Architecture in the World Risk Society

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THE WORLD RISK SOCIETY

Architecture, in the phase of modernization described as the *World Risk Society* by Ulrich Beck[1], remains precariously perched between its capabilities and culpabilities. Architects work in a context characterized by the development and implementation of social, technical, and ecological systems of mounting hazard. The World Risk Society is a new, second phase of modernity related to its antecedent by the production and the distribution of goods (the emancipating ideas, ideals, and materials goods of the Enlightenment and Industrial Revolution) but differentiated by the production, distribution, and (attempted) management of bads (debilitating pollution, loss of freedoms, catastrophe). As Beck notes, "the belief that modern society can control the dangers that itself produces is collapsing—not because of its omissions and defeats but because of its triumphs."[2] In other words, the successes of first-phase modernity have yielded the risks of second-phase modernity. From climate changes to economic crises to social transformations, the World Risk Society, in Beck's terms, "epitomizes an era of modern society that no longer merely casts off traditional ways of life but rather wrestles with the side effects of successful modernization."[3]

In this context, the sources and effects of low-probability, high-consequence catastrophe approaches the continental and the global; that is, with the ongoing globalization of modernity comes the globalization of risk. In second-phase modernity, risk is indifferent to otherwise instituted distinctions such as class and race or the developed and developing worlds. Thus risk leaves no life, and no aspect of life, untouched. As risk becomes increasingly systemic, it becomes ever less predictable and ever less subject to individual expertise or control. In this way, scientific knowledge and methods have eclipsed themselves; second-phase modernity is characterized as much by our inability-to-know as much as the ability-to-know that characterized so much of the Enlightenment and first-phase modernity. Probable and knowable but rather unthinkable events can escape management and oversight with sufficient velocity to trigger cascading sets of effects that have profound social, economic and ecological consequences. The utter inability of a major government and/or major corporations in the developed world (*all the King's horses and men*) to manage low-probability, high-consequence disasters — such as Hurricane Katrina or the Deepwater Horizon oil spill — is strong evidence that we are in a new phase of modernization; that the contours of modernity have changed. Finally and equally important, such catastrophes need not occur but rather their specter alone is sufficient to transform multiple aspects of public and private life; that is the definition of risk.

How then, is architecture different in this world context? Sociologists such as Ulrich Beck and Anthony Giddens provide some direction: in short, modernization must now be much more reflexive.[4] This call for reflexivity — coolly looking the first-phase modernization in the eye — has multiple and major implications for any ethical, mindful mode of practice of architecture, and specifically for any relevant mode of architectural research, in the twenty-first century.

ARCHITECTURE IN THE WORLD RISK SOCIETY

The realities of second-phase modernity demand a more cogent appraisal of architecture's complex contexts and contingencies coupled with more reflexively sober architectural responses to maintain what efficacy remains in the discipline after the often fundamentally aimless style-based shell games and playboy parlor tricks of twentieth century architecture. This reflexivity has a couple of related implications for an architecture suited to the new phase of modernity in the twenty first century. First, in first-phase modernism, new materials and techniques were frequently cited as causal enablers of change and new architectures. In second-phase modernism, however, substantive advances in practice will not emerge from such a simple, if not blind, technologically-determined narrative. Rather, there will be greater efficacy in architectures that emerge from a careful confrontation of architecture's most recurrent procedures, techniques, and hard logics. For example, questioning basic and routine techniques that in many ways engender the problems associated with first-phase modern architecture—such as air-conditioning, multi-layered walls, and the privileging of program over architecture's many other functions—are prime examples of directions for reflexive research as a basis for more sound practices. Rather than jumping disciplinary bounds for new materials, technologies, or technologies, reflexive questioning basic assumptions ultimately triggers a cascading set of advantages for architectures relevant to the contexts of second-phase of modernity. Second, closely related, if architecture is to become much more aware of its techniques and procedures as its recurrent procedures and techniques are confronted, there will inevitably be greater efficacy in the development of much more simple systems that can be more readily studied and known as opposed to the escalating, hubristic complexity that emerged out of the twentieth century and drove architecture into the most recent period of recession. Strategically de-escalating technology is an essential way forward in the conditions in the next phase of modernity. In what follows, I will discuss each of these points followed by an example of building that is emblematic of these points.

