



Optimize plant turnarounds with AI-powered software

How much time and costs can be saved by scheduling with an AI-powered solution? The numbers are staggering. While plant shutdowns are a necessary part of life, they can either be a positive activity that increases productivity or a negative one if the shutdown exceeds its deadline and goes beyond the budget.

Plant shutdowns are often required by federal and state governing agencies to prevent accidents and ensure that the plant is running within stated regulations. Time is money, so site-specific plans are key when implementing a safe and effective shutdown. Additionally, many facilities are inspected during shutdowns and if issues are uncovered, the shutdown is extended and costs are increased.

Plant shutdown activities can last from a few weeks to even months. These activities require a combination of labor and equipment that is well-orchestrated to complete all tasks in as short a time as possible and get operations back online in a timely matter at the least cost. AI-powered software allows managers to schedule and optimize thousands of activities and hundreds of resources automatically and rapidly, and quickly re-sequence the schedule if any changes occur—

all of which save significant time, and time is money, of course.

Everyday challenges. A maintenance manager's typical day involves scheduling required maintenance work by assigning it to the available maintenance crews and other resources. Over a typical week, a manager may have to schedule hundreds of these maintenance activities, some of which may be critical. What if the software used to build and manage the maintenance schedules is out of date or unsophisticated? If this is the case, a lot of manual work will be done, and because there is no time to carry out the required analysis of the schedule, many important questions will go unanswered.

For example, how will maintenance activities impact production? Can we reduce non-productive time and still complete the work on time, and how much money will that save? If crew members are out or have medical issues, what will be the impact on the schedule? Should work on specific equipment be moved up to lessen the impact on the plant production? What is the best response to unanticipated events, such as a breakdown or outage, that we cannot control?

These questions emphasize the need for maintenance managers to have a higher degree of scheduling automation at their fingertips and to use software's predictive capabilities to create an effective and efficient schedule of maintenance work orders.

Accelerating schedule creation and management. Recently, a heavy industrial plant utilized a proprietary AI-powered scheduling software^a to help schedule a 4-d shutdown at their plant. To ensure they made the right decision, the plant shared their schedule in Microsoft Project and asked if it could be improved upon. As a response, the AI-powered scheduling solution was utilized to schedule tasks, materials and people in an optimal way. The built-in, AI-powered optimizer rapidly evaluates all available options and selects the sequence of activities that best meets user-defined constraints and production targets. The scheduling software^a was quickly loaded at the plant in just one day, enabling the shutdown schedule to be optimized. Additionally, the software eliminated the need for multiple applications or spreadsheets and time-consuming manual calculations.

Once it was up and running, the software did the heavy lifting of initial schedule creation (FIG. 1)—searching the set of activities, resources, sequencing/timing combinations and preferences/policy requirements to assemble a schedule in far less time than would be required using a more manual approach. What might take days or weeks to complete manually was done in minutes. Ongoing schedule management was greatly simplified using automatic scheduling logic.

The AI-powered software automatically schedules and optimizes thousands of activities and hundreds of resources and quickly re-sequences the schedule if any changes occur (e.g., an on-the-job injury). By linking a schedule to key metrics, the software can also provide immediate insight into how changes to that schedule will impact costs and production goals, ensuring the schedule is aligned with business objectives.

The software took all constraints into

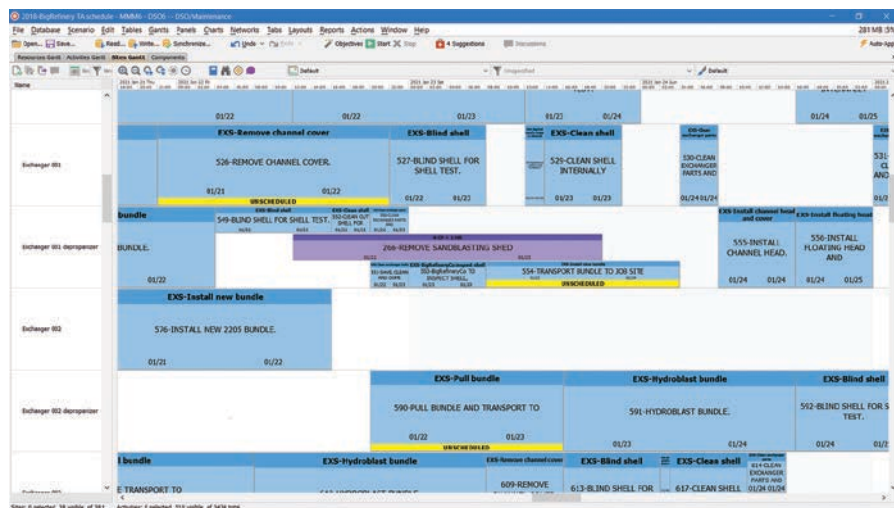


FIG. 1. The AI-powered scheduling software^a delivered predictable performance by aligning schedules with business rules and constraints, enabling everyone in the organization to benefit from a complete, single-source view of operations.

account to eliminate idle time. It analyzed all personnel involved and their tasks, then automatically optimized the schedule so that people were working and not waiting. In addition, the software identified how resources could be optimized and revised the schedule accordingly. With everything and everyone maximized in the schedule, resources were used to their fullest with activities unfolding in the optimal order to ensure fewer interruptions in the process.

