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Heritage and waste values
Guest Editors: Susan Ross and Victoria Angel

1 Guest editorial

6 Locating heritage value in building material reuse
   Allison Iris Arlotta

16 Deconstructing heritage: enabling a dynamic materials practice
   Tina M. McCarthy and Eleni Evdokia Glekas

29 Building conservation and the circular economy: a theoretical consideration
   Satu Huuhka and Inge Vestergaard

41 Vancouver pre-1940 houses: a cache for old-growth forest wood
   Zahra Teshnizi

52 Demolition and deconstruction legacies: Toronto’s Honest Ed’s and Mirvish Village
   Alison Creba

65 Creating with traces of life: waste, reuse and design
   Staffan Appelgren

76 Heritage waste management: a possible paradigm shift in the post-earthquake
   reconstruction in central Italy
   Ahmadreza Shirvani Dastgerdi, Flavio Stimilli, Carlo Pisano, Massimo Sargolini and
   Giuseppe De Luca

90 Post Syrian-war material recovery, reuse and transformation in the Old City
   of Aleppo
   Christine Kousa and Uta Potgiesser

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Guest editorial

Heritage and waste: introduction

“New heritage suggests that instead of finding the best, calling it heritage and fighting to keep it, we should look with open eyes at all that exists, accept that at some level it is all heritage and then decide how best to use it for social and future values. This may involve traditional preservation, but it may not.” G. Fairclough, 2009 “New Heritage Frontiers,” *Heritage and Beyond*, Ed. Council of Europe, 33.

Contexts

Given the magnitude of waste generated by demolition and disasters, and concerns about resource depletion and landfill, increasing attention is being paid in research and policy to partial or complete deconstruction, and to methods for salvage and design based on the reuse of reclaimed materials. Waste, deconstruction and material reuse are also being considered in the context of environmental studies, industrial ecology, and cultural theory. The field of heritage conservation has, however, been slow to engage in an equivalent reflection on material waste or reuse. This is despite the frequently considerable quantity of discarded materials that may be generated as part not only of inescapable demolition but of any given conservation project.

The multiple impacts of construction, renovation and demolition and, in particular, the extraction, transformation and eventual discarding of materials, often after only a short life, are generating increasing interest in examining how all building processes, including heritage conservation, can enable material reuse. Furthermore, attending to the embodied environmental effects of building materials forces the field of heritage conservation to the address the complexity of reusable materials and assemblies embedded in buildings. Not only unique crafted elements like carved stone but manufactured systems like modular ceilings form part of the wider inheritance of the entire existing building stock and infrastructure. Given its sheer volume across the globe, it is precisely the more recent material legacy—previously deemed to have little or no heritage value—that is becoming the focus of stewardship efforts in the twenty-first century. New approaches to conservation are thus required to address this expanding scope and specific issues of buildings, materials and assemblies of the recent past.

In parallel, recent scholarship on curated decay, toxic materials, urban mining and the circular economy (CE) has introduced critical perspectives on alternative futures for built heritage and, in some instances, practical strategies for stewardship and conservation. To begin with, waste management and material reuse processes are beginning to challenge traditional definitions of heritage that draw distinctions between “value-bearing” elements of the built environment and elements of “no value,” as part of policies guiding how the latter are to be managed. However, gaps between critical heritage theories, the emerging area of discard studies, and innovative waste management practices and policy frameworks, highlight the need for greater dialogue between these areas of enquiry, to foster productive alliances. The aim of this issue on “Heritage and Waste” is therefore to explore questions and ideas that arise at the intersection of heritage conservation, waste and value classifications, and material reuse. In making connections between previously disparate fields and practices, the goal is to encourage a critical reassessment of the concepts of heritage, waste, value, conservation and material reuse for the twenty-first century society.

This special issue of the *Journal of Cultural Heritage Management and Sustainable Development* was initially conceived as a follow-up to a symposium at Carleton University
Ottawa, Canada in October 2018, entitled *Heritage in Reverse, Material Values, Waste and Deconstruction*. This event brought together pioneers of deconstruction and reuse in Canada and the USA with established practitioners and emerging scholars working primarily in heritage conservation and sustainable design. Four of the presenters have contributed to this special issue. The call for abstracts drew responses from scholars from Europe and other continents, adding perspectives from building science and anthropology, and case studies addressing post-disaster contexts in Italy and Syria, among others. Indeed, the high number of abstracts received suggests that the theme of “Heritage and Waste” has resonance on every continent.

This collection of articles draws attention to a growing interest in the transformative contexts and processes of disaster, demolition, deconstruction, salvage, reuse and recycling; and the broad range of values of the materials generated and or utilized. It makes the case that heritage conservation can play a much greater role than it has to date in environmental sustainability, by helping to reduce resource consumption and landfill development. Moreover, it highlights opportunities to plan for material reuse in ways that are inclusive and socially equitable.

**Overview**

These eight articles reveal the breadth and complexity of concerns associated with how heritage conservation and material salvage and reuse intersect, informed by their geographic and cultural contexts. The topics they address encompass the dynamic nature of heritage and value; the cultural meanings of demolition, deconstruction, and material flows; heritage conservation and the CE; entanglements of designers and materials in reuse design; and the environmental, cultural and social roles of material reuse in post-disaster contexts. They are summarized and discussed in related pairs below:

Articles by Allison Arlotta and by Tina McCarthy and Eleni Glekas challenge the traditional boundaries of heritage conservation and the field’s narrow focus on intact buildings and sites, traditionally limiting salvage to highly valued elements for collection or treatment as spolia. Both texts argue that processes of deconstruction and material reuse can in some cases not only sustain, but generate, associative and other values, in addition to conserving the embodied effects of materials, and expanding conservation’s role in broader reuse.

Pointing to recent scholarship on “past-presencing” and to second-hand markets, in which objects gain increasing layers of associations and meanings in present uses, Arlotta proposes that the concept of heritage be understood to exist on a spectrum, from reliquary and stable to dynamic through reuse. She also argues that, in practice formally valued artifacts and waste co-exist, and that a new understanding of both could be derived by considering them collectively, rather than separately. Ultimately, both heritage conservation practitioners and waste managers work with “valued” materials. As such, much could be gained by moving beyond a focus on buildings, toward a greater engagement with building components and fragments, and with the flow of materials from building to building and place to place.

McCarthy and Glekas focus on the absence of a treatment type for buildings entering the end of their lifecycle. Using the case study of a Savannah, Georgia not-for-profit, Emergent Structures, they consider how the deconstruction industry might evolve through the consideration of the heritage value of materials. Through this example, they reveal how an understanding of the sometimes difficult cultural history of materials can influence approaches to material reuse and stewardship. They also highlight how deconstruction and heritage materials practices can not only play a role in mitigating the loss of buildings and sites, but be carried out in accessible and equitable ways for communities and people.

The pair of papers by Satu Huuhka and Inge Vestergaard and by Zahra Teshnizi develop the focus on heritage values and processes with perspectives from sustainable
design, construction and waste management, to expand the goals of building and building materials conservation with reference to recent theory and policy.

Huuhka and Vestergaard take a theoretical approach built on reviewing recent literature to explore the CE, which they argue has not yet gained traction in the discussion of sustainable heritage practice, but could. They connect the CE-based efforts to measure the values in prolonging the lives of buildings and materials to those of building conservation. While the CE does not currently pay as much attention to the existing building stock, a conservation focus on the entire building and heritage values, limits the development of tools to facilitate their whole or partial reuse, including as material banks that recognize ecological and other material values.

This theoretical approach could help to break down conceptual barriers around types of values and their roles in managing materials throughout their lifecycles. In counterpart, Teshnizi’s article offers a concrete example from the city of Vancouver, one of the increasing number of municipalities experimenting with a form of legislated deconstruction. While less explicitly linked to CE theory, her arguments also build on measuring ecological value of materials and environmental impacts over the lifecycle. Such local policies are emerging as a North American counterpart to initiatives happening at a regional scale in the EU. Teshnizi’s paper considers the potential of old growth wood in the city’s pre-1940s houses, which often stands to not only retain ecological values, but gain economic value through its recovery.

In theory the Vancouver context provides a case study of how municipal policies or regulations might through waste management also address objectives for heritage conservation. However, the policy reference to heritage is underdeveloped, and the tools and practices for deconstruction remain premature without the context of an organized salvage industry or a thriving reuse and design market. These perspectives also highlight the need to support the roles and practices of those who actually do the work of unbuilding and re-design.

The next pair of articles, by Alison Creba and Staffan Applegren, then looks at perspectives from changing practices, exploring entanglements of matter and living beings as part of deconstruction and transformation. Here, the authors’ research involved embedded approaches to documenting demolition/deconstruction sites and in salvage/reuse processes and projects. While Creba spent time observing a large-scale and highly watched demolition site in Toronto, Canada, Appelgren reports on time working with a pile of reclaimed oak flooring in a re-design company studio in Gothenburg, Sweden.

For Creba, the evolving relationships of materials and people from a once iconic discounted retail hub are both connected and disconnected in a complex choreography on and off site and over time. Making reference to “follow-the-thing” or object biography, while following popular discussion on social media, she argues that we should be mapping material flows to appreciate the new values attributed to what might otherwise be considered lost. Her phenomenological approach draws attention to individual stories of attachment to place through efforts to salvage more unusual materials like neon-signage, while pondering the environmental responsibilities of disposing of what was once considered architectural trash.

In contrast, Appelgren pursues a sensory ethnographic approach, involving close contact (through touch and odor) with reclaimed oak flooring, to understand how the processes of reclaiming and designing with salvaged materials is informed by co-constituted human-animal-material lives. He argues that concepts like CE that are helping direct waste management in Sweden, need to be better informed by processes that recognize socio-historic values but also the risk and messiness of reuse processes. These insights from time spent alongside demolition contractors or interiors reuse designers offer complimentary new perspectives to broaden the usual focus on associated values, while like McCarthy also highlighting limitations in established notions of what constitutes conservation work.
The last pair of papers explores human-material interactions within post-disaster contexts, where earthquakes and war have destroyed or disrupted lives, communities, and urban fabric, in addition to generating post-disaster material debris at a massive scale. In contexts examined here, in Italy following earthquakes and in Syria as a result of the Civil War, rubble management issues are quite distinct from those associated with development-based demolition debris, amplifying the close connection between material and human destinies, as more or less equitable human choices.

Ahmadreza Shirvani Dastgerdi and his four co-authors use the 2016–2017 earthquakes in central Italy as a case study to challenge traditional philological approaches to the management of post-disaster rubble (or heritage waste). They question how top-down, expert-driven approaches are employed to identify and catalogue historically and architecturally significant building material, with the goal of carrying out scientific restorations of damaged monuments. The authors argue instead for more integrative, community-based approaches to rubble management, influenced by “new paradigm” thinking in the field of heritage conservation, as well as the UN Sendai Framework for Disaster Risk Reduction and its call to “Build Back Better.” These approaches place greater emphasis on community participation in reconstruction, and the importance of safety and resilience in an earthquake-prone region, with the intent of ensuring the long-term sustainability of historic towns and villages.

Christine Kousa and Uta Pottgiesser examine the value and potential of material debris in Syrian post-conflict reconstruction efforts, where very little guidance yet exists regarding material debris management and reuse. In this context, appropriate stewardship of material debris is critical for improving quality of life and people’s ability to return to their homes, while also avoiding increased landfill. Appropriate management and reuse of material debris may also, however, help to sustain memory and traditional building forms and practices. The examples selected in this article suggest the broad range of forms that should be considered for reuse, from landscape elements in revitalized public space to needed infrastructure for renewable energy. Such examples reinforce the arguments of many authors in this issue on the important role that reuse can have in both sustaining and transforming values.

Looking forward
At the 2018 symposium on “Heritage in Reverse,” Mark Gorgolewski, Canadian architect, educator and author of Materials Salvation, The Architecture of Reuse (2018), identified the need to connect the carbon accounting of existing materials to storytelling about material lives. If cultural heritage conservation needs to pay more attention to material reuse considerations, the reuse industry can also better use heritage processes to support the arguments for reclaiming the materials. Other key conclusions from the symposium worth highlighting here include the need for new economic and accounting models to help bridge values, and support development of related fields and industries. This will include research to establish the relative economic values of building and materials reuse in multiple contexts. Taking conclusions of the 2018 symposium and this special issue as a starting point, it can be anticipated that further research will be needed in a number of key areas:

To address new principles and values categories, heritage and conservation policies and processes of evaluation will need to be adapted to more expansive and inclusive. While established conservation principles like reversibility can be redefined to connect to reuse, place-based values may need to expand to address the full lives of materials. Discussions of material compatibility must also build on expanded understandings of the diversity of embedded values of existing materials.

To foster material reuse, conservation treatments could be redefined as part of a greater continuum of actions that include building relocation and deconstruction in part or in whole. Establishing a continuum will help build recognition of the critical importance of all building and
material reuse in the decarbonization of our environment, without pitting material reuse against built heritage conservation, or limiting the focus on official inventories of historic buildings.

To acknowledge the inherent tension between conservation of historic sites, deconstruction, and material reuse, in parallel to adaptation of evaluation tools, research is needed that demonstrates how to quantify the differences between building and building materials reuse. The maintenance of the existing building stock, heritage or other, also keeps materials in use. The arguments used to promote heritage conservation need to better connect to arguments in favor of building stock reuse in general.

To address gaps in current capacity, re-education of participants in heritage and conservation processes on the greater potential of reuse is needed. The full spectrum of conservation related practices from maintenance to adaptive reuse and urban infill need to involve new perspectives, support new trades, and pilot project and policy models. Through informed communities and practices, conservation, adaptive reuse and infill projects should become places where reclaimed materials are valued.

To reflect the vast legacy of the building stock of the twentieth century – both ordinary and outstanding – survey, inventory and evaluation systems should, in future, be designed to place greater emphasis on the functional, social and material values of the whole of our built inheritance. This broader complex legacy –that is also habitat to many millions of people– was often constructed with a much shorter material lifecycle in mind. As it ages or lose value in its current built form, new ideas about cultural heritage, sustainability, and material reuse should propel conservation, sustainable design and waste management sectors to reconsider how this vast resource bank can be kept in use through dynamic processes, while offering continuity and in many cases, more equitable access to resources.

New directions in building and materials reuse require a combination of looking back and looking forward. There is much to be done to move the “Heritage and Waste” discussion forward and into concrete actions. We would like to thank all our authors for sharing their original ideas and perspectives, and also acknowledge the 15 reviewers whose comments were invaluable to the quality of the papers as published.

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Note
Locating heritage value in building material reuse

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Abstract

Purpose – The purpose of this paper is to explore the intersection of building material reuse and heritage value, and raises questions about how “preservation” has traditionally been defined and conceptualized. With a grounding in the realities of global climate change, the paper argues for further research on the topic and for the active engagement of the preservation field in reuse efforts.

Design/methodology/approach – After a review of existing literature, this study takes a descriptive and conceptual approach to explore the heritage values generated through material reuse.

Findings – This paper finds that processes of material reuse are richly embedded with heritage value and offer a conceptual challenge to established modes of heritage practice.

Practical implications – The findings of this paper suggest that heritage practitioners should actively engage with material reuse efforts to better understand the heritage values generated from such processes. Areas of future research and collaboration are identified.

Originality/value – Despite their intrinsic interaction with aged and existing infrastructure, there has been limited engagement in the heritage and preservation field with the topics of deconstruction, building material reuse, or construction and demolition waste practices more generally. This paper thus provides descriptive research on a topic that has been unevenly explored.

Keywords Climate change, Sustainability, Heritage, Preservation, Building materials, Conservation theory and practice

Paper type Conceptual paper

Introduction

There has been limited engagement in heritage literature with the topics of building material reuse and demolition waste more generally. But there is immense potential in heritage practice to move beyond a focus on buildings and toward a greater engagement with building components and fragments.

This paper will explore this potential through a discussion of building material reuse and heritage values, highlighting the conceptual challenges that material reuse poses to established modes of preservation practice. It will conclude by identifying areas of future research and collaboration for the heritage field in relation to material reuse.

Review of relevant literature

The practice of building material reuse has been studied in several, sometimes disparate, areas of research, and thus a review of relevant literature covers many disciplines, including sustainability and waste management, heritage and historic preservation theory and social sciences.

It is important to establish the environmental drivers that underpin discussions on material reuse and demolition waste. Several decades-worth of research in the fields of environmental science and economics has established that human activity is constrained both by carbon and greenhouse gases, whose accumulation in the atmosphere is causing irreversible climate change, and by limited natural resources, which vary in renewability and are at risk for overconsumption (Newton and Meyer, 2012). The architecture, engineering and construction (AEC) fields typically make use of virgin materials, whose extraction is energy- and water-intensive, and puts pressure on wildlife habitats and ecosystems. As global populations and living standards increase, consumption of natural
resources, both renewable and non-renewable, including timber, minerals, and metals, are also increasing (OECD, 2012).

Recent research has asserted the need to develop more sustainable practices that address both these constraints through increased building material reuse. Currently, the dominant model for resource consumption in AEC fields is linear: resources are extracted, processed into usable materials, which are then manufactured into component parts and assembled into buildings. Buildings are used until they reach the end of their perceived functionality, and then demolished, their waste dumped into landfills for eternity (Crowther, 2005). In a closed-loop system, such “waste” would provide the “feed” for new buildings, diverting this material from landfills, prolonging the life of natural resource stocks, lowering the cost of construction materials, and decreasing the carbon and energy contributions of the construction sector (Cruz Rios et al., 2015).

For its part, heritage research has had very limited interaction with material reuse as a sustainability strategy in preservation projects (Meryman, 2005; Frangipane, 2015), despite a large body of heritage literature addressing sustainable preservation. Research on sustainable preservation has raised questions about the inherent sustainability of preservation practices or historic architecture, the need to improve energy efficiency and calls for densification (Keene, 2003; Avrami, 2016). Sea level rise, changes in temperature, and an increase in many types of natural disasters have also put pressure on preservation practice, and much of the literature focuses on assessing sites’ vulnerability to the effects of climate change (Marzeion and Levermann, 2014; Reeder-Myers, 2015).

The topic of building reuse as it relates to sustainability has been much more readily embraced by preservationists than material reuse. Internationally, both UNESCO and ICOMOS view the long history of adaptive reuse – re-occupation of a historic building for a new use – as one of the ways that historic cities model sustainability (Hosagrahar et al., 2016). In the USA, the National Trust for Historic Preservation has shifted its language toward a focus on building reuse. The Trust’s report, “The Greenest Building,” employs life-cycle assessments to understand the avoided impacts involved in building reuse, and finds that a new energy-efficient building can take between 10 and 80 years to overcome the carbon costs of its construction (Dunn et al., 2011). “The Greenest Building” laid the foundation for the Trust’s recent focus on reuse, a campaign it calls Reurbanism: Shaping Communities Through Reuse. The Trust followed up on these findings with “Untapped Potentials: Strategies for Revitalization,” which analyzes economic, technical, financial and regulatory barriers to building reuse. One of the stated aims of this work is to “decrease building demolition and resource waste” (Preservation Green Lab, 2017).

While there is much discussion within heritage literature and practice about the realities of our growing climate crisis, the topic of material reuse is notably absent. Does this reflect an underlying challenge that material reuse poses to many of the traditional modes of preservation practice? This paper will explore this question investigate how the reuse of building materials intersects with our understanding of heritage value.

Heritage values and material reuse
To understand these traditional modes of practice, it is helpful to examine how the field has defined heritage values. A consideration of heritage values is an integral part of preservation decision making. Over several decades, aesthetic and historic associations have traditionally dominated preservation work and decision making about values has typically been limited to experts, following a curatorial approach (Smith, 2006). The narrowness of these practices has compelled the field to consider a wider range of values from a broader, more inclusive set of stakeholders. Heritage is increasingly understood as a social construct, meaning “it results from social processes specific to time and place” – processes that are informed and determined by values (Avrami et al., 2000). Thus, preservation works to conserve places and objects...
whose fabric is not inherently valuable, but rather valued for its associations, which are complex, variable and dynamic.

Despite their established importance at the core of preservation decision making, values are difficult to pin down. Some of the clearest scholarship on values in a heritage context comes from the Getty Conservation Institute, which defines values as the qualities attributed to places and objects (Avrami and Mason, 2000). From this broad definition, several observations further clarify how values are understood within this context:

- Values are always attributed, never intrinsic. While material may have certain essential characteristics, value does not exist inherently in this material.
- Values are always multiple. Heritage is never valued in only one way.
- Values are mutable. They change over time within communities and within individuals.
- Different values cannot necessarily be measured by the same standards. The economic value of a landmarked building cannot be measured in the same way as its aesthetic value. Because of this incommensurability, values are rarely able to be compared by the same metrics.
- Values can be, and frequently are, incompatible. Dealing with value requires recognizing that they can come into irreconcilable conflict (de la Torre, 2013).

There have been several attempts to group values into categories. An early contribution came from German historian Alois Riegl, whose definitions of “intentional,” “unintentional” and “age-value” monuments established a set of criteria based on aesthetic and historical associations of places that became the basis of preservation work for much of the twentieth century (Riegl et al., 1982). More recently, the discussion of values has been marked by a reaction against the limitations of aesthetic and historic value, and has sought to expand typologies to include social, spiritual, identity, research, natural and economic values (Avrami and Mason, 2000). As the lists of values lengthen, further categorization has emerged, most notably from Fredheim and Khalaf, who surveyed the literature on values to ascertain four overarching types of heritage values:

- Associative: values based on connections to people, events, places, practices, traditions, stories, etc.
- Sensory: values of sensory pleasure (such as aesthetic value related to sight, or auditory value related to sound).
- Evidentiary: values that provide evidence for research (e.g. this includes what is commonly thought of as archeological or scientific value).
- Functional/Instrumental: values derived from use (Fredheim and Khalaf, 2016).

Fredheim and Khalaf do not examine this last category in their article, but use, exchange, and movement can generate other and varied values that should be of consideration to preservationists. Appelgren and Bohlin call this past-presencing, when “culturally and historically specific ideas, values, norms, and practices configure engagement with the past in particular ways” (2017). In other words, past-presencing describes the ways in which the past is brought into, performed, lived and used in the present (Macdonald, 2012).

Appelgren and Bohlin’s exploration of the second-hand market explores how reused objects gain ever more layers of association as they circulate in the market through time – associations they describe as “living and transforming.” Appelgren and Bohlin assert that valuing within the second-hand market may have more in common with what is generally understood as intangible heritage. When UNESCO officially recognized intangible forms of heritage at the 2003 Convention for the Safeguarding of Intangible Cultural
Heritage, it reaffirmed that appreciating, engaging with, and learning from the past can be accomplished in myriad ways – and emphasized the importance of understanding heritage as a process, rather than just as a product. As described by UNESCO, intangible heritage can include oral traditions, performing arts, social practices, rituals, festivals, and traditional craftsmanship (UNESCO, 2003). That said, the past-presencing of the second-hand market differs from what the field considers intangible heritage. With living traditions, rituals, craftsmanship, and arts the “heritage” and its value is understood as ascribed to the ritual. The same may be true for second-hand markets, but heritage value is more readily understood to be ascribed to the object. However, it is important to note that reuse may evoke similar dimensions of intangibility – “people recount tales as they sell things, value the accounts they hear when buying and fabricate fictive stories when using them,” which “triggers imagination and invites contemplation of previous trajectories and histories” (Appelgren and Bohlin, 2017). In other words, the exchange of material elicits layers of associative values.

This storytelling ability of objects has been widely examined in the fields of anthropology and museum studies, where the term material culture is typically used and objects are thought to have “social lives” (Appadurai, 1986). Material culture studies reveal how a thing can be anthropomorphized in a way – turned into a witness with the power to share “if [you] had the will to listen imaginatively, about what it had lived through” (Macdonald, 2013). When objects are claimed biographically, they can also “act as modes of telling about people’s lives.” Biographical attachment can be obvious, as in a family heirloom passed down through generations, or more obscured – imagine an oak desk, purchased for its reminder of a childhood classroom.

These use-generated values differ from the values derived from the assembling of objects in museums. The desire to preserve artifacts in collections has perhaps always existed, but exploded in the post-war, post-modern context, as many looked to musealization as a response to counter rapid change in the present. But while museums offer opportunities for reflecting on change, they also act as a stabilizing force – by removing them from continued use, objects that “have previously aged as part of everyday lives […] come to temporal standstill” in a museum context. (Macdonald, 2013, p. 151). The impulse might be spurred by the fear of damage, wear, and loss that comes with use, as well as the desire to move objects from individual ownership to a quasi-communal ownership “removed from the kind of social relations that are imagined as typical of more modern ‘consumerist’ society” (Macdonald, 2013, p. 152).

This last idea points to an important area of tension in thinking about heritage. Although the exchange of objects stimulates such associative values, there is an underlying assumption that heritage loses a certain authenticity or integrity when it becomes commodified. This tension provokes an interesting conversation. Even while the preservation field has worked to prove the economic benefits of historic preservation (Rypkema et al., 2011), there is also an assumed incongruity between the market, and the historical, communal, and artistic dimensions of preservation. The idea here is that the market overrides all other values, and is “concerned with only profit; and heritage is valued for its promise to provide ‘something more’, ‘something real’ – the authentic.” (Macdonald, 2013, p. 110). There is good reason to be concerned about the reuse market for materials, as it is rife with potential for exploitation and theft. In describing the proliferation of salvage in Detroit, Michigan, Hetletvedt argues that there is a place-based component to the historic built environment that is not captured by material reuse. She states that “the fetish for the artifacts of the city’s urban decay is resulting in the permanent removal of many of Detroit’s material assets from their long-standing context” (Hetletvedt, 2016). Despite this tension, it is interesting to note that landmark designation – the preservation field’s primary policy tool – is inexorably linked to the market. In fact, the singling out of certain places as
“historic” may itself be a form of objectification that further facilitates commodification. Just as there is no neutral choice for heritage when it comes to the market, there is also no way to avoid fragmentation – “what survives,” even the most wholly conserved village or intact row of houses, “is always a fragment of what existed” (Lowenthal, 1989).

