

The Low Cash-Cost House: Sustainability as a Source of Culturally Responsive Design

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INTRODUCTION

In the 1940's the Tuskegee Institute embarked on a program of affordable housing that came to be called the *Low Cash-Cost Housing* program. The program provided a new housing paradigm for the impoverished tenant farmers of the Alabama Black Belt. The houses built through the program carry significant meanings as "complex artifacts embodying important information about the people who built them."¹ These dwellings manifest the hopes and dreams of Black Americans in the postwar rural South and mark a singular congruence of self-reliance and proto-sustainable design.

HISTORY OF THE PROGRAM

The Low Cash-Cost Housing program occurred during decade following World War II. The program continued the legacy of Booker T. Washington at the Tuskegee Institute in its self-build approach exploiting native materials, and its dedication to bringing about home ownership for tenant farmers.

The houses of tenant farmers in the early 20th Century were similar to the slaves' quarters inhabited by their descendants. These one-, or two-room houses lacked indoor plumbing and regular maintenance – the tenant, perpetually indebted to the plantation owner, possessed neither the resources nor incentive to maintain a house they would never own.²

These were the houses that attracted the attention of Booker T. Washington on his week-end rides around Macon County after he came to the Tuskegee Institute in 1881. The houses inspired him to create outreach programs promoting house ownership and upkeep. These programs were enacted as Washington initiated an ambitious program of campus construction. Students and faculty made bricks and constructed buildings, creating an impressive campus despite severe funding limitations.³

The outreach programs endured following Washington's tenure through the efforts of the Black agents of the Alabama Cooperative Extension Service. However, the programs failed to substantially change the housing conditions for the Black Belt farmers. The tenants' problem was the cost of construction materials. Improved housing would be obtained only if low cost materials became available.⁴

Tuskegee Institute president Dr. F. D. Patterson founded the Low Cash-Cost Housing program in the years following World War II to respond to this challenge. The program – which taught farmers to build houses of hand-made concrete block formed from native materials – applied the self-build approach used by Washington to the creation of affordable housing.

Patterson followed a long tradition of masonry experimentation in Macon County dating back to student brick making under Washington. Examples of innovative masonry techniques exist throughout the county today.⁵

Patterson's researchers experimented with affordable construction techniques such as rammed earth construction and innovative concrete making methods, none of which proved to be effective. On a ride through the county one day, Patterson observed a local man making concrete blocks from "materials which were lying on the ground right around him."⁶ The Institute researchers tested the method, and, Patterson later wrote, "pronounced the experiment a success and proceeded to take the idea to the people whose plight was our concern."⁷

Patterson initiated a program of construction using the new technique of block making. A small subdivision on the campus called Roberts Circle became the Institute's on-campus housing laboratory. A Rural Housing Office was established which sponsored block making classes. The Tuskegee block was used to build houses, classroom buildings, farm buildings and churches around Macon County.⁸



Fig. 1. House. Roberts Circle Subdivision. (Photo: Don Armstrong)



Fig. 2. Agricultural Building Constructed of Tuskegee Blocks. (Photo: Don Armstrong)

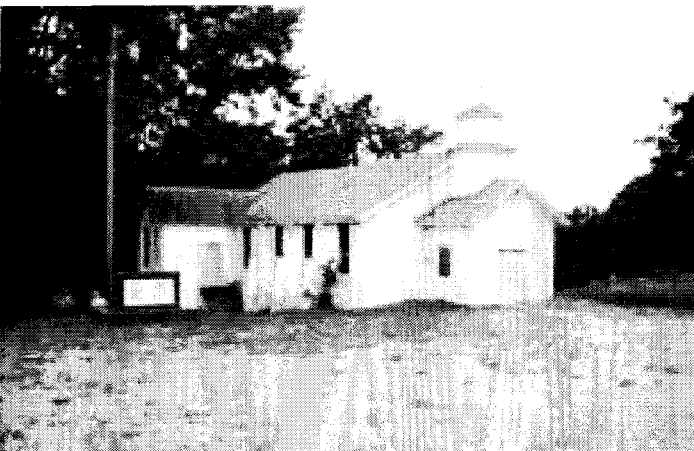


Fig. 3. St. Johns Church. Made from Tuskegee Blocks (Macon County, Alabama). (Photo: Don Armstrong)

