REGENERATION OF ABANDONED INDUSTRIAL AREAS IN ROMANIA AS A SUSTAINABLE RESOURCE FOR THE CURRENT COMMUNITY

Sara Andreea BUCUR - *"Ion Mincu" University of Architecture and Urban Planning*

sarabucur@yahoo.com

Abstract. The issue of contemporary and historical ruins requires the development of a coherent program for the revaluation and, at the same time, protection of this type of heritage that is in decline, without which history would disappear and, with it, our memories. The gradual degradation of "our own pasts" particularly characterizes the postmodern period of deindustrialization, identified globally, with visible repercussions in Romania as well. The postmodern period is considered the founder of abandoned architecture and, simultaneously, of premature ruin -a phenomenon visible in numerous industrial platforms massively built in the 1960s-1980s and abandoned after only a few decades. A relevant example is the Rulmentul Platform in Brașov, where buildings designed for a long life cycle reached a state of ruin in less than 20 years.This becomes the period of accelerated transformation and urban transitions generated by the "revolution of speed," both in the architectural field and in related fields. The approach to urban void integrated into cultural heritage involves interdisciplinary research that goes beyond the sphere of architecture and involves the analysis of the environment, the meanings of space, and the values attributed to it by the community. The relationship with the surrounding environment determines a series of analyses necessary in the process of recovering the void created by abandonment, which will outline the authenticity of new contemporary interventions. In order to understand a place or space in depth, one must take into account its visibility in society and for society, what the significance and meaning of the building is, and for whom it is valuable. The viewer's perception of the ruin changes its status on an emotional level: from an object of contemplation, a sanctuary of collective memory, to an intermediate space (the time of ruin), ultimately becoming "just another place in the city," doomed to decline. The regeneration of abandoned urban areas of former industries, considered fragile territories of post-industrial decline, involves a strong "symbolic trace," namely the emotional layer of the ruin. The emotional attachment inscribed in the "living memory of the recent past"(1) positions abandoned industrial architecture in a sensitive area, very close to the present in time, and accentuates the negative experiences of the past (crisis, globalization, natural disasters). This urban void, seen as a "buried space," unused, can be reactivated through adaptive and ecological regeneration strategies, being returned to the community.

Keywords: sustainability, conversion, adaptive reuse, collective memory.

Introduction

"Everything changes before it has a chance to be" (2)

The process of ruin is continuous, manifesting itself as soon as the architectural "act" makes its debut in the urban fabric. The causal relationship between abandonment and degradation is defining in the process of transforming architecture into ruin. Abandonment develops both consciously, through the absence of human presence or function, and unconsciously, through uncontrollable natural causes: natural disasters, earthquakes, wars.

The term ruin itself becomes an obstacle to understanding and cataloguing architectural objects, being simultaneously both a characteristic and a process through which architecture "changes". The apparent identity of the ruin requires traversing the unknown and taking risks, the very destiny of the ruin becoming a form of "creatio continua"(3).

Memory, in the study of ruins, can be divided into two symbolic formulas: trace and node. Both work together to preserve the image of collective memory, but they differ in the way society relates to them, the emphasis being on symbolism or visual perception.

The concept of the trace of memory presents a visible imprint, a remnant of a fragment that once belonged to a whole. In the current context, the trace emphasizes the fragility of society and its impact on the environment, being a physical imprint devoid of social discourse. It reflects the unpredictability of ruin, where each element is considered temporary and can completely fade away over time.

In the case of many abandoned industrial complexes, the trace can be described as graffiti markings, peeling plaster, or material decay. For example, in the main hall of the former Rulmentul industrial platform in Brașov, the graffiti-covered walls and deformed metal structures represent clear traces of an intense industrial past, visible from the very moment one enters the site. These fragments become independent elements, unique pieces that make up a fictional assembly of what was once a whole, activating memory in ways that are less socially acceptable, through creative reconversion: controlled vandalism, art, remembrance (reactivation of trauma). The possibility of recycling ruins becomes a challenge in contemporary architecture, with the aim of avoiding premature demolition. The aestheticization of ruins has, in addition to its sustainable component, an artistic component of valuing disorder.

