

INFLECTION

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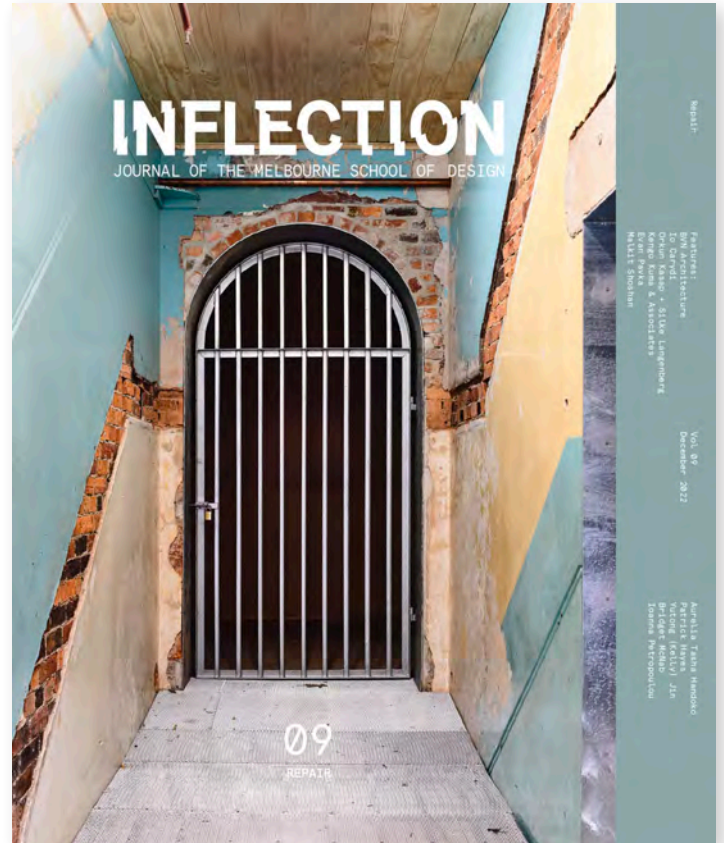
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Rejuvenating former industrial areas into natural landscapes hides an uncomfortable truth: pseudo-returns to nature, while poor attempts at erasing the scars on our landscapes, constitute Repair as we know it. *Inflection Vol. 09* showcases thinking that is part of a contemporary metamorphosis, where Repair instead becomes a nuanced approach to architectural design in the 21st century. In engaging with the opportunities presented within the built environment, while evaluating potential consequences and leading innovation in the field, how can architecture acknowledge and adapt, rather than continue to damage and eliminate the existing?

Inflection is a student-run design journal based at the Melbourne School of Design, University of Melbourne. Born from a desire to stimulate debate and generate ideas, it advocates the discursive voice of students, academics and practitioners. Founded in 2013, *Inflection* is a home for provocative writing—a place to share ideas and engage with contemporary discourse.



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TEMPORALITY

SHIPYARD 1862

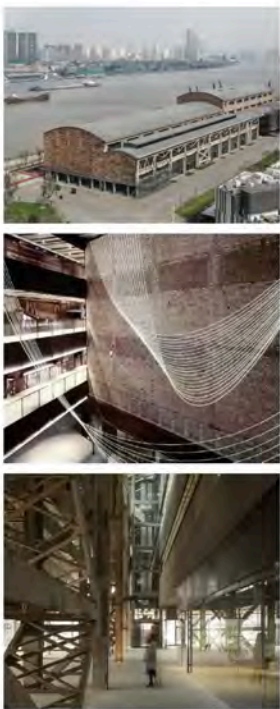
Kengo Kuma & Yutaka Terasaki

Project location: Shanghai, China
Completion year of renovation: 2017

We have transformed a shipyard built in 1972 into a mixed-use complex comprised of a theatre, a multipurpose hall and commercial spaces. The project's name '1862' is a direct reference to the date of establishment of the company who used to run the shipyard. Back in those times, plenty of factories were lined up along the streets in this area. However, when we visited the site in 2011, most of the factories had been demolished and were waiting for redevelopment.

