

## Technological Approaches in the Manufacturing of Arans

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### Abstract

Arans are a set of basic loop elements. Their physico-mechanical indicators are determined by the way these units are arranged in the module and by the technological parameters of knitting machines. Knowledge of the structural features and technical capabilities of knitting machines guarantees a final product without defects.

**Keywords:** arans, physico-mechanical indicators, defects.

### 1. Introduction

The modules under consideration are complex three-dimensional structures. Their combinations leads to the production of spectacular knitwear with certain physico-mechanical indicators. The requirements for the appearance and operational qualities of the final product predetermine the way of its manufacture, the technology used in its design and production. And it also determines the raw materials that are used to create it. Last but not least, the time needed for the development of the structures under consideration is also important. It must be consistent with the technical specifications of the machines and the quality indicators of the yarn.

### 2. Classification and Approaches

Taking into account the configuration of the structural elements that make up the arans, it is necessary to develop technologies that complement and upgrade the technologies of knitting basic structures. In this regard, the types of arans should also be considered.

Depending on the number of intersecting loops, the arans are divided into single-loop, two-loop, three-loop (Fig. 1.1, Fig. 1.2, Fig. 1.3). This classification is made depending on the number of criss-crossing front stitches. In rarer cases, the aran can also contain 4 front stitches - this is done when knitting with more elastic yarn or knitting with loops with a longer yarn length. In most structures, arans are made on a reverse base. Based on the number of stitches that are crossed, the steps of displacement of the needle bed are also determined.

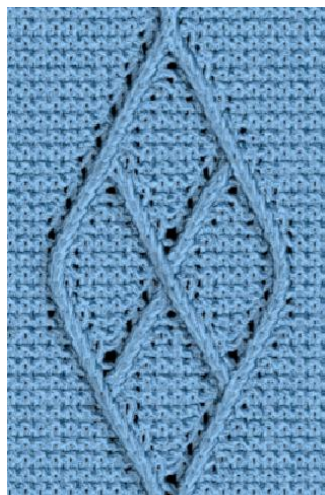


Fig. 1.1: Single-loop aran

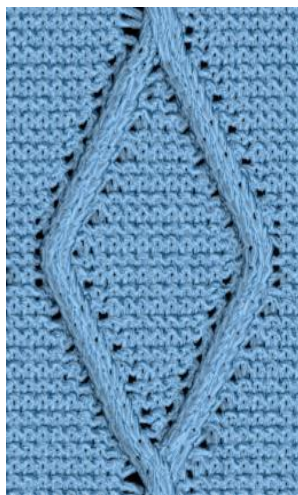


Fig. 1.2: Two-loop aran

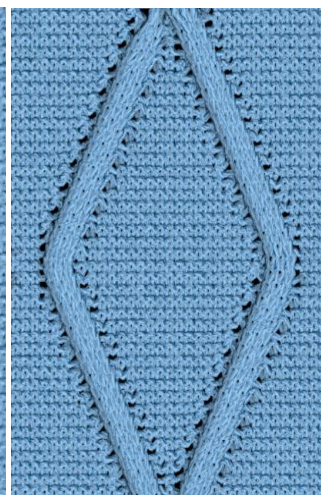


Fig. 1.3: Three-loop aran

Figures 1.4, 1.5 and figure 1.6 show the process of sequences for the pattern of a single-loop, two-loop and three-loop aran with a left slope.

The most at risk of destruction is the single reverse loop, which intersects with the group of front loops, that determine the slope of the aran. To avoid dropping from the needle or tearing this loop, several methods can be applied.

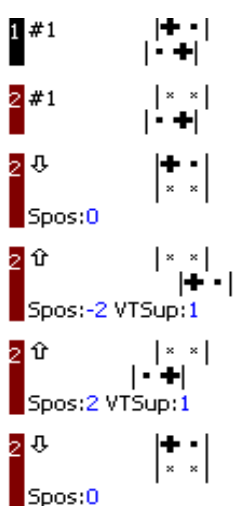


Fig. 1.4: Scheme of a single-loop aran with left slope

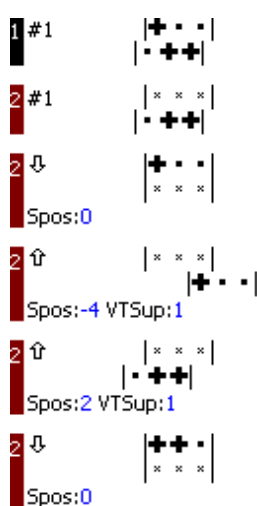


Fig. 1.5: Scheme of two-loop aran with left slope

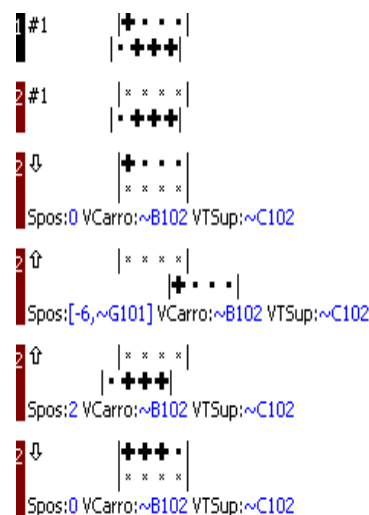


Fig. 1.6: Scheme of three-loop aran with left slope

One of them is to lengthen the loop by not knitting in the corresponding loop row. Another way to alleviate crossover is to place a displacement correction, when the needle bed is displaced by more needle steps. An alternative that can also be used is to set an additional "+1" point – a half needle step needle bed offset. In this case, the machine, instead of shifting its needle bed by the required number of steps, shifts the bed half a needle step more to stretch the stitch and prepare it for the transfer, after which it returns to the break necessary to cross the loops.

Other major factors affecting knitting structures are the speed of movement of the carriage and the strength of the pulling mechanism. With structural parameters that do not imply the destruction of knitting, these indicators take standard values. But with a large displacement of the needle bed, boundary densities and low strength characteristics of the yarn, they must be sufficiently understated. Additional auxiliary techniques for transporting loops when crossing with displacement of the needle beds are to adjust the sinking levels of the transporting and receiving needles in the needle beds after the action has been performed.

Last but not least, the need to transfer forward the reverse loops, surrounding the arans and their subsequent return after the completion of the crossing of loops, can be indicated.

### 3. Conclusions

The technologies for the production of arans are developed according to their structural features, the quality of the raw material used, the technical specifications and the production requirements of the machine. Depending on the size of the displacement of the needle bed, all additional loop transfers from the structure are set. At critical values of yarn strength, a combination of all technological techniques mentioned above is used.

### References

1. Charalambous A., A New Approach to the Study of the Structure of Transverse Knitted Knits, Textiles and Clothing 3'2017,
2. Charalambous A., Knitting Structures Aran., Textile Industry 11/12'95,
3. David J. Spencer., Knitting Technology,2001
4. Steiger Library.

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