It is useful to think about these ideas not as silos but as a spectrum, with the reliquary effect exemplified by museums on one end, and reuse on the other. The spectrum allows for movement and mutability, with objects taking on characteristics of both. This waffling of state – relic or reuse, noun or verb – is expressed in the story of Clarice, one of Italo Calvino’s titular Invisible Cities. In Clarice, residents of a declining city put pieces of their luxurious past to use for their current needs – fancy curtains become bed sheets, marble urns become planting pots. Though the value of the material changes, “almost nothing was lost of Clarice’s former splendor; it was all there, merely arranged in a different order, no less appropriate to the inhabitants’ needs than it had been before.” Soon they begin to feel the old Clarice slipping through their fingers, and attempt to save it by removing these pieces from use and collecting them “under glass bells, locked in display cases, set on velvet cushions […] to reconstruct through them a city of which no one knew anything now.” But because meaning is not inherent in the objects, the “first Clarice” is never truly stabilized.

**Conceptual challenges of material reuse**

Like the residents of Clarice, preservationists struggle with how best to engage with the past in the present, and frequently rely on musealization and an overt intention to stabilize. But the movement of material, through museums or through second-hand markets, induces past-presencing, “articulates in tangible terms the metaphorical rehabilitation to memory from death and ruination,” and gives old objects new associations (Williams, 2014). The cultural geographer Caitlin DeSilvey argues that remembering or engaging with heritage does not depend on the reverence of a static object and can be elicited just as powerfully and meaningfully through the processes of decay, death, and change. DeSilvey illustrates this with examples from her experience curating excavations from a long-abandoned Montana homestead, where she frequently struggled to determine what to keep and what to discard. Ultimately, she concludes that the choice is not necessary. Although preservation practice tends to “neutralize these ambiguous perceptions through a set of value judgements that render materials into distinct categories of ‘artefact’ and ‘waste,’” in fact the two states coexist, and new understanding can be gained from viewing them together (DeSilvey, 2006).

Hazel Denhart’s research into the psycho-social impacts of building deconstruction in post-Katrina New Orleans supports this argument. Deconstruction is the process of dismantling a structure to maximize the recovery of reusable material, in contrast to conventional demolition, which uses mechanical equipment to tear down buildings, limiting the resulting material’s reusability. Denhart’s phenomenological study finds that all participants experienced extreme sadness and distress over the imperative to bring down their buildings, imposed by the city’s need to eliminate threats to public safety. But for each participant this sadness was transformed to empowerment and relief through the deconstruction process. The study identifies the comparison of deconstruction to organ donation as emotionally powerful to participants, who were relieved that they could be of service to other New Orleanians in need of material to rebuild. For those participants who kept some or all of their deconstructed material, reusing parts of their home in new construction provided a sense of closure and even excitement. Deconstruction was also seen as more respectful to the buildings, especially those that were very old, like one congregation’s century-old church. In this study, the concepts of historical loss and “managing change” – familiar language to preservationists – are at the forefront. Denhart’s study suggests that heritage workers and C&D waste managers both deal with heritage values.
While preservationists tend to focus on the material’s stabilized existence within a structure, waste managers more frequently see material released from this stasis. China’s Ningbo Historical Museum also offers an example of this “relic-reuse” spectrum. Ningbo is a millennia-old coastal city in eastern China, historically home to stone masons, landscape artists, and craftsmen. Early in the twenty-first century, a new Central Business District was established, requiring the demolition of 30 small villages. Within this new district, the state planned to construct a new Historical Museum and commissioned the noted architect Wang Shu to lead its design. Wang’s firm, Amateur Architecture, which he runs with his wife, Lu Wenyu, is heavily influenced by and intertwined with traditional craft, historical research, and local knowledge. Disturbed by the demolition, Wang described the museum’s site as “a place without memories” and said his design aimed “to recover the cultural roots that the place had lost” (Denison and Ren, 2012).

Left with only rubble on the site, Wang employed a traditional local construction method called wa pian qiang (clay-tile wall). This technique was historically used in Ningbo to quickly rebuild after typhoons, and it involves salvaging bricks, tiles, and stone – in this case from the demolished village structures – which masons then use to build walls. As Wang describes, his “favourite Chinese tradition is to use common and natural building materials. As time changes, these are repeatedly built and rebuilt” (Denison and Ren, 2012). Without ever entering its exhibits, the Ningbo Historical Museum already tells a story. From afar, the varied colors and textures of the tiles seem to form a mountain range, evoking the city’s celebrated landscape painting tradition. Up close, the visitor is drawn to the small pieces of ceramic that make up the landscape, whose worn texture and stamps suggest their own stories. Interestingly, Wang describes this technique as “preserving time” – not preserving history, or preserving architecture, or even place. Preserving time implies a dynamic process. While his work in Ningbo is a paean to the city’s history, it also acknowledges and celebrate change.

These examples support arguments that shift in how heritage literature describes and perceives values have not led to corresponding changes in how the field operates. Critics have taken particular aim at the practice of designation, with historian David Lowenthal (1989) putting forth early criticism of the “rampant cult” of inscription of heritage on designation lists. Designation is part of a conventional heritage paradigm that relies on the assessments of experts over a “rare and unique” canon of heritage objects and sites that are stabilized through legal protection (Wells and Lixinski, 2016). Since the twentieth century, heritage work has been codified within a practice that relies on designation of sites into fixed categories to prevent their “loss.”

Under increasing environmental threats, many in the heritage field have adopted the sustainability language of “non-renewable” resources to describe historic buildings and artifacts, and to argue for their continued protection (Longstreth, 1991; Phillips, 2015). This has been contested by a developing area of research that seeks to explore heritage as a process rather than a product. Cornelius Holtorf, a Swedish archaeologist, was one of the early voices to claim inherent renewability of heritage. He argues that history is endlessly renewable, that humanity is always creating new pasts (Holtorf, 1998). Rather than unprecedented loss of history in contemporary society, Holtorf sees an unprecedented accumulation of historic sites and artifacts, possibly more than can reasonably be handled (Holtorf, 2015). His view is certainly polemical, but others have built on his work in ways that are more practical, understanding the renewability of heritage, while also acknowledging the irreplaceability of historic built fabric (Avrami, 2016).

Material reuse, deconstruction of buildings, and the second-hand market do not fit nicely into the traditional designation model of existing heritage systems, which were designed to promote the stabilizing of heritage, and thus do not necessarily have the flexibility required to recognize material flows. In fact, flow of material from building to
building, place to place, challenges these systems. This is partly what makes the discussion of values in second-hand exchange so intriguing – that this process occurs without the oversight of an overarching organization. The reuse market, with no formal intent to preserve, does precisely that by “contribut[ing] to the perpetuation of items that would otherwise be lost” (Appelgren and Bohlin, 2017). Material reuse may fit into a broader understanding of what constitutes heritage, but it upends the field’s traditional thinking about what to do with heritage.

Conclusion
The ability for reused material to demonstrate both functional and associative value suggests that heritage values can be located not just in a building or even a building fragment, but in the dynamic process of reuse and reconfiguration. This ties into larger conceptual shifts that recognize heritage as a process rather than a product. Though there is some encouraging emerging research on the relationship between preservation and material reuse (Ross, 2017), the broader preservation field’s acknowledgment of and interest in this discussion seems slight. This is unfortunate because the heritage sector has much to offer these efforts.

Because material reuse has been so unevenly investigated, this is an area to which preservation can make a meaningful contribution. There is much more to be learned from qualitative research into precedents of scavenging, salvage, and reuse. Deeper investigation of historical precedents and global cases of reuse economies could reveal valuable lessons for future practice. There are many historical and policy examples that have not been subject to secondary analysis. Studying the work of the many non-profit, private and arts-based salvage endeavors around the world, and investigating their motivations, successes, and challenges would greatly contribute to a holistic understanding of material reuse in a heritage context. People hold deeply emotional associations attached to place so phenomenological research, in particular, should be prioritized. Studying how the processes of deconstruction, salvage and reuse of historic built fabric feel for participants can contribute significantly to the heritage field’s understanding of how people experience change.

Preservationists should also appreciate that this work is already happening in parallel fields of waste management and community development, where material reuse has been championed for its potential to create stable jobs with low training thresholds, to close the consumption loop of building materials, to make communities more self-reliant, and to contribute to more sustainable construction practices (Leroux and Seldman, 1999; Crowther, 2005; Leigh and Patterson, 2006; Seldman and Platt, 2006). Preservationists can join conversations that are happening in these fields by participating in local waste advisory groups, volunteering with material reuse centers, and considering salvage as a possible program of local historic preservation commissions and advocacy groups. There are many fascinating examples of this kind of synergy across North America, such as municipal policies that seek to prevent the mechanical demolition of old and historic buildings, including the Green Demo By-law in Vancouver, British Columbia and Portland, Oregon’s Deconstruction Ordinance. Compelling examples of local preservation commissions operating their own reuse programs exist in the Borough of Mountain Lakes, New Jersey, and in Columbia, Missouri. Preservationists are well-suited to this work – assessing value and advocating for reuse in the context of old and existing buildings are two key skillsets of the heritage field.

Because of the philosophical tensions that material reuse raises for the heritage field, this work is bound to be at times challenging, difficult, and emotional. Still, it is critically important. As global climate continues to change dramatically, the field’s knee-jerk desire to designate, categorize, and stabilize will be increasingly irrelevant. Seeking to
understand and elicit heritage value through material reuse may allow the field to develop new tools and practices for the future and support communities facing increasing environmental change.

References


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Deconstructing heritage: enabling a dynamic materials practice

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Abstract

Purpose – The purpose of this paper is to address a gap in current heritage practice within the USA, as defined by the US Secretary of Interior’s Standards, which offers no treatment for a building entering the end of its lifecycle.

Design/methodology/approach – Building on research conducted for “Deconstructing the Culture of Demolition,” Master of Design Studies thesis completed in 2018, this paper seeks to better understand how deconstruction industry practice could be changed by the inclusion of heritage values through a case study of the sustainability non-profit Emergent Structures of Savannah, Georgia.

Findings – The benefits of replacing demolition with deconstruction extend beyond the preservation of materials alone. Applying critical heritage theories to deconstruction practice addresses challenging issues in the discipline, such as mutability of heritage objects and equity in heritage practice. Deconstruction redefines the concept of death in the built environment, harnessing its energy to serve the heritage goals of memory, revival and sustainable community development.

Practical implications – The findings are based on real-world practice, linking heritage methodology to deconstruction practice. These examples will be useful to preservation professionals who deal with demolition in the course of their work, to rethink the idea of waste and value in heritage practice.

Originality/value – This paper explores best practices in promoting heritage value and community engagement through deconstruction. This insight will promote interdisciplinary communication around historic materials and their treatment, which remains unexplored in both deconstruction and heritage research.

Keywords Environment, Deconstruction, Heritage values, Sustainability, Materials reuse

Paper type Case study

Introduction

A building, like a person, has a finite lifespan. Unsalvageable historic structures and vernacular buildings that fall outside the narrow criteria for landmark designation remain vulnerable to demolition despite preservation efforts. A global emerging alternative to demolition, whole building deconstruction, challenges the assumption that the end of a building’s life must result in total loss. Deconstruction, also known as hand-wrecking, disassembles a building in the reverse order of construction, saving its materials for reuse. The practice of deconstruction is a solution to loss of historic fabric via demolition, but current heritage practice does not value it as an appropriate treatment for historic structures.

The nature of heritage has been increasingly debated in recent decades, as social values including identity, belonging and sense of place have gained acceptance alongside traditional notions of the intrinsic historic, aesthetic or scientific value in the material remains of the past (Jones and Leech, 2015). This paper adopts the idea of heritage as a dynamic cultural process rather than product, situating it as a method of caring not only for the past, but also for the future (Harrison, 2015a, b). Deconstruction and material reuse resonate strongly with environmental concern for the future. Advances in this field have been pioneered by organizations like Rotor, a Brussels based non-profit firm that promotes building materials reuse and RAU Architects, designers of the Alliander building in Duiven, the Netherlands, the country’s first renovation project to receive a BREEAM (Building Research Establishment Environmental Assessment Method) outstanding sustainability certificate (http://rotordb.org/; Dutch Green Building Council, 2005). These practices, however, are not commonly associated with historic stewardship.

Through a case study of the sustainability non-profit Emergent Structures of Savannah, Georgia (USA), elements of deconstruction practice that impact heritage materials will
be explored. Although this paper is based in the USA, the conclusions are globally applicable to the context of both western heritage practice and environmental crisis. Applying critical heritage theories to the practice of deconstruction will address mutability of heritage objects and equity in heritage practice. From this discussion, the possibility of extending heritage practice beyond whole buildings to include their materials emerges.

*Heritage values in context*

Fabric-based authenticity is central to traditional definitions of historic integrity, which use the age value of extant building or landscape material as a link to events or patterns in history. Inherent in this materiality is a quality of “boundedness”; heritage designation applies to sites, objects or buildings that are precisely defined (Smith, 2006, p. 31). Once resources are surveyed and recorded, stewardship follows the ethic of minimal intervention. Smith identifies this philosophical structure as the “authorized heritage discourse,” which relies on “authorizing” professionals to decide what heritage is and assign it meaning.

Western heritage practice is permeated by a value structure which manifests through authorities and professional organizations operating at the national and international level worldwide. The Athens Charter of 1931, the Venice Charter of 1962 and the Burra Charter of 1979 and 1999 all employ a conservation ethic requiring minimal intervention in historic fabric. The Burra Charter includes cultural significance in heritage value, but these intangible social values remain secondary in practice to the inherent value in fabric (Smith, 2006; Jones and Leech, 2015).

In the USA, this discourse is perhaps even more firmly entrenched in historic preservation (as heritage conservation is known in the USA) law and policy, reinforced by a legal system designed to protect individual property rights. Under the fifth amendment to the US Constitution, individuals cannot be deprived of property without due process of law (First Congress of the USA, 1789). To justify restrictions placed on individual property rights, the criteria for authenticating heritage are under pressure to appear objective and quantifiable. Using physical material to indicate cultural value, backed up by professional certification, helps ensure that the law is not exercised arbitrarily (Wells and Lixinski, 2016).

As a result, the National Register of Historic Places establishes the physical characteristics that buildings or sites must have for “historic integrity,” while the Secretary of the Interior’s Standards define how this physical integrity should be retained through application of four treatments: preservation, restoration, rehabilitation and reconstruction (www.nps.gov/tps/standards.htm).

In recent decades, heritage practice has moved toward social values-based authenticity in the designation process, constructed through increased community engagement. This has sparked an expansion in the types of sites recognized as heritage. Despite this broadening in the type of resources considered historic and increasing diversity in the narratives about them, concerns remain that historic preservation is missing the mark when it comes to preserving the type of community assets people really care about (Jones, 2017; Poulios, 2010; Waterton and Smith, 2010; Wells, 2017). National Register nominations are based in the qualities of a “property,” which may relate to a myriad of significant connections all tied back to the notion of fixed place, fabric and ownership. The basic conflict between the evolving nature of community identity and the fabric-based designation systems reveals an equity crisis in heritage practice. Such frameworks treat heritage, and community identity, as fixed and defined by the past. Denied the ability to change in the present, heritage is disconnected from identity, material is segregated from experience.

Despite the hegemony of heritage discourse at the policy level, interpretations of heritage in practice are more fluid. Harrison (2015b) argues that all preservation, from conservation to adaptive reuse, is a process of creating something new from fragments of the past, blurring the separation of past and present. In his view, by designating heritage, we choose
things “to hold up as a mirror to the present, associated with a particular set of values that we wish to take with us to the future” (Harrison, 2015b, p. 310). In this regard, access is crucial; those who define heritage values shape perceptions in the present and actively envision the future.

Historic preservation practice is engaged in such value selection as it evolves to incorporate the concerns of environmental sustainability (Avrami, 2016; Powter and Ross, 2005). The Secretary of the Interior’s Standards were amended in 2011, adding guidelines on sustainability to the rehabilitation treatment (www.nps.gov/tps/standards/rehabilitation/sustainability-guidelines.pdf). These guidelines recognize that continued use of historic buildings requires adaptation to changing energy sources as well as efficiency expectations. While comprehensive in terms of addressing the operational energy of buildings, the guidelines are silent on another key environmental concern in the built environment, the waste generated from construction renovation and demolition (C&D waste). Waste reduction has been an assumed benefit of building reuse: it is the basis of the popular claim “the greenest building is the one already built.” The waste generated from rehabilitation, however, is often overlooked, as is the waste from historic buildings that are demolished despite preservation efforts.

There is an unspoken gap in the four treatments offered by the Secretary of Interior’s Standards that lies between rehabilitation and reconstruction. In this space, demolition by disaster, neglect or permit impacts resources without consideration of heritage values. The lack of intervention on behalf of a building’s materials is deeply cultural, relating to the fabric-based principle of minimal intervention, the definition of heritage as property, as well as values surrounding disposability and the concept of trash.

Historic preservationists have never adequately addressed the question: How did buildings become disposable? Greg Kennedy (2007) explores the phenomenon of disposability in An Ontology of Trash. Kennedy describes a perceptual shift in the early twentieth century, the ability to see things as worthless, to treat them as if they no longer exist. Buildings are not designed for disposability yet began suffering its symptoms with advances in mechanical demolition at the close of the nineteenth century, a condition that became systemic by the end of the Second World War (Ammon, 2016). This destruction was made possible by technological changes that reconfigured every aspect of the built environment, from demolition machinery to building materials. The conversion of otherwise sound building material into rubble exercises the logic of disposability, like that of throwing out a single-use plastic bottle. Kennedy argues that this linear disposal system enforces a mode of non-caring in participants, a necessary defensive reaction to a system that violates the laws of nature so profoundly, depriving us of connection to our position as stewards of both the past and the future.

Kennedy’s ontology of trash reveals the danger of invisible things, as they pile up in forgotten corners, wreaking havoc. “Disappearing” the processes of destruction and decay from heritage practice has further encouraged mechanical demolition’s dominance of this phase in a building’s lifecycle, creating a framework in which no conservation alternative could be developed. Deconstruction offers this alternative, enabling a materials conservation practice that could replace demolition in cases where building removal becomes inevitable. Framing this practice will require a closer look at deconstruction and materials reuse, to understand the current scope of industry practice and potential connections to heritage concerns.

*Deconstruction: industry perspectives*

Within current practice of deconstruction, ecological, economic and social values predominate existing literature. The ecological mandate for deconstruction in terms of waste reduction is clear: The Northwest Economic Research Center (NERC) estimates that demolition of a 1,400 sq. ft. (130 square meter) home generates 42 tons (38.1 metric tons) of landfill material.
More than 85 percent of this waste could be diverted from landfills through deconstruction (Paruszkiewicz et al., 2016, p. 16). In terms of carbon impacts, deconstruction yields a net benefit of 7.6 metric tons of CO₂ eq per house over demolition (Nunes et al., 2019, p. 4).

NERC also examined the economic impact of deconstruction in Portland, Oregon to assess the impacts of the Portland Deconstruction Ordinance. This ordinance mandates the use of deconstruction instead of demolition for all designated historic resources or residential buildings built in 1916 or earlier (City of Portland, 2016). The study found that this policy could generate between $1.5 and 1.6m in the local economy per year, creating 30–40 new jobs (Paruszkiewicz et al., 2016). The retail reuse industry has similarly been found to create millions of dollars in economic activity annually from material that would otherwise be buried in a landfill (Greysock et al., 2004; US EPA, 2012; Guy, 2014).

Most of the jobs created by deconstruction are workforce development jobs, entry-level positions that employ economically disadvantaged workers. These workers spend their income within the community, strengthening the local economy. When building materials are sold at discount prices in reuse centers, repairs become more affordable to homeowners with tight budgets. In effect, deconstruction benefits vulnerable workers and consumers in the economy, redirecting economic activity to those in need (Paruszkiewicz et al., 2016).

This potential for workforce and economic development has not gone unnoticed in the public sector. Municipal governments have been experimenting with deconstruction projects for the three last decades, among them Hartford, Connecticut, Baltimore, Maryland, and Oakland, California. (Leigh and Patterson, 2006). Implementing public-private partnerships to spur revitalization in areas struggling with urban blight, these projects have all demonstrated positive benefits of deconstruction within communities.

Of these pilot studies, none have considered the heritage implications of their work, despite the direct involvement of historic buildings in deconstruction. Economically, deconstruction must compete in the marketplace with demolition, balancing high labor costs against the value of salvaged materials reclaimed (Dantata et al., 2004). Salvage value, or the market price for reclaimed building materials, is typically greater in older buildings, as is salvage potential, the ability of materials to be removed without damage (BMRA, 2012, pp. 2-6). Heritage values play an important but undocumented role in this equation. Chini and Bruening (2003, p. 3.0), in their report on deconstruction, state that deconstruction should only be considered when adaptive reuse of the building is not an option. This idea, though sometimes echoed in the literature, is not present in the training materials for deconstruction professionals (BMRA, 2012).

The lack of heritage value standards in the deconstruction industry articulate the current lack of cross-disciplinary communication. Unaddressed issues and tensions between the materials reuse industry and historic preservation limit the potential of deconstruction to save historic materials from destruction and the reuse of these materials to serve heritage goals. This raises the question: How would the practice of deconstruction change if heritage values were included in the process?

Case study: Re:Purpose Savannah[1]

Re:Purpose Savannah is a new campaign from Emergent Structures, a sustainability and social equity focused non-profit based in Savannah, Georgia. Re:Purpose addresses C&D waste reduction, converting building materials into an engine of creativity and social equity in the community. This initiative promotes building materials reuse, actively participating in every facet of the reuse marketplace, from building deconstruction to materials processing, resale and production of craft goods. Re:Purpose hosts sustainability-themed community workshops and events designed to develop the reuse marketplace. The property includes a lumber yard for processing and retail of salvaged building materials and an 8,000 sq. ft. warehouse used for craft goods production and small business incubator studios.
Re:Purpose is currently the only building deconstruction contractor operating in the Savannah area. Demand for their services is high and they have gained a reputation for working specifically with historic properties. In a city with a rich architectural heritage and comprehensive historic preservation laws in place, deconstruction and materials reuse is changing the equation at the end of a building’s lifecycle, converting loss into gains.

Project spotlight: The Anderson Twins

The pair of Italianate homes at 414 and 418 Anderson Street, Savannah were the first deconstruction projects undertaken by Re:Purpose, completed in the fall of 2018 (Plate 1). Nicknamed “The Anderson Twins,” these were originally modest single-family homes built for working professionals in 1874. Demographics of the area changed quickly, and 418 was soon converted to a boarding house, then a two-family home (www.repurposesavannah.org/andersontwins). By 2017, the structures had suffered a decade of abandonment and blight; No. 414 collapsed from damage sustained in hurricane Irma while No. 418 listed dangerously to one side, threatening to collapse itself. A Chatham County Recorder’s Court judge found the structures to be a safety hazard and ordered their demolition, superseding the City’s review process for razing historic properties (Curl, 2018).

Scott Crotzer (then executive director of Emergent Structures) noticed the plight of the buildings, and reached out the Historic Savannah Foundation, which held a preservation easement on the properties. Using the research developed in his recent master’s thesis, Scott pitched the idea of deconstructing, rather than demolishing the Anderson Twins (Crotzer, 2018). Working with the property owner and the Foundation, an agreement was reached: Re:Purpose would be allowed to deconstruct No. 418 and salvage its materials if they also removed the debris pile from No. 414. Convinced that the project would be worthwhile, Scott agreed.

Scott, a Savannah College of Art and Design graduate with a Bachelor of Fine Arts in Historic Preservation and a Master of Fine Arts in Design for Sustainability, was uniquely qualified to negotiate this delicate agreement. The deconstruction began with documentation. Delving into historic atlases, photographs and street lists, research into the history of the homes and their residents provided insight into the changes they underwent over the years. Measured floorplans, site plans, elevations and 3-D renderings of the buildings were created by Savannah Technical College architectural drafting students. Further physical evidence
was obtained during the deconstruction itself, revealing building processes and technology in a state of flux in the late nineteenth century. Both timber framing and balloon frame (continuous stud wall) techniques were used to construct the Twins; the pile of extracted fasteners contained a combination of hand-forged, manufactured cut and modern wire nails (www.repurposesavannah.org/andersontwins).

