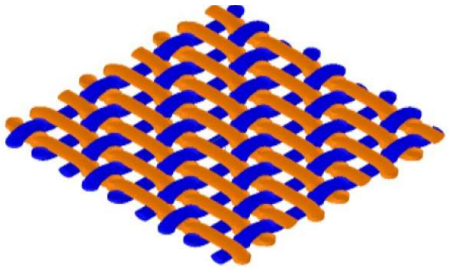
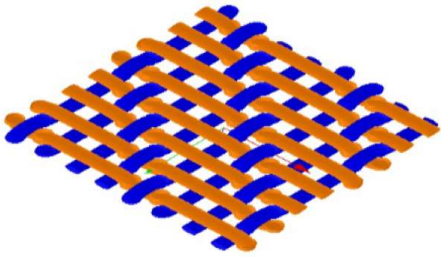
Twill Weave

Twill weave is characterized by diagonal line in the fabric which is created by the floats of the ends or picks.



Interlacement pattern in 2/1 twill weave (warp: orange an



Interlacement pattern in 3/1 twill weave (warp: orange an

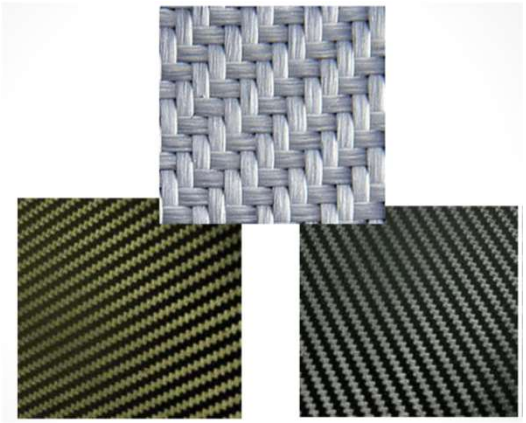
Twill Weave

Based on the prominence of warp or weft floats, twill weaves are classified as follows.

Warp faced: 2/1, 3/1, 3/ 2

Weft faced: 1/2, 1/3, 2/3

Balanced twill: 2/2, 3/ 3, 2/1 / 1/2



Twill Weave

In warp faced twill, the floats of ends predominate over that of picks.

In contrast, the floats of picks predominate over that of ends in weft faced twill.

In case of balanced twill, the floats of ends and picks are equal.

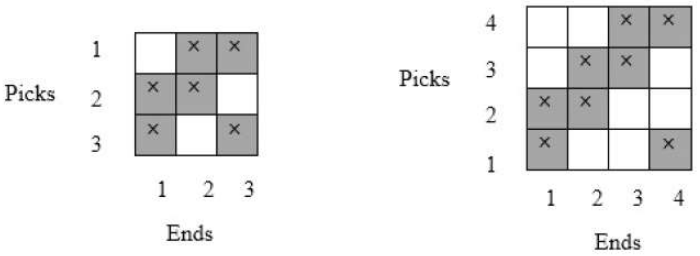
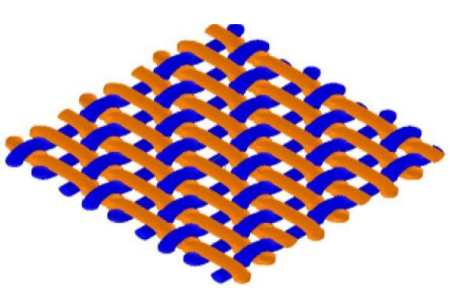


Figure 5.12: Warp faced (2/1) twill and balanced (2/2) twill

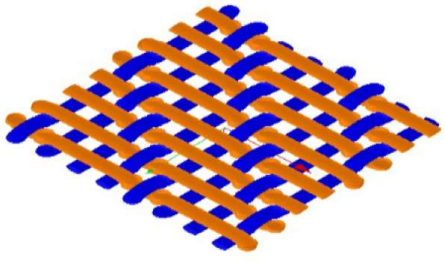
Twill Weave

Twill weave has lesser interlacements than the plain weave. Thus the crimp in yarns for twill weave will be lower than that of plain weave.