The proposal to map abandoned sites represents the documentation of the current state of the buildings. Mapping the deterioration aims to create an intermediate archive, which allows us to trace the possible evolution or involution of the ruins over time and understand them. This method also facilitates prevention in the face of multiple hazards. Conversely, "neglecting" the traces will inevitably lead to the loss of social identity, the erasure of collective memory, and even premature demolition.

If the trace represents the fragmented, physical memory of a place, the memory node expresses an active and emotional connection between the community and the ruin. Identified as a post-traumatic space, the node is a sensitive point of reflection on collective memory. It is a witness to a future that never happened, a "ruminative" space, the mental framework of the collapse of time, of returning to failures or traumas that cannot be resolved.

The node highlights the resident's emotional relationship with the abandoned site. In the case of the Tractorul Factory, the administrative building and the central tower functioned for a long time as emotional landmarks for the community, serving as places where both daily activities and the professional memory of the employees were concentrated.

The analysis of ruins from the perspective of the node is based on the delineation of two categories of layers imported from classical stratigraphy: the symbolic affective layer and the memory layer. The symbolic layer studies the emergence of ruins and their potential for valorisation, while the memory layer is made up of personal experiences (memories), interpretation and urban integration.

The concept of the memory node stimulates the reactivation of collective memory as a form of social reflection. The significance of ruins in contemporary times, their exploitation, or the relationship of inhabitants to accentuated architectural abandonment are just some of the issues that the memory node addresses. Architectural ruins become nodes of collective memory when they are symbolically reactivated, transforming into places where historical, social, and identity discourses converge.

Industrial heritage in Romania

The Romanian built environment abounds with abandoned industrial platforms, which detract from the urban fabric and generate large areas of dysfunctionality. Most industrial areas in Romania were formed around the urban periphery to facilitate access to transport (railways, main roads), imposing a clear boundary between industrial space and the city itself. This separation led to the emergence of working-class neighborhoods in the vicinity of factories, contributing to the "modern" zoning of urban space.

Over time, the gradual integration of these areas into the city led to the complete absorption of the periphery into the urban fabric, increasing access to public transport, decent housing, and essential urban facilities. Thus, industrial platforms give rise to neighborhoods with a significant urban role, becoming essential landmarks in the evolution of the city. Relevant examples for the study in question are the Rulmentul Platform (1949) and the Tractorul Plant (1925), two of the most important industrial platforms in the city of Brașov, initially located on the outskirts and later developing into two large "working-class" neighborhoods of the city: the Rulmentul neighborhood and the Tractorul neighborhood.

The period after the 1990s visibly amplified the phenomenon of deindustrialization in Romania, shaping new economic and urban realities. The disappearance of the "production chain" transformed the city into a capital urban space, oriented towards investment and development, and former industrial sites, once considered "places of professional identity and daily rhythm," became strategic land, potential resources for urban regeneration and the reactivation of collective memory.

Deindustrialization produces major changes in the urban structure, while on an emotional level it interrupts the transmission of collective memory. This discontinuity breaks society from its recent past, laden with social and identity meanings.

During the communist period in Romania, industrial hubs functioned as complex social structures, especially in heavily industrialized cities (Brașov, Timișoara, Bucharest, etc.), so their rapid disappearance would indicate a physical and symbolic void. Industrial ruins thus become a space of transition, a junction between "what was" and "what can become" the city.

Post-industrial urban regeneration becomes a process of reinterpreting and remembering abandoned sites, an act of functional reuse, but also a cultural-symbolic process that allows for the continuity of the city's authentic identity, without which the urban discourse would be discontinuous and artificial. Old industrial platforms are witnesses and indicators of the dialogue between the past and the present.

