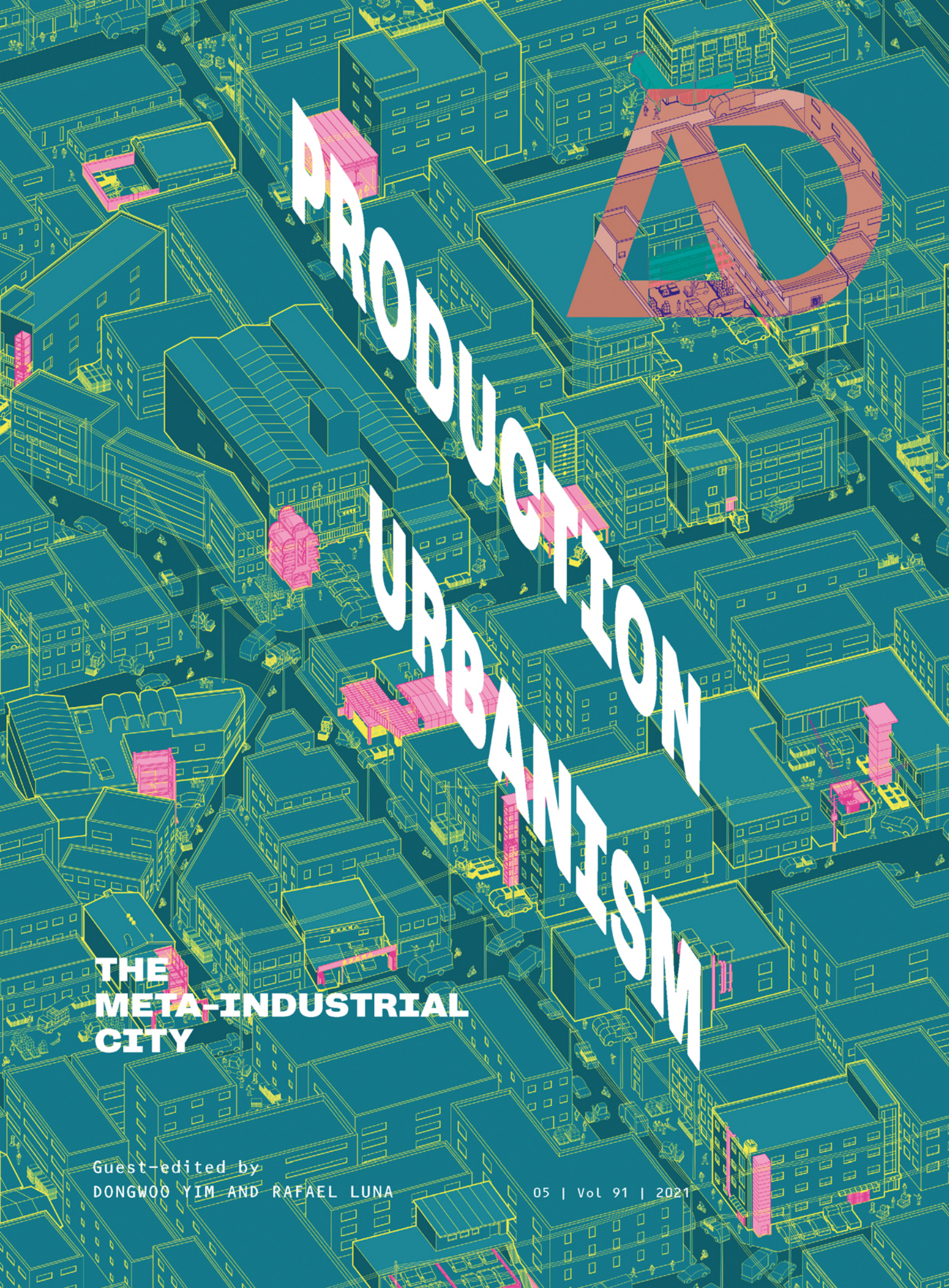

PRODUCTION URBANISM

THE META-INDUSTRIAL CITY

Guest-edited by
DONGWOO YIM AND RAFAEL LUNA

05 | Vol 91 | 2021

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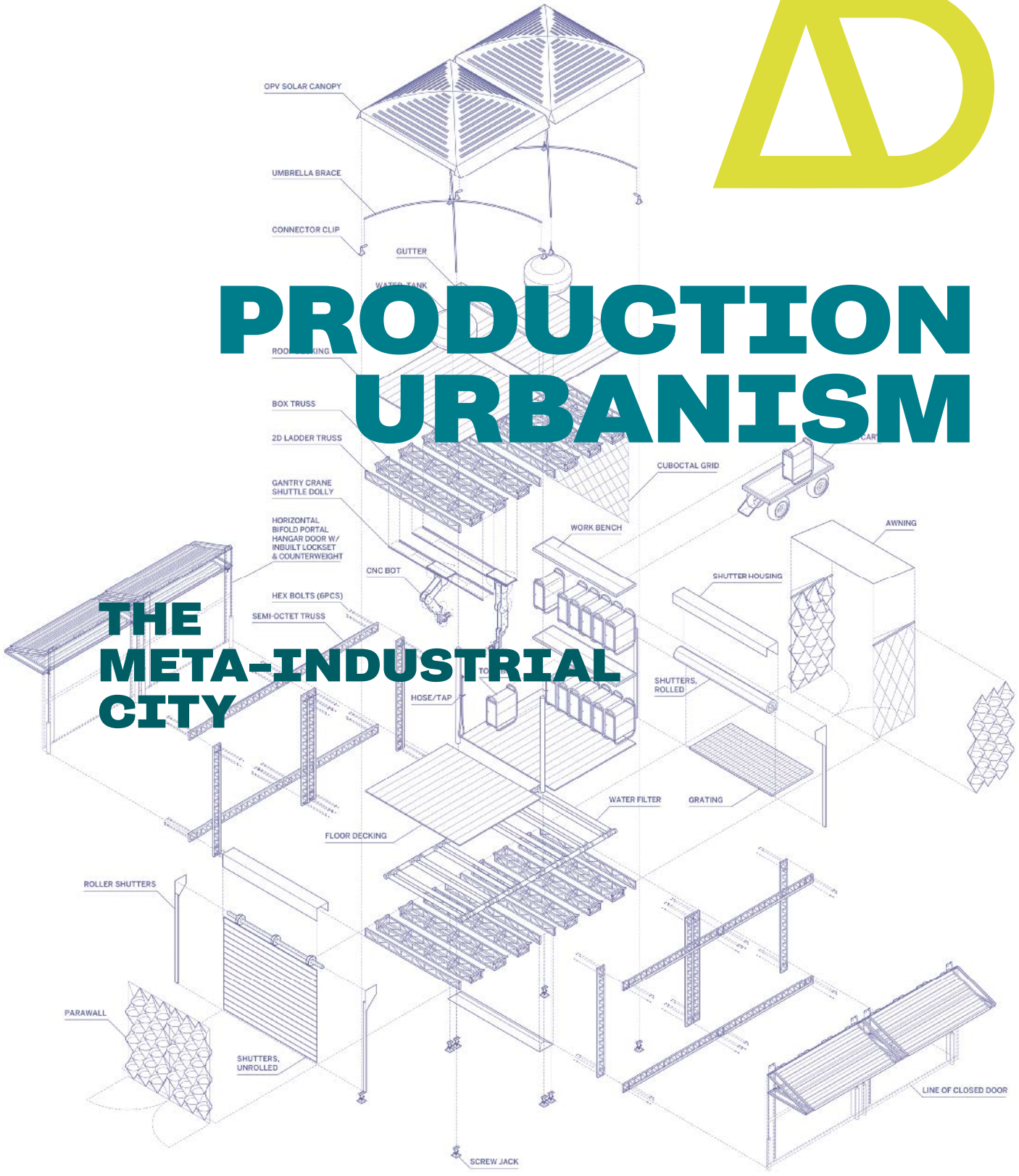

