From a “Box of Documents” to Operational Intelligence: Five Handover Failures Holding Owners Back

Executive summary

The construction industry generates enormous volumes of drawings, models, submittals, test reports, and manuals. But owners repeatedly discover that, once the building is occupied, much of that information isn’t usable for operations. The operations phase for facilities is typically much longer than the actual construction time and accounts for roughly 60-80% of total lifecycle costs, so poor handover information quickly becomes a drag on OPEX, risk, and performance.[1]

At the heart of the issue is a structural misalignment: Construction is structured to deliver a physical asset on time and on budget, but operations needs structured, validated, system-ready information. ISO 19650 frames this as a lifecycle information-management problem rather than a closeout paperwork problem, with defined information requirements, documentation practices, and acceptance criteria.[2]

When this discipline is missing, owners experience five predictable failures: the “box of documents,” loss of asset-level data, a BIM model unusable for facilities management (FM) purposes, lack of structured data for downstream operations systems CMMS (computerized maintenance system) or IWMS (integrated workplace management system), and loss of project knowledge at closeout.

The industry-wide cost of fragmented information is significant. NIST estimates $15.8 billion per year in costs are tied to inadequate interoperability in U.S. capital facilities—with owners/operators carrying a large share of that burden.[3]

Assumptions and usable handover

This article assumes a typical medium-to-large commercial or institutional building project, delivered under a common procurement route (design-build or construction manager at risk) with a professional FM organization that uses or plans to use operations management software after handover.

In this context, usable handover refers to information that is (a) structured where necessary, (b) quality-checked against acceptance criteria, (c) traceable to physical assets and locations, and (d) able to be integrated into owner systems with minimal manual re-entry.

ISO 19650-1 emphasizes lifecycle information management using BIM concepts and principles, and that the appointing party should set information requirements and acceptance criteria that delivery teams must respond to.[2]

1 The “box of documents” problem

At closeout, owners receive large, unstructured document dumps: thousands of PDFs and scanned operations and maintenance (O&M) manuals that reflect the contractor’s processes rather than operations’.

Typical manifestations

O&M manuals arrive as huge PDFs without consistent indexing, certificates are scattered, file names are inconsistent, and “as-builts” are not clearly distinguishable from design intent. O&M manuals are needed for operation, but historically, having all the desired information available on completion has often been problematic.

Root causes

Contracts tend to specify documents rather than data, information requirements aren’t defined early enough to drive disciplined collection, and closeout activities get compressed by schedule pressure. McKinsey reports that large projects typically finish about 20% later than scheduled and can be up to 80% over budget, so information gathering that “checks the box” for contractually obligated asset data is often rushed at the end of a project.[5]

Owner consequences

FM teams can’t find equipment information quickly, nor can they confidently link documents to assets, so they lose time recreating knowledge that already exists. The immediate consequences are delayed readiness and inefficiency, which are consistent with NIST’s finding that inadequate interoperability imposes large recurring costs in lifecycle workflows.[3]

Mitigation

Treat closeout as a progressive deliverable. Require staged submissions (draft and final), enforce naming and metadata rules in a common data environment, and define acceptance criteria that are aligned to operational use: searchability, completeness, and asset linkage. Under ISO 19650, the owner’s requirements should define what information gets delivered, how detailed it needs to be, and what counts as acceptable.[6]

2 Loss of asset-level information

Critical asset data is seldom brought together, checked for accuracy, or delivered as a complete, reliable asset register that operations teams can use starting on day one.

Typical manifestations

Owners are often missing equipment lists, manufacturer or model numbers, serial numbers, installation dates, warranty details, spares, and maintenance requirements. Where structured handover is attempted, gaps show up as quality defects. Building data standards such as COBie exists to capture and deliver digital information related to maintainable assets, reducing delays from handover to operations.[7]

Root causes

Asset data is dispersed across submittals, schedules, shop drawings, commissioning records, and O&M manuals. In this case, no single party is accountable for assembling it into an operational dataset, and acceptance testing is weak or absent. The result is a "known unknown" upon occupancy: information exists somewhere, but not in a form the owner can use.

Owner consequences

Owners commission site surveys, manually catalog assets, and rebuild asset databases—often months after occupancy. Lost warranty data like install dates and guarantor data create financial exposure when claims are unable to be substantiated. At scale, these turnover inefficiencies mirror NIST's quantified burden of poor interoperability across lifecycle stakeholders—most visibly at the handoff from design and construction to operations, where fragmented asset data drives ongoing operational cost and performance gaps.[3]

Mitigation

Make the asset register a first-class deliverable. Define required fields and unique IDs, mandate structured formats (e.g., COBie), and require periodic quality control reports and defect correction before final acceptance. COBie standards and resources were created for owners and delivery teams when an asset data deliverable at handover is expected.[8]

3 BIM models that are not usable for operations

BIM models may not be "operations-grade" at delivery. They reflect design intent rather than installed conditions or are incompatible with FM tools and processes.

