RESEARCH ON IMPROVING THE TEMPERATURE STORAGE OF NEEDLES OF SEWING THREAD USED IN SEWING

Maksudov Nabijon Bohodirovich
Namangan Institute of Industrial Technology
Doctor of Technical Sciences Associate Professor
E-mail: maqsudovnabijon@mail.ru
Tel:+998943073947

Boymatova Kamola Abdurakhman's daughter
is an assistant at Namangan Institute of Industrial Technology
E - mail: kamola boymatova@gmail.com
Tel: +99894 174 34 14

When it comes to sewing, needle temperature has a significant effect on stitch strength. As the temperature increases, the sewing strength in fabrics is affected. Therefore, a thorough understanding of the relationship between needle temperature and stitch strength is essential if you want to achieve superior sewing results. Keeping the needle at the optimum temperature is an important factor in ensuring that the finished fabric holds up well against stress and wear. Needle temperature control is an important aspect of achieving a successful sewing result.

An increase in temperature affects the strength of seams in fabrics. It is important to understand the relationship between needle temperature and stitch strength to achieve optimal sewing results. When it comes to sewing, needle temperature has a significant effect on stitch strength. As the temperature increases, the sewing strength in fabrics is affected. Therefore, a thorough understanding of the relationship between needle temperature and stitch strength is essential if you want to achieve superior sewing results. Keeping the needle at the optimal temperature is an important factor in ensuring that the finished fabric holds up well against stress and wear. Controlling the needle temperature is an important aspect of achieving a successful sewing result.

A mathematical model can be used to model the effect of needle temperature on stitch strength during sewing. The model is based on the following equations: The mathematical model mentioned above provides a systematic approach to estimate the stitch force based on the needle temperature during sewing. The new operation "Mathematical model of reduction of needle temperature strength during sewing process by melting polyester thread" can be used to modify the model. In practical applications, this modified model can be very useful for the garment industry in polyester sewing, as it helps manufacturers to produce high-quality garments more cost-effectively. The modified model includes a set of equations that take into account various parameters such as stitch density, fabric type, sewing speed, and polyester thread melting point. The model aims to optimize the temperature to achieve maximum stitch

strength, taking into account the decrease in stitch strength that may occur due to the melting of polyester thread. [1]

The modified model shows that an increase in needle temperature leads to an increase in heat transfer rate and stitch strength, but this is limited by the melting point of the polyester yarn. When the temperature exceeds the melting point, the strength of the seam decreases due to excessive melting and thermal degradation. Needle temperature monitoring is critical for optimal results, and it is important to keep the temperature in the optimal range, taking into account the reduction in stitch strength due to melting of the polyester thread.[49]

The model shows that an increase in needle temperature leads to an increase in heat transfer rate and seam strength. However, when the temperature exceeds the critical temperature, the weld strength decreases due to excessive melting and thermal degradation. A mathematical model can be used to predict the effect of needle temperature on stitch strength during sewing. This model can be used to optimize the sewing process and achieve better results. To maximize stitch strength, it is important to monitor the needle temperature to ensure it is within the optimal temperature range.[2]

Synthetic sewing threads (such as nylon, polyester, Kevlar, and Nomex) used to attach outerwear have good heat resistance. This means that heat doesn't conduct through them as well as materials like silver or copper. But as the temperature increases, some polymers (eg nylon and polyester) melt and lose strength faster than other polymers (eg Nomex). Their reaction to heat is characteristic of their chemical composition. Polyester yarns usually do not recover after 177°C, and we can see a change in their properties at 80-120°C. In our scientific research work, we installed a grease box for thread lubrication on a universal Juki machine, shown in Figure 1.

