Computer Methods of Analysis of Offshore Structures
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Module - 02
Lecture - 02
Offshore structures - 2

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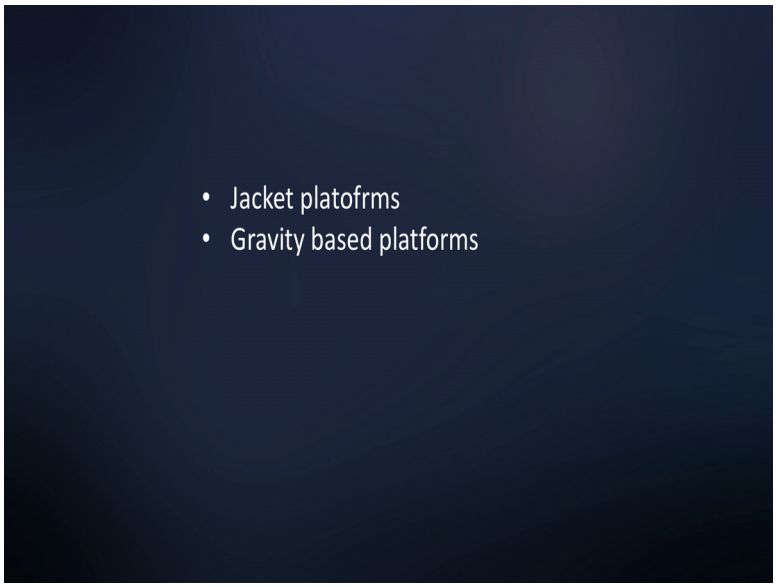

Friends, let us continue the discussion on module 2. We are focusing on understanding different structural forms in Offshore Structures. So, lecture 2 is going to focus again as a continuation of different types of offshore structures, what we had discussed in lecture 1 of module 2.

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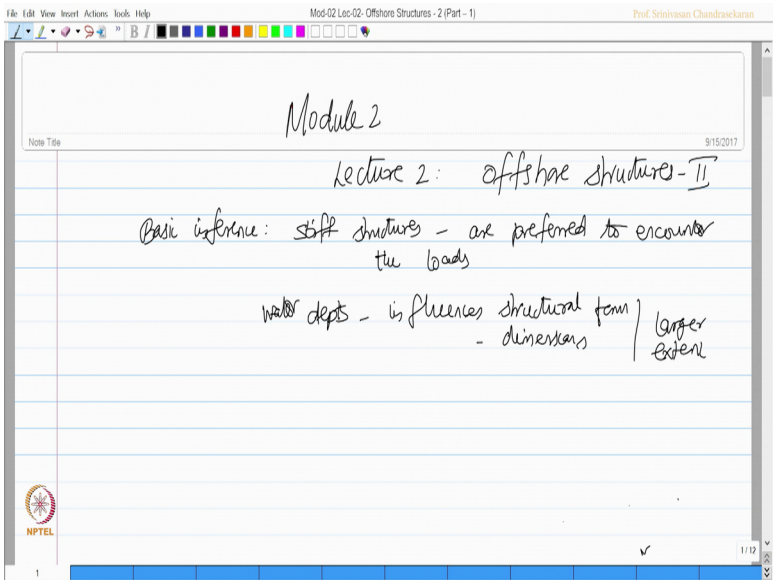

We had a basic inference: that stiff structures are preferred to encounter the loads. We also understand that water depth; influences the structural form, member dimensions to a larger extent.

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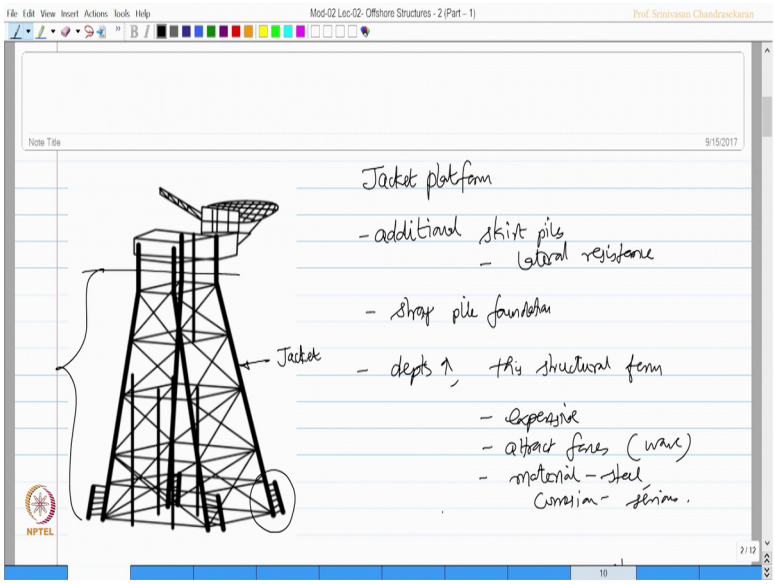

If you look at this figure; which shows me the sketch of one type of platform, this is a typical jacket platform; we call this as a typical jacket structure. This is supported by additional skirt piles to enhance lateral resistance. So, they need a strong pile foundation. So, for the entire water depth members are provided.