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DONGWOO YIM AND
RAFAEL LUNA

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Guest-edited by **Dongwoo Yim and Rafael Luna**

'In an era fascinated by new technologies and hyperconnectivity, architects face the call to envision a future built environment beyond simple technocratic ideals and into complex hybrid scenarios where infrastructures of production can be repositioned as an architectural problem.'

—Dongwoo Yim and Rafael Luna

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Goldsmith.Company, Floating Farm Dairy, M4H district, Rotterdam, 2019.
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Page 1
Agbogbloshie Makerspace Platform, Taxonomy of the AMP spacecraft kit, 2020.
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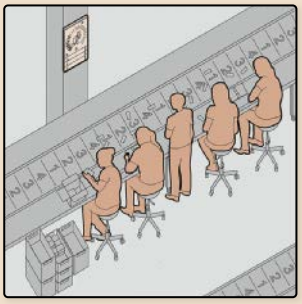
ARCHITECTURAL DESIGN

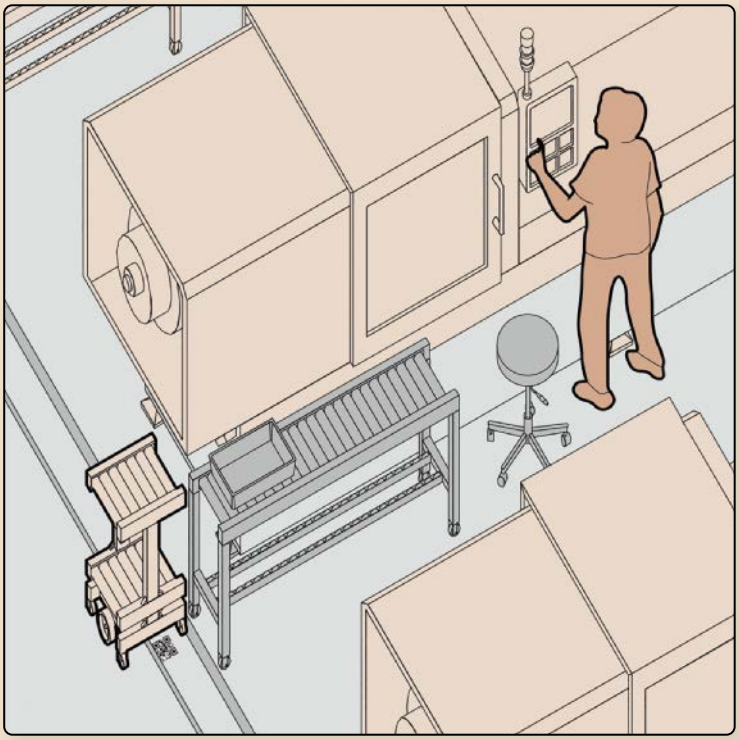
September/October	Issue	Profile No.
2021	05	273