From these severely deteriorated structures condemned to demolition, Re:Purpose staff and volunteers reclaimed 65 tons of materials for reuse, diverting just over 60 percent of the materials from the landfill. Among the heritage materials reclaimed were longleaf heart pine lumber and iconic “Savannah Grey” bricks. Longleaf pine is an endangered species today, due to its dependence on fire to reproduce. The lumber’s cell structure and resin content make it perform like a hardwood, rot resistant and extremely strong. The Savannah Greys, also known as McAlpine’s Grey Brick, are bricks made from the grey clay of Henry McAlpin’s Hermitage plantation located on the Savannah River (www.georgiahistory.com). The bricks, handmade by slaves in the early nineteenth century, are an important part of Savannah’s heritage, contributing a distinct beauty to its architecture while also speaking to difficult aspects of its history (Plate 2).
The story of saving the Savannah Grey bricks demonstrates the challenge heritage materials face in the deconstruction process. Because the Re:Purpose team was engaging in their first deconstruction, they had contracted a deconstruction supervisor to help train workers and manage the site. Focusing on efficiency and cost-effectiveness, the contractor tested the value of the brick in the chimneys by dropping them from the roof. Since they shattered on impact, he concluded that they were poor quality and not worth saving. According to Mae Bowley, executive director, the Re:Purpose team immediately intervened, explaining the heritage value of the brick and constructing a chute out of old doors to convey the bricks safely to the ground. The organization ended up making a profit on the project due to the resale value of the bricks. Some of these bricks were purchased by the Coastal Heritage Society, for use in landscaping at their museum, while others were used in private residences.

The deconstruction of the Anderson Twins drew strong community support, involving over 832 volunteer hours. The project is showcased on the organization’s website, which presents historic and architectural information about the homes alongside stories and examples of reclaimed materials and reuse projects (www.repurposesavannah.org/neighborhood). The webpage offers an invitation to the community to share stories about the deconstructed homes or post projects completed with their reclaimed materials.

Connecting community with history, through materials, is a key strategy in Re-purpose Savannah’s facilitation of the reuse market. When customers purchase reclaimed materials, they are made aware of their origin (Nussbaum, 2018). According to Bowley, finding markets for salvaged material is the biggest challenge facing reuse in Savannah. Conveying the history of materials through their sale for reuse adds value to the final product; handcrafted items become vehicles for the story of a building to live on once it can no longer be preserved in place (Plate 3).

What is worth saving: values in deconstruction
As the story of the Savannah Grey bricks emphasizes, material evaluation within deconstruction is a critical issue, determining what is saved. The Re:Purpose approach to deconstruction is unusual; heritage values are not adequately addressed by current industry practices. The historical knowledge and sensitivity of the Re:Purpose Savannah deconstruction crew changed the outcome of the Anderson Twin’s project. The Savannah
Grey bricks would have been destroyed under existing technical value-assessment strategies of deconstruction practice. Further, the physical evidence found in scribe marks and nails would remain undocumented in conventional deconstruction practice, erasing sources of information unavailable through archival research.

The organization’s success in working with historic properties can be traced to their hierarchy of reuse, a policy that determines which jobs they decide to take. Topping this hierarchy is the imperative statement “SAVE. THE. BUILDING.” (http://emergentstructures.org/wp-content/uploads/2018/07/ES-One-Pager.pdf). Re:Purpose Savannah only accepts projects that have been slated for demolition. From this point, they link materials reuse values with community and materials integrity, keeping salvaged materials local and as intact as possible.

Following these values, Re:Purpose begins the deconstruction process with documentation. Depending on the resource and its significance, this can range from a few hours of research to full 3D reconstruction. Documentation is not usually included in a deconstruction contractor’s scope of work. For Re:Purpose, this extra step is essential to understanding the full value of materials, as well as building community interest in their reuse. The Re:Purpose approach is further defined by community involvement. The hours donated to the Anderson Twins represent a compelling engagement of the community with heritage materials, further promoted by the publicly accessible, participatory history on the website.

By clearly defining terms of engagement for deconstruction and recognizing the heritage value in materials, Re:Purpose Savannah is able work more effectively with historic properties and the organizations dedicated to preserving them in place. Maintaining the historic connections of building materials is not inherent in the processes of either deconstruction or reuse. The idea of “heritage materials” requires awareness and interpretative support throughout both processes. Re:Purpose has developed specific policies to support historic stewardship in the materials they remove, demonstrating a potential framework for preservation professionals to engage with materials heritage through deconstruction.

**Developing a heritage materials practice**

Building materials exist as a paradox in a heritage discourse that favors whole building preservation. As assemblages they are the foundation of fabric-based authenticity, yet as individual disintegrated components they are not granted heritage status or protection. Heritage, defined in terms of values and functions in society and memory, has the potential to transcend such points of material transition.

Jones’ (2010) ethnographic research reveals how people experience and negotiate authenticity through objects. Jones finds networks of relationships between people, places and things at the center of the experience of material authenticity, not the things themselves. Further, she argues that direct experience of an object leads to personal attachment and involvement in the relationship network. Materiality is crucial, but specific: personal attachment requires physical contact or intimate experience with the object itself.

From this vantage point, the possibility of articulating a heritage materials practice begins to reveal itself. If material authenticity and heritage value is negotiated via personal involvement in relationship networks, these dynamic structures of meaning could readily adapt to the physical changes presented by deconstruction and reuse. Further, if personal attachment deepens upon intimate experience with material, then the process of deconstruction holds vast potential for enriching heritage connections within communities.

This perspective supports the findings of Denhart’s (2009) phenomenological investigation of building deconstruction in post-Katrina New Orleans, based on the experiences of participants in the New Orleans Mercy Corps program to deconstruct homes.
slated for demolition after Hurricane Katrina. Residents found empowerment and relief in the discovery of value, through deconstruction, in what they had been told was total loss. Denhart found three components of deconstruction that supported this feeling of relief: reuse of material; the transformative act of donating materials to others; and respect for the buildings. In keeping with the primacy of experiential relationships found by Jones, as well as community attachment to the residential vernacular documented by Wells (2017), Denhart’s participants expressed that architectural value did not figure into the need for respect: “It was not a great mansion or, you know, an interesting house [...] But yet it was a house. It was a house and at some point, some family must have lived in it [...] So it deserves dignity too” (Denhart, 2009, p. 198).

The present fixation on whole-building heritage can be understood as a form of the invigorated boundary maintenance identified by Guthrie (2013), indicating vulnerable concepts in need of further examination. Holtorf’s (2015) exploration of loss aversion in heritage practice is particularly relevant here, explaining the paradox of fighting to preserve a building whole, but when this fight is lost, allowing it to be reduced to rubble and relocated to the landfill. By focusing myopically on avoiding loss of whole buildings, preservationists have missed an opportunity to preserve the salvageable parts and to further integrate sustainable design into preservation practice.

Deconstruction addresses this inconsistency within preservation practice by offering a treatment that can replace demolition, continuing the ethic of preservation through the process of building removal. Heritage materials are irreplaceable, just as much so as the buildings they were once contained within. Materials reuse represents a point of transformation in the stewardship of the built environment. Historic materials can add layers of information and social context into contemporary environments, and their reuse within communities has the potential to voice an unlimited diversity of values.

The importance of dynamic, open value systems to heritage practice is only beginning to be studied and understood. Research has linked participatory, multi-vocal heritage fieldwork to an increasing sense of community equity and personal investment in the heritage process. Qualitative approaches have informed the extension of open values systems into mapmaking and 3D heritage practice (DeNardi, 2014; Jones, 2017) These studies emphasize the displacement of heritage professionals from their role as arbiters of heritage value, instead relying on community participation, collaboration and observation. These methods allow community members to take the tools of heritage professionals into their own hands, producing results that may or may not align with previously accepted heritage values.

There is great potential for application of these methods to the processes of deconstruction and materials reuse. The liminal position of building materials in heritage practice lifts the expectations of fixed meaning usually associated with designated objects and archives. In sorting through the fragmented material remains of the Moon Randolph Homestead in Missoula, Montana, Caitlyn DeSilvey (2004) reveals the potential associative value of disintegrated materials. The objects at the Homestead are akin to the building materials that remain after deconstruction, inconsequential at first glance. Yet their significance is revealed when layered with written and oral history, materials serving as conduits to consolidate recollections, lending the past presence (DeSilvey, 2004, p. 91).

As DeSilvey (2017, p. 178) suggests, “If we are to explore alternatives to the preservation paradigm, perhaps we need to develop modes of care that help us negotiate the transition between presence and absence.” DeSilvey’s arguments are directed at exploring an entropic heritage practice; a materials heritage practice could follow the logic of decay to a different stopping point along the continuum.

Disintegrated materials provide an opportunity to tell new stories. Materials heritage is the history of work, of workers, the builders and makers rather than designers and owners.
These contributors are often unrecognized in a heritage practice focused on architectural product rather than process. Connecting these stories through a practice that simultaneously promotes contemporary workforce development and ecological stewardship provides a compelling vision of heritage actively employing the past in the present to create a more equitable future.

Access and equity are not guaranteed outcomes of materials reuse, however. Kaleigh Herstad (2017) examines the reuse marketplace in Detroit, a city that has experimented with deconstruction as a part of its blight removal program. Here, Herstad observes that the potential of material reuse to restore community identity and history is largely unrealized. Instead, the city’s painful history of racial and economic injustice is reinforced: as low-income, blighted black neighborhoods are dismantled, their materials are repurposed as expensive craft goods, marketed with a sanitized narrative of reclamation to a mostly white upper-class clientele. Except for the jobs generated by deconstruction itself, Herstad finds the source communities are excluded from the economic and cultural benefits of materials reuse.

As Herstad’s research indicates, more work is needed to understand the complex meanings in material reuse and overcome underlying social inequities. Just as Re:Purpose Savannah developed careful policies to retain heritage value through deconstruction, materials reuse also requires attentive facilitation to ensure that reuse benefits the community of origin. Would the community based Re:Purpose approach encourage diverse participation in the Detroit reuse market? If deconstruction and reuse is to facilitate social and economic equity, such questions must be explored.

Conclusion
Deconstruction offers a more meaningful connection of historic preservation and the principles of sustainable design through the reuse of increasingly rare historic building materials and the reduction of construction waste. More importantly, however, materials reuse provides a vital connection to the past. In the USA as well as abroad, the current regulatory system does not value deconstruction as a treatment for historic buildings. Yet the critical heritage literature reviewed in this paper suggests that expanding heritage values to include elements of change and transition is not only possible, it has the potential to enhance heritage practice.

Reframing waste as heritage is an opportunity to transform the experiences of loss and exploitation that follow from waste and disposal. Narratives of revitalization, expressed through materials reuse, can be a critical tool for communities struggling with blight or natural disaster to engage productively with loss. Essential to this is the connection between a community and its heritage materials. Achieving equity through reclamation requires access, not only to jobs, but to material for reuse, facilities for transformation and connection to the historic background that turns repurposing into an act of cultural engagement. The work of Re:Purpose Savannah demonstrates the important contribution heritage professionals can make to both the deconstruction and materials reuse industries, strengthening both the business and cultural benefits of reuse.

As the practice of historic preservation continues to evolve worldwide, the development of a heritage materials practice, enabled through deconstruction is the next logical step in the progression of the field. Including deconstruction as a new treatment in the Secretary of Interior’s Standards would provide the policy framework necessary to engage preservation expertise, enabling cross-disciplinary collaboration with the deconstruction industry. Adding deconstruction to heritage practice creates an opportunity for preservationists to learn a new method of stewardship and train new practitioners. By engaging the ethic of reuse as a wholistic system that supports sustainability goals, heritage professionals can offer a positive alternative to demolition and the culture of disposal.
1. This case study is drawn from a series of phone, e-mail and in-person interviews with Scott Crotzer and Mae Bowley between 2018 and 2019.

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Deconstructing heritage


Further reading

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Abstract

Purpose – The purpose of this paper is to discuss the relation between building conservation and circular economy (CE), which are often erroneously seen as inherently contradictory to one another.

Design/methodology/approach – The work draws from a comparative approach. The paper reviews a body of literature on architectural conservation and CE to establish an understanding on the state-of-the-art for both disciplines separately. Then, the relation between thereof is developed through a theoretical discourse.

Findings – Both architectural conservation and CE aim at safeguarding value, although they define “value” differently. Fabric-focused conservation and CE favor minimal intervention to material, albeit they arrive at this conclusion from different bases. Consequently, both approaches struggle with the low cost of virgin resource extraction and waste production and the high cost of human labor in contemporary Western societies. CE could be harnessed for building conservation by adopting its vocabulary and methodology, such as lifecycle assessment and material flow analysis. Transitioning toward CE can help increase the preservation of built heritage while redefining what is meant by “heritage” and “waste.”

Originality/value – Prior to this paper, there have been no articles addressing the relationship of the concepts explicitly and to this extent. The paper provides a theoretical basis for further discourse and outlines some implications of CE for the construction and built heritage disciplines.

Keywords Conservation theory and practice, Sustainability, Architecture, Building materials, Modern heritage

Paper type Conceptual paper

Introduction

The circular economy (CE), that is, the reuse of pre-used objects and materials, was conceived as something undesirable in the consumption and growth oriented Modernist societies of the 20th century: a sign of poverty, marginality and backwardness of its users (Kinney, 2011, p. 2). During the last decades, the disciplines of environmental economics and industrial ecology have, nevertheless, increasingly proposed CE as a solution for combating the impeding global environmental and climate crisis, rooted in the “take-make-dispose” model of the industrial linear economy. Because CE is typically conceptualized through slogans such as “waste as a resource,” “to circulate” may at the first glance seem to contradict what it means “to conserve.” Under these circumstances, it is hardly surprising that issues related to the circularity of heritage objects have only been addressed in conservation theory to a very limited extent, and the discipline’s stance toward the idea has been fairly negative. Conservation doctrines (e.g. ICOMOS, 1964; ICOMOS, 2013) tend to reject re-contextualization and other redefining activities except in extraordinary cases, although the paradigm has shifted from strict preservation toward more permissive ideas of conservation, adaptation, and utility (Ashworth, 2011). Yet, it is symptomatic of the discipline’s attitude toward circularity how poorly partial preservation is valued even under the one subtopic of the heritage discipline that deals specifically with reused objects, the research into “spolia” (architectural reuse of components, typically medieval reuse of Greco-Roman marbles). More often than celebrating the survival of the fragments or the
creativity of their salvagers, scholars express distress over the “violence” the donor buildings have assumedly experienced (e.g. Kinney, 2011, p. 4 or Wharton, 2011, p. 179) or disdain over the lack of imagination or courtesy of the users of spolia (e.g. Liverani, 2011, p. 45; Meier, 2011, p. 223; Wharton, 2011, p. 187). While positive takes on spoliation as ecological and cultural adaptation, preservation and translation have increasingly emerged (e.g. Brandenburg, 2011; Esch, 2011; Hansen, 2003; Kalakoski and Huuhka, 2018), the fact that many prominent researchers in the field still portray the target of their research as a “parasitic” activity at best does send a message.

The current paper argues that the discipline’s disregard or distaste for circularity may largely result from a lack of understanding of what CE in fact is, and what are its fundamental principles. This is understandable, as the wider society outside the industrial ecology discipline from which the CE concept emerges is also only starting to grasp what CE is about, and its guiding principles are too often misrepresented or not presented at all in the non-professional discourse. So, the purpose of this paper is to present a discussion from a blue-sky perspective that brings together the ideas of CE with heritage conservation theories, in order to analyze when their principles are compatible and when they may contradict one another. The paper works with the concepts of circularity and conservation in the context of the built environment and built heritage. Unlike in archaeology and object conservation, architectural conservation seems particularly skeptical toward heritage objects (buildings or their parts) being relocated, repurposed, and thus, re-contextualized or reinterpreted. Simultaneously, though, what is understood with “heritage” is undergoing a major transformation. First, the very definition of heritage is in and of itself expanding and becoming more fluid, and academics are increasingly tapping into the present utility and meanings of heritage instead of its physical features (e.g. Smith, 2006; Ashworth, 2011). Second, the amount of potential built heritage has increased exponentially as a result of post Second World War construction boom (Hassler, 2009). Third, this Modernist heritage differs significantly from the traditional buildings the discipline is used to dealing with (Hassler, 2009; Plate 1).

These facts call for rethinking conservation in the twenty-first century. There is a growing understanding that the built heritage can contribute to sustainable development (e.g. ICOMOS, 2019). Adaptation has long been part of the conservation discourse (Ashworth, 2011), arguments have been made for the embodied energy of heritage buildings (e.g. Jackson, 2005), and CE has been introduced to some extent in the context of historic urban landscapes (e.g. Fusco Girard, 2017). Nevertheless, no explicit elaborate discussion on

Plate 1.
The majority of building conservation tends to address traditional, pre-industrial buildings (left) that are few in number and artisanally handcrafted. Notes: One of the main challenges for the discipline in the twenty-first century is dealing with the industrially mass-produced built heritage (right). For rather obvious reasons, processes developed for the former type of heritage are not easily applicable to the latter.
how the theories of CE and conservation can be related seems to have been put forward prior to the article at hand. The paper argues that embracing the principles of CE could be one way for the discipline to address some of the current and future challenges. The research draws from a comparative approach. It is based on a body of literature from architectural conservation and CE, providing a condensed overview of the fundamental ideas underlying the two disciplines. Then, the relationship is developed in a theoretical discourse. The paper aims to produce a foundation that enables further discussion on the relationship between heritage and circularity in the built environment.

On architectural conservation
Architectural conservation theory can be seen to take a two-fold stance toward circular activities. On one hand, reuse is considered as an innate feature of vernacular built heritage. It is believed that building parts and materials of vernacular buildings were “designed" for recurrent renewal (Matero, 2007, p. 77). This kind of practice is regarded as particularly natural for wooden structures, such as Nordic log houses or Japanese timber buildings. Typically building parts were also passed down from buildings of higher requirements, such as residential buildings, to those of lower ones, such as outbuildings (Kalakoski and Huuhka, 2018, p. 192). The fact that the building parts were still considered as usable for other purposes demonstrates that their value had not been completely drained during the earlier uses. Today, this is not seen as reuse but “continuous use” (Kalakoski and Huuhka, 2018, p. 209), which, unlike spolia, is not usually considered ethically dubious but natural and intrinsic. Perhaps this interpretation draws from the reuse as defined within one specific culture and in the context of less material abundance. Such reuse practices which derive from true necessity supposedly make the intentions of their makers pure.

On the other hand, such practices are usually not seen as acceptable for professional building conservation. The discipline emerged when Western societies industrialized and modernized, and distanced themselves from the natural world and the vernacular. The emergence of new materials, such as steel and reinforced concrete, and construction methods stirred seminal thinkers like Alois Riegl, John Ruskin and Eugène Viollet-le-Duc into developing philosophies that laid the foundations for modern conservation theories. Today, architectural conservation is largely driven by the belief that historically “authentic" physical material of heritage objects carries the memories and values associative with them (Jones and Holden, 2008, p. 95; Jones, 2009, p. 137). So, the purpose of conservation is conventionally seen as preserving the material fabric within its built context to as great a degree as possible (Kemp, 2009, p. 61), although it is regularly debated whether the “original" form of an object or the material evidence should be conserved if preserving both is not viable (Matero, 2011, pp. 1-3).

What feeds this debate is that the value-constituting features of heritage are considered multi-dimensional and subject to interpretation (Orbaşlı, 2008, p. 52). Features such as location, function, provenance, design and construction techniques are usually considered, and matters such as rarity or typicality can also be acknowledged. In practice, conservation usually looks for an acceptable compromise between the authenticity of the material substance and the integrity (completeness) of the historical and artistic ensemble (Jokilehto, 2017, p. 429). Moreover, the “original" is not conceived to consist solely of the first state of the building but also all major events that occurred during its past which it witnessed and which therefore contribute to its unique meaning (ICOMOS, 1964: Articles 7 and 11). Therefore, restoration to an earlier state is usually not seen as desirable. This view is also connected to understanding authenticity as “honesty": that the appearance of things should portray their “true" inner nature. Thus, all time layers, including conservation activities, should bear a stamp of their time in terms of surface patina and crafting techniques, and so avoid “falsification" (ICOMOS, 1964: Articles 9 and 12).
Essentially, conservation theory is premised on qualitative argumentation. While objective material science can contribute to conservation decisions regarding, for example, decay, it does not answer whether an object should be deemed valuable and selected for conservation. These decisions are based on subjective interpretation and are therefore prone to debate. The passages above attempt to portray the prevailing dogma of architectural conservation as set forth by authorities such as ICOMOS. Real-life practices are naturally more flexible than the doctrines admit. Furthermore, since the 1990s, the fabric-focused tradition has been increasingly challenged by an emerging “constructionist” paradigm that deems the significance of heritage as a construct of its users, rather than something embedded in the objects themselves (Smith, 2006; Ashworth, 2011). This approach often moves away from Euro- and material-centricity and taps into the intangible aspects of heritage, such as traditional crafting techniques or oral histories – concepts that may resonate with non-western and indigenous cultures. In an extreme form, though, this cultural relativist view could decouple the meaning of an object from its history, as a user can give any object any meaning that is then “authentic” to them. So, in addition to the long-running debates within the fabric-focused tradition, the emergence of this novel, competing paradigm toward a democracy of voices and a focus on utility over other types of values is a further source of internal controversy in the discipline.

**On circular economy**

By the mid-twentieth century, the ecological limits of the “take-make-dispose” model of the linear industrial economy started to become perceivable. In the 1960s, ecological economist Kenneth Boulding (1966) compared the Earth to a spaceship: both are closed systems that have neither unlimited resources nor infinite sinks for waste. Environmental awareness grew through the Club of Rome report “The Limits to Growth” (Meadows et al., 1972), which highlighted the problems of industrialized societies’ flawed perception of unlimited natural resources. A vision to mitigate the problem was commissioned by the European Union and put forward by architect Walter Stahel and social economist Genevieve Reday-Mulvey (1981). They proposed extending the lifespan of products, i.e. conserving their performance, as a strategy that would efficiently substitute work for fossil fuels and virgin materials, and envisioned an economy in loops, where labor-intensive repair and repurposing would contribute positively to economic profitability.

Over the decades, the notions on the Earth as a closed system within which the economy must operate led to the emergence of an entire discipline, industrial ecology, applying the logic of the natural realm to industrial production (e.g. Bourg and Erkman, 2003). Ideas of “metabolisms,” with flows and stocks of materials, energy and nutrients, are integral to this kind of systems thinking (e.g. Meadows, 2009). Many of these thoughts were popularized outside of academia in the 2002 book Cradle to Cradle: Remaking the Way We Make Things by architect William McDonough and chemist Michael Braungart. They spread awareness of the closed loop i.e. cradle-to-cradle principle and promoted the idea of “upcycling.” This concerns how design can increase the economic value of a reprocessed product, as opposed to the value decreasing in the usual recycling process, i.e. “downcycling.” Designer items made out of waste materials are prime examples of this. A somewhat contrasting idea to upcycling is “cascading,” which proposes a sequential, lengthened downcycling process (Fraanje, 1997; Figure 1). Interestingly, cascading is essentially the same as the continued use practice in vernacular construction, in which the building parts proceed from prestigious buildings to mundane ones. McDonough and Braungart (2002) also drew attention to the need to separate natural and industrial metabolisms from the start in designing production processes. Technological materials are considered to disrupt the biological cycle and vice versa; they therefore called for changes in the design of products so that materials could more easily enter these loops at the end of their lifecycles. In 2010, ideas on CE were picked up by the
then-founded Ellen MacArthur Foundation, which gathered them under one conceptual umbrella and published the well-known “butterfly” diagram (Figure 2).

To summarize, CE is founded on extending the lifecycles and conserving the environmental and economic values of already extracted and refined natural resources. The primary purpose is to avoid material extraction and resource depletion as well as the related energy use and greenhouse gas emissions. This is best achieved through the maintenance, repair, repurposing and recycling of products, in this very order, and by moving to a lower-level approach only when a higher-level option is no longer feasible. CE also proposes fundamental changes to new production to improve a product’s circular capacity. However, the lifecycle extension of currently existing stocks of goods is seen as the main priority, despite the fact that their re reparability and adaptability properties may not always be ideal. The idea of buildings acting as “material banks” for future construction at the end of their life is focal for CE, but the premature demolition of buildings to access raw materials is never encouraged. The current authors’ personal experience is that this is a common misunderstanding among practitioners. It may stem from the fact that the majority of the circularity discussion has taken place in the context of fast-moving goods, such as consumer electronics, for which a quick phase-out of linear technologies in favor of more circular ones is, of course, practically more feasible than for the long-lasting built environment.

Remarkably, most works applying CE on buildings (e.g. Arup, 2016; Cheshire, 2016) still focus excessively on new build. Perhaps the Modernist obsession for all things new, still highly influential among construction profession, may best explain this phenomenon. Yet, it is particularly striking against the fact that annual new construction represents at most one percent of building stocks in most Western countries (Hassler, 2009). Figure 3 presents the current authors’ conceptualization of the priorities of CE in buildings’ context, the emphasis being on the conservation of the existing stock. Notably, only the oldest heritage can be considered fit for the biological cycle, whereas modern buildings inevitably belong to technologically defined loops. As illustrated in Plate 1, pre-modern buildings were made of stone, timber, or clay without any substances that would prevent the biological processes from reabsorbing the materials at the end of the lifecycle. Modern buildings, on the other hand, are based on complex composite structures made out of extensively manipulated substances, such as reinforced concrete, engineered wood, mineral wools and plastics. The capacity of such materials to return to the natural cycle is severely hindered, and some substances can even be hazardous if released to the environment (cf. Cheshire, 2016, p. 69).

Whereas the underlying theory on CE is qualitative (as any theory), the priority order of CE (continued use over reuse, reuse over recycling, recycling over virgin extraction and disposal)
Figure 2.
A popular conceptualization of CE. The closer to the core the measure is, the more preferable it is considered.

