# Exploring the Common Failures and Routine Maintenance of Jeans Overlocking Machine

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**Abstract**

**Purpose** – This paper explores the common faults and daily maintenance methods of the overlock machine of the jeans production line. The overlock machine is one of the most widely used types of equipment in jeans manufacturing enterprises. It proposes targeted and operative solutions to enhance the regular operation of the overlock machine.

**Design/methodology/approach** – Based on the application of overlock machines in jeans production lines, in-depth research and analysis of overlock machines in jeans production lines, use of case study method, continuous optimization of liberation methods for common faults of overlock machines, clarification of standard operating steps and daily maintenance methods for overlock machines.

**Findings** – For common types of failures such as broken threads, broken needles, skipped stitches, wrong stitches, and sewing material problems in overlock machines, The author goes deep into the production line, tracks the operation of the jeans production line equipment, analyzes the causes of the failures, and propose solutions one by one.

**Research limitations/implications** – Overlock machine troubleshooting does not apply to other sewing equipment, and proficiency requires specialized training.

**Practical implications** – By sorting out faults and solutions, we can maintain a virtuous cycle of overlock machines on the production site and provide hardware for the smooth operation of the production line.

**Originality/value** – The method proposed in this paper guides sewers and production line team leaders to enhance overlock machine maintenance and provides technical references for all types of jeans manufacturers to maintain and repair their overlock machines.

**Keywords:** overlock machine, jeans, sewing failure, routine maintenance

**Paper type:** Research paper

## 1. Introduction

The manufacturing industry in developed countries has developed gradually, while China's manufacturing industry has shown a leapfrog development in a short period. Manufacturing is the main body of China's national economy, and it is a general trend to continuously promote the development of the manufacturing industry (Bi Na, 2022). on February 28, 2022, President Xi Jinping emphasized the need to adhere to the growth of the real economy, promote the advanced industrial base, and accelerate the construction of world-class enterprises. The essence of jeans production and manufacturing is that workers use equipment to complete processing tasks, and sewing equipment is an essential production component. Management of equipment by manufacturing enterprises is a business imperative, and production lines require equipment spot checks and equipment repair and maintenance work, reducing equipment risk (Ma Lili, 2019). The Overlock machine is one of the essential sewing equipment in the jeans production line. How to maintain the movable rate of the overlock machine is the hardware guarantee to improve the efficiency, jeans production line in advance to find out the common failures of the overlock machine for prior management, and do an excellent job of routine maintenance of the overlock machine is the top priority.

## 2. Literature Review

The Chinese jeans production industry has been following the traditional production model, which needs more

effective equipment management and is efficient (Wei Dinghui et al., 2020). Zheng Ji et al. (2017) pointed out that modern high-speed industrial overlock machines generate strong vibrations in each moving component during high-speed operation, which affect their working accuracy, so it is crucial to analyze the dynamic characteristics of high-speed industrial overlock machines and effectively control and manage their whole machine vibrations for overlock machine troubleshooting. Neglecting the maintenance of the equipment during the production process often leads to the undesirable consequence of production line disconnection in case of equipment failure (Song Ying, 2021). Overlock machines, known as lockstitch machines, are generally divided into three, four, and five threads. Their primary function is to prevent the raw edges of garments from becoming unstitched and pilling. Since overlock machines are highly used in the production process of jeans and operate under high loads for a long time, it is imperative to master the causes of their failures and solutions and to learn routine maintenance. Luo Yan et al. (2022) pointed out that jeans are one of the most classic clothing items and have always been loved by consumers. Zhang Fengshuo and Wang Yanzhen (2022) concluded that with the progress of technology and the improvement of people's living standards, jeans have gradually evolved into a diversified, casual, and fashionable versatile product. According to a global market analysis report by Just Style, the global denim market was $57.3 billion in 2018 and is expected to reach $60 billion in 2023, with jeans accounting for more than 75% of the market share of all denim products. Li Siyi (2017) noted that denim fabric is textured, thick, and comfortable. Wear-resistant unique characteristics and his unique weaving method determine that only denim fabric can achieve such process effects as draws and cat whiskers in fabric recycling. It also does not cause damage to the style structure of the garment. Wu Jiaxin (2019) points out that the audience of denim clothing can cross all social categories, such as regardless of class, regardless of race, regardless of gender, and regardless of religion, thus having a wide range of social needs. Li Tingting (2017) pointed out that China is also a large producer of denim garments, and the total production of denim garments is continuously growing. Zheng Peng (2018) proposed the modular production of jeans and divided the jeans product system into four main modules: body module, placket module, pocket module, and waist module. Moreover, empirical research quantifies and analyzes the standard time of each operation unit in production. In the context of the rapid development of China's production manufacturing industry, the existing literature that although many scholars have analyzed the importance of overlock machines in jeans production, from the perspective of jeans production lines and the use of overlock machines. However, more research needs to be conducted involving the types of faults and daily maintenance of overlock machines, leading to a more scattered theoretical level and a severe lack of application level. In general, the existing research has two blind spots: firstly, jeans as a widely used introductory class of garments, so how to manage the overlock machine with a high usage rate in the jeans production line and sort out the types of overlock machine failures in advance is a problem yet to be explored; secondly, how to do the daily maintenance of the overlock machine in the jeans production line to prevent problems before they occur and help improve the efficiency of the production line has not yet been launched for specific analysis. Given the above two gaps, the author will go deep into the production site of the jeans production line. Based on the actual production line, the author analyzes the common failures, daily cleaning, and maintenance of overlock machines, then effectively controls the production interruptions caused by overlock machines and provides technical reference for the maintenance and repair of overlock machines for various jeans production enterprises.

