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Appropriate construction technologies for design activism

Material research practices in response to globalisation

In the former factories of the world: contrasting labour, knowledge, and physical capital in Hong Kong

Daniel Elkin, Gerhard Bruyns, and Peter Hasdell

Workers in Hong Kong made plastic flowers, incense before that, and consumer goods throughout the city's provincial, Imperial, and colonial periods. Kowloon Peninsula's deep harbour and proximity to shipping lanes gave rise to export-oriented industries long before imperialistic conflicts changed their ownership from Chinese to British, and back again. Making things in this context served to define self-motivated enterprise. Hong Kong Chinese people made most of their export goods following a low material investment, labour-intensive model. Workers hand-painted ceramics and toys more often than their employers invested in better plant to replace their work.[1]

Relationships to time and industry have changed in Hong Kong, particularly since the 1980s. The city has reimagined itself as a centre for financial capital and knowledge capital, as a 'global metropolis'[2] rather than a manufacturing hub. Indeed, this particular factory of the world[3] is now defined regionally rather than locally. Cross-border trade[4] communicates knowledge capital from the offices of Hong Kong to the sprawling, cheaply rented tidal flats of Shenzhen, Zhuhai, and Guangzhou, where the physical capital of real estate awaits. This re-imagining brings inequalities. Spatial and economic 'compression'[5] has occurred, where profound poverty and anxiety sit adjacent to the 'top-level professionals coming to the city' and the 'global flows' of commerce and capital.[6] Along with the clearance



1 Expansive assembly spaces of fabrication firms in Mainland China.

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2 The tidal flat environment of South China and accompanying tooling environment.

and replacement of old spatial morphologies,[7] historic areas of the city have been redeveloped to allow those not participating in the 'knowledge-based economy'[8] to maintain their lives and livelihood.

The conflicts of agency in this scenario are reflected in specific decisions that designers make, placed as they are between knowledge workers and object makers. The binary character of globalisation centres is, in part, prompted by ambition to ascend from poverty, and the ensuing fluidity of physical capital changing rapidly in relation to knowledge or financial capital.[9] Conventional architectural design practice specialises in accommodating the latter two forms of added value, benefiting from the fluidity of work across global borders, nimbly following the factories of the world as global capitalisation is insinuated into cheap labour markets.[10] The primary constraints upon this fluidity are prevailing starting biases, influencing *how* things should be made, and containing preoccupations about *who does the making*. In response to these prevailing predispositions, we set out here possibilities for a material-led design research practice – out of our own preliminary work – to seek to transcend the spatial inequities that a globalisation centre produces.



3 Street furnishings under assembly near Zhuhai.

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Entrepreneurial situations

Hong Kong's compelling character, and various seductive contexts in the city, have provoked the attention of various spatial thinkers. While economists theorise cities as markets for exchange, the externalities of trade tend to define a city's urban peculiarities, which architects grow to love. In such contexts, density, phantasmagoria, and informal commerce produce unique spatialisations that offer potential for working outside the constraints of normative spatial practice.

Perhaps the strongest injunction against globalisation is that it tends to homogenise space.[11] However, Hong Kong's markets and pedestrian streets have given rise to a morphologically familiar, locally inflected architectural language



4 Hawker stall roof detail with post-occupancy painting and additions, including a security camera.

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5 Post-occupancy welding and finishing details, for either repair or addition of umbrella or broomstick handle holders.



6 Post-occupancy hinge weld repair and paint patch-up on a hawker stall.



7 Wear and corrosion on a standardised hawker stall padlock hasp.

that elicits affection. Hawker stalls, symbols of entrepreneurial enthusiasm,[12] have coalesced into markets on Temple Street in Yau Ma Tei, Gresson and Tai Yuen Streets in Wan Chai, and many others in the Central District. Their spirit exonerates their irregular materialisation. Urbanity is an art of compromise, and Hong Kong's emergent entrepreneurialism[13] has worked here to produce a pluralistic expression of rough-and-ready mercantile spaces, materialised with tarpaulins, galvanised pipes, plywood, and castors.

When some of the hawker stalls burned down in 2011,[14] an opportunity emerged for designers to *work on* rather than just *look at* this energetic environment. Some entertaining, and unlikely, spatial transgressions came out of the resulting participatory design process. Hawker stall proprietors ascended to the top floors of design school buildings. Designers and design students went out into the streets to view and study in depth the less-than-transcendent details of proprietor-built stalls. The resultant design work eroded what had become the accepted boundary between the trained agency of design professionals' knowledge and the immediacies practiced by the street market builders. However, time and use revealed something amiss about new designs produced in this way, not in what was made, but in who made it and how.[15]

This critical difference becomes evident after a high-speed ferry ride from Central Hong Kong Island to the port in Zhuhai. On a company car ride to a nearby factory, the distinct atmosphere of *mainland* China opens up in lofty developments and four-lane highways similar to, but more broad-shouldered than, Hong Kong's newest, largest buildings. The air is swampy in the company gardens between high-ceilinged assembly spaces and the workers' dormitory. In this factory, metal panelling and furniture is manufactured for international infrastructure projects. A factory similar to this, with comparable space and tooling, made the hawker stalls that were designed to replace those that burned on Fa Yuen Street *[1–3]*.