FIRST-PHASE TECHNOPHILIA

Throughout first-phase modernity, architecture practice was characterized by a potent, and curiously mixed, cocktail of technological euphoria, technological determinism and technological capitulation. In the early twentieth-century, casting off the trappings of previous habits of production and decoration was a recurrent narrative of modern architecture. New materials and techniques were often at the core of the promised new futures and new architectures. For instance, Mies van der Rohe stated in 1924 that he saw "in industrialization the central problem of building in our time. If we succeed in carrying out this industrialization, the social, economic, technical, and also artistic problems will be readily solved."[5] With Mies taken here emblematically, an enthusiastic technological determinism was broadly embedded this narrative. In the decades that followed, a more instrumental capitulation to the new technologies unreflectively transformed architecture yet with often unimagined and un-thought consequences. For instance, as air-conditioning systems and electric lighting systems permeated building design, architects unequipped with even rudimentary knowledge of thermodynamics or physiology acquiesced to air-based systems, critically unaware of their performance and effects. In turn, these architects found, at best, space and expression for the presence of these systems in buildings as an emblematic component of architecture's burgeoning modernization rather than a deeper, more poignant integration of the body within architecture or the multifarious consequences of the new techniques. In many cases, architects thus willingly reconfigured building envelopes, building budgets, and expectations of human health and comfort in buildings around the demands imposed by non-architectural systems and techniques.

Such acquiescence has proved to be a fiduciary irresponsibility and a failure of disciplinary imagination; and it most certainly is unfit for the new phase of modernity. It is also the source of the extreme asymmetry between the capabilities of technology and the culpabilities of technology in first-phase modernism that has accumulated into a range of building-based problems from carbon emissions to building sickness syndrome to skill atrophy. In the World Risk Society, blind technological determinism and capitulation is as highly suspect as it is unethical and irresponsible. In this new phase of modernity, the techniques of architects must become more self-aware through a more patient and thorough study of its own disciplinary assumptions and habits. This is a primary source of substantive transformation and innovation. To append to the contours of second phase modernity, architecture must practice a more mindful view of technology's capabilities and culpabilities; i.e., a more cognitively balanced practice of progress and risk. In this phase of modernity, architects will finally have to coolly look technology and technique in the eye, not for a salvation of marketable or promised futures but for verifiable and prudent practices. In this century there can longer be the luxuriant, autonomous acquiescence of building design of first-phase modernism; architects will need to deeply and reflexively reconsider their technique in whole.

Reflexive confrontation of technique must now involve verifiable knowledge of a technique's vast contexts, performances, and consequences: second-phase modernist architecture will need to trade up to knowledge from hand-waiving, deterministic discourse and promises. It demands asking research questions that extend beyond the terms of its own discourse. It also demands a more nuanced and full grasp of the performativity of technique in its most polyvalent and multifarious sense. On the cusp of second-phase modernity, Jean Fracois Lyotard understood the necessary advantages of focus on performativity:

The performativity criterion has its 'advantages.' It excludes in principle adherence to metaphysical discourse; it requires the renunciation of fables; it demands clear minds and cold wills; it replaces the definition of essences with the calculation of interactions; it makes 'players' assume responsibility not only for the statements they propose, but also for the rules to which they submit those statements in order to render them acceptable. It brings the pragmatic functions of knowledge clearly to light, to the extent that they seem to relate to the criterion of efficiency: the pragmatics of argumentation, of the production of proof, of the transmission of learning, and of the apprenticeship of the imagination.[6]

SIMPLE SYSTEMS

How then should reflexive architectural research of the performativity of technique proceed? In a sociological context characterized by abstract systems, risk, and complexity, more knowledge, science or technology does not necessarily advance the discipline of architecture or society; again if often begets new problems as it solves old problems. Consequently, our second-phase modernity is characterized by "conscious and unconscious inability-to-know."[7] As Beck notes, the "World Risk Society is a non-knowledge society in a very precise sense. In contrast to the premodern era, it cannot be overcome by more and better knowledge, more and better science; rather precisely the opposite holds: it is the product of more and better science."[8] In architecture, it follows that not necessarily more or better science—often construed as new building science (materials, technology, techniques)—will advance the discipline in the right way.