Previously a place manufacturing large-scale ships, the Shipyard's architecture operates at industrial dimensions, thus giving it a subliminal sense of scale. The building is 200m in length and 45m in width with a height of 30m. There are not any walls in between, it is a one-room space with a void measuring 26m tall. Due to the lack of maintenance, the building was suffering from leaking problems at various locations. Rusted pipes that were presumably used during production times were lying around on the ground. The concrete columns supporting the building were weathered and marked by time. Yet when we witnessed the state of the columns, we did not look at it from a negative point of view. We were fond of this brutal space that carried its own history. During the revival of the building, we paid close attention, trying to explore ways to create a building for the future while maintaining the existing scale and texture of the architecture.

We responded by creating two atriums along the north-south direction which are then linked by another east-west facing, five-storey tall atrium. This compressed void evokes an ascending verticality which exacerbates the encounter between the human scale and that of the Shipyard's monumental structures. Here, the void not only exhibits the original columns and girders as an impressive spectacle, but also redefines them as the building's core where all events gravitate towards each other.



'Void' and 'Structure' tend to be antithetical concepts. The norm is for the structure to recede into the background in order to frame the emptiness of atriums. Instead, we deliberately inverted the relationship of the two by using the void to frame the raw, load-bearing structure built in the 1970s at the forefront. These aged concrete columns were kept in their original condition as much as possible. For instance, we kept the rusted steel staircase, the painted slogans and numbers which would be otherwise described as dirty and untidy. To preserve such rich textures, the supplementary structures were designed to be the least visible.

These days, commercial spaces tend to conceal the unsightliness of building structures with shiny surfaces, thereby redefining the visual identity of buildings. No matter what structure the architecture uses, the glamorous interiors that ultimately construct our spatial experience bear no relationship with it. As such, the world's commercial spaces have certainly become magnificent and glamorous, but also normalized and insipid.

Shipyard 1862 is a unique structure that is intended to create a 'barebones' commercial space by showcasing the unique structure in the most prominent location. Another critical consideration in the adaptive reuse of architecture is the rediscovery of a building's materiality and maintenance. Every architecture bears a unique texture that identifies it. Materiality imprints a deeper impression than form. If asked to describe the form of a building, the memory of it would be vague most of the time. However, the texture of the building leaves a clear impression behind. Materiality transcends beyond the visual experience, as it requires all five senses of the human body to engage it, to remember it. When the construction was completed, an elderly person who used to work in this exact factory came to visit. He put his hands on the preserved steel staircase and nostalgically began to share his personal memories of the place. He climbed onto the stair, saying that he used to invite a girl here on a date. We strongly believe this building is able to remind people of their own experience while connecting to the future.

Apart from the central commercial area, we planned an 800-seat theatre at the east side of the building. Here, we also worked hard to create the sense of scale and materiality. The ceiling of the theatre exposes the existing concrete beams. In general, acoustics are the highest priority in theatre design and the structure is often invisible due to its acoustic clouds ceiling, but here we only met the minimum

Opposite & Middle: Image courtesy of Erieta Atraki. Above & Bottom: Image courtesy of ELLINA PAO.

CONSUMERISM VS COFFEE WASTE

RECONSTRUCTING DAILY LIVING

Kristen Wang

As the world's second-most traded commodity, coffee is considered a significant beverage consumed in over 2.25 billion cups coffee every day by billions of people across the globe. Approximately 19 million Australians, more than 75% of the entire population, drink coffee daily; this means that Australia alone consumes at least 27000 tons of coffee a year! Suppose we see the other side of the coin, with an estimated average of 11 grams of coffee ground going into each cup of espresso or latte drink. In that case, each cup of coffee produces a staggering eight times more waste than the drink, from wet dispensed coffee grounds and cups to coffee husks and hessian coffee bean bags in the coffee industry chain.¹ Despite governments and local groups trying to convert some of this waste into compost, most coffee waste (an estimated half-million tons in Australia or 18 million tons worldwide) sadly ends up in landfills. However, worse than that, they generate significant greenhouse gas emissions, such as methane—one of the primary causes of global warming, which is 25 times more potent than carbon dioxide.²



Biodegradable materials contain polymers that should be capable of being ultimately absorbed by the surrounding environment and degraded by microorganisms (bacteria, fungi and algae) through composting processes to produce natural breakdown compounds such as carbon dioxide, water, methane and biomass without causing any pollution.³

The global consumerism of coffee is significantly considerable, however the public are mostly unaware of the waste behind the coffee industry and its waste damage. Each gram of disposed café coffee grounds accumulates. Here, the spark of an experimental design exploration begins—Re-Bean Coffee Projects, which aims to repair the current ecosystem of coffee waste. Through creative design work, the problems of waste handling are analysed and the potential of organic coffee waste is realised. The project consequently aims to investigate the potential solutions to the coffee waste issue by utilising the natural biological substance of coffee grounds with a combination of other bio-substances (ideally waste, too) to produce a biodegradable material for further applications.

