Module 6: Work Management Systems

A facility doesn't run on good intentions alone. It runs on systems—and the most important systems aren't always the mechanical ones. They are the management tools that determine what gets done, who handles it, and whether the work is completed on schedule. Module 6 explores the technology backbone of facility operations, covering work order management, computerized maintenance management systems (CMMS), computer-aided facility management (CAFM), building information modeling (BIM), smart building technology, and data analytics.

Together, these tools give facility managers the information they need to make confident decisions rather than simply reacting to problems as they arise. By the end of this module, learners will be able to manage a work order system, distinguish between CMMS and CAFM, explain how BIM supports daily operations, and use data to build a strong case for facility investments. The focus throughout is practical: how to select, implement, and use these tools to run a better building.

Topic 6A: Work Orders, CMMS & CAFM

Topic 6A covers the core software tools that facility managers rely on to manage work and space effectively. It begins with work order management—the foundation of any maintenance program—before moving into CMMS, the platform that automates and tracks maintenance activity across an entire portfolio. From there, it examines CAFM, which connects space data and asset records to give managers a broader view of their building. These three systems are distinct yet complementary, and understanding how each one functions—and how they relate to each other—is essential for anyone managing a modern facility.

6.1 Work Order Management

Work orders are the basic unit of work in facility management. Every repair request, inspection, and scheduled task flows through a work order, making the system that manages them one of the most important tools in daily operations. Without a structured approach, work gets lost, costs become difficult to track, and tasks accumulate without any clear order of priority. A well-run work order system gives the entire facility team a shared view of what needs attention, who owns each task, and how long the work is taking. That visibility is what separates a reactive maintenance team from one that anticipates problems and addresses them before they grow.

The Work Order Lifecycle

Every work order follows the same fundamental path. It begins with a request, moves through review and approval, gets assigned to a technician, and concludes when the work is completed and recorded. This path is called the **work order lifecycle**, and understanding each stage is the first step toward managing work effectively.

The lifecycle begins when someone submits a request—a building occupant reporting a broken light, a technician flagging a leaking pipe, or a supervisor scheduling a routine inspection. The request enters the system with key information: what the problem is, where it is located, and when it was reported. At this stage, accuracy matters considerably. A vague request like “lights are out” takes longer to resolve than one that identifies the specific location, fixture type, and when the problem first appeared.

From there, a manager or supervisor reviews the request, checking whether it is valid, whether it requires urgent attention, and whether the team has capacity to handle it. Approved work orders then move into the assignment queue. The assignment considers the skill set required, the technician’s current workload, and the urgency of the task. A CMMS speeds up this step by displaying who is available and what they are already working on, reducing the time between request and action.

When the technician completes the work, they close out the order—and that closing step matters more than many new facility managers realize. Closing a work order captures what was done, how long it took, what parts were used, and whether any follow-up is needed. That data feeds directly into reports, budgets, and planning cycles. Without it, the organization loses the institutional knowledge that helps predict future maintenance needs. Managing the full lifecycle—not just completing the repair itself—is what turns a work order system into a genuine management tool.

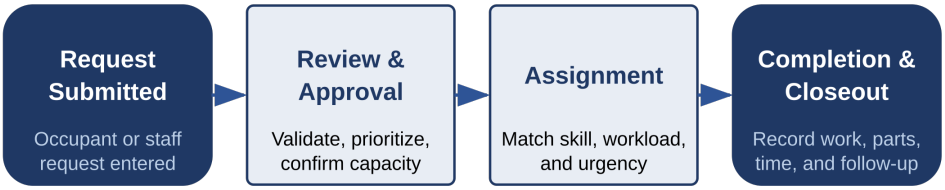

FIGURE 6.1 | WORK ORDER LIFECYCLE

Priority Classification

Not all work orders carry equal weight. A flooded restroom requires immediate attention; a squeaky door hinge does not. **Priority classification** is the system that tells the facility team which tasks need action right away and which ones can be scheduled into a future time slot. Getting this right is one of the most critical skills in work management, because poor triage wastes time and creates real safety risk.