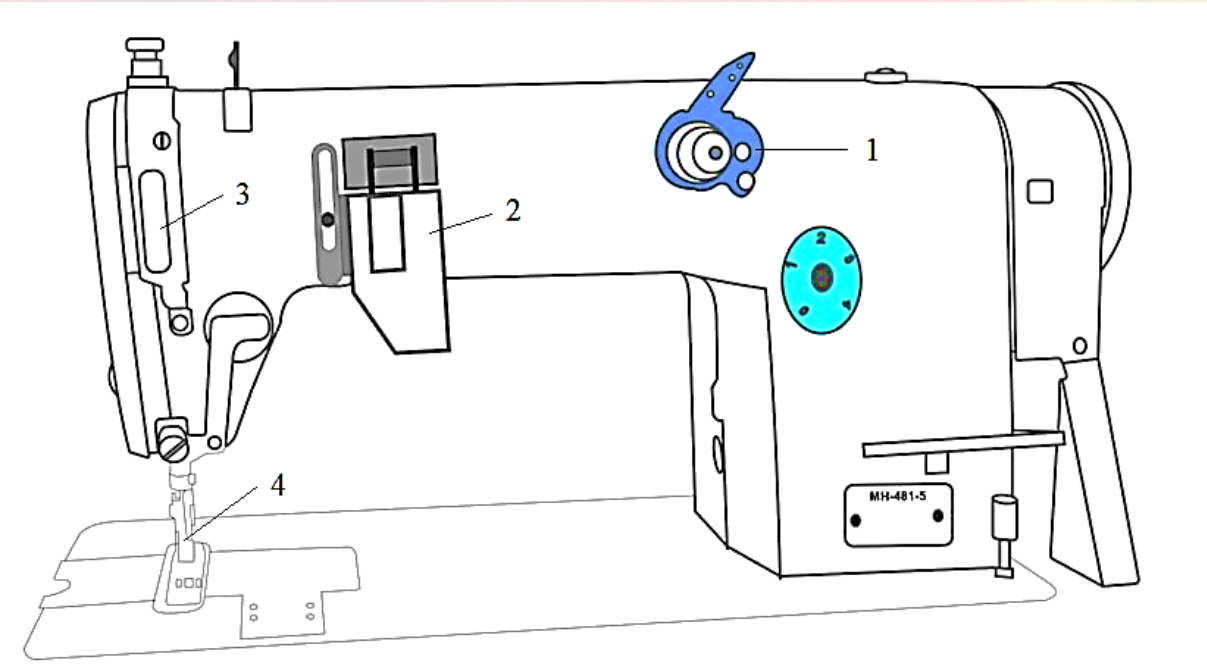

Figure 1. Lubricating machine

To cool the needle, we used a thread lubrication system passing through the needle. We tested the lubrication system at 3 different speeds to see its effect.

We measured the speed of the sewing machine at 1000, 2500 and 4000 speed without using the lubrication system. We also measured the temperature of the needle in 3 experiments to see the initial heating temperature of the needle. we saw that the total time interval was 30 seconds. In 30 seconds, we saw that the temperature of the needle rises to 1400 at our 1st speed, up to 1600 at our 2nd speed, and over 180 0 at our 3rd speed.

We measured the temperature of the sewing machine at speeds of 1000, 2500 and 4000 thousand with the lubrication system in use. During the lubrication process, when the rotation speed was 4000, the cooling rate decreased by 100 0. We can see that the cooling time during the lubrication process started from 20 seconds.

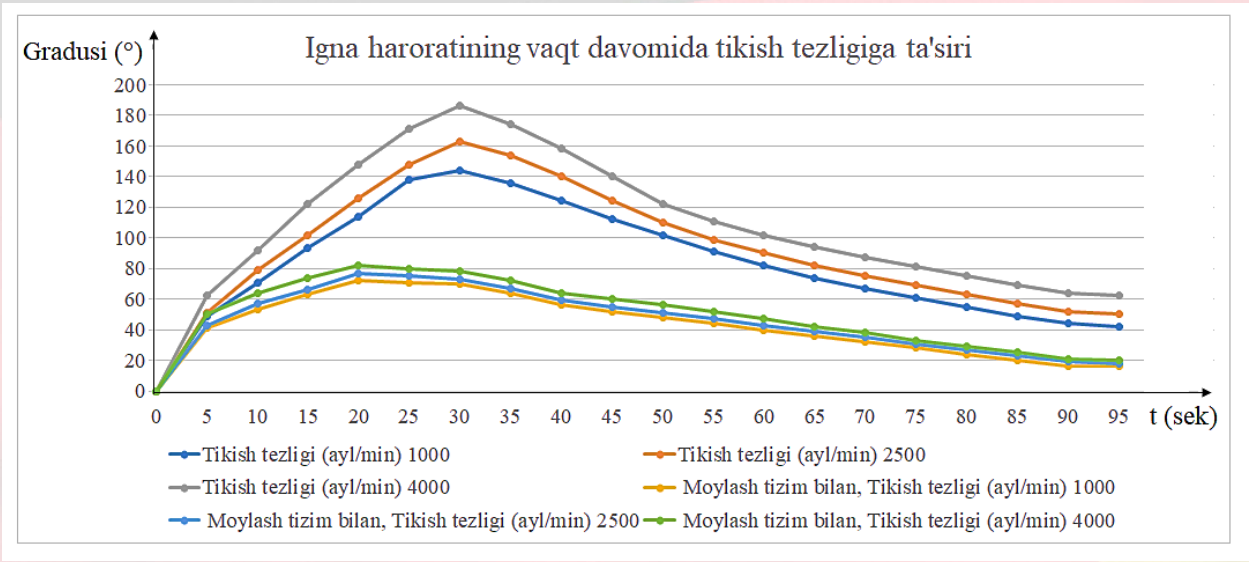

Figure 2. Change of needle temperature over time depending on sewing speed.

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