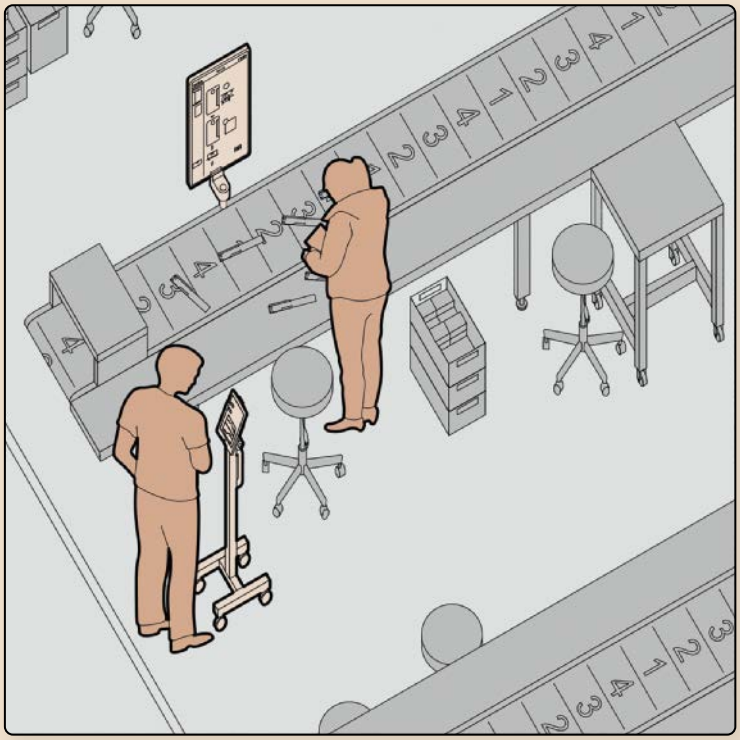


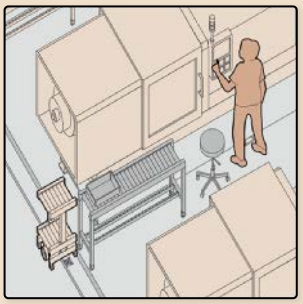
Marina Otero Verzier

NOTHING IS AUTOMATIC

PRODUCING MORE-THAN-HUMAN RELATIONS IN THE PEARL RIVER DELTA

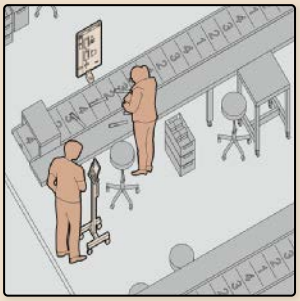


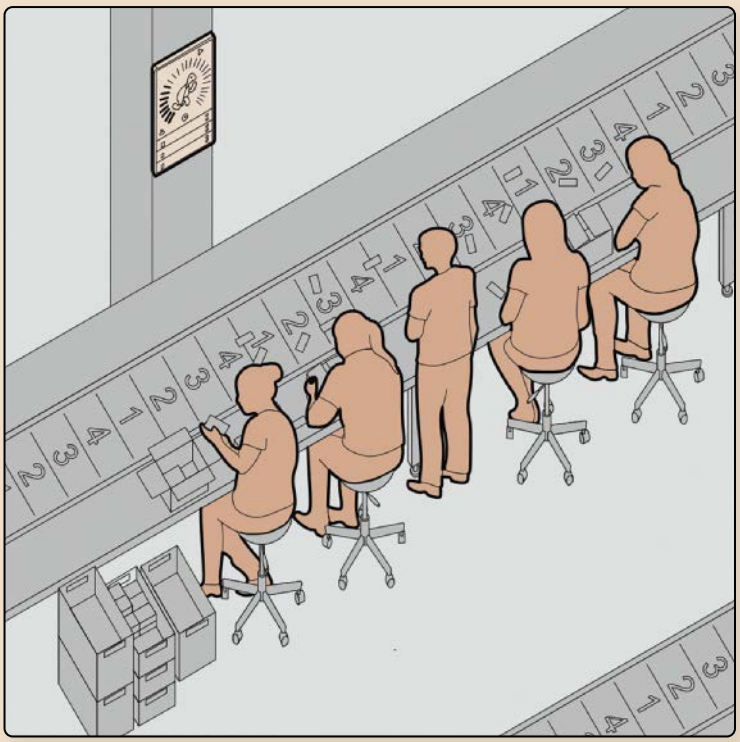




Het Nieuwe Instituut,
Ash Cloud factory (part of
Automated Landscapes project),
Shenzhen, China,
2018

Automation plays a key role in increasing efficiency and productivity in the Ash Cloud factory, yet here robots and AI have not replaced humans. Instead, they have reprogrammed them and become their managers.





In the light of rapid urbanisation, manufacturing processes in China's Pearl River Delta are undergoing extensive change. This is one of the regions where the collaborative research project Automated Landscapes has been exploring how automation affects the built environment. Among several international partners involved in the initiative is the Research and Development department at Rotterdam's Het Nieuwe Instituut, headed by **Marina Otero Verzier.** Here she charts how the area's industries are being rearticulated in line with shifting relationships between humans and machines, and how this is proving a double-edged sword for the evolution of the city.

While automated machines have captured humans' imagination throughout history, the architecture of full automation is no longer a distant project. Implemented today in places like the US, Germany, the Netherlands, Japan and Korea, autonomous machines maximise the performance of financial, logistical and production centres. Even the so-called 'factory of the world', the Chinese region of the Pearl River Delta, is transforming its production lines to become one of the main scenarios for the transition to automated systems.[1] And it is precisely in the region's manufacturing, logistics and supply chain infrastructures that the new architectures – buildings, spatial practices, technologies, protocols – for the interaction between humans and robots are being tested.

When in 2014 the Chinese government launched 'Made in China 2025' – a national plan aimed at redirecting the focus of its manufacturing industry from a quantity to a quality paradigm – mass production was giving way to so-called 'intelligent manufacturing'. At the core of this transition was the introduction of advanced robotics to increase labour productivity and competitiveness.[2] The national scheme triggered other regional and local programmes in areas of concentrated production.[3] One of these automation programmes, initiated by Guangdong province in 2015, has received more than 900 billion Chinese yuan in funding, with subsidies covering between 10 and 20 per cent of companies' investment in robotics upgrades. Its name evokes what many would consider a dreaded, dystopian future: 'Robots to Replace Human Workers'.[4]

If we are to take the name of this programme as equivalent to its ambition, it would seem that the Pearl River Delta is the ideal place to explore how these disruptive changes could affect the architectures of production and the labouring bodies that populate them. Yet while automation still seems, for many workers, to be leading to a future without work, machines are but the human fantasy of the working body par excellence. Or, as Michel Foucault put it, while 'men have dreamt of liberating machines, there are, by definition, no machines of freedom'.[5] In fact, modern conceptions of freedom and contemporary factories are both built upon the reproduction of industrial capital and the exploitation of human and non-human workforces. Their ideologies materialised into seemingly banal architectures.

Since 2017 the cultural centre Het Nieuwe Instituut in Rotterdam, the Netherlands, has been working on the initiative Automated Landscapes, a collaborative research project analysing precisely these unassuming architectures that are nevertheless emergent scenarios for the future of labour and production urbanism. Developed together with Marten Kuijpers, Ludo Groen, Victor Muñoz Sanz, Merve Bedir, the Future+ Aformal Academy in Shenzhen and Hong Kong, and a large number of supporters and collaborators, Automated Landscapes reflects on the implications of automation for the built environment and the bodies that inhabit it. In the Pearl River Delta, the research has focused

primarily on the Build Your Dreams (BYD), Rapoo Technology and Ash Cloud factories – all located in Shenzhen – as case studies for the paradigms for the division of labour as socio-spatial relations between humans and non-humans.

Redistribution of Labour

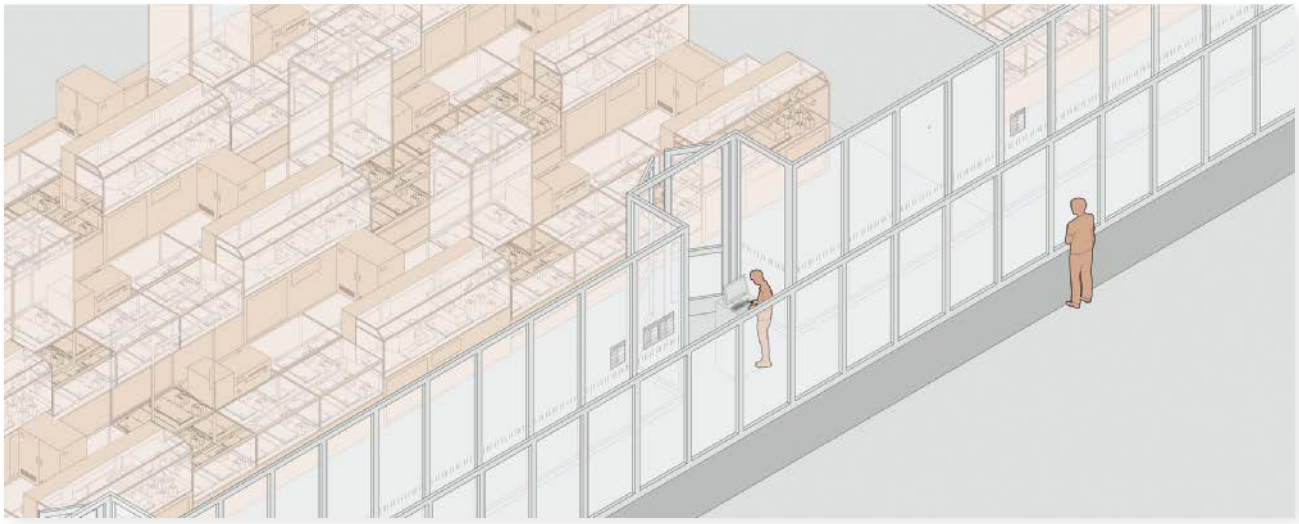
Build Your Dreams is one of China's main manufacturers of cars, battery-powered bicycles, buses, trucks, forklifts, solar panels, and rechargeable and mobile-phone batteries. In its factory in Shenzhen's Pingshan District, humans and robots do not cross paths. Their domains are demarcated by a clear, straight, glass wall. Yet on both sides of the wall, bodies – human or otherwise – follow the same rhythm. That of the monotonous and predictable operations needed to keep the largest battery production in the world running.[6] A rhythm dictated and monitored by software systems that track the status of batteries.

