Statics and Dynamics
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Lecture – 09
Statics - 2.3

We listed last clipping, we looked at a link member or an axial member.

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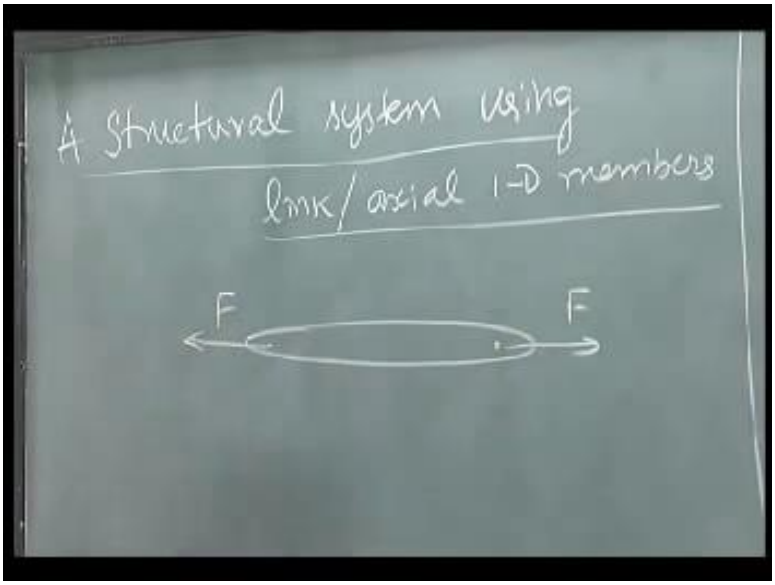

Now, we look at a system that you can build out of this, the simplest system that you can build out of this. Thanks to Mr. Venkateswara Rao, we have built a system here. If you notice each is a member, just going to take it out to show you. Each is a member, where the forces are acting essentially at two points, the point here and the point here. And therefore, this is an axial member and each of these members are joint together.

Give me a minute to join them together and there you go you to get a structure. Remember, everyone of this, this one, this one, this one, this one, this one, this one or this are pinned together, you can see it here. We will have a closer view later to form a structural system and it consists of one dimensional axial or link members like this, such a system is called a truss system. Please remember that we need to have forces acting only at these points and they had be only forces and not moment to the resultants, which means the only possibility of forming this particular structure is by using pins that joint each one of this. Are you able to see?

Each one of these yellow pins joint the members, also we have another requirement in

this. I cannot have forces in between, which means that I should assume that the mass of these are negligibly small compare to the forces that act on this particular system. Supposing I apply a force or for example, I pull or push at any one of these joints and I have a structural system, I can use the structural system in order to take loads. One such example we will see in detail.

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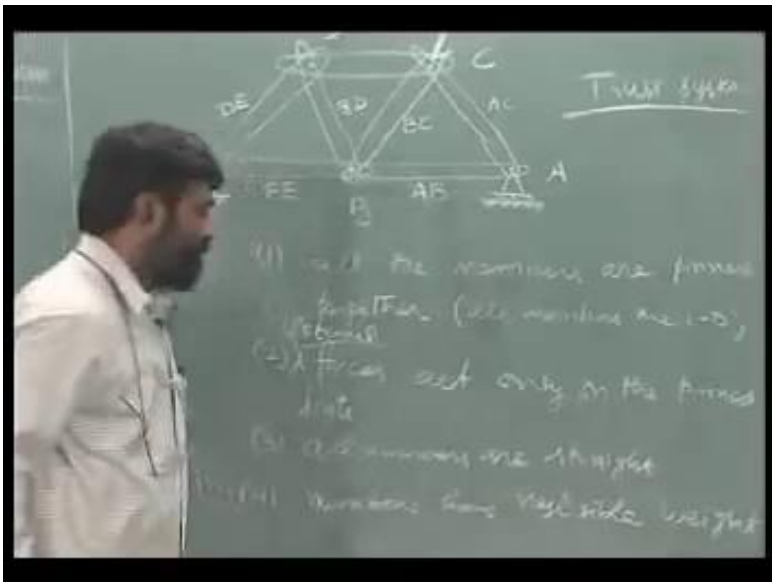

And we let us look at an example of this sort itself, let me draw this. I have such members joint together, if you do not mind my drawing in a rough way, these are pin together at these points and let say I have to now fixed to a fixed frame. So, I have fix it on this board, at one point here this is not enough, because the entire I have to add one more here, the entire thing can only move, it cannot remain stationary.

