C. Architectural Reuse

> People are happiest in buildings where change occurs at every scale from weeks to centuries. Such buildings are fractals in time.
>
> —Stewart Brand

Figure 29: Adaptive reuse of an old railroad grain elevator into a mixed use garden store and residence: Stookey's Feed and Garden, Moscow, Idaho

Architectural reuse processes include adaptive reuse, conservative disassembly, and reusing salvaged materials. This definition is broad and inclusive permitting many different interpretations; however, the underlying objective is that architectural reuse be understood as an evolutionary process occurring over time.

C.1.1 Discussion: Adaptive Reuse

Like ecological succession, adaptive reuse deals with directional change, a gentle and unpredictable temporal shift in the whole basis of the building's structure and function: the succession of the built environment. Adaptive reuse "slows nutrient loss" while contributing to the diversity, complexity, and continuity of a particular place. Genuine places worthy of our affections are created through the process of adaptation.

The Geography of Nowhere by James Kunstler presents a very readable argument for preventing the uncritical new construction of "placelessness." According to Kunstler,

> The average citizen, who went to school in a building modeled on a shoe factory, who works in a suburban office park, who lives in a raised ranch house, who vacations in Las Vegas, would not recognize a building of quality if a tornado dropped it in his yard. But the professional architects, who ought to know better, have lost almost as much ability to discern the good from the bad, the human from the antihuman.[1]

Figure 30: Pickering Barns ECO Center *(See* **C.1.2 Case Study**)

Figure 31: Gas Works Park, Seattle, Washington

Adaptive reuse is the process of changing a building's function to accommodate the changing needs of its users. This phenomenon is examined in Stewart Brand's *How Buildings Learn: What Happens After They're Built* (New York: Viking, 1994). This excellent book is a comprehensive investigation of what happens to buildings over time. Preserving a building and its function may be acceptable under circumstances relating to extraordinary historical events, but not for the vast majority of existing structures. Although the linking of landmark events and buildings can result in landmark buildings deserving of historic preservation, the reality of escalating property taxes and land values forces even the most pure preservationist to take a second look at adaptive reuse. Reuse is a form of preservation, and can be accomplished in a respectful way as demonstrated by the Pickering Barns ECO Center.

Adaptive reuse can also serve as point of departure for other related issues such as derelict infrastructure, industry, and landscapes. Gas Works Park in Seattle, Washington, is an example of how an abandoned industrial site can be resurrected as a public park. Although the ground remains polluted, the rusting hulks of a previous time grace human play and community vitality. However, the romanticism of industrialism is shadowed by warning signs that inform us of soil toxicity. Similar forsaken spaces exist everywhere in the form of decaying railroad yards, quarries, mills, farms, silos, and factories.

The benefits of reuse extend far beyond the conservation of our cultural legacy. Old buildings can be economical through tax credits and lower acquisition, demolition, and material costs. Available utilities and public services can also lower site preparation costs. For example, the Environmental Resource Center in Downey, California, reused its old office building, decreasing site work costs by 50%[2]. Adaptive reuse of whole buildings conserves natural resources and the energy required to extract, process, and transport building materials. Open space is preserved by avoiding the urban sprawl that accompanies new development, and employment increases due to the fact that rehabilitation is labor-intensive. Overall, the physical and social fabric of the community is strengthened. Adaptive reuse should always be investigated, because it is the highest form of recovery.

Energy Resource Center in Downey, California:
Figure 32 (top) illustrates the original building, while Figure 33 shows the "open-heart surgery" (Southern California Gas Company)

Adaptive reuse revises the function of a building while preserving the integrity of architectural space. In order for a building to accommodate change, it must have a functional value as well as a commodity value. Buildings that offer an open arrangement of spaces and a flexible structural framework have the best potential for reuse. In *Ecologic Architecture*, Richard Crowther says, "Our tendency to fixed-state space planning is counter to our own dynamic of thinking, articulation, and mobility."[3] We have adopted this approach for the purpose of protecting the public's health and safety. The Uniform Building Code (UBC) requires buildings to follow a set of rules with respect to their occupancy and construction type. While establishing fixed uses helps simplify the regulatory process, the specificity of functions has gotten out of hand. The 1994 UBC outlines a total of 32 separate occupancies, each of which contains numerous sub-sections. The subsequent "hard" separations and compartmentalization limits the capability of a building to adapt to future needs. Open plans and partitioning that is easily recyclable or biodegradable, such as Stramit straw panels, allow for greater versatility.