## 3. Research Methodology

### *3.1 Enterprise Site Survey and Research Method*

Visit the production lines of different enterprises, summarize the experience and lessons learned in the use of overlock machines in the production process, collect and analyze field data, take a favorite jeans enterprise as a research pilot, analyze the use of overlock machines in the production process, pre-production preparation, production process control, and quality control in the production line of the jeans manufacturing enterprise, and summarize the experience for the problems We also discussed and learned from the employees.

### *3.2 Case Study Method*

According to the application of the overlock machine in the jeans production line, we continuously optimize the liberation method of common faults of the overlock machine to improve production efficiency and reduce cost. In-depth research and analysis of overlock machines in jeans production lines to clarify the standard operating steps and daily maintenance methods of overlock machines and to verify the effectiveness and practicality of the proposed solution measures in the improvement study of common faults of overlock machines in combination with actual cases of sewing workers. Through detailed case study analysis, problems are identified from overlock machine practice and summarized for exploration. Based on theoretical and practical research, the efficiency of jeans production enterprises is continuously improved.

## 4. Research Findings

### *4.1 Common Faults of Overlock Machines and Measures to Solve Them*

#### 4.1.1 Broken Wire

Broken threads in overlock machines can be divided into broken surface threads and broken, bent needle threads. As shown in Table 1, thread threading, not following the steps, wrong thread quality, too muscular thread tension, not returning worn out machine needles or needle guards in time, mismatched machine needles and threads, incorrect needle installation height, and sewing speed too fast can cause broken face lines. Causes of broken bending threads include too muscular thread tension, wrong position of the wire rod, too hot machine needle, and not using high-quality thread.

Solutions for broken threads include threading by standard steps, using high-quality threads and moderately reducing thread tension, replacing worn machine needles or needle guards promptly, keeping machine needles and threads matched, keeping machine needles in place, and reducing sewing speed. Solutions for broken, bent needle threads include moderately reducing the thread tension, adjusting the position of the wire rod according to the standard, controlling the heat range of the machine needle, purchasing high-quality threads, and abandoning inferior threads.

