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Special Conference Issue: The Future City

Overcoming Carbon, Climate, and Societal Challenges in Cities

Megacities vs. Urban Sprawl

Reducing the Carbon Emissions of High-Rise Structures

Debating Tall: Move or Build a New Inland Megacity?

In Numbers: The Global Impact of 9/11 on Tall Buildings

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Global News

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Americas

A major renovation of the 1931 **McGraw-Hill Building** in **New York City**'s Midtown West has been completed. The classic Art-Deco building, designed by Raymond Hood, now includes open office floor plans, exposed steel ceiling beams, fully operable windows, outdoor terraces for select office suites, and an 11-meter-tall (35-foot-tall) lobby atrium. The total project cost around US$120 million to complete. Despite the building being both a New York City and National Historic landmark, the renovations proceeded over preservationists' objections, as the landmark protections applied only to the exterior.

Minneapolis also played host to a major renovation, in this case to a 1985 office tower formerly known as the Campbell Mithun Tower, rebranded as **Two22 Tower** after a US$20 million, year-long construction project. The redesign includes a monumental staircase in the place of escalators, dedicated space in the main entry for vendor pop-ups, and clarified wayfinding. Other updates involved the elevator banks, atrium, and skyway which were given marble finishes and high-technology features. Indoor and rooftop terraces, video conference rooms, and a pool table room were also added.

The increasing influx of technology and other companies seeking a low-tax environment is driving real estate upwards in **Austin.** Local firm Urbanspace Real Estate + Interiors has proposed a 55-story high-rise with 345 market-rate residences called **The Modern,** located in the Rainey neighborhood. Amenities will include indoor and outdoor lounges, private dining areas with catering kitchens, an Olympic-size swimming pool, a fitness center, a board room and business center, a guest suite, and bike and paddleboard storage, among others.

A project proposed for **1698 West Georgia Street** in **Vancouver**'s Coal Harbour area would reach 100 meters and provide 125 residential units—and feature a two-story waterfall. The design by Kohn Pedersen Fox Associates employs stepped massing at the top, which is meant to evoke mountaintop cliffs, while the podium's forms nod toward the foothills.

Europe

Big news on the tall and energy-efficient front has come to **London,** where developer Apt has received planning consent for three towers on the edge of Canary Wharf, which it says could become Europe's largest Passivhaus development. The project at **2 Trafalgar Way** will include 1,672 student rooms, 80 apartments for University College London staff, commercial office and retail space, and indoor children's play space. All this will be housed in towers of 28, 35, and 44 stories, linked by a four-story podium. The two taller blocks will also be linked by a skybridge. Oddly, the project will also feature a McDonald's drive-through.

Also in Canary Wharf, a 225-meter residential building has been proposed for a South Quay waterside site. If approved, the existing six-story office building built in the 1980s would be demolished and replaced with a 57-story residential building at **17 Admirals Way** that would deliver 495 units, with 125 earmarked as affordable homes. The bronze-clad building will feature a crown decorated with a thin spire, which will light up at night.

In keeping with the view that renovation can be at least as sustainable as new construction, the City of London's fabled **Barbican Centre** is set for a major renewal. The City of London Corporation has launched a search for a design team to re-envision the landmark. The facility is targeting net-zero carbon emissions by 2027. Final selection of the design team is anticipated by February 2022.

McGraw-Hill Building, New York City.
© MdeAS Architects

Two22 Tower, Minneapolis – rooftop terrace. © Corey Gaffer

Overcoming Carbon, Climate, and Societal Challenges in Cities

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Trained as an architect and a journalist, Safarik was the director of marketing for Brooks + Scarpa Architects (formerly Pugh + Scarpa Architects) from 2008 to 2011. He has a bachelor's degree in Journalism from Northwestern University and a master's degree in architecture from the University of Oregon.

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Abstract

The tall building, the city, and by extension, urban life, are all facing unprecedented challenges, in multiple aspects—carbon, climate, and societal. The planet's rapid urbanization and climate crisis are on a collision course, requiring huge corrections in the way we build and the resources we use. There are many ways forward for sustainable vertical urbanism, as seen through dozens of optimal examples. But as we have learned from the resilience of cities through other calamities, such as 9/11, weather events, and the COVID-19 pandemic, within these challenges lie tremendous opportunities. The great question is, do we as a planet have the collective political will to implement the best practices we identify?