In contrast, there exist – among other places – shops in Mong Kok and Tai Kok Tsui in Hong Kong, where often venerable metalworking equipment is

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8 Ad hoc levelling details on standardised hawker stalls.



9 Original factory finish on a hawker stall, *in situ*.

crammed in among aluminium and steel stock. Such shops often manufacture air-handling ductwork or trays to catch air conditioner condensation. Their owners often own the only welder or grinder in the neighbourhood and, hence, they occupy their off-hours repairing local fixtures: stainless steel entry doors, framing for clothes lines or – as patches of off-colour paint and spattered, flux-core welds prove – the more typical mass-produced hawker stalls *[4–10]*. These shops comprise the living maintenance context of participatory design: they are where consequences of social innovation projects are borne out *[11–16]*. The simpler material constraint of *tooling* thus expands into the *tooling environment*, in which the scale, cost, and availability of a tool needed to do work becomes a regulator, before and after the fact of deployment. Paint replaces powder coating, and nineteenth-century patination practices[16] become appropriate again as they can be carried out *in situ*. Products and spatial furnishings made in this way take on a 'hungry' character, where – in contrast to the mainstream mainland factories – the neighbourhood metalworker holds out the continuing prospect of repair or replacement.

Neo-production

The danger is that the import of this locally oriented, materially led approach to manufacturing remains intellectual. Designed metal furnishings, such as a hypothetically site-suitable hawker stall, have little impact on people's agency no matter where they were made – whether architected and factory-produced, or more spontaneously designed and fabricated – and they risk becoming artisanal fetish objects. The injection-moulded plastic stools at nearly every *dai pai dong* open air restaurant bear comparison as effective and cheap artefacts, replaceable, solving the same problem that more expensive designed metal stools would solve. There is one gently polemical sensitivity to the tooling environment, deeply endemic to the material decisions made in furnishings we have designed, which may matter to the idea of agency in Hong Kong: which is to say that even if only one metalworker in the city makes these prototypes, any of them *could*. Published in the right way, the intellectual property and knowledge contained within such prototypes remains equally viable on both sides of the new and old factory border, becoming a kind of 'pattern' transmitted across the two. Negotiations on specifics of such patterns operate on a case-by-case basis. A small shop owner, for example, cannot make bending curves cost-effective. And designers end up buying finer hardware when the fabricator supplies only zinc-dipped hex bolts.

Such patterns stand both before and after each restatement of a prototype, and in this way a pattern becomes distinct from a design. First, it becomes adapted in content to suit the tooling environment in question. This adaptation operates in a discrete way, in response to templates and tooling rather than renderings: asking *how* to make, not *what* and *why* to make. Second, a pattern's means of dissemination as knowledge becomes more critical than its content and expression. They tend to scale and proliferate through the robust propagation of detailed knowledge, rather than through vertical integration and economies of scale, like industrial products typically do. Rationalising the relevant ideas and forms of such 'local knowledge' takes time.[17] Beyond archival and documentary efforts, finding ways to transmit knowledge robustly takes even greater effort, but becomes operable outside the scaling problems of the power structures normative to design.[18]

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10 Post-occupancy painting and welding repairs on a hawker stall, contrasted with the original powder-coated finish.

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Knowledge patterns

Hong Kong gives rise to enough independent spatialisation cultures, beyond the street markets, to suggest plentiful opportunities for the development of such knowledge patterns. By way of another illustration, weekend and public holiday mornings find Central, Sheung Wan, and Wan Chai streets filled with people spending their morning, noon, and night sitting on public furniture, among roadside planting, and on the pavement. These people are so-called 'helpers': typically Philipino, Indonesian, and Malaysian domestic workers hired by professionals and their families throughout Hong Kong Island and Kowloon. On weekdays, their bosses participate in the knowledge economy, but on Saturdays and Sundays their helpers are put in an awkward position. Many of them live with their employers to maintain legal work status. But, at weekends, they take to the streets to cook meals, hold exercise classes, and while away time to avoid being put to work on their days off.[19]

Some 'helpers', crowded under Norman Foster's HSBC headquarters, for example, or sitting on the closed streets underneath Cesar Pelli's International Financial Centre, use found materials and their ingenuity to develop spatial expressions out of the emergent drive that gives Hong Kong its entrepreneurial reputation. Helpers combine tarpaulins and cushions with unfolded cardboard boxes into domestic spaces on the pavements. They make living rooms and card game parlours, dining rooms and entrances, making irregular but discernible design decisions and constructing common architectural languages *[17–19]*. Without denying the urgency and inhumanity that prompts their emergence, these forms offer exciting expressions of spatial agency. And they inspire designers' and journalists' imaginations.

