

Design for Disassembly: Buildings That Can Change

Reversible architecture needs more than exposed bolts. Plan the layers, access, component records and future decisions that allow a building to remain useful as needs change.

By World Arch Journal · 2026-10-18

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FIG. 01 · ORIGINAL AI-ASSISTED CONCEPT VISUAL · NOT A DOCUMENTED BUILT PROJECT · WORLD ARCH JOURNAL, 2026.

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Project file

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- **SCOPE:** Conceptual guidance · project-specific assessment required

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Design for disassembly asks a building to explain how it can change. The issue is larger than whether a bolt can be undone. A component needs an accessible connection, an understandable removal dependency, a plausible next use and enough information to judge its condition. Without those things, a reversible-looking detail can remain difficult to recover.

The UK Green Building Council's design-for-deconstruction guidance includes the instruction "Simplify and separate building systems". This article uses that principle to build an original architectural decision framework, from the first structural grid to the handover record. It addresses future options rather than promising that every component will find a second market.

The accompanying workplace image is an AI-assisted editorial concept, not a completed case study. Our diagrams are original explanatory drawings. No material recovery rate, carbon saving, disassembly time or structural certification is claimed for the illustrated building.

Adaptability, repair, relocation and material recovery are related ambitions, but they lead to different drawings. An adaptable office may change its internal layout while its frame stays in place. A repairable facade allows a failed panel to be replaced. A relocatable module needs lifting, transport and reassembly strategies. Material recovery looks beyond the current building to another use of its components.

Start by writing a short change brief with the client. Which parts are likely to change during ownership? Which failures would be disruptive? What would make the building useful to another occupier? A reversible joint does little to help an office become housing if the plan depth, access and environmental conditions cannot support the new use.

The public summary of ISO 20887:2020 places disassembly and adaptability within a common design framework. This guide does not claim conformity with the full standard. The relevant editorial lesson is to define the intended future change before specifying a collection of apparently circular materials.

For a hypothetical small workplace, the brief might prioritise a replaceable facade, accessible services and partitions that can move without altering the primary frame. Relocating the entire building could remain outside scope. Making that boundary explicit helps the team invest in useful interfaces rather than claiming unlimited flexibility.

This is also where adaptive reuse and disassembly meet. The first preference may be to keep a serviceable building working, then recover selected components when change is necessary. Planning for recovery should support long service life rather than make premature replacement appear environmentally desirable.

Separate layers with different replacement cycles

A frame, a weathering surface, an electrical installation and a tenant partition are unlikely to need attention at the same moment. If one becomes inseparable from another, a small intervention can expand into a much larger loss. The design task is to keep interfaces intelligible without compromising the functions that hold the building together.

Our layer diagram separates structure, enclosure, services and fit-out. It is a conceptual organisation, not a universal construction sequence. The building still needs connections between these systems. The useful question is whether those connections can be inspected and addressed when one layer changes.

Consider an accessible services zone beneath a durable structure. It may allow a cable route to change while preserving the frame. But access panels, inspection clearances, acoustic separation and fire protection all need coordination. Calling the zone accessible on a concept
Skip to main content if later joinery or equipment blocks the opening.

Facade maintenance provides another test. Can one panel be reached and replaced without removing an entire elevation? Are its fixings concealed behind an irreversible finish? Can replacement work preserve the weather barrier and surrounding insulation? Draw the smallest credible replacement operation, then check its interfaces at corners, openings and ground level.

These questions connect disassembly to our guides on rainscreen water control and mass-timber design. A removable cladding system still needs reliable drainage. A timber frame with visible connections still needs an engineered load path, moisture management and the required fire strategy.

