Building Rammed-Earth Systems

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today

1 Outline

INTRODUCTION:

- Building Energy
- Fluxability
- Exacting Inexactly
- Actual Complexity
- The Creative Evolution of Duration
- Bases of the Program
  - Physiological Basis
    - Radiation Nation
    - Humidity City
  - Energetic Basis Maximum Power Design Energy Systems Language
  - Computational Basis
    - Fluxable Program
      - Integrated Design
      - Flux.io
  - Ecological Basis
    - Deep Ecology
    - Cascades of Complexity
    - Exergy per Emergy
    - Exacting Program
      - The City is Not a Tree
      - AutoTune
      - ASHRAE Guideline 14-2002
  - Import Rammed-Earth in the context of TAS
    - radiant heat transfer a first-order design line
    - intrinsic moisture handling is fine
    - exergy per emergy
    - cascades of benevolence
  - Tuning Structure to Environment
    - striated complexity for smooth complexity
    - how are we to model TAS? (RE)
    - scope and scale of the model
    -

For Alexander, this urban system is like a semi-lattice in set theory. Two sets of objects and activities overlap at the newsrack. If diagrammed like a branching structure, the branches overlap and connect. The semi-lattice diagrams natural cities like Siena, Liverpool, Kyoto, or Manhattan. The tree segregates urban functions in an organization, while the semi-lattice offers ambiguity and multiplicity in a structure that is thick, tougher, more subtle, and more complex. On the one hand, Alexander expands the repertoire of design to include activity. But on the other, he quickly codifies and taxonomizes that activity. He mimics the object of this own critique by reforming the artificial with a natural correctiveinstead of the tree, the semi-lattice becomes the placeholder. Despite his attempt to incorporate active form and information, Alexander only creates another immobilized form.8

2 Introduction

> "There are tumults of the mind, when, like the great convulsions of Nature, all seems anarchy and returning chaos; yet often, in those moments of vast disturbance, as in the strife of Nature itself, some new principle of order, or some new impulse of conduct, develops itself, and controls, and regulates, and brings to an harmonious consequence, passions and elements which seem only to threaten despair and subversion."
>
> *William Gibson, Bruce Sterling — The Difference Engine*

This thesis is an attempt to derive a fluxable design program for rammed-earth construction from what Kiel Moe has contemporarily called "an architectural agenda for energy."

> "An architectural agenda for energy ultimately requires a more fluxable program for buildings. By becoming more programmaticly inexact but in exacting ways, buildings characterized by precisely vague typologies and anticipitory functions can best trigger the emergent properties of actual complexity and the creative evolution of duration." [1, p245]

"Truth is not Truth"

Patent US2009/0234696A1, "Engineered Architecture", submitted by licensed architect Eli Attia and published on September 17, 2009. Description of Related Art: "Current practice for architectural design, fabrication, and construction for buildings includes various inefficiencies and areas of waste. Such inefficiencies may involve coordination, communication, design, material provisioning, material management, etc. There is, therefore, a need in the art for improved systems and methods for automated design, fabrication, and construction management for buildings."

The role of On the international scale, emissions trading enabled by Article 17 of the Kyoto Protocol reduces exergy to a market game and neglecting the externalities s Paris accord, infrastructure, collectives, physiological, quantum.

Unwarranted junctions and conceptual disjunctions between engineering and architecture are shown to have been a significant factor of extensive infrastructural malpractice in the twentieth century [2]. Namely, isolating patterns of insulated energy design fell out of nineteenth century equilibrium thermodynamics then manifested in physiologically and environmentally malignant building energy systems. This framework for designing indoor climates runs so deeply in the modern practice and discourse that scaled solutions such as solar energy transformers, turbines, biofuels, atomic energy, and the ideology of energy efficiency fail to recognize the local movements of energy itself.

It is postulated here that

To address this complexity a program is formulated. At the outset, "program" has an architectural sense and a computational sense. "Architecture" as well has a physical sense and a virtual sense.

> ". . . analysis that identifies all involved material and energy flows from the formation of raw materials to end of life of the building." [3, p. 70]

2.1 Fluxability

Flux is

2.2 Form Follows Energy

2.3 Computational Modeling in Light of Analytical Modeling

2.4 Thermal Inertia and Intrinsic Evaporative Cooling

2.5 Form of the Model

References

[1] Kiel Moe. *Convergence. An Architectural Agenda for Energy.* Routledge, 2013.

[2] Kiel Moe. *Insulating Modernism. Isolated and Non-Isolated Thermodynamics in Architecture.* Birkhauser, 2014.

[3] Kiel Moe and Ravi Srinivasan. *The Hierarchy of Energy in Architecture. Emergy Analysis.* Routledge, 2015.