As with the hawker stands, one must be cautious when trying to *work on* or *add to* this culture of spatialisation in a mode that conforms to the familiar constraints of mainstream industrial production. For example, one could imagine a design project formulated to understand and document the cardboard furniture that helpers make, setting out to improve it through a study of pizza box details and cardboard furniture design. To extend this thought experiment, one could then imagine developing capitalisation strategies and a supply chain in order to manufacture cardboard furniture more efficiently. Indeed, one could imagine horizontally integrating the process to saturate the 'domestic helper market' with superior designs. However, it is important to remember that designers' ambition to improve is a kind of colonisation in its own right, due to the centralisation of agency that industrial models require,[20] recalling governmental or societal arrangements that orchestrate the original inequality being studied.[21] One of the reasons that post- or decolonial design work and scholarship – for want of better labels – leans on archival and documentary strategies[22] is exactly this problem.

Mobilising material practices

These instances highlight how material practices themselves can be mobilised in design activism. Established academic design-build activist practices tend to work through deeply embedded modes of practice.[23] The evolution of this kind of design activism[24] is often justified in terms of research, seeking to create knowledge through typological improvement.[25] However, a possible change of tactics becomes apparent here: the production of discrete, disseminated *patterns* through decentralised knowledge generation. In such projects, the knowledge capital produced, and its modes of dissemination, become as much part of the design as discrete designed artefacts. With this in mind, the



11 Hong Kong's tooling environment: small shops with fabrication spilling out into the street.

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12 Metal fabrication in Hong Kong, partially occupying the sidewalk.

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13 Metal fabricators in Hong Kong often diversify into glass fabrication or retail to support their primary business.

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14 Some metal fabrication businesses in Hong Kong produce air ducting and air conditioner support hardware.

tactics for representing socially driven design practice deserves more specific theorisation. *Pattern making* can play an important role here. Structures of agency around the pattern perform differently to the typical design research outputs of a gallery publication or a case study project, simply because the underserved constituency who is subject to design research gets to decide whether to use them or not. What level of relevance could speculative, programmed, and published designs for furniture prototypes[26] reach if they were published online? Would this differ from patterns for cardboard furniture, printed on Tyvek or Masonite and physically disseminated throughout Central District? At least any unused patterns could be returned to the home institution gallery for display.



15 Ageing physical capital in Hong Kong.

Leaning too heavily into this problem of colonisation can leave designers and academics in an unproductive place, answering the question 'how can design do good here?' with a serving of 'do nothing and observe' to avoid problematic differences in agency. But the problem remains: the publications designers make about researching disadvantaged people and their cultures of spatialisation frequently benefit the researchers more than their subjects (our present research included). In such instances, designers tend to identify problems that they can work on through what they make, and not merely through how they conduct themselves professionally. Indeed, the specific character of architectural representation contributes to effecting the imbalance of agency that this implies.[27] The representational colonisation of Hong Kong and its density[28] is increasingly prevalent.[29]

Camouflage as method

In the context of land seizure, clearance, and citizen relocation to make way for comprehensive redevelopment,[30] the Hong Kong government's Building

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Department has coined the term 'Unauthorised Built Works' (UBWs) to describe spatial interventions made without a permit. It has become apparent that the authorities are prepared to take significant measures to prevent and remove such interventions.[31] The scope of UBWs include rooftop squatter homes and home alterations, along with subdivided flats and the well-publicised 'cage homes', all of which have featured in international press coverage and photographic exhibitions.[32] While the authorities may not approve, unauthorised citizens and chief executives alike depend upon UBWs to support their lifestyles amid the ever-increasing densification of Hong Kong.[33] The government has responded with aerial LIDAR scanning and 'clearance blitzes' to detect and remove UBWs.[34] The echoes of ideas about spatial militarisation here are clear.[35]

In this context, we argue that the idea of *camouflage* offers an important tactic for design and design research, in terms of both discrete technical tactics and representational techniques. It is not a new idea in architecture.[36] In the field of what might be called design technics, this approach would seem to imply an emphasis on deployability and prefabrication.[37] Thinking about representation, it also implies particular approaches to publishing design outcomes, omitting information to maintain anonymity, and grounding any rhetoric applied to design work. In such cases, emphasising prefabrication serves to ensure that the value added by any intervention is commensurate with the interference caused by its installation, and that the work is finished before the building department official arrives.