The Low Cash-Cost house attracted the interest of the federal government following the passage of the 1949 Housing Act. The Tuskegee block became approved by the Farmers Home Administration (FmHA) for federally funded housing, possibly the first and only owner-made construction material of native materials to be so approved. Two Macon County families built the first houses owned by Alabama Blacks to be funded by the program.⁹

U. S. Secretary of Agriculture Charles Brannan toured Low Cash Cost Housing sites at the Institute in 1950, indicating the significance of the program. Brannan is depicted in newspaper photos standing with a family beside their house under construction. Publicity photos of officials posing with Black families in their government-financed houses were common at that time, sometimes with a blatantly paternalistic looking white official “sharing” a black family’s joy.¹⁰



Fig. 4. U. S. Secretary of Agriculture Charles F. Brannan Observing the Laying of Tuskegee Concrete Block. (Source: Low Cash-Cost Housing)

The Institute published an illustrated booklet in 1950 entitled *Low Cash Cost Housing*. The publication contains instructions on block making and house construction, and photographs of construction sites and completed buildings. It contains illustrations which are similar to those in a 1949 *Popular Mechanics* publication entitled *Popular Mechanics’ Famous Concrete Block House*, indicating that it was possibly used as a model for the Tuskegee booklet.¹¹

The program built houses through the middle of the 1950’s. It disseminated its ideas far outside the Alabama Black Belt during that time.

The program was visited by representatives from several foreign countries interested in affordable housing during the early 1950’s. These visitors, sent to the Institute by the State extension service, came from predominantly non-White nations, probably a reflection of service’s segregation policy at that time. The Institute promoted the program abroad and sent a representative to South America and to Africa to teach about the program.¹²

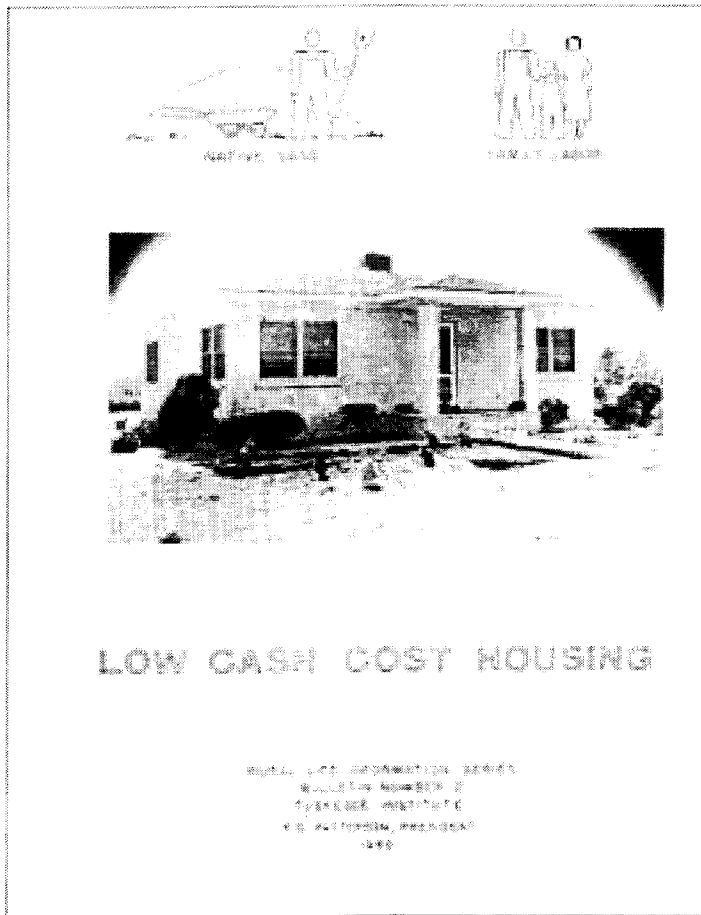


Fig. 5. Cover of *Low Cash-Cost Housing*.

