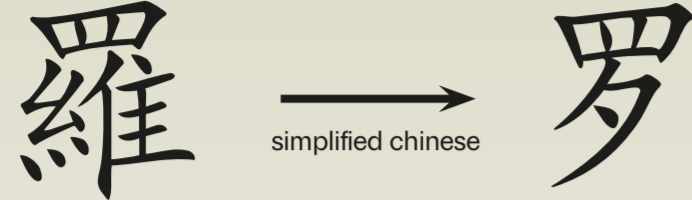


300-201 BC

Early mentions of leno weave appear in the ^{ěr yǎ}尔雅, the earliest surviving Chinese dictionary and encyclopedia. It describes a weave structure used as netting for catching birds named ^{luó}羅. Later definitions include: gauze, lightweight fabric, to collect, to gather.



712-770 AD

The poet ^{Dù Fǔ}杜甫 writes about ^{luó}羅, a luscious and luxurious embroidered silk leno.

"Splendid silk Leno, gold couching embroidered with Kirin in silvery yarn and peacock in golden threads, shimmer in the light of late spring sunshine."

繡羅衣裳照暮春，
蹙金孔雀銀麒麟。

With the arrival of larger scale textile production, production techniques and apparatus are lost.

1987

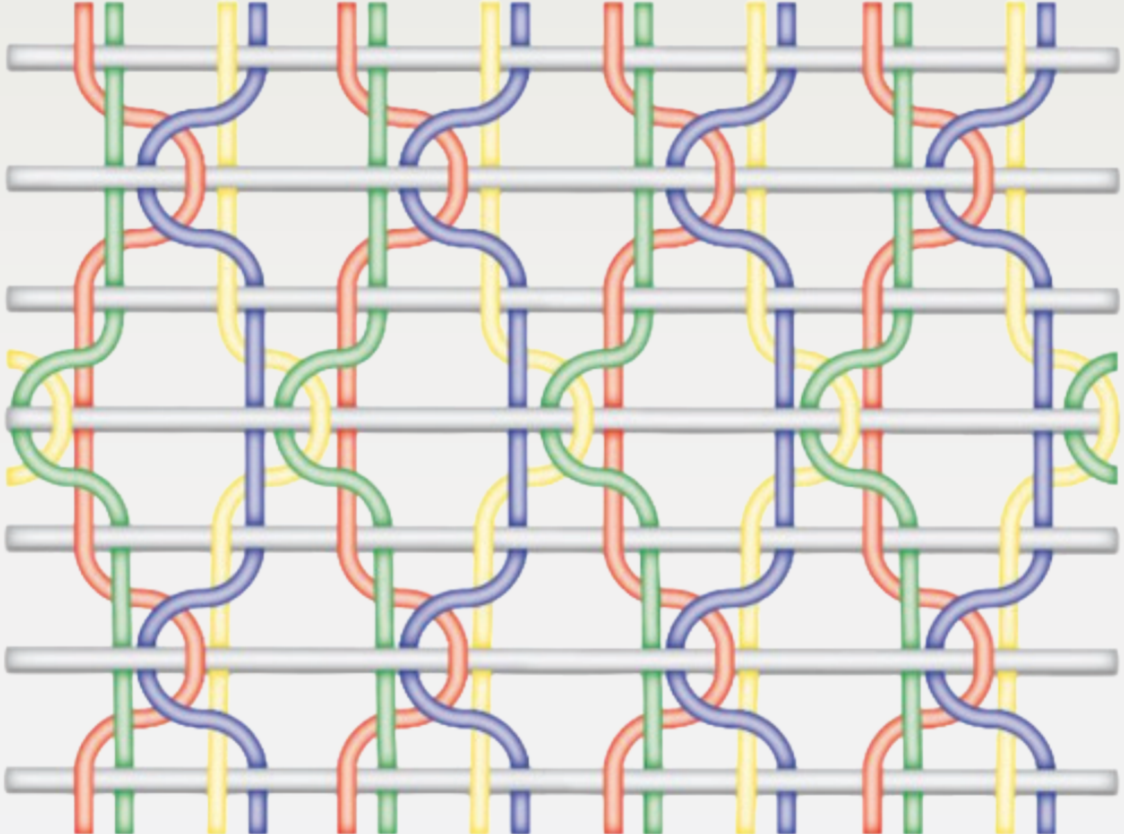
Archeological excavation in the Famen Temple unearths leno apparel of Empress Wu Zetian in the Tang Dynasty, known as Jiang Hong Luo Di Cu Jin Xiu.