Source: Adapted from Ellen McArthur Foundation (2015, p. 20)

Figure 3.
CE in the context of buildings

Notes: The priority order proceeds from left to right and from inner loops to the outer ones. New build from virgin materials is omitted due to its small significance, but its design principles can be found in, for example, Cheshire (2016)
is backed up by hard science such as lifecycle (LCA) and material flow (MFA) analyses. These quantitative methods demonstrate the environmental benefits of extending buildings’ lives in terms of saved energy and materials, and avoided emissions and waste (e.g. Jackson, 2005). The assessments’ robustness relies on the identification of all relevant energy and material flows into the product or system, including any losses, and assigning them with correct environmental impacts. While the results may be contested, based on for example the accuracy of the underlying environmental impact database, there are few subjective dimensions to the methodology itself.

Theories collided
When the fundamentals of CE and architectural conservation are placed side by side, it becomes obvious that they share the aim of conserving, restoring and/or re-creating value, although the definition of value differs between the approaches. In architectural conservation, the value propositions can be manifold and contradictory between competing paradigms, or even within one paradigm. According to the conventional, fabric-focused approach, the primary values are the cultural and historical values, which are embodied in physical features, even if they can be underlain by different characteristics (design, artisanship, etc.). The authentic historical building material is usually seen to carry much of the values. Thus, the material substance is considered the main target of the conservation, and minimal intervention is often viewed as the most appropriate approach. In CE, the environmental value is prioritized, understood in the terms of the amount and degree of refinement of the natural resources embedded in the building and its parts and the use value. There is an underlying idea that in an ideal CE, in which negative externalities on the environment have an appropriate price, these features would translate directly into economic value. CE relies primarily on extending buildings’ lifetimes through maintenance and repair, so it discourages any unnecessary removals of existing material or additions of virgin material. This leads to a minimal intervention principle very similar to fabric-focused conservation. Here, CE and architectural conservation arrive at similar conclusions from different directions.

While architectural conservation had conventionally focused on singular, often monumental buildings (Smith, 2006), CE does not make this kind of distinction. Of course, the more artistic effort in terms of artisanship or (industrial) design has gone into an object, the more refined the material has become, at least in many cases. This means that cultural artefacts like architecturally significant buildings would be viewed highly in CE, too. Nevertheless, the differences in the breadth of their scope does also set conventional conservation and CE apart. Even though the built heritage is today increasingly understood from perspectives larger than single buildings, exemplified for one by the Historic Urban Landscapes approach, many heritage tools, such as listings, innately exclude certain buildings and sites while including others. Smith (2006) has argued that this kind of exclusivity and discrimination are rooted deep in the current heritage system. One of the problems of listings is that they can only cover a limited proportion of all heritage. In Switzerland, for one, only 14 percent of the building stock has been inventoried, and 3 percent has been officially protected (Hassler, 2009, p. 558). Listed items are typically selected from a group of similar cases, only few of which are elevated into the position of “heritage” (this is usually the most representative, i.e. the “purest” building or site, the one with the least historical complexity). An adverse consequence is that the outliers are simultaneously labeled as “not heritage.” From the sustainability perspective, the issue is that what is not affirmed as heritage is often susceptible to stripping or demolition. The access to the resources of heritage management, such as the knowledge base on the fabric-preserving conservation methods, is also hindered. So, even though the built heritage would be understood from a perspective broader than monuments,
the practical tools are often inadequate to promote the conservation adhering to the minimal intervention principle on a larger scale.

Hassler (2009, p. 565) has in fact highlighted this as one of the most vicious problems of conservation in the face of the immense mass of Modern built heritage. According to her, the market mechanisms (of the linear economy) are too shortsighted to preserve all assets in the building stock in the long term, but the conventional methods of building conservation are not expandable over the entire building stock, either. Consequently, technically viable Modernist buildings are razed all over the world in great numbers to provide land for new buildings, with little to no concern over the inflicted ecological burden, potential heritage values or social repercussions. In this regard, it can be argued that the transition to CE would have a greater potential capacity to conserve historical and cultural values in the building stock than what can be achieved through institutionalized heritage conservation, even though this is an unintended consequence of CE. Safeguarding the values, albeit different but resulting in the same ends, sets both fabric-focused conservation and CE apart from the current linear economy, which creates value out of consuming, not conserving. Alas, neither the value-constituting features of conservation or CE usually translate easily into financial value in the linear economy, where the price of materials, energy, waste and emissions do not reflect the true cost of the damage inflicted on the planet's livability, and where human labor remains disproportionally high-priced. This dilemma is an enormous hindrance for the practical implementation of CE in near future.

Furthermore, thanks to the cascading approach, CE acknowledges the significance of partial preservation (cf. Figure 3), which architectural conservation tends to disregard as “waste.” Despite the conservation theory seemingly favoring complexity, practical conservation often struggles with hybrid and heterogeneous objects. Even if value constitution is ostensibly subject to interpretation, the current dogma considers buildings as immobile, so the site becomes a nearly non-negotiable feature (Brilliant, 2011/2014, p. 173; Gregory, 2008, p. 113). The skepticism toward partial preservation is understandable, since endorsing it in the current linear economy would likely open a Pandora's box for destructive, unircular operations. Alas, it can also lead to absurd situations where ruination in situ becomes practically preferred over preservation via relocation, exemplified for one by museum authorities (Härö et al., 2013) disapproving of the salvage of components from dilapidated houses deserted in rural peripheries with no realistic prospects of resettlement. So, in spite of the stated admiration for the material evidence, building conservation sees too little value in partial preservation (Kalakoski and Huhuka, 2018, p. 209). Even in archaeology, where conservation activities typically revolve around mobile objects, artefacts in non-primary locations or uses become easily labeled as less authentic, i.e. less valuable, and modified objects are often restored to strip them of their later added features (Jones, 2010, pp. 184-188). In building conservation, Modern built heritage seems to be a category particularly prone to attract such stylistic restoration. The argument has it that since Modernism was all about exploring the new possibilities offered by novel materials and technologies, Modernist buildings, unlike traditional ones, were intended to stay forever young and therefore, traces of age or change disturb their integrity (Fixler, 2008; Plate 2). This idea is in direct conflict with the minimal intervention principle, and as a result, with CE.

Interestingly, the relation of CE to the emerging paradigm that emphasizes utility and meanings of heritage over its physical conservation is less clear. In this approach, the value of authentic substance is not inherent but relational to present needs. Symptomatically, researchers tapping into this paradigm in the current linear society may find physical heritage as uninteresting and the focus on fabric conservation as misguided. Then again, in a society that would acknowledge the planetary environmental boundaries as a precondition for human activities, fabric-focused conservation would directly connect with the society’s aims, thus contributing to a high contemporary value.
The transition from the linear economy to a circular one could in fact render many of the internal conflicts of conservation discipline obsolete. First, the debate between fabric focused and use and meaning focused paradigms would become redundant in that the former would serve the present interests. Second, the minimal intervention principle would be consolidated (over the restorative approach) on an ecological basis, verifiable through the means of LCA and MFA. Conservationists could contribute to the transition by harnessing these quantitative tools, which provide hard evidence on the significance of long service-lives that is more digestible for the current techno-econocratic society than the slippery slope that the conservation discipline’s value-infused argumentation often is, despite its undisputed importance. It would also enlarge the scope of conservation toward both the wider building stock and toward partial preservation, increasing the discipline’s potential societal relevance exponentially. Of course, CE will not answer in architectural terms how a fabric replacement should be made if it is truly inevitable, that is, whether the replacement should fit in for integrity or announce itself for authenticity. CE does propose, though, that using already existing building parts reclaimed from dilapidated buildings should be prioritized over manufacturing new ones from virgin materials. In this sense, CE may also contradict and challenge some of the current conservation doctrines, such as the constructionist focus on preserving fabrication traditions over historic material substance, or the principle that replacements should be distinguishable as new additions. These aims and circularity, manifested through reuse, may in some cases be difficult to reconcile, so CE will also encourage exploring previously unknown horizons in conservation theory.

Conclusion
Prior to this paper, the relationship of architectural conservation theory and CE have not been addressed explicitly and to this extent. The purpose here has been to provide the first brief joint overview of the prevailing theories in these disciplines and to form a basis for further discourse. It seems rather obvious that pre-modern, vernacular construction followed the principles of circularity, that is, avoided waste and dissipation and approached redundant buildings, objects and materials as resources. The industrial revolution changed this, and in doing so, also gave birth to the heritage discipline. Although conservation is often seen a counter-reaction to the way Modernism was fascinated with artistic and technological avant-gardism and breaking with the past, it is noteworthy that from a materials perspective it is largely premised on the same ideological basis. This is manifested in conservation theory currently rejecting circular practices as acceptable conservation approaches.

Even so, the discipline has also transmitted tacit knowledge of the pre-modern era on circular building practices, founded upon an inbuilt balance with environmental limits,

Notes: Both repairs represent conservation based on the minimal intervention principle, so they also implement CE exemplarily. It is argued, however, that most of the practicing architectural conservationists would find the former acceptable, but fewer would be ready to embrace the latter one.
through the Modern times to the present one, which seeks to overcome the problems of the industrial take-make-dispose economy. In the transition toward CE, the need for the conservation discipline in the Modernist sense will diminish, while in practice conservationists' knowledge base will also become more important than ever. To implement CE in its highest level in the built environment, urban development and construction activities need to be based on the maintenance, repair and adaptation of the existing stock, not on its replacement. Here, a lot remains to be learned from the conservation discipline, because most literature addressing construction from a CE viewpoint still focuses excessively on new construction. In a CE, conservation should become a mainstream activity situating at the heart of the construction sector; what is now known as “conservation” would simply be called “construction.” In addition to supplying its body of knowledge on fabric-conserving practices for wider use, the discipline may also contribute to sustainable new build by revisiting the waste-free construction methods of the past to recreate ways to build adaptable, relocatable, recyclable and non-toxic buildings in the future.

At the same time, though, conservation needs to learn to identify better material and ecological values, in particular in the vast mass of modern built heritage, and to acknowledge the value of partial preservation and relocation of buildings and their parts. The unsustainable demolition and construction practices of industrialized societies and the effort to conserve at least some of their built heritage are two sides of the same linear economy system, and it is this very system that sets the limits to conservation as the discipline is currently understood. As follows from the fundamental principles of CE, such as product life extension and minimal intervention, a society that is more circular in the true sense of circularity will in fact automatically conserve more built heritage than a less circular one. Interestingly, this may result in a transformation of what is understood as heritage. When all things material are valuable and almost nothing is waste, less conservation’s time can be spent on debating what should be conserved and how, so more opportunities may arise to focus on people’s relationships with the material realm. The authors would like to offer this essay as an invitation for further reflections, not only recognizing opinions that resonate with their own, but also warmly welcoming views that contradict or challenge this thinking.

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Vancouver pre-1940 houses: a cache for old-growth forest wood

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Abstract

Purpose – Single-family houses in Vancouver that were built prior to 1940 are a cache of wood from British Columbia (BC) old-growth forests. The purpose of this paper is to discuss the environmental and heritage values of maintaining this finite resource, assess the current policy and regulatory efforts of the City of Vancouver to save this resource and recommend further opportunities to improve and expedite these efforts.

Design/methodology/approach – Using the City of Vancouver as a case study, this paper identifies effective policy practices to encourage and facilitate salvaging and reusing old wood resources. Additionally, the paper discusses the key challenges and risks that need to be addressed for these policy approaches to succeed.

Findings – Pre-1940 houses constitute about 40 percent of single-family houses that have been demolished in Vancouver in the past few years. The City of Vancouver enacted the Green Demolition Bylaw in 2014 requiring a minimum of 75 percent diversion of demolition waste. However, wood from these houses has been mainly chipped and recycled as biomass fuel or landscape mulch rather than reused. The result shows that regulatory enforcement along with support for infrastructure development may be crucial to protect the remainder of this valuable heritage resource.

Originality/value – This paper considers the environmental and heritage values of wood elements used in old houses and recommends further policy and regulatory interventions to maximize wood salvaging and reuse. Since protecting entire houses may not be always feasible, retention of wood elements is proposed as an alternative path for maintaining and cherishing this ancient and irreplaceable heritage.

Keywords – City of Vancouver, Green Demolition Bylaw, Heritage construction materials, Old-growth forest, Pre-1940 single-family houses, Wood frame salvage

Paper type – Case study

1. Background

In recent years, a growing body of heritage conservation literature has been exploring broader definitions of heritage value that encompass building materials and demolition waste. Associated with this, building deconstruction and material salvage are becoming more recognized as a means to achieve sustainability and heritage conservation goals (Arlotta, 2018; Creba and Ross, 2018; Ross, 2019).

Canada’s Heritage Places (2010) defines heritage value as the aesthetic, historic, scientific, cultural, social or spiritual importance or significance for past, present and future generations. In the context of the Pacific Northwest, a building material with heritage value is lumber used in historic houses. These houses contain valuable and irreplaceable sources of wood from old-growth forests in the region (Plate 1). Ancient forests are non-renewable and endangered (Ancient Forest Alliance, 2018). This wood resource can also be understood to have historical value as it embodies the stories of those who cut these first-growth forests to build these houses. It is, therefore, crucial to value the finite remainder of this natural and historical heritage that is maintained in the form of framing lumber and shiplaps in the limited pre-war housing stock in the region (City of Vancouver, 2018a). By salvaging and reusing this lumber, a slice of the past and its stories can be protected and cherished in new buildings and in other wood products.

From a sustainability and environmental perspective, reusing wood from old houses maintains this material in the resource flow and prevents embodied carbon in wood from being released in the environment, prevents impacts from landfills and burning it and protects forest ecosystems by reducing new wood harvesting (Chini and Bruening, 2003; Gorgolewski, 2008, 2018; Guy et al., 2006).
A life-cycle assessment (LCA) study by the US Department of Agriculture, Forest Service, Forest Products Laboratory showed that reusing framing lumber can reduce the embodied energy by 15 times and embodied greenhouse gas emissions by about four times, compared to using virgin equivalent products (Bergman et al., 2013). Another study by the UK Building Research Establishment showed that reclaiming and reusing timber studwork can reduce embodied environmental impacts by about 80 percent when compared to using new timber (cited in WRAP, 2008). A recent LCA of 36 single-family houses deconstructed in Portland, Oregon, showed that the carbon benefit of deconstruction is about double (7.6 metric tons CO₂ eq. per house) relative to demolition. The majority of this carbon benefit was because of the avoided production of new materials and the continued sequestration of biogenic carbon in the salvaged wood, which constituted 85 percent of the total salvaged materials by weight (Nunes et al., 2019).

Previous studies of deconstruction and salvaging show that in addition to heritage, aesthetic and environmental considerations, salvaged wood that is originally from first-growth forests is often of higher quality and more durable, when compared with wood from second-growth forest (Delta Institute, 2018; Diyamandoglu and Fortuna, 2015; Falk, 2002; Gorgolewski, 2008, 2018). Plate 2 shows lumber taken out from a heritage house in Vancouver. Despite the unappealing surface, this wood has higher density, tighter grains and fewer defects, mainly because of the slower growth of old-growth forests.

From an economic and market perspective, deconstruction and reuse create local green job opportunities, because deconstruction and preparing salvaged materials for reuse is more labor-intensive (Delta Institute, 2018; Diyamandoglu and Fortuna, 2015; Falk, 2002; Gorgolewski, 2008, 2018). As for the financial implications of deconstruction vs demolition, various case studies in the USA, one on Vancouver Island, and some recent case studies in Vancouver are conducted. These case studies have shown that when deconstruction savings such as reduced landfill fees, revenues from selling salvaged materials and tax deduction from donating salvaged materials are factored in, demolition can be comparable or even more costly than deconstruction (Delta Institute, 2018; Teshnizi, 2015).
Despite the heritage, aesthetic, environmental and economic advantages and value of deconstruction, salvaging and reuse, and even with the educational materials and guidelines that local government provides, deconstruction practices are not prevalent in the construction industry. This paper assesses the efforts that the City of Vancouver, British Columbia (BC) has taken to incentivize, facilitate and enforce salvaging of construction materials, with a focus on wood materials used in old houses. This wood is from 200 to 2000-year-old trees that were harvested from BC’s old-growth forests.

2. The current status of wood salvaging and reuse in the City of Vancouver
The City of Vancouver’s Greenest City Action Plan (hereafter referred to as Action Plan), which set the roadmap to making Vancouver the world’s greenest city by 2020, has set a target of reducing waste that is sent to landfills and incinerators by 50 percent from 2008 levels by 2020. Given that construction and demolition (C&D) waste constitute more than 40 percent of the total waste of the City, increasing diversion of C&D waste was identified as a priority in the Action Plan and also in the 2040 Zero Waste Strategic Plan (City of Vancouver, 2015, 2018b).

The City data show that the majority of this C&D waste is generated through demolition. Within that, about 80 percent of the waste from the demolition of commercial buildings, which consists primarily of concrete and metal, is recycled. The diversion rate from the demolition of one and two-family houses are often less than 50 percent. This is largely because the variation of waste material and smaller quantities of materials used in these buildings makes separation of waste more difficult and less worthwhile (City of Vancouver, 2018a). Therefore, diverting waste from the demolition of houses has been identified as a significant opportunity to achieve the City’s waste reduction objectives (City of Vancouver, 2015, 2018b).

2.1 The City of Vancouver’s policy for diverting demolition waste
To increase demolition waste diversion from one and two-family houses, the City enacted a Green Demolition Bylaw in 2014. This bylaw was modeled on a sample bylaw that was developed by Metro Vancouver – the regional government – to support municipalities in mandating demolition waste diversion (City of Vancouver, 2018a). Metro Vancouver developed this sample bylaw as part of its actions to achieve a diversion target of 80 percent for C&D by 2020, as it was identified as a priority in the region’s Integrated Solid Waste and Resource Management Plan. To ensure the applicability of this sample
bylaw, Metro Vancouver conducted a three-year consultation program with demolition contractors, recycling facility operators, industry associations and regional municipalities (Metro Vancouver, 2010, 2013a, b).

The City’s Green Demolition Bylaw required a minimum of 75 percent waste from demolition of houses built before 1940 and 90 percent from houses that have character status to be reused or recycled. To get back a security deposit of about CAD $15,000, project contractors are required to submit a compliance report, including all receipts from licensed recycling, reuse or landfill facilities (City of Vancouver, 2018a). The City of Vancouver (2013) defines a character building as “any building constructed before 1940, if it also has a number of surviving, prescribed character features such as the authentic or period massing, roof form, front porch, exterior wall materials, window openings and frames, and detailing” (see an example of a character house in Plate 3). The date, 1940, was established to reflect the community’s concern about “the loss of character buildings built before the Second World War, regardless of type or style.” This was found through an earlier planning study by the City staff.

A 2018 report to the City Council confirmed that of the 1,000 pre-1940 houses, which were demolished between 2014 and 2018, 98 percent have been able to meet the diversion requirement. The average diversion rate was improved from 50 to 86 percent, which is roughly 10,000 tonnes of additional waste diversion per year. Following the success of the industry in adapting their practices to meet this bylaw, a number of municipalities in Metro Vancouver implemented similar bylaws with various levels of mandatory and educational processes (City of Vancouver, 2018a).

2.2 The barriers for salvaging and reusing lumber from old houses in Vancouver

In 2013, the Vancouver City Council approved a Heritage Action Plan that recommended a number of immediate and medium- to longer-term actions to conserve and celebrate the City’s heritage resources. One of the five key recommendations of the plan was to recognize and use deconstruction as a solution to preserve heritage features and also divert waste from landfill (City of Vancouver, 2013). When the Green Demolition Bylaw was approved, the City expected that requiring a high diversion rate would result in a transition toward
deconstruction or partial deconstruction to salvage valuable building elements such as clean and untreated wood.

Despite the success of the Green Demolition Bylaw in increasing the waste diversion rate from smaller demolition sites, it was not very effective at increasing salvaging and reuse. After four years of enforcing the bylaw and despite growing interest in salvaged lumber and shiplap within the local market, the City realized that – without specifically requiring salvaging in the bylaw – almost all contractors demolished houses using an excavator (Plate 4). This method resulted in minimal to no salvaging of unique architectural details such as fixtures, doors and cabinets. The main obstacle that regional demolition contractors gave for not deconstructing houses and salvaging more materials and components was their clients’ expectation to remove the building from its site as quickly as possible to make it ready for new building development (City of Vancouver, 2018a). This is partially because of the relatively long permit wait times in Vancouver, due to the large number of permit applications. Therefore, when the permits are finally granted, developers and contractors want to start the construction process as soon as possible.

Teshnizi (2015) identified the following additional barriers to reusing salvaged dimensional lumber in Vancouver.

2.2.1 Salvaged lumber is more expensive than new. Due to the high labor cost associated with deconstruction and processing of salvaged lumber, as well as a shortage of supply and availability, salvaged lumber is more expensive in the current market compared to new lumber. However, a number of studies in the USA have argued that if deconstruction became common practice and more salvaged material became available, the price would drop, making salvaged materials a viable alternative to new materials (Falk, 1999; Falk and Guy, 2007). This may not be fully applicable to the Canadian context, because of the relatively low price of lumber. However, the financial value of salvaged lumber is not the only motivation for its reuse. It is also the environmental and heritage values, the character and story it adds to new buildings.
2.2.2 The availability of salvaged lumber is not reliable. The market for salvaged lumber, especially for smaller size framing lumber is less developed. Currently, businesses are unwilling to pay enough for salvaged materials to make it worth the additional labor time to remove these items intact. Until very recently, there was also no business that would carry out deconstruction to salvage these materials. Demolition contractors in Vancouver also stated that there is less interest among the trades to work on deconstruction projects compared to demolition or construction projects. This is a broken loop in that even if a project aims to use salvaged dimensional lumber, unreliable availability discourages the demand side of this resource, which in turn discourages the supply side of the market.

2.2.3 Salvaged lumber has different characteristics compared to new. Salvaged lumber from pre-1940 houses is typically very dry, dense and hard on tools. It also has larger dimensions compared with new lumber – for instance, a 2×4 from before 1930, is actually 2 inches by 4 inches, whereas a new 2×4 is 1.5 inches by 3.5 inches. There may also be some irregularity in the length of salvaged lumber and it may not match the standard sizes. These differences, in addition to the differences in appearance, make it difficult and time consuming to use salvaged lumber in combination with new.

2.2.4 Salvaged lumber must be re-graded to be reused structurally. Previous and ongoing studies in the USA investigated the feasibility of using salvaged lumber structurally. They recommended re-grading methods or potential engineered wood products that salvaged wood can be used for (Arbelaez et al., 2019; Davis, 2012; Falk, 1999, 2002; Falk et al., 1999, 2008).

Currently, there is no standard method for re-grading salvaged lumber. Therefore, graders are not able to regrade and stamp salvaged lumber for structural uses. It is only engineers who are eligible to sign off salvaged lumber for structural use, which is inefficient and costly (Kane Consulting, LOCO BC, Restraint Consulting, and Urban Fabric, 2012). In the Canadian context, there is anecdotal support from the Forest Products Association of Canada and National Lumber Grades Authority for the usage of reclaimed lumber, but there is currently no research specific to the structural application (Ergun, 2014; Teshnizi, 2015).

As Teshnizi (2015) has estimated, about 1 percent of the total wood waste generated by the City of Vancouver is salvageable dimensional lumber from old houses (Plate 5). With all the additional effort required to prepare this salvaged lumber for reuse, using it in structural functions that will hide it behind finishes would not be the best use of such a valuable and limited resource. Additionally, establishing grading rules is an initiative that must be done at the federal or provincial level. Therefore, the City decided that establishing new grading rules for salvaged lumber would not be a high priority for them at this point.

Plate 5.
Dimensional lumber in a 1920s house in Vancouver, B.C. This include 2 by 6 joists and rafters and 2 by 4 studs (photo credit: Zahra Teshnizi)
2.3 The City of Vancouver’s policy for increasing wood salvaging and reuse

Given the success of the first phase of Green Demolition Bylaw in diverting demolition waste, the program was expanded in 2019. Two years prior to enacting the expansion, the City consulted with demolition contractors to raise awareness about the expansion and to collect feedback. The demolition industry had successfully adapted to the earlier version of Green Demolition Bylaw. Their main concern was occasional capacity limits of the regional wood recycling facilities, which in turn is caused by a lack of demand by end users. In response to this feedback, the City proposed an incremental expansion to the bylaw to allow and support the regional authorities, such as Metro Vancouver, and industries to expand recycling and reuse capacities (City of Vancouver, 2018a).

In the expansion of the Green Demolition Bylaw, the City employed a two-part strategy to solve the lack of supply and demand for salvaged materials: requiring salvaging of materials and supporting the establishment of a deconstruction hub.

Below are the components of this bylaw expansion (City of Vancouver, 2018a).

2.3.1 From pre-1940 to pre-1950 one and two-family houses. The bylaw now requires 75 percent waste diversion from pre-1950 houses. This scope now covers 70 percent of houses demolished each year. As a result, an additional 8,000 tonnes of building materials are expected to be diverted annually. The City plans to expand the bylaw in phases to eventually include all house demolitions. This will allow the regional recycling facilities to adjust and build capacity for additional materials and newer materials, such as composites.

2.3.2 Deconstruction of all pre-1910 one- and two-family houses and heritage-registered pre-1950 houses. The main issue with the earlier version of the Green Demolition Bylaw was its low success rate in encouraging material salvaging and reuse. The majority of recycled wood from old houses was used as biomass fuel, as landscape mulch, or as demolition hog, which is chipped wood that used for top dressing on tipping pads in landfill facilities. The City realized that to achieve deconstruction and salvaging, they needed to mandate it, because the construction industry is bound by financial constraints on their end. Without this, the speed of demolition would be their main priority, rather than the quality and quantity of salvaged materials.