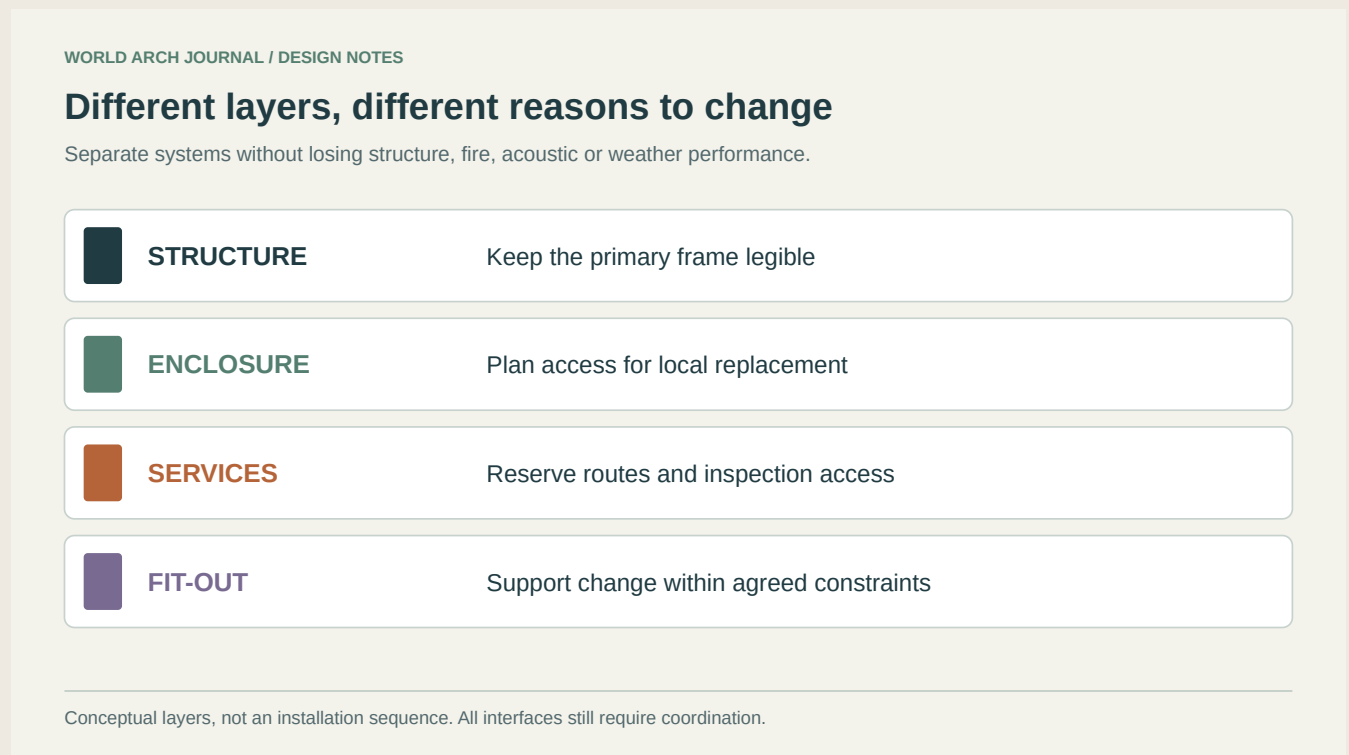


FIG. 02 · LAYERS WITH DIFFERENT REPLACEMENT CYCLES · ORIGINAL WORLD ARCH JOURNAL DIAGRAM, 2026. CONCEPTUAL; NOT A CONSTRUCTION DETAIL.

Draw the access around the joint

A mechanically fastened connection can be a useful starting point, but the presence of a bolt does not prove reversibility. It may be inaccessible after closure, unable to tolerate repeated assembly, difficult to identify or dependent on an adjacent component that cannot be removed. The section must show the space and dependencies around the fastener.

Our comparison drawing places two generic assemblies side by side: one with an accessible mechanical connection, the other with a continuous bonded interface. It deliberately avoids naming a material as universally good or bad. Adhesives may have a justified technical role; the question is whether the selected assembly's future separation is understood and documented

Ask the design team to demonstrate the principle at a representative interface. Which layer gives access? What support is needed during planned replacement? What surrounding finishes are disturbed? Is the component recoverable without uncontrolled damage? A qualified team must define safe temporary conditions; an editorial diagram cannot supply a demolition method.

The U.S. Environmental Protection Agency’s best-practice guidance links recovery-minded design with accessible connections and clear information. In our framework, the corresponding drawing deliverable is a connection schedule that records access, fastener identification, adjacent systems and the reference for future professional review.

Review reversible details against present-day obligations too: structure, fire, acoustics, water, durability and security. A component that is easy to remove but fails in ordinary service is not a successful circular design. Where a replaceable cover provides fire or weather protection, the reinstatement requirements belong in the maintenance record.