Keywords: Carbon, Climate, Social Issues, Sustainability

Introduction: The Resilient City

The incredible confluence of events in just the past two years could understandably give pause to even the most ardent urbanist. From the outbreak of a global pandemic, to civil strife on the streets, massive flooding both on, and far away from the ocean, to collapses both physical and financial—one could be forgiven for thinking that the urban proposition as we know it may have run its course. Our cities can seem like the staging ground for the apocalyptic visions that doomsayers have been touting since time began. Indeed, the threats are very real. Almost any statistic one can cite, from sea-level rise to housing prices and Gini coefficients (a normalized ratio that measures income inequality), suggests that we as a global, urban society are headed in the wrong direction.

Despite headlines about empty offices and suburban flight, however, there is still substantial evidence that cities, with all their problems, are where people want and need to be. And throughout history, cities have proven to be remarkably resilient, against many a shrill chorus of impending doom. This does not mean that cities will remain static; they never have been. If anything, in the next generation, it is likely that cities will see the degree and speed of change that transpired during the Industrial Revolution and its aftermath. The directions in which cities grow may be unfamiliar—retreating

Figure 1. Cities are remarkably resilient. After the great fire of 1871, Chicago emerged from near-total devastation to become a world-class city and home to many skyscraper innovations before the close of the 19th century just 30 years later. Source: Public domain

Megacities vs. Urban Sprawl; Densifying vs. Social Distancing

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Abstract

Decentralization and the "15-minute city" are ideas that are currently being put forward to tackle urban challenges, but how will these issues be tackled in the design of tall buildings? What is the implication for these ideas in a future, pandemic-aware context? Can future vertical expansion be addressed through new models that take into account the same multiple and complex challenges currently being faced in the horizontal realm? It is time that we stop understanding vertical development in terms of autonomous single-program buildings, and instead approach it as the holistic extension of multiple urban systems along the vertical axis.

Keywords: Densification, Megacities, Social Distancing, Sustainability, Urban Sprawl

> "The argument that cities are 'bad for people's health' is not new, and pandemics throughout history have resulted in the development of new infrastructures and planning regulations."

Learning by Doing

While different parts of the world experienced second and third waves of the coronavirus pandemic, in the fields of urban design and architecture, questions surrounding the future-proofing and sustainable development of our cities gained increasing momentum. The world remains in a state of flux; governments have implemented different policies and regulations locally and globally; and developers and investors have adjusted their business models towards an unknown future. How do we go about designing for these new dynamics as architects and planners? Currently, the whole world is "learning by doing," which is a unique, simultaneous experience. On the one hand, we have seen knowledge exchange about planning issues taking place in newly transformed global online conferences, and on the other hand—in our direct physical environment—we are witnessing bottom-up initiatives transforming our environment, alongside immediate measures that may fail or succeed. Clearly, the ecosystem of life, urban development, and growth as we have known it has been turned on its head by the pandemic.

It is commonly understood that three key drivers—the introduction of new codes and regulations, the call for a holistic approach to sustainability and the increased incorporation of technology—will play significant roles in how our cities develop in the near future. In the following paper, we will touch upon these drivers and further investigate the future of urban densification in light of the challenges brought about by the coronavirus pandemic, and what this may mean for the vertical expansion of our cities post-COVID-19.

Pre-COVID Assumptions

Prior to the COVID-19 crisis, we expected an increase of 2.5 billion people to move or be born into in the world's urban areas by 2050. The physical densification of our cities, whether outwards or upwards, was already considered an inevitability, and this projected densification had placed significant pressure on city planners.

In fact, forecasts have stated that in 2050, two-thirds of the world's population will live in urban areas (UN 2018). This growth presents enormous challenges to our cities environmentally, socially, and economically. In order to prepare for this widespread future densification, cities have already accepted expansion in one form or another. Providing adequate means to serve the needs of

Reducing the Carbon Emissions of High-Rise Structures from the Very Beginning

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Stefanie Weidner studied architecture at the University of Stuttgart, Germany, and the University of Melbourne, Australia. After her diploma she worked as a research assistant at the Institute for Lightweight Structures and Conceptual Design (ILEK), where she defended her doctoral thesis on resource consumption in urban structures in 2020. Since 2019, she works at Werner Sobek as an architect and project leader for sustainability, with an emphasis on embodied emissions and resource consumption. As of 2022, she will be head of Werner Sobek's new office in Copenhagen.

Abstract

Minimizing carbon emissions and reducing resource consumption in commercial high-rise buildings is an essential component of the building industry reducing its overall footprint. A concise study of design options with three levels of carbon emission production was undertaken for a real project proposed for a site in central Hamburg. The study showed that carbon emission reductions of up to 78 percent could be made by electing to design in hybrid timber as opposed to conventional concrete, and that a 47 percent reduction could be achieved through a concrete-optimization process.

