

Architectural Conservation and Historic Preservation
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Lecture - 11
Divergent Approaches for Managing and Rehabilitating Heritage Properties
Degrees of Intervention (Contd.)

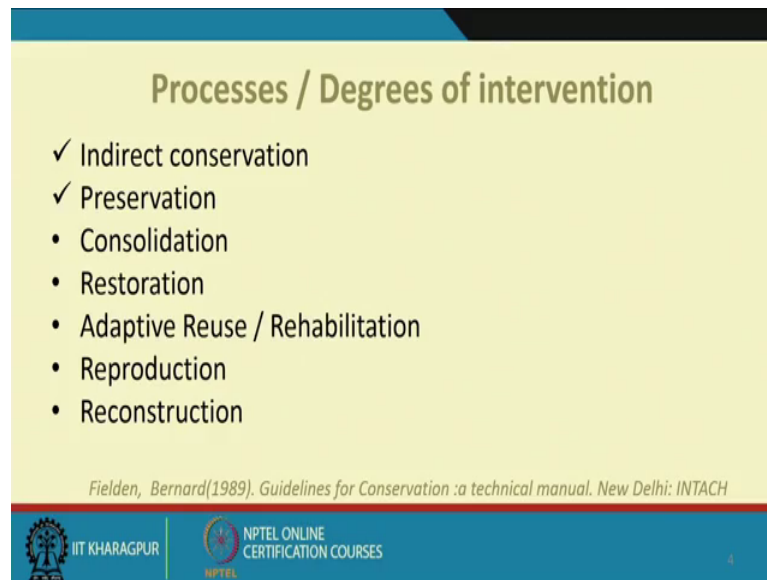
Welcome to our next lecture. Today's lecture we will continue with the degrees of intervention, and today we will discuss about the part two. Remember we have already started that this part, and where we have been discussing the various approaches of conservation; and in that process, we are introducing into the different terms.

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Now, just to recapitulate conservation means all the processes of looking after a place so as to retain its cultural significance. So, it signify all the processes.

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Processes / Degrees of intervention


- ✓ Indirect conservation
- ✓ Preservation
 - Consolidation
 - Restoration
 - Adaptive Reuse / Rehabilitation
 - Reproduction
 - Reconstruction

Fielden, Bernard(1989). Guidelines for Conservation :a technical manual. New Delhi: INTACH

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And in that we have mentioned in the last class that lecture indirect conservation, preservation and the different approaches. And in our last lecture we have discuss indirect conservation and preservation. Today, we will talk about consolidation, and also restoration; and subsequently the other approaches.

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Processes / Degrees of intervention

Consolidation

Physical addition or application of adhesive or supportive materials into the actual fabric of cultural property, in order to ensure a continued durability or structural integrity .

Fielden, Bernard(1989). Guidelines for Conservation :a technical manual. New Delhi: INTACH

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Let us talk about consolidation first. Remember that we have discussed the maintenance part and we have discussed also the preservation. So, what is consolidation? So, consolidation is the physical addition or application of adhesive or supportive material in

the actual fabric of a cultural property, in order to ensure a continued durability or structural integrity. We can take an analogy like suppose someone or a child has a problem as a fracture fell in the playground, and has a pain in his one of his arms, then goes to the doctor. So, what the doctor does probably you will take the x ray, but initially what he will do is that to keep some pain relief some medicine and also then later on we will take the x ray. But before that some sort of a do not move the hand and other thing, so these types of instructions the doctor will give to the child, so that is almost like an indirect conservation.

The next is that when if it is in the x-ray, the next day when the x-rays taken if it is found out that there is a fracture, what the doctor does is sort of give a bandage and put it on a sling and say that ok for 3 weeks or 6 weeks it has to be like that. So, it has to be her it is nothing internal, but it is just putting a sort of a precaution and so that the he does not move the hand and then it will cure. So, that is the preservation the next stage I mean some sort of a cure which is taking care of the arm, but not doing something internally.

Now, there may be a stage where the damage or the fracture is so severe that I mean even by putting a bandage or putting it on a sling for 6 weeks it is not enough. And by x-ray it is possible to understand that in that case what happens in that case the if it is case of a child or a grown up whatever in some sort of a other measure is required. And there we have to intervene within the body and put some armature or some sort of support. So, that is almost like a I mean you can take an analogy is like a consolidation. Now, what consolidation means actually in when we talking about the historic structures or historic some sort of a material. Let us take a look.

