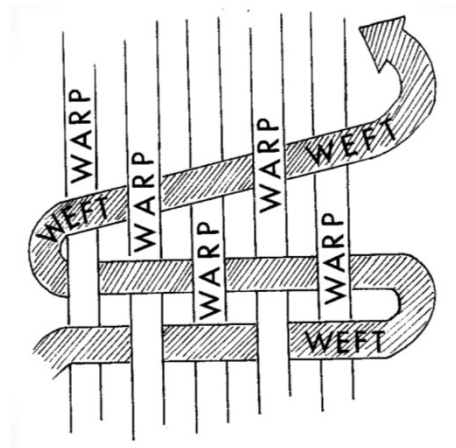
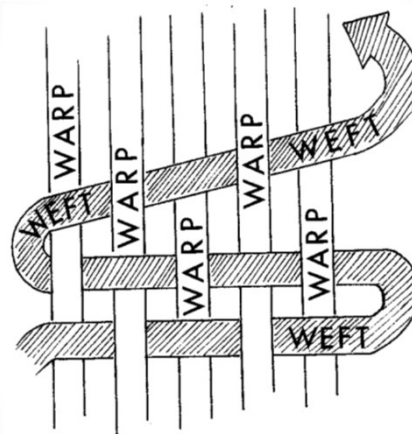


## Weave design



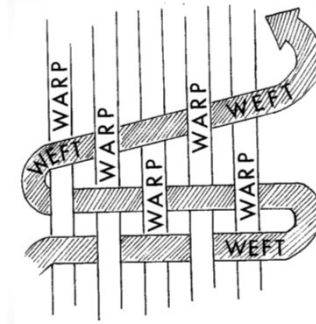
### Characteristics of Warp

- Runs parallel to selvedge
- Usually thin (fine) yarn
- Stronger
- Has more twist
- Greater in numbers
- Straighter and more parallel
- If filament and staple yarns used in fabric, the warp is usually the filament yarn.



## Characteristics of Weft

- 90 degrees / perpendicular to the selvage
- Bulkier
- Less strength
- Low twist
- More hairiness
- If filament and staple yarns used in fabric, staple is usually used in the weft / fill.



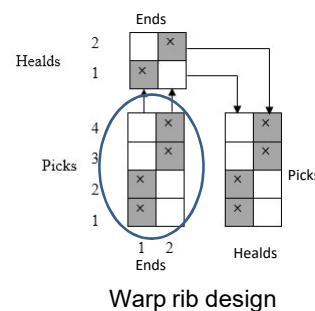
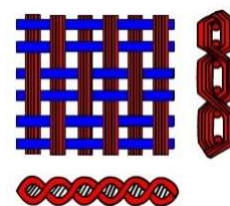
## Weave Design

Fabric weave design implies the **pattern of interlacement** between the warp and weft yarns.

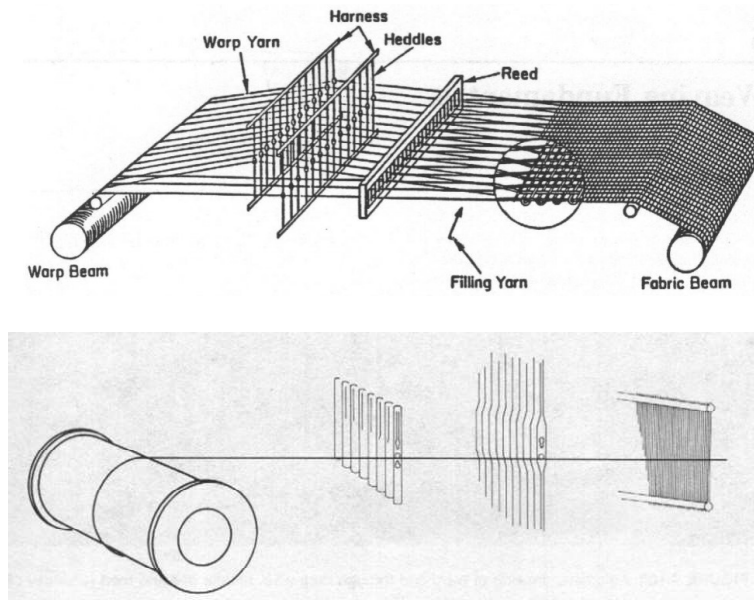
The design influences the **aesthetics** as well as the **properties** of the woven fabrics.