Considered important landmarks of identity in the development of the "new" city, former industrial platforms actually mark the way we relate to the memory of the place and how we can preserve it in the present without destroying it. Thus, collective memory becomes an essential urban dimension, a landmark of urban authenticity and coherence, positively influencing society's perception of industrial ruins.

Industrial heritage in Romanian post-industrial cities generates the "rhythms, values, and aspirations" of the recent era and redefines the role of the city in contemporary times: from a city developed around the economy and production to one oriented towards services, culture, innovation, and sustainable reuse.

Since the 2000s, cities have been undergoing a broad process of "re-urbanization," which is producing changes at the demographic, economic, social, and cultural levels. Re-urbanization occurs differently depending on location, density, population, local economy, and external influences. (4)

Post-industrial urban regeneration

The concept of urban regeneration does not refer to the simple conservation or physical transformation of a site, but to a complex process with direct influences on quality of life, the urban economy, and social structure. Regeneration involves identifying the activities and strategies necessary to revitalize degraded urban areas, reorganizing functions, and correlating them with the socio-cultural and economic context of the current community.

Large-scale urban interventions significantly contribute to the transformation of cities. The Coresi project, developed on the former Tractorul industrial platform, is a relevant example: an inaccessible industrial zone has been transformed into a multifunctional district, featuring housing, offices, commercial spaces, and cultural areas. Clearly, the loss of industrial landmarks would lead to the elimination of an important component of collective memory, the ignoring of the past, and the creation of an artificial space. These industrial urban silhouettes form boundaries and remain anchored in the past, like "informal archives."

In this sense, the regeneration of former industrial platforms allows the continuity of the past into the present and becomes an indisputable resource of the urban fabric for "perpetuating authentic identity." The possibility of reconversion increases the value of abandoned industrial sites, and "preserving the sense of belonging" is considered an act of

controlled functional reuse adapted to the needs of today's society.

The metropolitan area of Brașov offers valuable examples in this regard, especially in the case of the former Tractorul and Rulmentul industrial platforms. The selection of these two examples is not random, but is based on the strong urban contrast they produce in the city's structure. Although both represent important hubs of the "new city," characterized by accelerated development and increased demand for residential, commercial, and cultural spaces, only the Tractorul plant has been brought back to life in a contemporary manner, adapted to the needs of society. The Rulmentul platform continues to be a problematic point in the urban landscape due to its advanced state of deterioration.

The disappearance of the production chain and the accelerated transition to privatization, together with the need for economic restructuring, led to the massive deindustrialization of Brașov. This has resulted in a complex process of urban transformation, in which the vacated industrial platforms are facing strong pressure to be repurposed. Located in key areas of the city, these abandoned sites are becoming important resources for urban regeneration, thanks to their considerable size.

Contemporary urban regeneration involves a controlled process of reinterpretation and remembrance. Beyond the physical component of the buildings, it is necessary to integrate a symbolic component as a trace of the "industrial past," thus composing a coherent and authentic urban discourse.

In this context, the former Tractorul factory and the Rulmentul platform become fundamental landmarks for understanding the process of post-industrial regeneration in Brașov. As spaces of transition, laden with social, symbolic, and economic layers, they have the potential to decisively influence the future evolution of the city (Figure 1).

The Tractorul Case

The Tractorul Brașov factory was returned to society following an architectural conversion, which can be viewed both positively and negatively. Built in 1925, after World War I, it initially manufactured aircraft until 1948, when the Russians took over the territory and production was shifted to tractors. The first models appeared on the Romanian market only in 1960, starting with the IAR 22 model. Until 1990, the factory enjoyed enormous success, with around 23,000 employees. After this stage, it entered a slow process of privatization, leading to its complete closure in 2007. After about five years of abandonment, the transformation process began in 2012.(5) The huge factory, covering an area of 120 hectares, representing approximately 8% of the usable area of the city of Brașov, is becoming a multifunctional "whole", comprising: a collective housing neighborhood (Figure 3), kindergartens, leisure areas, office spaces (Figure 4), green spaces, a hotel, entertainment areas, an urban museum, and commercial spaces. All these new functions have transformed the former factory grounds without completely erasing the imprint of the old buildings. The conversion took place in stages with the aim of "regenerating the community and preserving the image of what was once a factory the size of a city."