Refer to the 1994 Uniform Building Code, *Table 3-A, for a description of occupancies by group and division*

See **Appendix II: Straw Building Materials** *for a description of Stramit*

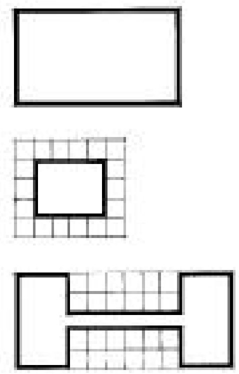

Figure 34: Building types organized with respect to their cellular structure allows for more flexibility in their future reuse

See adaptive reuse section of **D.1.1 Discussion: Life Cycle Analysis** *for more information on William McDonough's projects*

What if the design process and code structure were amended so that buildings offered public safety with respect to spatial types rather than occupancy types? Buildings might be categorized according to their cellular structure. The cellular forms would then be shaped and scaled according to the occupancy loads and uses, but at least buildings would afford some level of flexibility. Cellular organization strategies already exist within traditional building types, which is one of the reasons why they are so often adapted to new uses. Single-space structures (e.g., railway stations), predominantly cellular structures sharing open space (e.g., atrium buildings), and predominantly cellular structures with spacious rooms (e.g., schools) are examples of building types that aren't constrained by their particular function.[4]

The study of traditional building types and examples of adaptive reuse provides insight as to how we can create resilience to change in new construction. Kevin Lynch suggests the speculative redesign of any proposed building for a different use as a good test for adaptive potential. For instance, William McDonough frequently designs for the future reuse of his projects. Based on analysis and speculation, it is possible to draw some conclusions that can inform the design process. Characteristics of adaptable structures include modest scale, simple forms, low density and height, generous interior or exterior open space, separable parts, and durable, "patchable" construction.[5]

C.1.2 Case Study: Pickering Barns ECO Center (Issaquah, Washington)

This adaptive reuse project blends the restoration and rehabilitation of the historic Pickering Barns in Issaquah, Washington, with new construction incorporating salvaged and recycled-content materials.

The Pickering Barns were in a dilapidated state when plans for a shopping mall on the land occupied by the early farm were presented to the building department. Because the barns are listed on the National Register of Historic Places, the developer was required to submit designs for their rehabilitation. Ideas for their use began flowing, but eventually the developer donated the barns to the City of Issaquah. Working with private sector companies, the Washington State Department of Ecology, and King County Solid Waste, the city constructed a unique, state-of-the-art facility devoted to education about resource conservation. When completed, the ECO Center will sport an environmental retail store, specialized recycling services, organic gardens, an educational resource library, a conference center, and a materials exchange.

Figure 35: Pickering Barns showing dilapidated state of original building (KPG, Inc.)

Figure 36: Stabilizing the loft barn (KPG, Inc.)

The City of Issaquah hired KPG, Inc., a firm of architects, landscape architects, and civil engineers, to resurrect the barns as a showcase of preservation, adaptive reuse, and resource-efficient construction while adhering to the Department of the Interior's guidelines for historic preservation. A balance was achieved whereby the restored loft barn retained its original identity from within, and the stall barn was renovated for the retail area and café.

