**User stories of Operators:**

1. Fix Machine Faster through Chat: As an Operator, I want an app to allow for quick and easy communication with the maintenance technician through chat or calls about machine problems so I can report machine problems, ask questions, and receive updates on repairs, ultimately fixing issues quickly.
2. Identify Problems Early: As an Operator, I want an app to show me a list of things to check on the machine so I can find small problems before they become big ones and stop production.
3. Be a Machine Pro: As an Operator, I want to keep track of how well I'm doing on the machine so I can see where I can improve and become the best operator and get promoted.
4. Easy Shift Change: As an Operator, I want an app to let me easily show the next person what's going on with the machine so I can leave on time, and they can start work quickly.
5. Maintenance Remainder: As an Operator, I want an app to remind me when to do maintenance on the machine and show me how to do it so I can keep the machine running smoothly for a long time.
6. Fixing Common Issues Myself: As an Operator, I want the app to have basic troubleshooting instructions on how to solve some common machine problems so I can get the machine working again without waiting for the maintenance technician Instructions.
7. Don't Forget the Rules: As an Operator, I want to have all the easy-to-find machine instructions in one place, easy to find, so I can always double-check I'm doing things the right way.
8. Pre-shift Checks and Cleaning: As an Operator, I want a checklist within the app to guide me through pre-shift inspections, cleaning, and lubrication tasks so I can ensure the machine is ready for optimal performance and prevent breakdowns.
9. Learn New Things and Get Promoted: As an Operator, I want to have lessons and training modules on how to use the machine even better and new technology so I can become a super-skilled operator and get a promotion.
10. Request Time Off Easily: As an Operator, I want an app to let me submit requests for time off directly so I can plan my personal life more efficiently and avoid any confusion with scheduling.
11. Feel Safe and Supported: As an Operator, I want an app to provide easy access to safety information and procedures so I can work with confidence and know what to do in case of an emergency.
12. Stay Hydrated and Take Breaks: As an Operator, I want an app to remind me to take breaks and drink water throughout my shift so I can stay focused, avoid fatigue, and work safely.
13. Celebrate Achievements: As an Operator, I want an app to recognize my accomplishments (e.g., achieving production targets, resolving a complex issue) so I feel valued and appreciated for my contributions.
14. Focus on Quality: As an Operator, I want an app to display real-time quality control data during operation so I can identify and adjust settings to maintain consistent and high-quality output.
15. Avoiding Disruptions: As an Operator, I want the app to track completed pre-shift checks and scheduled maintenance tasks, alerting me of any missed tasks to minimize potential disruptions during production.
16. Suggest Improvements: As an Operator, I want an app to provide a way for me to anonymously submit suggestions for improving the machines or workflows so I can feel like my voice is heard and contribute to a better working environment.