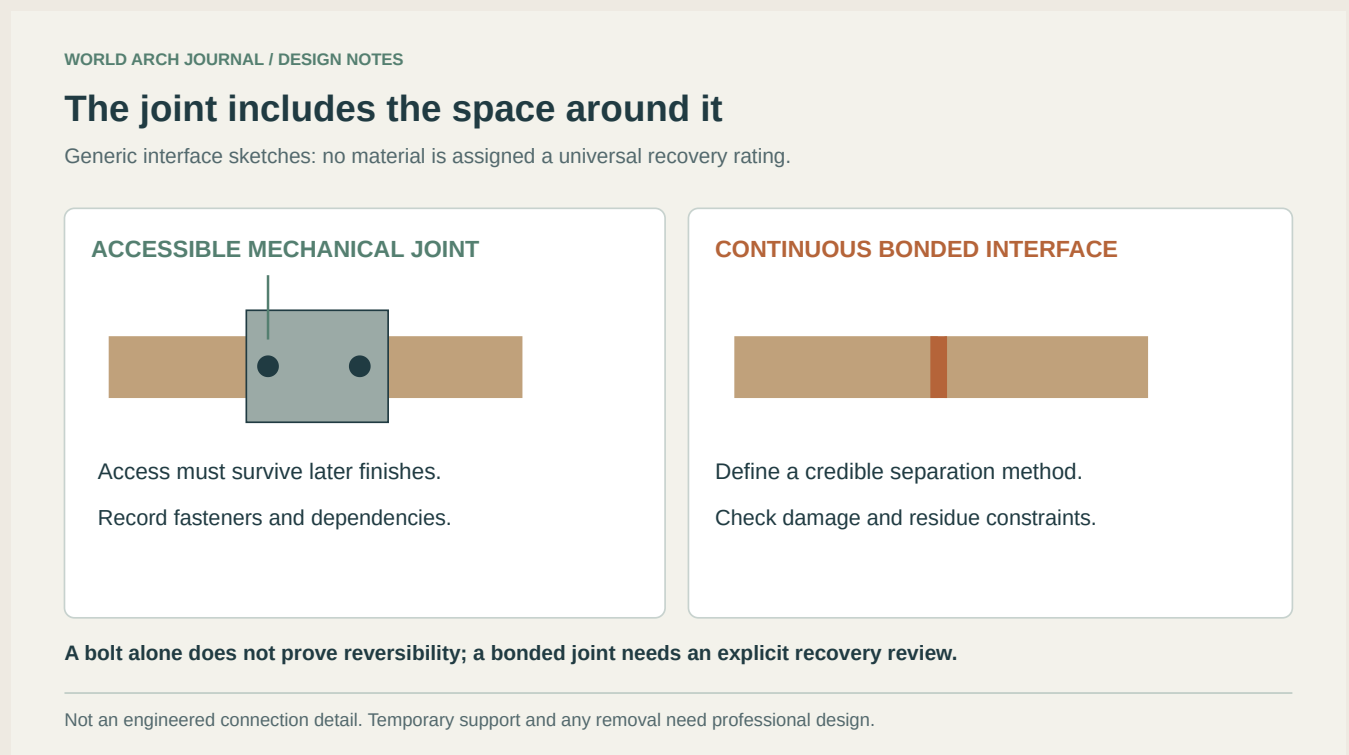


FIG. 03 · ACCESS MAKES A JOINT REVERSIBLE · ORIGINAL WORLD ARCH JOURNAL DIAGRAM, 2026. CONCEPTUAL; NOT A CONSTRUCTION DETAIL.

Test one bay before making a whole-building claim

Choose a representative bay and describe three possible future interventions: changing the fit-out, replacing part of the enclosure, and recovering selected components at the end of the bay’s service. This is a design review exercise, not permission to undertake dismantling. Its purpose is to find dependencies while the drawings can still change.

Future intervention	Design question	Record to produce
Change the internal layout	Can partitions and services change while required separations remain effective?	Planning constraints, service zones and fire/acoustic interfaces
Replace one enclosure panel	Can access, protection and weather control be maintained?	Panel identifier, connection reference and replacement constraints
Recover a structural component	What engineering review, temporary support and condition assessment would be required?	Structural information, dependencies and competent-review requirements

Now test an awkward bay rather than only the ideal one. A corner, stair interface or services riser may expose problems hidden in the repetitive grid. Standardisation can help organise information, but the exceptions often determine how much of a system remains practical to reuse. Those judgements are the working end of adaptive reuse strategies: deciding, bay by bay, what earns a second life.

The EU-funded BAMB reversible-building-design research considers transformation and reuse as connected design questions. In an architectural review, that suggests a useful change to the usual presentation: place the present arrangement beside a plausible future arrangement and explain which parts stay, which move and which require further assessment.

Do not turn that diagram into a promised recovery percentage. Future condition, regulations, dimensions, contamination, warranties, transport distances and demand are unknown. Record those uncertainties as decision variables. The drawing becomes more credible when it shows where a future team will need evidence rather than implying that every part is automatically reusable.