This repetitive labour in the assembly lines is precisely what makes the use of automation cost-effective, as well as being the cause of the decrease of human workers employed in manufacturing processes. Robots maximise productivity and save space, while guaranteeing a working environment where lunch breaks, common spaces and human comfort are becoming obsolete. Where workers' unions have no place. With the exception of a handful of engineers and managers – who rarely make incursions into the domain of machines – the presence of the human body and the architecture designed around it becomes more irrelevant. The glass wall might soon be so too.

However, automation does not only imply the replacement of human activities by machines, but also a redistribution of labour. The bodies of those who previously populated the human domain are not necessarily liberated from the bondage of labour, but instead pushed to relocate. Workers disappearing from the Build Your Dreams production line may appear elsewhere – notably in places where the precision of their human fingers' movements is still in demand. The factories of the Shenzhen-based electronics manufacturer Rapoo Technology are such a space.

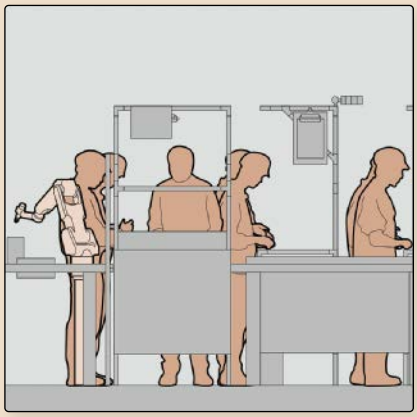
Rapoo started to introduce automation within its assembly lines in 2005. The measure was meant to be a solution to labour shortages in peak-demand seasons. It took the company four years to complete automation of one of its production lines. Paradoxically, the product for which the technology had been implemented was already outdated by then. Robotic solutions, they learned, needed to be constantly adjusted in order to respond to changes in market cycles.

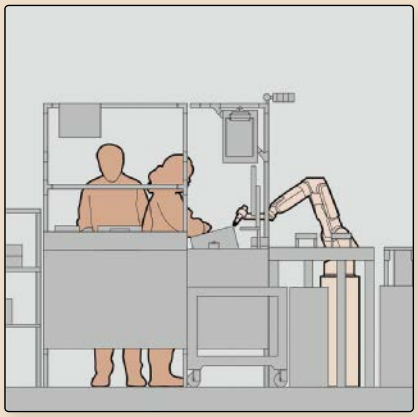
To avoid a repeat of such complications the company designed a flexible manufacturing system based around collaboration between humans and robots, instead of the replacement of the former. Robots carry out the repetitive tasks needed for the production of standardised components, in addition to the more dangerous and heavy activities. Human labour is, in turn, focused on adding the plasticity that market changes demand.[7] Yet there is always trouble in paradise, and Rapoo's human–machine collaborative strategy also resulted in the reduction of its human workforce from about 3,000 to 700 employees.

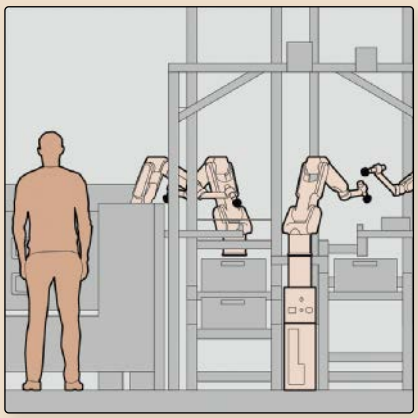


Het Nieuwe Instituut,
Build Your Dreams factory
(part of Automated Landscapes project),
Pingshan District,
Shenzhen, China,
2018

Founded in 1995, Build Your Dreams is a major manufacturer of various vehicles as well as solar panels, and rechargeable and mobile-phone batteries. The company has transitioned to automated technologies for efficiency. As humans disappear in favour of robotic labourers, assembly lines and storage areas are reorganised to maximise productivity. Engineers and managers do not venture into the domain of machines here unless absolutely necessary.



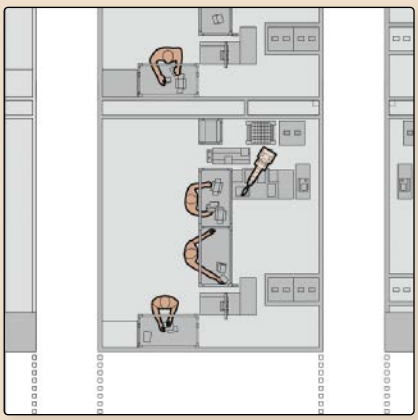


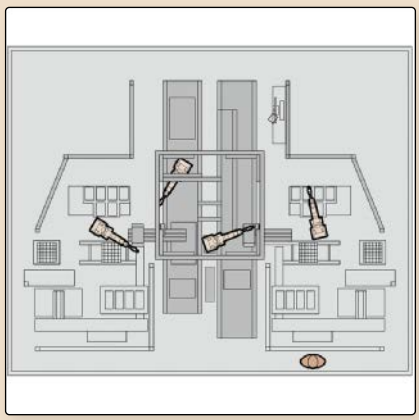


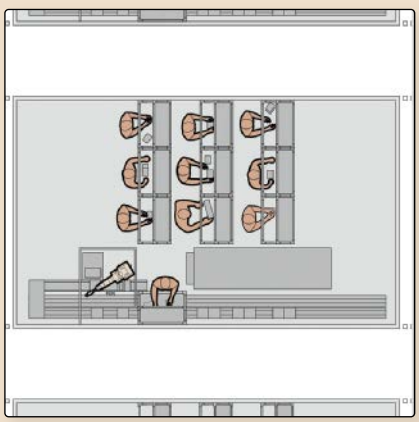
Rapoo Technology is a Shenzhen-based electronics manufacturer that has introduced automation in its assembly lines since 2015. Rapoo's strategy is based on collaboration between humans and robots, and the factory's architectural solutions reflect the various scales and formats for these human and non-human interactions.

Het Nieuwe Instituut,
Rapoo Factory (part of Automated Landscapes project),
Shenzhen,
China,
2018

The work and maintenance of the robots, as well as the training of human employees to achieve maximum efficiency, is controlled by AI







The spatial configurations of human–machine relations inside the Rapoo factory are organised into rectangular work islands, where the levels of automation range from manual to fully automated manufacturing. Robot arms work alongside human operators assembling computer keyboards, mice, and their sub-components.

Human workers are still in demand at Ash Cloud, a company also located in Shenzhen that produces accessories for mobile phones and tablets. There, robots and AI have not replaced humans. Instead, they have reprogrammed them and become their managers. The enterprise resource planning (ERP) system manages the factory internally and remotely to the point that the figure of the middle manager has been rendered redundant.