We do not want to appear glib about flouting building codes. But camouflage can be advanced as an effective response here. The context calls for research



16 Small-scale metal fabrication in Hong Kong's tooling environment.



17 Cardboard recycling, the re-uptake of informal building material in Hong Kong.

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18 Cardboard shelters under the HSBC Headquarters Building.



19 An informal entryway making use of strip lighting in the pavement.

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20 A rural fishing village under Hong Kong's administrative control.



21 The rural, non-industrialised *other*.

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22 Rural village houses clad in galvanised sheet steel.



23 Ageing of zinc paint on galvanised sheet metal.

into projects where either the construction of the architecture, or the activities inside it upon completion remain out of sight. Indeed, this poses interesting technical questions: can roof geometry made on a small scale and reasonable budget to be invisible to LIDAR, for example, and are there places where practices of aesthetic deception can be turned into provocative, meaningful design opportunities?

A material research case study

A specific project illustrates this idea with respect to a specific context. As Hong Kong's centre of financial gravity spins inward and outward, the city's semi-rural surroundings acquire new roles. The suburbs redefine their relationships to a globalised economy and its values, in relation to tourism and the cultural production of a non-industrialised *other* [20–7]. In the territories around the city, Hong Kong's hinterland of fish farms and country parks preserve a symbiotic space of decompression across which physical capital and knowledge capital negotiate their exchange. Along with demographic changes, the suppression of development in such locations arguably serves as a punitive foil here to the tourism expenditure, which gets radiated from the urban centre to its boundaries.[38]

There exists a fifteen-foot by twenty-foot concrete pad in one of these rural villages under the Hong Kong government's administrative control. A living room in the local vernacular architectural language of wood frame and metal cladding previously stood on the pad, demolished by a storm leaving behind two bedrooms, a kitchen, and a bathroom standing around an empty void. At the land lessee's[39] request, we began a design proposal for occupying the site and returning it to its function as a living, entry, and multi-use space connecting the remaining rooms. Building anything on this site becomes problematic because slum clearance and registration ordinances have stalled any changes to the pad or surrounding spaces. The Lands Department, after demolition, prohibited any further construction [28–30]. With the assumption that the formal execution of the work may never happen, we have instead decided to build models, mock-ups, and tests to solve some instrumental and spatial challenges in reoccupying this space, for the benefit of the site owner and connecting residents.

We have conducted experiments in building double-curved, timber-frame and metal-cladding wall constructions, outwardly unnecessary, as a direct response to the coastal wind loads that demolished the original structure. The primary challenge has been to create demountable, double-curved metal panelling without the use of press-forming, hydroforming, or hammer-forming over jigs, to keep the tooling involved within the skills of local fabricators. We see this as a building technology pattern suitable for wider application. The curvature also works to conceal tourists' vision of residential areas,

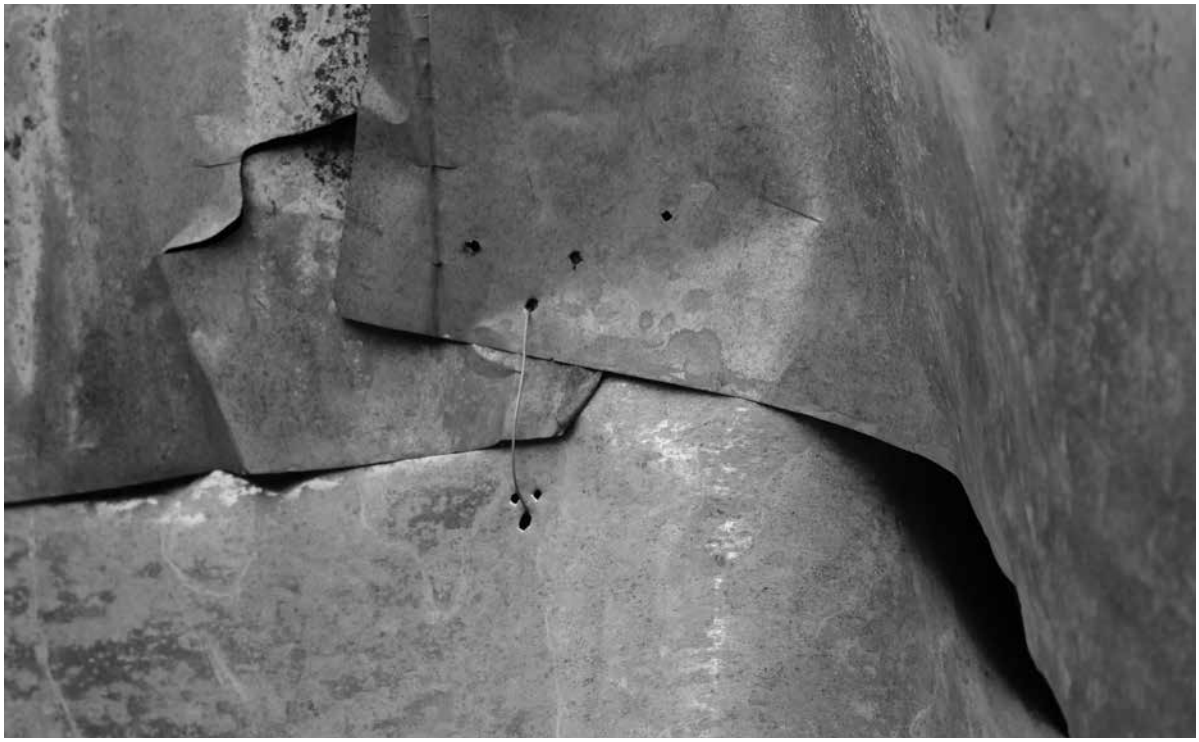
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24 The local fibreglass fabricator's house and workshop.