The design is constructed on point paper by using **cross (x)** and **blank**.

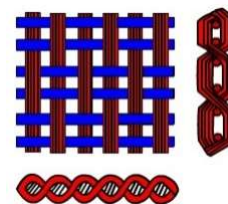
The **cross** means that the **end is passing over the pick** and vice versa



## Passage of warp yarn on loom



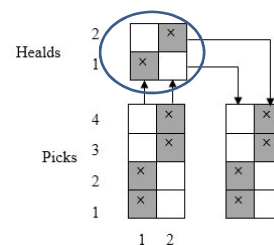
## Drafting



Drafting determines the **allocation of ends to healds** i.e. which end will be controlled by which heald.

Generally, drafting is made in such a way that **minimum number of healds is required** to produce a particular design.

In case of drafting, a **cross means that the heald is up** and a blank means that the heald is down.



Warp rib design

## Straight Draft

**Diagonal line** is created by the crosses

This implies that end one is controlled by heald one, end two is controlled by heald two and so on.

e.g. **Plain weaves**

Healds	4				x
	3			x	
	2		x		
	1	x			
		1	2	3	4
		Ends			

## Pointed Draft

**Pointed line** is created by the crosses

The repeat of the design contains **more than one ends with similar interlacement pattern**.

For example, ends 1 and 7 are allocated to one heald (heald number 4).

e.g. **Twill weaves**

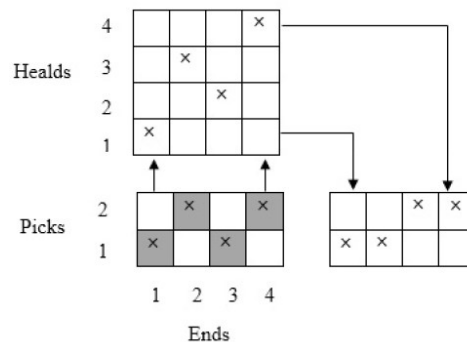
Healds	1				x				x
	2			x		x			
	3		x				x		
	4	x						x	
		1	2	3	4	5	6	7	8
		Ends							

## Skip Draft

For **heavy (high areal density)** plain woven fabrics, the number of ends is very high.

Skip draft uses four healds instead of two healds

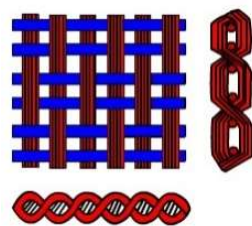
Hence, **number of ends controlled by a single heald becomes less**



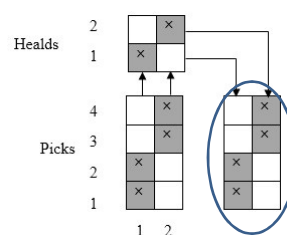
## Lifting Plan

Lifting plan shows the **position of healds (up or down)** for different peaks i.e. which heald or healds will be lifted in which pick.

Lifting plan is shown at the right hand side of weave design.



Warp rib interlacement pattern



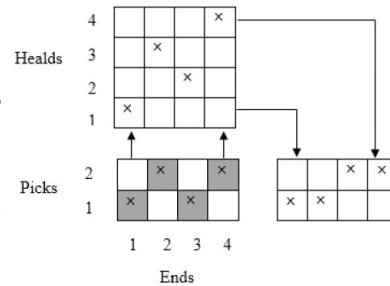
Warp rib design

## Skip Draft

Lifting plan shows that for the 1<sup>st</sup> pick, healds 1 and 2 are in up position and healds 3 and 4 are in down position (opposite in second pick)

Therefore, healds 1 and 2 (or healds 3 and 4) can be tied or coupled together with ropes or strings and their shedding operation can be controlled by a single cam.

Thus, skip drafting helps to reduce the number of mechanical components (cam, follower, treadle lever etc.) in the loom.