For equivalent fabrics, 3/1 twill will give higher tearing strength than followed by 2/1 twill and plain.



Interlacement pattern in 2/1 twill weave (warp: orange an



Interlacement pattern in 3/1 twill weave (warp: orange an

Pointed Twill

There is no continuous line. However, the twill lines change directions at specified intervals and thus create pointed effect on the fabric.

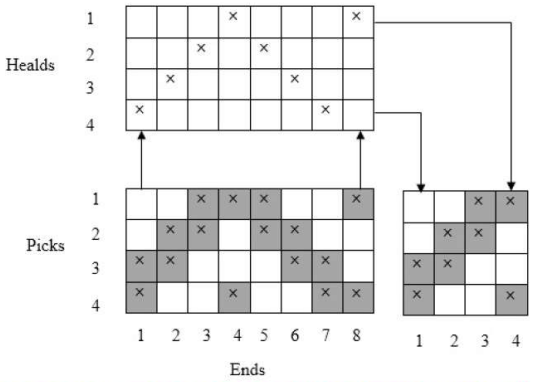
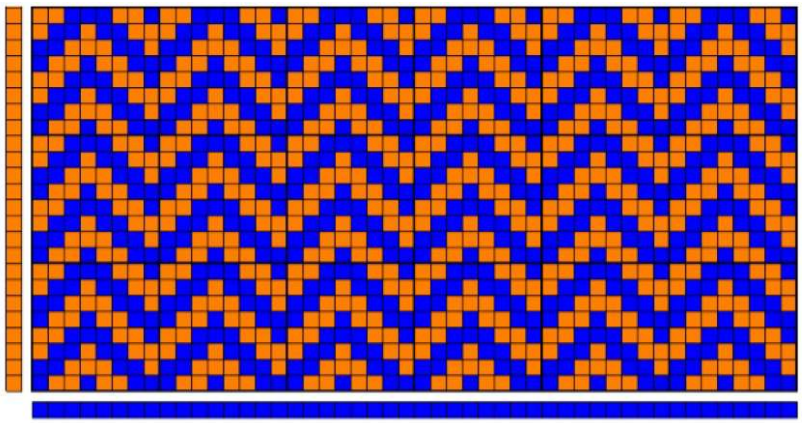


Figure 5.15: Design, drafting and lifting plan of pointed twill

Pointed Twill

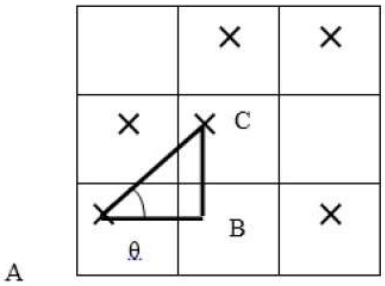
The 4th end is considered as the mirror line and the design is reversed such that the interlacement pattern for the ends 5, 6 and 7 becomes identical with those of ends 3, 2 and 1, respectively.



Angle of Twill

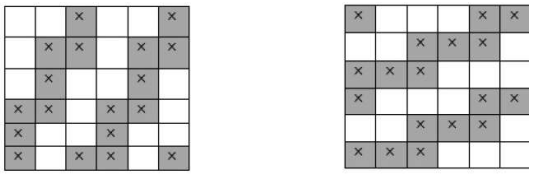
The angle made by the twill line with the horizontal direction (weft direction) is known as angle of twill or twill angle

It is dependent on pick spacing, end spacing and move number of the design.



$$\theta = \tan^{-1}\left(\frac{BC}{AB}\right) = \tan^{-1}\left(\frac{\text{pick spacing}}{\text{end spacing}}\right) = \tan^{-1}\left(\frac{p_2}{p_1}\right)$$

