Science and Technology of Weft and Warp Knitting
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Module - 2
Lecture - 9
Weft Knitting - Single Flat Bed Machine

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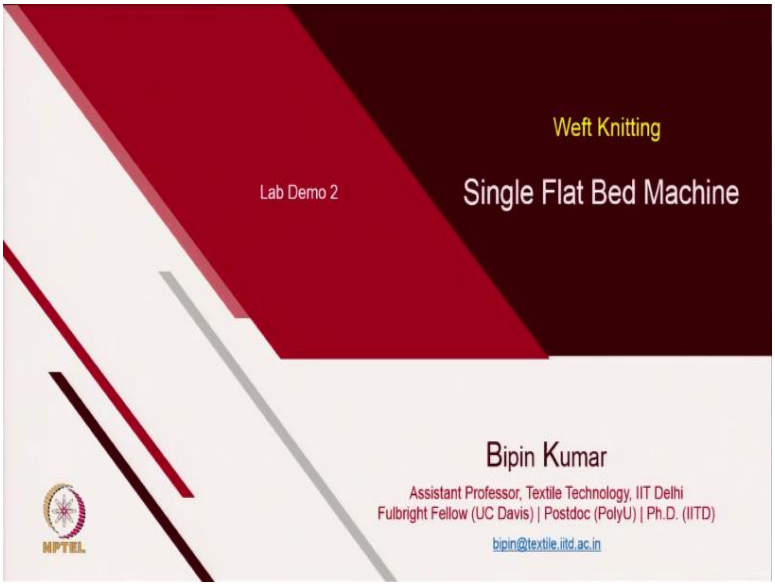

Welcome participants. Now I am going to move in lab demo number 2. Here, I am going to show you how we operate the weft knitting machine. The first machine which I am going to show you is single flat bed machine. So, in today's week, we covered so many theories regarding single flat bed machine.

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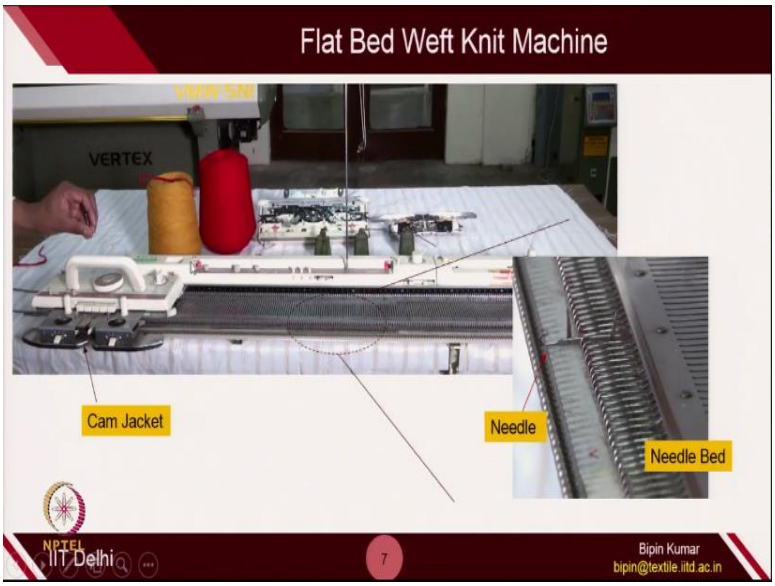

So, in this, you come across the needle, also the needle bed; how the needle was arranged on this bed and the part is cam jacket. So, how the cam helps to move the needle from coming from the bed and going inside the bed. So, this reciprocating movement of needle was done by the movement of cam jacket from left to right and right to left.

