Electrical Measurement and Electronic Instruments
Prof. Avishek Chatterjee
Department of Electrical Engineering
Indian Institute of Technology, Kharagpur

Lecture - 03
Demonstration of PMMC & Electrodynamic Instrument

Keywords: PMMC, moving coil, fixed coil

Welcome, so in last couple of videos we have studied PMMC Instrument and Electrodynamic Instruments. So, I think it is a nice opportunity for us that we have some broken instruments with us.

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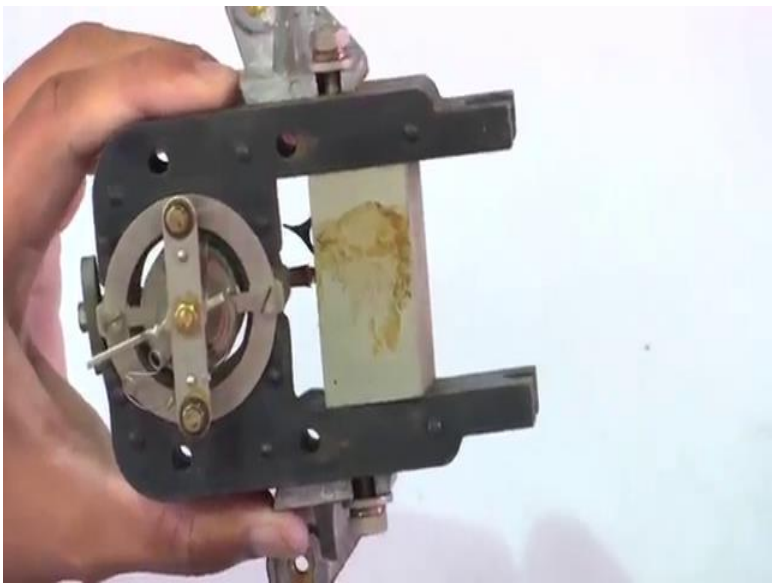

And, we would like to see how they actually look like. So, this instrument which I am holding in my hand is actually the internal parts of a PMMC instruments; let us identify all these parts. So, this black thing that you see, this black thing along with this white rectangular object they form the permanent magnet.

Actually, this white object this is only the magnet, it attracts my keys. And this black thing is just a piece a soft iron. So, if we refer to our diagram on screen.

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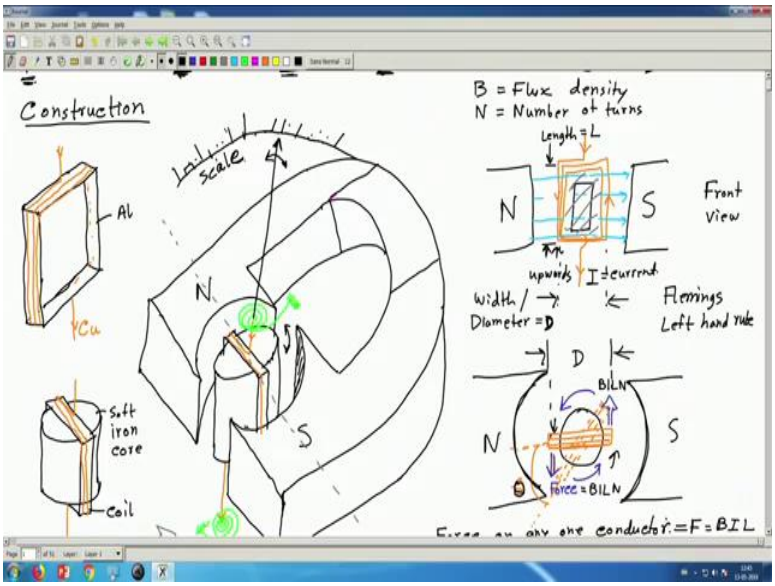

So, we have here a permanent magnet and then so, this only this part is the magnet and this this part, and this part are the black parts. This is not the magnet, but this is only an iron of I mean it is a piece of iron which guides the fluxlines from this magnet through this coil. So, its it is a guide for the magnetic flux lines and the actual magnet is only here, but this acts as an extension to this magnet.

So, this is the magnet. Now, you can see that there is a circular core here inside. So, we can see it from both sides, there is a core, circular core black in color which is held together with this outer magnet through this aluminium strips, which looks like a silvery object in on screens, so that is the core and between the core and the magnet we have this coil. So, we can see the coil which you can see it from this side.