**User Stories of Maintenance Technician:**

1. Minimize Downtime: As a Maintenance Technician, I want an app to provide digital checklists and guides to take preventive measures (like lubricating bearings, checking belts for tension), so that I can extend machine lifespan and minimize downtime (to avoid unplanned equipment failures that halt production).
2. Perfect Maintenance Execution: As a Maintenance Technician, I want an app to access the estimated maintenance schedule (indicating tasks and frequency) and pre-arrange preparations (e.g., ordering parts, scheduling downtime) for flawless execution of maintenance activities.
3. Preventative Maintenance: As a Maintenance Technician, I want to conduct frequent inspections (e.g., visual inspections, vibration analysis) to identify signs of wear (e.g., cracks, excessive wear on components) and prevent major breakdowns (e.g., catastrophic equipment failure causing significant downtime and repair costs).
4. Digital Maintenance History: As a Maintenance Technician, I want a centralized platform to record all maintenance activities (repairs, inspections, replacements), so that I can eliminate paper documents and ensure a digital documented history to track past repairs for specific machines for smooth Maintenance and reporting.
5. Early Issue Detection: As a Maintenace Technician, I want to perform regular inspections (e.g., listening for unusual sounds, checking fluid levels), so that I can detect minor issues early on (e.g., loose bolts, minor leaks) and ensure machine longevity.
6. Prioritize Operator Safety: As a Maintenace Technician, I want to regularly inspect all safety features and emergency shutdown mechanisms (e.g., guards, pressure relief valves), so that I can prioritize operator well-being by ensuring proper machine operation to prevent accidents and injuries.
7. Optimize Maintenance Strategy: As a Maintenace Technician, I want to leverage inspection data (e.g., wear patterns, repair frequency), so that the maintenance schedules can be continuously refined and optimized for each machine.
8. Expert Help for Complex Issues: As a Maintenace Technician, I want to quickly reach out to service providers, so that the unexpected electrical faults (e.g., short circuits) or complex issues beyond my expertise can be quickly addressed.
9. Streamlined Communication: As a Maintenace Technician, I want a centralized communication platform to avoid filling out individual contact forms, so that I can submit all issue details (text descriptions, photos of damaged components, videos of malfunctioning equipment, voice messages explaining the problem) to the service provider through centralized platform for efficient communication.
10. Broadcast Communication: As a Maintenace Technician, I want to send broadcast messages to all operators at once, so that critical information (e.g., upcoming machine shutdowns for maintenance, urgent safety warnings) can be efficiently communicated at once.
11. Targeted Communication: As a Maintenace Technician, I want to notify targeted operators with information to focus on specific types of products required (e.g., depending on upcoming production schedules), so that targeted operators are prepared for upcoming jobs.
12. Clear Issue Explanation: As a Maintenace Technician, I want a platform to clearly explain the issue to engineers, so that the exact location within the machine (e.g., "Leaking oil from the valve located on the top right side of the machine") can be quickly understood.
13. Detailed Issue Reporting: As a Maintenace Technician, I want to provide a detailed description of the problem (text description of symptoms, photos of the issue, video recordings of malfunctioning equipment, audio recordings of unusual noises), so that the engineers at service provide can perform accurate diagnosis and repair.
14. Estimated Engineer Response Time: As a Maintenace Technician, I want to receive an estimated time for the engineer's initial response, so that I can anticipate the issue resolution timeframe and its impact on the production line (e.g., plan for temporary solutions or adjust production schedules).
15. Minimize Service Costs: As a Maintenace Technician, I want to investigate previously resolved problems under warranty (e.g., reviewing maintenance history for similar issues) before reaching out to the service provider, so that I can avoid unnecessary service costs.
16. Improved Maintenance & Clarity: As a Maintenace Technician, I want to raise tickets to engineers for unresolved issues like machine malfunctions, or any confusion about its operation, so that I can ensue improved overall machine maintenance and have a clarity (e.g., knowing that all potential issues are addressed, and equipment is functioning optimally).
17. Easy Machine Information: As a Maintenance Technician, I want a way to easily capture and report all relevant machine information during an issue, so that I can provide a clear picture of the problem to engineers and expedite troubleshooting and repairs.
18. Suggestions from Engineers: As a Maintenance Technician, I want to receive suggestions from engineers of the machine builder based on their understanding user issues from their other customers, so that I can benefit from their expertise and potentially maintain machinery.

**User Stories of Asset Management Engineer:**

1. Receive and Analyze Issue Details: As an Asset Management Engineer, I want an app to receive detailed issue descriptions from customer service representatives (including warning messages, and any troubleshooting steps already taken by the customer, photos, videos, and the exact location of the issue within the machine), so I can understand the seriousness of the problem and provide an estimated time for troubleshooting.
2. Collaborate for Remote Resolution: As an Asset Management Engineer, I want an app to easily connect with on-site maintenance technicians via chat, video calls, or shared screen sessions, so that I can diagnose and troubleshoot issues remotely, minimizing travel costs and downtime for the customers.
3. Document Service Activities: As an Asset Management Engineer, I want a system that allows maintenance technicians to document all detailed records of repairs, inspections, and maintenance activities during each shift, so that the documentation can be stored centrally to avoid the risk of data loss from local computers.
4. Manage Workload Effectively: As an Asset Management Engineer, I want to view a summary dashboard of all open service tickets (including the type of issue, reported severity, time the ticket was raised, and error codes/IDs associated with the problem), so that I can prioritize tickets based on urgency and seriousness and efficiently manage my workload by addressing critical issues first.
5. Receive Alerts for Critical Issues: As an Asset Management Engineer, I want to receive alerts for critical issues via email or Teams notifications, including details about the issue, affected equipment, and potential impact, so I can ensure a prompt response and minimize downtime for the customer.
6. Track Issues for Preventive Maintenance: As an Asset Management Engineer, I want to track and analyze the frequency of specific machine issues reported by technicians, so I can identify common trends and recommend preventive maintenance strategies to customers, ultimately improving the overall reliability of their machines.
7. Gather Feedback for Warning System Improvement: As an Asset Management Engineer, I want a system to collect feedback from machine operators (e.g., collect feedback from operators about false alarms from a sensor) during the machine operation, so that I can gain insights into their experience and identify areas for improvement within the warning system, ultimately enhancing machine efficiency.
8. Visualize Data for Predictive Maintenance: As an Asset Management Engineer, I want an app that visualizes and combines trends of various machine parameters with warning messages, operator observations, and actions taken, so that I can proactively perform preventive and predictive maintenance tasks, ultimately reducing breakdowns and boosting machine uptime for customers.
9. Knowledge Database: As an Asset Management Engineer, I want to document the solutions of resolved issues, so that they can be used as a knowledge base for resolving repeated issues, improving troubleshooting efficiency.
10. Update Managers on Issue Status: As an Asset Management Engineer, I want an app to update the status of issue resolution to my manager, so that there remains clarity and proper communication about the issue status to make decisions regarding on-site visits.
11. Security and Data Privacy: As an Asset Management Engineer, I want an app to ensure secure storage and transmission of all customer and machine data, so that they comply with data privacy regulations.
12. Unique Codes: As an Asset Management Engineer, I want the error messages, warning messages and issues to be given with error codes/IDs, so that the issue could be clearly identified out of all issues.
13. Condition Monitoring: As an Asset Management Engineer, I want the ability to continuously monitor the health of the machines and set dynamic parameters, so that failures can be prevented under extreme operating conditions.