The conversion took place in three main directions: collective housing, commercial area, and business camp, the latter being developed in stages. The first stage focused on renovating the old buildings and converting them into Class A office space (T39, T42 - Gate 2, Central Building-Tower), plus preserving the exterior architectural space as a historical landmark. (2012-2016). The second stage was the continuation of the development of the office area with three buildings L1, N1, N2 (2015-2017). Phases three and four present the expansion of the office function, with three more buildings H1, U1, and H2 (2019). The final, fifth stage involves the rehabilitation of the former hangar building (Figure 2), the former welding area, into a community space and entertainment area. This last intervention was to be completed by 2021, but work on its transformation is still ongoing.

The entire transformation process was a rigid one, due to the completely destroyed areas, but overall, the intervention was adaptive and sustainable. Materials from the industrial area were recycled. Most of the existing materials on the former industrial platform were reused through recycling (around 20,000 cubic meters of materials reused after demolition and 10,000 cubic meters of materials saved by preserving the old structures).

Another positive factor was the certification awarded to the office buildings, which fall within the "very good" level. Among the negative aspects of the conversion process are the unexploited ruins; the multitude of completely destroyed halls, leaving no trace of the past. The old buildings that housed bureaucratic activities were integrated after the conversion in order to preserve the history of the place.

One of the most significant positive aspects of this intervention is the opening up to the community of an area previously inaccessible to the general public, reserved exclusively for authorized personnel, and its transformation into a public space, accessible and connected to the dynamics of the city. This transition from a closed industrial territory to a "free" urban setting was achieved both figuratively, through the diversity of new functions, and metaphorically, through the removal of the fences that enclosed the factory area. The conversion aimed to regenerate the community and preserve the image of what was once "a factory as big as a neighborhood." (6)

The Rulmentul case

In contrast to the conversion model analyzed above, the former Rulmentul Brașov Platform, located near the Tractorul Factory, did not enjoy such a favorable development. Considered one of the oldest and most complex industrial units in Romania, with a long tradition in the production of bearings, gears, and mechanical transmission components, the Rulmentul factory went through a difficult and prolonged process of post-industrial transition. Since 2008, it has been subject to a considerable number of privatization procedures (no fewer than thirteen successive attempts), illustrating the instability and lack of economic interest in such technological heritage. After failed attempts and repeated administrative proceedings, the factory was sold in 2009 for €2.5 million, a value that does not reflect the site's real potential, but rather highlights its advanced state of disrepair and the lack of a coherent revitalization strategy.

The urban evolution of the area is taking an unfavorable direction with direct repercussions on the site. Unlike the former Tractorul Platform, which was regenerated into a dynamic urban hub through the Coresi project, which managed to maximize the economic, social, and cultural potential of an industrial platform, Rulmentul has remained in a state of prolonged stagnation. While the Tractorul area is considered an example of good practice in post-industrial regeneration, Rulmentul has become a residual space, marked by ruins, partially collapsed halls, broken windows, and exposed metal structures that emphasize the advanced state of decay. This discrepancy highlights the major differences between planned and sustainable interventions and situations where the economic, administrative, and political context blocks any conversion initiative. The year 2024 officially launches "a hope for development" in the area through the organization by the Romanian Order of Architects (OAR), in partnership with the Braşov, Covasna, Harghita Territorial Branch of the OAR, with the Contracting Authority being the Braşov City Hall, of the International Solutions Competition "RULMENTUL, Braşov."(6) Although the competition ended in October 2024, no concrete steps have been taken to implement the winning transformation project for the former industrial platform, with all efforts currently blocked.