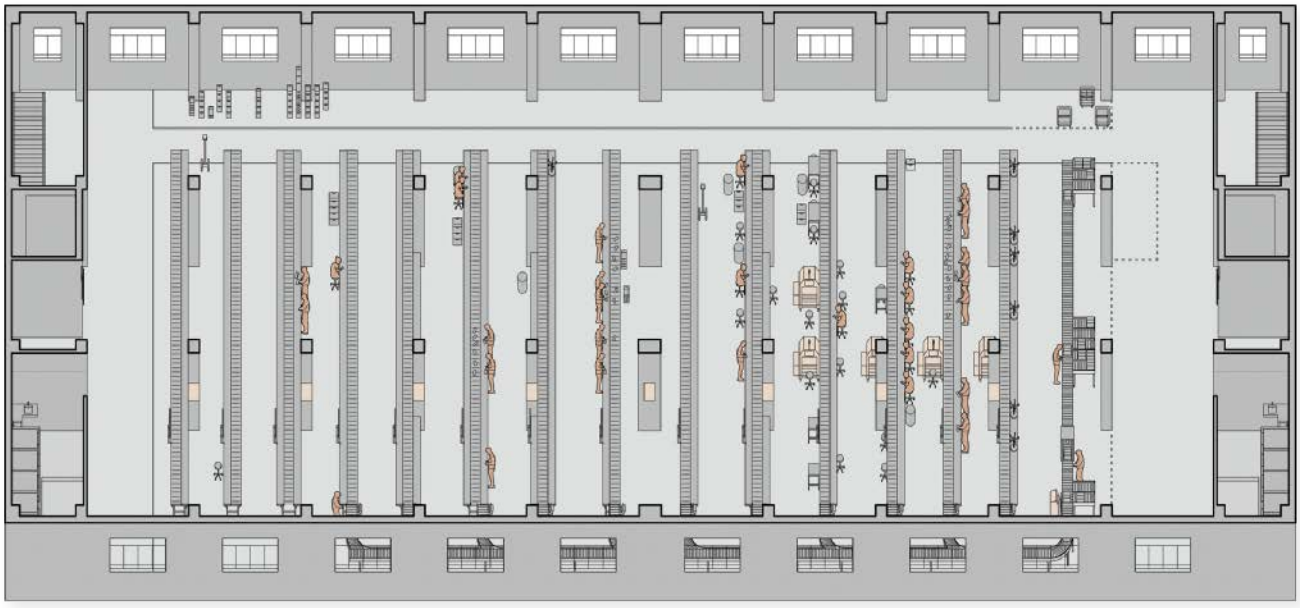
The ERP monitors supply and demand, product stocks, employee tasks, shifts, hours and vacations, resource usage, waste produced, currency exchange and stock market activity in real time. Easily accessed through an IOS application, the system quantifies performance and efficiency and makes results intelligible through the screens of computers, tablets and mobile phones. It in fact channels all communication between the management team and human and machinic employees.

The work and maintenance of the robots, as well as the training of human employees to achieve maximum efficiency, is controlled by AI. In this way, the productivity of each assembly line is measured against objectives and cost. Productivity is also enhanced by digital avatars of a sad turtle or a happy rabbit that emerge and preside over the assembly lines to either push or motivate the human teams' work. Nothing is fully automatic. It is designed for subjecting bodies to the crude pace dictated by production needs. As architect and filmmaker Liam Young puts it, human bodies are optimised and trained to perform as components of an efficient planetary-scale production line.[8]

New Paradigms

The examples of Build Your Dreams, Rapoo Technology and Ash Cloud demonstrate how automation does not necessarily lead to a utopian human society organised around leisure, nor to one of rampant unemployment due to the total replacement of the human workforce. They show, instead, how under the relentless scrutiny of AI, employees are pressured to perform at their limits to contribute to an infinite supply of cheap labour at the expense of resting time, one-to-one communication, welfare and safety issues. Their bodies are in fact abstracted into numbers and graphs displayed on smooth surfaces. They are data on a screen where forms of empathy and solidarity towards the worker are rendered irrelevant to the AI or humans who coordinate, recalibrate and control them. A perfected Cartesian regime designed for maximum profit through the full exploitation of bodies, and unbothered by changing social dynamics and working conditions.

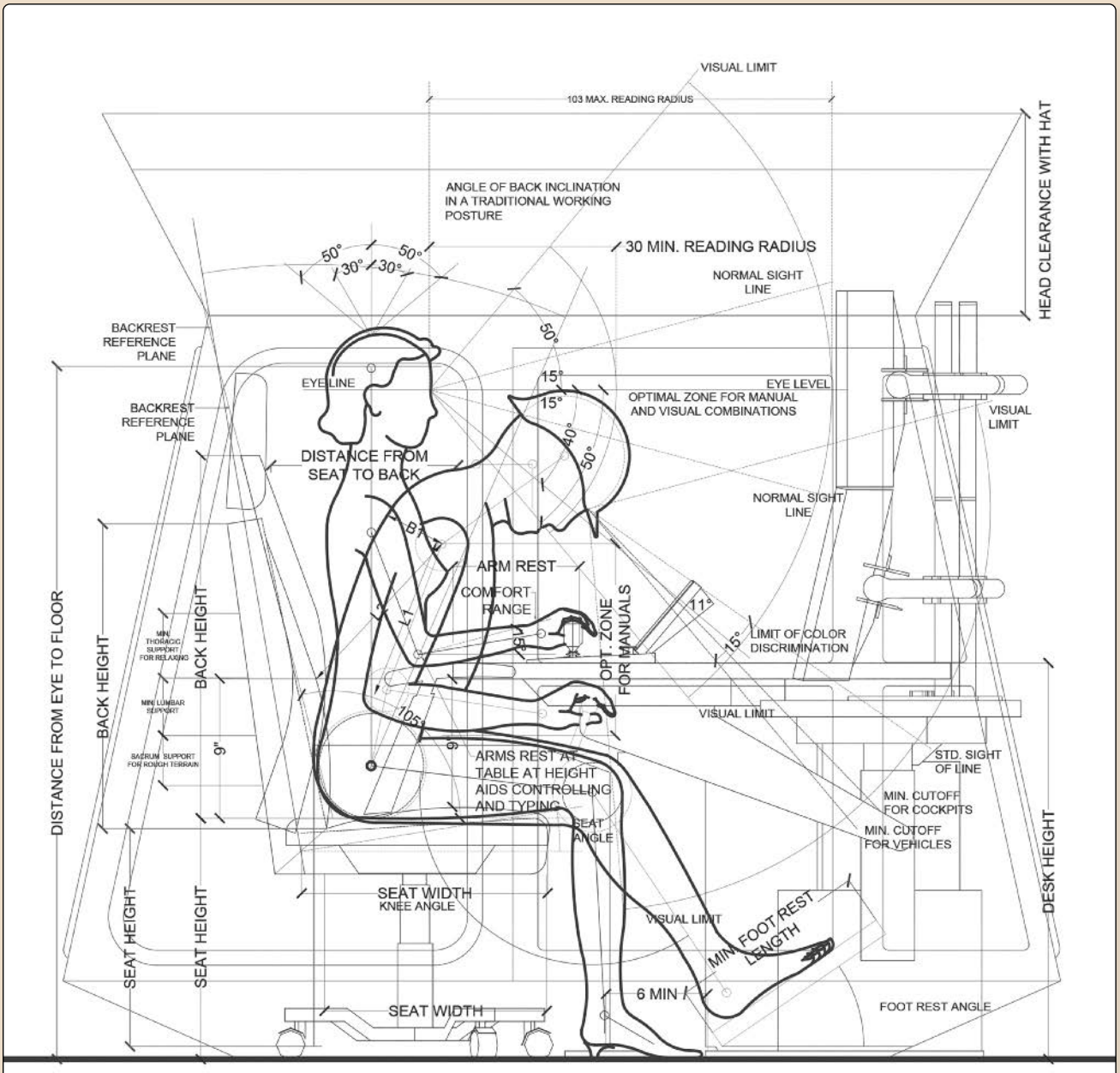
These infrastructures and dynamics have a profound impact on the environment. As some human bodies and their capacities become dispensable (or exhausted), so do the spaces that they inhabit even beyond the assembly lines and production centres. Automation does not mean replacement, but displacement and differential distribution of the social, ecological and economic effects of these regimes.[9] What happens in the factories in Shenzhen has an impact on the city's landscape and economy and in its neighbouring cities and regions where workers made redundant may need relocate. It is also felt in more distant territories, where the changes in the pace of production and the supply chain that automation is instilling in the Pearl River



