are using some kind of polypropylene sheets or anything for this cladding.

And, here again you have these battens. And, they are basically of a single lap you can see here a single lap and just covered one below like this like this sorry. And, this is again a butt joint this is a butt joint and a lap joint. And whereas, here there again a parallel faced there is a little lap over here. And, what you see here is a kind of as a butt with beaded edge so, basically the little beading over there and again here lapped boards. So, what they do is so, the section is something like which is quite common this is quite common and so, how this rescission over it and then how it again . So, these are all for good aesthetic purposes.

So, this is one what you can see here is a kind of using the weather boards as a cladding and which could be also the back up to it design kind of insulation material which we fell into it. So, rather than a brick wall on the façade what we use is this weather board claddings.

(Refer Slide Time: 14:38)



And, this is another plaster or pargetting as cladding. So, this is quite famous especially in Suffolk area which you see quite often. So, what they do is they have these laths were nailed very closely right, spaced to the studs basically maybe of this much may be of about 5 centimeter or something 50 mm I can say. So, and then they keep the laths or the battens on to it. And, then they also closely spaced to the studs and any necessary intermediate members, because if it is continuous; then they might make an intermediate vertical members also if needed.

And, frame plaster in 2 course was an applied to the outside. So, it might be a stucco it might be a lime plaster or a particular compositions which they can use at least 2 course they used the outside. And, there would be a separate lath and plaster interior lining. The so, basically what you see is this plasters and he see here again this whole set, what you can see is the kind of decorative element and, it is also referred as a kind of freehand pargetting.

So, here you need to have certain kind of picture or what kind of imagination you are going to create onto the facade of it and at the same time it should not create a very high bumps or lows. So, it has to be a little carefully done, especially in this because especially the details which you have to see is a kind of adjust how they plaster it. At the same time one has to look at it how the operational aspect of these windows.

And, there are different patterns one can look the there the zigzag patterns of it and there is a cable moulded or combed pattern of it and there is a fan combed pattern like you have the fan combed pattern. And, you have the moulded pargetting debased mediaeval patterns, which is of a kind of mediaeval times. As, well as you have the moulded panel pargetting. So, like that variety of some of the motif it could be Corinthians or any other natural elements can bring into it. So, it brings a kind of aesthetical that is where this particular technique is very relevant, especially when we are dealing with the culturally responsive built environments.

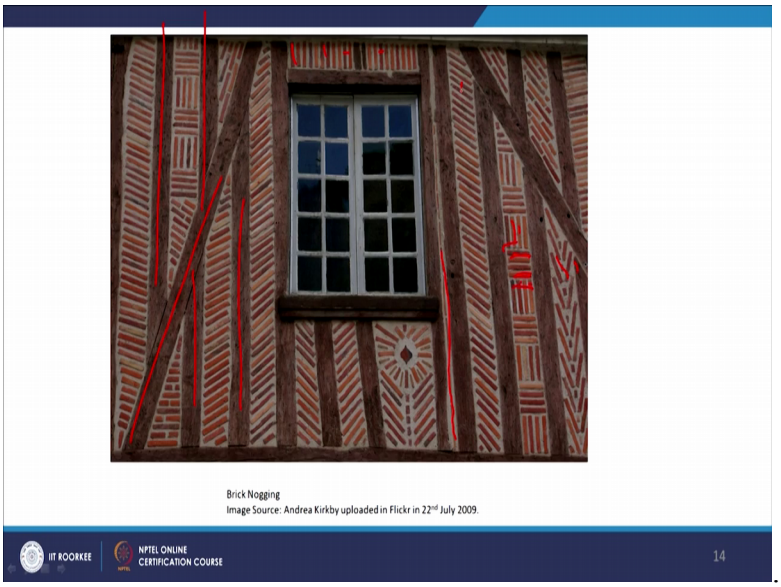
And, when you are dealing with these kind of old buildings, especially for any kind of renovations or if you are dominating with any kind of new intrusions in the context of these buildings; obviously, certain care has to be taken from the urban design perspective as well.

(Refer Slide Time: 17:21)

And, I think there are many more techniques, but I would like to just for this lecture I would like to brief about a kind of brick noggin technique. This is one of the last I am going to discuss and here what the same thing you have the frame here. And, in between sometimes even in the cruck trusses as well you can make it is a kind of different compartments and you knock the break and, the different ways how one can infill in this particular panels.

So, one some of the techniques you can see is brick on edge was used with lighter timber sections. And, as well as here if you see the kind of compartments they can do here is date picked out in the colored bricks.

(Refer Slide Time: 18:22)



So, basically so, there are also worked out like I can show you a good example here the one of the; I got this is a very beautiful photograph from Andrea Kirikby in a Flickr. So, one can see that. So, these compartments have been or the structural members and then you can see how different portions of bricks are aligned in a different fashion and you can do I mean extensive decoration with it with a simple material brick.

So, what we learn in the bonding techniques in the beginning of our architecture or the building construction classes is basically we know about the English bond, a Flemish bond you have the English bond with you have one header, one footer, and you have the Flemish bond with alternative header and footer. So, in that way we did learn about this, but you know how this timber could be a kind of supporting material along with the brick walling systems you know. So, in that way it could be aesthetically experimented and what you can see here is a kind of timber and you see the lintel up here. And, even in between you can see the filling material the noggin is a bridge has bricks have been nogged in and in various passions one side you have.

So, this is also creating a kind of it is not continuous, but you see the breaking a kind of, but whereas, you see here it is an inclined, but then it is in a continuous pattern. So, with

this what we understood is just with the timber especially in the countries like England or in Sweden or in Finland or any other European countries, been in Canada countries like Canada or even America. Especially timber is one of the biggest resources for building activities not only now historically it has been used as a basic building material.

So, one of the demerits in the present context is especially with a fire. So, how we can protect this timber buildings especially in the event of fire? Because, during the fire the timber is much more prone and that is where the building codes, that is where the building codes will help us to how we can actually plan the building and how we can orient it how we can compartmentalize the buildings? And, at the same time how we can provide insulation materials and how we can provide the fire you know what kind of fire stoppage we can do you know. So, all these things these are some advancements and in the next class what I will also deal with it is now as a timber as the vernacular building resource which we discuss.

But, then with various examples mostly we discussed in the English side of it and we also did discussed about various techniques like cladding wattle and daub cladding and the cruck construction which is more important aspect in the timber buildings. And, we also did discussed about the clay tile cladding and we also discussed about the mathematical tile cladding, and then which is also referred as a mechanical tile cladding, and we also discussed about the weather board cladding.

So, in this way we did discuss. And, the next class we will also look into how the advanced systems also work a small brief about that we will also discuss about that.

Thank you very much.