Most organizations use a four-tier framework, summarized in Table 6.2.

Priority Level	Trigger Conditions	Response Target
Emergency	Immediate threat to life safety, health, or critical systems (gas leak, fire alarm fault, power failure in critical space)	Same day — typically within 1–2 hours

Priority Level	Trigger Conditions	Response Target
Urgent	Serious problem without immediate danger (failing HVAC in extreme weather, worsening roof leak, malfunctioning water heater)	Within 24–48 hours
Routine	Scheduled maintenance, minor repairs, and non-time-sensitive tasks grouped by building area or trade	Planned into weekly or monthly schedule
Low Priority	Non-critical improvements (repainting, carpet replacement, storage additions)	Scheduled when time and budget allow

TABLE 6.2 | WORK ORDER PRIORITY CLASSIFICATION FRAMEWORK

A clear priority system does more than organize the queue. It protects the team from spending all available time on small urgent tasks while larger preventive work falls behind schedule. Priority definitions should be written down and applied the same way by everyone on the team. When they are, work gets triaged faster, technicians spend their time on the right tasks, and occupants receive more accurate timelines for when their requests will be resolved.

Cost and Labor Tracking

Work orders do more than schedule repairs—they are also financial records. Every work order captures the cost of completing a task, including labor hours, materials, contractor fees, and equipment use. When that data is recorded accurately, facility managers gain something valuable: the ability to see where money is going and understand the patterns behind spending decisions.

Labor tracking starts with time. Technicians log the hours they spend on each work order, which tells the manager how long different task types typically take and feeds directly into scheduling and staffing decisions. A task that routinely takes four hours but is only budgeted for two points to a planning problem—either the estimate is wrong or the process needs review.

Material tracking records the parts and supplies used to complete each job. Over time, this data reveals which assets consume the most parts and how quickly inventory turns over. That information feeds into procurement planning and helps identify assets that may be approaching the end of their useful life. When repair costs begin to outpace replacement costs, the data makes a compelling case for capital investment.

Contractor and vendor costs are tracked the same way. When outside labor is used, the work order records the vendor, the scope of work, and the total cost—creating an audit trail that makes it easier to compare vendor performance across similar jobs over time.

Together, labor and material data give facility managers a true picture of maintenance costs at the asset level. A CMMS that captures this data accurately can produce cost-per-asset reports identifying which pieces of equipment are the most expensive to maintain.

That insight drives smarter budgeting and better decisions when aging equipment comes up for repair or replacement.

Key Metrics: Backlog, MTTR, and PM Compliance

A work order system produces more than completed tasks. It produces data, and that data—when tracked as **key performance indicators (KPIs)**—tells a facility manager whether the maintenance program is running well or gradually falling behind. Three metrics stand out as the most widely used (Table 6.3).

Metric	What It Measures	Warning Signal
Maintenance Backlog	Total volume of open work orders not yet completed	Steady growth indicates the team cannot keep pace with incoming work
Mean Time to Repair (MTTR)	Average elapsed time from work order opening to closure	High MTTR means work sits in queue too long, allowing small problems to grow
PM Compliance	Percentage of planned preventive maintenance tasks completed on schedule	Low compliance leads to accelerated equipment wear, voided warranties, and rising reactive costs

TABLE 6.3 | KEY WORK ORDER PERFORMANCE METRICS

Tracking these three metrics over time gives facility managers the evidence they need to manage staffing, set priorities, and make a credible case to leadership for additional resources. Numbers tell a story that anecdotes alone cannot. A team that monitors its own performance is better positioned to improve—and to prove that improvement to the decision-makers who control the budget.

Balancing Planned vs. Reactive Work

Planned maintenance covers work scheduled in advance—preventive inspections, filter changes, lubrication routes, and system tests. **Reactive maintenance**, sometimes called corrective or unplanned maintenance, is work triggered by a failure or complaint that was not on the schedule until something went wrong.

