Computer Methods of Analysis of Offshore Structures
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Module - 02
Lecture - 02
Offshore Structures - 2 (Part - 2)

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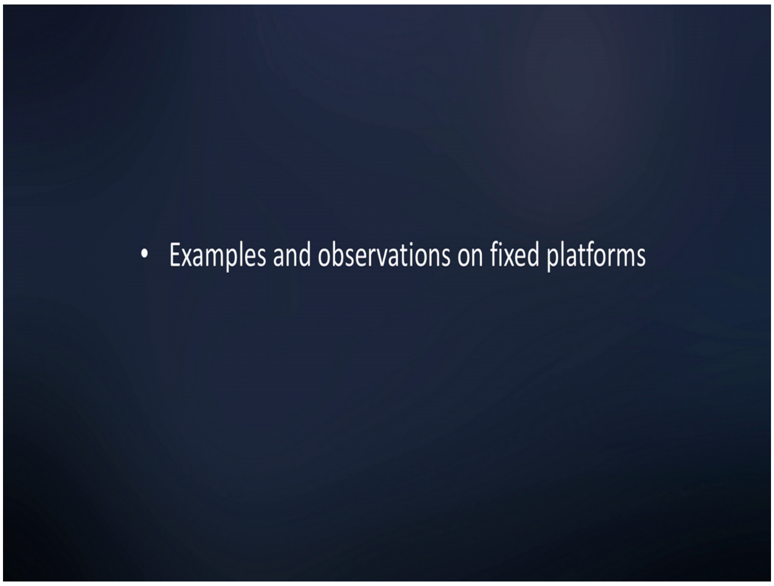

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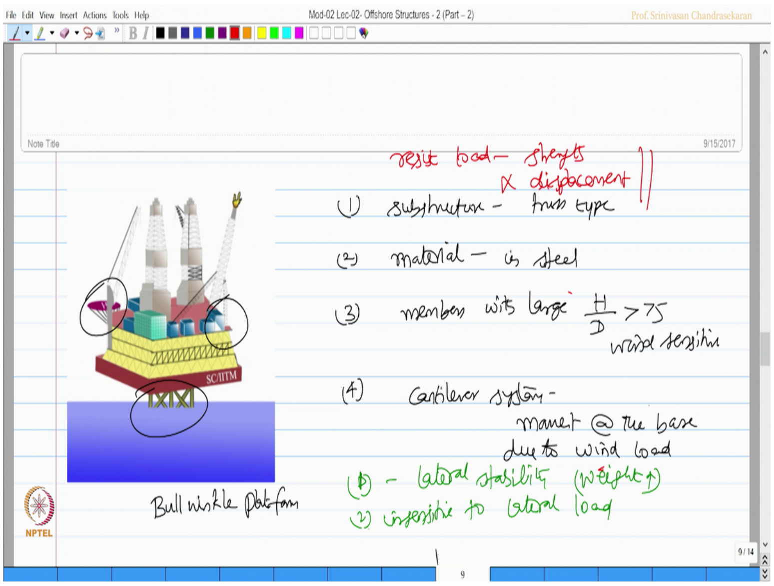

The picture what you see here is the Bullwinkle Platform. We can make some observations: one the substructure system is again a truss type. The superstructure has essentially material in steel. It also has elements or members with large H by D more than 5 make it wind sensitive. Fourth, there are lots of cantilever systems which imposes moment at the base due to wind load.

There are some advantages of this platform. They have high lateral stability, because of increased weight. They remain insensitive to lateral load. And the crux of the problem is they resist loads by strength and not by displacement.

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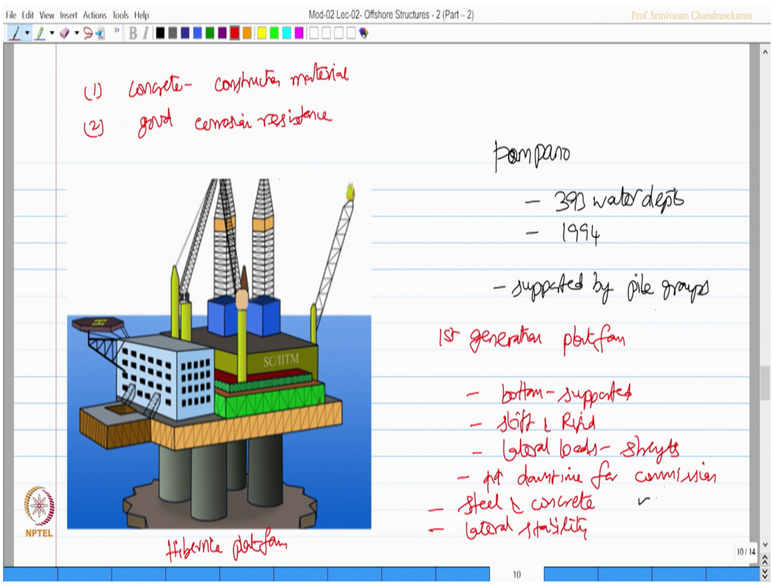