where unwanted visitors often trespass into occupants' space. The resultant wall thickness forms concealing poché to separate the new domestic space from the walkway outside. The design was produced to conceal its deployment by means of speed. Demountable fixings borrowed from street furniture were sought for the assembly of prefabricated, lightweight components – in addition to quiet, fast joinery – similar to a proprietary Simpson Strong-Tie. The joinery can be imagined as occupying a place between do-it-yourself and high-tech prefabrication.

The resulting material intelligence presents an incremental improvement to an otherwise common building system. However, the tooling for the framing – currently milled from plywood – seems out of place, and bent-wood, doubly curved walls may be a more practical solution. And it is possible that local dragon boat builders could contribute to building them. They would bring extensive knowledge about how to build curved objects out of wood framing. They also know details to make the work more feasible.[40] Their patience and dexterity could be characterised as a currency of regional 'critical[ity]',[41] of great relevance to this work and to similar design research into potential decolonialising



25 Ad hoc sheet metal details in the rural fishing village.

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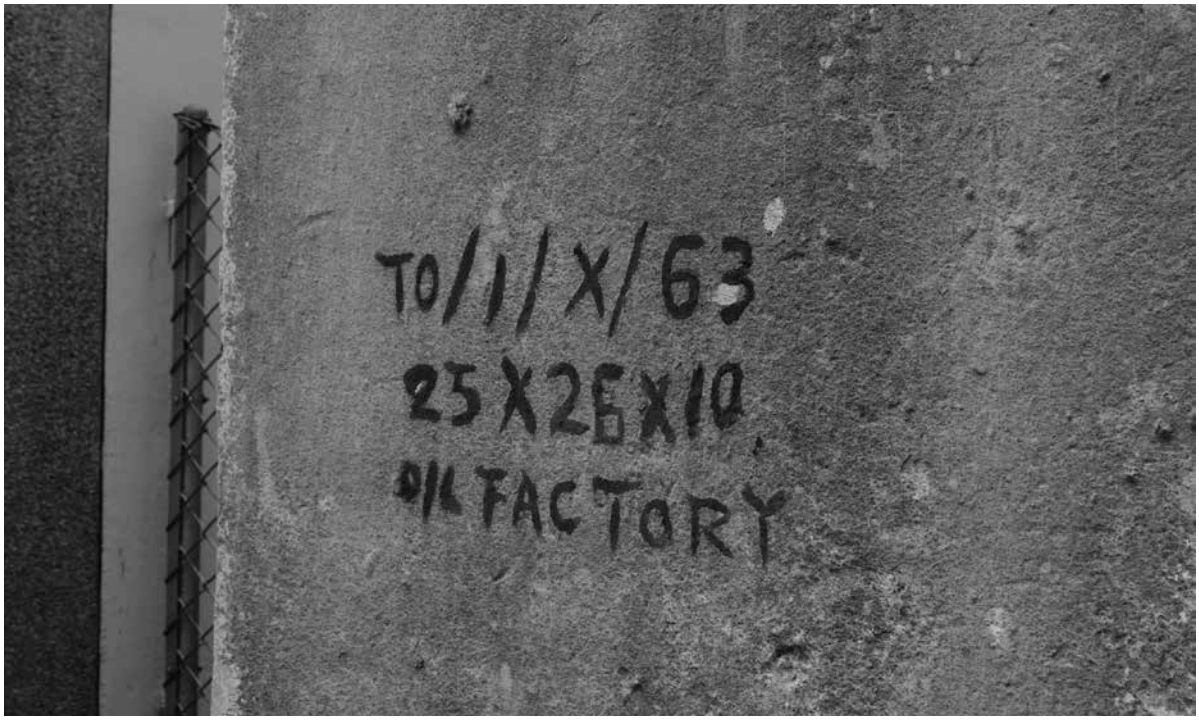