Angle of Twill



Repeat size 3×6 Repeat size 6×3

Figure 5.18: Steep and reclined twill

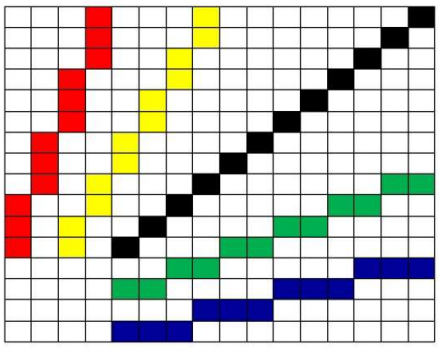


Figure 5.19: Different twill angles

Satin and Sateen Weaves

Satin and sateen weaves are characterized by the following features:

✓Only one binding point in each end and pick within the repeat

✓No continuous twill line

✓Smooth appearance

Satin and Sateen Weaves

Satin weave is warp faced whereas sateen weave weft faced.

The fabrics have very smooth and lustrous appearance which is created by the long floats of either ends or picks.

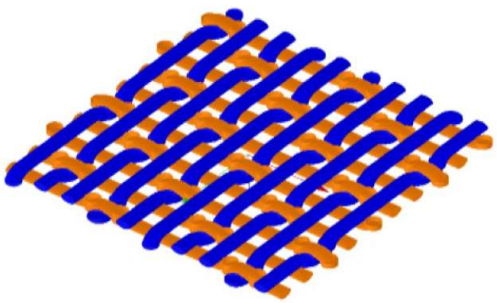
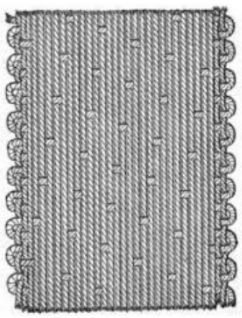


Figure 5.21: Five-end sateen (blue weft is at the face side)



Satin and Sateen Weaves

To make the effect of the warp floats more prominent, following steps are adopted.

✓Use of coarser warp threads than the weft threads

✓Use of higher ends per inch (epi) than the (ppi)

Satin and Sateen Weaves

For the construction of sateen weave, a feasible move number is chosen.

Using this move number, only those points are marked on the point paper where the end is floating over the pick.

Sateen weave (weft faced) can be converted to satin weave (warp faced) by interchanging the crosses with blanks and vice versa.

Satin and Sateen Weaves

For a seven-end sateen weave, probable move numbers are 1, 2, 3, 4, 5 and 6.

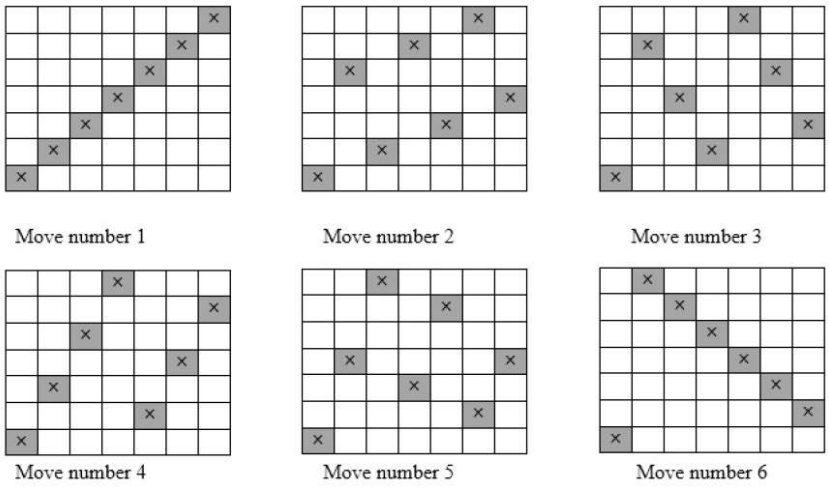


Figure 5.20: Seven-end sateen with various move numbers

Satin and Sateen Weaves

But, move number 1 and 6 (n-1, where n is the repeat size of the weave) produce twill weaves.

Only move numbers 2, 3, 4 and 5 produce valid sateen weaves.

