The future of lens manufacturing

Rethinking paper tickets and explore digital alternatives

Innovation means more than a value – it is about shaping the future of ophthalmic lens manufacturing. To lead the industry towards smarter, connected workflows, we have to constantly challenge conventions. One example is a long-standing element of the production process that has remained largely unchanged: the paper job ticket. For decades, these printed slips have been used in Rx labs, accompanying each job through the complex journey from prescription to finished pair of glasses. But in an age defined by automation, IoT integration, and real-time data, the paper ticket is no longer keeping pace. It is time to rethink its role and explore the digital alternatives that will help build the Lab of Tomorrow. *By Joanna Zhang*
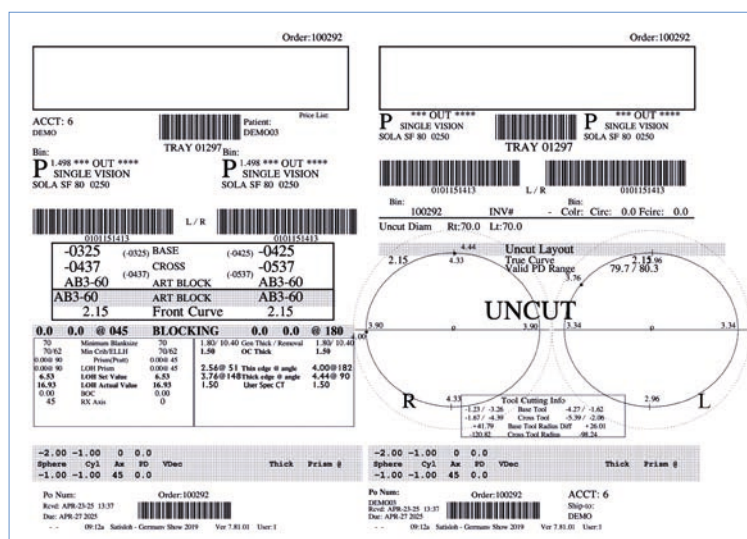
Fig. 1: *Paper ticket versus E-Ticket Tags. Picture: Satisloh*

I n every Rx lab worldwide, the paper ticket carries job-specific information, instructions, and status updates through every lens production stage. It connects machines, operators, and software systems, ensuring each lens is processed correctly and delivered on time. The simplicity and tangibility of paper have made it a trusted tool for decades. But in today's fast-paced manufacturing environment, that same simplicity is a bottleneck.

Current Rx labs workflow

Rx (prescription) lens production is a multi-step process (blocking, surfacing, coating, cleaning, edging and inspection) and each of these has unique dependencies,

timing, and tolerances. Therefore, a precise coordination between machines, operators and tracking systems is required to maintain high throughput, accuracy, quality and efficiency.

Lens manufacturing equipment is evolving and software systems like MES (Manufacturing Execution Systems) and LMS (Lab Management Systems) have been enhanced, but the paper ticket remains static.

It is meant to bridge data systems, machines, and people but it does not adapt, evolve, or communicate in real time and does not take advantage of the connectivity, automation, or responsiveness of today's digital manufacturing technologies in Rx labs.

Fig. 2: *E-Ticket dispaying an error. Picture: Satisloh*

The paper ticket:
a reliable but outdated system

There are various reasons that make the paper ticket obsolete in modern labs.

1. Extra manual work and data duplication: Operators often make manual notes on the job ticket across the different process steps, some not legible. This not only consumes time but increases the likelihood of human error and inconsistencies.

2. No or limited real-time data: Unlike digital systems, there is no live tracking with paper tickets. When changes occur such as job cancellations, order change or priority change, lab managers, operators, and technicians rely on physical and/or verbal updates to monitor the lens progress, hindering accurate forecasting, quick decision-making, and agile problem resolution.

3. One ticket loaded with information: Each printed ticket carries lots of data from the start of the process – lens type, coatings, priorities, machine instructions, inspection flags, and more. As jobs become more customized, these details clutter the ticket, making it hard to read and increase the risk of overlooking critical information.

4. Complexity in job grouping: During production, job tickets printed for a single job (two lenses) are often switching between one-piece-flow and batch-flow processes. This creates a manual complexity where tickets are separated, then re-matched and re-grouped back to the job throughout the day.

5. Visual job identification difficulty: With no digital indicators or visual aids, locating a specific job on the production line is nearly impossible without physically inspecting each paper ticket – or checking in the system where it was last scanned. This creates delays and adds unnecessary searching time, especially in high-throughput environments.

6. Using paper instead of digital alternatives leads to a higher resource consumption and ecological footprint, as paper production is energy- and water-intensive.