Hibernia platform is what you see on the screen. Similar to Hibernia we have Pompano; essentially a 393 meter water depth commissioned the year 1994, supported by pile structures. So, essentially the first generation platforms; offshore platforms were bottom supported. Stiff and rigid, resisted lateral loads essentially by strength, had very high downtime for commissioning. Material used were essentially steel and concrete and that are the idea what they had in the beginning of offshore structures they of course, had good lateral stability.

Hibernia platform had concrete as a construction material; concrete is good corrosion resistant. It is in fact, superior to steel in corrosive environment. So, subsequently other platforms like troll A, troll B were all constructed; which were again in concrete which were of similar structural geometry what you saw in Pompano, Hibernia etcetera.

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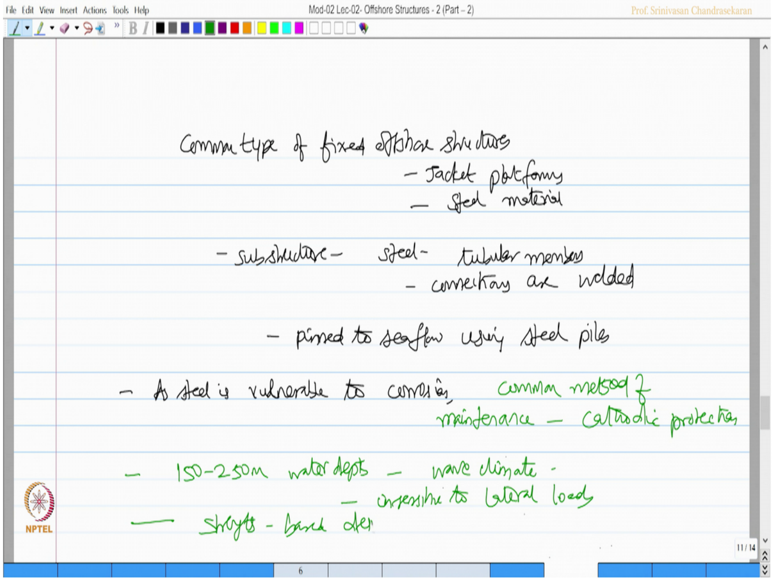

Common type of fixed structures fixed offshore structure, were jacket platforms essentially steel is the construction material used. The substructure is fabricated using steel, tubular members and the connections are welded, they are pinned to the sea floor using steel piles.

So, as we understand as steel is vulnerable to corrosion, they used a very common method of maintenance to avoid corrosion is cathodic protection. It is been seen that these platforms are suitable for a depth of 150 to about 250 meter water depth. And it also depends on the wave climate, where you want to install this platform, they are insensitive to lateral loads, and it is strength based design.

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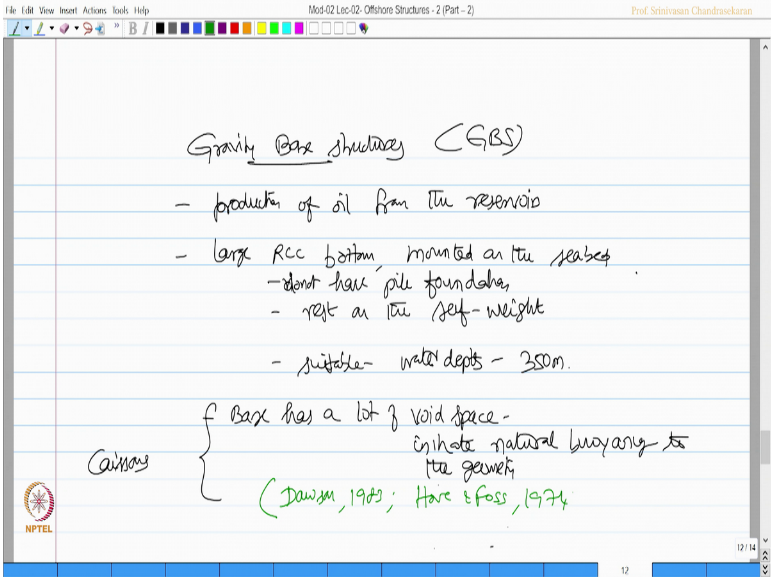