Keywords: Concrete, Decarbonization, Hybrid Timber

Introduction

Until recently, carbon dioxide (CO_2) emissions of the building sector were mainly discussed with regard to the operating phase only. However, when considering a typical office building with high energy performance standards, less than half of the building's emissions are generated by the actual usage (Röck et al. 2020). More than 50 percent of all emissions linked to an individual building are embodied emissions. Some 64 percent of these embodied emissions result from the production and transport of the building materials, as well as from the erection of the building itself (Life Cycle Stage A). Twenty-two percent of embodied emissions are due to maintenance (Life Cycle Stage B), whereas 14 percent result from demolition and disposal (Life Cycle Stage C) (Röck et al. 2020).

What this also means: A third of the overall carbon emissions of a high-quality office building are emitted before the first occupant moves in. It takes over 50 years of annual operative emissions to reach the level of embodied emissions (Bechmann, Mrzigod & Weidner 2020).

Moreover, the climate-damaging impact of the initial embodied carbon is even greater than is suggested by this ratio. This is because an increasing decarbonization of the energy mix must be expected, provided that the objectives of the Paris Agreement are met: all energy generation worldwide must be fossil fuel-free by 2050 at the latest. Regarding the damage caused by emissions with relation to a particular date such as the year 2080, it is not only the amount of emissions that needs to be considered, but also the timing of their release. Greenhouse gases (GHGs) that are emitted when the building is constructed cause climate-relevant damage to the atmosphere right from the beginning. Operating emissions and the related damage, on the other hand, are very low to begin with, and only add up over time (Sobek 2022, Weidner et al. 2021).

Thus, it becomes obvious that future-proof sustainable design must focus much more on the materials we use for construction and on our methods of construction. This paper will discuss methods of minimizing carbon emissions and reducing resource consumption in commercial high-rise buildings, through the example of comparing the global warming potential (GWP) of three designs, as considered for a tower in Hamburg, Germany.

Designing Holistic Well-Being In the Age of Hybrid Working

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Abstract

The rise of the hybrid mode of working means that people with vastly different backgrounds, knowledge, skills, and individual needs are working alongside and collaborating with each other in the same space. Flexibility has therefore become a key consideration in workplace design, which also coincides with the huge interest in well-being. With these trends in mind, this paper proposes that future workspaces should be "spaces that inspire" the body, mind, and soul. Design recommendations are offered to address well-being from an all-round perspective, benefitting building users, the community, and the environment. The discussion focuses on multi-functionality, bodily health, mental wellness, biophilic environments, community engagement, and responsive workspaces.

Keywords: Office, Well-being, Workplace

> "Fifty-four percent of employees would consider leaving their jobs after the pandemic if they are not afforded some form of flexibility in where and when they work."

Introduction

Never have the modes of work been so diverse in contemporary history. A growing number of multinational employers are transitioning to "hybrid mode" in their daily operations, which is already having an influence on the kinds of workspaces they build for employees.

While coworking spaces are known for their ability to bring individuals of different professions, needs, and work routines together in one place, larger corporations are also becoming increasingly multidisciplinary. Engineering firms are recruiting policy experts, academic research is done across departments, and retail brands are diversifying their product and service offerings to boost market coverage.

All this means that people with very different backgrounds, knowledge and skills, and who have varying needs of their own, are working alongside and collaborating with each other in the same space. At the same time, "well-being" is becoming a strong consideration in building design, as people are now hyper-aware of how the conditions of their daily surroundings affect long-term wellness. Meanwhile, employers increasingly recognize that staff well-being is critically linked to business performance and resilience. Ensuring that people work productively in a healthy and inspiring environment, while bringing added value to the community, is now a high priority for both employers and building operators.

Multifunctional, Flexible Neighborhoods

Human well-being is holistic and multidimensional. People spend about a third of their time in their workplaces, and individuals have a range of needs to fulfill throughout the day, in addition to business requirements.

As the boundary between work and lifestyle continues to break down, future office complexes will evolve into efficient, fluid communities where a wide range of spatial functions are within convenient reach of users. These include, but are not limited to flexible workstations, breakout spaces, exhibition venues, arts and performance spaces, healthcare, retail, food and beverage (F&B), sports facilities, greenery, etc.