26 Older, painted surface treatments on galvanised sheet metal.

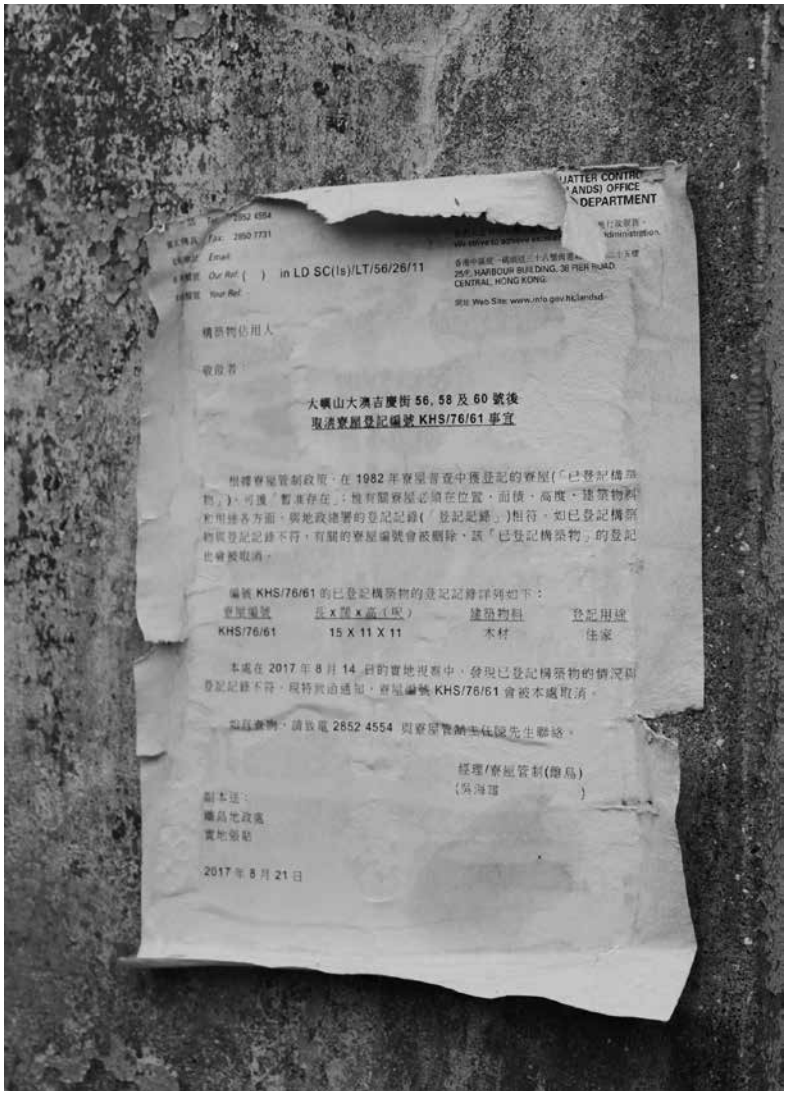


27 Diverse languages of metal, in a shipping container and nearby temporary structure for a festival.

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28 Painted rural factory registration numbers and dimensions from the previous Government spatial survey.



29 Lands Department development prohibition notice.

practices. What connects these constructs of workmanship and the polemic surrounding them within architecture is *labour* – the vast energy that can be imagined as moving between the past and future factories of the world.[42]

Reflecting on material design research

Material design research has tended to privilege the agency of designer-fabricators as stakeholders, tending to situate their agency through their capability for the production of form. Labour, here, is often framed in opposition, either implicitly or explicitly.[43] In contrast, design activism manages 'agonism' – meaning a positive acceptance of conflict – between diverse agents in the built environment as an output. Importantly, the role of material design practices are rarely understood in relation to this productive conflict.[44] It has been argued that the relationship between design and labour negotiates 'the temporal division [within design which] itself hold[s] power'.[45] How things are made, and who makes them, alter the agency of labour as a stakeholder situated in place, which is critical towards the life of a project in the four dimensions of space and time.

Our future material research will seek to articulate this agenda further: to foreground who makes something and how within the discourses of material practice, as a means to tie technical research

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30 Squatter building registration designations. These painted numbers designate spatial use and dimensions, so that any future deviation from squatter development survey can be identified and punished.

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more strongly into the agency of design activism. Strategies for this work are emerging from our work to date. They include the scale specifics of physical capital in the *tooling environment*; the operational character of representation through *pattern making*; the tactics of *camouflage*; and the character of space and assembly developed through *camouflage's* material registers.

We advance these strategies to propose a relevant approach to designer-making in the complex context of Hong Kong. They are fitting for a former industrial centre where changes in manufacturing's relationship with labour have come to define broader conflicts of agency over time. These conflicts suggest that design's relationships with the principles of industry – the centralisation of agency through physical and financial capital; economies of scale; and the divisiveness of conventional representation – must be questioned and counter-normative starting biases brought to bear. We will continue to work to elucidate material design research recognising its role in the cultures of labour and industry changing around it.