Leno Weave

Properties

Leno is described as a **thin, soft, light** and **airy** fabric. These properties stem from the weave **structure** itself as well as the **yarn used**. Leno weave is defined by the action of **twisting warp yarns to adjacent warp yarns** (and non-adjacent for more complex structures), inserting the weft yarn between a warp twist and a warp counter-twist. This creates "**pockets**" through which air and light can pass, creating a **porous** structure and accounting for the observed light and airy properties and unique breathability. Despite this porosity, the **weft remains in place**, meaning it can't move vertically.

Due to leno's structural twists, warp yarns need to be **strong** as to not break under twisting tension, and **smooth** to minimise yarns getting caught to each other. Historically complex leno fabrics were made out of **silk** as it is the only **natural filament fibre**. Additionally, incorporating a **structural twisting motion** could further **strengthen** the fabric.



Front view of traditional Chinese non-fixed four-warp leno.

Potential Applications

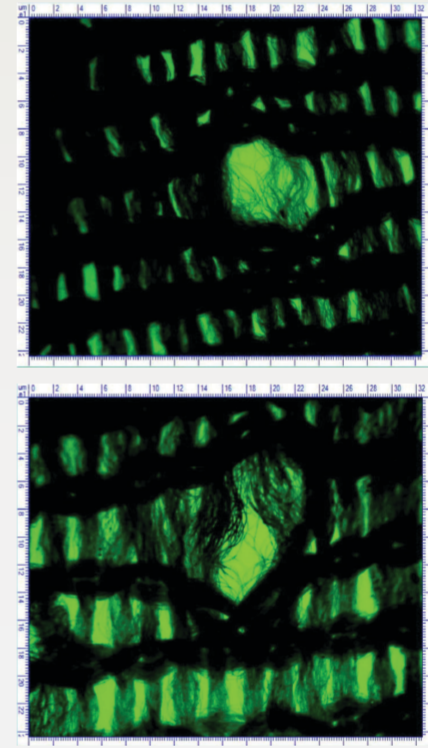
Sportswear

Leno structures demonstrate several properties that are highly relevant to **sportswear**, particularly **breathability, moisture transmission, lightness, and structural stability**. Research indicates that **non-fixed four-warp Leno may be especially effective in ventilated zones** such as underarm or back panels, where **thermophysiological comfort** is critical. Its **self-locking open geometry** can maintain **porosity** under load, which distinguishes it from less stable open meshes. These features suggest suitability for performance-oriented garments requiring both airflow and mechanical reliability.