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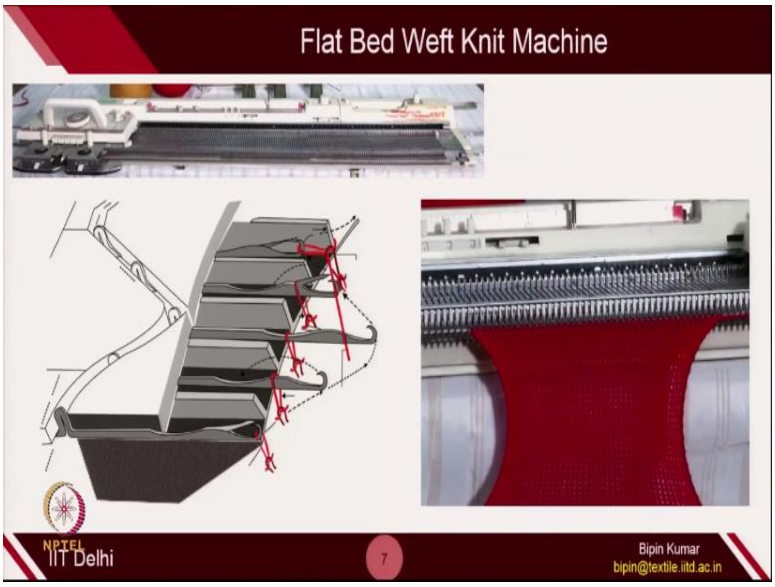

During this process of movement of cam jacket, the butt of the needle was interacting with the groves inside the cam jacket. And because of this, the needle was doing reciprocating movement. So, we also saw each of these needle position has some significance during this loop formation. **(Video Starts: 01:23)** And you can see here in this video, how the loop was getting formed.

So, many needles was participating simultaneously and loop was being formed simultaneously. Okay. First thing I am going to show you, the functioning of needle, how exactly, **(Video Ends: 01:43)** what is happening inside the needle; how the old loop is coming out; how the old loop is knocked out; how the yarn is getting catched. So, first, let's, let me show you the movement of needle and how it interacts with the yarn. Okay.

(Video Starts: 02:02) So, I have already shown you the needle in one of the lecture. So, this is the needle which you already know. All the elements of these needles: so, it is hook, latch, butt, tail and the stem. So, what happens is, the first thing is, before the cam jacket interacts, the needle was holding this old loop. Okay. So, you can see here. You can imagine this is the old loop which is hold by the hook. Okay.

And on the machine, the moment cam jacket interacts with the needle butt, this is the butt on the left side of my hand. You can see here, this is the butt. So, the moment cam jacket interacts, it forces needle to move forward. Okay. But since the loop was hanging by certain weight, so it cannot slides along with the needle. So, it remains stationary, only the needle slide. So, because of this, you can see, the latch gets open. Okay.

So, the needle slides but loop does not. Because of this, the latch gets open. So, you can see here, the latch gets open automatically. Okay. Now, this is called clearing, because the old loops comes out completely from the latch. Now, in the next process, what happens, the new yarn or the yarn is getting presented to the hook part and you can imagine the hook catches the yarn the moment old loop is cleared from the latch.

And now, the cam jacket forces the needles to go towards left or towards the bed. During this process, you can see, the old loop is closing the latch and latch is getting closed. Okay. And if the needle moving sufficiently back loops will still slide and it will come out or knock out from the head part of the needle. So, this is the position where the new loop is getting formed. So, you can see here that hook is still catching the new loop and old loop is knocked over.

And after knocking over the old loop, bend the yarn in the form of loop and new loop is being formed. So, this is the most simple process which is happening in the loop formation. **(Video Ends: 04:49) (Video Starts: 04:50)** On the machine also the same thing is happening. The butt is getting engaged and needle do the reciprocating movements. It clears the old loop and it knocks the old loop from the needle.

And that old loop is engaged with the new loop. So, this is the new loop is getting formed. And you can see how the machine is running. So, the first thing before we start **(Video Ends: 05:18)** operating on the machine, we have to identify or we have to define how much width of the fabric we wants to create. So naturally, the first thing we want to do is needle selections.

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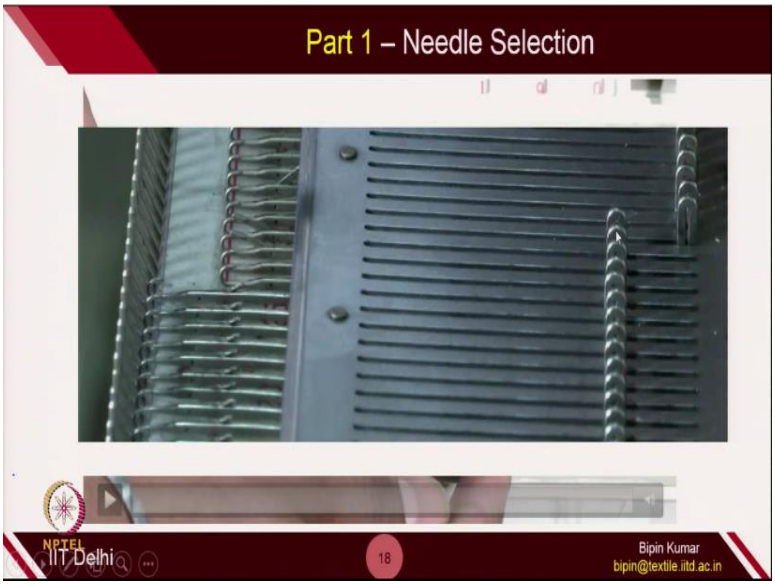