Additionally, most sustainable furniture products in the current market conventionally incorporate other traditional or non-sustainable materials for the need for structural functionality. In contrast, many so-called biodegradable products are not entirely biodegraded or even mixed with toxic chemicals for mass manufacturing, ultimately weakening their sustainability goal. Critically, Re-Bean Coffee Projects challenges this binary approach by creating a sense of singularity and unity from the same material.

With this goal in mind, Re-Bean Coffee Projects aims to recycle, reuse and reconstruct coffee wastes to create sustainable and fully biodegradable design objects that will induce no other harm to our precious natural environment after their end life. It poses a significant challenge—the invention of such 100% biodegradable material from disposed coffee ground waste, fabrication from this unique new material and functionality and practicality in balance with the material's biodegradability.



Material Learning from Prototyping
A coffee bean is an organic substance; the surface of untreated coffee ground particles is jagged, crumpled, porous, and irregularly shaped. Making use of its unique three-dimensional structure, disposed coffee ground plays a role as the filler of the material mixture. On the other hand, a binder that holds coffee grounds to create a solid determines the new mixture's fundamental quality and property features. In other words, the binder should also be a non-toxic or non-chemical organic substance that can break down in natural environments to achieve the biodegradability of the new coffee material.

Further experimental testing with the amount of binder as a control parameter found that the number of coffee grounds affects the volume, the shrinkage and the drying speed of the new coffee material. This experiment aimed to find the optimum mixture for casting and gaining volume against the number of coffee grounds. With the added coffee grounds increasing, the combination changed from a runny liquid texture to a densified paste state, which means when reaching a certain point, the mixture will be too thick to manipulate for casting.

Countless research and prototypes of coffee ground mixture matching, small sampling and ratio findings were conducted to find the most suitable bonding agent and formula to produce a desired solid form. The explorative binder testing included sugar, milk, banana, starch, tea leaves, etc. However, the most successful outcome was achieved from bone waste.

A solid prototype of the new coffee material was tested on a compressor with a pressure measurement sensor. The data result recorded a 408kg pressure, proving that this coffee mixture material has an incredible compression strength. The slow-motion video captures that the material prototype broke from the hole and cracked.

Above: Coffee and Coffee Re-Bean chair.

Above: Testing samples of coffee ground and binding paste on viscosity.

CONTRIBUTORS

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Fernandez is a designer whose interests lie in interrogating the many divides and biases that lie within the architectural profession, through speculative projects and writings. He has participated in talks at Blindside Gallery, MPavilion, Testing Grounds, Black Spark Cultural Centre, and was a part of the Gertrude Emerging Writers program in 2020. Fernandez has written pieces for *Caliper Journal*, *Architect Victoria* and *Dissolution Magazine*, amongst others.

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MacKinnon is a recent architectural graduate from the University of Melbourne. He currently works at Rebecca Naughtin Architect, a local residential architectural firm, and is interested in design that challenges convention while reducing the built industry's impact on the environment. He is inspired by sustainable urbanisation, urban acupuncture and co-creation for social housing and public spaces.

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Xue has taught architecture at Shanghai Jiaotong University, the University of Texas, and City University of Hong Kong. He is also extensively involved in design and consultant practice in Hong Kong, the Chinese mainland, and the US. An award-winning architect and writer, he has published 15 books, 40 book chapters, and more than 160 research papers in professional and international peer-reviewed journals including *Cities*, *Habitat International* and *Urban Design Journal*, among others. His book on Hong Kong was awarded by the International Committee of Architectural Critics (CICA) in 2017. His research interests are Chinese architecture, transnational design and high-density environments.