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Processes / Degrees of intervention
Consolidation

Consolidation of loose fragments of mural paintings
injection of adhesives to secure a detached mural painting



Fixing Baroque altarpiece painted on the wall. Vergós Guerreat. La Segarra, Spain



Mural painting on canvas. Fixing fabric wall support. Chapel of "Les Alegries", Lloret de Mar, Spain

Courtesy : NÚRIA PIQUÉ - GOBLETY S.L. CONSERVATION - RESTAURATION D'ŒUVRES D'ART.
<http://artrestauro.com/fotos/pm7.JPG> accessed on 21/12/2017



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For example mural, I mean it is not always that we always start with the building of moral or a wall painting or some sort of a painting, where you can see that it has come up come out. Because the plaster, or the mural or the layer has become loose, and it has does not have the strength to adhere to the surface. And if there are certain particles which have become loose. Now, then it is very essential that to fix those loose fragments to the original surface. Then in that case, it is important that some sort of a and some sort of an adhesive is put behind those loose fragments, so that they can be they can continue in the same. There will be some there will be some sort of a mark there will be some fragments, but still it will be an original one.

So, in this case, what you can see that they are very carefully putting a injection and putting some sort of an adhesive material, so that that fragments can be can that which has become detach can be attach back to the original surface. This is a Baroque altarpiece painted on a wall and in Spain; and the second one is also Spain where the mural painting on canvas, they are fixing it out with some sort. So, some sort of a consolidate (Refer Time: 05:17) material is fixed to the original surface, and so that this loose particles are adhered to that. So, this is what we call is consolidation.

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Now, in case of that we have talked about the paintings or murals, so in some cases the plaster because the plasters are very old of the historic structure, they over the years over the time they lose their adhesive quality, and they can come out of the surface. Now, it is very easy to remove the entire plaster and then replaster it. But for historic fabric is very important to keep the original fabric or original plaster or original material as long as possible, if it is possible. This originality is very important sometimes they may contain some mog, they may contain certain paintings and other things, but even without that to keep the original plaster is absolutely very important if it is possible.

So, this plaster consolidation with grout injection is one of the very practice technique that will put some sort of a grouting material and behind the surface, so that it can again adhere and this strength is revived. So, what is that it is the sensitive consolidation of compromised historic plaster preserves the history fabric of the structure and provides option for future research and treatments. One understand that it may not be a very long lasting solution may be or may not be there are ways of doing that, but still as long as it is possible if you can keep the original plaster then it is better to keep it that way. So, this is where the grouting and the grout injection is required.

We must understand when we are talking about such techniques, we also have to understand what type of grouting material to be used. There is a lot of debate about that there are certain quick fix type of solution that where we can put the acrylic mixture or

some sort of a resin which are very quick setting. But in historic fabric or historic structures or historic elements, this is generally not desirable why because there are many, many considerations which have to be seen when we use the grouting material. First of all the grouting material has to be compatible with the original material. They should not be stronger than that, and it should also sort of a slow setting. So, the selection of the grouting material and the process is absolutely important to understand that what type of material has to be selected.

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Processes / Degrees of intervention

Consolidation

When ?
The strength of structural elements has been so reduced that is no longer sufficient to meet future hazards

Ruins of 1st-Century Roman Theatre Alfama District - Lisbon, Portugal

Courtesy : Adam Jones, Creative Commons Attribution-Share Alike

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Now, so this is some of the things when we are talking about taking the plaster (Refer Time: 08:13) the plaster, or the murals back to the surface. But when we are talking about consolidation, we are also not only talking about fixing the plaster, there can be a problem remember our example or an allergy with the fracture of a hand there are problems with the original structure has lost its strength. So, let us see when do we use this process of consolidation or the approach of consolidation.

So, when? When the strength of the structural elements has been so reduced that is no longer sufficient to meet the future hazards, so that is why we have to strengthen the original thing and then we have to intervene within the structure and that is what we generally call the consolidation. We are not removing the structure, we are not taking away the structure and rebuilding it that that has to be very well understood. We are using


such some sort of a strengthening element strengthening material, so that to help it sort of a gain some sort of a strength to survive for a longer time.

Now, you can see that this is a wall. This is a wall Ruins of the 1st-Century Roman Theater in Alfama District in Lisbon, Portugal. Now, this walls naturally these walls are existing nobody is talking about in this case the reconstruction or other thing, they will be kept as it is because they are the historic evidence. Now, it may be possible that some of these walls have lost its original strength - the inner strength; and in such cases, this approach of consolidation is suggested.