The balance between these two types matters considerably. A team that spends most of its time reacting to failures faces real challenges: reactive work typically costs more, often requiring expedited parts, overtime labor, and emergency contractor calls. It is also harder to plan around, making scheduling and staffing unpredictable. Most importantly, a high reactive load signals that the preventive program is not catching problems early enough to avoid the breakdown.

Data from organizations including BOMA and IFMA regularly shows that high-performing maintenance programs run at roughly 80 percent planned work and 20 percent reactive. That ratio is not a rigid rule, but it serves as a useful benchmark. A team that is reactive more than 40 to 50 percent of the time is likely missing preventive work, understaffed, or managing a portfolio of aging assets that need capital attention.

Work order data is the primary tool for tracking this balance. A CMMS can generate reports showing the split between planned and unplanned work orders across any time period. When that ratio begins shifting toward reactive work, it signals a need to investigate—not just fix the immediate problems, but identify the underlying cause.

Moving toward a more planned maintenance model takes time and sustained effort. But the payoff—lower costs, longer asset life, and a more manageable workload for the entire team—makes the investment worthwhile.

REFLECTION QUESTION

> A facility manager at a mid-sized office building notices that the maintenance backlog has doubled over the past three months, even though the number of technicians on staff has not changed. Which three metrics would you examine first to understand the cause? What might each metric reveal about the problem?

6.2 CMMS — Architecture & Application

A work order system answers the question of what needs to be done. A **computerized maintenance management system (CMMS)** answers a much broader set of questions: What assets does the organization own? When were they last serviced? What does it cost to maintain them? What work is coming up next week, next month, and next year? A CMMS is the central operating platform for a maintenance program—the tool that turns scattered tasks and informal records into a managed, data-driven operation. Understanding how a CMMS is built, how to select and implement one, and how to use it well is one of the most practical skills a facility manager can develop.

Core Modules: PM Scheduling, Asset Tracking, and Work Orders

A CMMS is a collection of connected modules, each serving a distinct function. The three most fundamental are **PM scheduling**, **asset tracking**, and work order management. Together, they form the operational core of the system. Table 6.4 summarizes how each module functions and the value it delivers.

Module	Core Function	Operational Value
PM Scheduling	Plans and automates preventive maintenance tasks; generates work orders automatically at set frequencies	Shifts the team from reactive to planned work; enables PM compliance tracking
Asset Tracking	Maintains a profile for every piece of equipment including specs, history, warranty, and cost data (the asset register)	Supports budgeting, capital planning, and regulatory compliance with full historical context

Module	Core Function	Operational Value
Work Order Management	Manages the full task lifecycle from request through assignment, completion, and closeout; links every task to a specific asset	Builds the maintenance history record; reveals failure patterns and cost concentrations over time

TABLE 6.4 | CMMS CORE MODULES AND THEIR OPERATIONAL VALUE

FIGURE 6.5 | FACILITY MANAGER REVIEWING WORK ORDERS IN A CMMS

Selecting and Implementing CMMS

Choosing the right CMMS is a significant decision. The market includes dozens of platforms ranging from simple cloud-based tools designed for small teams to enterprise systems capable of managing portfolios of hundreds of buildings. The right choice depends on the size and complexity of the portfolio, the technical capacity of the facility team, the organization's budget, and the level of integration needed with other systems.

Several factors matter most during the selection process. The system should match the team's actual workflows—a CMMS that is too complex for the staff to use consistently will generate poor data, which defeats the purpose. Ease of use, mobile access for field technicians, and the quality of vendor support are all practical considerations that affect whether the system gets adopted or abandoned.

Implementation is where many CMMS projects run into difficulty. A common mistake is going live before the foundational data is ready. A CMMS needs accurate asset data, complete PM task libraries, and a clear work order workflow before it can function well. Organizations that rush the launch and plan to "clean up the data later" typically find that the cleanup never happens—and the system underperforms as a result.

A phased approach works better. Start with a single building or a single trade, build the asset register carefully, load the PM tasks, and train the team on the workflow before

expanding. Early wins build confidence and reveal problems on a manageable scale. The goal in the first months is not to use every feature the system offers—it is to use the core features well and establish habits that produce clean, reliable data from day one.