Table 1. Causes and solutions of broken wire failure

| Fault Type | Cause of failure | Solution |
|---|---|---|
| **Cross-sectional lines** | Poor threading, wire entangled in the conductor | Threading according to the steps of the threading diagram |
| | Bad quality of wire | Use of high-quality wire |
| | Wire tension is too muscular. | Reduce wire tension |
| | The needle guard and the machine needle touch, which will lead to thread breakage | Replace worn needle guards or needles promptly. |
| | The needle is too thin, and the thread does not match | Selecting the right machine needle to use |
| | The installation height of the lower bending needle is unsuitable, touching the cloth feeding teeth and needle plate. | Installed in the correct position |
| | The sewing speed is too fast, causing the needle to heat up and cause thread breakage. | Reduced sewing speed |
| **Broken bent needle and thread** | Bending needle picking rod, the wire guide's position is not good enough to make the tension too strong. | Adjustment according to standard adjustment values |
| | Unsuitable position of the wire guide rod, uneven hooking, and broken wire | Adjust the position of the conductor rod regarding the standard adjustment value |
| | Needle heating | Refer to the needle heating value, reasonable control |
| | Too much tension on the bent needle thread | Reduce the tension of the thread and keep the balance of tension with other bent needle threads |
| | Bad quality of wire | Use of high-quality wire |

Source: Jeans Overlock Machine Field Observation Summary, 2022

#### 4.1.2 Broken Needle

A broken needle is a machine needle that is broken by unexpected resistance and obstacles during the sewing process. The main reason is that the needle is caused by collision or friction with the overlock machine parts during operation,

and there are evident traces of being rolled and rubbed where it touches the machine needle [13]. The main reasons for needle breakage are that the machine needle falls in the wrong position, the needle thread tension is too high, the fabric feed teeth are too high, or the machine needle is too low. The needle model and the fabric thickness do not match, and the height of the needle guard is not correct, as shown in Table 2. Timely calibration of the needle drop point position, lowering the needle thread tension, adjusting the fabric feed teeth and the needle height according to the standard, choosing the suitable needle model, and calibrating the needle guard's height are all measures that can effectively solve the needle breakage problem.

Table 2. Broken needle failure causes and solutions

| Fault Type | Cause of failure | Solution |
|---|---|---|
| **Broken needle** | The needle drop position is not correct, resulting in the needle touching the needle plate and presser foot. | Adjust the needle drop point position accurately |
| | Excessive needle and thread tension | Reduces stitch tension |
| | Needle breakage caused by too high feed teeth or too low needle | Adjustment according to standard adjustment values |
| | The amount of protrusion of the upper bending needle is too large, and the height is low. | Adjust the upper bending needle position concerning the standard value |
| | Needle type is not selected correctly; thick fabric selected a fine machine needle. | Choose the correct type of needle, and thick fabrics use thick needles. |
| | Needle breakage due to bending needle touching the machine needle | Adjust the movement of the bending needle to avoid collision with the machine needle |
| **Needle tip damage** | Low needle guard height and poor front and back position | Raise the needle guard and adjust the gap between the needle and the needle moderately |
| | The amount of front and back movement is not suitable, and the bending needle touches. | Adjust the amount of exercise before and after |

Source: Summary of observations of jeans overlocking machines in operation, 2022

4.1.3 Skip Stitch

Skip a stitch, also called skip stitch, is a phenomenon where the threads on both sides of the sewing material are not twisted together after the sewing material has passed through the overlock machine. Overlock machine skipped needles include skipped needle threads during overlocking, skipped needle threads for downward bending, skipped needle threads for upward bending, skipped needle threads for five thread face threads, and skipped needle threads for five bottom thread threads. As shown in Table 3, when the installation position of the wire rod is shifted, poor threading, wrong needle loading direction, deformation of the bobbin tip, dull needle tip of the lower bending needle, incorrect needle height of the upper bending needle, excessive thread tension, inability to produce a suitable thread loop, high needle guard installation, and high needle bending installation height are the leading causes of the needle skipping problem, the targeted solutions include, reasonable adjustment of the wire rod position, following the threading chart given by Targeted solutions include: reasonable adjustment of the wire rod position, threading in accordance with the standard specifications given in the threading diagram, ensuring the correct direction of needle loading, replacing deformed shuttles and machine needles, paying attention to adjusting the installation height of the bent needle, moderately reducing the line tension, but not too low, because too low will lead to unstable wire loop, reasonable adjustment of the needle guard plate height and bent needle installation height, so that it is controlled in a reasonable range.