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Processes / Degrees of intervention
Consolidation

- Most historic structures have composite walls built with two faces of masonry while the core is filled with rubble and mortar.
- Over time, voids develop in the core and pathways form which can direct water to the inside face.



The slide features a yellow background with a blue header and footer. The title 'Processes / Degrees of intervention' is in green, and 'Consolidation' is in red. The list of bullet points is on the left, and a photograph of a stone wall is on the right. The footer contains the logos of IIT Kharagpur and NPTEL.

Why, because most of the historic structure composite walls built of two faces of masonry that what we see outside its generally external treatment; and inside the core is filled with rubble and mortar. As you can see this is the Ruins from Hampi which has been sort of a undergone some treatment. So, there are the these stone faces and inside there is a some sort of a core material. And this core material most of the time because over the years due to some sort of a problem or it comes under some sort.

So, over time, the voids developed in the core and pathways form which can direct water into the inside face and that creates the problem. In such cases, the grouting within the wall section and remember sometimes these wall sections are very, very thick. So, grouting within the wall section is absolutely important and that is why when we say the

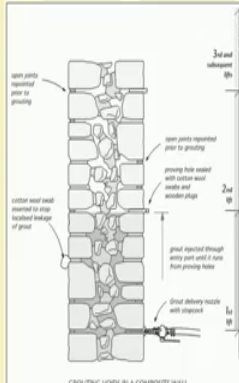
grouting can be a localized grouting and grouting can be over a wall stretch of wall or the structure.

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Processes / Degrees of intervention

Consolidation

- Most historic structures have composite walls built with two faces of masonry while the core is filled with rubble and mortar.
- Over time, voids develop in the core and pathways form which can direct water to the inside face.
- The basic grouting method helps in filling the voids



<http://www.buildingconservation.com>

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So, this is an example where you can see that the wall is made out of some sort of an external, there are two external surfaces; and within there is a core element which over the years have become loose and so the grouting has to be done. So, generally the grouting has a process that it generally starts with a sort of is an injection, but over a larger period we sort of a fix the grouting holes, and then it starts from below and then some sort of a grouting material is put under pressure generally and it tries to fill up all the voids.

So, remember one thing is very important when we select the grouting material in such case especially it is a large sort of a thickness of the wall very wide walls then with the grouting material has to reach the all the voids and all the cracks. So, the selection of the material the time for setting for the material, comfortability of the material that is a very important; and generally the preference should be for using as much as possible the closer to the original traditional material or similar composition. So, the basic grouting methods help in filling up all the voids. It should be a liquid stage initially and then gradually it should start setting.


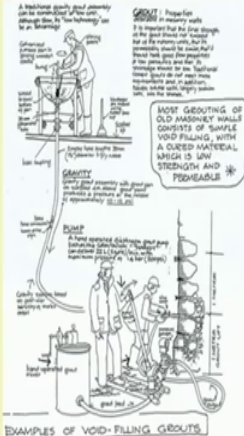
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Processes / Degrees of intervention

Consolidation

The basic grouting method helps in filling the voids

Consolidation of historic wall with grouting

EXAMPLES OF VOID-FILLING GROUTS

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So, as you can see that this is the grouting process is going on. So, this is a wall which is there, and some sort of a pipes are fixed the grouting holes are fixed. And somebody from the top this man he is putting a grouting mixture and it filling it up under pressure or to the all the material, so that it gradually sort of fills up all the cracks and voids. So, and it gives some sort of a strength to the core material which sort of builds up the wall, so that it can survive. So, this is the basic approach of the consolidation, but grouting or injecting a grouting material behind a plaster surface are some of the approaches or some of the ways the grouting can be done wherever it is required. But there are the grouting or this consolidation can be that approach can be taken for some other sort of a situation also. Let us see.

As I told you again going back to our analogy that there is a that there is a fracture in the arm, and it is not possible their such the fracture is so complicated that it is necessary to put some extra armature or support within the body. And these type of things is also probably sometimes it is necessary for the historic structure or element or component also. Let us see.