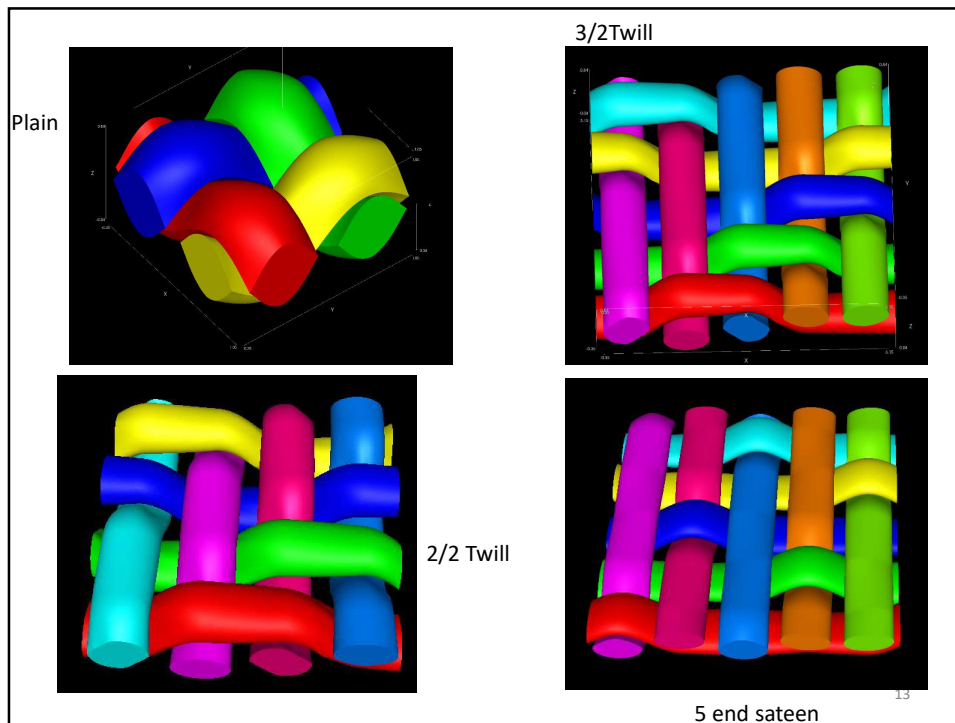
## Simple Weaves

The following weaves are the most popular in woven fabrics.

Plain weave and its derivatives

Twill weave

Satin and Sateen weave



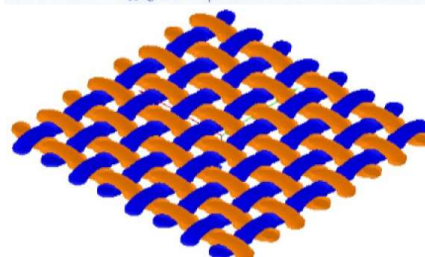
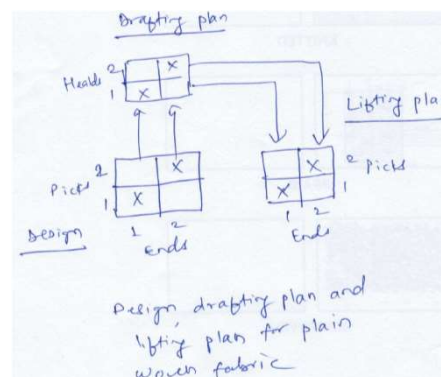
## Plain Weave

Simplest and most commonly used weave.

The repeat size is **2x2**, which implies that the weave repeats on two ends and two picks.

It gives maximum number of interlacement and firm fabric

Higher crimp due to more interlacements



## Derivatives of Plain Weave

Warp rib

Weft rib

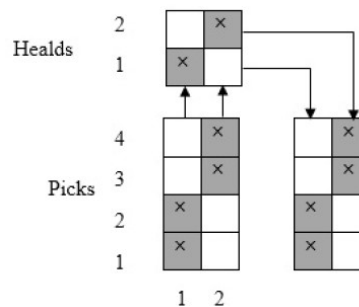
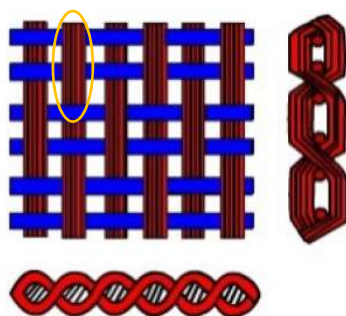
Matt (basket)