WORLD ARCH JOURNAL / DESIGN NOTES

Review one bay, then test an awkward one

Design questions for future change: use a corner or service interface as a second test.

CHANGE THE FIT-OUT

What can move inside the bay?

Record service zones + required separations

REPLACE THE ENCLOSURE

Can one panel be reached?

Record access + weather-control interfaces

ASSESS COMPONENT RECOVERY

What must be reviewed before reuse?

Record condition + structural dependencies

A review framework, not dismantling instructions or a claim that the illustrated parts are reusable.

Give components an identity that survives handover

A material passport is useful only if someone can connect its information to the real component. A beautifully formatted spreadsheet loses value when the panel identifiers do not match the as-built drawings, later replacements are omitted or the only copy sits in an inaccessible project account.

For the hypothetical workplace, begin with a modest register: component identifier and location; manufacturer and product reference where known; dimensions; declared composition; connection reference; installation date; available technical evidence; maintenance history; and known limitations. For load-bearing components, retain the relevant structural information and require professional reassessment before another use.

Distinguish a documented fact from an assumption. “Product identified from an installation record” is different from “material inferred from an old photograph”. Attach the source of the information and the date of any inspection. Where hazardous substances may be present, specialist investigation and the applicable local procedures take priority over a reuse ambition.

Agree who maintains the register, how revisions are approved and which open formats can accompany the owner’s normal systems. A QR code can help find a record, but it does not guarantee that the destination will remain available. Keep an owner-held export and an intelligible index alongside the building documentation.

Link this information to the project’s BIM and documentation workflow. The model is one means of organising responsibility, not a substitute for it. A small, accurate register that is updated after each replacement is more useful than a comprehensive model abandoned at practical completion.

WORLD ARCH JOURNAL / DESIGN NOTES

A passport must point to something real

Keep facts, assumptions and unknowns distinguishable in the component record.

COMPONENT ID

PANEL / F-023

Location on as-built plan

Link to owner-held register

Source + revision date

**Identity must match
the installed component.**

PRODUCT

Reference, dimensions, composition

INTERFACES

Connection + access requirements

EVIDENCE

Technical records + known limits

HISTORY

Installation, inspections, replacements

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...ment. It does not certify future condition, structural capacity or market demand.

Make a conditional carbon case

Design for disassembly creates an opportunity; environmental benefit depends on what happens next. Extra material or connection complexity today may be justified by future service and recovery, but that balance should be examined rather than assumed. Compare the proposal with a credible baseline and state the service-life and recovery scenarios.

A European Commission Joint Research Centre study on reuse potential examines how outcomes vary across construction elements and materials. Its results are not a transferable saving for an unrelated project. The appropriate project claim needs its own quantities, boundaries, treatment of future reuse and sensitivity to assumptions.

Keep separate the benefits of retaining a component in place, reusing it elsewhere and recycling its material. Those pathways require different handling and evidence. Do not count the same avoided production twice or present a possible future credit as a measured current reduction.

A strong brief can therefore set a concrete deliverable without predicting an unknowable market: demonstrate one accessible replacement interface, document the principal component families, resolve the identified dependencies and hand over the information needed for later assessment. Review those commitments during procurement so substitutions do not erase the design intent.

Architecture that can change is not defined by an exposed bolt or an industrial aesthetic. It is defined by the relationship between space, interfaces and information. When the next team can understand what is present, reach what needs attention and judge what can stay, the original design has preserved a useful choice.

Continue exploring: reversible buildings depend on materials whose next life is documented — browse the material library for the surface systems discussed in specification, and read how reuse played out in practice in our 9 October briefing on reuse, learning and arrival.

Frequently asked questions

- ▶ Is design for disassembly the same as modular construction?
- ▶ Do bolted connections guarantee reuse?
- ▶ What belongs in a material passport?
- ▶ Does disassembly always reduce carbon?

[Skip to main content](#) [Principles of design for disassembly?](#)

[What is a reversible building?](#)

Evidence and source notes

1. UK Green Building Council — Design principles include system separation, reversible connections and recovery information.
2. ISO — The public summary of ISO 20887:2020 describes disassembly and adaptability design principles.
3. U.S. Environmental Protection Agency — Recovery-minded design includes accessible connections and useful building information.
4. BAMB research project — Reversible design considers transformation and future reuse.
5. European Commission Joint Research Centre — Research examines reuse potential across construction elements and materials.

Related architecture stories

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