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Processes / Degrees of intervention
Consolidation

- Where traditional methods are inadequate, use of modern techniques may be suggested but they should be reversible, proven by experience and compatible

Fielden, Bernard (1989). Guidelines for Conservation : a technical manual. New Delhi: INTACH

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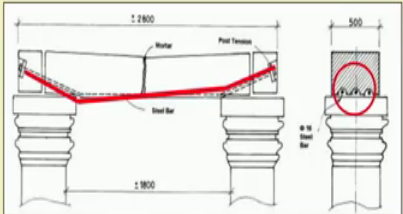
Now, what the ethics start we will talk about the ethics of conservation, the generally what is say that where traditional methods are inadequate, use of modern techniques may be suggested but they should be reversible, and proven by experience and comfortable. Remember we are putting some external element within the historic fabric, so one has to be very careful it the historic fabric cannot be treated as a guinea pig, it should be some sort of a treatment or technique which has been tested which has been with experience and we have seen the compatibility. So, in a lot of care and precaution must be taken. So, let us take some of the example.

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Processes / Degrees of intervention
Consolidation

Preah Khan Temple , Angkor

Repair and strengthening of bearing beam by post tensioned steel bars



Sanday, John & STUBBS, J & Gavrilovic, Predrag. (2017). Structural Consolidation and Conservation of The Monuments at Preah Khan - Historic City of Angkor - Cambodia.

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For example, this is the Preah Khan temple in Angkor and you can see that it is not in a very good situation, there are the columns, they are standing the structure is standing, but some of the beams and some of the columns are some of the lintels may have sort of been damaged. So, extensively that it is not possible to sort of. It does not have the strength to take the load.

Now, again I am saying that it is very easy to dismantle, it is very easy to keep it as it is. But when we are talking about something which we have said that it is valuable to us, and it is significant we must take care that how to keep it or give it the strength required, so that it can survive longer period. Now, in this case as you can see that that these two columns in the from the same temple these two columns and these two columns that the beam which is spanning that is a huge crack, and it is in a very very very important or a significant position the crack has developed. So, the beam is not able to take this load any further.

One can say that replaced the beam, yes, that is the there is a more severe step we should first say that keeping the beam as it is can we give it some extra support, so that it can stand. So, in this case as we can see that there is some post tensioned steel bar which has been fixed up with that. So, you can see that this has been fixed up and through the section and so that it can keep that support which is required.

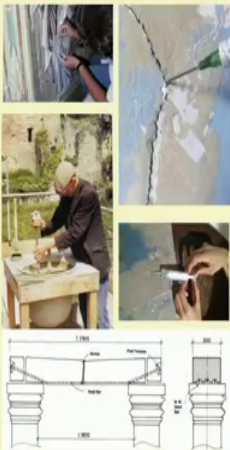
So, it is a new material we are definitely introducing a new material to the historic element, but again as I say that this is taking the decision is generally taken after a lot of deliberation, discussion that this is the method which sort of can sustain it or can keep it for a longer time. And we have to give that support. So, this is again another process of consolidation.

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Processes / Degrees of intervention
Consolidation

- Utilization of traditional skills and materials
- Where traditional methods are inadequate, use of modern techniques may be suggested but they should be reversible, proven by experience and compatible

Fielden, Bernard (1989). Guidelines for Conservation : a technical manual. New Delhi: INTACH



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So, as we can just take a brief look again that what we are talking about the consolidation that it gives that when the material either it can be a plaster or a beam or a lintel or a core of the wall that when it is no longer have that strength to hold. So, we sort of a helping it to strengthen it through some sort of an external measure which definitely is an intervention, but we one has to be very careful.

So, the general sort of a some principles are there that as much as possible the traditional skill and materials should be sort of a regarded or considered for this type of approach. And where traditional methods are inadequate and use of modern techniques may be suggested, but they should be reversible, reversible means later on some other method or there is creating a problem, it should be able to take it back or undo the entire process. So, these reversibility is very important criteria when you are talking about the historic structure.

And again which is proven by experience and which is compatible to the original structure. It should not be very very strong. So, that the original structure sort of does not have anything to do. And because a lot of times the behavior of the material the older material and the new material if they are very incompatible, then it can cause further problem to the historic structure. Because now we are really intervening within the structure this is very important to understand this before we intervene. So, this is the third degree of intervention where we are really intervening within the structure.

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Processes / Degrees of intervention

Restoration

- To revive the original concept of the object / cultural property (Fielden, Bernard 1989)
- Returning a place to a known earlier state by removing accretions or by reassembling existing elements without the introduction of new material (The Burra Charter)



Before and After
Restoration of historic structure,
Spokane, Washington

Blog.preservationnation.org

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Now, let us talk about the next intervention method which is restoration. So, what is restoration? Now, I am using two definition of restoration as given by sir Bernard Fielden. Now, what he is saying is to revive the original concept of the object or the cultural property, I mean one has to be very clear that he is not talking about revive the original structure, he is talking about reviving the original concept of so. So, what is the difference between a structure and the concept, we will try to understand that through some of the examples. But I am also giving another example which is the Burra Charter, Burra Charter defines a restoration as returning a place to a known earlier state by removing accretions or by reassembling existing elements without the introduction of the new material.

