

Weaving a Logic of Assembly

KRISTOPHER PALAGI

Louisiana State University

Concrete formwork is expensive. Within residential construction, the wood installed, shed and discarded compounded by the exhaustive cost of labor, make casting even a simple straight wall insurmountable. Regardless of the number of sustainable practices thrown at it -- engineered, re-claimed, recycled -- to attempt a novel form becomes an unjustifiable venture. Moving away from wood, pre-fabricated formwork can minimize the cost but drags along baggage of its own. Metal panels demand a strict adherence to standardization for efficiency, while foam blocks only allow the structural integrity to blend with heavenly thermal results by completely masking the poetics of a concrete finish. And digital fabrication's tolerances shine bright but we are lying to ourselves if we believe it will illuminate the other 99% of construction. Principally, this project aims to develop a reusable formwork assembly for casting in place concrete walls with structural capacities. Additionally, the system is challenged to pair limitless formal variations with minimally skilled labor.

The logic of the assembly is housed in the variability and structural efficiency of a steel cable network in place of wood or steel panels with walers. The steel cable, either reusable or pretensioned as reinforcement within the wall, swaps the previously lost embodied energy of standard formwork for useful energy in engorged concrete mass. This is accomplished as the fabric membrane distends into the cable network facilitating a swollen finish concrete form. Although seemingly uncontrolled, the woven assembly, once tuned, establishes a high level of precision at key nodes. This precision allows future stages of standard construction systems (framing, finishes, and utilities) to be choreographed.



Weaving a Logic of Assembly

Concrete formwork is expensive. Within residential construction, the wood installed, shed and discarded compounded by the exhaustive cost of labor, make casting even a simple straight wall insurmountable. Regardless of the number of sustainable practices thrown at it – engineered, re-claimed, recycled – to attempt a novel form becomes an unjustifiable venture. Principally, this project aims to develop a reusable formwork assembly for casting in place concrete walls with structural capacities. Additionally, the system is challenged to pair limitless formal variations with minimally skilled labor.

The logic of the assembly is housed in the variability and structural efficiency of a steel cable network in place of wood or steel panels with walers. The steel cable, either reusable or pretensioned as reinforcement within the wall, swaps the previously lost embodied energy of standard formwork for useful energy in engaged concrete mass. This is accomplished as the fabric membrane distends into the cable network facilitating a swollen finish concrete form. Although seemingly uncontrolled, the woven assembly, once tuned, establishes a high level of precision at key nodes. This precision allows future stages of standard construction systems (framing, finishes, and utilities) to be choreographed.



Weaving sequence - tuning key points



Weaving sequence to finish cast



Weaving sequence to finish cast



previous assembly and material studies

Full-scale logic of assembly studies



Full-scale material studies



Initial scaled model system studies