Table 3. The cause of the skipped stitch fault and the solution

| Fault Type | Cause of failure | Solution |
|---|---|---|
| **Stitch skipping during overlocking** | The needle tip of the lower curved needle is not good and cannot hook to the thread loop. | Replacement of new machine needles |
| | The installation position of the guide bar is too close to the inside, and the picket bar receives too much wire, making the wire ring too small. | Reasonable adjustment of wire rod position |
| | Wrap the wire around the conductor when threading, poor threading | Accurate threading according to the threading diagram |
| | Unsuitable bending gap and return amount | Adjustment about standard adjustment values |
| | The needle and thread pressure plate is deficient, resulting in an unstable thread loop. | Replacement of severely deformed parts |
| | Because the needle heats up, it also skips stitches before it breaks | Refer to the needle heating value, reasonable adjustment |
| | Needle bending, poor needle loading direction | Proper installation of new machine needles |
| | The needle is not in the designated position, especially when the height is too high, can not hook to the thread loop, and skip the needle. | Adjust needle height regarding standard adjustment values |
| **Downward bending stitch jumping needle** | Poor threading | Refer to the threading diagram |
| | Rotating bobbin tip defective, thread loop slipping away | Replacement of deformed parts |
| | Too much thread in the lower bending needle, twisting of the thread loop | Reduction of line volume |
| | Lower bending needle return amount, upper bending needle height, upper and lower bending needle intersection gap bad | Refer to the standard adjustment value |
| **Upper bending stitch jumping needle** | The needle height is not correct can not hook to the line | Accurate needle height adjustment |
| | The needle tip is not in the proper position to hook the thread | Refer to the standard adjustment value |
| | If the upper bending needle stitch amount is too much, the needle will make the thread slack. | Reasonable adjustment to reduce the amount of thread |
| | Needle bending, needle tip damage | Timely replacement of new machine needles |
| **Five lines of surface thread skip stitch** | Needle height is not good. Even if the return volume is good, it will skip the needle. | Reasonable adjustment of needle height |
| | Needle bend, wrong installation direction | Replace the needle with a new one and install it correctly |
| | The needle guard is installed too high, which will cause the wire loop to spread out. | Adjustment of wire guards |
| | Skipped stitches due to the type of fabric and sewing | Ensures needle and fabric matching |

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|---|---|---|
| | speed | and reduces sewing speed |
| | Deformation of the bending needle, thus overwhelming the thread loop | Replacement of new parts |
| | Wire tension is too high to produce proper wire loops | Reduced wire tension |
| | Harmful bending needle gap return amount | Reference adjustment value |
| **Five-line bottom line jump stitch** | Needle tip damage, making the machine needle shorter and thicker | Replacement of new machine needles |
| | The needle pitch is too small. | Increase the stitch length |
| | The needle guard is mounted too high and will hook the thread loop | Reasonable adjustment of the height of the needle guard plate |
| | Wear of the bent needle tip hole, causing the bottom line to lean back | Replacement of new parts |
| | Too much movement in front and back, and it is not easy to hook to the line | Adjustment regarding standard volume |
| | The height of the curved needle installation is too high, too close to the needle plate. | Suitable height adjustment |
| | The bottom line tension is too small, and the line loop is not stable | Slightly increased bottom line tension |

Source: Jeans Overlocker Tracking Observation Summary, 2022

4.1.4 Bad Stitching

Bad stitching is the most common type of failure in overlock machines and can be divided into three threads with lousy stitching and five threads with bad surface thread bubbles. When the thread tension is too small, it will cause the empty ring to be unstable, when the thread tension is too large, it is easy to lose the balance, the fabric feed teeth are too high, the bending needle does not fit properly, the needle guard plate height is too high, the needle plate installation position is offset, the back of the needle hole has a depression with the flat part inside the fabric feed teeth, it can't press the empty ring and return, the needle and thread do not match, the needle and thread pull out amount is too small all can produce the problem of lousy thread stitch, as shown in Table 4, for these causes, the corresponding measures can be taken The corresponding measures can be taken to solve one by one, reasonable adjustment of the thread tension, so that it is neither too large nor too small, refer to the standard value of adjusting the height of the feed teeth and the height of the needle plate, always pay attention to the needle plate position, repair or replace worn parts, choose and fabric matching machine needles, refer to the standard adjustment of the amount of needle and thread pull out.