To ensure the feasibility and market demand for wood salvaging and reuse, three recent deconstruction pilot projects were conducted in Vancouver (Plate 6). They showed a significant potential for wood salvaging and interest in all of the salvaged materials, which were either donated for resale or sold directly from the job sites. The City is also in the process of publishing educational materials, to share what has been learned from these projects with the industry and public.

Plate 6. Deconstruction and wood salvaging in of a house built 1912 in Vancouver, B.C. (photo credit: Unbuilders Instagram page)
The City also looked into best practices of deconstruction requirements in other North American cities. A successful example is Portland, Oregon, which has been requiring deconstruction of pre-1916 houses (about one-third of all house demolitions in the city) since 2017. The Portland experience has shown a successful increase in salvaging and reuse and job opportunities (City of Portland, n.d.).

The City of Vancouver, therefore, required salvaging of wood from pre-1910 house and heritage-listed pre-1950 house. This would be about 10–12 houses per year from about 900–1,000 houses that are demolished annually. By selecting a small number of houses that are the oldest and/or have the highest heritage value and highest quality of wood, the City will ensure the highest reuse potential and allow the industry and market to grow capacity for more salvaged wood materials.

To simplify the procedure and as was proven in the pilot deconstruction projects, a minimum of three metric tonnes of wood must be salvaged from these houses (which is less than half the wood in a typical small house).

2.3.3 Support the establishment of a non-governmental deconstruction hub. Learning from the experience of other North American jurisdictions, such as Portland, Seattle and Oakland, hearing from local deconstruction contractors, and as identified in Teshnizi’s (2015) study of barriers to salvaging in Vancouver, the City understood the value of a local central hub to gather, upcycle and retail salvaged materials, including salvaged wood. The hub can also provide training and other resources to support deconstruction. The City, therefore, committed to financially support an independent and locally operated organization to establish and operate a deconstruction hub by allocating $250,000 of its Innovation Fund, contingent on matching funds.

3. Conclusion and further recommendations
In the context of the City of Vancouver – with the current land process, cost of construction, and permit wait times – voluntary and incentive programs have not been effective in transitioning the industry practices from demolition and waste recycling to deconstruction and salvaging. In this case, prescriptive regulatory requirements have proven to be necessary for achieving the sustainability and heritage preservation goals through the reuse of salvaged building elements.

While the City of Vancouver is a leader within North America in developing policies that encourage deconstruction and waste salvaging, the following actions are proposed for consideration, in order to increase the reach and impact of the current solutions and policies:

- Emphasizing and raising awareness about the heritage value of salvaged lumber.

So far, the City’s Heritage Action Plan has relied primarily on sustainability initiatives to maintain building elements with heritage value. The heritage preservation staff of the City could take a more active role in emphasizing and demonstrating the heritage value of building elements, especially lumber from old-growth forests. These actions could add to the current focus of the Green Demolition Bylaw, which is mostly driven by environmental motivations.

Heritage conservation efforts could allow community members to better recognize the value of salvaged wood harvested from old-growth forests. There could be a mechanism to identify this wood. Examples of possible solutions might include heritage stamps, barcodes and QR codes that redirect viewers to the story of that piece of wood, or a certification or heritage plaque for items that are made of salvaged wood.

- Comprehensive consideration of environmental benefits of salvaged lumber.

The City’s recently approved Climate Emergency Response (2019) includes reducing embodied carbon in new construction as one of its six Big Moves. This will
provide a unique opportunity for the City to capture the environmental benefits of salvaged wood from a more comprehensive perspective rather than emphasizing only waste reduction. An LCA study could better indicate the life cycle environmental benefits of salvaged wood. This could allow new buildings that use salvaged wood to show the contribution of such action on reducing the buildings embodied carbon.

- Combining deconstruction hub with a construction innovation and training hub.

Given the high value of land in the Vancouver and Lower Mainland region and associated high rents, the City and their industry partners are struggling to make the business case for a deconstruction hub, despite its proven value in making salvaging and reuse more feasible. A solution to this could be to create a hub that responds to multiple environmental and innovation goals of the building industry. For instance, in addition to sorting and preparation of salvaged materials, this hub could research the use of salvaged wood in value-added engineered wood products. The hub could also be used as a center for showcasing and teaching building deconstruction, salvaged wood preparation and innovative construction technologies to deliver low-carbon emission buildings.

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About the author
Zahra Teshnizi is, currently, Research Manager at UBC Sustainability Initiative and is in charge of the collaborative research projects with Vancouver Zero Emission Building Exchange (ZEBx). She is the Author of Opportunities and Regulatory Barriers for the Reuse of Salvaged Dimension Lumber from Pre-1940s Houses, written as the City of Vancouver Greenest City Scholar in 2015. Zahra holds a Master’s in Advanced Studies in Architecture from the University of British Columbia with a focus on the influence of multiple stakeholders on sustainable use of construction materials throughout the building life cycle. She has a diverse background in project management, applied research and outreach, focusing on tools, best practices, policies and guidelines for green buildings and sustainable development. Zahra Teshnizi can be contacted at: zahra.teshnizi@ubc.ca

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Demolition and deconstruction legacies: Toronto’s Honest Ed’s and Mirvish Village

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Abstract

Purpose – Building on the thematic intersection of architectural waste and conservation, the purpose of this paper is to look at the demolition and deconstruction of Honest Ed’s and Mirvish Village – an iconic site in downtown Toronto. In doing so, it examines contradictory site values and tensions inherent in sustainable heritage practices.

Design/methodology/approach – This article uses a “follow-the-thing” methodology – an approach developed by the cultural geographer Nicky Gregson (Gregson et al., 2009) – to demonstrate how engaging with processes of building demolition and deconstruction can begin to reveal the site’s multiple legacies.

Findings – Recognizing that materials are not lost, but instead move through and are determined by various physical, spatial and cultural conditions, this piece demonstrates how an attention to the choreography of demolition and deconstruction may deepen our understanding of notions of ownership, responsibility and stewardship.

Research limitations/implications – Exposing material trajectories and various actors in the chain, this work challenges the save/discard binary which underpins conventional heritage practices and provides insight into new ways of considering the significance of demolition/deconstruction sites as well as broader social and environmental landscapes implicated in its reconfiguration.

Originality/value – Whereas heritage value is often defined in contrast with perceptions of loss, this piece suggests that engagement with processes of demolition and deconstruction constitutes a form of conservation that simultaneously acknowledges the difficult heritage of these procedures, while also commemorating the site’s ongoing transformation.

Keywords Sustainability, Waste, Heritage, Demolition and deconstruction, Follow-the-thing, Honest Ed’s and Mirvish Village

Paper type Conceptual paper

Prelude

Veronica calls in tears. It’s a Friday night in late February 2018. The author is sitting at her desk in Ottawa, surrounded by academic articles that deal with demolition – its history, value and effect on broader landscapes. Her friend has just exited Bathurst Station in Toronto and found herself in the presence of Honest Ed’s absence. “Tell me what you see”, the author prompts. “The sky”, she responds. “The condo across the street and a band of bright lights under the hoarding”. Like many other friends and colleagues, Veronica had been following the redevelopment of Honest Ed’s and Mirvish Village, sending updates via photos and informal reports.

“I thought they were going to keep the sign” she says, grappling with the loss of material. The author explains that just one of the five large signs was salvaged during the previous May with the promise of being reinstalled elsewhere in the city. This information does not seem to ease her friend’s immediate shock and grief. Perhaps this is because what was saved seems negligible after watching the remaining four signs un-ceremonially dissected or demolished and sent to the metal scrap yard. Or perhaps this scene, like the whole process, reveals something wholly unexpected. Together they attempt to navigate new understandings of the
site, now transformed – one at a distance and in the depths of theory and the other, on site and in a sea of feelings.

This paper continues with this act of grappling. Investigating the connection between architectural waste and conservation, this study of materials in motion illuminates not only how materials gain and lose value within networks of people, process and place, but draws attention to the social and environmental implications of these maneuvers. In adopting this holistic perspective, it considers the consequences of determining heritage value and related conservation approaches in association with their broader social and environmental legacies. The paper asserts that in opening new ways of understanding and evaluating heritage value, an attention to these choreographies constitutes a form of conservation that simultaneously acknowledges the difficult heritage of demolition and deconstruction while also commemorating the site’s ongoing transformation. Lingering in the territory between the structure’s presence and its absence, it probes the intersection of heritage conservation, environmental sustainability and discard studies by asking: on sites where demolition and deconstruction are a part of heritage conservation treatments, what exactly is being saved?

The case of Toronto’s Honest Ed’s and Mirvish Village is a particularly interesting case study to examine such questions because of its contested significance. Located centrally at the intersection of Bathurst and Bloor streets in downtown Toronto, the site is best known for Honest Ed’s – a large discount store adorned with oversized signs lit by thousands of light bulbs – and Mirvish Village, a series of historic residential structures adapted to commercial use in the 1960s (Plate 1). A landmark and institution, the store was notable for its immigrant-driven customer base, for whom it served as a first-stop for procuring essential housewares (Michael, 2015). Similarly, the adjacent Mirvish Village was celebrated as a unique creative enclave and public space (ERA, 2016). In 2013, following the death of the founders and Ed and Anne Mirvish and more than six decades of operation, the site was sold to Westbank Projects Corp. For the next three years, the site remained active as developers cycled through various iterations for its redevelopment. In 2016, approval of the final plan specified the partial deconstruction and restoration of 24 of the original 27 homes, the relocation of an entire structure in Mirvish Village, and the construction of new residential and commercial spaces. And while a selection of signage and other decorative features were salvaged, none of Honest Ed’s structure was to be saved (ERA, 2017). Exemplifying the tension between cultural and architectural values, the various conservation treatments applied to the site’s structures and materials reveal hierarchical value propositions embedded in conventional heritage practice.
Context
In the western tradition, the goals of heritage conservation have historically been focused on protecting architecturally significant structures for the benefit of future generations (Holtorf, p. 406). Within this thinking, cultural heritage is understood as an irreplaceable resource which must be protected against loss, damage and change. Heritage value is conserved through “minimal intervention” and the protection of character-defining elements, which The Standards and Guidelines for the Conservation of Historic Places in Canada define as “the materials, forms, locations, spatial configurations, uses and cultural associations or meanings […] which must be retained in order to preserve heritage value” (Parks Canada, p. 5). Although this approach provides a strategy for retaining specific heritage assets amidst complex conservation projects, it nonetheless leads to a hierarchy of value, where specific elements must be retained at all cost, and others are easily discarded. In her work on the heritage values of architectural waste, Susan Ross questions how this hierarchy contributes to a neglect of the broader values related to the total structure and all its materials (Ross, 2017a). Linking standards of conservation with principles of sustainability, this line of thinking recognizes all materials as non-renewable resources which for which parallel yet divergent notions of value apply. Challenging the notion that heritage practices are inherently sustainable because they recognize value in existing building stock, this inquiry critically examines the broader social and environmental legacies of waste generated in development projects on heritage sites.

While this has obvious implications for the heritage sector, the potential of the material not-retained has only recently begun to regain attention from the building industry (Thomsen et al., 2011). Connecting the demolition of buildings to the production of waste, deconstruction has been identified within the fields of structural design, construction management and industrial ecology as an alternate to demolition which mitigates waste (Thomsen et al., 2011). Within this thinking, deconstruction may be conceived as a form of conservation which preserves local architectural vernacular through the re-circulation of local building components and mitigates destructive resource extraction for virgin materials (Ergun, and Gorgolewski, 2015, p. 184). And while similar, it is important to note the distinction between the two terms: where demolition is the indiscriminate destruction of a structure often facilitated by machines, deconstruction connotes a more careful un-building, conducted through machine-assisted manual labour. Endlessly nuanced, throughout this paper, these terms will often be used in conjunction (as in demolition/deconstruction) because while being conceptually distinct, in practice these processes are often entangled. However, demolition and deconstruction are not simply environmental and technical issues. Associated with loss and destruction, the social and cultural implications of these processes can be tied to modern movements in architecture and urban design, as well as instances of environmental violence and cultural oppression (Schopf and Foster, 2014, p. 4; Bratishenko and Zardini, 2016; August, 2015). For some historians, the act of demolition is indicative of a broader “culture of clearance”, whereas in economic terms demolition is understood as an inevitable process for new development within a capitalist system, as in the concept of “creative destruction” (Ammon, 2016; Schumpeter, 1942; Harvey, 1989). Within the field of heritage conservation however, demolition is one of many instances where the threat of loss reveals the contested significance of a given site and defines heritage itself (Harrison, 2013a, b, p. 7). Despite this deeply engrained loss aversion, shifts in the discourse increasingly recognize heritage to be in a constant state of change and transformation (Jones, 2006; DeSilvey, 2006; Hamilakis, 2007). In line with this, in his essay “Averting Loss Aversion”, critic Cornelius Holtorf suggests that the physical destruction of a heritage structure may be viewed as one episode in the longer evolution of a site (Holtorf, 2015, p. 413). From this perspective, demolition and deconstruction may also be viewed as generative events, which produce new memories, materials and site values.
It is in this context that this paper explores the deconstruction/demolition of Honest Ed’s and Mirvish Village. In doing so, it suggests that an inquiry into these processes reveals a unique event which not only commemorated and transformed the site, but also generated volumes of material that added new dimensions to broader cultural and environmental landscapes.

Un-building
For some, the demolition of Honest Ed’s officially began in September 2017, when large wrecking machines began to chomp away at the building. For others, the site had already been undergoing a process of transformation for some time. It was taking place as the site was enclosed with hoarding and secured with underground shoring; and as the most precious (ornaments) and hazardous materials (asbestos) were removed from the site. Before this, it manifested through community-led good-bye rituals. In November 2016, an artist walked the perimeter of the site for 24 h in a ritual circumambulation. In February 2017, dozens of artists transformed the former discount store with installations and performances as a part of an event called an Honest Farewell. In May 2017, ritual performance blended with processes of unbuilding as dozens gathered to watch as the first of five large Honest Ed’s signs was carefully removed from the store’s façade with the promise of eventually being reinstalled elsewhere in the city (Plate 2). Over the summer of 2017, the empty building was anonymously plastered with posters which expressed a tragic sentiment. Of note were a pair of posters which read “WHY DIDN’T DRAKE SAVE HONEST ED’S?” and “IF YOU’RE READING THIS, IT’S TOO LATE” (Plate 3). Referencing Drake, the influential Toronto-born musician and ambassador of Toronto’s basketball team the Raptors, the posters intelligently interwove the hand-painted graphics of Honest Ed’s with Drake’s album art to not only connect these icons of city, but question who and what interventions could save the cultural landmark.

This question of how and what to save is particularly accentuated at Honest Ed’s because, despite its iconic cultural significance, the structure itself was considered a piece
of architectural trash. Indeed, Ed’s acquired this reputation quite honestly. Beginning in 1943 in a modest storefront at the corner of Markham and Bloor Streets, Ed and Anne Mirvish first opened The Sport Bar, which sold dresses bought in bulk on Spadina Street (ERA, 2015, p. 16). In the mid-1940s, The Sport Bar was doing well in part because of new incomes women were generating through war-time employment. This success enabled Anne and Ed to expand their shop through the purchase of their first stretch of buildings along Bloor Street. As their space expanded, so too did their inventory. They began purchasing stock from bankruptcy and post-fire-sales, thus establishing the store’s varied yet affordable wares (ERA, 2015, p. 18). In the years that followed, the Mirvishes experimented with other names for their business before settling on Honest Ed’s. Drawing crowds with large sales events, the store grew as adjacent properties were purchased and adjoined by knocking down walls. The resulting space was maze-like; iterative and evolving; an architecture of accumulation.

Beyond its kitschy aesthetics and punny slogans, the unique character of the building came to represent the values of both Ed and his enterprise. Early advertisements for the store championed the “dumpy building” as evidence of a commitment to delivering savings not only to his customers but to the broader community. One add read:

Our building is a dump! Our Service is Rotten! Our fixtures are Orange Crates! BUT!!! Our prices are the lowest in town! Save yourself and save a lot of money! (Mirvish, 1993, p. 52)

It is this frugality – which encapsulated both the building and its wares – that was central to Honest Ed’s reputation. In addition to sourcing items at rock-bottom prices, the legacy of Honest Ed’s is thus connected a sense that these savings subsequently contributed to larger community events and generous gestures. Perhaps one of the most notable examples of this is the annual Christmas turkey give-away. Beginning in 1987, each year on a designated Sunday in December, the Mirvish family gave away free turkeys to anyone who entered the store. The tradition, which continued for 28 consecutive years, represents a savvy advertising gimmick to some, but for others is a philanthropic gesture. Motivation aside,
these forms of investment reverberated and were reciprocated by the surrounding community. As evidence of this, following the closure of Honest Ed’s, a local real estate company stepped in to carry on the turkey give-away tradition (Lalani, 2016).

As a part of an embedded approach for this research on Honest Ed’s demolition/deconstruction, the author spent much of the fall and winter 2017/2018 on site with contractors, watching the building come apart. Throughout the process, it was common for passers-by to pause, watch and inevitably document the event on their camera-phones. Undoubtedly, some of these pictures contributed to the over 27,000 images with the label #honesteds posted to the social media platform Instagram. Like the de-installation of the sign, the creation of these photos blurred the line between ritual, commemoration, salvage and destruction. With this collective observation, the site transformed. Not only were new dynamics of the structures physical composition revealed, but space was created for consideration of the broader impacts of its demolition. Beyond what was being lost, observers were prompted to consider what was being generated.

**Following things**

By late December 2017, the conditions on site were harsh. Having made their way through most of the building, the cold weather and impending holiday placed pressure on the contractors to quickly dismantle the precarious second Honest Ed’s sign. Working from an outstretched boom, workers cut jagged pieces and tossed them into the rubble below (Plate 4). In the days that followed, images of these pieces, stealthily retrieved from the site surfaced on the internet. Later, Spacing magazine—a local publication dedicated to urbanism and architecture—would host a raffle to auction off a few of these coveted shards. Emblems of the entangled material and cultural values of Honest Ed’s, these shards resisted categorization as waste. Defying yet embracing their materiality, these recomposed fragments revealed new attachments, interpretations and locations, all the while remaining linked to both the legacy of the site, and its process of unbuilding.

Giving meaning to this choreography, Arjun Appadurai’s (1986) book offers insight into the reciprocal ways in which people find and attribute value to things, and the way things, in turn, give meaning to the social relations in which we live. Illuminating the link between

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**Plate 4.**

From an outstretched boom, workers cut the large Honest Ed’s sign into manageable pieces and tossed them into the rubble below, 21 December 2017
production and consumption, technology and labour, knowledge and power, Appadurai (1986) suggests:

[...] we have to follow things themselves, for their meanings are inscribed in their forms, their uses, their trajectories. It is only through the analysis of these trajectories that we can interpret the human transactions and calculations that enliven things. (p. 5)

Following things is a methodology used by cultural geographers and environmental historians to illustrate the social and ecological impact of production and destruction processes. Gregson et al.’s (2009) study of end-of-life ships broken down on Bangladeshi beaches is an example of the ways this approach simultaneously reveals complex landscapes of contamination, and labour injustice, as well as “chock chocky” furniture and an emerging middle class. By following things, Gregson et al. trace the trajectory of components from end-of-life ships as they move from wrecking yards, to workshops, to market, to newlyweds’ apartments, and later, as they are repositioned within the homes of growing families. Challenging the notion that waste is devoid of worth, Gregson et al. explain how both material and associative values flow through the global shipping trade, the ships, the workers, the tools, the workshop, the carpenters, the street, the market, the emerging middle class, the individual consumers, their histories and their homes. In doing so, the authors highlight both the positive and negative social and environmental effects of controversial ship breaking practices and suggest that the act of following things never fully arrives at a single destination.

Still grappling yet inspired by this approach, prompted further questions: Where is Honest Ed’s now? What landscapes have been affected by its demolition and deconstruction? How are the various components, remnants and residues shaping and shaped by their new surroundings? Ambitiously pursuing these queries, a map was assembled using an online software (Figure 1). Drawing on data provided by site managers and labourers as well as first and second-hand observations, this exercise in “following things” began to reveal a dynamic portrait of the demolition/deconstruction site’s legacy.

Through the construction management team, the quantities and destinations of some materials defined by the three-primary waste categories: metal (steel), “mixed waste” and hazardous (asbestos) were identified. Of this material, approximately 41.20 Mega Tons (MT) of asbestos was transported 262 km to a designated landfill in Blenheim, Ontario. However, following the steel and “mixed waste” proved more difficult. While these materials were tracked 11 and 22 km from the site to dedicated transfer stations, attempts to contact these facilities went unanswered and destinations beyond these locations were not identified. Finally, while materials identified as metal, mixed or hazardous waste were accounted for, the trajectories of more “valuable” items such as copper pipes were not as rigorously documented. Indicative a broader deficit of data relating to quantities and distribution of construction and demolition (C&D) waste, these limitations are also illustrative of the degree to which responsibility is linked to ownership. In Toronto, where these materials are minimally regulated and waste is managed by individual contractors, the challenges of following these materials also alludes to the extent to which the destinations of demolition waste is of little concern to project developers and designers (Saotomoe, 2007, p. 29).

Whereas thinking of materials in their new locations opens a dialogue about the ways in which they continue to perform elsewhere, an inability to do so subsequently evades a discussion of the qualitative effect of these materials have in their new settings.

Remnants and residues
In March 2018, with the structure entirely demolished, the site remained a-buzz with activity. Less than 10 km away, Deadstok Reclaimed’s woodshop was similarly humming as they processed Douglas Fir and Long Leaf Pine beams harvested from commercial
structures on the Honest Ed’s/Mirvish Village site. Promoting their acquisition of lumber from the site on social media, Deadstok Reclaimed endorsed the value of these materials by emphasizing a connection to Honest Ed’s and Mirvish Village as well as the historic forests from which they were derived. Visiting both locations, the site manager and owner of Deadstok each offered accounts of the salvage process. Representative of the challenges and opportunities for building deconstruction and material reuse, the site manager recognized the inherent value of the old-growth timbers and his crew adjusted their methods to facilitate their reclamation despite the fact that the extra time spent extracting these materials added cost to the overall project. For Deadstok Reclaimed, though the beams themselves were free, the salvage process involved added expenses including truck rental and labour costs. Indicative of the value of this exchange, a short segment on CityNews later celebrated this “unique partnership” for recognizing and facilitating the continued legacy of the site (Brown, 2018) (Figure 2).

Attention to not only the locations but the types of materials that move indicates a tension between the embodied values of the adapted residential structures of Mirvish Village, and the composite architecture of Honest Ed’s. This contrast was re-enforced during a last site visit where contractors from Heritage Restoration Inc. (HRI) were busy dismantling and palletizing an exterior brick wall. Representative of the vernacular architecture of Toronto, the careful deconstruction of these bricks had been specified in conservation plans as a method of retaining cultural and physical integrity in the future restoration work which would take place on site. Valuable for its consistent colour and porosity, the high monetary worth of these bricks is emphasized in other restoration jobs where salvaged bricks are not available and compatible new bricks must be imported from the UK at great cost (Creba, 2017, p. 10).
Collecting this data for the map, it was noted that bricks were sorted and stored temporarily on site. From there, the bricks would be transported just over 8 km to the HRI lot where they would be cleaned and eventually returned to the site for use in façade restoration. As with the bricks, the timbers were carefully extracted from the structure and assembled in a distinct pile on site. They would travel roughly 3.5 km to a woodshop where they were re-shaped and subsequently shipped to various locations throughout Ontario. Taking the form of a mantel piece near Three-Mile Lake in Muskoka, an ornamental post in Leslieville and interestingly, as public seating in the site’s future landscape plan, one critique of these transformations identifies the lost structural value of the beams in their new uses. This insight alludes to missing infrastructure and frameworks in the Canadian context required to apply contemporary grading standards to heritage building components (Gorgolewski, 2018, p. 44).

In the case of both the salvaged timber and brick, careful disassembly and extraction also resulted in the creation of information that could accompany the material throughout its journey. Whereas notations on bricks indicate the manufacturing company, the grain direction and milling properties of timber can indicate its age and structural capacities. In Resource Salvation, the architectural scientist Mark Gorgolewski (2018) notes the use of material passports – which communicates a components’ technical or historical data – as a method of encouraging reuse by certifying the enduring structural capacities of salvaged components (p. 55-56). Integrating this concept with the data already being developed through city-wide heritage inventories and municipal demolition permits, previous research has suggested that material tracking may also promote greater awareness of the connection between heritage places, processes and materials (Creba, 2017, p. 25).

On a final site visit, the author observed a series of trucks arriving with loads of shale rock which was dumped, distributed and compacted with rollers in order to prepare the site for another round of heavy coring machines. While there, a crew member suggested that the nearly 100 trucks daily were transporting the shale from a newly excavated site elsewhere in the city. Connecting demolition sites, the flow of this material both literally and figuratively added a new layer to the site. Illuminating a network of urban development, this flow of fill reinforced the demolition/deconstruction site as a site in constant transformation – both receiving and contributing material from a series of related geographies. In contrast, data
gathered from colleagues and related networks via social media revealed the proliferation of cultural ephemera from Honest Ed’s/Mirvish Village. Recording locations on the map, respondents also offered lists of items acquired from the site before its closure. Most popular among them were the store’s famous hand-painted signs. When plotted, many of these items were seen to have proliferated within the city while a few adventurous plaques made their way great distances to Algoma District in northern Ontario and Launceston, Tasmania.