For more on resource efficiency, see **A.1.1 Discussion: Resource Efficiency** *and* **A.1.2 Case Study: ReCraft 90 and the Model Conservation Home**

The project was divided into phases. With a mere $89-per-square foot budget, W.B. Clark Co. was contracted to perform the work. The barns required a new foundation, structural bracing, replacement timbers and siding, and extensive interior renovations to accommodate the new program. The heating and cooling requirements thermally separated the open loft area from the ancillary conference room, resource library, bathrooms, and utility room. Since the clerestory windows of the main loft act as the primary natural light source, the architects chose a Kalwall partition system that

Figure 37: Pickering Barns ECO Center interior of stall barn

Figure 38: South elevation of stall barn

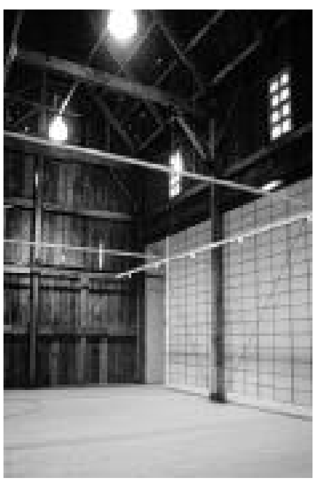

Figure 39: Interior of finished loft barn showing Kalwall partitions and clerestory windows

allows light transmittance and thermal resistance. The severe rotting at the bases of the large timber columns required the removal and replacement of the damaged portion by grafting on lengths of salvaged material. Nearby, a disassembled barn provided replacement boards, battens, and planks for the siding and floor. Other reused items include interior doors and fluorescent lighting fixtures.

The interior of the stall barn underwent a complete transformation. The original posts and beams supporting the roof were in poor condition. Foam-core panels spanning parallel strand lumber (PSL) trusses replaced the original structure, creating an open space for the retail businesses. The walls were insulated and covered with FiberBond wall board made from recycled gypsum and newspaper. The barn doors at the south end of the stalls are used as movable shading devices for the new glass infill.

Ditos Daranciang, the project architect, is enthusiastic about tackling another comprehensive reuse job, but expressed concerns about federally mandated wage structures inhibiting the cost-effectiveness of disassembly and reuse. In the U.S., materials represent only about a third of the cost of construction, with labor accounting for the remainder. As long as material prices remain disproportionately low compared to labor, cost-effective conservative disassembly and adaptive reuse will continue to be a challenge. Nonetheless, the Pickering Barns ECO Center confirms that it is a rewarding one.

C.1.3 Exercise: Design for Reuse

Adaptive reuse can occur at many scales from individual buildings to "Main Streets" to entire districts—all of which are examples of ecological succession with respect to whole buildings.

Objective

To investigate examples of adaptive reuse within the community. (This exercise would make a good prelude to the design of an infill studio project.)

Preparation

Read *How Buildings Learn* by Stewart Brand. This book contains innumerable examples of adaptive reuse strategies, especially in Chapters 10, "Function Melts Form," and 12, "Built for Change."

Execution

Choose one of the two analyses:

1. An individual building (relocation, reuse, preservation, combination)

2. An entire district (Main Street, residential neighborhood, warehouse district)

Address these issues: contextual relationships, architectural compatibility, internal function and organization, choice of new materials and preservation of old materials, historic integrity, and compliance with the Secretary of the Interior's guidelines if applicable. Based on interviews with architects, builders, and owners, develop your vocabulary associated with adaptive reuse, and gain insight beyond that which can be empirically derived. This may include the state of decay, any special reconstruction, problems (and solutions) encountered during the planning or construction stages, unique artifacts uncovered during dismantling, or the "human story" associated with the building's past. Carefully document the building or district using photographs and sketches.