In reality, the inverse is true. Claims about new materials and techniques—those narratives that so resonate with first phase modernism—will most likely generate and exasperate other unintended problems according to the extensive networked logic of second-phase modernity. The vistas of variables and the clouds of contingencies of our abstract systems are simply too vast, too un-knowable. The unquestioned rush towards innovation and the "new" that characterized much of research and practice in first phase modernism becomes suspect in the terms of second-phase modernity. As historian of technology David Noble writes, today technique demands "a transcendence of the irrational and infantile ideology of technological progress which has confounded Western thinking for at least two centuries... this ideology of technological progress, according to which technological advance is viewed as being inescapably beneficial for society—indeed, seen as being identical to social and human progress—begs all the critical questions."[9]

As such, in this new context architectural research now must acknowledge, and address, its inability-to-know the outcomes of its own techniques and technologies. This non-knowledge condition suggests that radically more simple means and methods are the most efficacious trajectory for research; systems that are more knowable because they are at once simpler (fewer layers, components, materials) and they have existed long enough to know their actual performance. The self-imposed amnesia of three thousand years of building performance knowledge that was jettisoned in early modernism in favor a giddy euphoria for new techniques and technologies is central to this inability-to-know in architecture.

In contrast, a lower-technology, higher-performance approach improves the performance of practices and buildings not by adding ever-increasing layers of technology, systems, programs, specificity and coordination to our buildings and design practices but rather by questioning and strategically editing the superfluous complexity that dominates our buildings, cities, practices, discipline and lives. De-escalating the complexity of contemporary practice increases actual, actionable knowledge for practice; a genuine and critical forward movement for practice in the World Risk Society. For instance, this involves research on more durable construction/structural techniques that involve fewer and fewer components; a reflexive doubt about the efficacy of the multi-layered approach to contemporary construction and design teams that was enthusiastically but unreflectively developed in the highly-additive nature of twentieth century architecture. This involves re-coupling aspects of the three-thousand year reservoir of intelligence embedded in the simple systems of pre-modern built environments along with the knowable aspects of contemporary building design techniques, analysis, and production. In this new context, progress means something different. It certainly not the blind velocity towards the new or the emergent, but rather the reflexive study that opens a pathway to more knowable systems and means. Architecture can no longer sentimentalize new materials, techniques, and technologies and escape from the realities of second-phase modernity by, as Gidieon stated, "masking itself with the shells of bygone periods."[10]

A lower-technology approach is higher-performance not only because it is capable of achieving the forms of energy efficiencies perhaps evident in a higher-technology building but because it opens adjacent notions of durability, adaptability, and tolerance. A key dimension of such research—key to its higher-performance—is its durability that in turn sponsors the next-uses of the construction. This focus on durability and next-use contrasts sharply with the planned obsolescence and turnover of capital inherent in first phase modernism.[11] The second-phase modernity suggests, especially as buildings approach zero-operational energy performance, that the embodied energy of a project becomes the critical factor in respect of resource consumption.

The preceding points suggests that relevant architectures could emerge in second-phase modernity from a questioning of basic assumptions and a focus on radically more simple systems. These points will be essential to meaningful performativity of architects and architecture in the twenty-first century. The following project, a recent design-build effort in Colorado, in its own ways embodies aspects of these principles.

figure 1: Colorado Project, by author

Situated atop a hill in the Colorado mountains, the building captures several significant views of the adjacent landscape. The construction system utilizes 6x8 spruce timbers for the structure, insulation, finish materials, and enclosure of the walls and floor. The roof is a ruled surface that pitches water and snow to a single scupper on the east wall. This roof also gives the ceiling an asymmetrical belly that casts light and sound around the interior. The mass of the building is used in the summer and the winter to modulate the thermal swings of the climate and seasons. This case provides a comparison of a solid, stacked wood wall compared to a conventional stick framed, multi-layered wall.