So, as the water depth increases this structural form will be very expensive; plus it can attract forces, I am talking about wave forces. Three if you understand the material a steel, then corrosion may be a serious problem of this kind of structures, because all structural members extend for the entire water depth.

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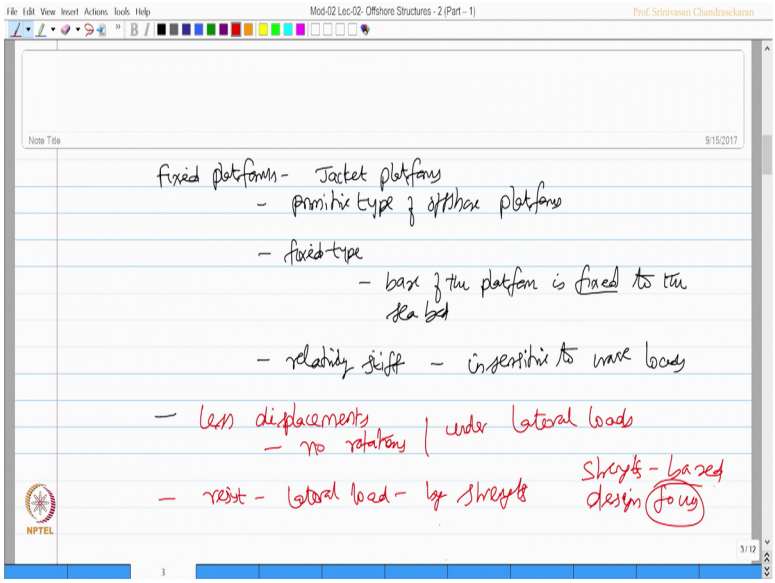

So, fixed platforms which are jacket platforms; they are primitive type of offshore platforms. They are of fixed type in sense the base of the platform is fixed to the sea. They are relatively stiff.

And therefore, they proved to be insensitive to waves. So, most importantly they undergo very nice displacements. And practically no rotations under lateral loads they resist lateral loads by strength.

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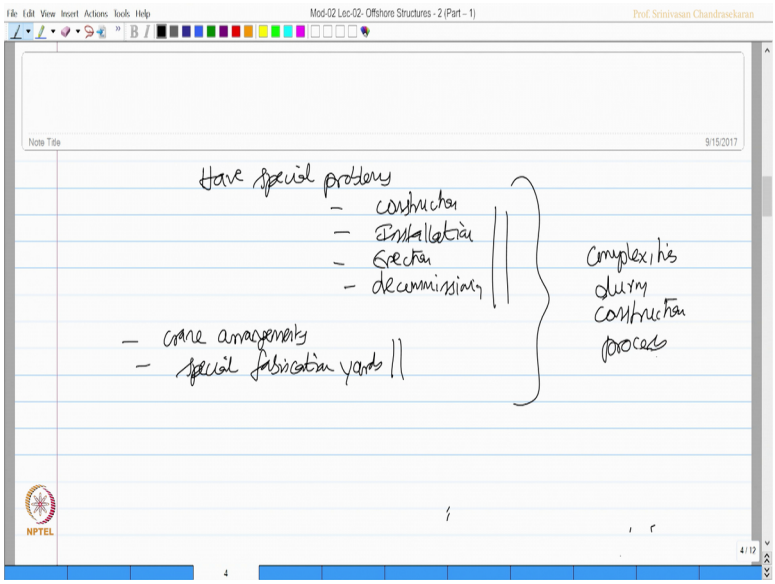

So, strength based design is the focus. These structures have special problems related to their construction, installation, erection. of course problems with decommissioning as well; they need special kind of crane arrangements, they also need special fabrication yards; to erect such kind of platforms, which all include complexities during construction process.

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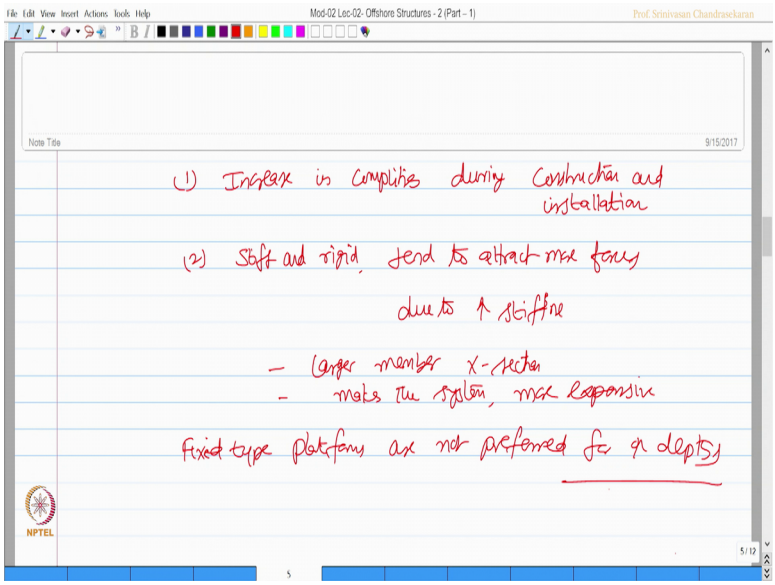