Low Cash Cost house sites were visited by Ezra Taft Benson, who served as the U.S. Secretary of Agriculture in 1954. However, the visit received far less press attention than the 1950 Brannan visit, indicating a drop of public interest in the program. Low Cash-Cost houses were not built or used for demonstrations that year, which appears to have been the last year of the Program.¹³

The end of the program seemed to coincide with the end of Patterson's presidency, indicating that no one could fill the void he left. However, if the Institute had continued the program there would have been other obstacles. Federal funding for the houses was limited. The Tuskegee block, a hand-made construction material, was an anachronism in an era enthralled with new advances in manufactured materials. The Low Cash-Cost housing program constructed over 30 buildings during its roughly 10 year lifespan. Many of these buildings continue to play a vital role in the cultural landscape of the Alabama Black Belt.

CONSTRUCTION PROCESS

The construction process used to build the Low Cash-Cost houses was socially as well as technologically innovative. The process fostered a sense of community using sustainable design strategies.

The owner, prior to constructing a house, applied to the program and received a set of construction documents. The Institute facilitated the process through promotional, administrative, and design functions. Candidates learned about the program in several ways, including the annual Tuskegee Farmers' Conferences which featured exhibits about the program, *The Negro Farmer* newspaper, and through Black extension agents. The program was also promoted by community leaders.¹⁴

The Institute administered the application process and loan approvals before 1950. Owners provided some of the construction costs and labor. The Institute provided technical assistance by staff and labor by students and offered courses in various construction skills. The Institute's role was diminished in 1950 when the Farmers' Home Administration became the lender for the program. Owners applied through the local FmHA office and the Institute continued to provide technical assistance. Tenant farmers were ineligible for FmHA loans, defeating one of the original objectives of the program.¹⁵ The houses' construction drawings were produced by the Tuskegee Institute's Division of Architectural and Mechanical Drawing. House designs were available for 2-, 3- and 4-bedroom houses. Many variations of these designs are found in the field, indicating the possibility of user involvement in design.¹⁶

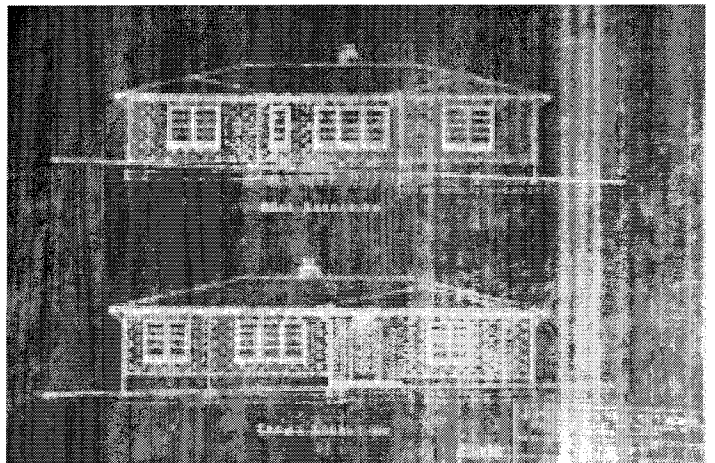


Fig. 6. Construction Drawings for a *Low Cash-Cost House*. (Source: Tuskegee University Physical Plant)

Construction started with making concrete blocks. The blocks were site-cast using native sands and gravel. Blocks were made in winter or summer, the farmers' down time. The blocks, as well as the houses, were sometimes made by cooperative groups of farmers.¹⁷

The blocks were cast in partitioned wooden forms, sitting on a 2" concrete slab. The forms contained chambers allowing many blocks to be simultaneously cast and were soaked in recycled motor oil to prevent the blocks from sticking to it. A more durable, easy to use form was designed by President Patterson which was made available to owners.¹⁸

