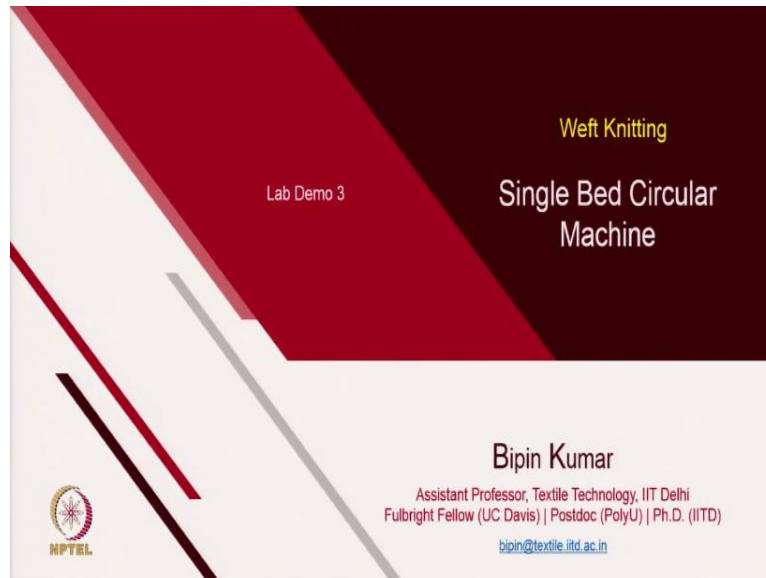**Science and Technology of Weft and Warp Knitting**
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Module - 2
Lecture - 10
Weft Knitting - Single Bed Circular Machine

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Welcome participants. Now we are going to move in lab demo 3. As a promised, I am going to introduce to you all possible knitting technologies and we have these machines in our lab. So, today we are going to demonstrate you single bed circular machines. We have already covered this machine in lecture number 3 and 4. So, now let's see how this machine runs in real scenario.

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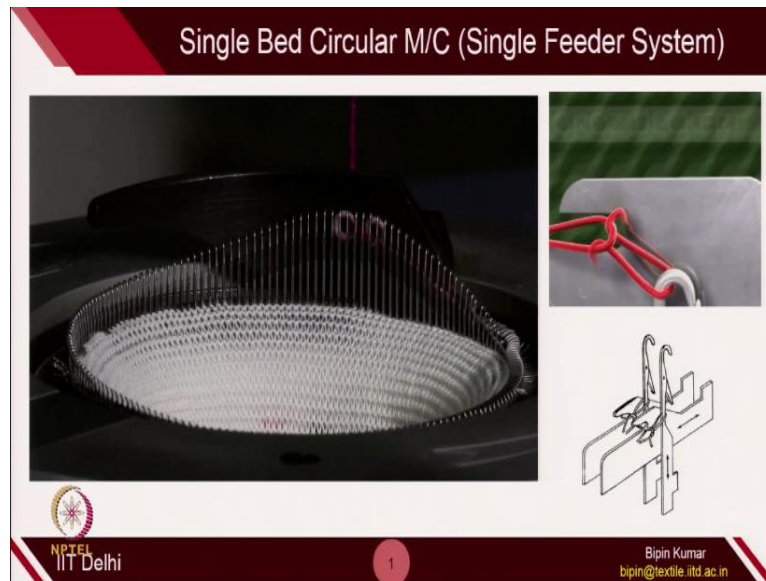
Just a quick recap. I hope you remember this video. **(Video Starts: 00:49)** So, how this particular single bed circular machine is utilizing the yarn and creating fabric with the help of knitting action. In this particular machine, we also have seen how the sinker also helps in loop formation in holding, releasing and making loop. Okay. So now, we are going to see how we place yarn in this particular machine; what happens at the initial stage;

How the fabric is created; **(Video Ends: 01:30)** how you can use or make different designs of the fabric using this type of machine. This is the most simple machine in circular knitting. It is single bed, just one bed is used. And also, it is a single feeder system. So, just 1 yarn is used in the knitting process. And this type of machines is actually used to create tubular fabrics and especially for making socks.