Het Nieuwe Instituut,
Ash Cloud factory (part of
Automated Landscapes project),
Shenzhen, China,
2018

The Ash Cloud factory, focused on the manufacturing of mobile phone polyurethane cases, still depends on human labour and maintains a spatial organisation based on assembly lines that operate during fixed hours.

Rather than aiming for enhancing productivity, a post-anthropocentric and non-Cartesian architecture could instead serve to challenge the inevitability of unequal relations between humans and the planet



Het Nieuwe Instituut, Anthropometric graphical study of crane cabin operator versus remote control operator, Automated Landscapes project, 2018

The Automated Landscapes project initiated in 2017 had as a hypothesis the substitution of humans by robots in production centres due to the introduction of emergent automation technologies. Yet the research demonstrated that blue-collar human workers are not disappearing from production sites, but being displaced to other markets and territories and/or replaced by white-collar workers who control operations remotely from their laptops and iPads.

Delta translate as even more pressure on the already strained manual labourers to remain competitive.

What to do with the replaceable, displaced humans has been the focus of educational programmes to develop workers' skills and competencies or proposals for a universal basic income. Yet perhaps the most important question to address is how these new paradigms of work could bring the seed of an alternative organisation of society and its accompanying architectures. After all, the fascination and anxiety produced by an automated world can be redeployed towards the actual prospect of social, economic or ecological collapse in the face of climate crisis – a crisis brought about by this quest for relentless production based on the exploitation and invisibility of labouring bodies.

Future Speculations

If there is something to glean from the architecture of the Build Your Dreams, Rapoo Technology or Ash Cloud factories it is that, unlike contemporary cities, they do not have humans at their centre. Perhaps the de-centring of the human that we are witnessing in the productive architectures of the Pearl Delta River could be taken further, to the de-centring of the notion of humankind as a universal, rational subject. However, rather than aiming for enhancing productivity, a post-anthropocentric and non-Cartesian architecture could instead serve to challenge the inevitability of unequal relations between humans and the planet. For nothing is fully automatic. Humans, their time, their labour and behaviours are managed by technologies, protocols, legal documents and social conventions. The product of automation is not only commodities but, perhaps more importantly, the technologically enabled biopolitical production, reproduction and extraction of forms of life.

Yes, human bodies are subject to programming. We could, therefore, be willingly self-reprogrammed not for the pursuit of profit and privilege for some humans, but instead to unleash ecological practices and networks of ethics and responsibility. To combat climate injustice. To conceive and enact an architecture not based on systems of exploitation of bodies, on the depletion of resources, on the dictates of the market and the rationality of economic efficiency. An architecture for the future that is not confined to managerial disciplinary boundaries or technological industrial progress. ◭

Notes

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6. Jiang Shan in conversation with Merve Bedir (member of the research team), Pingshan, China, 25 January 2018.
7. Steven Lee in conversation with Merve Bedir and Marten Kuijpers (members of the research team), Shenzhen, China, 25 October 2017.
8. Liam Young in conversation with Simone Niquille and Arif Kornweitz, 'Useful Life Podcasts', part of *Work, Body, Leisure*, Dutch Pavilion at the 2018 Venice Architecture Biennale, curated by Marina Otero Verzier: https://work-body-leisure.hetnieuweinstituut.nl/audio.
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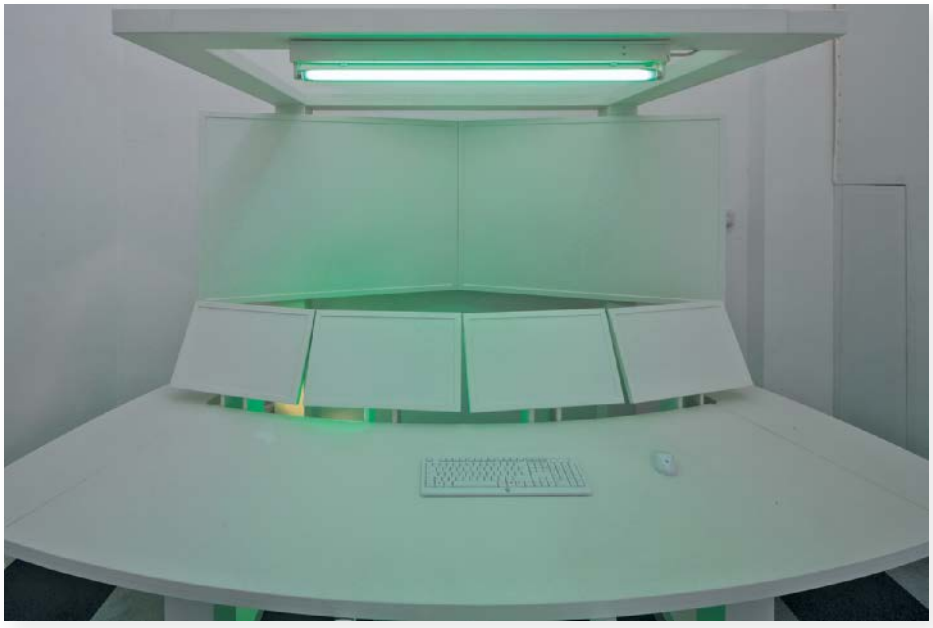

Marina Otero Verzier (curator), *Work, Body, Leisure*, Dutch Pavilion, Venice Architecture Biennale, 2018

This work, by Marien Kuijpers and Victor Muñoz Sanz, and included in the OFFICE Room in the Dutch Pavilion at the 2018 Venice Architecture Biennale, looked into the transition to automation production and the effect it has on territories and labouring bodies. Shown here is a replica of the operator's remote work area inside the fully automated container terminal in Rotterdam (APM).