Whereas gravity based platforms, they are actually meant for production of oil from the reservoirs. They have a large reinforced cement concrete bottom mounted on the seabed. They do not have pile foundation. They essentially rest on the self weight. They are seemed to be suitable for water depth up to about 350 meters. The base has lot of void space which can be used as this is to initiate natural buoyancy to the geometry.

These bases with void space are called caissons. There are many references available in the literature read more from Dawson 1983, Hove and Foss 1974 etcetera.

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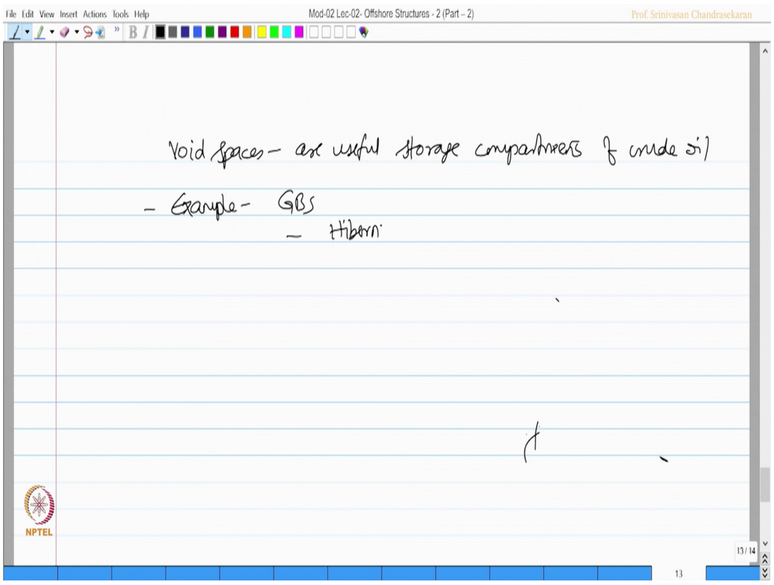

Void spaces are useful as storage compartments of oil. One classical example of GBS as we saw is Hibernia.

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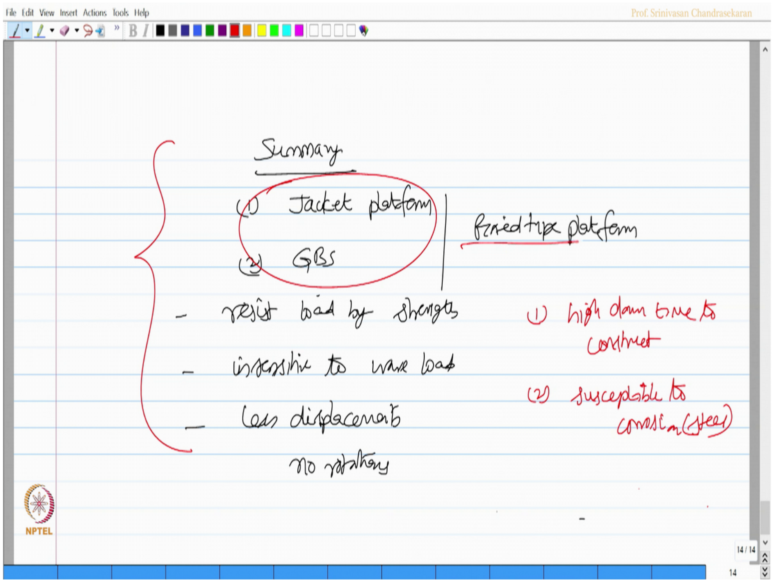

So, friends in this lecture; we learnt two types of offshore structural systems which is jacket type, other is gravity based structure; both are fixed type platforms, they resist the load by strength, they are insensitive to wave loads, they have very less displacement and no rotations, they take high down time to construct they are susceptible to corrosion; essentially when it is steel. So, primitive structural forms were essentially jacket and GBS, which are fixed type. As the functionality of the platform changed the structural form was also changed, which will see in the next lecture.

Thank you very much.