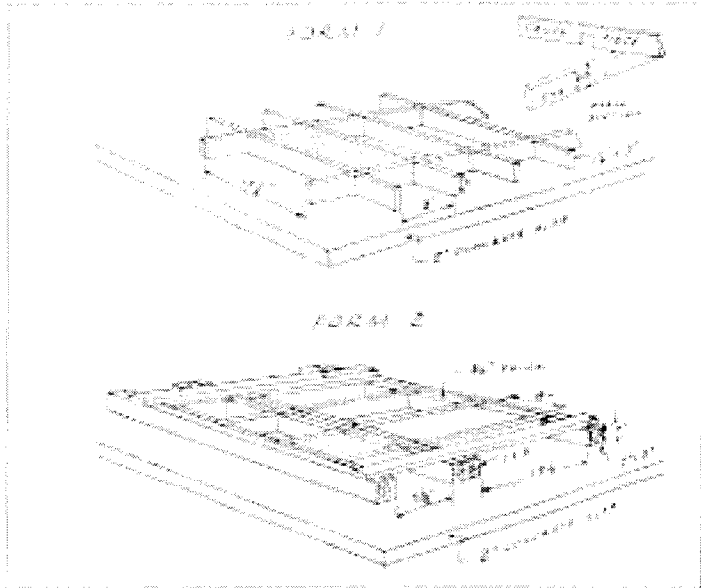


Fig. 7. Wooden Forms Used to Make Tuskegee Block. (Source: Low Cash-Cost Housing)

The builders cast the blocks from a cement mix containing sand and gravel quarried from or near the house site. One account states that "a creek bed was found that had promising looking gravel in it and the block making plant set up on its bank...gravel was used just as it came from the earth."¹⁹ The percentage of gravel in the sand quarried from the creek bed established the amount of Portland cement used in the mix. Typically builders mixed the cement slurry by hand, although motorized mixers were sometimes used. They cast the blocks from a wet mix to eliminate tamping and water-curing. The block makers poured the wet concrete mix into the forms and leveled it off with a wooden float. They removed the blocks from the forms after 24 to 36 hours and stacked them in the shade to cure. An average of 3600 blocks was required.²⁰

The builders constructed the walls after the blocks had cured. Erecting the walls entailed an efficient use of materials and instilled the owners with the pride of place that comes when the users of a building invest themselves in its making.

The builders laid out the house footprint and built a block foundation wall on an un-reinforced concrete perimeter footing before the erecting the actual walls. Footing sizes varied from 16"-20" wide by 8"-10" deep. Apparently, no interior footings were used although the house's longitudinal interior wall appears to act as a bearing wall for the roof. This foundation design does not meet the typical standards of its time as



Fig. 8. Using a Wooden Float to Level the Cast Cement. (Source: Low Cash-Cost Housing)



Fig. 9. Constructing a Building Using Tuskegee Concrete Blocks. (Source: Tuskegee University Archives)

indicated in Architectural Graphic Standards and other references.²¹ The instruction booklet insures the owner that laying the block was a "simple process...with a few hours of instruction and some supervision, a farmer can do all the masonry work on the walls except building the corners," which would require a skilled mason.²² The builders erected rowlock cavity walls – a type of wall more commonly associated with brick construction. They constructed two wythes, vertical sections of wall each one block thick, separated by a 1 3/4" cavity. The builders then tied the two wythes together by setting header blocks on edge, spanning the wall cavity. They alternated headers with stretchers, also set on edge. One account states that "The air space in the concrete blocks could be produced not by the way the blocks were made but by the way they were laid."

The masons invested more labor in these walls than standard concrete block construction would have required. They had to lay more individual masonry units and spend more time plumbing the walls – the inside wythe and outside wythe each required separate plumbing and leveling – than standard construction would have required. The builders set the block using