Table 4. Reasons and solutions for harmful traces

| Fault Type | Cause of failure | Solution |
|---|---|---|
| **Three lines of bad stitching** | Poor position of the needle plate in the front and rear direction, forming a poor empty ring | Reasonable adjustment of needle plate position |
| | Low wire tension leads to an unstable empty ring | Slightly increased tension |
| | Wire tension is too high and out of balance. | Check if the thread tension is too high due to poorly positioned needle and thread leaders. |
| | The cloth feeding tooth is too high, which will clog the empty ring | Adjustment concerning standard values |
| | Improper fit of the bending needle, the adjustment method is stricter when the ring is empty than when there is fabric. | Adjustment according to standard values |
| | Auxiliary cloth feeding teeth have damage. | Repair or replace the cloth feed teeth with new ones |
| **Five lines face line bubble bad** | The height of the needle guard is too high and flattens the wire loop | Adjust the height of the needle guard |
| | Needle thread tension is too muscular, and the needle will bend or empty loop backward. | Reduces stitch tension |
| | Needle thread, bent needle thread tension is too low, making the empty ring unstable. | Reasonable adjustment of wire tension |
| | Improper needle plate installation position: The needle is terrible close to the front of the plate hole. | Adjust the needle plate to the correct position so that the left and right are equal |
| | The back part of the needle hole and the flat part inside the feeding teeth are depressed, and the empty ring cannot be pressed and returns, forming an evil empty ring. | Repair or replace parts to make it flat |
| | The front section of the primary feeding tooth has a knife opening, thus cutting off the empty ring. | Restoration of the anterior segment of the delivery tooth with a file |
| | The empty ring presser foot has a depression on the bottom of the presser foot, which cannot press the empty ring. | Repair or replace parts to make the bottom surface the same |
| **Poor closure of an overlocked surface thread** | The needle wire conductor pole position is too high, resulting in too many pickets for the picket pole. | Adjustment according to standard values |
| | The machine needle is too thin, and the thread is too thick; the needle and thread do not match. | Selecting the right needle |
| | Loss of line tension balance, poor collection | Reasonable adjustment of line tension balance |
| **Poorly closed double-loop suture face line** | Too little needle tension, too much bottom thread tension | Increase stitch tension and decrease the bottom thread tension |
| | The pull-out amount of needle and thread is too small | Adjustment concerning standard values |
| | The selected machine needle is too fine | Selecting the appropriate machine needle |

Source: Jeans Overlock Machine Field Observation Summary, 2022

4.1.5 Sewing Material Problems

The three major components of the jeans production line are personnel, machine, and sewing material. The superiority of sewing material predominantly affects the sewing effect of the overlocking machine. Common sewing material problems include sewing fabric misalignment and sewing fabric wrinkling. When the presser foot pressure is too high, misalignment generally occurs; damage to the bottom of the presser foot or poor trimming causes the lower fabric to be firmly pushed and leaves the upper fabric to produce misalignment. The front of the feeding teeth is high and easy to misalign, the bottom thread is too tight and easy to produce shrinkage, the machine needle used is too thick, or the thread is too thick, and the needle plate used has too large a needle hole are easy to cause wrinkling. As shown in Table 5, moderately reducing the pressure of the presser foot, keeping the bottom of the presser foot flat, keeping the central feed teeth and the secondary feed teeth in the same straight line, increasing the amount of bottom thread, choosing a needle and thread that match the fabric, and choosing a needle plate with a small hole can effectively solve the sewing material problem.

Table 5. Causes and solutions to sewing material problems

| Fault Type | Cause of failure | Solution |
|---|---|---|
| **Sewing fabric misalignment** | Presser foot pressure is too high; generally, misalignment will occur | Reduced presser foot pressure |
| | The bottom surface of the presser foot is damaged or poorly trimmed with resistance, and the lower layer of fabric is firmly pushed while leaving the upper layer. | The bottom surface of the presser foot can be polished with a file. |
| | The hinges are too tight. | Loosen the hinge without loosening the presser foot |
| **Sewing fabric wrinkling** | The front of the cloth delivery teeth is high and easily misaligned | Lower the front, but keep the primary and secondary feed teeth in the same straight line |
| | The presser foot pressure is too low, and the press cloth effect worsens. | Increase presser foot pressure |
| | Insufficient amount of bottom thread, the thread will be stretched tightly and produce shrinkage. | Increase bottom line volume |
| | There is a segment difference between the primary and secondary feeding teeth. | Adjust to no segment difference |
| | The needle used is too thick. | Choose fine needle |
| | The wire used is too thick. | Choose fine thread |
| | The front part of the teeth of the delivery tooth has become rounded | Replace the cloth feeding teeth with new ones |
| | Too much tension on the bottom line | Reduced bottom line tension |
| | Use of needle plates with oversized holes | Choose a needle plate with a small hole |