Finally, as one of the site’s most symbolic features, efforts to locate pieces of the iconic Honest Ed’s signs also revealed interesting dynamics. While the sign carefully disassembled in May 2017 had made its way to a storage facility in Oakville Ontario, the proliferation of the fragments generated in December 2017 remained in question. Although it was possible to identify several people in possession of these shards, these individuals were intentionally vague about exact storage positions. Perhaps because they were illicitly collected, this reluctance to disclose their locations also alludes to their contested value. In both cases, efforts to salvage Honest Ed’s signage can be considered a conciliatory act to moderate broader feelings of change and loss. Severed from the building, the sign became spolia, a term frequently used by architectural and art historians that refers to the often-symbolic reuse of architectural features (Meier, 2011; Frangipane, 2015). As an ancient practice, the tradition of integrating salvaged components in architecture is linked to a recognition of the structural and symbolic capacities of building materials (Frangipane, 2015). In contemporary architecture, Hans-Rudolf Meier connects these practices with efforts to maintain continuity through the change inherent in urban metabolism. Writing from a European perspective where “the attempt to establish an objective connection to the site and its history by means of spolia has become nearly ubiquitous” Meier also warns that, “In some cases, the presence of spolia may be seen as an attempt to temper the rupture created by the new building itself” (Meier, 2011, p. 227). Understanding demolition and deconstruction to be potentially traumatic acts, the process of locating the sharp shards from the iconic Honest Ed’s sign subsequently uncovered a desire to safeguard not only physical pieces of the site’s legacy, but to ease the emotionally challenging effects of its erasure.

Legacies
Although the structure no longer stands at the corner of Bathurst and Bloor Streets, this story of Honest Ed’s is not about what was lost. Instead, this account reveals how processes of demolition and deconstruction also generate new meanings, memories and materials while deepening our understanding of notions of ownership, responsibility and stewardship. Considered both trash and treasure, Honest Ed’s architecture of accumulation represented cultural and material values associated with thrift and community. In its unbuilding, the site revealed broader associations to the city. Resisting categorization as waste, materials generated through demolition and deconstruction asserted their value through sanctioned and illicit salvage activities, and by travelling to various destinations. Physically reconfigured by hand and machine, the site was also transformed through good-bye rituals and collective observation. Drawing attention to site, this paper considers the often overlooked period between a structure’s presence and its absence to suggest that consideration of these processes adds new dimension to sustainable heritage conservation practices.

Opening new ways of understanding and evaluating heritage value, this exploration of the choreography of demolition and deconstruction reveals a network of actors and geographies implicated in the site’s evolving significance. In contrast with conventional heritage practices in Canada which ascribe value to specific character-defining elements and often ignores remaining building elements, this paper uses a follow-the-thing methodology to observe how value is gained and lost through varied processes and locations. Tracing the trajectories of materials proliferating from the site, this exercise
identifies the challenges and limitations in identifying the pathways of precious, harmful and quotidian items. Drawing attention beyond the site, this exercise prompts consideration of the broader social and environmental impacts of demolition and deconstruction practices (Plates 1–4).

As an alternative to demolition, deconstruction has been presented as a form of conservation which retains regional architectural vernacular by promoting the reuse of local materials and mitigates environmental degradation. In the case of Honest Ed’s and Mirvish Village, deconstruction is both a social and structural process which conserves entangled cultural and physical values through intentional and inadvertent acts of salvation. Aligning with the contemporary heritage discourse which recognizes heritage as a process, this paper presents the demolition/deconstruction of Honest Ed’s and Mirvish Village as a significant event in and of itself which situated and commemorated the site’s ongoing transformation while tempering the trauma of loss.

Finally, in returning to the question posed at the outset, this paper dissolves the save/discard binary which underpins conventional understandings of heritage value by demonstrating how materials and values continue to act both on site and beyond. It suggests that on sites where demolition and deconstruction are a part of conservation treatments, an engagement with – not a resistance to – these processes have the potential to improve connectivity, accountability and appreciation of such formative periods of transformation.

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About the author
Alison Creba, having worked in both the trades and the arts, recently completed her Masters in Heritage Conservation from Carleton University’s School of Indigenous and Canadian Studies where her research focused on themes of building deconstruction and material reuse as well as vital materiality. After a six-month internship with the Brussels-based Architecture collective, Rotor, Alison is now based in Toronto where she pursues interdisciplinary work exploring the legacies of urban sites. Alison Creba can be contacted at: alisoncreba@gmail.com

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Creating with traces of life: waste, reuse and design

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Abstract

Purpose – The purpose of this paper is to adopt posthumanist perspectives on waste as traces of life to investigate how the alternative heritage work of redesigners transforms discarded building materials into reuse interior designs. It combines recent research on waste, shifting focus from representational and symbolic aspects to its material and indexical relations to human life, with critical perspectives emphasising heritage as encompassing different and ambiguous ways of engaging with material transformation over time.

Design/methodology/approach – Anthropological fieldwork involving participant observation was conducted over six months to closely examine the entanglement between redesigners and reuse materials in interior design work.

Findings – The sensory ethnographic approach reveals how materials are approached as unfolding processes rather than closed objects. Tracing how redesigners capitalise on the ambiguity of traces of life in building materials, the paper shows how uncertainty and risk are inevitable companions when working with reuse. To rehabilitate used things, and reassociate with materials classified as waste or heritage, means following their trajectories of becoming and responding to their signs of life. While involving important benefits, this often leads to the inconvenient and risky mess characteristic of an interconnected and entangled multispecies world.

Originality/value – Ethnographic analyses of reuse design are few. In particular, there is a lack of studies informed by posthumanist theories recognising the social and ecological embeddedness and mutual entanglement of humans and materials. By studying practices for extending the lifespan of salvaged materials external to formal heritage management this paper contributes with perspectives to revitalise heritage practices, while highlighting the neglect of socio-historic values of materials within circular economy.

Keywords Waste, Heritage, Interior design, Reuse, Building materials, Posthuman anthropology

Paper type Research paper

Neither the critters nor the people could have existed or could endure without each other in ongoing, curious practices. Attached to ongoing pasts, they bring each other forward in thick presents and still possible futures; they stay with the trouble in speculative fabulation. (Donna Haraway, 2016, p. 133)

Introduction

What has Donna Haraway’s by now famous call to “stay with the trouble” to do with heritage and waste? The quote was written as part of a political and ethical appeal for recuperation of the manifold expression of life on a damaged planet. Neither heritage nor waste is an explicit concern in Haraway’s text, but “the trouble” she is referring to could well be defined as precisely that which in modern consumer society has been concealed and externalised from everyday socio-material life through distinctions between “valuable heritage” and “worthless waste”. What Haraway (2016) urges us to do is to stay with the inconvenient and risky mess that the connectedness and entanglements of multispecies worlds entail, or, in other words, to live our lives in close proximity to heritage and waste and to “make kin” with all forms of life beyond ancestral and genealogical ties (pp. 102-103). While Haraway discusses “critters” – for example, the camels and pigeons that inhabit her more than human social worlds – this manifold gathering of earthly beings are of course embedded in wider entangled lifeworlds that manufacturing industries extract resources from and, at the other end, waste management systems inject with organic and inorganic waste. Haraway (2016) asks us to practice response-ability through kin-making with other beings (p. 130), which can be extended to encompass matter, materials and things, if we follow Jane Bennett (2010), who argues that “all bodies are kin” (p. 13).
This paper will explore how reuse interior designers (redesigners) stay with the trouble and draw on heritage values and practices in their work of transforming used and discarded building materials and furniture into reuse interior designs. Making up one-third of all waste, construction and demolition (C&D) waste qualifies as the number one waste stream in the European Union in terms of volume (European Commission, 2016, p. 1). The EU policy document stresses the importance of proper management of C&D waste and proposes recycling and reuse of materials as key for sustainability and quality of life. It also foregrounds how C&D recycle materials are associated with “a lack of confidence in quality” and “potential health risks for workers” (European Commission, 2016). This paper provides a theoretically based analysis of an empirical case that demonstrates the pros and cons of working with reuse building materials. The main argument is that by being attuned to the vitality of matter (Bennett, 2010), the redesigners close the gap between waste and heritage through their “growing” techniques (Appelgren and Bohlin, 2015; Appelgren, 2019) valuing and following the material processes of becoming (Ingold, 2012) and decaying (DeSilvey, 2017) and reassociating with waste as a sign of life (Reno, 2014). Yet, as will be shown, this approach is also one that entails risks and uncertainty.

While waste management sites and heritage institutions at first sight may seem to be very different kinds of organisations, they both have evolved to collect, sort, handle and store vast flows of material culture generated by life in contemporary society. In fact, they are the main institutions for dealing with the afterlife of all our material culture. Recently, they have both faced mounting problems related to the sheer amount of stuff they need to handle (Harrison, 2013; Reno, 2016; Morgan and Macdonald, 2018). Coinciding with warnings of humanly induced irrevocable climate change and exhaustive environmental degradation, such challenges have resulted in differing types of responses, ranging from resignation (Carlson, 2018) to pulling the emergency break (Lou, 2019). In Sweden, one of the most widespread responses among civil society, government and industry has been to embrace the idea of a transition into a (more) circular economy. The Swedish Government, for example, has turned to circular economy in its sustainable consumption strategy (Ministry of Finance, 2016) hoping this will contribute to a more efficient use of finite resources. The idea, simply put, is to turn waste into resources in new production cycles and thereby reduce both resource extraction and waste accumulation (McDonough and Braungart, 2002; Webster, 2017).

However, as has been noted, critical assessments of actual instances of a circular economy in practice are rare (Gregson et al., 2015) and most of the effort, and commercial interest, to circulate materials is directed towards recycling (Alexander and Reno, 2012). Less attention has been directed towards reuse, and prolonging the life of things and materials within their existing socio-material entanglements. Where recycling tends to be disruptive and reductive, focussing on the energy and material value of circulating materials (MacBride, 2012), practices of reuse, repair and redesign also salvage and reclaim the social, historical and cultural values embodied in used and discarded things and materials. Capturing and cultivating, or growing, these qualities tends to imply longer, more local and more small-scale processes (Appelgren, 2019; Norris, 2019), hence drawing less attention than large-scale schemes that promise extensive transition into resource circularity. Nevertheless, in Sweden the field of reuse design, or redesign, (Swedish, återbruksdesign) has recently become popular not least in the public sector where institutions increasingly are establishing procurement agreements for purchasing reuse as part of their sustainability policies (Appelgren et al., 2018). These reuse activities are interesting to explore from the perspective of critical heritage studies as there are striking resemblances in terms of approaches to collect, value and care for aging things, their historical biographies and contextual traits in order to perpetuate these into the future.

The anthropological study that the present paper is based on comes out of extended ethnographic fieldwork conducted with redesigners and the emerging field of reuse interior
design, and took place in Gothenburg, Sweden, from 2016 to 2018. Following this field for two years, talking to and working with redesigners, conventional interior designers, architects, furniture makers, corporate and public sustainability and procurement officers, sustainability eco-label representatives, second-hand furniture retailers and others, approximately six months was spent at a redesign studio. This entailed participating in the everyday work of salvaging, redesigning and installing used building materials and other discarded objects as part of interior designs projects in private and public spaces. Working closely with people and things on an everyday basis in this space, the guiding principle was what the anthropologist Sarah Pink (2015) calls sensory ethnography where participating with all senses is an important approach to study and understand the unfolding of socio-material entanglements. Inspired by the work on new materialism by Jane Bennett (2010) and Tim Ingold (2012, 2014) fieldwork was designed to closely follow the collaborative and responsive nature of redesign work. Although this influence was initially of theoretical nature, below it will be discussed how it also corresponded with and how the redesigners themselves practiced and thought about their work as a process of working with and along materials and things. Previous work has outlined the collaborative nature of redesign involving both humans and materials and how this is embedded in an evolving socio-material environment (Appelgren, 2019). This paper will concentrate on the uncertainty and ambivalence of the traces of life that used materials bring with them.

**Signs of life in the mountain of waste?**
The studio where fieldwork took place was located in an area of the city that was somewhat run down and set for urban renewal, which meant affordable rent and salvageable used materials. Two interior designers had set up the company a few years earlier and profiled it as a social enterprise that aimed to “rehabilitate both the materials and people”. At the time of fieldwork in the studio there were about eight “participants” enrolled in government-funded labour market training programmes for the long-term unemployed, working with the redesigners in a space of 200 square metres packed to the ceiling with salvaged used materials. With mounting general interest in reuse interior design, the studio had recently attracted work commissioned by companies, schools and the municipality, and during the fieldwork period the studio was generally busy juggling work for multiple projects at the same time.

Most of the time we worked in the studio itself, making specific parts of ongoing design projects under the supervision of the redesigners themselves. This could entail any kind of practical work, like gluing wallpaper on a chest of drawers, screwing pieces of wood to a bicycle wheel to make a lamp, rolling magazine pages to decorate a mirror frame, drilling holes in porcelain cups, etc. Often the work process would take one through several stages up to the point when the object would be ready for instalment. Typically, the redesigners had worked out a design concept based on requests from the client, the location, the designers’ design vision and available materials. Assignments would be distributed among the participants along with instructions on what to do and what to use. Working with existing materials, such as used building materials, furniture or just stuff that had been found, received or purchased (this was often true for tools and work stations too), was a core principle for the redesigners. Elsewhere, I have suggested that reuse interior design can be understood as a “design of the concrete” (Appelgren, 2019). Inspired by Claude Lévi-Strauss’ (1966) work on “the science of the concrete”, the concept foregrounds how redesigners remain within an evolving social and material environment, using things and materials at hand to develop their designs, in contrast to the conventional “design of the abstract” which starts from scratch with an empty space and the imagination is the only restriction in the furnishing process. The latter works from ideas to materials, while the former works from materials to ideas.
After having been assigned a task, and collected building materials and tools, an unpredictable process would often ensue. One would learn about the properties, qualities and affordances of the materials one was working with as they responded to the treatments applied. Inevitably, adjustments and corrections had to be made depending on how the process evolved. Care had to be taken to be attuned to the properties of the materials and their responses, to follow their trajectories and to work with them, not only as materials for creating designs, but also as design collaborators affecting the outcome. This process can fruitfully be understood in terms of growing (Ingold and Hallam, 2014). More than merely assembling parts to make a finished product according to a preconceived plan, the organic metaphor of growing sheds light on the process of gradual transformation. In this process care is taken to cultivate the existing properties, nurture certain traits, both physical and cultural and the co-responsive exchanges between humans and materials (Appelgren and Bohlin, 2015; Appelgren, 2019).

Responsiveness to the traits of materials involved becoming sensuously and perceptually receptive to the vitality of transforming, aging and sometimes decaying materials, and the layers of marks and remnants that they embodied depending on the socio-material contexts they had been entangled in. In the field, this turned out to be complex and ambiguous matters. Arriving to the studio one chilly morning the second week of fieldwork, the redesigners were preparing to pick up oak flooring from a private house that was being renovated. This presented a fruitful opportunity to talk about and participate in salvaging materials. The huge piles of oak flooring that we were shown in the garage and in a dumpster on the driveway turned out to be of the highest quality. Produced locally, solid oak planks of 22 mm thickness, they would cost a fortune today and were surely a luxury when they were laid in the hallway and the living room in the early 1950s. Native to Sweden, but maturing slowly and representing only a fraction of the total national forest stand, oak has always been valued far higher than the common pine and spruce wood for furniture and flooring. Nearly 70 years later, the traits and marks of aging were noticeable. The planks had aged beautifully and variously depending on where they had been laid, some more worn than others, some more sun-bleached than others. There were also marks like scratches from furniture, holes from nails and occasionally a label of the floor producer attached to the underside (Plate 1). Unsurprisingly, the oak planks were hard with a lacquered upper side and a smooth surface on the underside, and smelled of aging oak and old dust. Then, we soon realised, there was the smell and spots of dog’s urine. The owner’s dog had recently become old, she told us, and occasionally urinated indoors. Of all the properties and qualities of the wood planks, stains and smell of urine quickly became the main guiding criteria when sorting through the piles and selecting which ones we should bring back to the studio.

The sensuous nature of material vitality and the presence of life in discarded aging materials that we experienced in the encounter with urine-stained oak wood were given new significance when reading Joshua Reno’s (2014) proposed “new theory of waste”, where he argues that it is time to revise the classic understanding of human discards as “matter out of place”. The British Anthropologist Mary Douglas famously analysed dirt and pollution as consequences of socially established orders of classification. Simply put, for Douglas (1966) dirt and pollution are not inherent qualities but arbitrarily emerging in things and phenomena that transgress boundaries between cultural categories. It is debatable if all waste can be said to be dirt in Douglas’ sense, not least as it often appears in the right place, maintaining the system rather than disrupting it (Liboiron, 2019). However, in Douglas’ symbolic and representational form of waste becomes a distinctively human issue. Breaking away from this perspective, Reno (2014) draws on Posthumanist approaches to study across species, and compares waste with animal scat, defining it as “a sign or remnant of a form of life” (p. 8). In what way, he asks, do all species produce waste, and what is the significance of these material left-overs? If humans, and other
species, necessarily leave trails of marks and fragments behind them in their social activities, we can ask how these matters play an active role in social life. These trails are not merely symbolic. Inspired by Jane Bennett’s (2010) work on vital materialism and the idea that things are vital and produce effect (pp. 4-6), Reno (2014) argues that approaching waste as scat foregrounds its materiality and the indexical and iconic connection between waste and the being that left it behind (p. 10) as well as how waste communicates with other by-passing beings “semiotically equipped to register its appearance, feel, odour and taste” (p. 13).

Returning to the case of the oak flooring, we unloaded the precious planks into a big pile outside the studio. The next assignment was to sort through the pile again, this time to separate planks with nails from those without. There were stains of urine on some of the planks, but since they did not smell we had decided to bring them. After having assembled a neat pile of nail free planks in the studio, hours were spent pulling out nails from the rest in the front yard. Sorting, selecting, arranging and preparing materials were labour intensive, but the redesigners maintained that it was worth the work given the value of the materials and the importance of reuse. It also allowed for close and extensive contact with the materials through shifting phases, which was an opportunity to learn about their properties and reactions through different sensuous registers. The afternoon passed in the company of oak, iron nails and a set of tools, touching the hard, cold surface of the wood, seeing the dark brown vibrant hue, hearing the creaking sound when pulling stubborn nails and smelling the mixture of oak, dust, rust and moisture (Plate 2). The next day a slight but unmistaken odour of urine infused the studio. After some bewilderment we realised that the cosy indoor temperature released signs of life that eluded us in the chilly outdoors. These dormant traces of other beings embodied in the wood only got a more distinct responsive presence as we worked with the oak planks. Sanding, cutting and drilling caused friction and raised temperature which accelerated the bursts of urine odour throughout the studio (Plate 3). Amidst a flow of jokes we quickly decided that the pile of valuable oak planks needed yet a...
stricter sorting. The dog’s urine was part of a multispecies entanglement and a sign of life that was also considered to be a matter out of place in the studio. Resolutely, some of the salvaged oak planks became categorised as waste a second time, discarded into a dumpster and taken away to be burned.

Rehabilitation

How, then, can this story from the studio floor help us think about broader issues of waste, kin-making and response-ability? Let us start at the end. Dealing with the “trouble” of the urine-stained oak planks by letting it disappear from view can be seen as representative of a broader societal tendency. If all beings leave waste behind, the meticulous effort to disassociate from it and make it disappear seems to be a distinct (modern) human practice (Corvellec, 2019). Landfills and incineration plants tucked away in secluded locations ensure that waste is made to disappear and kept out of sight. Being concerned with mass waste, Reno (2014) points out that in contemporary society discarded things cease to be “signs of life” through the complex apparatus of waste governance (p. 19). Indexical ties are severed and connections to particular beings are disrupted through technologies of sanitary engineering. By being isolated from everyday social life, waste loses its capacity to communicate and to signify particular bodies and beings. However, waste management does not erase waste, it merely reorganises it in order to make it “controllable and legible to engineers, states and corporations” (Reno, 2014, p. 19). Importantly, turned into disassociated mass waste, human discards also tend to metamorphose into hazardous and toxic residuals that need even stricter control and containment in order to not leak and pose a serious threat to humans, animals and plants, which includes far more serious airborne substances than the stench of urine such as toxins, carcinogens and allergens (Hird, 2012, pp. 456-458).

The Sociologist Myra Hird (2012) and others have drawn attention to the failings of the strategy to contain waste: society’s attempts to make it disappear (Corvellec, 2019, p. 218), sometimes even to the point of being silent about it (Spelman, 2011, p. 313). Waste not only leaks
back into society and the environment. It now also speaks back in the debates on environmental degradation and climate change, asking humanity to deal with it differently. As noted, circular economy and similar economic schools have become prominent voices in these dialogues, suggesting that waste should be turned into resources (see Gregson et al., 2015; Blomsma and Brennan, 2017; Valenzuela and Böhm, 2017 for discussions). However, reconceptualizing waste as resources risks reproducing the very binaries and structures from which the destructive forces of waste once originated. First, conflating waste with resources only reproduces the extractive and instrumental human relationship to the material world. Second, resource efficiency, rather than socio-material entanglement, continues to be the governing principle in how we relate to the environment. Third, dominating large-scale business models privilege recycle schemes that reduce and downcycle discarded things to extract energy or material values, ignoring other important layers of significance. Finally, underpinning this is the continued disassociation and disruption of human beings from their waste. In an economy of material circulation, a primary function is to encourage people to sort and recycle their material possessions. Citizens are thus disciplined through a process of governmentality (Lougheed et al., 2016) into becoming subjects-in-motion relating fleetingly to objects-in-motion that are conveniently passed on when undesired (Appelgren and Bohlin, 2015; Bohlin, 2019).
This mode of fleeting connections to other beings and things contradicts Haraway’s position of staying and making kin, and it further “conceals the vitality of matter” (Bennett, 2010, p. 5). Looking back at the beginning of the story of the oak planks, we see that “the trouble” was handled differently. Rather than disassociation and containment, it signified a moment of association and engagement that extended ambiguously over several phases. By reconnecting waste to the form of life that once expended it as a “sign of life” (Reno, 2014, p. 8) the affective and communicative dimensions of discarded materials were reintroduced into human social life. Instead of controlled and disassociated waste (the current situation) or disconnected and circulating resources (what circular economy models strive for), discarded things became vital materials active in the socio-material life along with humans, animals and plants. This revitalised entanglement connecting a multitude of beings expanded beyond the present back to non-human organisms such as the dog and the oak trees of southern Sweden that were turned into wood commodities at the sawmill near the city of Falkenberg in the 1950s (according to the label attached to the planks). Importantly, it also extends forward in time to include other arboreal and non-arboreal life forms that may, thanks to reuse, escape damage and risks, for example, of harvesting or environmental pollution. When the redesigners talked about “rehabilitating” not only people, but also things and materials, they acknowledged that contemporary society left things used up, worn out and exhausted, often prematurely and with little thought of further usefulness. Rehabilitating these things involved being perceptually open to the vibrancy of materials (Bennett, 2010) and to follow their trajectory of becoming (Ingold, 2012), in other words, following the New Oxford American Dictionary’s (2015) definition of “rehabilitation”, restoring them “to health or normal function by training and therapy”.

Conclusion
What the story have not yet told is that the rehabilitated aging oak planks became beautiful building material for redesigned tables, desktops, lamps, shelves and more over the next couple of months. Often, they had characteristic signs of life such as patina, marks, scratches and occasional stains that were handled and grown with care in the making process (Plate 4). However, the central point of this paper is that the outcome of staying with the trouble is uncertain, and cannot be known until after the fact.

Plate 4.
Caring for marks and scratches

Source: Photo by author
Staying with things, reassociating with and living closely to materials currently classified as either waste or heritage, following their trajectories of becoming and responding to their signs of life will often lead to the inconvenient and risky mess that is characteristic of an interconnected and entangled multispecies world. Waste, as more than symbols and as more than resources, resonates with and affects human and animal bodies, in its accumulated vital materiality and process of becoming. This “thing-power” (Bennett, 2010) produces effects and it shapes designs. When working closely and collaboratively in forming designs out of reclaimed materials the process is ambivalent and unpredictable. Some signs of life and presences of former entangled beings are valued and cherished (what we tend to classify as heritage) while others are unwanted and troublesome, evoking reactions and responses of avoidance (what we often think of as waste). Yet, attempts to disassociate and disengage in the high and low of used and aging material culture run the risk of being even more inconvenient and unpleasant. Returning to the quote by Haraway that opens this paper, there are possible futures to speculate in by connecting and responding to other beings and things in their rich and manifold processes of becoming, but trouble will be an inevitable companion.

**Acknowledgement**

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Heritage waste management
A possible paradigm shift in the post-earthquake reconstruction in central Italy

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Abstract
Purpose – The considerable volume of rubble generated by the 2016–2017 earthquakes in central Italy reveals a significant issue in the post-disaster reconstruction phase. Drawing from the experience of Macerata province and the city of Camerino, the purpose of this paper is to explore a possible change of attitude in the reuse of heritage waste materials in the reconstruction process of damaged historical villages and towns in Italy.

Design/methodology/approach – This research outlines a comparison between national and regional directives on the rubble management on the one hand, and the praxis on the other, carrying out semi-structured interviews with experts who have been involved in the reconstruction process of Macerata province and Camerino, in Marche region.