Asset Data and PM Task Libraries

A CMMS is only as useful as the data inside it. Two data sets matter most: the **asset register** and the **PM task library**. These are the foundation that everything else in the system depends on, and they require real investment to build correctly.

The asset register starts with a physical inventory of the facility. Every maintainable piece of equipment—HVAC units, plumbing fixtures, electrical panels, elevators, fire suppression components—gets catalogued with its identifying information and location. The depth of this record matters. A bare-minimum entry with just a serial number and location is better than nothing, but an entry that also includes installation date, warranty terms, and the last five years of service history is far more useful. Building a complete asset register takes time, but it is the work that makes every other CMMS function more valuable.

The PM task library defines the specific maintenance tasks the system will schedule. Each task specifies what work needs to be done, how often, what tools and materials are required, and approximately how long it should take. Good task libraries draw from manufacturer recommendations, ASHRAE guidelines, and the organization's own maintenance experience. They are not static documents—they should be reviewed and updated as equipment ages, as new assets are added, and as the team learns from actual maintenance experience what intervals and procedures work best.

When the asset register and PM task library are both accurate and complete, the CMMS can do what it was designed to do: generate the right work orders, for the right assets, at the right time, with enough information for the technician to complete the task without guesswork.

Key Performance Reports

One of the most powerful features of a well-used CMMS is its ability to produce performance reports. Raw data collected through work orders and PM records becomes useful only when it is organized into reports that answer management questions. Several reports stand out as the most directly useful for facility managers (Table 6.6).

Report	What It Shows	Decision It Supports
PM Compliance Report	Percentage of scheduled PM tasks completed on time over a given period	Program health assessment; required by leadership and auditors
Maintenance Cost Report	Spending broken down by asset, trade, building, or time period	Capital planning decisions; repair-versus-replace analysis

Report	What It Shows	Decision It Supports
Backlog Report	Volume of open work orders and how long each has been waiting	Identifies growing deferred work before it becomes a crisis; surfaces staffing and scheduling bottlenecks
Work Order Aging Report	Individual work orders that have exceeded their target completion time	Flags accountability gaps; reveals patterns in specific trade or system delays

TABLE 6.6 | CMMS PERFORMANCE REPORTS AND THEIR MANAGEMENT USE

CMMS Integration with BAS, Procurement, and CAFM

A CMMS becomes significantly more powerful when it is connected to other systems in the facility management technology stack. Three integrations stand out as the most valuable: building automation systems (BAS), procurement platforms, and CAFM.

BAS integration allows the CMMS to receive alerts and data directly from the building's control systems. When a BAS detects that a chiller is operating outside its normal parameters, it can automatically trigger a work order in the CMMS rather than waiting for someone to notice the problem and submit a manual request. This connection supports **fault detection and diagnostics (FDD)**—the ability to identify equipment problems early, before they become failures. BAS-to-CMMS integration is one of the clearest examples of how smart building technology and traditional maintenance management reinforce each other.

Procurement integration connects the work order process to purchasing and inventory. When a technician closes a work order and records the parts used, the system can automatically update inventory counts and flag items that have dropped below reorder thresholds. This reduces the risk of running out of critical parts and creates a direct link between maintenance activity and procurement costs—which makes budget tracking more accurate and purchasing decisions more informed.

CAFM integration links asset and space records between the two platforms. When an asset is moved as part of a space renovation, the CAFM system can update the asset's location in the CMMS automatically. This keeps maintenance records accurate without requiring manual updates in two separate systems. As this module explores further in Section 6.3, CMMS and CAFM serve different but complementary roles—and their integration is where much of the practical value of both systems is realized.

REFLECTION QUESTION

A facility manager is evaluating two CMMS platforms. The first has a clean interface and is easy to learn, but its reporting features are limited. The second has powerful analytics and strong integration capabilities, but the interface is complex and the implementation timeline is longer. What factors would you weigh in making this decision, and how might the size and technical capacity of the maintenance team affect your recommendation?

