

Revolutionizing Textile Maintenance: How CMMS Powers Industry 4.0

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The advent of Industry 4.0 marks a profound transformation in the industrial landscape, including the textile sector. This industrial revolution, characterized by the integration of advanced digital technologies, redefines production and management standards in the industry. In this rapidly changing context, Computerized Maintenance Management System (CMMS) emerges as a crucial pillar for the transition to a more agile, efficient, and competitive textile industry.



CMMS in the Textile Industry Context



CMMS, a central concept in industrial maintenance, refers to the use of software and digital technologies to plan, track, and optimize maintenance activities for production equipment. Its importance in the textile sector, especially within the context of Industry 4.0, lies in its ability to ensure the proper functioning of manufacturing facilities, reduce unexpected downtime, and maximize operational efficiency.

The functionalities of CMMS are extensive, covering the entire maintenance lifecycle, from initial planning to task execution, performance tracking, and reporting. Key features of CMMS in the textile sector include:

- 1. Intervention Management:** CMMS allows for the scheduling of interventions, assigning personnel, and tracking their progress. It ensures better coordination between maintenance teams and machine operators. It also centralizes intervention requests, work orders, and inspection reports.
- 2. Equipment Management:** With CMMS, companies can inventory and map all equipment, such as weaving machines, dyeing systems, drying equipment, and sewing machines. It records their technical characteristics, maintenance histories, and spare parts needs.
- 3. Preventive Maintenance:** CMMS allows the definition of preventive maintenance plans based on fixed time intervals, operation counters, or specific performance metrics. It can automatically generate work orders, reducing unexpected downtime.
- 4. Inventory Management of Spare Parts:** By centralizing information on interventions and spare parts needs, CMMS can track spare parts inventory and even automatically generate purchase orders.

Benefits of CMMS

- 1. Mastering maintenance delays:** Maintenance delays are inevitable to a certain extent, but if they become too significant, they can disrupt the smooth operation of your business. A CMMS balances maintenance resources and costs, preventing delays from becoming uncontrollable. The CMMS software captures minor repairs that might otherwise go unnoticed and allows for task scheduling, assignment, and prioritization, ensuring that no maintenance work is neglected. With CMMS, maintenance teams can plan work more efficiently, allocate resources better, and track progress in real-time, leading to faster response times and reduced downtime.
- 2. Increasing equipment lifespan:** To keep equipment functioning in good condition for longer, preventive maintenance is essential. The integration of a CMMS with sensors, SCADA, and MES systems enables real-time tracking of equipment health. Through this continuous monitoring, potential failures can be detected before they occur, problems diagnosed accurately, and maintenance planned proactively. This reduces the likelihood of unexpected breakdowns, ensuring smoother production processes and minimizing the risk of costly repairs. Additionally, CMMS allows companies to set maintenance schedules based on operational data, ensuring that interventions are performed at optimal intervals to extend the lifespan of machinery.
- 3. Accelerating repairs and inspections:** Downtime occurs whenever an asset needs repair or inspection, and while some downtime is inevitable, minimizing its duration is key to maintaining productivity. An effective CMMS significantly reduces the length of downtime. Technicians can access the CMMS mobile application from anywhere, retrieving equipment history, diagrams, and spare parts locations. This ensures they have the information they need immedia-



tely, allowing for quicker and more efficient completion of maintenance tasks. By reducing the time required to locate parts and understand issues, CMMS enables faster repairs and smoother inspections, keeping machinery running at peak performance.

4. **Accurate forecasting of maintenance parts:** Inventory management is crucial to avoid costly issues. A CMMS helps manage, track, and organize spare parts, ensuring that companies always have the necessary supplies on hand. Through automated purchasing and detailed inventory reports, businesses can make data-driven decisions about when and how much inventory to order. This prevents overstocking, which ties up capital, and understocking, which can lead to production delays. Accurate forecasting ensures that the right parts are available exactly when needed, helping to maintain smooth production lines and reducing the risk of halted operations due to a lack of spare components.

CMMS and Industry 4.0

The integration of Computerized Maintenance Management System (CMMS) within the framework of Industry 4.0 in the textile sector offers a powerful synergy with other advanced technologies such as the Internet of Things (IoT). This synergy enables real-time equipment monitoring, faster decision-making, and more effective maintenance interventions.



1. **IoT sensors for real-time monitoring:** IoT sensors are connected devices that collect data from equipment and assets. In the textile context, these sensors can monitor production machines, air conditioning systems, conveyors, and more. CMMS can integrate this real-time data to detect anomalies, predict failures, and plan maintenance activities. For instance, if a sensor detects overheating in a weaving machine, the CMMS can automatically generate an intervention request for a technician.
2. **Predictive maintenance:** The integration of CMMS with predictive maintenance technologies, such as data analysis and machine learning, allows for anticipating equipment failures. Using predictive models, CMMS can recommend specific actions, such as replacing a part

before it breaks down, thus reducing downtime and increasing production efficiency.

3. **Inventory and spare parts management:** CMMS can be linked to inventory management systems, allowing it to track spare parts levels, orders, and delivery times. When an IoT sensor detects abnormal wear on a machine, the CMMS can automatically generate a spare parts order, ensuring quick and efficient maintenance interventions.
4. **Equipment tracking and traceability:** Industry 4.0 emphasizes the traceability of products and equipment. CMMS can record the complete history of each piece of equipment, including repairs, inspections, and parts replacements. This traceability helps better understand the equipment's lifecycle, optimize its usage, and make informed maintenance decisions.

CMMS, Challenges to Overcome

Despite the many advantages that CMMS offers, it also presents certain challenges that companies must overcome to fully capitalize on its potential.

1. **Resistance to change:** Like any new technology, CMMS can face significant resistance during adoption, both from management and workers. Employees are often reluctant to change their routines and abandon methods they have used for years in favor of new ones. To address this, a change management phase that includes awareness and training is essential.
2. **Lack of skills:** Proper training of operators is necessary to ensure that they can effectively use these new maintenance management methods. Companies must invest in workforce development to help employees understand and utilize the CMMS system efficiently.
3. **Resource constraints:** The implementation of a CMMS requires an investment in terms of software, hardware, and training. Without sufficient resources, it can be difficult to roll out the system successfully across the organization. Companies need to carefully plan and allocate budgets to ensure a smooth transition and avoid any setbacks.



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About the author: neotex 4.0 center is Tunisia's leading competence center focused on Industry 4.0, specifically tailored for the textile and technical textile sectors. Its vision is to enhance the value creation of enterprises in these sectors through supporting the integration of innovative Industry 4.0 projects and coordinating with various ecosystem stakeholders.

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