Conclusions

The study of post-industrial regeneration demonstrates that industrial ruins are more than just degraded spaces, lacking in aesthetics and function; they represent a bridge between the socio-economic, cultural, and urban transformations of the city.

At the socio-economic level, deindustrialization has had a negative impact on society, leading to job losses, urban fragmentation, and the emergence of problem areas in urban spaces. However, the regeneration of former industrial areas through reconversion has had positive effects on the city and society by diversifying functions and opening up to the community without completely erasing the collective memory.

By reusing what already exists, industrial ruins increase sustainability, reduce the consumption of new resources, and strategically delimit the city. Thus, ruins take on a new architectural dimension, that of "experimental space," where fragility and degradation become resources for creative innovation.

Case studies show that the closure of a fundamental industry can, through reconversion and reactivation, generate a new type of urban energy capable of supporting economic and social recovery. The Tractorul Platform, once considered "a factory as large as a neighborhood," has become a valuable resource that preserves the traces of the recent past and continues to shape the city's identity in a coherent and strategic way, demonstrating that the intelligent reuse of industrial ruins can generate a new kind of urban energy. The transformation of the former hangar into an entertainment space and the integration of the administrative buildings into the office area are examples of how the memory of the place can be preserved and reactivated.

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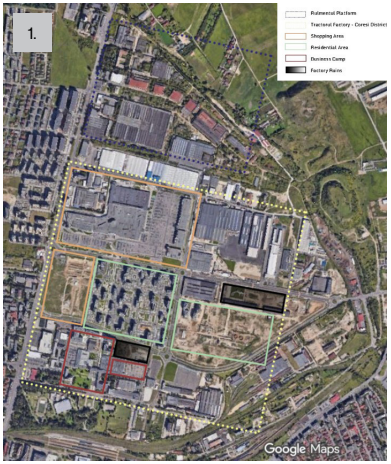
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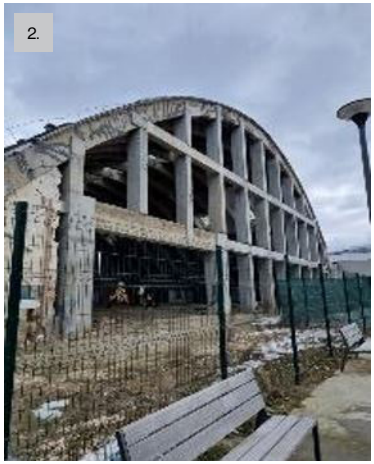
Figure 1 – Tractorul and Rulmentrul industrial area currently, Google Maps (Coresi Shopping Resort) and personal adds.

Figure 2 – Hangar 40 ruin, personal archive.

Figure 3 – The residential area of Coresi Braşov, today, personal archive.