STACK ASSEMBLY AND STRUCTURE

The walls of this building are composed as a stack of 6x8 spruce timbers either six, twelve or eighteen feet long. This single material comprises the structure, enclosure, air/water/vapor barriers, finish system, cladding, as well as the thermal conditioning system of the building. These timbers perform all the functions of a typical multi-layered wall and once a timber is installed, there is no additional labor involved with the assembly of that part of the wall.

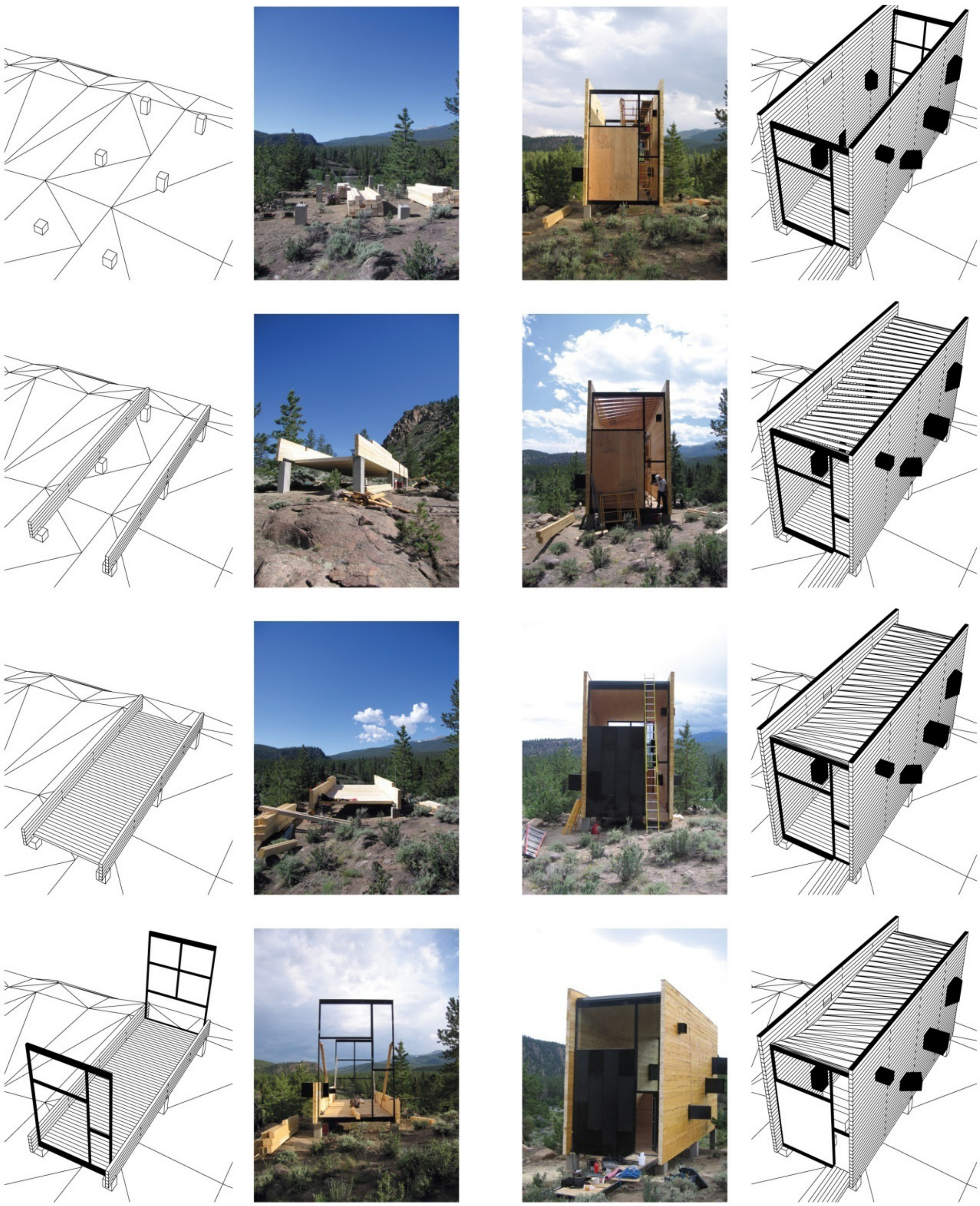

Figure 2: Assembly

EXTERNALITIES OF STICK AND STACKS

While the appearance of a stick framed, rain-screen clad wall would have been more or less satisfactory and well-performing in a limited sense, the externalities of a stick framed wall —how its materials are extracted, transported, manufactured, transported again and again — is as vulgar as it is destructive. Even if the stick framed building is pleasant enough, this vulgarity is evident in the plundered landscapes of its extraction, the factories of its manufacture, and the pollution, and risks conflicts associated with its petro-transportation.

In contrast, the spruce wood for the stacked wall comes from the same valley as the project location. Likewise, they were processed into timbers at a mill in the same valley. The result is radically little transportation costs and pollution compared to other approaches. The cut off remainders of the timbers also proved to be excellent fire wood that was used both for cooking and conviviality on the remote mountain site during construction. As the dominant material in the building, the spruce provided dramatically less waste than a typical stick-framed assembly. A major point here is that more budget was spent on material for the building assembly rather than the externalities of a typical wall.

An analysis of the embodied energy of these two wall systems is illuminating as examples of first and second modernity approaches. As a construction (hopefully) becomes more energy efficient in terms of its operation, the role of its embodied energy becomes increasingly important; it becomes a greater part of the ecological resources required for a building. Certainly as a building team claims to yield a "zero-energy" building (zero-operational energy building), then its embodied energy is all important. This timber structure has no power-operated systems and is thus a zero-operational energy building.

