

## Analysis of the Hollowing Design on Knitwear

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### Abstract

*As people's life is in the direction of leisure, freedom and comfort, the requirements of garments have been changed from warm, durable to fashion and beautiful. The individual, fashion and applicative garments become more and more popular, and knitwear is no exception. Overlap, unevenness, and hollowing are the main ways of individual design of knitwear. And the hollowing design is the most popular. Rationale and forming technologies of hollowing have been introduced in this paper; Different effects that the design of hollowing could reach have been analyzed; And different styles of knitwear that use various kinds of hollowing design are generalized at last.*

**Keywords:** Knitwear; Hollowing; Design

### 1. Introduction

With the improvement of people's life and cultural tastes, the requirements of knitwear has also been changed. Not only have leisure, fit and comfort are required, but fashion, beauty and novelty are also asked. So the design of knitwear has brand new demand. Hollowing design is unusual in the innovation of knitwear's style. It is air permeable, artistic, and fashion. Because of its good air permeability and high exposures of skin, knitwear which has hollowing design is just worn in end of spring and early autumn. But with the development of knitting technologies and the variation of fashion trends, the application of hollowing design is more flexible, so the wearing of hollowing knitwear has no seasonal restrictions and hollowing design has satisfied the requirements of people's pursuit of individuality and fashion.

### 2. Shaping Technologies of Hollows on Knitwear

The shaping technologies of hollow on knitwear have become more plentiful because of the change of human's aesthetic taste and the development of modern machinery and equipment. Shaping technologies mainly include as follow.

#### 2.1 Using Loop Transfer Structure to Shape Hollows

Loop transfer structure is to move some loops from one longitudinal structure line to another longitudinal structure line according to requirements of pattern design. And using loop transfer structure to shape hollows is a basic method<sup>[1]</sup>.

Because there are two ways to transfer loops, loop transfer structure has two styles, including cross stitch and cable stitch. Cross stitch is to move loops to difference orientations to shape hollows on knitwear<sup>[2]</sup>. Figure 2-1 is the loopydiagram of cross stitch. Cable stitch is to transfer the loops which are adjacent on the basis of the requirements of pattern. Hollows also can be shaped by cable stitch. Figure2-2 is the loopydiagram of cable stitch. The style of hollow on the knitwear would be monotonous only using loop transfer structure. So it could be varied if coordinates knockover, as shown in the Figure 2-3.

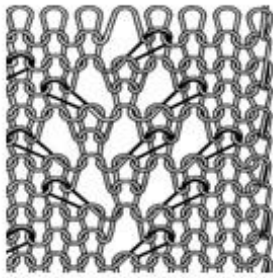


Fig. 2-1 Cross stitch  
loop diagram

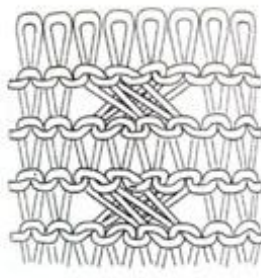


Fig. 2-2 Cable stitch  
loop diagram



Fig. 2-3 Loop transfer  
coordinates knockover

## 2.2 Using Tucking Texture to Shape Hollows

The hollow shaped by tucking texture is to use tuck loops to form uneven tiny holes. every tuck loop will form neighbouring holes<sup>[3-4]</sup>. Figure 2-4 is the loop diagram of tucking texture. With drawing yarns of the adjoining loops, loops in the unit of tucking texture will lengthen. But the height of tuck loops is unequal with other loops' which are in the same line, and this forms an uneven surface. The more uneven surface of fabric is, the bigger hollow will be.

## 2.3 Using Needle-Out Structure to Shape Hollows

Hollowing pattern shaped by needle-out structure is maverick, exaggerated and artistic. The size and distribution of hollows are all optional, as shown in the Figure 2-5. If want to form large area of hollow, we can use needle-out structure and loop transfer structure in the same time. when weaving fabric, we just need to move the needle-out parts to the neighbouring knitting needles, then let the needles quit working and return to work after other needles having woven several line.

## 2.4 Using Dropped Loop Structure to Shape Hollows

Dropped loop structure is to drop stitch in the parts that are needed hollowed, which ends connection in longitudinal structure line and then shape hollow. The size of hollow is according to the number of neighbouring knitting needles of dropped stitch<sup>[5]</sup>. If want to form large area of hollow, dropped loop structure and tucking texture can be used together. The hollowing effect shaped by dropped loop structure is similar to what is shaped by needle-out structure, because they all will not make the yarn to shape a loop, just the state of yarn, as shown in the Figure 2-6.

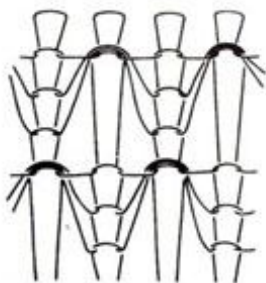


Fig. 2-4 Tucking  
texture loop diagram



Fig. 2-5 Needle-out  
structure



Fig. 2-6 Dropped  
loop structure

## 2.5 To Shape Hollows via Changing the Length of Loop

To shape hollows via changing the length of loop can be easily formed by computerized flat knitting machine. We just make knitting needles that are on the corresponding needle bed form tucking loops in the same time via the needle selection technology of computerized flat knitting machine, and then let them out after weave. Hollows can be made by increasing the length of loops, as shown in the Figure 2-7.

## 2.6 Using Different Thickness of Yarns to Shape Hollows

Weaving fabric with different thickness of yarns make fabric surface has different thickness and density, and then form hollowing effect in thin place, as shown in Figure 2-8.

## 2.7 Using Narrowing and Widening to Shape Hollows

Using narrowing and widening can shape different sizes of hollows according to design. hollows will be free, optional and avant-garde, as shown in Figure 2-9.