## Warp Rib

Two neighboring picks move in a group

Prominent ribs become visible in the warp direction

The picks undergo more number of interlacement than the ends and therefore higher weft crimp

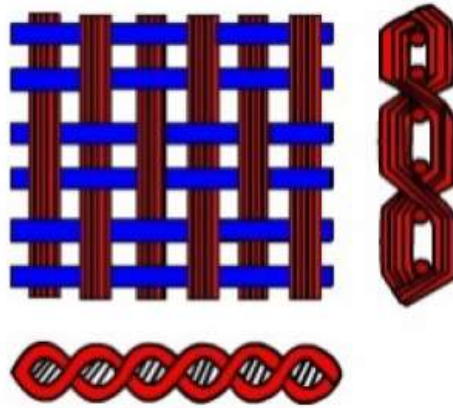




### Warp Rib

Warp rib have more tearing strength in the warp direction as compared to the plain woven fabrics

Two neighboring picks resist the tearing force together in a pair resulting in higher tearing strength in warp

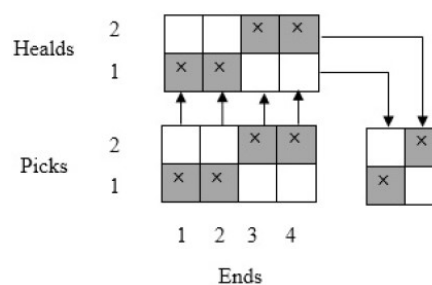
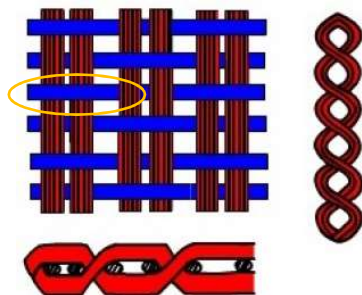


### Weft Rib

Two neighboring ends move in a group

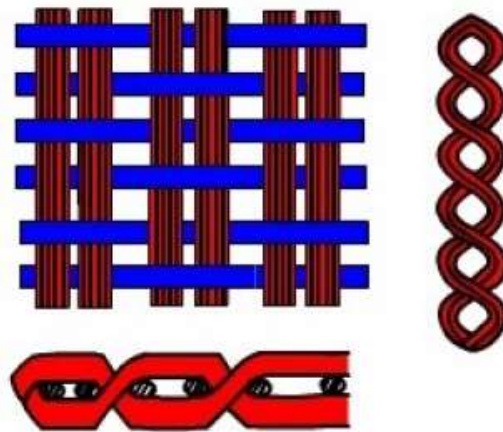
Prominent ribs become visible in the weft direction

The ends undergo more number of interlacement than the picks and therefore higher warp crimp



### Weft Rib

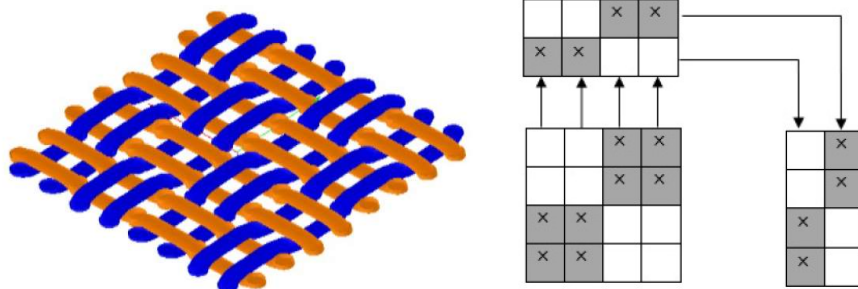
Weft rib have **more tearing strength in the weft direction** as compared to the plain woven fabrics



### Matt or Basket Weave

Multiple ends and picks interlace with each other in a group.

In 2×2 matt weave, two ends and two picks form pairs and interlace in the form of plain weave



### **Matt or Basket Weave**

Tearing strength of matt woven fabrics is higher in both directions as compared to that of equivalent plain woven fabrics.