So, this is the coil and it can turn you see, I can turn this coil inside the magnet, and this is turning alone the core is not turning only the coil is turning. And, this needle like thing which I am holding is a pointer which I have not drawn before but let me now draw it. So, there is a pointer attached here, a long pointer attached to this coil. So, when this coil turns, in either direction this pointer will also turn towards the left or right and we will have a scale with markings like this. So, when we have any current through this coil, the coil is turned and then this pointer is also turned, and it moves across along this scale.

And therefore, we can measure the amount of rotation or the angle of rotation by observing where the pointer is on this scale. So, this is the this is the pointer the scale is

not there because it is broken and this thing this copper like thing, it is not copper its actually phosphor bronze, it was this spiral spring. Now it is broken, but you can see this spiral spring on the other side. On this side it is broken when I was taking this thing out of the box. So, this this is the spiral spring, and this is made up of phosphor bronze.

Now, this phosphor bronze has some nice properties and one of them is that it is a conductor and therefore, actually the current flows through this spring. So, the current I flow through this spring, then it goes to this coil, then it comes out from the other end and then again it flows through the other spring and then it comes out. So, this phosphor bronze spring helps the current to flow through this spring and then to the coil through the coil and then finally, through another spring and then out. And, then we have bearings which I have shown here, but let me now draw it. So, we generally have some bearings, let me draw them like this.

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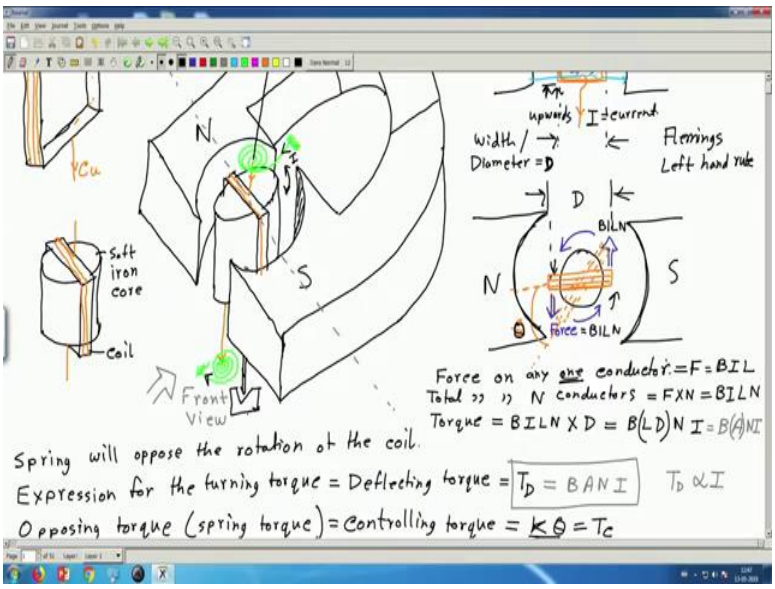

So, we have generally jeweled bearings with very little amount of frictions friction and this basically this is the shaft or the spindle or the axis of this coil which can rotate on top of this jeweled bearing. So, that bearing is also you can see it is here some sort of bearing is there. So, this is the PMMC instrument which we have talked about. Now, let us look at an electrodynamic instrument. So, we know that in an electrodynamic instrument the difference is that the permanent magnet is replaced by electromagnets or solenoids coils.

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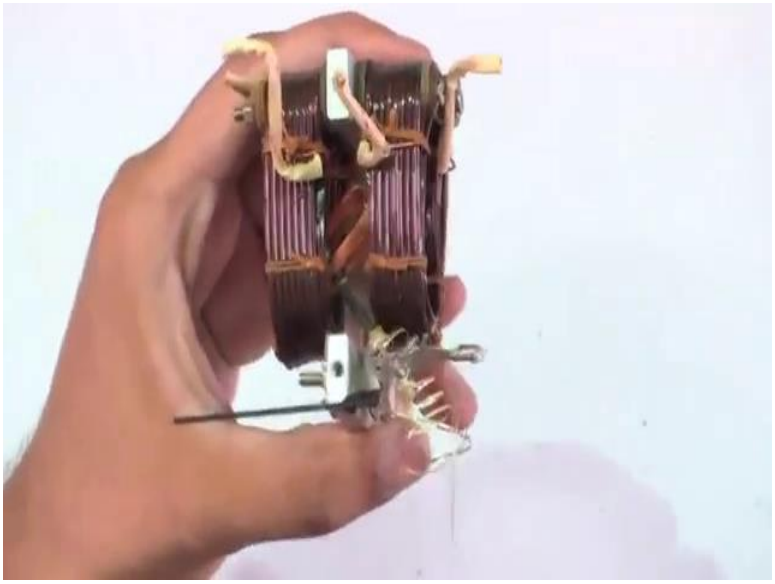

So, this is the internal parts of an electrodynamic instrument and here you can see main three coils. So, this is one coil, these are the turns. So, let us see from this side so, this is one coil, so these are the turns, and these are the two ends of the coils, this white insulated thing are the two ends of this coils. So, these are the turns of one coil; so, this is one of the fixed coil let me turn it now, this side there is another fixed coil.