The embodied analysis for the stacked and stick approaches to wall construction is revealing. The 6x8 spruce timbers for the walls and floor of this building were locally harvested and air-dried in desert-like climate of the Upper Arkansas River Valley. On account of this the embodied energy value for each wall is 7421 megajoules. The embodied energy value for a stick-framed and clad wall of a kiln-dried lumber of the same dimensions is 42958 megajoules, or nearly six times the embodied energy.

STICK	**qty**	**length**	**linear feet**	**volume per**	**cu feet**	**cu meter**	**MJ per unit**	**MJ**
2x6 stud	39	18.2	710	0.05729	40.66444	1.1514888		
2x6 plate	2	36	72	0.05729	4.12488	0.1168036		
blocking	76	0.875	67	0.05729	3.809785	0.1078811		
2x12 beam	3	36	108	0.11458	12.37464	0.3504108		
						1.7265842	4692	**8101**
Plywood	**qty**			**volume per**	**cu feet**	**cu meter**		
1/2"	23			1.333	30.659	0.8681662	9440	**8195**
Batt Insulation	**qty**	**length**	**sf**		**lbs**	**kg**	**MJ per unit**	**MJ**
R-19 x 12"	36	18	648		162	73.5	150	**11025**
Interior Finish	**qty**	**length**	**linear feet**	**volume per**	**cu feet**	**cu meter**	**MJ per unit**	**MJ**
1x6 SYP #1	39	36	1404	0.01909	26.80236	0.7589583	4692	**3561**
Rain Screen	**qty**	**length**	**linear feet**	**volume per**	**cu feet**	**cu meter**	**MJ per unit**	**MJ**
2x4 nailer	19	19.2	365	0.028645	10.4497	0.2959024		
2x6 cladding	39	36	1404	0.05729	80.43516	2.2776701		
						2.5735725	4692	**12075**
								42958

STACK	**rows**	**length**	**linear feet**	**volume per**	**cu feet**	**cu meter**	**MJ per unit**	**MJ**
6x8 timber	31	36	1116	0.276909	309.0304	8.7507677	848	**7421**

Figure 3: Emergy Analysis

Further, the solid timber wall that provides for adjustments and tuning engenders durability through mass. In contrast to the increasingly thin layers of materials in contemporary construction, the thickness of the material provides a redundancy of material that points to a longer use life due to a different paradigm of maintenance. In the case of plywood, oriented strand board, and of other engineered wood products there is no data that establishes their performance or integrity beyond a few decades, especially depending on the quality of their detailing and installation.