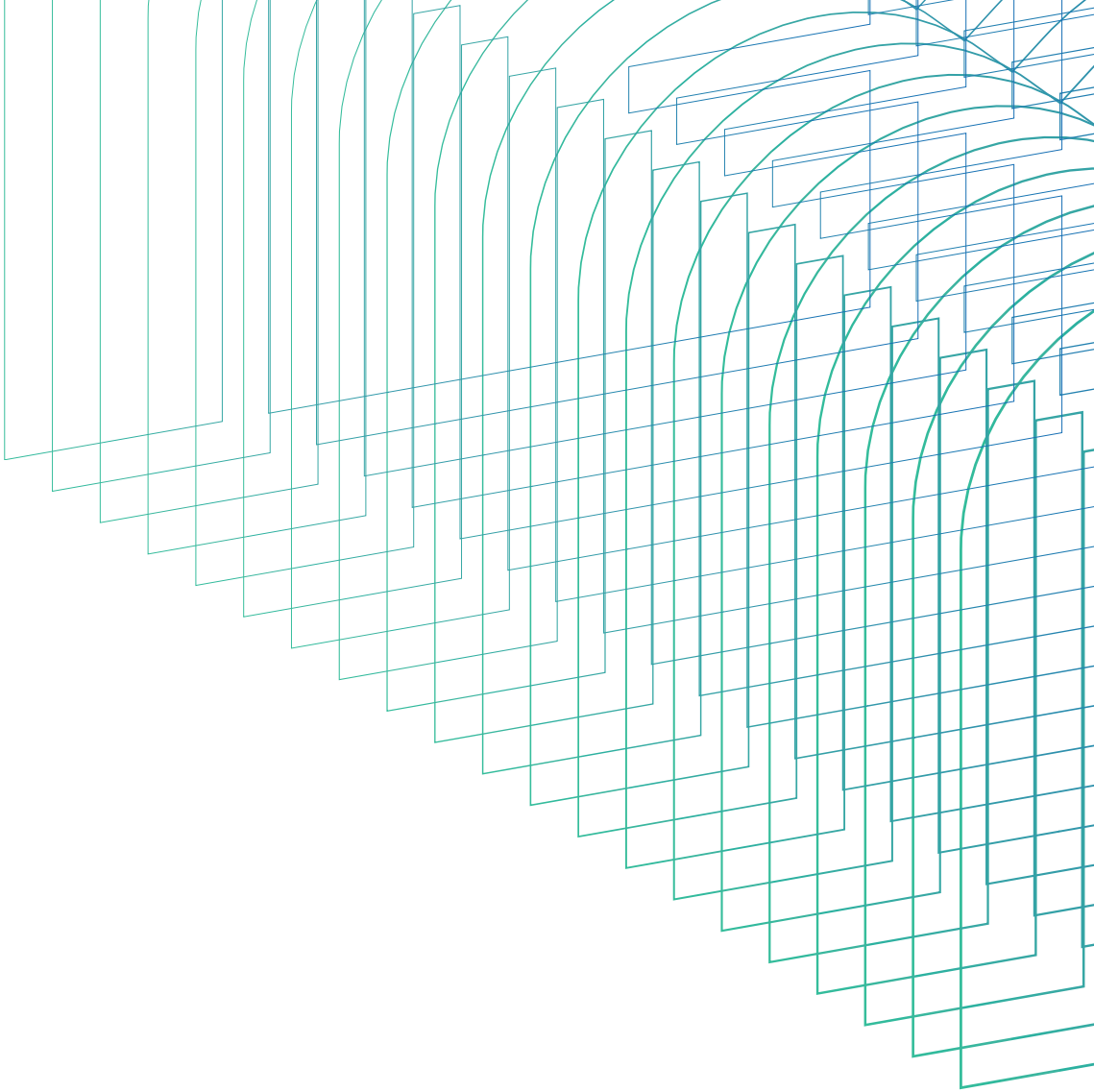
Figure 4 – Coresi Business Campus, personal archive.


1.
Rudmental Platform
Tractorial Factory - Ciorosi District
Shopping Area
Residential Area
Dormitory Camp
Factory Ruins
Google Maps


2.


3.