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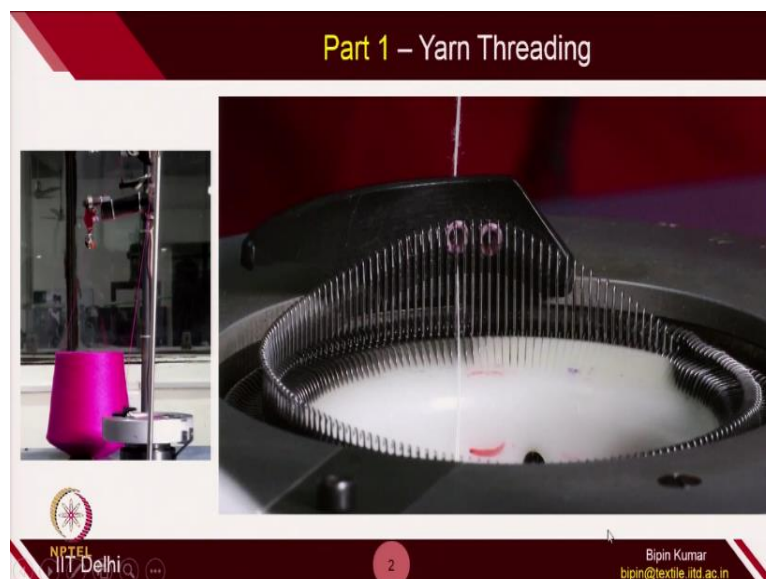
Let's see how it works. So, this is actually the machine. If you look at these machines, you have the yarn on the top of the machine platform. And this is the cylinder where this is the zoomed part of this particular cylinder part. So, the first thing is how we place yarn on this machine. You can see through this video. So, this is called yarn threading. So, similar to weft knitting flat machine which we introduced in demo number 2, we also have to provide yarn and that yarn has to pass through certain sequence to feed this yarn to the needle head.

So, let's see how we start this. **(Video Starts: 02:34)** You have the cylinder, this these are all, yarn is first passed through this guide, this hole. So, you can see here, we are starting from here. This is the guide. And then all tensioner system. We are catching this yarn, we are passing through all holes so that yarn follows a particular path. This is done to avoid ballooning, so that there should not be yarn breakages.

The yarn, and tension has to be adjusted. This is again, yarn is passed through a constant speed meter. This releases the yarn only at a constant speed to avoid tension variation. Again, through one guide. And finally, we supply yarn through this feeder part. So, this is the feeder part, you have the hole here. You pass this yarn and you places this yarn from the bottom. So, now when you rotate this particular cylinder, yarn is already placed.

And you can see these needles are actually on the clearing position. So, the needle which is at the topmost position, it will first catch this yarn. **(Video Ends: 04:05)** And all the needles which is passing through that clearing position, it will keep catching this yarn. This is how the yarn is thread on the machine. And this yarn is then taken from the downward part of this cylinder. And that yarn segment is fixed at the bottom of the machine.

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Let's see initial run. Initial run is little bit difficult because, to catch the yarn, the latch of the needle need to be open. We have, there was no old loop, so it was difficult to predict, like all the latch of the needle will be open across this circumference. So, we need some kind of brush to open the latch for all the needle so that it can keep catching the yarn in during the rotation. So, let's see. **(Video Starts: 04:54)**

So, when you run the machine, when you run the machine, so this yarn will be supplied to all needles. But not all the needles will be catching the yarn, because the latch is not open. So, we must make sure the latch remain open whenever yarn is present. So, you can see here, the needle do not able to catch the yarn. So, naturally we are opening the latch. So, those needles who are open, they only catches the yarn.

And we keep doing this process till all the needles catch the yarn. So, once the needle catch the yarn, once the first loop is generated, you will find some kind of uniformity in the motion, because the yarn itself help in latch opening and closing. So, knitting actions starts repeating in each particular needles. And this is how the fabric gets created. So, the first few cycles are little bit complicated.