CONTRIBUTORS

Yasmine Abbas is architecture and engineering design faculty at the Pennsylvania State University. She researches strategies for the design of living environments across contemporary conditions of expanded physical, digital and mental mobilities. She has worked in multicultural environments employing design thinking methods to generate pan-urban intelligence and drive urban innovation. She co-founded the Agbogbloshie Makerspace Platform (AMP), was the winner of the Rockefeller Foundation's Centennial Innovation Challenge 2013, and has received the 2017 SEED award for Public Interest Design, and Le Monde Urban Innovation Award – Citizen Engagement, Le Monde Cities (2020).

Frank Barkow is the founder of architectural practice Barkow Leibinger. He received his Bachelor of Architecture from Montana State University in Bozeman, and is a graduate of the Harvard University Graduate School of Design (GSD) in Cambridge, Massachusetts. He is a design and construction leader in the practice, and heads up the research group investigating both digital and analogue fabrication methods. His approach embraces design in a discursive way that allows the work to respond to advancing knowledge and technology. He has been a professor at the Princeton University School of Architecture in New Jersey since 2016, and has recently taught at Harvard GSD.

Michele Bonino is Associate Professor of Architecture and Urban Design and Vice Rector for Relations with China at the Politecnico di Torino. He was previously a visiting professor at Tsinghua University in Beijing (2013 and 2014) and a visiting scholar at the Massachusetts Institute of Technology (MIT, 2016). He was the Academic Curator (with Sun Yimin) of the 2019 Shenzhen Bi-City Biennale of Urbanism/Architecture. On behalf of the Politecnico di Torino, he is leading the design of the Shougang Visitor Centre for the XXIV Olympic Winter Games (Beijing 2022). He has co-edited a number of books including *China Goes Urban* (Skira, 2020) and *The City after Chinese New Towns* (Birkhäuser, 2019).

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Vicente Guallart was a chief architect (2011–15) of Barcelona City Council with responsibility for the strategic vision for the city and its major projects. He also co-founded and directed the Institute for Advanced Architecture of Catalonia (2001–11). The work of his practice, Guallart Architects, has been widely published, and exhibited at the Venice Architecture Biennale and the Museum of Modern Art (MoMA) in New York. He is the author of the books *Plans and Projects for Barcelona 2011–2015* (2015) and *The Self-Sufficient City: Internet has Changed Our Lives but it Hasn't Changed Our Cities* (2010), both published by Actar, and co-author of the *Metapolis Dictionary of Advanced Architecture*. In 2010, the American Institute of Architects organised a solo exhibition of his work in Washington DC.

Tali Hatuka is an architect, urban planner and associate professor at Tel Aviv University, where she is the head and founder of the Laboratory of Contemporary Urban Planning and Design (LCUD). Her work focuses on the urban realm and society (public space, conflicts, technology) and urban development and city design (housing and industry). She graduated from the Faculty of Architecture and Town Planning at the Technion – Israel Institute of Technology in Haifa, received an MSc in Urban Design from Edinburgh College of Art/Heriot-Watt University, and a doctorate from the Technion. She was a Fulbright and a Marie Curie fellow in the Department of Urban Studies and Planning at MIT.

Doojin Hwang studied architecture at Seoul National University and at Yale University in New Haven, Connecticut. He founded Doojin Hwang Architects (DJHA) in Seoul in 2000. He has been involved in a series of projects in the city's historic centre, including a number of *hanoks* (traditional Korean houses). This inner-city experience led him to develop ideas about an urban mixed-use typology he calls 'rainbow-cake architecture', which is also the tile of a book he published in 2015. He has given lectures and exhibitions extensively around the globe.

Alexis Kalagas is Urban Strategy Lead at Relative Projects, and leads an advanced architecture studies unit at Monash Art, Design and Architecture (MADA) in Melbourne. Working across research, curatorial and strategic design projects, he has explored the economic, social and technological forces reshaping our experience of urban space and the home as a Harvard GSD Richard Rogers Fellow, a Future Architecture Fellow, and a finalist in the City of Sydney's Alternative Housing Ideas Challenge. He is the co-editor of *Reactivate Athens: 101 Ideas* (Ruby Press, 2017) and exhibited at the Seoul Biennale of Architecture and Urbanism with Zurich- and Belgrade-based design research group TEN in 2019.

Yerin Kang is an architect based in Seoul, and has served as Associate Professor in Practice in the department of architecture at Seoul National University since 2019. She co-founded the design firm SoA (Society of Architecture) in 2011. Key projects include Roof Sentiment at the National Museum of Modern and Contemporary Art (MMCA, 2015); the mixed-use Paju Book City Studio M, Gyeonggi Province (2017), and the Seong-su Silo, part of the Metropolitan Small Manufacturers' Support Center (MSMSC) in Seoul (2019), which have featured in various international publications. She was the curator of the 'Production City' exhibition at the Seoul Biennale of Architecture and Urbanism in 2017.

Kengo Kuma established Kengo Kuma & Associates in 1990 in Tokyo, after his time as a visiting scholar at Columbia University in New York. He received his Master's degree in architecture from the University of Tokyo, where he is currently a University Professor and a Professor Emeritus. Since then, Kengo Kuma & Associates has designed architectural works in over 20 countries and received prestigious awards, including the Architectural Institute of Japan Award, the Spirit of Nature Wood Architecture Award (Finland), and the International Stone Architecture Award (Italy).

Chihoon Lee is an architect and a co-founder of the award-winning practice SoA (Society of Architecture) in Seoul. His work has been exhibited at international venues including the MAXXI – National Museum of 21st Century Art in Rome (2012), and published in media such as the *Architectural Review*, *Domus Korea, Mark* and *SPACE* magazines. With Yerin Kang he was awarded the 2015 Young Architects Program (YAP Korea) organised by the Ministry of Culture and Korea Architects Institute, MMCA, MoMA and Hyundai Card Co, Ltd. In 2016 they were finalists in the AR Emerging Architecture award.

Wesley Leeman studied at the Rotterdam Academy of Architecture, graduating in 2014. His graduation project addressed regional-scale agricultural modernisation in the Yangtze delta, China. After working at several architecture offices in the Netherlands from 2008, he joined Goldsmith.Company (founded by Klaas van der Molen) in 2017, and became a partner in 2019. The firm operates within the boundaries of architecture and urbanism, and has gained specific expertise in the fields of nautical and agricultural architecture over the last decade. He is also currently a tutor at Rotterdam.

Scott Lloyd works on architecture, publishing and curatorial projects. His design, research, teaching and writing explore the politics and aesthetics of space. He graduated from ETH Zurich, where he researched and taught urbanisation. He is currently director of the design research group TEN, which won the Swiss Art Award for Architecture in 2018 and the 2020 Foundation Award for emerging architecture practices.

Winy Maas is a founding partner and Principal Architect of MVRDV, and has received international acclaim for his broad range of urban planning and building projects across all typologies and scales. He challenges colleagues, clients, as well as students and collaborators at TU Delft's The Why Factory – an internationally engaged think tank he established in 2008 – to question the boundaries of established standards to produce solutions that reimagine how we live, work and play. He is widely published, actively engaged in the advancement of the design profession, and sits on numerous boards and juries, including the Spatial Quality Boards of Rotterdam, Eindhoven and Barcelona.