6.3 CAFM — Space & Asset Integration

A CMMS tracks what happens to equipment. A **computer-aided facility management (CAFM)** system tracks what happens to space. These two platforms serve different purposes, and understanding that difference is key to using both well. Where a CMMS focuses on maintenance activity and asset history, CAFM focuses on where people work, how space is used, and how assets are tied to specific locations. Together, they give a facility manager a complete view of the building—not just what is being maintained, but how the physical environment is organized and whether it is being used well.

CAFM vs. CMMS: Distinct but Complementary Roles

The most common source of confusion in facility management software is treating CAFM and CMMS as interchangeable. They are not. A CMMS is built around equipment and maintenance workflows. A CAFM system is built around space—floor plans, room assignments, occupancy data, and the relationship between people, assets, and locations.

Think of it this way. A CMMS knows that a specific air handler was serviced on a given date, by a specific technician, using two replacement filters. A CAFM system knows that the air handler serves the third-floor east wing, that the wing contains 42 workstations, and that occupancy in that zone has dropped 30 percent since a recent reorganization. Both pieces of information matter. Neither system alone tells the full story.

It is also worth noting that the term **integrated workplace management system (IWMS)** is used widely in the industry, often in place of CAFM. An IWMS is a broader platform—it typically includes all the functions of a CAFM system plus real estate portfolio management, lease administration, and sustainability tracking. As vendors have expanded their platforms over time, many tools that started as CAFM systems now market themselves as IWMS platforms. Both terms appear in practice, and a facility manager should expect to encounter both. For the purposes of this course, CAFM is used as the primary term, with the understanding that modern platforms often exceed that original scope.

One feature that clearly sets CAFM apart from CMMS is the **project management module**—where a CMMS manages tasks individually, a CAFM system can assemble multiple tasks into a single coordinated project spanning different trades, assemblies, and floors. Table 6.7 summarizes the key functional differences between the two platforms.

Attribute	CMMS	CAFM / IWMS
Primary Focus	Equipment condition, maintenance activity, and asset history	Space inventory, occupancy data, and the relationship between people, assets, and locations
Core Data Record	Asset register: equipment specs, service history, cost, and warranty data	Space record: floor plans, room assignments, square footage, and utilization rates

Attribute	CMMS	CAFM / IWMS
Project View	Task-oriented — each job is an independent work order tied to a single asset or location	Project-oriented — multiple tasks across trades, assemblies, and floors managed as one coordinated effort
Key Integrations	BAS (fault detection), procurement (inventory), CAFM (asset location updates)	BIM (spatial data), HR (headcount and seating), CMMS (asset location sync)

TABLE 6.7 | CMMS AND CAFM: A FUNCTIONAL COMPARISON

Space Inventory and Utilization Tracking

The foundation of any CAFM system is the **space inventory**—a complete, organized record of every space in a facility. This includes office suites, conference rooms, storage areas, mechanical rooms, common areas, and any other defined zone. Each space is catalogued with its location, square footage, classification, assigned department or cost center, and current occupancy status.

Space inventory data answers basic but important questions. How much space does the organization occupy in total? How is it divided by department? What is the ratio of office space to support space? These numbers matter for budgeting, lease negotiations, and long-term planning—and they are surprisingly hard to answer accurately without a managed system.

Beyond inventory, CAFM systems track **space utilization**—how often and how fully spaces are actually being used. Utilization data can come from manual surveys, badge access records, or sensor systems that detect occupancy in real time. When utilization data is layered over space inventory, patterns emerge. A conference room that is booked 90 percent of the time but physically occupied only 40 percent of the time points to a booking behavior problem. A cluster of private offices that sits empty three days a week raises questions about whether that square footage is earning its cost.

Utilization tracking has become especially important as hybrid work has reshaped how office buildings are used. Facility managers are under growing pressure to demonstrate that their space portfolio matches actual demand—and CAFM data is the tool that makes that case.