Source: Jeans Overlocker Long-Term Tracking Summary, 2022

*4.2 Overlock Machine Operating Procedure*

In the first step, prepare the sewing material by first placing the cut pieces to be overlocked on the counter next to the overlocker or in a plastic basket for easy access, as shown in Figure 1.

Figure 1. Prepare the sewing material

Source: Photographs taken at the jeans production site, 2022

In the second step, lift the presser foot and place the seam under the presser foot. If a sewing worker encounters a curved seam, he can start stitching from the curved side and start wrapping the edge, with the index and middle fingers of the left hand gently pressing the cut piece and the thumb and index finger of the right hand pinching the cut piece, as shown in Figure 2.


Figure 2. Placement of seam material

Source: Photographs taken in the field of the jeans production line, 2022

In the third step, the sewing worker could use the left hand as the axis, pull the seam with the right hand and rotate the seam in hand. In contrast, in sewing, keeping the speed of the hand rotation coordinated with the speed of the foot pedal, trying not to stop the overlocker abruptly, the edge of the seam should be overlocked both straight and complete, as shown in Figure 3.

Figure 3. Sewing gestures

Source: Photo of jeans line sewing workers using an overlock machine, 2022

In the fourth step, if the sewing worker encounters a semi-finished product that needs to be overlocked with an uneven edge, it overlooks it in the shorter position. It cuts off the excess edge round and smooth, as shown in Figure 4.

Figure 4. Rounded seam edges

Source: Photo of semi-finished product taken by jeans production line, 2022

*4.3 Routine Maintenance of Overlock Machines*

The overlock machine requires routine maintenance to ensure the smooth operation of the jeans production line. As shown in Figure 5, the maintenance parts include the table, oil volume, needle bar, shaft part, presser foot, fabric feed teeth, over thread part, and headgear.


Figure 5. Illustration of the maintenance parts of the overlock machine

Source: Web photo, 2022

The sewing workers clean the table, the equipment as a whole and its surroundings, the presser foot and cloth feeding teeth, the over thread part, the internal over thread part, and the headgear daily, as shown in Table 6, using a soft cloth and brush to wipe off the dust and clean off the thread, check whether the oil window oil level is within a reasonable range before going to work every day, drop some lubricant on the shaft part every month, need to keep their hands clean before officially starting sewing, and record a summary of the daily maintenance of the overlock machine is recorded.

Table 6. Breakdown of maintenance parts for overlock machines

| Number | Maintenance Program | Cleaning method | Supplies | Baseline | Periodicity |
|---|---|---|---|---|---|
| **1** | Tabletop, equipment overall, and surrounding | Wipe off dust with a soft cloth | Soft Cloth | Do not get the debris on the surrounding clothes | Daily |
| **2** | Oil level check | Check the oil window oil level should be in the high and low range | visual assessment | Below the mark should notify the team leader to refuel | Before work every day |
| **3** | Needle bar | Wipe off dust with a soft cloth | Soft Cloth | Do not use too much force to avoid wiping off the oil | Daily |
| **4** | Shaft section | Drop some lubricant | Manual | Just be appropriate | One month |
| **5** | Presser foot and cloth feeding teeth | There are brushes to wipe away dust | Brushes, tweezers | Raise the presser foot during operation | Daily |
| **6** | The line part | Check the looseness. Use a soft cloth to wipe the dust and clean the threads. | Soft Cloth | No looseness, clean | Daily |
| **7** | Internal over-wire part and headgear | Open the outer cover and use a soft cloth to clean up the cloth dust and threads. | Soft Cloth | Open the shell with attention to pinch hands | Daily |

