

Science Cabinet #1
X. Experimental Construction
1. List of construction
innovations.

A PARTIAL LIST OF INVENTIONS IN CONSTRUCTION: THE CENTER FOR ENVIRONMENTAL STRUCTURE

NEW TYPES OF MASONRY WALL

- Massive composite brick, concrete, and block wall in which concrete interlock allows the whole to function structurally
- Dry-stacked concrete block wall with offsets and inserts to create more vivid building form and mass to strengthen space
- Earth-cement interlocking block wall
- Slab-locking foundation blocks
- Concrete foundation blocks, with rebars embedded and ready to receive slab mesh
- Castellated earth-concrete blocks
- Composite poured sand-cement concrete columns and beams with brick infill.

NEW TYPES OF WOOD STRUCTURE

- Use of eight-inch and ten-inch stud walls creating thickness and strength with only minor increase in cost
- Monocoque construction: a lightweight wall made of ribs of one-by material covered with plywood so that the whole wall acts together as a box beam

- Massive hollow plywood beams and columns, 24 inches by 24 inches, with frequent interior collars and exterior corner design to protect plywood end grain.

NEW TYPES OF VAULT

- Domed vault made from layers of cone-tile stacked and riffled to form arches, and laid together to form a spherical vault
- Basket vault with layers of ultra-light-weight concrete laid over burlap
- Heavier basket vault, with pumice concrete laid over basket and burlap and chicken-wire.

NEW TYPES OF ROOF STRUCTURE AND ROOF SURFACE

- The Russian roof: a two-layer lapped plank roof system in which each board has two rills to take water from ridge to eave
- Lacework concrete trusses: shot concrete truss with curved members
- Cast lacework trusses.

NEWTYPES OF CABINETS AND FURNITURE

- Automobile lacquer over MDF
- New reflectors for office lights
- Furniture made of one-by material
- Mass-produced, individually fitted chairs
- Plastering lath as a base for sofa
- A client sits in a chairlike jig with moving parts (easily manipulated blocks of wood), and from the parameters the client establishes for his own comfort, a unique plywood-shell chair is generated with a complex three-dimensional curve not created for any other client. Yet it is all low-cost.

STRUCTURAL INVENTIONS

- Short pieces of steel bar (reinforcing bars) are used as pin-connectors in heavy timber connections
- Two-inch shell concrete floor slabs
- Gunit walls and columns
- 1.5 inch thin wall concrete
- Bamboo-urethane beams
- Thin concrete shells for shear reinforcement in post-and-beam structures

- Shot concrete trusses: trusses with complex configuration shot in the air
- Curved member wooden trusses.

INNOVATIONS IN BLOCK FABRICATION

- Rammed, vibrated and compressed molding of earth-cement blocks
- Cylindrical concrete blocks
- Self-centering wall blocks.

CONSTRUCTION INNOVATIONS

- Dry-stacked block structural walls and columns
- Use of one-by material as guidework for shot concrete
- Interlocking multi-masonry wall with poured connectors
- Low-cost formwork with foam fillers for shaping poured concrete
- Pre-cast concrete girder arches
- Marble-dust floors made with new styrofoam forming techniques that allow wide variety of form and color and pattern.