Move, Add, Change (MAC) Management

One of the most time-consuming tasks in facility management is handling the steady stream of moves, additions, and changes that happen as organizations grow, shrink, and reorganize. This work is called **move, add, change (MAC) management**, and it is one of the areas where CAFM delivers the most immediate practical value.

A MAC event might be as simple as one employee moving from one desk to another, or as complex as relocating an entire department across three floors. Either way, it requires updates to seating plans, phone and data connections, access control assignments,

furniture records, and cost center allocations. Without a system to manage these changes, records fall out of sync quickly. The floor plan in the CAFM system no longer matches the actual layout. Asset records show equipment in the wrong location. Help desk tickets go to the wrong technician because room assignments are outdated.

A CAFM system manages MAC events through a structured workflow. The request is submitted, reviewed, and approved. The system updates the floor plan, reassigns the space, and logs the change with a date and reason. If the CAFM is integrated with HR and IT systems, those updates can trigger downstream changes automatically—notifying IT to reassign phone extensions, alerting facilities to schedule furniture moves, and updating the HR directory with the new seat location.

The result is a facility record that stays current rather than drifting further from reality with each untracked change. Over time, clean MAC records also produce useful data—how often people move, which departments generate the most change activity, and how stable different parts of the portfolio tend to be.

CAFM Integration with BIM and HR

A CAFM system becomes more powerful when it connects to other platforms. Two integrations stand out as particularly valuable: building information modeling (BIM) and human resources (HR) systems.

BIM integration links the CAFM space record to a three-dimensional building model. Rather than working from a flat floor plan, the facility manager can view spaces in the context of the full building—seeing how rooms relate to structural elements, mechanical zones, and building systems. When a CAFM system is fed accurate data from a BIM model at construction handover, the space inventory can be populated quickly and with a high degree of accuracy. This connection is explored further in Section 6.4, which covers BIM for facility operations in detail.

HR integration connects space records to the organization’s employee data. When a new employee joins, the HR system notifies CAFM, which assigns a workspace and updates the occupancy record. When an employee leaves or transfers, the CAFM system can flag their space for reassignment. This keeps headcount and space allocation in sync without requiring manual updates from the facility team. In large organizations with frequent turnover, this integration alone can save significant administrative time and reduce the errors that come from managing two separate systems manually.

Together, BIM and HR integration position CAFM as more than a floor plan tool. It becomes a live record of the building—one that reflects both the physical environment and the people who use it.

Occupancy Analytics and Reporting

The data that flows through a CAFM system—space inventory, utilization rates, MAC activity, headcount by zone—can be turned into reports that support decisions at every level of the organization. **Occupancy analytics** is the practice of using that data to understand how space is performing and where changes are needed.

At the operational level, occupancy reports help the facility team manage day-to-day space requests. Which floors have open workstations? Which conference rooms are consistently overbooked? Where can a department expansion be accommodated without a lease change? These questions have fast answers when the data is current and the reporting tools are in place.

At the strategic level, occupancy analytics feeds into portfolio decisions. A real estate team deciding whether to renew a lease, consolidate two offices, or redesign a floor needs reliable data on how existing space is being used. A CAFM system that tracks utilization over time can show trends—whether demand is growing or shrinking, which space types are most in demand, and where the organization is paying for space it no longer needs.

KPIs for space management typically include cost per square foot, square feet per person, utilization rate by space type, and percentage of space classified as unassigned or vacant. These numbers connect the facility manager's work to the financial performance of the real estate portfolio—and they give leadership a clear picture of whether the organization's space is being managed well.

When occupancy analytics are presented clearly and updated regularly, they shift the CAFM system from a records tool to a decision-support platform. That shift is where the real return on investment in CAFM is found.

Reflection Question

> A company has just completed a major office renovation and shifted to a hybrid work model, with most employees coming in two or three days per week. The facility manager has been asked to prepare a report showing whether the current space portfolio still fits the organization's needs. Which CAFM data sets and reports would you draw on to build that analysis? What would you look for in the data?