One schedule to view, enhancing collaboration. The AI-powered scheduling software^a delivered predictable performance by aligning schedules with business rules and constraints, enabling everyone in the organization to benefit from a complete, single-source view of operations. The plant also used companion software that is a web-based schedule visualization and reporting tool (FIG. 2). This tool provided access to published maintenance schedules and associated data for all team members, from an internet-enabled device, and incorporated Gantt chart and tabular views of schedule information so everyone was viewing one single source of truth. The tool also allowed for input from front-line workers for more informed decision-making.

Eliminating 366 days of idle time. More importantly, by optimizing activities for the plant shutdown, the software provided a 4% improvement in the reduction of idle time, which in turn eliminated 366 days of idle time. In terms of financial savings, considering a cost of \$500/d multiplied by 366 days, the plant potentially saved \$183,000 in just three days. Because shutdowns can take place as many as six times per year, the potential savings can exceed \$2 MM. The software helped align the client's operational decisions automatically with business goals to maximize their return on investment through intelligent and responsive resource allocation.

Benefits beyond schedule optimization. In addition to optimizing schedules, the proprietary AI-powered scheduling software can optimize against cost resources. The scheduler can immediately see how their decisions would impact costs using

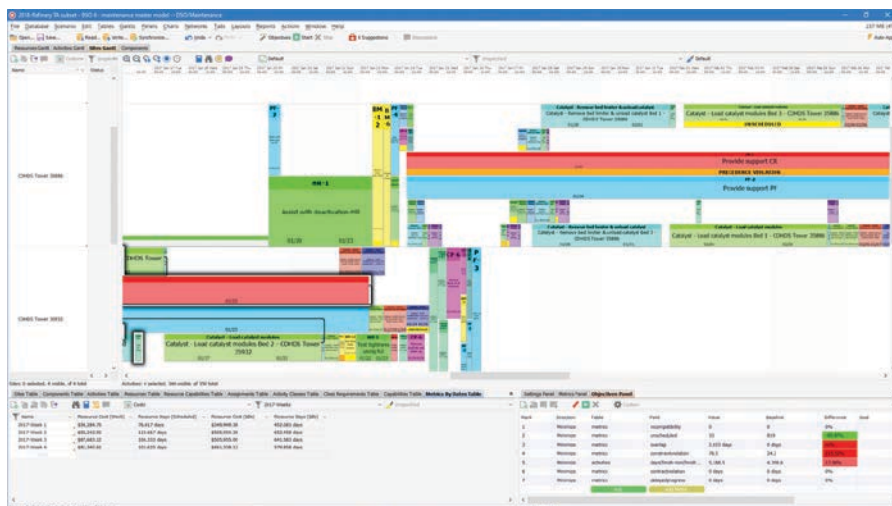


FIG. 2. A web-based schedule visualization and reporting tool provides access to published maintenance schedules and associated data for all team members.

“What if?” scenarios and advanced analytics. For example, what would the cost savings be if a higher cost resource of a welder at \$180/hr was swapped for one at \$120/hr? During turnarounds, an extra day can mean the difference between making or losing millions of dollars. AI-powered software can achieve this by adding different sets of resources to reach a faster time-to-production date.

Interactive capability puts users in control. To enable complete user control over a schedule, AI-powered software provides an interactive capability so that the user can adjust and adapt any schedule to accommodate organizational preferences. In a typical scheduling situation, a scheduler will use the software to generate a “first cut” solution automatically and will then manually manipulate this solution to incorporate preferences and to determine their impact. The scheduler can also lock the schedule for a specific time horizon (such as “up to 180 days from today”) and use the optimizer to rearrange the sequence of activities outside the locked time horizon to meet a specific objective.

Plant shutdowns are one of the most critical times in the operation of a plant. The revenue lost by shutting down a plant can amount to a significant portion of an annual budget and affect the plant's financial future in either a positive or negative way. How-

ever, when done efficiently, a shutdown can boost both plant reliability and revenues. AI-powered scheduling software provides a single solution that improves capital efficiency and reduces costs by ensuring the right resources, assets and people are in the right place at the right time and quickly

NOTE

^a Actenum DSO/Maintenance



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re-sequences the schedule if any changes occur. Simply stated, it is a proven way to optimize the plant shutdown schedule and maximize financial savings. **HP**