You will not observe very uniform fabric. But once all the needles catches the yarn, loops is being formed in all needles, then you will observe more uniform production. Okay. And this fabric is being pulled **(Video Ends: 06:12)** through the hollow part of the cylinder.
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So, once the needle start catching, you can any time replace any color of yarn and you can create different stripes. So, this is useful in design purpose. So, you might have seen the socks of different stripes. Also, there are lot of complicated designs are there. Such machines are also useful. But in this machine also you can any time change the color of the yarn and you can create different designs.

You would not be able to control the stitch length because here, somehow there is a problem with the cam system, because the cam is locked inside this bar. So, while running condition, we would not be able to control the stitch length or the stitch cam setting which is very useful in controlling the thread density. So, you have seen in the flat bed where with the help of knob, any time you can raise or downward, make the stitch cam go down.

So, with the help of that, you can control the loop density in the fabric. But in case of circular knitting, somehow we have to fix the stitch cam setting. Because, to change the stitch cam setting, you have to open the machine and then do the setting by manually. **(Video Starts: 07:28)** So, here you can see how you can change the color of the yarn. And the fabric is being formed. And the fabric is being taken from the bottom side.

So, any time any color of yarn you can simply replace. Okay. So, in terms of design variability, flat bed is much much useful **(Video Ends: 07:55)** compared to circular bed. In circular bed, the only thing you can do while running the machine is, you can simply change the yarn color. But in case of flat bed, multiple design possibilities are possible, like controlling loop length, increasing decreasing number of needles. So, in terms of research,

flat bed is much much useful. But in terms of productions, because you can see how fast it is revolving. In terms of production, circular knitting is more useful.

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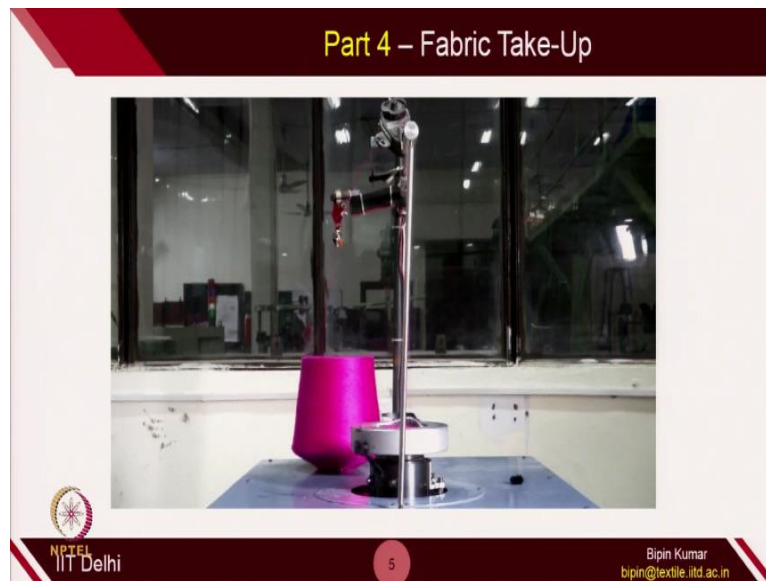
So, this is the fourth part where you can see how the fabric is being taken up. So, fabric is being **(Video Starts: 08:30)** formed. So, you can see this is how it is rotating. The cam is rotating, the yarn is supplied. And the fabric is being generated. Now, you can see how the fabric is been taken. This is where the fabric is being formed. This is tubular fabric and it is hanging. So, and you can see here, this is the dead weight.

So, you need a weight to carry the fabric, pull the fabric from the knitting zone. So, this is how **(Video Ends: 09:16)** fabric take up is done. The working of circular knitting machine is very simple. And also the flat bed knitting machine is also very simple. So, we have completed 2 basic technologies in knitting, related to weft knitting. One is flat bed; in demo 2 we introduced to you flat bed. In this particular demo we introduced to you circular bed.

Now, from the next week, we are going to start a new chapter of knitting technologies which is related to double bed machine. So now, instead of 1 bed, we will be working with 2 beds. Initially I will give you some kind of theory, how those machines are running. So, stay tuned. Thank you very much for listening.