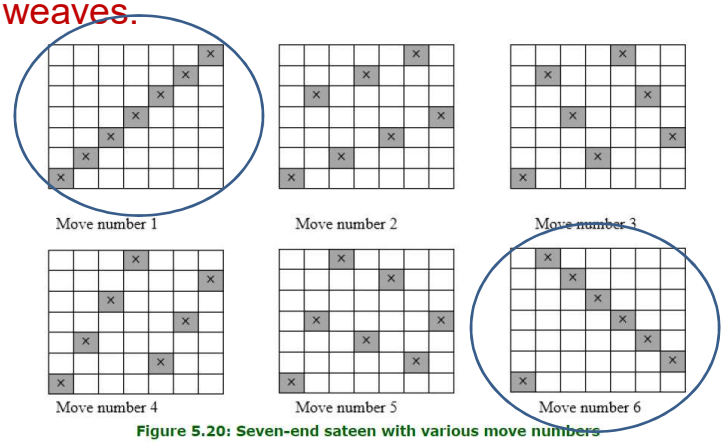


Figure 5.20: Seven-end sateen with various move numbers

Satin and Sateen Weaves

If move number is 1 or n-1 then twill weave is produced.

If a six-end sateen weave is designed with move numbers of 2, 3 or 4, then following interlacement pattern will be produced

But, there are certain ends without any interlacement.

Therefore, 6 end regular sateen (or satin) weave is not feasible

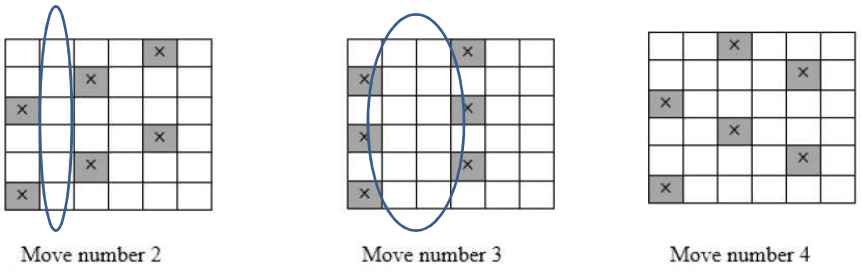


Figure 5.22: Six-end sateen

Rules for Making Sateen Weave

1. Move number 1 and (n-1) cannot be used as twill weaves are produced.

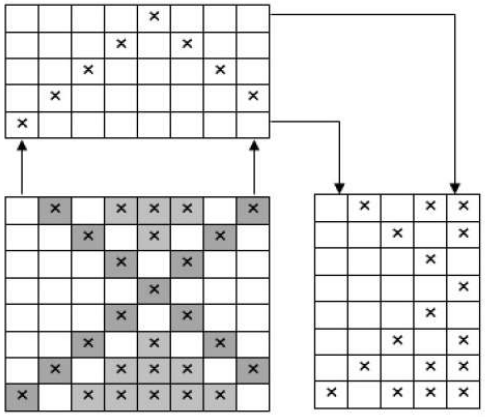
2. Move number and repeat size of the design should not have any common factor.

Eg. 6 end sateen does not follow both the rules

Some Fancy Weaves:Honeycomb

Honeycomb weave shows prominent diamond shapes on the fabrics created by the long floats of ends.