Source: Jeans production line field observation of overlocker and summary, 2022

## 5. Conclusion

Overlock sewing machines are susceptible to failures caused by the equipment's performance, the sewing workers' operation, and the materials processed. In this paper, the author analyzed the most common types of overlock machine failures, developed corresponding solutions to the causes of the failures, and summarized the operation steps and daily maintenance points of the overlock machine from the front line of jeans production to ensure the movable rate of the overlock machine. The research provided theoretical support for sewing staff and maintenance workers to troubleshoot and maintain the equipment quickly, shorten the maintenance time of the equipment, improve its efficiency, and guarantee a smooth and efficient jeans production line. The paper is an exploratory single-case study of a jeans production enterprise. There are still two research limitations in this study: First, the case enterprise selected for this study is a jeans production enterprise with a high failure rate of overlocking machines, and the "rational excess" of case selection may lead to the lack of generalizability and universality of the existing findings. Future research can conduct multiple case studies to verify the analysis and enhance the externality of the findings. Secondly, to focus on the research problem, this paper only explores the types of failures and maintenance strategies of overlock machines. In the future, researchers can expand the analysis to other standard equipment and consider using quantitative analysis methods and further verification through questionnaires to construct management databases of different equipments.

## References

Bi, N. (2022). Research on the intelligent manufacturing assembly line workshop layout considering AGV path planning. *Journal of Zhejiang University of Technology*, (5), 568-573.

COTTON INCORPORATED. (2019, February 14). Reporting on America's Attitudes and Behaviors. Retrieved June 6, 2022, from https://lifestylemonitor.cottoninc.com/denim-is-adapting-evolving/

Li, S.-B., Ma, C.-C., & Wang, B. (2014). Japanese Pegasus (PEGASUS) M700 overlock machine series failure and repair. *Knitting Industry*, (7), 99.

Li, S.-Y. (2018). Research on the re-creation of garments under the environmental protection-reproduction of denim fabrics under new trends. *Master's thesis*, Tianjin University of Technology. Retrieved from https://kns.cnki.net/KCMS/detail/detail.aspx?dbname=CMFD201802&filename= 1018181424.nh

Li, T.-T. (2017). Design and implement a personalized customization system for jeans. *Master's thesis*, Wuhan Textile University. Retrieved from https://kns.cnki.net/KCMS/detail/detail.aspx?dbname=CMFD201801&filename=1017820388.nh

Luo, Y., Zhou, R.-X., Li, X.-M., Zhu, L.-S., Wang, L.-L., Wu, X.-Y., & Ding, X.-M. (2022). Accounting and evaluation of the carbon footprint of jeans products based on process modularity. *Modern Textile Technology*, (6), 204-210. https://doi.org/10.19398/j.att.202206030

Ma, L.-L. (2019). Shop floor manufacturing execution system (MES) application for the electronics assembly industry. *Manufacturing Automation*, (12), 48-51.

Song, Y. (2021). Research on optimizing garment single-piece assembly lines under the vision of virtual simulation. *Silk*, (1), 72-78.

Wei, D.-H., Wang, H.-F., & Liu, L.-Y. (2020). Visualization and monitoring system for small and medium-sized automated production lines. *China Mechanical Engineering*, (11), 1351-1359.

Wu, J.-X. (2019). Green fashion. Master's thesis, Tianjin University of Technology. Retrieved from https://kns.cnki.net/KCMS/detail/detail.aspx?dbname=CMFD201902&filename=1019097509.nh

Zhang, F.-S., & Wang, Y.-Z. (2022). A study on the perceptual evaluation of women's jeans waist style design. *Journal of Zhejiang Textile and Clothing Vocational and Technical College*, (2), 21-26.

Zheng, J., Zhu, S.-W., Ke, X.-L., Xie, X.-X., & Zhao, Q.-H. (2017). Vibration damping study of high-speed industrial overlock machine. *Machinery Manufacturing*, (9), 38-41.

Zheng, P. (2018). Research and application of modular garment design and production model. *Master's thesis*, Soochow University. Retrieved from https://kns.cnki.net/KCMS/detail/detail.aspx?dbname=CMFD201901&filename=1018146561.nh

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