Because our bed width can be more than 1 meter or 2 meter depending on the production capacity. So, the first thing what we want to do is, we want to first select how many needles we actually wants to operate on the machines. So, the first part is needle selection on the machine itself, before we start making fabric. So, there is 2 location of the butt you can see on the needle bed.

So, this is the groves on which needles are arranged. So, in each of these groves, one needles are in operating. Okay. To select the needle, what we have to do is like, we have to push the butt forward. Because once the cam jacket moves on this platform, the slot location is somewhere here. Okay. And because of that, the butt gets engaged. So, the first thing what we want to do is, we have to select the number of needles on which we want to operate.

(Video Starts: 06:23) So, here you can see, this is the bed. And this is the needle which is being fixed on the bed. These are the 2 locations. One is resting position of the needle, resting position in the sense or idle position. So, once the cam jacket moves, these needles do not operates. Only those needle whose butt location is somewhere here, somewhere little bit further position. So, they can engage with the groves of the cam jacket. Okay.

So, you can see; and this is how it can come outside and inside the bed. Okay. And we can select as many needles depending on what we want to create. Okay. Let's suppose, if you do not want to use any of these needles, we can push this butt back side, so that we can push this butt back side and automatically that needles will not be engaged by the cam jacket. **(Video Ends: 07:38)**

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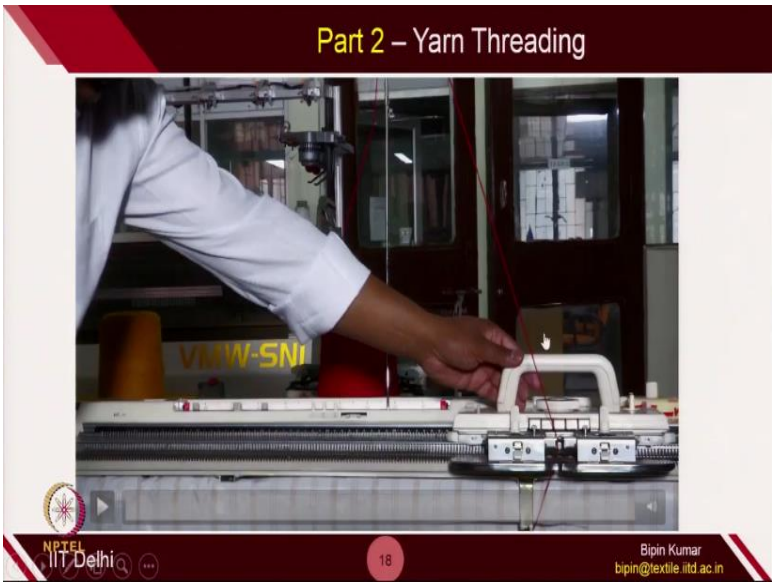

Now, the second part is yarn threading. So now, this is the yarn you can see on the machine. It has to fix or engage with the cam jacket, because the cam jacket not only helps in needle reciprocating movement, but also it has the role to provide the yarn to the respective needle during this movement. So, let's see what is happening here. So, in yarn threading, we take the yarn of suitable linear densities, we fix this yarn with the machine and then finally with the cam **(Video Starts: 08:13)** jacket.

So, this is how it is happening. So, the yarn has to pass through a series of machine elements. So, first is guide bars, these are the guide bar. Then, this is the tensioner. Disk type tensioners are there. Each of these elements has its role, because it makes the yarn moving in certain directions only. These are again some tensioner. And finally, this is the guide bar. And then, again the tensioner part.

