

The Architect as Curator of Reclaimed Materials

A visual essay about a methodology

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gruppe-aja

The Royal Danish Academy

Editors note: While not being invited to follow the established visual essay guidelines by the Editorial Board, the authors of this article spontaneously questioned the hierarchy between text and visual content, thus resulting in a slightly different visual essay.

Introduction

gruppe-aja is an architectural studio based in Copenhagen, led by Alberte Hyttel, Julie Lecuelle, and Amalie Holm. The studio explores the aesthetic potentials of relocating reclaimed materials.

Bricks and paving tiles are materials that, due to their generic geometry, durability, and widespread availability, are highly reused in Danish building culture (Boliu, 2023). However, during the production of bricks and the construction phase of concrete tiles, large amounts of residual products are still generated. These residuals come in various specific sizes and irregular shapes, and instead of being reused, they are crushed and recycled into granules for road fill or used as chamotte in the industrial production of new, generic tiles. This visual essay explores a low-tech design methodology that incorporates the specific shapes and limitations of these leftover materials in two projects by *gruppe-aja*. Through photographic material captured during the processes, the essay outlines the steps involved in developing an architectural project and reflects on the limitations and potential of the methodology.

The first project, Case 1, involves the transformation of a small brick barn used for storage into a communal dwelling for four families. This project explores the interplay between reusing salvaged materials and valuing the existing architecture. While some materials, such as wood and windows, are sourced from the project site, the flooring is made from leftover bricks from a nearby factory.

The second project, Case 2, involves the transformation of a garden north of Copenhagen. This project investigates how the landscape can be shaped using materials already found on-site, including leftover concrete cutoffs discovered in containers within the local neighborhood.

Approach

Central to the methodology used in these two cases is a commitment to an open-ended design process, where neither the choice of materials nor the final design is determined until the end of construction. The architectural process, therefore, involves tracing and collecting used or leftover materials from the site, local streets, or surrounding industries. Rather than pursuing predetermined outcomes, the method fosters a continuous dialogue with available resources, constantly adapting the vision to the potential of the salvaged materials.

While the unpredictable material supply may seem to dictate the design, the upcycling process is also guided by the architect's selection of materials, assessing their potential for technical and aesthetic integration into the specific project. This can be seen as an invitation for the architect to pay closer attention to the potential of existing materials, adopting the pragmatic role described by Irénée Scalbert as a bricoleur, who "rebuilds his set of tools and materials by using the debris of previous events, the odds and ends left behind by other ventures" (Scalbert, 2011, p. 73).

The overarching approach to reuse in this methodology is to work with the value of the existing geometry of materi-

als, embracing all their variations. Through this approach, minimal energy and resources are added, and the method offers a way to reduce the complexity of the technology required for the reuse process. It is also driven by an aesthetic motivation to explore the diverse and composite geometries through design.

The approach to reuse described above is demonstrated in the following photographic material, which attempts to capture the steps and tools of the methodology:

Project Site: Architectural analysis of the condition and potential of the existing architecture, along with an assessment of the available resources on-site.

Reclaiming: The process of identifying and sourcing local material supplies of leftover or used materials.

Categorizing and Curating: Analyzing and organizing the quality and quantity of the reclaimed materials.

Storage as Lab: Creating a stable supply on-site that functions both as storage and as a design lab for mock-ups.

Construction: The building phase, during which reclaimed materials are integrated into the project.

Fitting: Final adjustments to the often irregular reclaimed materials.

Although the methodology remains the same, the process varies depending on the supply sources. In the transformation of the barn (Case 1), the process was relatively linear: Reclaiming, designing, and constructing. In the garden project (Case 2), these steps were intertwined.