McKinsey & Company, 2024

Technical Textiles

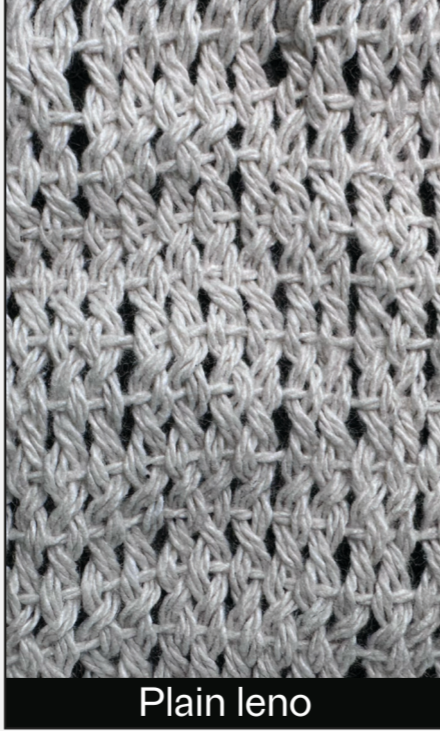


Shaker et al., 2020

Leno has considerable potential within technical textiles due to its **ability to combine openness with mechanical reinforcement**. Identified applications in **protective, medical, and reinforcement textiles**, particularly where **puncture resistance, yarn pull-out resistance, and controlled permeability**. Hybrid constructions, such as Leno combined with twill or plain structures, may enhance functional performance while retaining ventilation. This makes Leno relevant to applications such as **stab-resistant layers** or **permeable reinforcements** for high-performance materials.

Conservation of heritage textiles is a form of sustainability

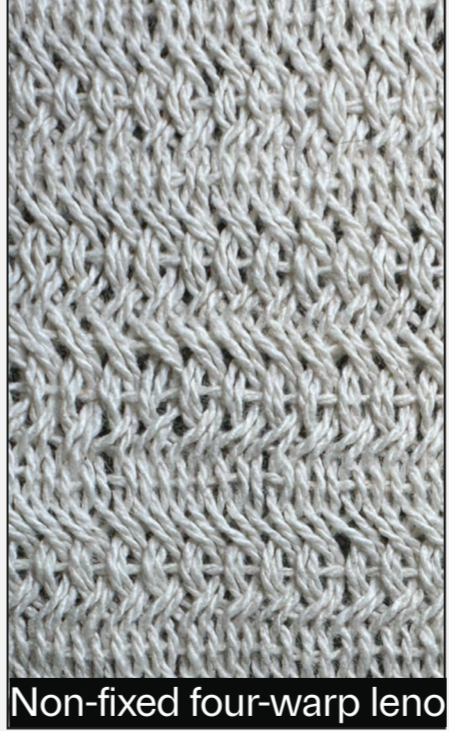
The conservation of heritage textiles can be understood as a **dimension of sustainability** that extends beyond environmental performance to **include cultural continuity, embodied knowledge, and local craft economies**. In the context of Chinese non-fixed Leno, preservation supports the retention of **rare weaving expertise** that is increasingly at risk of disappearance. This approach aligns with **slow fashion principles** by valuing **durability, repairability, and long-term cultural significance** rather than short-term consumption.



Plain leno



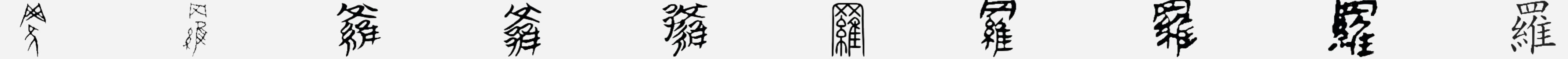
Non-fixed two-warp leno



Non-fixed four-warp leno

Scalability: navigating the divide between conservation and overproduction.

Scalability presents a **central tension** in the development of Leno, as wider mechanisation may improve accessibility but also **risk detaching the structure from its heritage context**. Mass production could reduce Leno to a **novelty fabric**, encouraging **overconsumption** rather than **sustainability**. A more responsible model of scalability would therefore prioritise **limited production, artisan collaboration, and clear heritage attribution**. In this framework, value is created through **quality, longevity, and specificity** rather than volume.



Oracle script (~1250-1000 BC) Bronze script (Late Spring & Autumn (~500 BC)) Seal script (Chu (Warring States: 475-221 BC)) Seal script (Chu (Warring States: 475-221 BC)) Seal script (Chu (Warring States: 475-221 BC)) Seal script (Shuowen (~100 AD)) Clerical script (Qin Dynasty (221-206 BC)) Clerical script (Western Han Dynasty (202 BC - 9 AD)) Clerical script (Eastern Han Dynasty (25-220 AD)) Regular script (Modern)