

Optimizing SMB Manufacturing: The Case for **AI-Driven MRO** Platforms



Exploring how artificial intelligence can transform maintenance, repair, and operations (MRO) processes to dramatically reduce downtime and costs for small to mid-sized manufacturers by reducing the gap between OEM-recommended MRO plans and the actual executed MRO plan.



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Introduction

Small and mid-sized manufacturers (SMBs) are poised to fuel the next wave of U.S. manufacturing growth. As demand rises, *smart manufacturing* adoption is accelerating, driven by automation and the need for real-time data insights on the factory floor. This creates tremendous opportunity for SMBs to scale up efficiency and output.

However, most SMB manufacturers operate with **limited infrastructure, aging equipment, and lean workforces**, which leads to a significant gap between the maintenance protocols OEMs recommend and what gets done day-to-day. They are under intense pressure to produce more, faster, and at lower cost -- but without the resources of large enterprises, critical practices like maintenance, repair, and operations (MRO) often fall behind. The result is that plants often run their machines to failure and address issues only after breakdowns.



Challenges for SMBs with MRO

To meet growing demands without massive new investments, SMBs must improve operational efficiency within their current constraints. Modernizing **MRO processes** offers a logical starting point. Emerging tools, especially artificial intelligence (AI)-driven MRO platforms, now offer SMBs a chance to implement proactive maintenance practices affordably. In this whitepaper, we explore the challenges of traditional MRO for SMBs and how AI-powered solutions can close the gap, enabling even small manufacturers to achieve more **uptime, safety compliance, and cost-effectiveness**.



Challenges of Traditional MRO for SMBs

For SMB manufacturers, maintaining equipment isn't just a technical chore -- it's a mission-critical business function. Yet traditional MRO approaches in smaller plants are often **reactive, fragmented, and labor-intensive**, creating a hidden drag on productivity and profitability. Key challenges include:

- **Limited Resources (Staff & Systems):** Most SMBs lack dedicated maintenance departments or modern computerized systems. Nearly *half of manufacturing facilities still use manual methods like spreadsheets or paper*¹ to manage maintenance tasks. This severely limits the ability to execute structured preventive maintenance plans that OEM manuals outline. Without specialized staff or software, it's incredibly hard to keep up with recommended service intervals, parts replacements, and inspections.

*"Today, we're still juggling spreadsheets and manual processes just to manage basic maintenance—and it's holding us back. It is reactive, fragmented, and hard to scale as our operations grow. What we really need is an **automated system that gives us real-time visibility, streamlined workflows, and the ability to finally get ahead of maintenance issues instead of constantly playing catch-up.**" – Mike Benner, **Benner Metals Corporation***

- **Scattered Data & Siloed Knowledge:** Maintenance records in many SMB plants are buried in filing cabinets, individual laptops, or not recorded at all beyond a technician's memory. Such fragmented data makes it difficult to get a full picture of equipment health or maintenance history. When a senior mechanic leaves, their knowledge of machine quirks and past fixes often leaves with them. An industry survey found the **number one challenge** for maintenance teams was simply *lack of resources*² (*human and technical*) to manage all the needed data and tasks.
- **Reactive "Run-to-Failure" Maintenance:** Because of resource constraints, many SMBs default to **reactive maintenance** -- essentially fixing things only after a breakdown occurs. A notable study found that **57% of manufacturing facilities primarily used a run-to-failure strategy**³. This reactive mindset is fundamentally at odds with OEM-recommended MRO protocols, which are designed to *preempt* failures and extend asset life. Consequently, **unplanned downtime** remains a top concern – more than 50% of maintenance professionals in 2024 cited machine downtime as one of their **biggest challenges**⁴.



- **Downtime and Lost Revenue:** The cost of these MRO shortcomings shows up starkly in downtime. One study found the *average manufacturing plant* experiences over **300 hours of lost production per year per facility**⁴. For an SMB manufacturer, those idle hours translate directly into lost revenue. Even using a conservative estimate, 300 hours of downtime could easily cost **over \$1 million in annual lost revenue** for a mid-sized plant. Beyond the financial hit, every unexpected outage can erode customer trust and incur premium costs to catch up.

How AI is Transforming MRO for SMBs

Traditional MRO in small/mid-sized plants is plagued by scattered information, reactive firefighting, skilled labor gaps, and surprise downtime. These are problems that SMBs often lack the bandwidth to solve manually -- but **artificial intelligence is changing the game** by delivering structure, automation, and even predictive insights across the maintenance lifecycle. An emerging class of AI-driven MRO platforms is making advanced maintenance techniques accessible to even the smallest factories. Key capabilities include:

