

Subject: Knitting Design Technology

Unit 2: Design variation using colour

Quadrant 1 – E-Text

Learning Objectives

The learning objectives of this unit are to:

- Describe ways of creating multiple coloured knitted fabrics.

2.1 Stripes

The simplest way to mix colours into a knitted fabric by creating multi coloured stripes. You may also have noticed most of the stripe designs you see are horizontal in nature. Let us look at the way to create stripes in Flat Knitting machine. After knitting a few courses with one colour, change the yarn feeder with a different one which is having a different coloured yarn in it. This time a new colour would be knitted above the previous colour. This way you can create horizontal strips in knitted fabric.

A normal hand driven flat knitting machine will be equipped with two yarn feeders. If more colours are required, you may have to manually change the yarn of one of the feeder. This way you can manage any number of colours in a Knitted pattern.

In case of Advanced Knitting Machine, there are more number of feeders. Some of them are equipped with 40 feeders to produce complex strip pattern. It is also interesting to know that vertical strips are not possible in Weft Knitting machine using the standard strip method. If we need to create a vertical strip, we can use Jacquard, Intarsia or Platting technique.

2.2 Jacquards

To create more complex coloured pattern, we can use a technique called Jacquard. In this unit, we will discuss 4 different jacquard techniques: Float jacquard, Tubular jacquard, Bird's eye jacquard and Ladder-back jacquard.

A Jacquard is a technique by which you can bring out a particular colour by selecting few needles to the front side of the fabric and simultaneously hide few other colours.

This method along with individual needle selection make Jacquard one of the most popular method to create coloured patterns in Knitting.

Float Jacquard

As you know we always start the knitting from bottom to the top. The first few courses we can knit with a single feeder till we reach the bottom of the coloured block. Next course, first select the needles where you need to show the base colour and knit only those needles with that colour.

Now, select the needles to create the colour block and knit those needles with the second feeder which is having the colour you wanted to appear in the colour block.

Repeat the steps till you reach the end of the loop and then knit with the base colour alone. When you look at the fabric from the front side, observe that this looks similar to the drawing. But if you look at the back side of the fabric, observe that whenever you have not knitted a yarn in a certain area, there is a long float. Hence, the name Float Jacquard. Since, we have used only one bed for knitting, this technique is also known as Single jersey jacquard.

The only drawback of this method is you cannot have long floats as during washing the floating yarn may break and unravel the fabric. So the maximum length of a float has to be restricted to less than one inch. Now this will restrict the pattern as well. So, we need to repeat the same colour after one inch of width. Hence, only smaller, dense patterns are knitted with this method. For Example: Fair Isle pattern

Advantages of Float Jacquard

Since we are not knitting on back bed needles, the weight of the knitted fabric will be relatively low compared to double jersey jacquards.

Disadvantage of Float Jacquard

Since we cannot have very long floats, we cannot make bigger motifs or low density patterns.

Tubular Jacquard or Reversible Jacquard

Let us look at creating the same pattern of coloured block at the center of a fabric with double jersey method. To create this jacquard let's start the way we did for float jacquard.

First knit with the base colour until we reach till be base of the colour block.

Start with the base colour and select needles from the front bed where you need base colour, also select the back bed needles for the entire width of the coloured block and knit with the base coloured yarn.

Next, select the rest of the needles from both the beds, and knit with the block colour. Observe that the front side looks exactly as the float jacquard as the same design is used here.

Now, look at the back side of the fabric. The design remains the same, but the colour is reversed. Hence, the name Reversible jacquard.

This is also known as tubular jacquard.

Each colour knitted separately on front and back bed, results in tubular spaces between them. This can be felt by pulling the fabric from front and back in opposite direction in any colour blocked area.

Advantages of Tubular Jacquard

The knit will be as fine as single jersey and looks cleaner than other double jersey jacquard from the front side. It is also a reversible jacquard. Any designs can be created using this method with two colours.

Disadvantage of Tubular Jacquard

Only two colours can be used in this method. This creates heavier fabrics compared to float jacquard of the same design.

Bird's Eye Jacquard

If you use a bird's eye jacquard, you can have multiple colours and virtually any pattern. In this type of jacquard, the yarn which is not knitting on front bed needle will knit on back bed needles with certain intervals to avoid long floats. Since, all needles at the backside will have some colour yarn knitting on it, the floats will be concealed between the front and back knit. As multiple yarns with different colours would be knitting on adjacent needles on back bed, there will be a multi-colour dotted pattern, which might look similar to the bird's eye view of the earth from the sky. Hence, the name birds eye jacquard.

Advantages of Bird's Eye Jacquard

It can knit with more number of colours. Any pattern is possible with such a method.

Disadvantages of Birds Eye Jacquard

One of the heaviest jacquard type. Front loops would be slightly stretched if you use more colours.

Ladder-back Jacquard

Ladder-back Jacquard is the most popular method to create a multi-coloured design as it is light-weight in construction. In this type, there will be a float which is restricted to the acceptable width and there will be a wale of back knit.