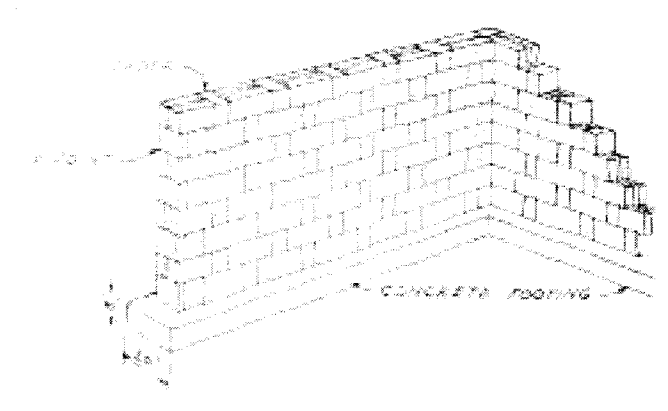


Fig. 10. Low Cash-Cost House Rowlock Wall Detail. (Source: Low Cash-Cost Housing)

a method more similar to that of brickwork than that of standard concrete block laying. They spanned window and door openings with site cast concrete lintels. The builders appear to have constructed the walls without using reinforced concrete beams or columns although the region is subject to severe windstorms.

The builders used their materials efficiently. The designers of the houses carefully matched the house dimensions to the block module to avoid wasting block.²³

The builders installed the floor, roof and other building systems after the walls were completed. The owners were joined by skilled artisans from the Institute and its environs who applied innovative, sustainable methods to keep material costs down.

The builders constructed the floor by pouring a 2" concrete sub-slab onto tamped earth or onto a bed of cinder fill. They apparently built the floor without a vapor barrier and wire reinforcing although both were commonly used at that time. They poured cement topping over the slab and finished it to a smooth surface. The instruction booklet describes this as a simple process although pouring slabs requires skill and arduous work.²⁴

The owner brought in skilled help to build the roof. Farmers with roof building skills probably helped those without. The Institute most likely had carpentry instructors and students available to assist building the roof, and provisions for milling the required lumber.²⁵ The Institute probably assisted with installing the house's only interior finish material, the gypsum board ceiling.

The Institute presumably assisted the owner in installing the plumbing and electrical systems. The builders only roughed in the plumbing in some cases where outhouses were used. The instruction booklet provides directions for installing electrical wiring, recommending that electric conduit be installed in the floor slab and exterior wall cavities where it serviced recepta-

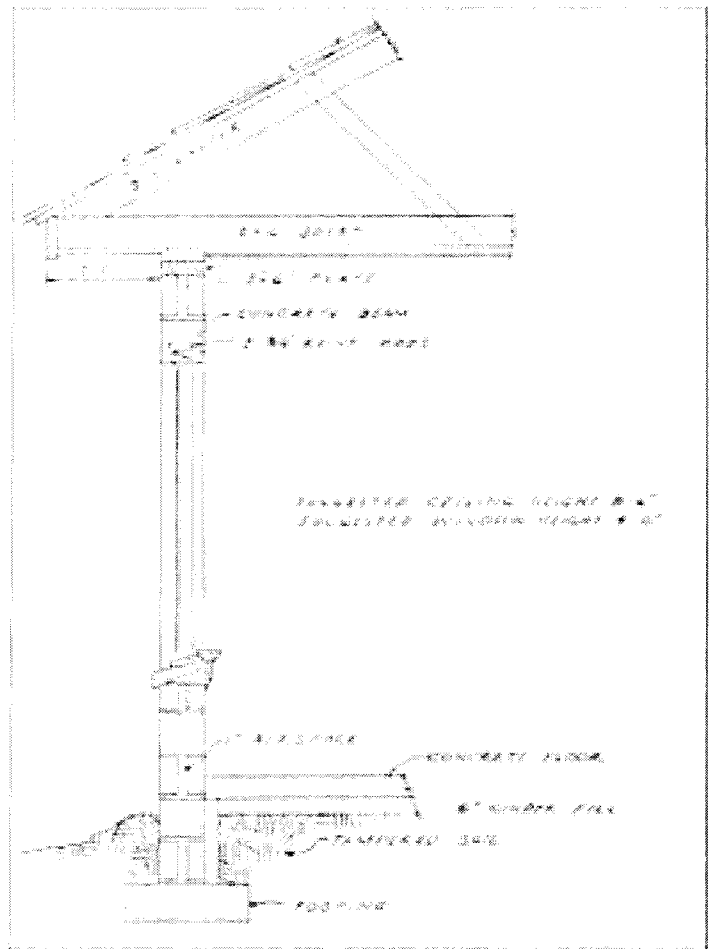


Fig. 11. Low Cash-Cost House Wall Section. (Source: Low Cash-Cost Housing)

cles. The electricians ran a separate circuit of wiring overhead in the attic for ceiling lighting fixtures omitting the need for running more wiring through the walls.²⁶