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Notes

1. Matthew Turner, *Xianggang Zhi Zao* (Hong Kong: Xianggang Shi Zheng Ju, 1988).
2. David R. Meyer, *Hong Kong as a Global Metropolis* (Cambridge: Cambridge University Press, 2006).
3. This specific language is used in the government publication, 'Hong Kong as a Knowledge-Based Economy', *Xianggang: Zhi Shi Xing Jing Ji Tong Ji Tou Shi* (Xianggang: Zheng Fu Tong Ji Chu Ke Ji Tong Ji Zu, 2009).
4. Refer to cross-border trade and its specific spatial ecologies in: Joshua Bolchover and Peter Hasdell, *Border Ecologies – Hong Kong's Mainland Frontier* (Basel: Birkhäuser, 2017).
5. This term is described in Tsjung-Yi Michelle Huang, *Walking Between Slums and Skyscrapers: Illusions of Open Space in Hong Kong, Tokyo And Shanghai* (Hong Kong: Hong Kong University Press, 2009).
6. Ibid.
7. Gerhard Bruyns, 'The Social and the Spatial, Urban Models as Morphologies for a "Lived" Approach to Planning', *Cubic Journal*, 1 (2018), 52–73, <https://doi.org/10.31182/cubic.2018.1.003> [accessed 6 August 2018].
8. *Xianggang: Zhi Shi Xing Jing Ji Tong Ji Tou Shi.*
9. Meyer describes Hong Kong and the Canton region's ascendance from poverty in the introduction to *Hong Kong as a Global Metropolis*.
10. Gerhard Bruyns and Peter Hasdell, 'From Entrepreneurism to (In)Terpreneurialism', in *The Entrepreneurial City, 10th Ifou Conference* (Hong Kong: The Hong Kong Polytechnic University, 2018), pp. 16–19.
11. Sharon Zukin, 'Destination Culture: How Globalization Makes All Cities Look the Same', in *Rethinking Cities and Communities: Urban Transition before and during the era of Globalization* (Hartford, Connecticut: Trinity College, 2008).
12. Esther Lorenz and Shiqiao Li, *Kowloon Cultural District: An Investigation into Spatial Capabilities in Hong Kong* (Hong Kong: MCCM Creations, 2015).
13. SMBWorld Asia Editors, 'Entrepreneurship is Booming in Hong Kong and Shenzhen | Computerworld Hong Kong', *Cw.com.hk* (2018), <https://www.cw.com.hk/it-hk/entrepreneurship-booming-hong-kong-and-shenzhen> [accessed 8 February 2018].
14. [n.a.], 'Fa Yuen Street Fire Deaths Ruled Accidental', *South China Morning Post* (2018), <http://www.scmp.com/news/hong-kong/article/1194136/fa-yuen-street-fire-deaths-ruled-accidental> [accessed 8 February 2018].
15. Daniel Elkin, 'Hong Kong Hawker Stalls: Normalization, Control, and Maintenance Aesthetics in Participatory Design', in *CAA 2018 Annual Conference* (Los Angeles: College Art Association, 2018).
16. Susan La Niece, *Metal Plating and Patination: Cultural, Technical and Historical Developments* (Ann Arbor: UMI Books on Demand, 1999).
17. Refer to self-provisioning as a local knowledge production measure in Kimberley Kinder, *DIY Detroit: Making Do in a City Without Services* (Minneapolis: University of Minnesota Press, 2016).
18. These scaling problems result from social design projects' reliance on supporting power structures, as described in Alastair Fuad-Luke, 'Design Activism's Teleological Freedoms as a Means to Transform Our Habitus', *Agentsofalternatives.com* (2018), <http://agentsofalternatives.com/?p=2539> [accessed 6 August 2018].
19. Emma-Lee Moss, '"That One Day is All You Have": How Hong Kong's Domestic Workers Seized Sunday', *The Guardian* (2018), <https://www.theguardian.com/cities/2017/mar/10/sunday-sit-in-inside-hong-kong-weekly-domestic-worker-resistance> [accessed 6 August 2018].
20. Refer to Fuad-Luke's distinction between 'social innovation design' and 'design activism', specifically differences in aims and social innovation design's contribution to neo-liberal logics, in Fuad-Luke 'Design Activism's Teleological Freedoms as a Means to Transform Our Habitus'.
21. Michel Foucault, *Discipline and Punish: The Birth of the Prison* (Brantford, ON: W. Ross MacDonald School Resource Services Library, 2013).
22. Lorenz and Li, *Kowloon Cultural District*.
23. See the work of University of Alabama's Rural Studio and the premise of the Citizen Architect, in particular the studio's refusal to take on work in New Orleans after Hurricane Katrina. Andrew Freear, Elena Barthel, and Andrea Oppenheimer Dean, *Rural Studio at Twenty: Designing and Building in Hale County, Alabama* (New York: Princeton Architectural Press, 2014).
24. Fuad-Luke, 'Design Activism's Teleological Freedoms as a Means to Transform Our Habitus'.
25. Rural Studio's transition from Sam Mockbee's leadership to Andrew Freear's, in which develops more systemic, type-pattern driven residential projects than the one-off work done in the past, is shown in Freear, Barthel and Oppenheimer Dean, *Rural Studio at Twenty*.
26. Daniel Elkin, 'Undevelopable:

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Metal, Curvature, and Hong Kong's Compressed Space', in *Architecture and Civil Engineering Conference* (Singapore, 2018).

27. Radovac develops media archives for punk and queer movements in Toronto and specifically addresses the problem of making a *punk rock archive* through open-source software structures and user-generated content. Lilian Radovac, 'Radical Histories and Alternative Archives: About Alternative Toronto', in *DIRT: Intersectional Approaches To Messiness* (Toronto: Ryerson University, 2017).
28. Nina Azzarello, 'Michael Wolf Photographs the Architecture of Density', *Designboom|Architecture & Design Magazine* (2015), <https://www.designboom.com/art/michael-wolf-photographs-the-architecture-of-density-01-16-2014/> [accessed 6 August 2018].
29. Brian Doucet and Drew Philp, 'In Detroit "Ruin Porn" Ignores the Voices of Those Who Still Call the City Home', *The Guardian* (2018), <https://www.theguardian.com/housing-network/2016/feb/15/ruin-porn-detroit-photography-city-homes> [accessed 6 August 2018].
30. Huang, *Walking Between Slums and Skyscrapers*.
31. Yee Man Mok, 'Studying the Phenomenon of Unauthorized Building Works in Tsim Sha Tsui and Yuen Long in HKSAR' (unpublished PhD thesis, The Hong Kong Polytechnic University, 2014).
32. Naomi Ng, 'Coffin Cubicles, Caged Homes and Subdivisions: Life Inside Hong Kong's Grim Low Income Housing', *South China Morning Post* (2016), <http://www.scmp.com/news/hong-kong/education-community/article/2022430/theyre-just-us-exhibition-shines-light-hong-kongs> [accessed 6 August 2018].
33. Tony Cheung, 'I Spent HK$10M to Fill in Illegal Basement, says Former Hong Kong Chief Executive Candidate Henry Tang', *South China Morning Post* (2015), <http://www.scmp.com/news/hong-kong/politics/article/1892191/i-spent-hk10m-fill-illegal-basement-says-former-hong-kong> [accessed 6 August 2018].
34. Mok, *Studying the Phenomenon of Unauthorized Building Works in Tsim Sha Tsui and Yuen Long in HKSAR*.
35. Chris Pearson, Peter Coates, and Tim Cole, *Militarized Landscapes: From Gettysburg to Salisbury Plain* (London: Bloomsbury Publishing, 2010).
36. Herzog and de Meuron's de Young Museum and Diller Scofidio + Renfro's Blur Building serve as examples.
37. Stephen Kieran and James Timberlake, *Refabricating Architecture: How Manufacturing Methodologies are Poised to Transform Building Construction* (New York: McGraw-Hill, 2004).
38. Bolchover and Hasdell, *Border Ecologies – Hong Kong's Mainland Frontier*.
39. This is as close as the client in question comes to being an *owner* of the land, since the property is technically leased from the Hong Kong government.
40. David Pye, *The Nature and Art Of Workmanship* (London: Herbert Press, 1995).
41. Kenneth Frampton, 'Towards a Critical Regionalism: Six Points for an Architecture of Resistance', in *The Anti-Aesthetic: Essays on Postmodern Culture* (Seattle: Bay Press, 1983).
42. Walter Benjamin, *The Work of Art in the Age of Mechanical Reproduction* (Lexington, KY: Prism Key Press, 2010).
43. Evidenced in multiple articles in: Robert Corser, *Fabricating Architecture: Selected Readings in Digital Design and Manufacturing* (New York: Princeton Architectural Press, 2010). See also Wes McGee, *Robotic Fabrication in Architecture, Art and Design 2014* (New York: Springer International Princeton University, 2014).
44. Hannah Wood, 'Spatial Activism: Profiling a New Wave of European Architecture Collectives and their Spatial Manifestos', *Archinect* (2018), <https://archinect.com/features/article/149989510/spatial-activism-profiling-a-new-wave-of-european-architecture-collectives-and-their-spatial-manifestos> [accessed 6 August 2018].
45. Ibid.

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