The digital solution to paper

At Satisloh, we have been working and developing technologies that can fully replace paper-based tracking – meeting the demands of this digitized, data-driven lens manufacturing era. But these solutions do not just replicate the role of paper in a different medium; they enhance and expand it.
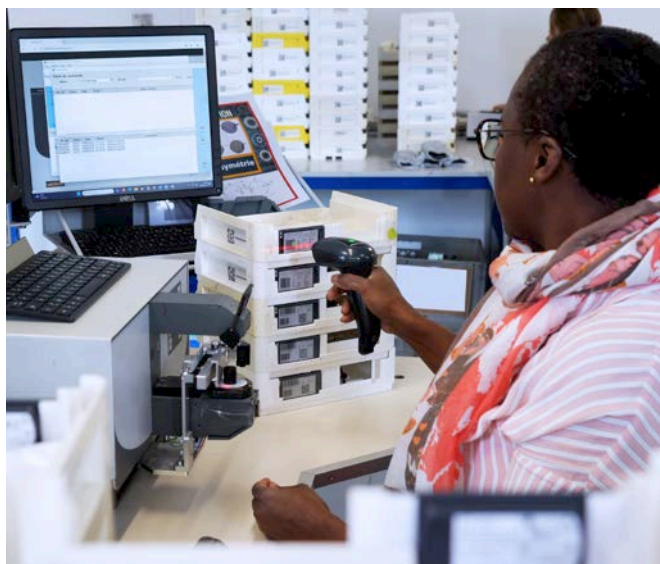
Fig.3: *In the finishing lab. Picture: Satisloh*

Fig. 4: *Example for batch coating process. Picture: Satisloh*

RFID chips: By embedding RFID (Radio Frequency Identification) chips into job trays, labs can enable automated job identification and real-time tracking at every machine. RFID removes the need for physical scanning or ticket reading – machines recognize and process jobs instantly, reducing errors and delays.

Electronic Shelf Labels (ESL): ESLs are customizable digital labels like Satisloh´s E-Ticket Tags, that can be placed onto job trays, mounted at workstations, or storage areas. Labs can customize them to streamline operations, display job status and live job updates, batch tracking, alert operators to urgent priorities, and help prevent bottlenecks. As jobs progress, ESLs automatically update, providing clear visual cues.

On-screen displays: Tablets, monitors, or machine-mounted screens can provide dynamic instructions. These interfaces are synchronized with backend systems, ensuring that operators always see the latest job information, settings, and alerts – without printing anything.

Human-Machine Interface (HMI): A centralized HMI connects all components of the workflow: machines, MES/LMS software, operators, and job data. This central interface ensures smooth communication across the production chain. It allows for centralized monitoring, job status updates, troubleshooting, and workflow optimization – all from a single dashboard.

By adopting these technologies, labs can enhance operational efficiency, reduce costs, and improve customer satisfaction.

The impact of Rx Labs going digital

The shift from paper to digital is more than a technological update – it is a strategic move that empowers Rx labs to achieve more.

Because digital tracking reduces downtime, minimizes manual input, and allows labs to operate with greater speed and precision, this leads to more operational efficiency. And furthermore, automation frees staff from repetitive tasks so they can focus on value-added activities.

Another criterion is the customer satisfaction. Digital systems enable faster job completion, real-time order updates, and fewer delays caused by ticket errors or misplaced jobs. The result is faster delivery times, fewer remakes, and higher customer trust.

Another advantage are the costs. Eliminating paper, printing supplies, and manual data entry reduces material and labor costs. Fewer errors and remakes also translate into long-term financial gains, making digital systems a cost-efficient upgrade.

And finally, real-time data enhances traceability, process control, and accountability. Managers can monitor production live, identify bottlenecks immediately, and make decisions based on up-to-date insights, not yesterday's paperwork, this leads to improved accuracy and visibility.

Future-proofing your lab

As the industry continues to evolve, digital infrastructure is essential for staying competitive. A paperless workflow supports IoT integration, cloud-based analytics, and future automation capabilities that are simply not compatible with physical tickets.

A common concern in adopting digital systems is the fear of downtime or operator resistance. However, digital ticketing solutions are being designed with adaptability and user experience in mind.

Phased implementation avoids disruption and operators can be trained quickly, thanks to intuitive interfaces and familiar

logic. And because these systems work alongside existing MES and LMS platforms, labs do not need to overhaul their entire tech stack to go digital.

Our commitment to digital transformation

In our opinion, it is important to drive change, not just responding to it. For example, by helping labs evolve toward higher productivity, continually produce better quality, and make smarter decisions on the production floor. This is a commitment to developing digital tools that align with real-world lab needs, offering scalability, interoperability, and measurable value.

The Lab of Tomorrow is about more than eliminating paper. It is about building an ecosystem where every part of the workflow, from the first scan to the final inspection, is connected, efficient, and intelligent.

Conclusion

Paper tickets were once the backbone of Rx lens production. But today, they are holding us back. The complexity, manual handling, and lack of real-time visibility make them incompatible with the speed and precision modern labs require.

The E-Ticket system is designed to address these specific challenges, replacing the paper ticket with a digital solution that is smarter, faster and it can be fully integrated in the lab production without disrupting it.

An E-Ticket system does not just digitize the paper ticket, it transforms the way labs operate. From automating manual processes to improving job tracking and transparency, it helps labs unlock new levels of efficiency, sustainability and performance.

The transition to digital is not just an upgrade, it is a necessary evolution to stay competitive in a fast-moving market. By embracing these innovations, we are not only improving operations, but we are shaping a better future for labs around the world.

Let us move forward boldly, embrace digital transformation, and unlock the full potential of our industry. ◆

Joanna Zhang

Joanna Zhang, is Satisloh´s Product Manager Automation, leading four product lines in the ophthalmic industry. Zhang has over 14 years of experience in product management and branding, previously working as a Product Owner at Schneider Electric Singapore and at Kumpan Electric Shanghai. Her extensive global experience spans both multinational corporations and startups across Europe and Asia Pacific, allowing her to bring a well-rounded, cross-cultural perspective to her work. Zhang holds an MBA in International Marketing from European University and a UX Design certification from the General Assembly.