Table 1: User Stories of Operators and Maintenance Technicians and Their Corresponding Requirements (US OP – User Stories of Operators and US MT – User Stories of Maintenance Technicians)

|  |  |  |  |
| --- | --- | --- | --- |
| **S.No.** | **Requirement** | **User Stories (Operators)** | **User Stories (Maintenance Technicians)** |
| 1 | Development of a web application | All the User Stories | All the User Stories |
| 2 | Dashboard to view all issues (potentially) | - | US MT-1 (Minimize Downtime), US MT-16 (Improved Maintenance & Clarity) |
| 3 | Contact form or error template for reporting issues | US OP-1 (Fix Machine Faster through Chat) | US MT-9 (Streamlined Communication) |
| 4 | Live chat option for easy and better communication | US OP-1 (Fix Machine Faster through Chat) | US MT-8: Expert Help for Complex Issues, US MT-9: Streamlined Communication, US MT-10: Broadcast Communication, US MT-11: Targeted Communication |
| 5 | Easily send the machine information | - | US MT-17 (Easy Machine Information) |
| 6 | Implement hardware to easily report issues | - | US MT-8: Expert Help for Complex Issues (potentially for complex issues requiring remote assistance) |
| 7 | Easily report machine history | - | US MT-4 (Digital Maintenance History) |
| 8 | Providing a checklist | US OP-8 (Pre-shift Checks and Cleaning) | US MT-1 (Minimize Downtime) |
| 9 | Auto Notify Engineers after issues in machine (potentially) | - | US MT-8: Expert Help for Complex Issues (for critical issues) |
| 10 | Knowledge database of all the solutions | US OP-2 (Identify Problems Early), US OP-6 (Fixing Common Issues Myself) | US MT-15 (Minimize Service Costs) |
| 11 | Receiving warnings, alerts, and suggestions | - | US MT-18 (Suggestions from Engineers), US MT-19 (Predictive Maintenance Insights from Machine Builder) |
| 12 | Videos, Infographics, or documentation of solutions and tutorials for Operation | US OP-9: Learn New Things and Get Promoted, US OP-11: Feel Safe and Supported | - |
| 13 | Operator Performance Improvement system | US OP-3 (Be a Machine Pro), US OP-13 (Celebrate Achievements), US OP-12 (Stay Hydrated and Take Breaks) | - |
| 14 | Shift Scheduling functionality | US OP-4: Easy Shift Change, US OP-10: Request Time Off Easily | - |
| 15 | Maintenance and Inspection Reminder | US OP-2 (Identify Problems Early), US OP-5 (Maintenance Reminder), US OP-15 (Avoiding Disruptions) | US MT-2: Perfect Maintenance Execution, US MT-3: Preventative Maintenance, US MT-5: Early Issue Detection, US MT-6: Prioritize Operator Safety, US MT-7: Optimize Maintenance Strategy |
| 16 | Feedback (Suggestion submission system) | US OP-16: Suggest Improvements | - |

Table 2: User Stories of Asset Management Engineer and Corresponding Requirements (US AME - User Stories of Asset Management Engineer)

|  |  |  |
| --- | --- | --- |
| S.No. | Requirement | User Story |
| 1 | Development of an asset performance web application | All User Stories |
| 2 | Dashboard to view all the issues | US AME 4: Manage Workload Effectively |
| 3 | Dashboard to view all the data trends | US AME 8: Visualize Data for Predictive Maintenance |
| 4 | Unique Ids to track the issues | US AME 12: Unique Codes |
| 5 | Condition monitoring of the machine and ability to set parameters to machine to avoid failure at extreme conditions | US AME 13: Condition Monitoring |
| 6 | Collect operators experience during an occurrence of warning | US AME 7: Gather Feedback for Warning System Improvement |
| 7 | Knowledge database of the solutions to handle future problems | US AME 9: Knowledge Database |
| 8 | Unique id to common issues | US AME 6: Track Issues for Preventive Maintenance |
| 9 | Live Chat with maintenance technician for detailed solution update | US AME 2: Collaborate for Remote Resolution |
| 10 | Document Service Activities | US AME 3: Document Service Activities |
| 11 | Receive Alerts for Critical Issues | US AME 5: Receive Alerts for Critical Issues |
| 12 | Update Managers on Issue Status | US AME 10: Update Managers on Issue Status |
| 13 | Security and Data Privacy | US AME 11: Security and Data Privacy |