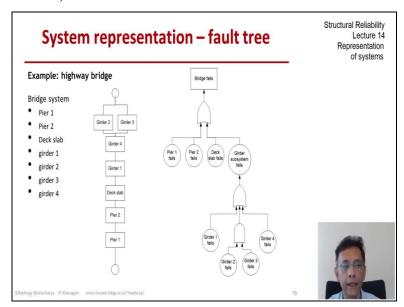**Structural Reliability**
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**Lecture –112**
**Representation of Systems (Part -16)**

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Let us go back to a few familiar problems and solve them again in terms of fault trees. So, the first 1 we take up is the bridge example. You remember that it has two peers 1 deck slab and four girders and we discussed the system logic and we came up with a block diagram that looks like what you have on your screen. So, we need to create the fault tree. So, our top event is bridge fails, so, that is our system failure and because most of these elements are in series.

So, we would start with and or gate. So, any 1 of them failing by it is tantamount to system failure and that those include the two peer the deck slab and so, on. So, let us take a look at those 1 by 1. So, 1 of the inputs into the; or gate would be the failure of pier 1. So, pier 1 fails is an elementary event that feeds into the; or gate just like that also pier 2 has the same contribution. So, pier 2 also feeds into the; or gate and the same role is played by the deck slab.

So, deck slab fails is another contributor into the or now it is convenient for our understanding is to create a new subsystem and let is call that the girder subsystem. So, if the girder subsystem

fails then the bridge system fails. So, that is another feed into the or gate but there are interesting details there and from what we see what we decided was if the end girders fail any 1 of them which is girder 1 or girder 4 then the whole system fails and that in turn causes the bridge system to fail.

So, the girder subsystem also is built up of an or gate but there girder 1 and girder 4 contribute individually but girder 2 and girder 3 do not they go through and gate because both of them must fail in order for the girder subsystem to fail which in turn causes bridge system failure. So, we have a smaller subsystem composed of girder two and girder three together if they fail then the girder subsystem fails and then that feeds into the higher level or gate.