In order to make it stationary I have to at least have one more here that makes it stationary. So, let me apply that also, so I will put a roller support at this point. So, let me name them as A, B, C, D and E. What I have named? Each of these pins I have named now, so that every one of these members can get a name. For example, this member can be called as A C, this member can be called as A B or B A. What we will do is, we make sure that we go alphabetically one after the other.

So, I will call this as A B, about this it is B E, D E, B D and B C. Well, if you have joint these two you would had A D as well as B C. Now, we have B C at least. So, if you notice carefully it is possible to have joint. So, in all if you look at this particular truss structure, all the members are joined by pins, so are pinned together. The other condition

that we have already imposed is forces or external forces act only on the pinned joints.

We can also impose one more condition, but that is not a necessary condition, that is all members are straight. We will examine what happens if it is not straight at a later stage, I will give you that as an exercise for you. If they are straight I know very well, I can use all the results that I have from this particular notion. And the given that these conditions are satisfied and it is pinned to a particular fixed frame, we have a structure now, called the truss system.

So, forces can act for example, I can have a force over here. Another important thing here that I am not added is, every one of these members as we already know are one dimensional members. So, I will just add over here, all members are one dimensional, one of the easiest thing that we looked at earlier of drawing a one dimensional member is, instead of drawing like this I could draw just a single line joining each one of these points. So, let us do that particular exercise next.

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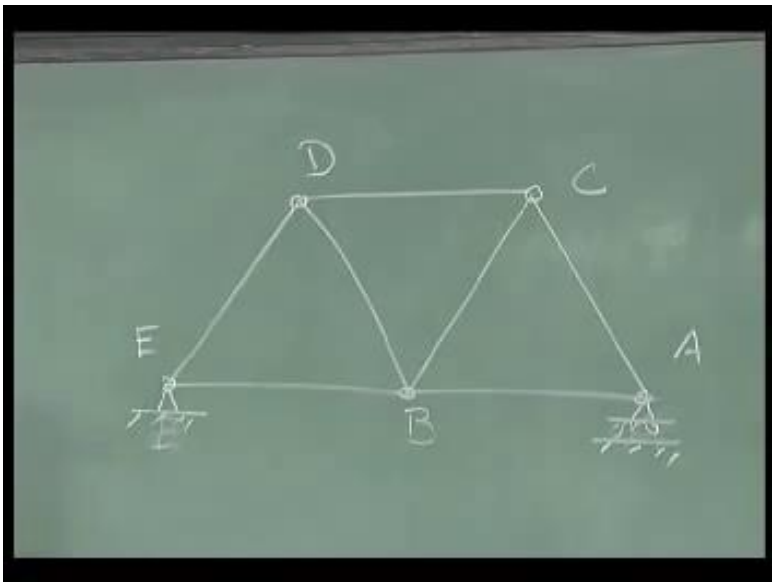

So, let me do that pretty fast, it is easier to draw also. Looking at this, I can now write A, B, C, D and E and all these are one dimensional or line members. And I can now insert the support over here, this is the same thing that I have drawn here, just to make sure I denote that these are pins I am just going to insert nice circles in the form of pins. So, now I would draw the same truss structure in a very simple way.

Now, cut, one more important thing that I have forgotten here which I mention when I was talking about this is, each of these members assume to have weight less than or

negligible compare to the forces applied on them. So, will be write members have negligible I will straight away write weight.