Findings – The research reveals that the current vision in Italy for the management of disaster waste is still very close to the traditional paradigm that gives heritage waste an intrinsic value, worthy of great efforts for its collection, catalogue and preservation in view of the likely philological restoration of the damaged heritage. The most recent experiences in Camerino show that institutions responsible for the conservation of cultural heritage may accept a possible paradigm shift towards a more innovative and less expert-driven approach to heritage waste materials and their possible upcycling.

Originality/value – Within a critique of the traditional restoration paradigm, this article links disaster waste management to the Sendai Framework for Disaster Risk Reduction, to enhance the long-term sustainability of historical villages and towns in Italy.

Keywords Upcycling, Sendai framework, Post-disaster reconstruction, Heritage waste, Rubble management

Paper type Research paper

1. Introduction
A disaster is a situation or event that overwhelms local capacity, requiring external assistance at national or international level (Jha, 2010). Depending on their nature and severity, natural disasters can generate large volumes of waste materials that have an enormous impact on the quality of the urban environment and pose health risks to the local community (Amato et al., 2019). Due to their particular geomorphology, over the last fifty years, many Italian regions suffered severe earthquakes, including notably – Sicily (1968), Friuli-Venezia Giulia (1976), Campania (1980), Umbria and Marche (1997), Molise (2002), Abruzzo (2009), Emilia (2012), Umbria, Lazio and Marche (2016 and 2017). Despite the periodical recurrence of such events, authorities have not yet developed a specific standard national protocol to manage “heritage waste” (rubble from damaged or destroyed heritage buildings) in a post-disaster scenario (A. Conforti, Interview, 5 June 2019). The National Civil

The authors wish to express their special thanks to the Superintendence for Cultural Heritage and the Civil Protection of Marche Region for their precious collaboration.
Protection Department is in charge of Disaster Waste Management (DWM) and struggles to cope with large volumes of rubble and heritage waste. For instance, in the case of L’Aquila, the collection of rubble has still to be concluded, more than six years after the event; in Emilia-Romagna, a more effective DWM policy was in place, but few indications are available on the potential use of recycled aggregates (Faleschini et al., 2017). In Italy, the restoration of historic buildings is of great importance and the established philological attitude gives heritage materials an intrinsic value, worthy of great efforts for their collection, catalogue and conservation (Carbonara, 2012). This paper explains a possible change in this attitude, by exploring innovative approaches in rubble management with the aim of enhancing the long-term sustainability of historical villages and towns. For this purpose, the discussion of the meaningful example of “Santa Maria in Via[1]” church in Macerata province explains the opportunities or missed chances under the current laws for DWM in Marche region. Notwithstanding the decision to apply an internal and external scaffolding structure “soon” after the earthquake (it took more than one year to finish it), in order to preserve the church from further collapse, this has been so damaged in its integrity that decision-makers have still to decide whether to demolish it or not. As the future of the church is still uncertain, its demolition could eventually become a viable option despite the accurate and costly scaffolding works (more than €5m), which along with the collection and storage of the rubble as “heritage waste”, would instead suggest a future philological restoration.

2. Theoretical framework
One potential consequence of a disaster is the destruction of buildings and infrastructures, which generates an enormous amount of rubble. Managing this type of waste is complicated since disaster waste is mixed and difficult to separate (Karunasena et al., 2009). In this study, the term “rubble” refers both to a mixture of building materials generated from the construction, renovation and demolition activities (Chen and Lu, 2017; Ibrahim, 2016; Jin et al., 2017; Park and Tucker, 2017), and to the building materials that may suddenly be created by natural disasters (Faleschini et al., 2017). Inappropriate rubble management not only increases the risk of environmental damage, economic losses and psychological impacts on the population (Amato et al., 2019), but also can influence the emergency and recovery operations in the affected areas (Zawawi et al., 2018). Post-disaster reconstruction in historical towns has often to address a considerable quantity of materials and components from heritage properties, more or less explicitly managed through a conservationist approach (Shirvani Dastgerdi and De Luca, 2018a, b). At the same time, “value-based conservation” calls into question the conceptual relationship between heritage and waste, often defined as the contrary of what has value (Ross, 2019). Indeed, both DWM and conservation practices should contribute to the sustainability goals by reducing the adverse impacts on the environment (ICOMOS, 2014, Section 4.3 a). Araoz (2011) proposed several innovative ideas and potential research topics to match cultural heritage management with sustainable development. He suggests a new paradigm for heritage sites, whose values no longer rest entirely on material culture, but also on intangible concepts for which traditional conservation practice often is neither effective nor applicable. In contrast, since the 1990s, the Italian debate concerning the maintenance and recovery of cultural heritage has continued to fostered cultural attitudes more oriented to the philological conservation of historically and architectonically valuable buildings (Fumo et al., 2004). Currently, this is still the most common approach to heritage in Italy, a relic of a time when the issue of disaster risk reduction was not yet as critical a priority as it has become.

Public perception and involvement are recognised as key factors for the success of DWM programmes (EPA, 1995). The reaction of communities to the proposed ideas for DWM may lead waste managers to alter their approaches. Public consultation during the
DWM process enhances the public understanding of the actions needed for proper management of the waste, and waste managers may recognise the possible inappropriateness of their ideas before their implementation. However, achieving a satisfactory level of community understanding in a disaster situation is still an open challenge. Some studies have proposed a specific education programme as an efficient approach for enhancing the management of rubble (Solid Waste Authority, 2004; EPA, 2008). However, there is inadequate guidance on how to organise communities in decision making about DWM (Brown et al., 2011).

The quantity and composition of disaster waste varies between regions and depends on different factors such as national legislation, regional planning and the construction technology of the country (Duan et al., 2015). According to Brown and Milke (2016), the appropriateness of on- or off-site waste separation depends on four factors: time constraints; resource availability; the mixture of the waste; and human and public health hazards. Nevertheless, these operations are hindered by the typical emergency barriers: the vast amount and the limited time, which often make the achievement of the ideal target very challenging.

At the global level, many authorities have provided standard guidelines for DWM (Zawawi et al., 2015) including the US Federal Emergency Management Agency (FEMA, 2007), the United Nations (UNEP, 2013), and the Japanese Ministry of Environment (Ministry of the Environment Japan, 2014). In Italy, however, the lack of a national protocol has pushed authorities to manage disaster-generated waste following an empirical and emergency-based method. The particular geology and geomorphology of Italy, coupled with the occurrence of many disasters like earthquakes, can cause the generation of large volumes of rubble. Some recent studies underline the critical role of decision-making in disaster situations and suggest an adaptable protocol for DWM in the Italian territory (Gabrielli et al., 2018). In this regard, this paper explores a possible change of attitude in the reuse of heritage waste materials in the reconstruction process of damaged historical towns, based on the experiences of Macerata province and the city of Camerino.

3. Research design
This research starts from a general review of national and regional directives on Construction and Demolition Waste in Italy. Then it focuses on practical methods of DWM in Macerata province and particularly in Camerino, one of the cities most affected by the 2016–2017 earthquakes. For this purpose, the authors carried out semi-structured interviews with experts who have been involved in the reconstruction process. The measurement tool was a questionnaire-interview with seven closed and seven open-ended questions, using the five-point Likert scale. The questions were designed based on relevant related research in this field (Amato et al., 2019; Gabrielli et al., 2018), and double-checked by the experts of the research team. The interview consisted of three sections: the efficiency of national and regional directives, the management practices and suggestions for improving the DWM framework. The surveyed population was composed of 15 professionals selected among DWM experts in Marche region through the snowball sampling method[2].

4. Research findings
The Construction and Demolition Waste legislation has been a roadmap for DWM in Italy. In fact, the Italian regulatory framework does not present general permanent laws for heritage waste in case of disaster (A. Conforti, Interview, 5 June 2019). The only relevant tool at the national level is article 191 of decree-law 152/2006, which allows authorities to circumvent bureaucratic restrictions to accelerate disaster management. After the earthquakes of Abruzzo (2009) and Emilia (2012), the Italian government issued several decrees for new forms of waste disposal to improve the assistance of the affected areas and
promote DWM. At the regional level, the ordinance of Emilia (2012) recommended the reuse of rubble, as recycled aggregate, for landfilling and other civil engineering works, such as road sub-base. Despite the approval of these decrees, their implementation has remained at an experimental level.

Likewise, in the case of Central Italy (2016), the Italian government issued an important decree (decree n. 189, 17.10.2016: “Urgent interventions in favour of populations affected by the 2016 earthquakes”), where art. 28 (“Provisions regarding the removal and management of materials deriving from the partial or total collapse of buildings”) and 28 bis (“Measures to encourage the recovery of non-hazardous waste”) describe the required management of waste materials. More recently, a resolution of the Marche Regional Council followed (DGR 334 2017, and subsequent amendment with DGR 160 2019), appointing the Regional Civil Protection Department as “Contracting authority and supervisor of interventions”, in charge of 52 different activities, among which the “management of waste materials” (activity n. 21). The Civil Protection could then define agreements with private contractors, such as Cosmari Ltd in the case of Macerata province, instructing them to apply the decree at the operational level.

The directive on “Procedures for the management and safeguard of cultural heritage in the event of natural disasters”, adopted by the General Secretariat of the Italian Ministry for Cultural Heritage (MiBAC) in 2015, has regulated the recycling and reuse of rubble in Macerata province and Camerino. It classifies the rubble into three different categories: highly-valued materials, mixed waste and ordinary building waste. Despite the various decrees aimed at facilitating DWM in Italy (Table I), the collection of rubble after the 2009 earthquake in L’Aquila – not to mention the 2016 earthquake in Central Italy – has yet to be completed (Faleschini et al., 2017).

After the review of national and regional directives on DWM in Italy, the authors carried out semi-structured interviews with experts through a questionnaire with seven close-ended and seven open-ended questions (Table II).

The initial analysis of interviewees’ general information showed that 72 per cent of them had been engaged in the reconstruction process in Macerata province from the beginning in 2017. Disaster managers (33 per cent) and civil society representatives (20 per cent) were among the most represented professions in this research. Besides, thirty per cent of the interviewees had previous working experience in a disaster reconstruction process (Figure 1).

The 15 interviewees agreed that current laws and directives have good potential for DWM in Italy. Nevertheless, they pointed out that a national law that would establish the responsibilities of administrators and professionals in post-disaster situations might enhance DWM. In 2016, many workgroups were formed in Macerata for DWM, always composed of MiBAC experts, civil protection specialists, Cosmari and municipal technicians. The Regional Crisis and Coordination Unit developed a model during this process consisting of several phases:

1. mapping of rubble with a specific survey card;
2. selection of materials by specialised technicians such as archaeologists or restorers assisted by construction workers;
3. separate storage of materials identified as “heritage waste” on pallets with a labelled code and microchip (while the rest of “non-heritage waste” follows a standard process of recycling or discharge);
4. possible transport to storage depots; and
5. digitalisation and systematisation, including details about the place of origin.

Although using this model has been effective with respect to the collection, separation and recycling of more than 60 per cent of the rubble in Macerata province after the 2016
earthquake, there is still a challenging and very open issue regarding the stored rubble, that falls within the A category, highly valued materials (20 per cent of the whole). Indeed, it is not yet decided what to do with and how to reuse them; the decree laws are not comprehensive and flexible enough to help meet all variables and issues emerging at each local site (Table III).

In this process, the rubble has been catalogued with a CER code (derived from the European Waste Catalogue). As a result, only a few authorised consortia in the Province of Macerata could proceed with the collection of rubble, with considerable transport costs to the authorised sites, displaced many miles from the original damaged building site. For health security reasons, the first step of this process is checking the presence of dangerous materials such as asbestos. Once completed and first treated in the authorised sites, the rubble receive a general CER code (n. 17.09.04, mixed demolition and construction waste). Then, there is a further selection, separation and treatment, through which homogeneous rubble receive specific codes and can be recycled in various sites located throughout the province. The main

<table>
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<th>Date</th>
<th>Type</th>
<th>Title</th>
<th>Approach</th>
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<tbody>
<tr>
<td>3 April 2006</td>
<td>Decree Law</td>
<td>n.152/Environmental standards (Lgs, 2006)</td>
<td>Enabling authorities to circumvent bureaucratic barriers to accelerate disaster management</td>
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<tr>
<td>28 April 2009</td>
<td>Decree Law</td>
<td>n.39/Urgent interventions in favour of populations hit by the seismic events in the Abruzzo region (Decree Law, 2009)</td>
<td>Operational and administrative procedures for CDW management</td>
</tr>
<tr>
<td>6 June 2012</td>
<td>Decree Law</td>
<td>n.74/Urgent interventions in favour of populations affected by the earthquake in the Emilia-Romagna region (Lgs, 2012)</td>
<td>Allowing the managers to deal with earthquake waste as municipal solid waste</td>
</tr>
<tr>
<td>3 September 2012</td>
<td>Regional Ordinance</td>
<td>n.34/Methods of monitoring the activities of rubble removal and management (Ordinanza, 2012)</td>
<td>The reuse of rubble as recycled aggregate for environmental filling and potential application in civil construction</td>
</tr>
<tr>
<td>23 July 2015</td>
<td>Decree Law</td>
<td>n.169/Procedures for the management and safeguard of cultural heritage in the event of natural disasters (MiBAC, 2015)</td>
<td>Classifying the rubble into three different categories</td>
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<tr>
<td>1 September 2016</td>
<td>Ordinance of the Head of the Civil Protection Department</td>
<td>n.391/Urgent civil protection interventions for Lazio, Marche, Umbria and Abruzzo regions after the 2016 earthquake (Ordinanza, 2016)</td>
<td>Enabling authorities to circumvent bureaucratic barriers to accelerate disaster management for ordinary CDW (Art.3)</td>
</tr>
<tr>
<td>17 October 2016</td>
<td>Decree Law</td>
<td>n.189/Urgent interventions in favour of populations affected by the 2016 earthquake (Decree Law, 2016)</td>
<td>According to the Ordinance 391/16, enabling authorities to circumvent bureaucratic barriers to accelerate disaster management for ordinary CDW, and to exceed the maximum rubble amount for temporary landfills through a simplified procedure (Art.28)</td>
</tr>
<tr>
<td>10 March 2017</td>
<td>Decree Law</td>
<td>n.334 (DGR)/New organisational structures for the emergency interventions after the earthquakes of 24 August 2016, 26–30 October 2016, and 18 January 2017</td>
<td>Enabling the Marche Regional Civil Protection Department to contract with private companies for undertaking the removal and separation of CDW, and the following storage, reuse or recycle</td>
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criticism is consequently that, with economic and environmental burdens on the community, the rubble make numerous journeys before finding a final location.

Although the philological restoration paradigm in Italy has made it challenging to address the issue of heritage waste, the post-disaster reconstruction process may bring a

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<th>A. Closed</th>
<th>B. Open-ended</th>
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<tr>
<td>The current Decree Laws have been sufficient for DWM after the 2016 earthquake in central Italy</td>
<td>Which Decree-Law do you think is the most effective for DWM and post-disaster reconstruction in Marche Region?</td>
</tr>
<tr>
<td>The hierarchy of responsibilities for DWM in Macerata province/Camerino is well defined</td>
<td>Which are the main drawbacks in the hierarchy of responsibilities for DWM, if any?</td>
</tr>
<tr>
<td>After the 2016 earthquake, property owners are well engaged in DWM in Macerata province</td>
<td>Do you see any unexploited potential in the engagement of property owners?</td>
</tr>
<tr>
<td>The way to assess rubble in Macerata province/Camerino is a correct one</td>
<td>Can you suggest any other possible good model/approach for the way to assess rubble?</td>
</tr>
<tr>
<td>Macerata province has promoted an agenda for recycling highly valued materials after the earthquake</td>
<td>Which unexploited potential do you see for the recycling of highly valued materials?</td>
</tr>
<tr>
<td>The DWM system has affected the reconstruction process in Macerata province</td>
<td>What type of conflicts have appeared between the DWM system and the reconstruction process?</td>
</tr>
<tr>
<td>The institutional framework supports the DWM activities in Macerata province</td>
<td>Which gaps do exist between the Decree Laws and the post-disaster waste management praxis?</td>
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Note: “Five-point Likert scale: completely agree, partially agree, neutral, partially disagree and completely disagree

| Table II. | The interview questions (translated from Italian by the authors) |

| Table III. | Amount and types of CDW collected, stored and recycled in Macerata province |
| Disaster waste materials | Still to be collected | Category (C) ordinary building waste |
| 60% Collected | 20% | 40% |
| 40% | 40% |

Disaster waste materials Category (A) highly valued materials Category (B) mixed waste Category (C) ordinary building waste

Notes: (a) Percentage distribution of the interviewees’ role; (b) previous working experience in a disaster reconstruction process

Figure 1. The initial analysis of interviewees’ general information
possible shift towards a lay approach meaning an approach based on involving non-experts, to cultural heritage, with significant innovations for the management of heritage waste. In Macerata province, many examples are potentially meaningful in this sense, especially in the cases of churches, such as the *Collegiata di Santa Maria* in Visso (Plate 1), *San Gregorio e Valentino* in Caldarola (Plate 2) and *San Filippo Neri* in Camerino (Plate 3). There is no room to represent the very many cases and the massive amounts of affected heritage and damaged buildings, for which there is a need for a completely new approach and paradigm. However, it will be useful to take into account at least one clear example that can help describe the potential shift.

The case of Santa Maria in Via in the old town of Camerino, mentioned by a few of the interviewees and present in public debate of the local community, is shown in Plate 4. Historically, it has suffered the impacts of three different earthquakes. The first one in 1799 caused the collapse of the original brick ceiling, which was later replaced by a trussed roof. The second earthquake in 1997, led to a restoration process lasting nine years. The third earthquake in 2016 caused substantial and extensive damage, especially to the bell tower (it collapsed upon a nearby building), the roof (partially collapsed inside the church) and generally the whole structure, especially in the upper parts. This last event, just twenty years after the previous earthquake and only ten years after the subsequent reopening of

![Plate 1](image1.png)


![Plate 2](image2.png)

the church, produced such massive and extensive damages that a possible change to the
current approach and paradigm to heritage conservation seems necessary.

The first critical issue is whether the church has somehow lost its integrity. The second
issue is, considering that a philological restoration is still just a hypothesis, whether the high
costs for the accurate but temporary scaffolding (as well as for the collection, catalogue and
storage of its waste materials), have any justification. Among the inhabitants of Camerino, a
very heated public debate has arisen about the church’s future. This is, in fact, one of the
casus belli that have stimulated a more general discussion on the future of many
compromised historical buildings. After this debate, a certain change in attitude in the
general approach to the post-disaster management of heritage, has already occurred, in
principle. In particular, both experts and the public are now ready to adopt a more open-
minded vision about possible radical change or the displacement of historic buildings
(Stimilli and Sargolini, 2019). For instance, the traditional slogan “wherever it was, however
it was” (often used by politicians for consensus purposes), has now left the room to more
sensitive formula such as “where it was, however it will be”, “wherever it will be, how it was”
or even “wherever it will be, however it will be”, which reveals a novel approach in contrast
with previous expert-based philological restorations. Before these innovative options would
however become something truly feasible, here would need to be an intermediate and
preliminary shift in the approach to the DWM, namely, in the comprehension, assessment
and reuse of heritage waste. In other words, it should become fully evident that there is a
considerable difference between the value of the building as a whole, including the very elements and materials that are composed of, and the value of the heritage waste materials in themselves, once the integrity of the building is lost and is impossible to recover.

5. Discussion

It seems appropriate to put the example of Camerino in perspective, comparing it with the help of a couple of meaningful cases. The first one is the philological restoration of the church of San Francesco in Assisi, Umbria, after the earthquake of 1997. In that case, similarly to what happened to Santa Maria in Via in Camerino, the ceiling of the church partially collapsed, along with the precious frescos painted on it. They were so valuable and important, according to experts, decision-makers and citizens, as to deserve the major effort of collection, selection and inventory of the more than 300 fragments which had fallen apart and scattered on the ground, as well as an overall investment exceeding €36m (Blasi et al., 1999). The second example is the case of three World Heritage Sites in Emilia Romagna Region[3], in the north of Italy, affected by a powerful earthquake on 20 May 2012. This earthquake was followed by numerous aftershocks, and considerable damage occurred to several important historic buildings and spaces in these sites (this included cathedrals and churches, civic towers, and public squares). Nine days later, another earthquake hit the same region. According to the General Secretary of the Italian Ministry of Cultural Heritage and Activities, the impact of the second earthquake on the cultural heritage of the area has been dramatic, and daily aftershocks continued in the area (World Heritage Committee, 2012).

However the assessment at the three World Heritage Sites showed that wherever damage was observed, this was often associated with an inherent weakness of the buildings due to pre-existing cracks, lack of recent maintenance, weak foundation soil, poor nature and quality of past restoration interventions, and even intrinsic fragility of buildings due to their original architectural design. Conversely, structures that had been well maintained and recently restored appear to have resisted well to the seismic vibratory ground motion (World Heritage Centre, 2012).

In the recovery phase, particular attention was dedicated to avoiding the dismantling of local communities through the realization of a clear program that involved, for instance, the re-opening of all the schools in the Region by 17 September 2012; second, involvement and consensus with the local authorities and population; third, clear and transparent rules for the reconstruction activities. The region became a laboratory for the most recent technologies for reconstruction and anti-seismic systems. The reconstruction showed that adapting buildings to anti-seismic rules is possible, as well as building new anti-seismic schools, at a sustainable cost (Bianchi and Labory, 2014).

Then in 2015, one year before the earthquake of central Italy, the Sendai Framework for Disaster Risk Reduction put the urgent issue of reducing hazards into the international spotlight (UN, 2015). This Framework has already become a milestone and reference point for many governments, institutions and scholars, who are seeking to address and contribute to disaster risk reduction. The Sendai Framework has presented the new paradigm of “Building Back Better”, which is an unavoidable requirement nowadays in any post-disaster reconstruction process. Building Back Better means avoiding the creation of new hazards, reducing existing levels of risk and managing any residual risk that cannot be eliminated (Glasser, 2017). Most remarkably, this conceptual approach stresses the importance of reconstructing better not only in terms of the built environment, but also with specific attention to the communities that are in close relationship with it. The scientific community has therefore to consider how to increase the resilience capacity of territories in which communities are at risk, if not already affected (Esposito et al., 2017; Shirvani Dastgerdi et al., 2019). Drawing from the Sendai Framework, safety and security aspects should acquire, therefore, the highest priority in any reconstruction process. It is no surprise that
the reuse of post-disaster waste materials should undergo thorough analysis and evaluation, in terms of physical reliability and consistency of the material, and that an increasing number of people present many doubts in this respect (D. Piccinini, Interview, 3 June 2019). The interviewees also highlighted that a centralised approach for managing the heritage waste is likely to fail or proceed very slowly and inefficiently, although a lack of clear and top-down directives is also perceived as a critical issue.

In fact, in the light of the new proposed lay approach to managing heritage waste and novel paradigm of Building Back Better, it becomes extremely challenging to maintain, conceive, and propose something that accurately reproduces the affected heritage in a philological way. Several interviewees shared this thread of thought, namely, that heritage is something dynamic, which a progressive, creative, and somewhat ambitious paradigm and approach could aspire to improve, by possibly enhancing its overall quality and value. Such a change of attitude in the Italian most traditional and conservative paradigm would mean to change the perspective on the construction materials of the architectural heritage. Their supposed “sacredness” and “only-possible” philological restoration and reuse should follow and derive in fact from the feasibility of restoring the integrity of the former building with no particular difficulty or drawbacks. The background idea should be that “the whole is greater than the sum of its parts”, and that the intrinsic value of any historical building can increase, with sufficient effort, investment and vision.

It is clear, thus, that the present discussion should not refer only to the very materials, whether preserved, truly original, available or not, but also and more broadly consider the different attitudes and perspectives on the heritage, as well as the choices and ways on how to manage and transform it.

Thus, it is possible to identify and outline two opposing paradigms and approaches for reusing heritage waste. Each of them features advantages and disadvantages, and could better fit one case or another, depending on the circumstances. However, considering a possible cultural shift towards the “innovative paradigm”, the current heritage-management system could change in parallel, allowing for more-imaginative solutions by contemporary restorers. These, in turn, might reconquer at least some of the self-confidence that enabled past architects and planners to imagine and implement, time after time, the vision they had of their ever-changing environment.

In support of this dynamic perception of our surrounding heritage, it is worth mentioning and briefly describing a couple of remarkable proposals. The first one is a scientific project of applied research (Eco-Tiles), by which the Geology Department of the University of Camerino, in cooperation with a private firm, has developed an innovative method for reusing the aggregates from damaged or collapsed buildings with the aim of producing recycled tiles for paving outdoor and indoor floors (Ansaloni et al., 2017). The second instead is an idea suggested by one of the interviewees (M. Sbriscia, Interview, 3 June 2019), to make the rubble available for broader reuse. An engineer from the civil protection, he claims that local administrations should promote a free trade market of treated aggregates, to enable an exchange of former-rubble between potential stakeholders and investors for possible reuse regardless of their original collocation. In this way, he argues, many bricks and stones that for any reason are not reusable in their original location, will find a third possible alternative, beyond lying “forever” in storage depots or being crumbled for landfills or the like. These proposals, besides sharable and sensible, sound in line with the envisaged and proposed a liberal approach to heritage waste.