And once this yarn is there and there is a push button where you can simply lock this yarn with the cam jacket. So, on the machine, you can see here, this yarn from this bobbin passes through the machine and now fixed with the cam jacket. Okay. **(Video Ends: 09:02)** And now, we are doing the setting. Now, the third part is, first course formations.

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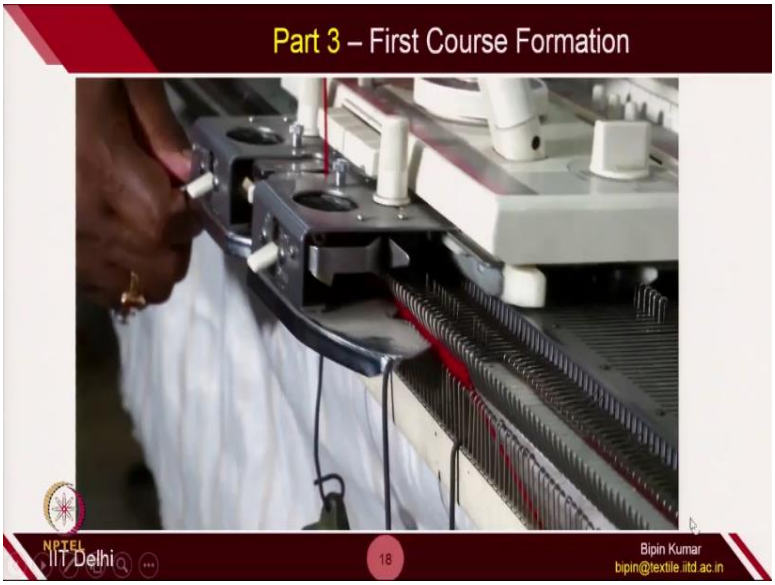

So, the moment the yarn is getting engaged with the cam jacket, now the time has come that cam jacket has to supply yarns to the needles which are being selected on this machine. So, let's see what exactly is happening, how we do this process. **(Video Starts: 09:24)** So, we take this yarn which slides on the bed from left to right, you can assume any left to right, whatever suits you.

And these are the needles which are being selected. So, you can see here, the needles at these locations are not selected. So, they are not catching the yarn. These yarns are free. Only those needle whose butt positions was little bit further; so, only these position, you can see here, these are the position of needles which able to catch the yarn, because it interacts with the grove.

You can see here, the grove location. Okay. Now, so once the needles catches the loop, we need a comb for the pulling. Because this is extremely important part in fabric formations, because we need some weight to pull the fabric. Otherwise, the fabric will not come out. We need some force to pull the old loop which being knocked out from the fabric surface. So, this is the load which we are applying. Okay.

So, you can see, the comb is also now engaged with these each loops and we are applying the load. Okay. So, we are creating a fabric width from here to here, because other needles are not working. So, this is the front view. After that, once this is done, the comb is secured. Then we are running the first course. So, now the yarn is getting supplied again. And that old loop which was done on the first course, it just knocked over.

So now, here we created the second loop. You can say the first loop because this is the loop where the leg part is being interacted with the old loop. **(Video Ends: 11:21)** And now we can do the process again and again.

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So, once this is done, **(Video Starts: 11:26)** you can keep running the machine and you can generate the fabric of sufficient length. Okay. The beauty of this machine is, once the fabric is being formed, you can play with different different designs. You can see here, the needles is coming out, so if you want to identify which is technical back and technical front. So, whatever you are looking on this side is technical back because needle is coming forward and then it is catching the yarn and taking it backward.

So, loop is being formed on the back side. So, that's why, only heads are visible. So, this is the technical back side of the fabric. Okay. We can also control the loop length. So, there is a provision on the cam jacket. You can control the loop length, you can control the loop setting, especially the stitch cam setting. So, and you can create a much denser loop. So, here you can see the loop length is so dense.

You can see here compared to the bottom loops which is bigger. So, on the same machine on the running fabrics, you can have different designs. You can also change the color of the yarn, you can get different colors of the stripes on the fabric. Okay. Once sufficient length is done, then again you can go back to its initial position. So, you can see here, now I am creating much bigger loops.

So, this is how you control the appearance, you control the permeability of the fabric. Machines has lot of flexibilities. You can also increase or decrease **(Video Ends: 13:16)** the length of the fabric. You can also increase or decrease the width of the fabric depending on number of yarn selections. With this, I am going to end. So, see you soon. Thank you.