Fig. 2-7 Change loops' length



Fig. 2-8 Different thickness of yarns



Fig. 2-9 Narrowing and widening

## 3. Effects of Hollowing Design on Knitwear

There are plenty of shaping technologies of hollows on knitwear and different shaping technologies will form various effects that woven garment cannot achieve. Designers can integrate some of their beauty-appreciation and design concept into innovation of knitwear.

### 3.1 Real and Fantasy Effect

The real and fantasy effect expresses well texture and illusion. That is to say, this effect is a visual feeling which is made by hollowing fabric overlapping with body bare flesh. This effect can be formed by needle-out structure and dropped loop structure, as shown in Figure 2-5 and Figure 2-6. Using different thickness of yarns also can make this effect, as shown in Figure 2-8.

### 3.2 Primary and secondary effect

We can make use of hollowing design to show the primary and secondary effect while the color of hollowing fabric is similar or same with another layer of fabric which overlaps with the hollowing fabric. The technology used in Figure 2-3 is exactly primary and secondary effect that is showed by using hollows to set cable stitch off to advantage.

### 3.3 Functional Effect

Structure optimization also can be promoted by hollowing design. As shown in Figure 3-1, the hollowing parts are just human bones and joints. This application of hollowing design achieves the functionality of the garment design to some extent, and also has visual effect of beauty and individuality.

### 3.4 Pattern Effect

Taking advantage of hollowing design to form patterns is a common technique of knitwear design. Geometric and natural patterns (such as flower and animal patterns) are the main patterns. Geometric patterns are mainly shaped by computerized flat knitting machine and knitting pin, as shown in Figure 3-2. But the flower patterns are principally formed via crochet hook, and they are different and varied, as shown in Figure 3-3.



Fig. 3-1 Functional effect Fig. 3-2 Geometric pattern effect Fig. 3-3 Flower

#### **4. Styles of Knitwear Formed by Hollowing Design**

Clothing design style is an integral visual effect of full collision force, which is formed by all components of clothing design such as colors, fabrics, style and clothing accessories<sup>[6]</sup>. Different hollowing techniques will form different knitwear styles, such as follows.

##### **4.1 Classic Style**

Hollowing design of classic knitwear style is usually more simple and generous, but it is unique and can withstand the test of time, and accepted by most people. The hollows of this style is small and close and forms a relatively conservative sexy, as shown in Figure 4-1.

##### **4.2 Lovely Style**

Hollowing design of lovely knitwear style focuses on showing girls' cute, humorous, simple and plain intrinsic nature. The color of this style is pure, fresh, soft and lively. In the meantime, color lightness is taller. In this style design, knitwear will be ornamented with lace and bow-tie frequently to express young girls' feelings of beauty. What's more, patterns of lovely cartoon and concise geometry are also powerful expression of lovely style. The hollows of this style is small, and the entirety is concise and not heavy or complicated, as shown in Figure 4-2.

##### **4.3 Rural Style**

In the hollowing design of rural knitwear style, floral print and checks are the main performance materials. And this style knitwear is always interspersed with bright color falbala to bring a feeling of leisurely rural life and a spirit back to nature. Rural style are often have regular hollowing shapes that have outstanding details but no complication. we will feel a warm and sweet mood rural style design, as shown in Figure 4-3.

##### **4.4 Complex Style**

Complex style hollowing knitwear is formed by advanced techniques and looks delicate. This style lays emphasis on creation of layered sense of the fabric and processing of details. Hollowing effect of complex style always has exaggerated and gorgeous patterns. The sizes of hollows are discrepant. Complex style has luxurious and elegant beauty, as shown in Figure 4-4.



Fig. 4-1 Classic style Fig. 4-2 Lovely style Fig. 4-3 Rural style Fig. 4-4 Complex style

#### 4.5 Romantic Style

We can experience the feelings of femininity, grace, soft and elegance by romantic style hollowing knitwear. The romance that is presented by romantic style knitwear is a new sense of interpretation. In other words, it is a regression of radical and unaffected romance elements<sup>[7]</sup>. The hollows of this style is small and close, but has a special distribution. This style pursues a kind of unaffected, soft and emotional beauty, as shown in Figure 4-5.

#### 4.6 Casual Style

Blocks, strips and words are often use as ornament in casual style hollowing knitwear. A great number of people love to wear this style knitwear because it is full of vigorous and urban breath. Concise line, brief material and pure color are the main features of this style. The distribution of hollow is casual, with no limitations. It expresses a leisurely psychological state. Knitwear in Figure 4-6 is a typical example of casual style.

#### 4.7 Avant-Garde Style

In pursuit of expressing individuality to break the habits is the main feature of avant-garde style hollowing knitwear. Concealing, thermal protection and cold-proof functions are not the considerations of avant-garde style hollowing knitwear design any more. Understanding, attitude, idea, and emotion of life will be expressed in knitwear. Hollows of this style are big and exaggerated. Knitwear has regular mixed irregular distribution and artistic post-modern flavor, as shown in Figure 4-7.



Fig. 4-5 Romantic style



Fig. 4-6 Casual style



Fig. 4-7 Avant-garde

### 5. Conclusion

After entering the new century, personalized and fashionized hollowing design of knitwear follows the changing trend of public lifestyle. Hollowing design plays an important role in knitwear design and has broad promotion space and unlimited business opportunities. With today's post-industrial highly developed, computerized flat knitting machine is widely used in knitwear industry and becomes the main equipment to shape hollow because it has multiple forming technologies. It can form variety of effects when used together with crochet hook and knitting pin.

Different style of hollowing knitwear can be formed by using various technologies, diverse yarn, multiple distribution and different size of hollow. Different knitwear meet different preference of people and open up a broader market.

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