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Parkinson is a photographic artist, arts professional and published author who uses photographic processes and practices to remix the visual vocabulary of urban environments across cultures. His PhD at the University of Melbourne researches collective art practices and public cultures in Yogyakarta, Indonesia and Dili, Timor-Leste. Parkinson coordinates and delivers a Street Art elective to undergraduate students at the University. He also co-curates and is a senior editor of PHOTODUST — an Asia Pacific lens-based photo project — and is a Youth Arts Officer with the City of Yarra. He is a member of the University of Melbourne Centre of Visual Art (CoVA) Graduate Academy and the Centre for Projection Art Creative Advisory Committee.

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Dieckmann is the recipient of the 2021 Byera Hadley Traveling Scholarship for her project, *Terracotta: Innovating Australian Rammed Earth Architecture*. Dieckmann's research aims to uncover how robots are innovating sustainable construction methods, making rammed-earth less labour intensive and more widely accessible to the profession. She is currently an architectural graduate practicing with Allen Jack + Cottier Architects, where she aims to make the built environment a more liveable and beautiful place each day.

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Cruddace is a senior practice director of BVN Architecture in Sydney, a collaborative firm engaging with civic, institutional and development projects in Australia and internationally. Previously a partner at Sheppard Robson in London, he has worked on a number of high profile schemes in Europe, the Middle East and Australia. Cruddace has particular expertise in the design and delivery of complex residential-led developments, commercial office HQs and high-rise towers. He currently leads BVN's Quay Quarter Tower project.

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Pavka is a writer and editor whose work explores the intersections of power, memory, gender, sexuality and the built environment. He previously held editorial positions at *Azure Magazine*, *Inuit Art Quarterly* and *Canadian Art* and has presented work at the Art Gallery of Ontario, Museum of Contemporary Canadian Art and the KTH Royal Institute of Technology in Stockholm. In addition, his writings have appeared in *Article*, *ArchDaily*, *ANInterior*, *Lunch*, *On Site Review*, *Pidgin*, *The Architect's Newspaper* and *Field Journal*. Pavka is an Assistant Professor at the Wayne University James Pearson Duffy Department of Art and Art History.

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Carydi is a registered architect and urban designer. With studies in Architecture (NTUA) and Landscape Urbanism (the Architectural Association) and previous working experience with Hargreaves Associates in London, Carydi developed an interest in landscape and environmental systems and their integration with the morphology of urban environments. She has taught as an Adjunct Lecturer in landscape and urban design courses at various universities in Greece and Cyprus and holds her architectural design firm in Athens.

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Bonwick is a graduate of architecture from the University of Melbourne. He holds a Bachelor of Arts in screenwriting and cinema studies. Bonwick works freelance in design, film and photography in Melbourne. His architectural design work and short films have been exhibited, screened and received recognition and awards around Australia and internationally. His independent architectural thesis project, *(Re)collecting Rural*, was recognized with the Bates Smart Award at its conclusion in 2021.

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Kengo Kuma

Kuma established his award-winning practice, Kengo Kuma & Associates (KKAA), in 1990. He is currently a Professor in the Department of Architecture at the University of Tokyo. He holds a PhD from Keio University and is an international and honorary fellow of multiple national architectural institutes. Kuma proposes architecture that opens up new relationships between nature, technology and human beings. His major publications include *Makeru Kenchiku* [Architecture of Defeat] (Iwanami Shoten, 2004) and *Shizen na Kenchiku* [Natural Architecture] (Iwanami Shinsho, 2008), among others.

Kirsten Day

Day is an architect and director of Norman Day + Associates. She is a Lecturer in Architecture at the University of Melbourne. Day chairs the Education Committee for the Victorian Chapter of the Australian Institute of Architects and is an examiner for the Architects Registration Board of Victoria. Her publications, workshops, and design studios explore the themes of future scenarios and the impact of change. Day organized the international conference, Future Housing: Global Cities and Regional Problems, at Swinburne University in 2016 with the Architecture Media Politics Society as part of the Housing Critical Futures conference series.

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Yutaka Terasaki

Terasaki is a partner at Kengo Kuma and Associates and a director of the firm's Shanghai office since 2020. A graduate of Tokyo University of Science, Terasaki has worked in multiple architectural practices in both Japan and China. He played a key role in the design of Shipyard1862.