

Digital Video Inspection Systems in Garment Manufacturing: Trends and Quality Control Transformation

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Abstract—The garment industry is increasingly turning to digital inspection tools to improve quality and transparency. Video inspection systems are helping both buyers and manufacturers monitor production from anywhere, catch defects instantly, and communicate more clearly. This is especially useful in today's fast-paced global supply chains where quick decisions matter. The study shows that these technologies boost efficiency and reduce risks related to product quality and compliance. However, challenges still exist, such as poor infrastructure in some regions and a lack of common standards. Overcoming these issues will be key to fully benefiting from digital inspection in the future.

Index Terms—Video Inspection, Garment Quality Control, Pre-shipment Inspection, Digital QC, Apparel Supply Chain

I. INTRODUCTION

The textile and apparel industry works across countries, with production often happening far from where products are sold. Because of this, maintaining consistent quality is essential to meet buyer expectations and international standards. Many garments are produced in countries like China, Bangladesh, India, Vietnam, and Turkey, making quality control across distances a real challenge.

To manage this, quality checks are carried out at different stages of production to ensure everything meets required standards. Earlier, inspectors had to be physically present, but now digital tools are changing the process. Technologies like video inspections, remote audits, and real-time defect tracking allow

teams to monitor production from anywhere. These tools are especially important during pre-shipment inspection, when most of the order is complete. As global demand for reliable quality increases, digital inspection methods are becoming a key part of the industry's growth.

II. VIDEO INSPECTION SYSTEMS

Video inspection service is a modern quality control method in which products, processes, or facilities are examined using live video, recorded visuals, or digital imaging instead of relying only on physical inspection. In this system, inspectors use devices such as mobile phones, tablets, or fixed cameras to capture real-time or recorded footage of the production process.

The recorded visuals are shared with buyers, managers, and quality teams, allowing them to review everything without being physically present at the factory. This not only saves time and travel costs but also improves transparency throughout the production process. At the end, a digital report with images and videos is created, helping teams make quicker and more confident decisions



Figure 1, Video Inspection

Video inspection services have changed the way quality checks are done in today’s garment industry. Instead of depending only on in-person inspections, companies now use tools like mobile phones, tablets, and cameras to capture live or recorded footage of production. This makes it possible to observe products and processes in real time, even from a distance

2.1. Stages of Inspection

In the global apparel industry, quality checks are carried out step by step to ensure everything meets the required standards. The process usually begins with a pre-production inspection, where materials and preparations are reviewed before manufacturing starts. This is followed by inspections during production (DUPRO), which help catch issues early while the garments are still being made.

As production nears completion, a pre-shipment inspection (PSI) is conducted to verify the final products. Lastly, container loading inspection ensures that goods are packed correctly before shipping. Throughout these stages, inspectors look for common problems like fabric defects, poor stitching, incorrect measurements, and labelling mistakes, helping brands deliver consistent and reliable products.

2.2. Role of Video Inspection

Video inspection systems take traditional quality control to the next level by making it more connected and efficient. They allow production lines to be streamed live, giving buyers and quality teams a real-time view of the manufacturing process. These systems also support remote inspections based on AQL standards, while creating digital records through photos and videos for clear documentation.

By enabling faster review and decision-making, video inspection helps brands stay on top of quality without needing to be physically present. This approach represents a move toward a more digital, transparent, and flexible way of managing quality across global production networks.

III. GLOBAL SERVICE PROVIDERS

Video inspection services are usually provided by third-party inspection firms and digital quality control platforms. Leading international companies like QIMA, SGS, Bureau Veritas, Intertek, HQTS, Worldwide Quality Control, and Eurofins play an active role in the textile and apparel industry, offering specialized quality assurance services for garments,

fabrics, and accessories. These companies employ certified inspectors who follow international standards such as ISO 17020 and carry out AQL-based checks at multiple stages of production. This includes fabric inspections, in-line production monitoring, and pre-shipment reviews of finished garments, ensuring consistent quality and compliance throughout the supply chain.

IV. KEY USERS OF VIDEO INSPECTION

Different types of businesses rely on video inspection to manage quality more efficiently:

1. International Brands & Retailers

Companies in fast fashion, like Zara and H&M, as well as premium brands such as Nike and Adidas, use these services to ensure consistent quality across their global supply chains.

2. Buying Houses & Sourcing Agents

Operating in multiple countries, they rely on remote inspections to maintain visibility and control without being on-site.

3. E-commerce & D2C Brands

These businesses need faster quality checks and depend heavily on digital evidence to verify production standards.

4. SMEs & Startups

Smaller companies benefit from reduced travel expenses by using remote inspections to oversee production effectively.

V. ADVANTAGES OF VIDEO INSPECTION

- 1) For manufacturers, AI-powered quality control helps catch defects early, minimizes the need for rework, and boosts overall production efficiency.
- 2) Buyers benefit by being able to monitor production remotely, ensuring greater transparency and speeding up approval processes.
- 3) Across the supply chain, these technologies reduce risks, enhance compliance with standards, and improve communication between all parties.

Overall, integrating AI into quality control not only makes operations smoother and more reliable but also helps lower costs and increase productivity, creating a

profit for everyone involved in the garment production process.

VI. CHALLENGES

- 1) Technical challenges: Issues with internet connectivity and concerns over data security can affect the effectiveness of digital inspections.
- 2) Operational challenges: Implementing video inspections requires skilled personnel, and camera or equipment limitations can sometimes restrict accuracy.
- 3) Organizational challenges: Some companies may resist the increased transparency that comes with digital monitoring, and the absence of standardized global practices can make adoption inconsistent across regions.

VII. FUTURE TRENDS

Inspection systems are critical due to:

- Multi-country sourcing
- Complex logistics
- Strict compliance standards (ISO, AQL, REACH, GOTS)

Adoption is highest in developed manufacturing hubs such as China and Europe, while countries like India and Bangladesh are rapidly increasing usage due to

- Export pressure
- Compliance requirements
- Cost efficiency needs

VIII. CONCLUSION

The apparel industry relies on complex, globally distributed supply chains, making consistent quality a major challenge. While traditional inspections required on-site visits, modern approaches now use digital solutions like video inspections and AI-based monitoring to keep a close eye on production. Video inspection systems, in particular, are changing the way garment quality is managed worldwide. Their wider adoption depends on better infrastructure and standardized practices, but they already serve as an important link between manufacturers and international buyers, helping ensure products meet

quality standards in today's increasingly digital and connected supply chains.

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