

LISA GELFAND & CHRIS DUNCAN

SUSTAINABLE RENOVATION

STRATEGIES *for* COMMERCIAL BUILDING SYSTEMS *and* ENVELOPE



MID-CENTURY MODERN BUILDINGS

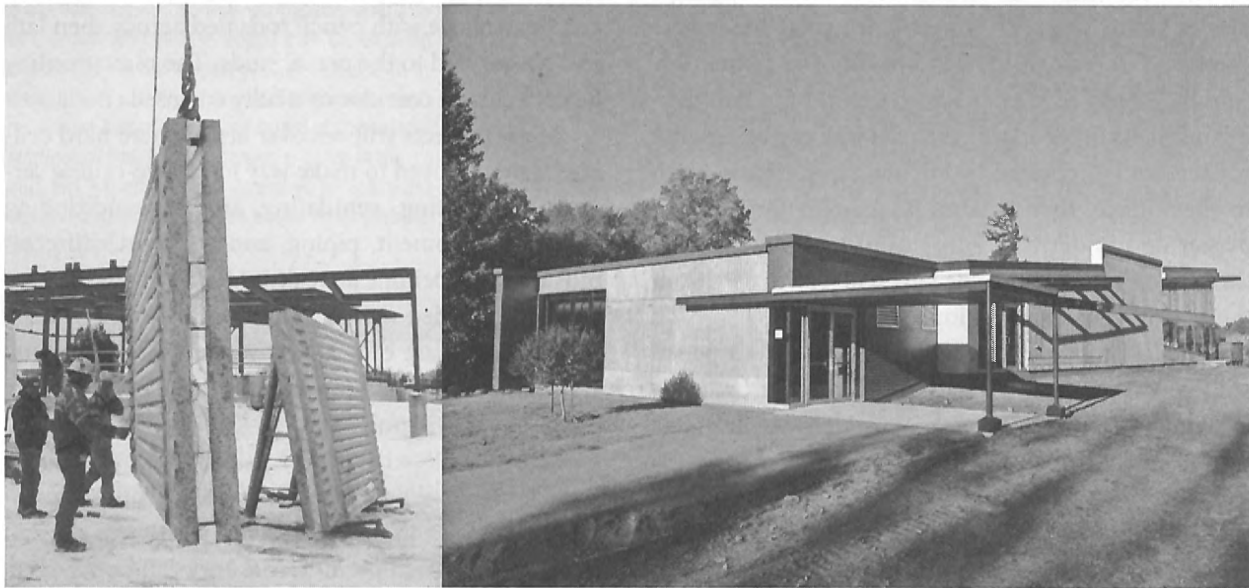
Mid-century modern buildings exhibit all the advances in materials and building techniques that accrued during the war years. New materials like plywood, asbestos panels, and plastics developed for the war effort became the “wonder” materials of the early postwar years. Accelerating production of housing for the booming wartime and postwar suburbs drove the need for simplified building methods for commercial and institution buildings. Speed of erection supplanted durability of materials for mid-century buildings. New systems were devised, experiments undertaken, and belief in the heroic capabilities of air-conditioning systems drove a faith in technology to overcome nature. Even while the case-study modernism from California promoted at least the appearance of indoor-outdoor

living, buildings became increasingly unprepared for natural influences. “Modern” meant a floor-to-ceiling view framing a life where all the conveniences of technology were available at the flick of a switch.

Construction methods can often drive a need for removal of hazardous materials. Such remediation is tightly controlled by legal requirements that must be followed but it is no longer the major obstacle that it was when the issue was first recognized. However, it may be the deciding factor in whether a material or building component can be reused effectively.

Disassembly Options

The designs for many mid-century buildings rely on repetition. Following on the heels of successful implementation of modern ideas of factory assembly and iterative construction, these buildings can lend themselves to disassembly and reuse. Some mid-