This is to break a longer floats into smaller ones with acceptable width. This will appear as a ladder at the back as the floats are getting arrested with two wales on either side. This leaves less number of back knits and makes the fabric lighter than Birds eye jacquard technique.

Advantages

It can knit with more number of colours, Any pattern is possible with such a method. It is light-weight compared to birds' eye jacquard.

Disadvantage

It is heavier than float jacquard.

2.3 Intarsia

The biggest disadvantage of any type of Jacquard is slow production and heavy weight or wastage of yarn. Slow production because at a time a machine can knit only 1 to 4 colours depending on the number of cam box (carriage / Knitting system) in the machine. That means for every additional set of colour the carriage should make an empty carriage move without feeders to the opposite direction to pick up the rest of the feeders to complete an effective course.

Let's look at this example.

We are going to knit a jacquard pattern with 3 colours using a single system knitting machine. To complete the first jacquard course the machine has to start, lets say, from left side and move to the right with first colour. The carriage should then make an empty move toward the left side to pick up the second colour and repeat the same for the 3rd colour as well.

So, that means we have 5 different movements of the carriage to complete a single effective course. The production will come down to 1/5th compared to a solid colour knitting. It is going to be heavy as well as there will be wastage of expensive yarn, because whenever we are not knitting a particular colour owing to the pattern design, the yarn is floating or knitting on the back side of the fabric.

Intarsia is a technique by which you can produce almost all jacquard patterns with a fabric thickness of a single jersey.

The appearance of this fabric would be as if someone has cut out the base fabric and patched it with a coloured fabric to complete the design. To do Intarsia, we need to have more number of feeders for the same colour depending on the number of colour blocks in each course. For example, let's look at the first design we tried on jacquard. A coloured block in the middle of a base fabric. If you look at a single course in the middle of the fabric, you can see three blocks of loops with 2 colours.

So, basically we have two coloured blocks with the base colour and one colour block with the second colour. In this case, unlike jacquard, where you just need to have two feeders with two colours, here you need three feeders, two with base colour and one with the second colour. Let's try to knit this pattern with 3 feeders in 2 colours. At the beginning of the Intarsia area knitting, the machine will park all the three feeders just before the start of each coloured block. The carriage will start from the left side and knit the last block and move the feeder to the right side.

Now, the carriage makes an empty move to the opposite side to knit with the second feeder with the second colour which is parked in the middle of the knitting area.

This would be knitted to the length of the block and parked just outside the middle block.

Now, the carriage goes back to the left side to fetch the third feeder and knit the first block. Then the entire process is done in the reverse direction. If there are more number of knitting systems, the carriage can take more yarn feeders simultaneously, and reduce the number of movement required for the knitting on a single movement.

Alternatively, if there are feeders available with kick back system, it will allow the feeder to kick sideways, and will go up clearing the knitting needle to perform without the worry of clashing with the feeder. In such a scenario, all the three blocks can be knitted continuously.

Advantages

It is the most light-weight construction technique for coloured patterns.

There is no wastage of yarn like in Jacquard. It is as fast as a solid colour knitting if you use kickback feeders.

Disadvantage

The number of feeders decide the number of colour blocks you can have in your pattern. Only less complex patterns can be knitted. More costly to knit.

If we use hand driven machines the operator might take one full day to complete one panel. If we use a computerized knitting machine which can ensure faster production, but this is expensive as the investment in a computerized system is much more.

2.4 Intarsia Jacquard

Intarsia jacquard is a combination of both the technology which combines the benefits of the two. The jacquard is capable of producing multiple colour blocks with minimum number of feeders and Intarsia makes the fabric thin as single jersey.

Let us say, we need to create a football motif with black and white colour, in the center of a green colour knitted panel.

The Intarsia technique alone cannot be used as it may require more number of feeders than you have in the machine. A jacquard pattern will make the fabric heavier as it will knit all the green coloured areas also with black and white yarn. However, if you use a Intarsia Jacquard combination, then the jacquard would be limited only to the black and white coloured football motif area, and we will be able to knit the rest of the panel with green colour as in Intarsia. This helps us to reduce the total number of feeders to 4, 2 with green colour and 1 each for black and white colours.

2.5 Platting

As the name suggests, Platting is a technique, which will cover a loop with another one with a different colour. For this technique, we need two different coloured yarns with a similar cross-section for an effective platting. The technique is simple. Feed each needle with two different colour yarns and make sure, two different yarns are available in two different heights. This will ensure when the needle comes down, one loop would always be on the top side of the hook and the other always just below that.

Both the loops will slip over the hook when the next cycle of loop formation happens, and the released top loop would be covered by the bottom loop.

This enables the single jersey fabric to look like one colour from the front side and another from the back side. As suggested, full needle double jersey fabric will not have the platted effect, as the top loops will be hidden between the two front loops.

If you use transfer patterns, or rib structures like 2x2, 3x3 etc., two colour patterns with front and back knit will appear on both side of the fabric.

2.6 Conclusion

To summarize, in this unit you have learnt to create multiple coloured knitted fabrics, such as stripes, jacquards, intarsia and platted fabrics.