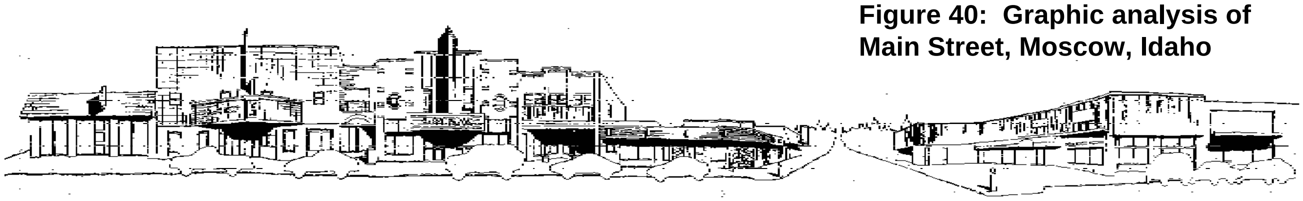

Figure 40: Graphic analysis of Main Street, Moscow, Idaho

C.2.1 Discussion: Conservative Disassembly

Figure 41: Conservative disassembly of Pickering Barns using a snorkel lift, Issaquah, Washington (KPG, Inc.)

Critics use the term “timelessness” when describing buildings that surpass fashion. Unfortunately, not all buildings are timeless, and their removal is usually the result of both obsolescence and bottom-line driven development. Whenever the value of property greatly exceeds the value of its building stock, the probability of demolition increases.

When architecture is demolished, the spatial continuum may be broken, but the materials continuum need not be. Just as the saprophyte reduces dead organisms to their simpler elements within natural systems, the demolition contractor might reduce a building to its simpler elements. The necessary shift that must take place for this analogy to hold true is from destructive demolition to conservative disassembly.

Figure 42: Wasankari Building Recyclers salvaging tongue and groove roof deck of the old Bowl-A-Rama, Moscow, Idaho

Popular demolition practices use heavy machinery to crush, splinter, and pulverize all materials, reducing them to a co–mingled waste heap. Existing mechanical separation technologies can prevent much of this debris from choking the landfill; however, this is capital-intensive and produces low-grade materials. Although conservative disassembly can yield higher-value materials, it is labor-intensive and dangerous work. Conservative techniques include:

1) manual removal of selected elements followed by mechanically assisted demolition; and

2) whole-building disassembly.

The first technique may involve the services of a separate salvage contractor to work with the owner and demolition contractor. Brown’s Used Building Materials in Spokane, Washington, works closely with a couple of demolition contractors who allow Brown’s to bid on the salvageable materials and send in a team of building strippers prior to the wrecking crew. Architectural ornament, metals, doors, windows, plumbing, good lumber, hardware, pipe, clean brick, and wire can all be removed prior to the arrival of the demolition team. The remaining materials are wasted because their separation is not considered cost-effective.

Normally, wood-framed structures fall within this category due to the high quantity of nailed connections. However, the Whole House Recycling Project monitored by Metro Portland in November and December 1992 proved otherwise.

For more information on Metro, see **B.2.2 Case Study: Metro HQ**

Over a two-week period, a 1920s wood-framed house in Portland, Oregon, was disassembled to make way for the expansion of a local grocery (the project was initiated by the grocer). The goal was to "demolish in a way that removed construction material in a reusable form." Preferring hand labor over the usual mechanically assisted process allowed for careful disassembly, cleanup, and sorting of materials. The low bid for conventional mechanized demolition was $8,000, while the actual cost of salvage and demolition was only $5,400. The avoidance of equipment costs and disposal fees more than offset the additional labor costs, and the value of the salvaged materials was never even calculated.

Heavy timber structures are commonly disassembled in this way due to the superior quality of the materials. Duluth Timber Company specializes in "logging the industrial forest" by salvaging heavy timbers, planks, and pilings from bridges and industrial buildings. With sawmills in both Duluth, Minnesota, and Edison, Washington, high-grade wood material from all over the country is made available to timber framers such as J Squared Timberworks in Seattle, providing the advantages of dimensional stability and old-growth forest preservation. According to Chris Luchi of J Squared, the salvaged timbers cost about 25% more than virgin timber, reflecting the additional labor required to disassemble and process the material.