6. Conclusion

The survey presented in this paper has drawn its reasoning, judgments, hypothesis and conclusion by researching on scientific literature and interviewing local stakeholders, such as decision-makers, waste managers, first rescuers, civil society representatives, post-disaster
managers, professionals and scientists. It has explained an emerging paradigm shift in Central Italian towns following earthquakes, from a more conservative model of managing heritage materials as precious rubble towards a more innovative one of managing the larger amount of waste materials, an idea potentially shared by a majority of people and broadly considered sensible and needed with a lay approach. It has explained an emerging paradigm shift in Central Italian towns following earthquakes, from a more conservative model of managing heritage materials as precious rubble towards a more innovative one of managing the larger amount of materials waste with a lay spirit and approach. This idea is potentially shared by a majority of people, is broadly considered sensible and needed, and can certainly pave the way for new lines of research on waste management. Given the necessity of enhancing our heritage to fulfil higher standards of safety in line with the disaster-risk-reduction paradigm, this possible shift is a viable and advisable choice. The enormous economic costs and environmental impacts of ineffective post-DWM suggest moving in this direction. The discussion of one case study and some additional examples and approaches has provided further insight into the current issues and possible options that are still on the desks of local administrations and decision-makers about the reuse of heritage waste in the process of post-earthquake reconstruction. The envisaged paradigm shift seems not only sensible but also necessary and urgent.

Notes
1. It is an outstanding example of a Baroque-style Roman Catholic Church of central Italy (mid-seventeenth century), to which the inhabitants of Camerino have constantly been attached and devoted over time.

2. The reliability of the collected data were calculated using Cronbach’s $\alpha$, resulting in 0.89, a higher value than the minimum satisfactory reliability coefficient, set by Nunnally to 0.7 (Nunnally, 1978).


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Post Syrian-war material recovery, reuse and transformation in the Old City of Aleppo

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Abstract

Purpose – Eight years of civil war in Syria severely impacted the historic core of Aleppo, with about 30 percent of its buildings completely destroyed and huge amounts of debris generated. This paper proposes recovery strategies for some of the most badly damaged sites in the city through material reuse and transformation, one of the goals of which is to ensure the continuity of the city’s urban cultural heritage. The purpose of this paper is to presents not only risks but also opportunities with respect to the integration of technologies to support recovery and reconstruction.

Design/methodology/approach – The paper analyzes the current situation in the Old City of Aleppo by identifying the most seriously damaged sites, namely those that have sustained damage to between 80 and 100 percent of the site. It reviews comparable international post-disaster examples and investigates appropriate options for dealing with the damage caused by the war and the management of debris, with consideration given to minimal intervention, the retention of structural integrity, technology and the integration of historic materials within new components and buildings. The methodology has relied on research through field work, including interviews with stakeholders in Aleppo.

Findings – The paper proposes two strategies to guide post-war rebuilding and conservation efforts in the Old City of Aleppo through: the creation of new multi-purpose, public open spaces and the use of debris in the repair of buildings and construction of new components and buildings, including infrastructure for solar panels within the new public spaces.

Originality/value – This paper contributes to the development of a post-civil war sustainable material recovery approach for the Old City of Aleppo and for Syria more generally, where a disaster waste management strategy is still in development.

Keywords Cultural heritage, Recycling, Recovery, Reuse, Demolition waste, Destruction, Public spaces, Reclamation, The Old City of Aleppo

Paper type Case study

1. Introduction

Due to the ongoing wars and conflicts in the region, the urban cultural heritage of the Middle East is being exposed to extensive destruction. While history, collective memory and identity are being lost, huge amounts of demolition waste are being generated, which the recovery and reconstruction process must address. This requires special care when dealing with the Old City of Aleppo, one of the oldest continuously inhabited cities in the world and has been inscribed on UNESCO’s World Heritage List in 1986 based on two criteria: (as) a
unique or at least exceptional testimony to a cultural tradition or to a civilization which is living or which has disappeared; e.g. the Old City of Aleppo reflects rich and varied cultures and bears the influence of many periods of history in its architectural fabric; and (as) an outstanding example of a type of building, architectural or technological ensemble or landscape which illustrates significant stage(s) in human history; for example, the Old City of Aleppo is a prominent example of a twelve century Ayyubid city (United Nations Educational, Scientific and Cultural Organization and UNESCO, 2004; Directorate General of Antiquities and Museums, Ministry of Culture, 2013). The concepts beyond these criteria like authenticity, the layout of the old city in relation to the dominant Citadel has remained basically unchanged. Also integrity, the remaining coherence of the urban fabric and the vulnerabilities of fabric and archaeological remains needs to be respected.

Although the reuse of debris has not yet begun in Syria, except in some recently initiated pilot projects, the reuse of building elements and recycling materials are not new ideas. From the earliest days of large-scale masonry construction in ancient Egypt, Greece and Rome, stone has been reused many times as buildings were destroyed by earthquakes or in war, or simply fell into disrepair. The manpower needed and the cost of reusing stone was much less than using new stone from distant quarries (Bill and Addis, 2006; Aleppo City Council, 2007). Using salvaged building material in place of new material can be an effective means of conserving natural resources and reducing the amount of energy required, in addition to having tangible economic benefits (Kernen, 2002). Moreover, material reuse may serve as a means of sustaining heritage value inherent in the buildings to the materials reclaimed from them (Ross and Carleton University, 2018). It can enable something of value to be recovered from the waste stream (Gorgolewski, 2017).

In Greater Aleppo, the millions of tons of debris pose a major threat to the environment by increasing the demand for newly quarried materials and decreasing the area available for landfill sites, which are in themselves difficult to deal with. There is a need to identify more sustainable solutions in line with the 2030 Agenda for Sustainable Development, particularly with Goal 11 to “make cities and human settlements inclusive, safe, resilient and sustainable.” Solutions are also needed to ensure the protection of cultural heritage and people, for waste, and for disaster management (United Nations, General Assembly, 2015).

Building conservation can be a crucial contributor to sustainability, because it can fulfill the interrelated economic, cultural, social and environmental principles of sustainable development. The reuse of rubble has also proven to be effective as a means of reducing waste and landfill use associated with demolition.

The United Nations (UN) Joint Environmental Unit (JEU) has prepared draft disaster waste management (DWM) guidelines specifically for developing countries with the aim of supporting the full cycle of DWM (JEU, 2010). The DWM framework can be divided into four phases: 0–72 hours immediate and short-term action; emergency, medium term action; early recovery, long-term action; recovery and contingency planning (Berg et al, 2013). This paper addresses the second phase in the DWM framework, addressing key issues such as the location of a disposal site for the different types of waste, streamlining logistics for waste collection, transportation and reuse/recycling activities. The required actions normally include assessments, operations, planning and communication and reporting.

Temporary sites for waste processing are important, in that they provide the time to appropriately sort, recycle and dispose of the waste (Brown et al., 2011). Effective waste management programs do not even exist in peace time and are a low priority in developing countries like Syria. As a result, the UNJEU has defined general guidelines for developing temporary storage sites: they should be located in or near the affected area and away from potable water wells and rivers, etc., they should be on public land because approval for this use is generally easier to obtain, the stored material should not threaten public health and safety, and they should be appropriate relative to the scale of the debris. (Berg et al, 2013).
Demolition can be considered as a normal process in the regeneration of building stocks over longer periods of time. Partial demolition begins with maintenance and refurbishment work, which could in theory continue until the whole building is replaced (one or more times) in a piecemeal manner. Until a century ago, small-scale “organic” processes of renewal and transformation were the normal way in which buildings and towns were redeveloped (Thomsen et al., 2011).

Based on his experience since the early 1980s with demolition contracts and consulting engineering services around the world, Lauritzen (2018) has proposed various scenarios of construction and demolition waste management and recycling (CDW). These are classified as: transformation of old buildings into reused buildings; partial demolition and reconstruction of existing buildings, transformation of old buildings into new buildings; demolition of buildings after end-of-life, recycling of materials and construction of new buildings, and transformation of individual buildings from old city to new city. Urban development and renewal are also addressed, including the repair or reconstruction of existing buildings and infrastructures, demolition of existing buildings and infrastructures, recycling and the local use of recycled materials. According to Lauritzen, the assessment of the potential of material from existing buildings for reuse in new buildings and opportunities for recycling materials locally should be considered.

With respect to the urban fabric of the Old City of Aleppo, reconstruction must take into consideration the distribution of the mass, the courtyard area and the properties of traditional building materials (Aleppo City Council, 2007).

Due to the Syrian civil war, both electric power substations in the Old City of Aleppo out of service (General Electricity Company of Aleppo, Ministry of Electricity, 2018). If the Old City of Aleppo is to use alternative sources of energy, those likely to be introduced in the immediate future will be solar energy sources (Windelberg and Kelziah, 2001). In addition, the recommendation of official bodies is to focus on solar energy investment (UNESCO and Aleppo University – Faculty of Architecture, 2017).

This paper proposes two scenarios for dealing with demolition waste in the Old City of Aleppo, and argues that the recovered building material (stones, timber and metal) should be stored, classified, and reused for the restoration of historic buildings and construction of new components and buildings, including infrastructure for a new solar energy grid. This would significantly enhance the sustainability of the rebuilding process, while protecting the architectural character of Ancient Aleppo and providing a sense of familiarity with respect to the appearance of the built environment. This could help support social continuity after the disaster and accelerate the return of residents to their homes. In addition, it would safeguard the environment by reducing energy requirements, the use of virgin materials and the consumption of land.

2. Current situation and data collection strategy
The research described in this paper is part of a PhD study with the aim of understanding the city’s residential neighborhoods, in order to restore heritage sites while improving living conditions. The study began with a damage and waste assessment, based on local information, government legislation and policies, and UNESCO reports and norms related to the current situation in the Old City of Aleppo, as well as information drawn from a range of media. The data collection included a reconnaissance survey (field observation), as well as interviews with key personnel for the purpose of understanding the existing problems and issues. Interviews were carried out with Aleppo city managers and related government officers (Municipality, Directorate of the Old City, Directorate General of Antiquities and Museums (DGAM)), the General Company for Technical Studies and Consultations and the Directorate of Electricity during visits to the Old City of Aleppo in December 2016, as soon the military operations in the Old City stopped, and in August 2017 and July 2018. In June 2019, video interviews were carried out with local authorities. The visits and interviews revealed that a total of 210 archaeological
sites have been evaluated by the DGAM at the request of UNESCO and conducted by local employees. In parallel, the General Company for Technical Studies and Consultations engaged the Ministry of Local Administration to undertake damage assessment, which records the extent of damage on three levels.

In addition, Shop and house owners who have started to return are receiving restoration permits from the Municipality (Directorate of the Old City), in compliance with the building code of the Old City. On the initiative of local NGOs and students of Aleppo University, conservation and restoration work, debris removal and sorting of historic stone are being carried out on a voluntary basis.

3. Damage assessment

Aleppo is located in the north-western region of Syria. Its historic center is one of the oldest continuously inhabited cities in the world and consists of about 16,000 buildings, mainly introverted courtyard houses (Windelberg and Kelzieh, 2001). These are connected together on more than 350 ha. The contemporary city has witnessed many wars throughout its history, exacerbated by the massive destruction caused by the earthquakes in 1138 and 1822 (Fischer et al., 2012). Nonetheless, the Old City still exists, and it is possible to read the character of its multi-cultural historical urban fabric despite the notable transformations within its interior (Petruccioli and Sarro, 2001). Between the 1950s and the 1970s, 10 percent of the old urban fabric was demolished with the aim of implementing a series of master plans.

In the summer of 2012, the Syrian civil war escalated in Aleppo. Militants were blockaded in its old neighborhoods, and although their leaders stressed that humans were more important than stone, the result was the killing of more people and the collapse of stonework under the shelling, bombing and clashes. This made it one of the most heavily damaged cities in the Syrian civil war, and resulted in the city being placed on the List of World Heritage in Danger in 2013 (Hinz et al., 2013).

Following the cessation of military operations in the Old City of Aleppo, in December 2016, damage assessment of the buildings has been conducted since 2017 by the General Company for Technical Studies and Consultations in Aleppo. The approximately 15,410 buildings were divided into three categories: 3,154 buildings have been destroyed, 9,049 buildings have suffered severe structural damage and 3,207 buildings have not suffered any structural damage. Each category in turn is divided into five sub-categories based on the percentage of destruction (Figure 1).

![Figure 1. Level of destruction in the Old City of Aleppo](image-url)

Notes: Left to right: very damaged; damaged; untouched

Source: Author – field work with General Company for Technical Studies and Consultations (2017)
4. Quantification and components of Syrian civil war debris

According to the World Bank Group and local authorities in Syria, about 14.9m tons of debris were produced during the Syrian civil war in the entire city of Aleppo (Onder and Hayati, 2017). This has only been partly removed and may require massive clean-up efforts entailing huge transportation costs. It could take about six years of continuous work and 26 million “truck-kilometres” to clear the debris from Aleppo (Onder and Hayati, 2017) (Figure 2). There is, however, no accurate estimate of the amount of Syrian civil war debris generated in the Old City of Aleppo. An estimate of its volume can be made based on the fact that in the historic city center alone about 30 percent of the structures were completely destroyed and 60 percent severely damaged, thus producing thousands of tons of debris.

Considering the massive structure of the traditional buildings in Aleppo (Osou, 2013), most of the debris that has accumulated in the Old City of Aleppo will be stone, wood, and metal, as well as soil, which was used as insulation and filler between walls and in roofs (Plate 1).

5. Heritage preservation between regulation and implementation in the Old City of Aleppo

Even though a cessation of hostilities came into effect in the Old City of Aleppo in December 2016, authorities have not yet developed a specific post-disaster concept for managing waste and debris. The only exception is legislation related to the removal of debris, notably Law No. 3 of 2018, which provides for “removing the debris of buildings damaged as a result of natural or unnatural causes or subject to demolition law.” This law, which has not yet been implemented, includes 14 articles regulating the process of clearing and benefiting from the

Source: Onder and Hayati (2017)
debris, in preparation for its disposal and determining the fate of millions of damaged buildings in Syria, whether by renovating, reinforcing or demolishing them. According to the Syrian Antiquities Law issued by Legislative Decree No. 222; amended in 1999 and again in 2012, in order to be regarded as historic legacies subject to protection, construction materials must be at least 200 years old (Syrian Law of Antiquities, Decree n.222 Syrian Arab Reublic, 1963).

Additionally, the 1999 Guidelines for Restoration provide a set of detailed standards based on international standards, such as the Venice Charter and World Heritage Convention.

In the Old City of Aleppo, activities to support the preservation of debris and urban historic fabric are still limited to emergency measures for the early recovery phase. In parallel with damage assessment, debris removal is being carried out in four contractual sub-phases: debris is taken to landfill in the southern countryside of Aleppo, with the green line as the first stage, and the blue line as the second stage. Other contracts are still under ratification – the yellow and purple lines show the third and fourth stages respectively. However, the red line shows that there are still many streets blocked by debris, with the directorate of the Old City reporting 250,000 cubic meters of debris in the Old City of Aleppo (Plate 2 and Figure 3) (Shadi Halwi and Director of the Old City of Aleppo, 2017).

Most stone has been kept in place with the aim of recovering and reconstructing all the buildings in the historic city center using historic material, in order to preserve the city’s architectural and cultural heritage.

In contrast, in Aleppo the strategy of debris preservation has already begun, though it is largely limited to one iconic historic building, where a buffer zone has been imposed around it that cannot be bypassed. This means that building debris cannot be tampered with, and original building material can be extracted from the debris. Local authorities started to restore the Great Umayyad Mosque thanks to USD16m funding. It is one of the most important religious and archaeological sites in the city and being rebuilt using “anastylosis” as a reconstruction technique, which is an archaeological term for a reconstruction technique in which a ruined building or monument is restored using the original architectural elements to the greatest degree possible. The stones of its minaret have been accumulated on the site (Plate 3).

Special attention has been paid to the collection of the debris debris on site. Each stone has been marked with a number and identifier (Plate 4) and measurements are being taken using a high-precision device to determine the strength of the stones and to what extent they...
are suitable for reuse. Usable stones will be identified, including some that are cracked. Some could be consolidated using metal bars, while others have been completely shattered. The wooden doors of the mosque are burnt and cannot be reused. All procedures are carried out under the supervision of the General Directorate of Antiquities in Syria, and the Syrian Ministry of Awqaf (Religious Endowments) has agreed with its Chechnya counterpart to finance part of the reconstruction of the mosque.

A comparable reconstruction technique employing original and non-original materials was employed in the rebuilding of Dresden’s Frauenkirche in Germany fifty years after the end of the Second World War, where 44 percent of the stone used in the reconstruction was recovered from the ruins of the original church. (Frenzel et al., 2001) and for St Andrew’s Church in Venzone in Italy, rebuilt forty years after the Italian earthquakes in 1976.

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**Plate 3.**
The debris of the minaret of the Umayyad Mosque, which was built in the eight century AD, and then renewed in the thirteen century

**Source:** Author – field work, December 2016
In Venzone, a huge amount of recycled material was employed in river protection works, while stone recovered from the historic buildings in the town center was stored, classified, and reused for building restoration (Faleschini et al., 2017).

Although clearing the debris is a complex task because of its volume, the lack of legislation and limited accessibility, the strategy for debris preservation should be conducted at the level of the entire historic core of Aleppo by clearing the buildings and streets of debris, taking it to temporary sites inside or close to the Old City, segregating each type and collecting the usable building material at an assembly point so it is ready for reuse, reclamation or recycling. Addressing the effects of destruction is an important factor in enabling people to return to their homes, which in turn plays an important role in ensuring a sense of security, belonging, stability and identity, especially if these homes are traditional houses with a local character.

In Haiti after the earthquake of 2010, one of the biggest obstacles preventing residents from returning home was a failure to remove debris across city, although debris had been cleared from houses and deposited in the streets (The Aleppo Project and Center for Conflict Negotiation and Recovery School of Public Policy, 2015). This is what is currently happening in the Old City of Aleppo, where the responsibility for individual houses usually lies with the owner, who is allowed to move debris into the street for collection by local authorities or a third party.

6. Post-civil war demolition waste treatment options

Collecting salvaged material for reuse requires that material be accumulated at specified points and separated according to type and reusability. After the earthquake of 2015 in Nepal, lack of coordination among the authorities reduced the opportunities of using original materials to rebuild the ancient heritage sites, within the surrounding area of Nandikeswor Bagaincha in Kathmandu, a site of considerable cultural and historical significance, the central area was left open for multi-purpose use, including a playground and DWM. Lit by solar lamps, it was one of the first spaces of its kind to be used as an emergency rescue space during a disaster (Upadhyay and Ranjitkar, 2015).

In such projects, sustainable approaches to material reuse should be followed. Reusing materials can not only minimize the generation of waste, but also reduces the cost of transporting, recycling and disposing of the waste. Only the waste materials that cannot be reused will be recycled for use in new construction. Minimum processing and energy use are achieved by reuse of the debris on site (Gems, 2015). Recycling the debris on or near the site is a common process in large construction projects. This also cuts project costs, in that it is about 40–50 percent cheaper than reconstruction using new materials.

Source: Tahan (2018)
In this context, this study proposes temporary open-space sites in the Old City of Aleppo, in order to store material until it can be recycled and reused for old and new buildings and infrastructure. It will also enable treatments to be studied involving minimal intervention, retaining structural integrity and integrating new objects and technology.

6.1 Scenario 1: transformation of destroyed sites into multi-purpose public spaces

Most areas in the Old City of Aleppo cannot be easily reached by heavy equipment and the debris cannot be rapidly removed since the city layout is characterized by narrow alleys. The debris contains materials that can be reused without reprocessing or with only basic processing. In other words, objects are being put back into use, either for their original purpose or a different purpose, without major reprocessing and avoiding the waste stream. While it does not include reprocessing, it might involve some reconditioning. Utilization of demolition waste is therefore divided into reuse, reclamation and recycling.

Scenario 1 proposes that some destroyed areas should be left empty, in order to create multi-purpose public spaces to serve as disaster risk management zones and parks. These proposed sites should be chosen based on the level of destruction, the historic value of the location, and former land use, amongst other considerations.

It must be noted that public green areas in the Old City of Aleppo are very rare. Their total surface area does not exceed 3 hectares, which is about 1 percent of the total surface area of the Old City. The largest green area is in the Safsafah quarter. Some small sites also exist to the south of the Citadel, which are typically associated with service buildings. Overall, the amount of open space outside the courtyards is below the national standard.

This is why in this paper proposes a temporary main site within the buffer zone of the Old City of Aleppo, identified by Resolution No. 300/a (Directorate General of Antiquities and Museums, Ministry of Culture, 2002). The aim is to protect the Old City by creating a transition area between the Old City of Aleppo and the urban fabric of the modern city. The buildings located within these areas are subject to detailed studies, resulting in a special urban system that takes into account the mass, and architectural and visual harmony of the urban fabric of the Old City in terms of the form of openings, facades, cladding materials and heights etc. In addition, as part of land use development within the urban fabric, proposed public spaces have been permitted in the Old City of Aleppo for the purpose of creating public parks, small sports grounds and playgrounds for children, etc. (Windelberg and Kelzieh, 2001).

There is a study of a public park in Tallet al Soudah near Action Area 1, formerly referred to as Pilot Project Area Bab Qinnasreen, awaiting implementation, which can inform this scenario. The neighborhood of Tallet Alsauda (Figure 4 marked with a blue circle, Figure 5, Plate 5) is an old quarter inside the wall of the Old City of Aleppo, located on its south-western border. With an area of 13.3 hectares (Qudsi, 2017), it is identified in this study as a “temporary” disaster risk management zone. This residential area has been classified as a “disaster zone” since 2002, due to the collapse of a number of buildings, which in turn claimed many victims. Since 2004, the population has been partially evacuated and buildings threatened with collapse have been partially demolished, with the plan of transforming the entire area into “Bab Qinnasrin Park” and relocating residents to shelters. Due to previous collapses and the Syrian civil war, this area is now completely destroyed and is one of the 100 percent damaged zones. It does not contain important historical buildings and is owned by the Awqaf (Religious Endowments).
Notes: Left to right: very damaged; land use; and property and acquisition

Source: Author – field work with the General Company for Technical Studies and Consultations, Ministry of Public Works and Housing (2017)

Sources: AKTC Syria (left); author, based on the United Nations (UN) Joint Environmental Unit (JEU) general suggested layout (right)

Source: Total Real Estate Development & Investment in Aleppo (2019)
6.2 Scenario 2: transformation of components of destroyed historic buildings into new components and buildings

Scenario 2 proposed that stone be directly reused in new components and buildings, after being separated from the building waste and having attached mortar removed. The vision of UNESCO and the local authority is to rebuild the Old City of Aleppo exactly as it was before the war and with the same stones if possible, an effort that would ultimately rely on local efforts. This would require a staggering amount of new building material – seven times the annual output of all quarries in Syria (Bjerregaard, 2017; Short, 2017). Stone from destroyed buildings could, however, serve as a quarry for the repair and construction of buildings. Particular focus would be on rebuilding the exterior stone facades, which express the identity of the old city, taking into account the fact that there are detailed plans for mosques, markets, baths and the historic castle from a previous restoration scheme which would enable careful reconstruction. But even though this applies to the region’s most important historic buildings, entire neighborhoods whose alleyways and traditional houses do not have the same historical value, although they are part of the identity of the old city, have now become debris.

Taking advantage of the opportunity to reuse items and demolition material on site would reduce the cost of waste removal and landfill as well as the cost of buying new goods and materials, and would minimize the environmental impact of the transport. This reuse scenario saves on resources, waste disposal, and energy use during material processing, as well as energy use during component manufacture and transport. In addition, the identity and collective memory of the city could be preserved through the use of reclaimed materials.

For powering services and providing public lighting, the plan would be to use reclaimed metal to build sub-structures for the solar panels in specific small-scale public spaces, further reducing building costs. These structures would be embedded within the urban fabric, effectively processing material from damaged and destroyed buildings into memorial aggregate, usable in new structures.

It is worth noting that all renewable energy supply systems were reviewed in relation to the situation in the Old City of Aleppo, with a solar energy supply system identified chosen for the following reasons:

[…] greater potential to use the solar energy provided by PV modules, a good match with the buildings, one of the most common and successful systems in the historical context.

Similarly, with the aim of rebuilding the city from within (LafargeHolcim Foundation, 2017), recycling operations on or as close as possible to the relevant site, sorting stations and places of use, as well as small mobile recycling plants could be set up at these proposed sites. They would process the demolition waste of the Old City of Aleppo and transform it into usable material. They would also ensure local job opportunities, while providing a platform for creating awareness among inhabitants regarding the importance of their engagement and for preserving the identity of this city. The debris from residential houses and private properties is owned by the local residents, who have the right to benefit from this material. However, no local-level guidelines exist regarding the collection of debris from private buildings.

7. Conclusion

This paper has argued that in historically important environments such as the Old City of Aleppo, the clearance of debris should be carefully managed, so as to enable the reuse of historic materials in the repair of existing buildings and in new construction. It has also proposed the reuse of some of the destroyed sites as multi-purpose public spaces, including DWM zones and parks, which would provide a dynamic public space that fosters socio-cultural interaction and promotes the involvement of residents in preserving the cultural heritage, while meeting the need for playgrounds and recreational areas.
The reuse of building waste does not require complex technology or equipment. It merely requires manual labor or simple tools. As such, reuse is the simplest and most effective way of restoring historical buildings. Moreover, the use of salvaged materials in new construction not only saves money, but also protects land resources and transfers valued attributes of historic buildings to the new ones. At present, one of the principal obstacles to a robust waste management program in the Old City of Aleppo is the lack of waste recycling equipment.

In rebuilding damaged location, the recent destruction should itself be considered as an historic event worth remembering. It should not be the aim of post-war reconstruction to obliterate all evidence of that traumatic event. This study recommends that future researchers could focus on further work in this area.

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Further reading


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