Honeycomb weave having a repeat size of 8×8



3: Design, drafting and lifting plan of Honeycomb

Some Fancy Weaves:Honeycomb

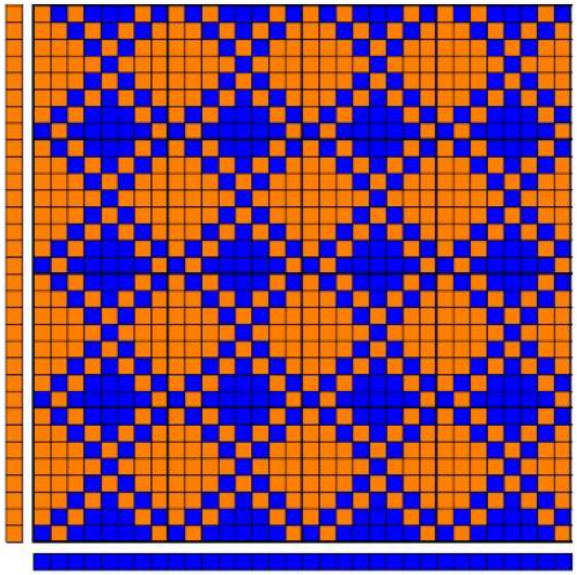


Figure 5.24: Extended view of Honeycomb weave

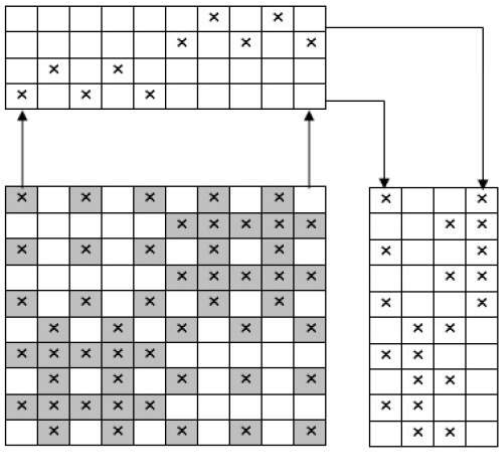
Some Fancy Weaves: Mock Leno

Some of the ends have frequent interlacement whereas the other ends have long floats.

The fabric shows small holes created by the grouping of threads.

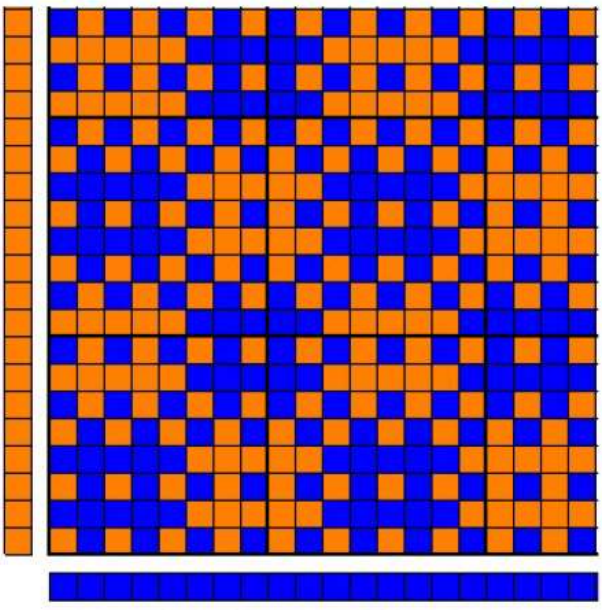
A mock leno weave having a repeat size of 10×10

Only four healds are needed



.25: Design, drafting and lifting plan of Mock leno

Some Fancy Weaves: Mock Leno

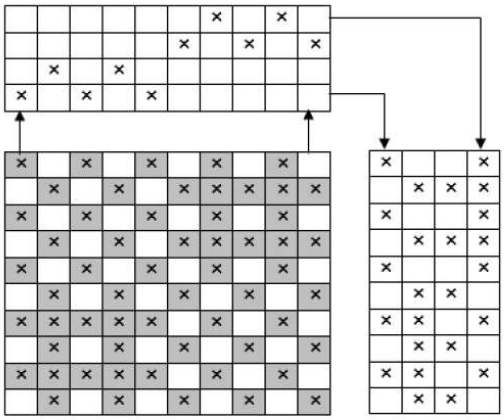


Some Fancy Weaves: Huck-a-Back

Similarity with Mock leno.

Top-right and bottom-left corners are having similar interlacement pattern like Mock leno.

However, the remaining two quadrants have plain weave like interlacement pattern.



27: Design, drafting and lifting plan of Huck-a-back

A 10×10 Huck-a-back design.

Some Fancy Weaves: Huck-a-Back