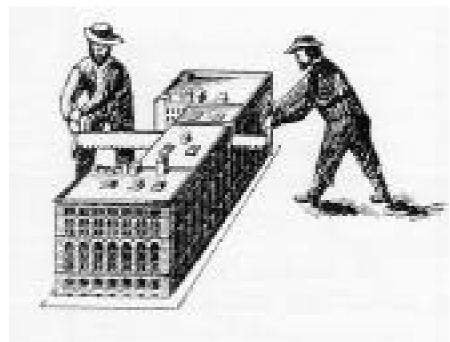

Figure 43: Duluth Timber Company's trademark "logging the industrial forest"
(Duluth Timber Company)

In Vancouver, Washington, there was a 720'-by-120' heavy timber warehouse with an interior concrete firewall, a roof deck of solid two-by-fours laid on edge, and wall infill of sheet metal on particle board spanning between two-by-eights. When the warehouse was demolished during the winter of 1994–95, more than 1,500 tons of wood, metals, and concrete were either recycled or salvaged. Only about 30 tons of mixed waste were landfilled, and the majority of that was asbestos roofing, which could not be recycled. Metro Portland's cost analysis of the project revealed that recycling and salvage saved $134,500.

Figure 44: Raising the timber framework of a studio built by Keith Smith, Moscow, Idaho

For more information on flexible framework design, see **D.1.2 Case Study: Advanced Green Builder House**

These examples demonstrate that when buildings are constructed with relatively high-value and durable materials in such a way that their separation is made possible, they can be conservatively disassembled. Timber-framed architecture is a good manifestation of design for disassembly, as are most post-and-beam type structures if their connections are either exposed or accessible. Obviously, bolts, self-tapping screws, and gaskets make disassembly easier than nails and glue; however, these types of connections increase materials costs and slow construction time.

Kevin Lynch suggests that we require demolition plans with any new construction. "We already require record plans, and designers and contractors necessarily work out a proposed sequence of construction. Imagining its reverse adds only a small burden. Besides, thinking through a demolition sequence will also inform building design in an interesting way."[6]

C.2.2 Case Study: The Sauna Experience (Moscow, Idaho)

On the spur of the moment, a small group of architecture students from the University of Idaho disassembled a small outbuilding over a weekend. On the outskirts of town, a couple of folks had just purchased a run-down farmhouse that they intended to restore. The 120-square-foot outbuilding was going to be demolished. Once a chicken coop, it had since been converted into a wood-fired sauna. The acquisition of free materials for a future sauna was reason enough to tackle the dusty job. Our intention was (and still is) to build a new sauna using highly insulative straw bales as a load-bearing wall and rammed earth tires as the foundation.

The dismantling proceeded quickly with simultaneous work being done on the interior and exterior. We carefully removed the nails from the cedar and aggressively tore away the brittle, sun-baked clapboards and roofing. Removing the roof structure before removing the wall bracing is important for the safety of those on the roof. Having one or two individuals working on nail removal and sorting throughout the process also helped speed the site cleanup.

Salvaged materials from the old chicken-coop sauna included high-quality 1'x12' rough-sawn cedar, 2'x4' studs, windows, trussed rafters, 4'x6' sills, and a woodstove called “the Volcano.” The door, shake roof, clapboard siding, and plywood floor were not reusable, so they were delivered to a local chipper facility to be used as boiler fuel for the University of Idaho’s wood-fired heating plant.

Figure 45: University of Idaho architecture students dismantling a sauna, Moscow, Idaho

Figure 46: Sketch of proposed reconstructed sauna using straw bales for a loadbearing wall and reusing rough-sawn cedar and roof rafters

C.2.3 Exercise: Building Deconstruction

Objective

The objectives for disassembling a small shed, garage, or outbuilding will vary (you must first determine what you are going to do with the salvaged materials), but the experience of performing the tasks necessary to take something apart yields immeasurable and unpredictable results. If something is easily disassembled, the chances are good that it is similarly uncomplicated to construct.