4.
Waters



CIRCULAR EDUCATION IN THE ARCHITECTURE SCHOOLS: THE DIDACTIC POTENTIAL OF SUPERUSE IN INDUSTRIAL VOIDS

Jacopo GASPAROTTO - *Politecnico di Torino*

jacopo.gasparotto@polito.it

Abstract. In a global context marked by the increasing scarcity of natural resources, the construction sector remains one of the most environmentally impactful. This condition calls for a radical rethinking of conventional production models, encouraging a transition from linear approaches to those rooted in the principles of the circular economy, increasingly relevant in architecture. However, their implementation remains limited, hindered by regulatory, procedural, and cultural barriers. It is therefore essential to understand how to train designers capable of acquiring the competencies needed to operate according to circular principles, while developing critical skills to grasp their values and potential. Circular Economy Education (CEE) plays a central role in fostering this paradigm shift and has emerged as a distinct field of study. This paper investigates how architectural education can effectively integrate Circular Economy principles, with a particular focus on teaching material reuse in the context of urban voids. The objective is to identify, through a critical review of innovative educational practices, a set of replicable approaches that facilitate the learning of contemporary circular design models. The research is based on the analysis of teaching experiences and educational pathways adopted by international universities that have incorporated these principles into architectural training. Particular attention is given to pedagogical methodologies focused on the reuse of construction materials and components, with reference to the concept of Superuse, understood as the creative ways that reveal and reinterpret materials. Integrating Circular Economy principles into architectural education requires a transformation not only in content but also in teaching methods. Material reuse labs, interdisciplinary workshops, and collaborations with companies adopting reuse practices emerge as key experiences for fostering a new design ethic. In this context, Superuse stands out as a strategy to promote within academic curricula, transforming resource scarcity into an opportunity to rethink the value of materials.

Keywords: Circular Economy in Architecture; Material Reuse Strategies; Superuse; Architectural Education; Industrial Voids Regeneration.

Introduction

In recent decades, environmental issues have taken on an increasingly central role in the international architectural debate, redefining the ethical, technical, and cultural horizons of the discipline. The climate crisis, the depletion of natural resources, and the growth of construction waste - accounting for roughly one third of all waste produced in Europe (European Commission, 2018) - demand a radical reassessment of the production and consumption models that underpin the building sector.

In this context, the transition toward a circular economy emerges as one of the principal challenges and, at the same time, one of the key opportunities for contemporary architectural practice. (Geissdoerfer et al., 2017, Journal of Cleaner Production, 143, 757–768) (Kirchherr et al., 2018, Resources, Conservation and Recycling, 127, 221–232). When applied to the built environment, circularity opens new possibilities for reducing the sector's environmental impact by promoting strategies of recovery, transformation, and reuse of existing materials. Construction and demolition waste are thus reinterpreted as design resources within a system that seeks to close production cycles and extend the useful life of materials (Norouzi et al., 2021, Journal of Building Engineering, 44), (Krajewska & Siewczyńska, 2025, Sustainability, 17(15)).

One of the urban conditions most suited to the application of circular-economy approaches is that of urban voids: abandoned, underused, or functionless spaces (Pluta, 2017, Biblioteka Regionalisty, 17, 87–95). Far from being mere elements of decay, urban voids can be reinterpreted as circular reserves of material. Integrating the principles of the circular economy into regeneration processes makes it possible to transform them into strategic resources for a sustainable city through practices such as urban mining, design for disassembly, and harvesting, to name a few. Among these are also emerging practices, including that of superuse: a design approach oriented toward the creative reuse of building materials and components, capable of assigning new and unexpected functions to what is typically considered waste. Unlike traditional forms of reuse, superuse highlights both the intrinsic material and immaterial qualities, namely the formal and narrative dimensions, of matter, endowing it with a new purpose. This practice is promoted in particular by the Dutch collective Superuse Studios (van Hinte et al., 2007, Superuse), which combines, in its architectural projects, an approach to sustainable reuse with a cultural reflection on the value of the built environment.

However, fostering a genuine circular transition requires more than innovating design alone; it also demands innovation in education. A circular approach entails a systemic shift that concerns not only construction sites and design practices, but also pedagogical and training models. Schools of architecture, as places where design knowledge is produced and transmitted, are thus called to reflect on how to impart the values and competencies of circularity to new generations of designers. (Renfors, 2024, International Journal of Sustainability in Higher Education, 25(2), 244–262), (Sumter et al., 2020, Journal of Cleaner Production, 282, 124–132).

In this regard, superuse represents a potential educational device applicable to the reuse construction site, which becomes a laboratory for active learning where sensibility, creativity, and operational skills are cultivated. From this perspective, urban voids emerge as potential experimental sites—open spaces in which new practices of transformation and reactivation can be tested. Architecture schools thus assume the role not only of places for professional training, but also of laboratories of cultural innovation, where scenarios of reuse applied or applicable to