Case 1, Linear process

Project Site

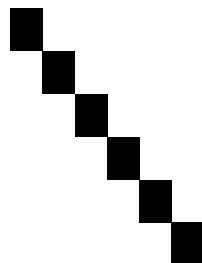
Reclaiming

Catagorising and Curating

Storage as Lab

Construction

Fitting



Case 2, Intertwined process

Project Site

Reclaiming

Catagorising and Curating

Storage as Lab

Construction

Fitting

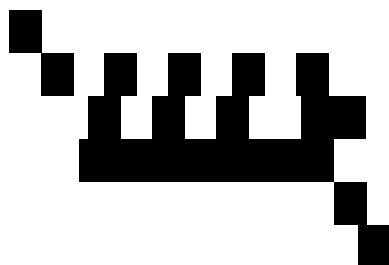


Figure 1: Diagram of process



Case 1 - Project Site In conversation with the owners, we decided to focus on the flooring as the main intervention. To continue the material language established by the building we looked for suitable flooring materials.

Unless others are mentioned, the pictures are from gruppe-aja's archive



Case 2 - Project Site When searching for materials for the long pathway, we chose to reuse the existing tiles and add salvaged cut-offs from local pavement tiles.

Photo by Hampus Berndtson



Case 1 - Reclaiming Leftover materials from the Petersen Tegl brick factory. During the firing process, some bricks receive uneven heat, leading to variations in format and colors, which results in unsellable bricks at the factory.



Case 2 - Reclaiming The pavement tile is a highly generic material, commonly seen in public landscaping worldwide. When square pavement tiles need to be adapted to corners or irregular areas they are cut to size, creating a significant amount of residual waste.



Case 1 - Categorizing and Curating When salvaging the bricks, we first analyzed the residual pile to identify the availability. In this case, we found mostly red and yellow generic bricks. We then categorized them by color, size, and condition to create an overview.



Case 2 - Categorizing and Curating When the concrete cutoffs are upcycled as found, the concrete tiles transform from generic to unique shapes. We use mock-ups as a design tool to help us visualize the limitations and possibilities.



Case 1 - Storage as Lab By embracing the variety of formats and colors available during salvaging, we curated a selection of bricks to compose a flooring pattern.



Case 2 - Storage as Lab The sidewalk tile cutoffs were assembled over a period of three months, with batches collected every three weeks. During the assembly process, we discovered a container of large, solid stones in the same color as the concrete and integrated them into the pavement, adding new texture.



Case 1 - Construction We always strive to ensure that the materials we use can be disassembled and reused in another context, and that broken pieces can be easily replaced. For the floor, a traditional method of compacting and leveling sand with a wooden board was used.



Case 2 - Construction Even though the concrete tiles have specific geometries when viewed from above, they are all of the same height. The cutoffs can therefore easily be relaid, using the same substrate as standard pavement tiles.



Case 1 - Fitting We created a checkerboard pattern using horizontal and vertical lines. Black bricks were thinner which adds a stitching, blending traditional formats with a new format. The thin pieces also make it possible to adjust for size deviations in the bricks.



Case 2 - Fitting After all the large tiles were laid, the smallest concrete tiles filled the spaces between the big ones like the final pieces of a puzzle. A few tiles needed to be cut to close the remaining gaps.



Case 1 - Result The brick paving forms a self-repeating pattern where the design shifts and twists, reflecting the subtle variations in each brick.



Case 2 - Result The concrete paving varies throughout, with new patterns continuously emerging in response to the surroundings.



Case 1 - Detail Even though the bricks may appear generic, each one has its own unique characteristics and size—much like the house. This requires a curatorial approach that can integrate and manage both the constraints and the given spatial situation.



Case 2 - Detail Since the tiles originally had the same dimensions (80x60 cm) before becoming cutoffs, it was straight forward to establish a rhythm and system that could deal with the wide variety of cutoffs.

The primary challenge of integrating reclaimed materials into architectural projects often lies in the lack of certification, as well as the requirements for scaling and ensuring a stable supply (Rotor 2). To describe both the potential and challenges of this methodology, the following analysis will focus on the characteristics of the two supply sources, the organization of storage, and the usability of design tools.