Preparation

Chapter five of *Building With Salvaged Lumber* by Elizabeth and Robert Williams (Blue Ridge Summit, Penn.: Tab Books, 1993) describes the conservative disassembly process for a typical wood-framed house. It demonstrates how to safely salvage the most reusable material in a cost-effective manner. A quick review of this book prior to any small-scale disassembly project will be helpful, but in lieu of this, here are a few guidelines:

Execution

1. Perform an initial site visit to assess existing conditions. Make arrangements to have water and electricity turned off. Quickly determine what is salvageable and what is not, then make plans in advance for their removal from the site, storage, resale, reuse, recycling, or disposal. Seek out area recyclers.

2. Come prepared with all necessary tools to get the job done. These tools will depend on the type of construction, but you'll definitely want good claw hammers, sledges, cat's paws, flat bars, pry bars, and crowbars. Bring any other tools necessary for bolted connections, removal of electrical boxes and wiring, metal siding or roofing screws, etc. (cordless drills are useful for backing out screws). Bring ladders, scaffolding, and safety equipment such as a good first aid kit, eye protection, heavy-soled boots, gloves, and hard hats.

3. Using **Appendix IV: Project Waste Analysis Worksheet**, track the materials as they are either salvaged and reused (or sold), recycled, incinerated (as hog fuel), or landfilled.

Alternatives:

1. Prepare graphic demolition studies of existing buildings (in the Beaux Arts tradition?).
2. Invent a modular "kit of parts" (Legos, Lincoln Logs . . . inflated balloons with Velcro?) then create a sculpture or a "building." What forms are possible?
3. Design for disassembly can be investigated as a studio design project, where the emphasis is placed on modularity, accessibility, and well-detailed connections.

C.3.1 Discussion

Reusing Salvaged Materials

> An environment that cannot be changed invites its own destruction. We prefer a world that can be modified progressively against a background of valued remains, a world in which one can leave a personal mark alongside the marks of history.
>
> —Kevin Lynch

Salvaged objects excite the imagination, and their expressive reuse captures a bit of the richness that only the past makes known. While the reuse of materials alone cannot supplant the historical continuity of whole buildings or implant timelessness into new construction, it does contribute a patina and character to projects that can be particularly powerful if accompanied be personal associations. Salvaged materials are inherently durable and adaptable; symbols of the beauty and necessity of natural decay over premature destruction.

The work of artists who reuse "found" materials challenges our ideas about waste and renewal. The art of bricolage is epitomized by the Watts Towers in Los Angeles, California. The towers were built of steel, concrete, and bits of ceramic tile by Simon Rodia during the Depression and war years. Rising to a height of almost one hundred feet, they have survived two major riots and are now listed on the National Register of Historic Places. Lesser known soul-stirring sculpture is created by Victor Moore outside of Pullman, Washington, and Dick Elliot and Jane Orleman of Ellensburg, Washington.

Victor and Bobbie Moore live in a house constructed from the old floor joists of a grain warehouse on the site of a played-out rock quarry. Although found pieces and assemblages of various sorts are pleasantly scattered about the property, the hulking mass of the junk castle stands vigil above the rest. Constructed of sheet metal, tin, washing machine parts, dryer doors, miscellaneous housings, bedsteads, and the door from a 1952 Oldsmobile, the castle was Victor's fine arts doctoral project in the late 1960's. To some folks it looks like a cossack tent; to Victor Moore it is like an old friend.

bricolage

something made or put together using whatever materials happen to be available.

Figure 47: sculpture at Dick and Jane's Spot, Ellensburg, WA

Figure 48: Victor Moore's junk castle near Pullman, WA

Dick Elliot and Jane Orleman, friends of the Moore's, have created "Dick and Jane's Spot." Their place is embellished by their own work as well as that of others. A tower of bricks laid in diagonal courses, reflector mosaics, figurines from found stuff, and a number of neon installations adorn the house and yard that face the city police station. "Our home allows us to have a dialogue with people without the filter of a gallery."[7]