One has to be seen that there are some sort of our differences between this two sort of a definition; and each and every case is very different one has to understand what it talks about. So, we will try to explain that through some of the example as I say that there is some sort of a basic difference between these two approaches. Now, I generally always say that restoration means the original concept of the object, reviving the original concept. So, let us see what it means.

You can see that this is what is restoration, this is a historic structure in Spokane Washington. This was the original how it was, and then it has been restored to some sort of a state the restoration. So, it is before and after. So, probably it has to take records to

some of the techniques of preservation, consolidation, repair, maintenance, all of these are very important to take it back to the original state. Generally that is what is restoration about.

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Processes / Degrees of intervention

Restoration

- Respect contributions of all periods of history
- Any later addition that can be considered as an historic document, must be preserved

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Now, while talking about a restoration there are also certain other things, which we generally talk about one is that respect all contribution of all periods of history. So, you can see that this is a little bit different of what Burra Charter say. So, contribution of all (Refer Time: 20:58) when we are talking about the history, we are talking about a very long time and it may so happen either there can be an individual structure or there is a group of structures. So, there can be accretions which have been there. And according to this what you say and also the Venice Charter also said, we talked about Venice Charter later on that respect contribution of all periods of history because it is not when we are talking about something is not only one period or one particular date. So, all periods actually that history is very important to understand.

Now, it also say that the later addition that can be considered as an historic document, must be preserved. So, it can be a particular part of the wall, it can be a particular additional structure, it can be maybe a wall painting, it can be some sort of a decorative element. So, what it says that something which is a part of the historic document which has been added in a later time, must be preserved, so that means, it is a very sort of a cumulative process.

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Processes / Degrees of intervention

Restoration

To revive the original concept of the object / cultural property

Konark Sun Temple, Odisha



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And also again I am saying to revive the original concept. So, let us see some of the examples to try to understand that what it means. Let us take the example of Konark Sun temple, it is in a Odisha. And what we see today is a world heritage site, and it is an monument which is protected by Archaeological Survey of India. Now, when what we see today of the Konark temple is only this part, the original structure the main garbhagriha is no longer there, it collapsed. So, this part is there. And what we are seeing there and the entire thing is based or a raised on a huge platform. And when we are talking about the platform on all along the platforms, there are this wheels, and this wheels also have were not there. They are also in a very bad stage originally, they have been put back to the structure to build up the wheels. And if you see this wheels clearly if you see the wheels clearly, there are some of the spokes which are missing there. So, nobody has tried to sort of a replace or sort of a make new additions to that, but they have been kept like that.

Now, what they found is that there are some of the horses the head of the horses or the bodies of the horses which were there, which they found it. And while putting these horses they are put it on some sort of wooden struts and on this there. So, now, the question comes that why this horses legs have not been built up or why the horses are not kept on the ground, why the horses not shifted within the museum, why they have been put up on some of these wooden sort of struts to keep it to the height.

And here comes the question of this original concept, because what was Konark temple, it is conceptualized as the chariot of the Sun God and these horses are actually dragging the chariot. So, it is very important to keep the horses at that height to complete that concept of the chariot and the horses dragging the horse. So, they have to be kept to that height and while keeping it that height, it is absolutely not necessary to put it complete the horse or reconstruct the horse or something does not matter. If it is looking ugly it does not matter, but it is honest it is a very honest approach to say that it has been only this part is available or it was found. So, it has been raised to the ground and this is what is an authentic way of a restoration. And this is what I call is the or what the experts call is the reviving the original concept.

And if you one understand this sort of a principle then it is very easy to take the decision what to do, should we take the horses, should I rebuild the horses, should we keep the horses on the ground. So, these are the each and every specific situation where we have to understand this.

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Now, there are many many example something like that like this is a museum in Rome where you can see that they found some of the fragments of the arches and they have put it back on the just sort of iron structures and kept it like that. So, that the entire sort of a scale of these where the beams were there or how was the column is there. So, they are

there. So, it is not the question of looking beautiful, it is the question often what is authentic and what is historical. So, this is what we call the restoration process.