The Community Centre Pointe-Valaine by Smith Vigeant Architectes in Quebec, Canada, reused insulated precast concrete panels from a dismantled tire store to build 40 percent of the exterior walls.¹⁴ (left) © Smith Vigeant Architectes; (right) © Yves Beaulieu Photographie

century modern buildings can be greatly improved by selective demolition because their site plans often favored regimented layout over social interaction. While many mid-century modern buildings employ composite assemblies or traditional assembly methods designed to look modern, some actually provided an infrastructure that was simply assembled and relatively easy to remove. In these buildings there is an opportunity to keep the removed material out of landfill by spending a bit more effort on disassembly rather than using a traditional demolition method that would grind it to bits. By cutting, unscrewing, or unbolting assemblies, partitions, panels, or cabinets can be salvaged wholesale, for reuse or sale to the salvage industry. In East Germany where much of the social housing of the mid-century was built with concrete panels, one creative architect has disassembled the concrete panels and reconfigured them into a new building.¹³

Here in the United States precast concrete planks and tilt-up concrete panels are ripe for reuse since their lifespan exceeds one hundred years. Hotel, motel, apartment building, store, and office components can find new life in the reuse of precast panels.

Curtain wall systems can also find reuse in renovation projects. Since mid-century curtain wall systems have such poor insulation capacity, most designers would prefer to move them inside. Like reuse of precast concrete panels, reuse of curtain wall systems requires significant on-site measurement and cataloging of parts and careful planning for new installation. However, curtain wall mullions and frames are easily cut and reinstalled. So long as lengths exceeding the existing size are not needed, reuse is fairly easy. Also, once inside, curtain wall sticks can be in-filled with wood or metal panels, allowing greater design freedom than that permitted when they are used for exterior weather-proofing.

LATE MODERN BUILDINGS

Hazardous Material Issues

Late modern buildings have hazardous materials concerns similar to many mid-century buildings. Asbestos and lead are usually present, although lead was banned from use in paint in the United States after 1978.¹⁵ While lead-containing paint lingered on the market or in repair stocks for some time, buildings constructed after the later 1970s generally do not contain it. Similarly, while asbestos has not been formally banned in the United States, litigation concerning asbestos-related health problems has drastically limited its use since the 1980s.

Late modern buildings are typified by even more reliance on air-conditioning, most often in combination with inoperable windows. Those built after the late 1970s oil crisis were also sealed very well to prevent leaking of heat during the winter. Because of this, many late century buildings suffer from various forms of "sick building syndrome." Problems with interior air quality can come from materials that off-gas or from the presence of moisture that can lead to growth of mold and mildew. Especially during the period right after a renovation, these buildings are particularly susceptible to high levels of off-gassed materials unless care is taken to avoid high-emitting materials and to increase fresh air intake.

Late century buildings also contain more components that are made with hazardous materials including carcinogens¹⁶ (formaldehyde, asbestos), neurotoxins¹⁷ (lead), and endocrine disruptors¹⁸ (PCBs, PBBs, PBDEs, BPA, phthalates). These substances, particularly in plastics and sealants, are ubiquitous throughout late modern buildings; however, they are hard to identify since manufacturers did not publicize their use. Part of the problem is that data about various substances in our building materials is depicted only in terms of

THE COMPLETE RESOURCE ON PERFORMING SUSTAINABLE RENOVATIONS FOR BOTH HISTORIC AND MODERN EXISTING BUILDINGS

This forward-looking and insightful guide explores how the sustainable renovation of existing buildings presents great opportunities for initiating extensive changes in the performance of the built environment. Great examples of existing building upgrades are examined, illustrating *how* to do sustainable renovations, along with current design approaches for radically improving the functionality of existing prewar, postwar, and late modern buildings. *Sustainable Renovation* saves its key focus for institutional and commercial buildings, but discusses the challenges they pose within a global scope that encompasses all building practices. Some of the discussions in this book include:

- The significance of energy and resource demands by the building sector and the urgency of reducing loads in existing buildings
- Management, design, and construction approaches to achieve major modernization in occupied buildings
- International case studies that focus on methods and benefits of successful sustainable transformations of existing building performance

Repurposing buildings to preserve style and add performance remains a work in progress as designers and builders discover new methods for improving sustainable practices and standards. With incremental modernization and operations strategies available for immediate implementation, this book demonstrates the different ways of thinking necessary when considering and attempting the integration of sustainable concepts into existing buildings—and enables readers to rethink the world that's built around them.

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Cover Image: Inside the authors' Gelfand Partners Architects office in San Francisco. The firm designed the renovation of this building, originally a public bath when built in 1890. The renovation earned LEED Gold. Photograph by Mark Lutheringer.

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