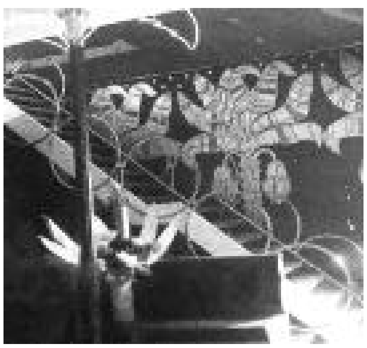

Figure 49: Franklin Institute multi-media center (top) and **Figure 50: the Black Banana Restaurant (bottom).** Alley Friends Architects, Philadelphia (Photos: Bruce Millard)

The reuse of cast-offs in construction projects fueled the ideas and creations of Alley Friends Architects in Philadelphia, Pennsylvania during the 1970s and 1980s. The partners consisted of Alan Johnson, Richard Stange, and Bruce Millard. The scope of their work included sets for horror movies and off-Broadway plays, temporary festival structures, passive solar buildings, and award-winning, multi-purpose, high-rise condominiums. Many times, design solutions emerged from materials on-hand. The Information and Media Center for The Franklin Institute in Philadelphia utilized fiberglass concrete waffle slab formwork salvaged from a construction site. Alley Friends created a multi-media wall for a small information theater at a science museum. In another project, for the Black Banana Restaurant, circular chrome clothing display racks worked as the stair guardrail. The firm's office was a testimonial to reuse as it occupied a series of row-warehouses in an abandoned industrial area along the banks of the Delaware River. These buildings served as office, materials storage, and residence for the partners and interns. Almost everything was salvaged, including the conference table from an old meat packing refrigerator door and cabinets from discarded cheese boxes made of Finnish plywood.

Sources of salvaged materials can be as varied as the materials themselves; however, reuse businesses specializing in used building materials and other architectural components offer consistent supplies. Some facilities like Second Use near Seattle and Brown's Used Building Materials in Spokane deal exclusively in construction materials, architectural elements (doors, windows, fixtures), and mechanical equipment. Urban Ore, Inc., in Berkeley, California, expands this "conventional" selection to include household articles, books, furniture, and small appliances. Happy Harry's Used Building Materials operates a chain of franchises throughout Canada and into the U.S.; the scale allows it to bid on large-scale demolition projects and exchange goods between locations. With the exception of Happy Harry's, these reuse facilities are intimately connected to the flows of used materials within their communities.

Other reuse operations are more focused. Seattle Salvage restores and sells only pre-1940 architectural "accessories" including doors, windows, lighting, and plumbing fixtures. Duluth Timber Company, with several regional operations, and G.R. Plume Company, in Bellingham, Washington, are specialists in resawn heavy timbers salvaged from turn-of-the-century industrial buildings. They produce high grade beams and lumber, paneling, and custom millwork for projects throughout the country.

Figure 51: Seattle Salvage showroom

According to Jim Broadstreet, architect and author of *Building With Junk*,

> It works well to have a collection of materials and design around them. It does not work well to design a structure, then go out and try to find the materials.

Buildings that incorporate salvaged materials sometimes exhibit formal characteristics based on the quality, availability, and dimensions of the materials themselves. These factors impose a kind of "carrying capacity," which the building cannot exceed. This is particularly manifest in Victor Moore's shed, which was constructed entirely from salvaged materials. The incremental growth seen in a house near McCall, Idaho, demonstrates how salvaged lumber of smaller dimensions can affect the scale, shape, and texture of the building. The composition is "fragmented" in an appealing way. The result is an organic aggregation of parts that creates a humble yet compelling form.

Figure 52: Two examples of "organic growth" by reusing salvaged materials include Victor Moore's shed (top) and this anonymous house near McCall, Idaho (bottom)

C.3.2 Case Study: Urban Ore, Inc. (Berkeley, California)

Figure 53: Salvaged wood materials at Second Use in Woodinville, Washington

The purpose of Urban Ore, Inc., is to prevent waste, serve the public, and conduct a successful business. It accomplishes this by receiving and purchasing goods using tax credits, trade credits, and cash, then selling the diverted materials as-is for reuse.[8] Regarding discarded materials as “already-refined ores that are most concentrated in urban areas,” Urban Ore is a successful model for an industry that exists between the demolition of buildings and the recycling, landfilling, or incineration of materials.