So, I should say they have; increase in complexities, during construction and installation.

Two, since they are stiff and rigid, they tend to attract more forces, due to increased stiffness. So, this will result in larger member cross sections, and it makes the system, more expensive. It is due to these reasons fixed structures are not preferred for higher water depths, then what is alternative people in parallel also studied concrete platforms.

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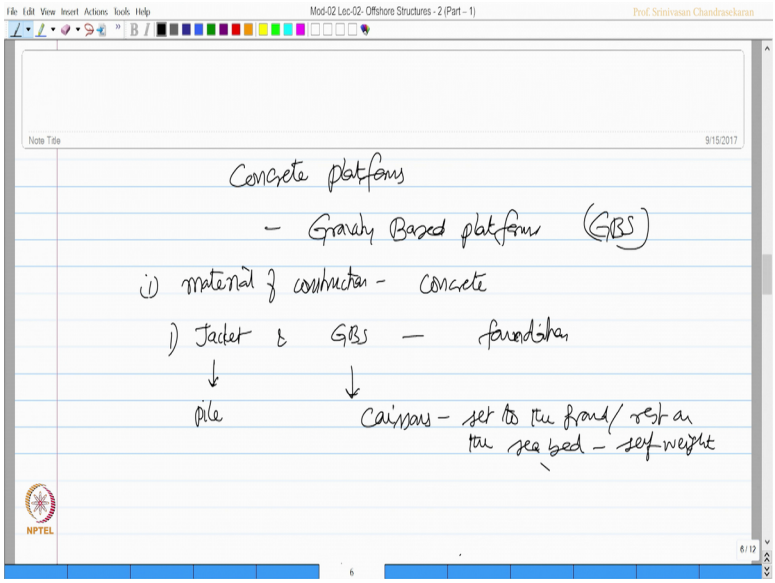

Gravity based structures briefly called as GBS platforms; essentially material of construction was concrete.

The basic difference between the jacket platform and the GBS is arising from the foundation. One difference is from the foundation, in the earlier case this the pile foundation whereas, in this case it is series of caissons being constructed which will be set to the ground and rest on the sea bed by its self weight.

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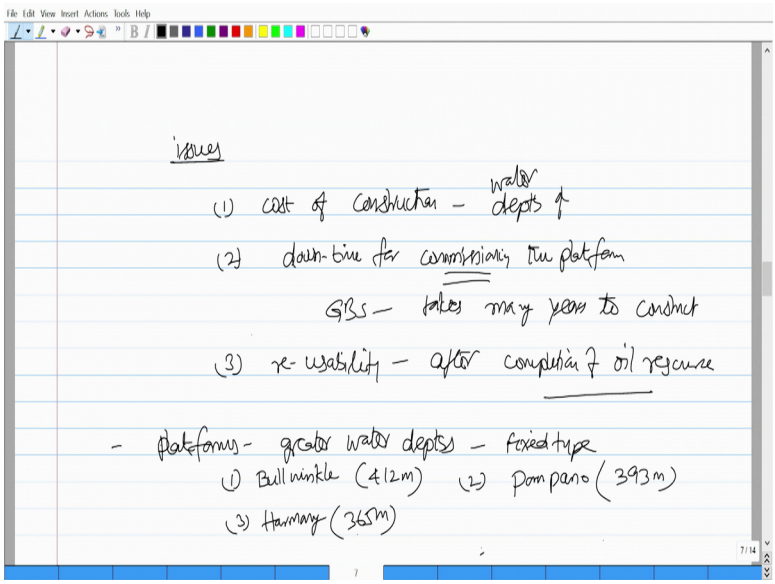

So, this geometric configuration, there are some issues; one cost of construction, two when you increase the water depth, two downtime for commissioning the platform; that is such platforms like GBS takes many years to construct. So, it takes lot of time to complete the construction and make the platform ready for oil exploration and, thirdly reusability of the platform after completion of oil source. So, this is an issue.

Of course, people also studied and constructed platforms for greater water depths, which are essentially fixed type. I can give some examples one is Bullwinkle constructed in at a depth of 412 meters. Second could be Pompano constructed at the depth of 393 meters. And third could be Harmony constructed at the depth of 365 meters.