- **Digital Machine Profiles:** AI can ingest and interpret equipment manuals and technical PDFs using natural language processing, creating a structured profile for each machine. For example, the AI parses manuals and knows that "Machine X needs belt replacement every 6 months or 1,000 hours." It builds a database of **recommended service intervals, lubrication schedules, part specifications**, and more for each asset. This ensures the OEM-specified preventive maintenance tasks are identified quickly and accurately. Essentially, AI can **bridge the knowledge gap** by turning unstructured documents into actionable maintenance data.
- **Smart MRO Plan Generation:** Using those machine profiles (plus industry best practices and safety/regulatory requirements), AI can auto-generate a tailored **maintenance plan** for each piece of equipment. This means a plant manager can get a ready-made schedule of what maintenance to do and when. The AI combines equipment specs, usage patterns, and even **OSHA guidelines** to recommend a plan optimized for that specific machine. The system creates a living maintenance calendar that matches OEM recommendations and the plant's operating context.
- **Automated Task Management:** Once maintenance plans are in place, the AI platform breaks them down into **clear task lists** and work orders with due dates and instructions. The platform then tracks progress, sends reminders, and alerts if a task is overdue. Instead of relying on one person's spreadsheet, *all* team members can see upcoming maintenance tasks, mark them complete, and log notes. This automation enforces discipline: preventive maintenance gets



done on time, and everyone is accountable. The result is a shift from chaotic, reactive work to **organized, proactive maintenance workflows**.

"Right now, there's a clear gap between the maintenance protocols our equipment manufacturers recommend and what actually happens on our shop floor. We need a system that can help us close that gap—one that can integrate with our ERP, automate our maintenance planning, and ensure our operations consistently meet OEM specifications. Without it, we're constantly at risk of unexpected breakdowns and avoidable downtime." – Dave DeVandry, DeKING Precision

- **Operational Dashboards:** AI-driven MRO platforms provide real-time visibility into maintenance operations that SMBs have never had before. Intuitive **dashboards** replace the old tangle of spreadsheets. Managers can see at-a-glance which machines are due for service, which work orders are open, and any red flags. Key metrics like maintenance completion rates, and downtime hours are automatically tracked. This centralized view transforms decision-making - instead of guessing, teams have data at their fingertips.
- **Compliance Oversight:** Keeping up with safety and quality compliance is another challenge. AI tools can assist by continuously checking maintenance activities against **regulatory standards**. For instance, the platform might flag that a required safety inspection hasn't been logged for a machine, or that a calibration certificate is expiring. This is especially valuable for small manufacturers that don't have dedicated compliance staff – the AI helps them **stay audit-ready** and avoid fines or hazards by following all required maintenance protocols.
- **Digital Recordkeeping:** Modern MRO platforms automatically capture and organize all maintenance and repair records in one place. Every time a task is completed or a part is replaced, it's logged under the machine's history. This eliminates the paperwork chaos of the past. When it's time for an audit or when a new technician comes onboard, *all history is searchable* and accessible. Furthermore, having thorough records helps with warranty claims and resale value of equipment.
- **SMB-Ready Accessibility:** Importantly, these AI-driven MRO solutions are being designed to be **affordable and easy to deploy for SMBs**. Unlike traditional enterprise asset management software that can be costly and complex, many use a **machine-based pricing model** (charging per machine or per asset, not per user), which is budget-friendly for small plants. They are cloud-based (software-as-a-service), so there's no heavy IT infrastructure needed – a small



factory can get started simply by signing up online and uploading their machine info. This accessibility means that the benefits of AI in maintenance are no longer limited to Fortune 500 manufacturers. Now, a small job shop or a family-owned factory can implement a high-tech maintenance program with minimal upfront investment.

By embedding intelligence and automation into maintenance workflows, AI-driven MRO platforms enable SMB manufacturers to **shift from reactive to proactive maintenance** virtually overnight. Instead of constant firefighting, teams can schedule downtime strategically and address issues *before* they cause failures. The payoff is tangible: less unexpected downtime, longer equipment lifespans, improved safety, and more production capacity. Those kinds of gains were previously out of reach for smaller firms without big engineering budgets. Now they are attainable with the new generation of AI tools.

Conclusion

As U.S. manufacturing enters a period of renewed growth, SMBs face both a challenge and an opportunity. They must contend with limited infrastructure, tight labor markets, and increasing performance demands -- meaning **operational efficiency is no longer optional, it is essential** for survival. However, new technologies can dramatically elevate their capabilities without requiring massive budgets.

AI-driven MRO platforms present a powerful opportunity to **close the gap between OEM-recommended maintenance protocols and the practices that SMBs implement**. By leveraging AI, a small plant can instantly access expert-level maintenance planning that was once out of reach. The effect is to transform outdated, reactive maintenance routines into intelligent, automated systems. An SMB can start managing equipment *proactively* -- scheduling downtime during off-hours, replacing parts *before* they fail, and optimizing maintenance intervals based on data rather than guesswork. All of this can be done while integrating with the existing workforce and equipment; importantly, it does not require an enterprise-scale investment.

The impact is straightforward: **more uptime, less waste, and a clear path to scaling production** with the assets you already have. Machines break down less often, and when they do, you are prepared. Maintenance expenses become more predictable, and efficiency improves, which feeds directly to the bottom line. In summary, optimizing maintenance through AI gives SMB manufacturers a chance to boost productivity and competitiveness like never before -- turning MRO from a costly headache into a strategic advantage.