Typical manifestations

Models lack the attributes FM needs. "Record" updates lag field changes, or the owner receives a model with no governance plan, so it becomes stale. The FM team may ignore the model and rebuild asset information in other tools.

Root causes

BIM adoption has historically focused on design coordination and construction planning. But operational requirements haven't been embedded into modeling workflows. The deeper cause is the absence of owner-defined lifecycle requirements and acceptance criteria: what the model must support, which properties are required, and what "as-built" means in verifiable terms. The emphasis of ISO 19650 on lifecycle and guidance ecosystem address this consistency problem.[2]

Owner consequences

Digital twin investments fail to pay off, model refreshes require rework, and critical decisions lack trustworthy underlying data. The interoperability cost burden that NIST has quantified provides a macro-level mirror of this micro-level failure.[3]

Mitigation

Specify open, exchangeable formats that make it quick and easy to conduct quality assurance and ensure consistency on your building models. Industry Foundation Classes (IFC) is an open international standard for BIM data exchange and sharing among software applications used by construction and facility management, which reduces the commitment to a specific file format and increases portability.[9] Pair the IFC standard with ISO 19650-aligned information requirements (including a defined level of information needed and acceptance testing) before handover.[2]

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4 No structured data for facility systems

Owners receive documents describing information, but not in structured datasets that can be loaded into CMMS, IWMS, or EAM (enterprise asset management) system, energy platforms, or analytics tools.

Typical manifestations

Information is in PDFs rather than standardized asset tables, equipment logs, or preventive maintenance schedules. Even when spreadsheets exist, they aren't aligned to the owner's system configuration or import schema.

Root causes

Many contracts do not require standardized data schemas, do not define system integrations, and do not test imports before the project is complete. Compressed closeout timelines amplify this root cause, so when projects run late or over budget, integration work is often deprioritized.[5]

Owner consequences

FM teams manually enter thousands of records, recreate hierarchies, and rebuild maintenance schedules, thus absorbing avoidable labor and delaying O&M work. COBie aims to reduce that type of lifecycle inefficiency with digital asset data that's more easily maintained. NIST has quantified poor interoperability as a major cost burden for owners.[10]

Mitigation

Require system-ready deliverables: a CMMS import template, a mapping specification, a test import to a staging environment, and correction cycles before final acceptance. Use COBie/IFC and .csv exports to align with common FM ingestion paths.[11]

5 Loss of project knowledge at closeout

Critical operational knowledge such as design assumptions, commissioning findings, control strategies, and the "why" behind decisions, disappear when the project team demobilizes.

Typical manifestations

Operators inherit a building that technically works but lacks documentation explaining how to run it efficiently. Sequences of operation are unclear; tuning and seasonal re-commissioning are not planned, training is minimal, and post-occupancy learning is not institutionalized.

Root causes

There is often no contractual obligation or procedural way to bridge construction and operations and ensure that new or updated facilities can be operated effectively on day one of occupancy. Proper and structured post-construction turnovers target this gap, so end users have support and training, verify that the facility performs according to the brief, and deliver structured digital asset information for long-term FM.[12]

Owner consequences

When FM teams spend years learning the building through trial and error, performance is reduced. This risk is especially severe for complex mechanical and controls-heavy facilities, where "how it operates" matters as much as "what was installed."

Mitigation

Adopt Soft Landings-style aftercare: Define measurable operational targets, plan post-occupancy evaluation, and require training during the transition. Ensure structured data includes commissioning and controls—not just equipment catalogs.[12]

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The owner playbook for mitigation

The five failures map to five corrective moves: structure closeout, build the asset register progressively, make BIM exchangeable and QA'd, design for CMMS ingestion, and institutionalize aftercare.

Failure theme	What the owner experiences	What "good" looks like
Document dump	Information exists but cannot be found or used	Structured package with metadata and acceptance rules
Asset data loss	No reliable equipment register	COBie or asset register with validated required fields
FM-unusable BIM	Model ignored or stale	IFC-governed record model aligned to operations
No structured FM data	Manual CMMS build	Tested import templates and mapped datasets
Knowledge loss	Operations by trial –and error	Capture Soft Landings aftercare, post-occupancy evaluation, training, and "why"

Recommended deliverables and data formats

- COBie dataset in a .xlxs, SpreadsheetML, or other approved form, as the structured bridge for maintainable-asset information; plus open IFC exports for model exchange
- Asset register in CSV/XLSX keyed by unique IDs and locations
- CMMS/IWMS import template plus field mapping and a verified test import
- Commissioning/aftercare artifacts (commissioning report, issue log, sequences/controls narratives, training records) aligned with Soft Landings principles. [13]

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