And these two are the two ends of this fixed coil and both these fixed coils are attached to the body or the frame of the instrument, so these two coils cannot move. So, this dark brown or these dark glossy things are the fixed coils. So, let me show this in my diagram.

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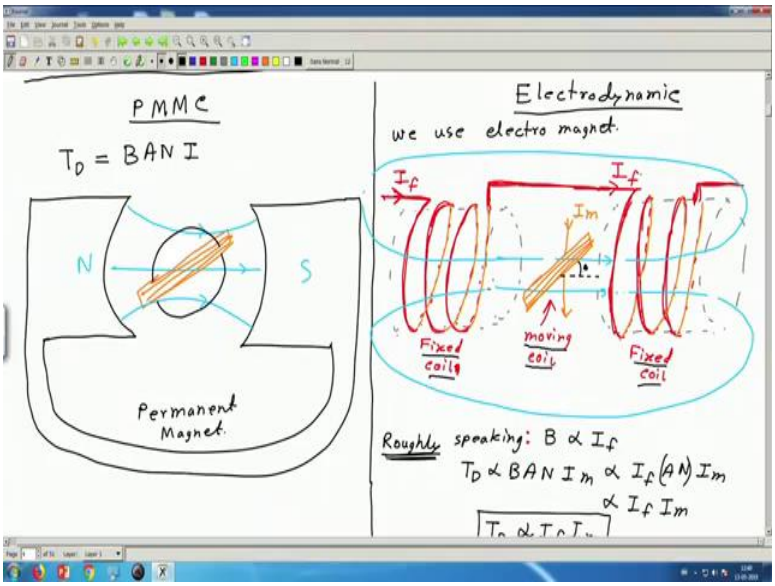

So, here in this diagram these red coils, which I have marked as fixed coils are this dark brown thing and then we have this moving coil. So, we have this moving coil which you see is like sandwiched between the two fixed coils, it is placed between the two fixed coils. Now, let us find out this moving coil in my instrument.

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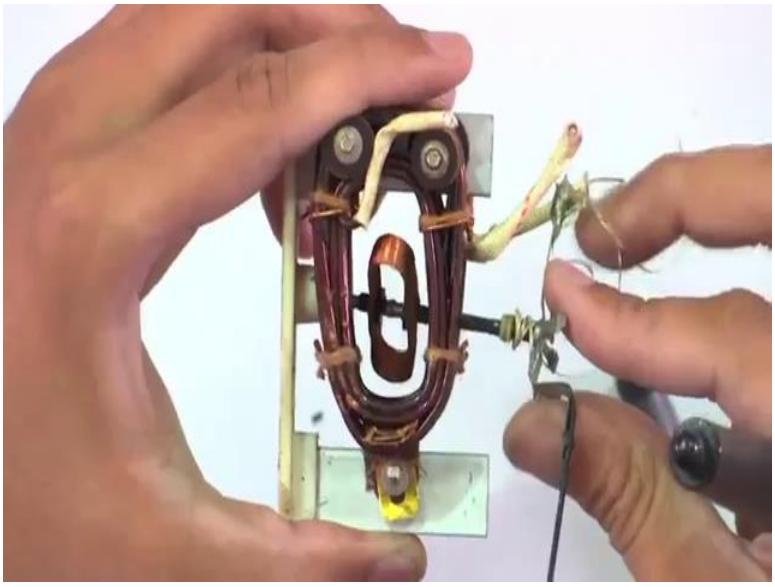

So, for that you have to look from this side, and you see that there is another coil which I can rotate inside, you can see there is another coil which is rotating inside the two coils. So, this is the moving coil which I am rotating with my right hand and the dark brown

thing is the fixed coil which is not rotating. So, smaller and brighter coil is the moving coil and the darker bigger coils are the fixed coils. So, you can see it from the top as well. So, from the top you see that the moving coil can rotate inside the two fixed coils and this long needle like thing you can guess what it is, this is the pointer.

So, as this coil moves the pointer will move across a scale, along a scale. And, again this this is the spring which is broken. This is the spring which was attached to the frame of the instrument and the spring tries to hold this moving coil at its normal position or tries to oppose the motion of the moving coil. So, I guess this short video will help you in having a better visualization of the instruments which I was trying to draw. And it will also probably help you in understanding the instruments better.

Thank you for watching.