Urban Ore sells used doors, windows, cabinets, lumber, toilets, sinks, tubs, bricks, masonry, furniture, and collectibles. The Building Materials Exchange and General Store are supplied by drop-offs, transfer station salvage, contractors, and haulers. Other reuse businesses, such as Brown’s Used Building Materials in Spokane, have a salvage crew on staff that works closely with local demolition contractors. Adjacent to the drop-off area is the processing deck where materials are sorted to be either sold as-is or disassembled for recycling. Materials that cannot or do not sell are eventually reprocessed as recyclable materials.

The most important selling aspect in any retail facility is the organization and display of goods. To many people, a reuse business looks like a junkyard; however, if the yard is designed as an enjoyable shopping environment, the merchandise will sell. Keeping the yard safe, clean, and organized is a routine problem for reuse businesses. Urban Ore, Inc. addresses this problem with the help of architect Mark Gorrell, along with input from the entire staff. Continuously revising the master site plan and strategizing for greater efficiencies, Gorrell is also one of Urban Ore’s customers. Many residential and small commercial projects throughout Berkeley have incorporated pieces of Urban Ore.

Studies conducted by the company prove the economic and environmental advantages of reuse over recycling. For example, an aluminum window can be separated into glass and metal for recycling. In Berkeley, a nearby quarry will accept the glass at no charge and grind it up into sand. The metal can be sold for 10–70 cents per pound. For either material, the hauler must pay for transportation. Conversely, selling a salvaged window as-is can bring in $15 to $200 without hauling costs.

From an environmental standpoint, reuse conserves all of the embodied energy required to extract, transport, and process the raw materials, whereas recycling requires additional energy inputs for recovery, transportation, and re-manufacturing. According to Berkeley's 1991 Integrated Waste Management Plan, Urban Ore diverted 5,300 tons of material from the landfill in a year, only slightly less than the 6,000 tons the city's state-of-the-art curbside recycling program handled.[9] Although solid waste agencies refer to salvaged materials as "difficult-to-manage wastes," Urban Ore proves on a daily basis that salvaged materials are valuable resources that can be prevented from becoming wasted resources.

Figure 54: Typical displays of windows, sinks, and doors at reuse facilities: Brown's Used Building Materials in Spokane, WA, (top) **and Second Use in Woodinville, Washington** (middle and bottom)

C.3.3 Exercise: Reuse Operations

Objective

To familiarize students with the reuse operations in their community on a level that benefits both the student and the reuse business. Depending on the needs of the business and the time available from the students, this exercise can terminate with a phone call and site visit or continue to evolve into a long-term activity such as the design and construction of a protective canopy for weather-sensitive materials (using salvaged materials, of course).

Preparation

1. Make a list of reuse businesses in your community and visit their locations.

2. What materials are commonly available? Pay particular attention to the general condition of materials and prices.

3. What materials can the public discard at the facility? What kind of drop-off policy is enforced?

4. Talk to the managers and / or staff to learn what is required by both the business and the community to increase public awareness of reuse.

Execution

In many cases, reuse yards are ill-planned, with numerous problems concerning circulation patterns, material flow, security, and retailing. Based on preliminary conversations with managers, staff, and customers (many of these will be "on-the-fly"), what design opportunities are present? Creating evocative drop-off area signage or developing a site map to aid prospective customers are possibilities. Persuasive graphics coupled with some helpful hints or construction tips will not only embellish a site map, but may serve to invigorate one's imagination. The site map might even culminate in the design of a long-term master plan. Often, materials will be exposed to the weather, which degrades their value over time. The need for simple display rack and shelter for doors might evolve into a small design / build project (using salvaged materials, of course).

***See* D.2.1 Discussion: Building from Waste *and* D.2.3 Exercise: Design/Build.**