Supplies

In Case 1, the residual product is produced at the Petersen Tegl Brick Factory in Southern Jutland, where it is geographically centralized within a confined area of the factory before being crushed and recycled into the production chain once or twice a year.

In Case 2, the residual product is generated during the construction of public sidewalks, with the supply source spread across Denmark. The cut-offs are temporarily stored in roadside containers before being transported weekly to the nearest recycling station, where they are crushed and recycled, creating a narrow time gap for securing the materials. This difference is clearly reflected in the process flows of the two projects. In Case 1, the residual materials are upcycled in a single day due to the centralized supply source, whereas in Case 2, the residual material is upcycled over several months and from multiple locations.

Both supply sources are potentially scalable, as the residual product is produced daily and in large quantities. However, they are also unstable because their current commercial material cycles depend on the materials being crushed and

recycled. They must continuously be relocated to a secure spot to serve as a stable supply source.

The architect's expertise is essential in the practical and selective upcycling of materials, with the architect's workspace physically moving along with the materials—whether away from the office, out on the factory site, on the street, in the warehouse, or at the project site. Several architectural firms have warehouse storage connected to their studios (e.g., Rudolf Olgiati, Rotor/Rotor DC, In Situ, etc.), where the warehouse functions both as a space to create stable supply sources and as an integral part of the architect's design process (Pireddu, 2022) (Rotor 1).

gruppe-aja does not operate its own warehouse but uses the project site as a temporary storage facility to secure reclaimed materials. This requires the client to make land available for storage before construction begins, which, in Case 2, lasted several months. Another potential limitation to this organization is that in Case 2, we collected materials “blindly”—not knowing the exact quantity required. This became apparent at the end when excess materials were thrown back to the containers it came from.

Design Tools

Conventional architectural planning tools, such as project drawings and renderings, are not always useful when working with these methods, as the project evolves continuously based on the availability of salvaged materials. In these cases, we worked with mock-ups as a design tool, which offers an opportunity to compose or construct with the va-

riety and diversity of the materials in 1:1 scale. In Case 1, we worked with a repetitive brick pattern as a formula fully described within the mock-up. In Case 2, the concrete tiles had different geometries, so the mock-up served more as an illustration of a concept. Consequently, the final pattern was created and designed during the construction phase, where each square meter had its own unique pattern.

In both cases, no architectural drawings were produced, and the method required our on-site presence throughout the construction. Scaling this approach or working with more complex projects would necessitate incorporating drawings into the methodology, making it possible to capture the diversity of the materials and provide a description that craftsmen could follow more independently.

Reflections

This method challenges the conventional sequence of a project, presenting both opportunities and obstacles in architectural practice. Regarding planning, these projects represent a process where neither the client, collaborators, nor the architect can predefine colors, materials, or building components. It is possible to consistently find suitable materials, as long as one remains open and avoids being overly specific in the search. As such, this approach demands flexibility from both the client and the architect, as both must relinquish some control and be willing to adapt the project as materials occur.

The cost of materials in these projects is close to zero, which challenges the conventional budgeting model based

on a percentage of material costs. For many, it might seem counterintuitive that building with often freely reclaimed materials is not necessarily cheaper in the end. However, this approach to reuse is characterized by the significant time spent curating salvaged materials and relying on simple technologies, which results in a higher labor cost.

In both cases, we encountered the limitations and potential of working with this methodology. At times, we found ourselves working in reverse compared to a traditional process. However, as we developed the methodology, it became clear that it simplifies the process of relocating and integrating reclaimed materials into new contexts and projects, all while maintaining architectural quality.

Traditionally, the bricoleur is practiced by non-professionals who creatively work with whatever materials are available. We aim to apply our professional architectural perspective to this process, serving as a shortcut to connect aesthetic work with resource awareness.

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