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Processes / Degrees of intervention

Restoration

- Replacement of missing or decayed parts must integrate harmoniously with whole but clearly distinguishable on close inspection

Konark Sun Temple, Odisha



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So, the replacement of missing or decayed part also when we talked about restoration. We must understand the replacement of missing or decayed parts must integrate harmoniously with whole, but clearly distinguishable from the whole inspection. So, there are situations where we sort of put back some or sort of give the new materials like in this case again coming to the Konark, you can see that this part is the original. So, the new materials have been putted back to give some sort of a concept to give a complete thing which when comes closer to that one can see that it is a new addition but from far away. And it is not necessary to even the craft and skill may be available it is absolutely not necessary and not advisable to put the sculptures or carvings on that. Because it is important to tell the people that it is a new addition and which has been done there.

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Processes / Degrees of intervention
Restoration

- Replacement of missing or decayed parts must integrate harmoniously with whole but clearly distinguishable on close inspection



Temple at Pathra , West Midnapore , West Bengal

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And there is a very good example of this new addition that this is a temple small temple in Pathra which has been restored. And it was originally like this it was in a very decayed condition you can see that these columns have been done because they were the main load bearing columns. So, they have to be rebuilt now while rebuilding these columns because otherwise this structure would have totally collapse it was very important to reconstruct or to these columns.

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Processes / Degrees of intervention
Restoration

- Replacement of missing or decayed parts must integrate harmoniously with whole but clearly distinguishable on close inspection



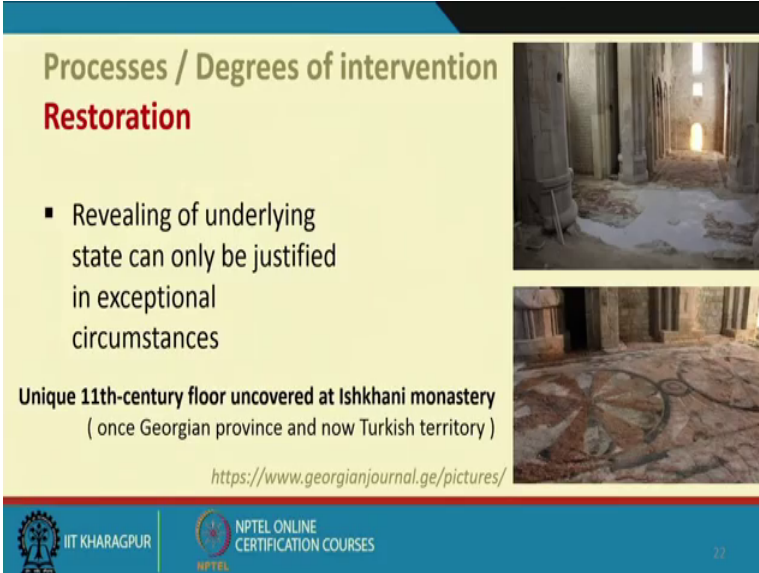
Pathra , West Midnapore , West Bengal

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what they have done is that in the columns some of this tiles were original and this part has been the new addition. But while doing the new addition this only the proforma or the profile or the framework has been taken, but without keeping it simple plain and without putting all the sculptures or decoration another thing. And this is the actually the almost the desirable or suggested method of a restoration.

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Processes / Degrees of intervention
Restoration

- Revealing of underlying state can only be justified in exceptional circumstances

Unique 11th-century floor uncovered at Ishkhani monastery
(once Georgian province and now Turkish territory)

<https://www.georgianjournal.ge/pictures/>

The slide features two photographs of the monastery floor. The top photo shows a narrow corridor with a plain floor and stone walls. The bottom photo shows a larger room with a complex, geometric floor pattern made of stone tiles.

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And also what we can see that some of the time we said that all parts of the history must be respected, but there are times that where some parts have to be taken out, taken back or to was open up certain things when. So, the principle said that revealing of underlying state can only be justified in exceptional circumstances that in taking out a part when something underneath or something behind is very important and it is an historical document then only one can take out the part.

For example, this is an example where there this is a sort of in Portugal, there is a sort of floor which has been discovered very recently and by uncovering or taking up the floor. So, it was no sorry it was actually a Turkish territory. Now, earlier a Georgian province. So, 11th century floor uncovered in a monastery because by taking out the plain floor which was later addition is something very beautiful say original material or flooring has been uncovered. It can be a wall painting, it can be a floor, it can be even a ceiling, where a beautiful ceiling has been covered over the years. So, in such cases one can sort of a remove the later addition to a sort of a fined or to display or disclose something which is

more important as a historically. So, this is the basic method or principle of the restoration process.

Thank you.