This mixed-use trend promises not just commercial efficiency, but a joyous and shared culture that encourages a variety of

Reimagining Plastics in the Built Environment: Ecobricks at the Ridge, Cape Town

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Fiona Carr joined Arup in 2019 as a graduate structural engineer with the buildings team after working as a port and coastal engineering and planning consultant for over three years. She completed her master's degree with a distinction in structural engineering at UCT and further obtained her master's degree with a distinction in structural engineering at Imperial College London. Since joining the buildings team at Arup, Fiona has worked on several projects ranging from office, residential, and mixed used facilities. She is determined to enhance and positively affect the world and local environments through creative, holistic, appropriate, efficient, and sustainable design of engineering solutions.

Anthony Graham-Jolly is a structural engineer in the buildings team at Arup. He has a strong desire to influence responsible development on projects he works on through lean design and carbon-efficient solutions. He was the lead structural engineer for The Ridge, where innovative ecobrick solutions were employed.

Gareth Griffiths is a Cape Town-based post-graduate materials scientist, built environment writer and magazine editor. He has been the technical writer for the V&A Waterfront on the Ridge project referenced in this paper. He is also editor of *To Build* magazine, a South African built-environment industry magazine with a focus on sustainability.

Abstract

The use of ecobricks in 2020 at the Ridge, a commercial development within the V&A Waterfront, Cape Town, a mixed-use, retail, tourist, and harbor precinct, presented a novel way of reducing the project's carbon and energy footprint, while sequestering a ubiquitous and environmentally detrimental waste stream from the open environment. The paper also highlights the positive and beneficial relationship between local communities and developers. The authors highlight the opportunity within the built environment for innovative ways to replace virgin construction materials with otherwise non-recyclable waste materials, including the context in which they are used, the risks, and the benefits. Through use of ecobricks in this project, some 5.5 metric tons of plastic waste were kept out of the ocean.

Keywords: Ecobricks, Construction, Life Cycle

Plastic Waste: Challenging the Urban Environment to Be Creative

Over 300 million metric tons of plastic is produced every year, of which half is used only once and then discarded, then surviving several hundred years on the planet as pollution. Of this, over 8 million metric tons of plastic is dumped into the oceans every year (Jambeck et al. 2015). The downstream damaging effects of such plastic waste significantly outstrip the negative effects of greenhouse gas (GHG) production caused by the manufacture of such plastics in the first place (Hamilton et al. 2019).

The use of ecobricks as void formers in place of conventional, hydrocarbon-based materials at the Ridge (Griffiths 2020, Mouton 2019), a new commercial project at the V&A Waterfront (V&A) in Cape Town, successfully demonstrates how replacing virgin and generally high-carbon-content construction materials with ecobricks can generate both positive environmental and social impacts (see Figure 1). Ecobricks commonly consist of non-recyclable, single-use plastics harvested from waste streams. In the case of the Ridge project, they consisted of the ubiquitous two-liter polyethylene terephthalate (PET) single-use beverage bottles, filled with other single-use plastic packaging waste.

Ecobricks at the Ridge: Demonstrating a "New Normal" Approach

The use of ecobricks at the Ridge building is one of the first such projects in the South African commercial building sector. In recent years the V&A Waterfront has become a leading developer of sustainable buildings in South Africa and has focused intently on removing single-use plastics within its properties.

In doing this, its development team has proactively sought ways to include ecobricks in construction projects as part of the overall solution for dealing with the plastics crisis. They found uses for ecobricks in smaller applications, such as a food garden, where the bricks are used to create raised beds in which vegetables are grown for distribution to displaced urban people. This resource was created and managed in partnership between the developer and a local non-profit, non-governmental organization (NGO) called the Ecobrick Exchange (EBE).

About the Council

The Council on Tall Buildings and Urban Habitat (CTBUH) is the world's leading non-profit organization for all those interested in the future of cities. It explores how increased urban density and vertical growth can support more sustainable and healthy cities, especially in the face of mass urbanization and the increasing effects of climate change worldwide.

Founded in the USA in 1969, the CTBUH member network embraces more than a million professionals working in all building industry sectors in almost all countries of the world. With offices in Chicago, Shanghai, and Venice, the Council runs hundreds of multidisciplinary programs across the world each year, through its regional chapters and expert committees, its annual conferences and global awards program, through funded research projects and academic collaborations, and via its extensive online resources and physical outputs. The Council is perhaps best-known to the public as the arbiter of tall building height and the global authority that bestows titles such as "The World's Tallest Building." Operating on a global scale, CTBUH serves as a platform for both cutting-edge information-share and business networking for all companies and professionals focused on the inception, design, construction, and operation of cities, and the buildings they comprise.

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