While there is an argument about the efficacy of the monolithic wall in terms of its embodied energy, its impetus in the project has as much to do with its effect on the building and those inside the building. The thickness, robustness of the wall is palpable. But there are other, more nuanced effects of the monolithic wall. This wall assembly engenders a radically different thermal perception of the space. Spruce is a softwood and thus not particularly dense so it does not conduct thermal energy as readily as more dense species. This creates a thermal lag: cold exterior surface temperatures conduct more slowly in the winter and likewise warm surface temperature transmission is dampened in the summer. At the same time, the spruce is dense enough to absorb solar energy and its interior surface is thus warmed in the winter, affecting the building interior's mean radiant temperature. The performative result is that the owner can read in the space in a t-shirt, sitting comfortably in a mid-sixties ambient temperature while exterior temperatures are sub-zero in the winter. So there are some subtle, often unconsidered, experiential differences between the stack and stick approaches.

The comparison of stick and stack approaches in respect of their performance as conflated matter/energy systems in this case points to practices that run counter to many assumptions of contemporary construction but that are consistant and illustrative of second-modernity conditions.

CONCLUSION

As neurologist Kurt Goldstein wrote, "there is greater revelation in pathological phenomena."[12] The pathological phenomena in architecture is most pronounced with its promiscuous and un-reflexive relationship with technique in first modernity. When contrasted with the technologically determined cul-de-sac of so-called "new" or "emerging" technologies, a reflexive, if not iconoclastic, approach to disciplinary procedure is no less creative, radical, or adventurous; as the questioning of basic assumptions and tactics must always be.

For the conditions of new modernity, an interrogatory, reflexive mode of research yields an approach to our current techniques that retires the discipline's acquiescence in favor of enriched thermodynamic imagination capable of advancing architecture's standing preoccupation with form in our current resource-constricted context. By burrowing into largely-unconsidered disciplinary assumptions, second-modernity approaches create multiple possibilities for architecture. Such engenderment is crucial not only to our current fiduciary responsibilities but more importantly will be fundamental to the achievement of the integrated ecological, economic, social, cultural, technical, thermodynamic, and formal performances that can make architecture so rich.

ENDNOTES

1 Ulrich Beck, *World at Risk,* (London: Polity Press, 2009).
2 Ibid., 8.
3 Ibid., 8.
4 Ulrich Beck, Anthony Giddens, and Scott Lash, *Reflexive modernization: Politics, Tradition and Aesthetics in the Modern Social Order*, (Palo Alto, CA: Stanford University Press, 1994).
5 Mies van der Rohe, "Industrialized Building" in Ulrich Conrads, ed. *Programs and Manifestos on 20th-Century Architecture*, (Cambridge: The MIT Press, 1975), 81.
6 Jean-Francois Lyotard, *The Postmodern Condition: A Report on Knowledge*. trans. Geoff Bennington and Brain Massumi (Minneapolis, MN: University of Minnesota Press, 1979), 62.
7 Beck, 115.
8 Ibid., 115.
9 David F. Noble, *Forces of Production: A Social History of Industrial Automation*, (Alfred A. Knopf: New York, 1984), 351.
10 Sigfried Giedion, *Space, Time and Architecture: The Growth of a New Tradition*. 5th ed., (Cambridge: Harvard University Press, 1967), xliii.
11 Daniel Abhramson, "Obsolescence: Notes Towards a History," *Praxis: Journal of Writing + Building 5* (2003), special issue on "Architecture After Capitalism," 106-112.
12 Kurt Goldstein, *The Organism*. (New York: Zone Books, 1995), 29.