DK Osseo-Asare is principal of transatlantic architecture studio Low Design Office (LowDO), is an Architectural League of New York 2021 Emerging Voices award-winner, and assistant professor of architecture and engineering design at Pennsylvania State University where he directs the Humanitarian Materials Lab. He co-founded the pan-African open maker tech initiative Agbogbloshie Makerspace Platform (AMP) and led urban design for the Anam City and Koumbi City new town projects in Nigeria and Ghana. He is a TED Global Fellow and received his MArch from Harvard GSD. His research explores material assemblies optimised for massively scalable radical resilience.

Marina Otero Verzier is director of research at the Het Nieuwe Instituut in Rotterdam where she oversees initiatives such as Automated Landscapes, and BURN-OUT: Exhaustion on a Planetary Scale. She is also the head of the Master's programme in Social Design at the Design Academy Eindhoven. She was a member of the curatorial team of the 13th Shanghai Biennale; curator of 'Work, Body, Leisure', the Dutch Pavilion at the 2018 Venice Architecture Biennale; chief curator of the 2016 Oslo Architecture Triennale; and the director of Global Network Programming at Studio-X – Columbia University. She has co-edited a number of books, including *Work*, *Body*, *Leisure* (2018), *Architecture of Appropriation* (2019) and *More-than-Human* (2021), published by the Het Nieuwe Instituut.

Nina Rappaport is an architectural historian, curator and educator. With her consultancy, Vertical Urban Factory, she focuses on industrial urbanism, encouraging urban production spaces, and the role of the factory worker. She is the author of *Vertical Urban Factory* (Actar, 2015) and co-editor of *Design of Urban Manufacturing* (Routledge, 2020). Her exhibition 'Vertical Urban Factory' has travelled to 12 cities since 2011. Her ongoing film project, *A Worker's Lunch Box,* features interviews with factory workers. She is Publications Director at the Yale School of Architecture, has been a visiting professor at the Politecnio di Torino, and teaches at the College of Public Architecture at Kean University in Union, New Jersey.

Maria Paola Repellino has a PhD in architecture and building design, is a research fellow at the Politecnico di Torino where she is Executive Director of the China Room research group and a member of the Future Urban Legacy Lab. She was previously a visiting scholar at the School of Architecture at Tsinghua University.
Her research work focuses on the role of industrial legacy in redefining the relationships between architecture, city and production in contemporary China. Recent books include *Fun Mill: The Architecture of Creative Industry in Contemporary China* (ORO Editions, 2021) and *The City after Chinese New Towns* (Birkhäuser, 2019).

Neil Spiller is Editor of Δ, and was previously Hawksmoor Chair of Architecture and Landscape and Deputy Pro Vice Chancellor at the University of Greenwich. Prior to this he was Vice Dean at the Bartlett School of Architecture, University College London (UCL). He has made an international reputation as an architect, designer, artist, teacher, writer and polemicist. He is the founding director of the Advanced Virtual and Technological Architecture Research (AVATAR) group, which continues to push the boundaries of architectural design and discourse in the face of the impact of 21st-century technologies. Its current preoccupations include augmented and mixed realities and other metamorphic technologies.

Shohei Shigematsu is a partner at OMA, based in the practice's New York office. He leads the firm's diverse portfolio in the Americas and Japan. His cultural projects across North America include the New Museum and Albright-Knox Art Gallery extensions in New York, Sotheby's Headquarters, the Quebec National Museum of Beaux-Arts and the Faena Art Center in Miami.
He has also designed exhibitions for Prada, the Venice Architecture Biennale, Metropolitan Museum of Art, Park Avenue Armory, and Dior's first US retrospective at the Denver Art Museum and Dallas Museum of Art. He is currently overseeing the construction of OMA's projects in Japan, including the Tenjin Business Center in Fukuoka and a mixed-use tower in Tokyo.

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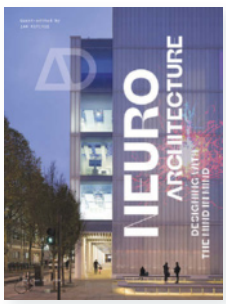

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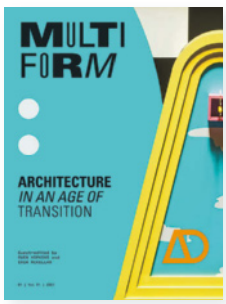

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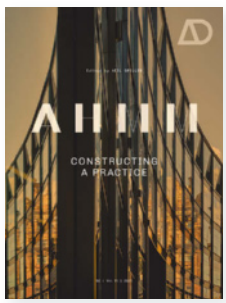

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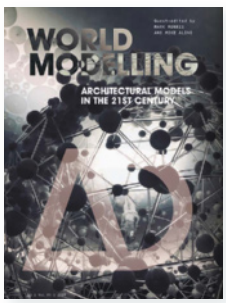

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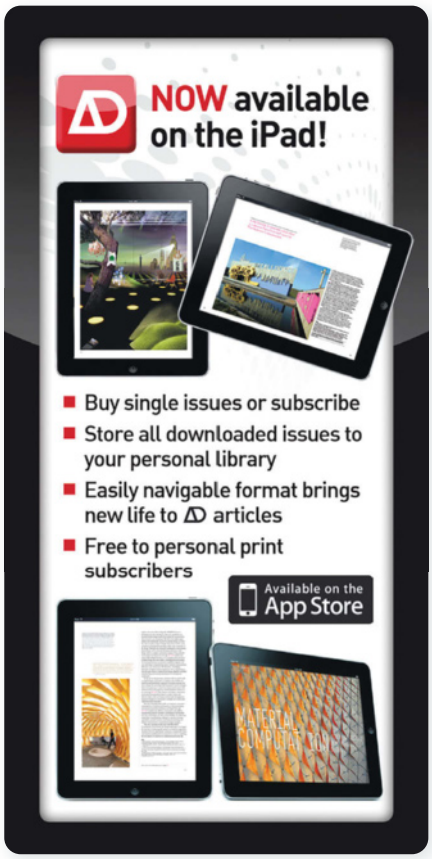

PRODUCTION URBANISM

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The Industrial Revolution caused a paradigm shift from an agrarian economy to a manufacturing economy, giving birth to the industrial city. 'City' became synonymous with a concentration of factories causing unfiltered scenes between centres of production and urban dwellings. The corrupted image of the city ultimately led to the displacement and separation of production away from residential zones in the 20th century.

However, new innovative manufacturing technologies are allowing a coexistence between factories and dwellings through hybrid typologies that blend production back into the urban fabric. This AD issue discusses the implications of the re-emergence of production as an architectural and urban agenda through hybrid models that engage a new socio-economic shift. Given the contemporary circumstances of a global pandemic affecting global supply chains, it is necessary to deliver a vision for a new productive urbanism that allows autonomous circular economies to flourish. Our 21st-century cities have an obligation to explore a new industrial revolution of shared economies that optimise the use of the legacy systems, infrastructure and building stock. Yet it is ultimately up to architecture to take arms in delivering new typologies.

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