The total construction cost for an 825-square-foot house, in 1950 dollars, was \$2,057, or about \$2.50 per square foot.²⁷

The owner, with assistance provided by the Institute, built a comfortable, durable house for far less than normal cost. They acquired construction skills in the process and felt an attachment to the house because they had invested a part of themselves in it. The owners enjoyed a new sense of community which arose from the communal approach to building. They now owned a house for the first time in the history of their family, a house with singular attributes.

The Low Cash-Cost House

The Low Cash-Cost House has many virtues. Its design reflects sustainable design strategies – reduced operating and embodied energy, lowered indoor pollutants, and use of passive energy –



Fig. 12. *Low Cash-Cost House.* (Photo: Don Armstrong)

and evokes a sense of place through its honest expression of native materials.

The house's most significant feature is the Tuskegee blocks. The blocks conserve energy through their high thermal mass and evoke place through the coloration and texture of the native materials they contain.

The blocks are solid and do not have the cells found in conventional concrete blocks. They were made in four different sizes. The blocks most commonly used were stretcher blocks with a nominal size of 8" x 16" x 3" (8" x 15 1/2" x 3 1/4" actual dimensions) and header blocks with a nominal size of 8" x 8" x 3" (8" x 7 1/2" x 3 1/4" actual dimensions). The blocks were also made in two other, less commonly used nominal sizes, 5" x 16" x 3" (5" x 15 1/2" x 3 1/4" actual dimensions) and 8" x 6" x 3" (8" x 6" x 3 1/4" actual dimensions). The blocks are very dense and a stretcher block weighs about 33 pounds, about the same as a standard concrete block, although less than half its width. The Tuskegee blocks have surface textures and colorations which vary—between blocks and within a single block—depending on the sand and aggregate used in the cement.²⁸

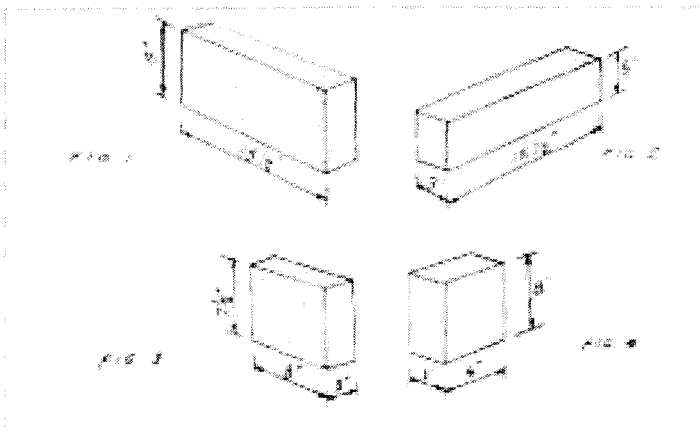


Fig. 13. *Types of Tuskegee Block.* (Source: Low Cash-Cost Housing)

The Tuskegee blocks embody less non-renewable energy than standard block. The blocks, made by hand on site were produced using little or no fossil fuel energy for manufacturing or transport. The blocks embody only the energy used to make the Portland cement they contain and the energy employed by cement mixers, when used. The blocks contain sand and gravel that was hand quarried, eliminating the use of mechanical digging equipment which is energy consuming and polluting.

The Tuskegee blocks evoke a sense of place by reflecting the character of regional soils and minerals. The blocks' colors come from the yellow and gray sand from which they were made. Their surfaces are subtly mottled with various colors and textures. Aggregates of local stone are exposed in the surface of some blocks. The hand of the block-maker is impressed in each block, and the strike marks and dents add character.

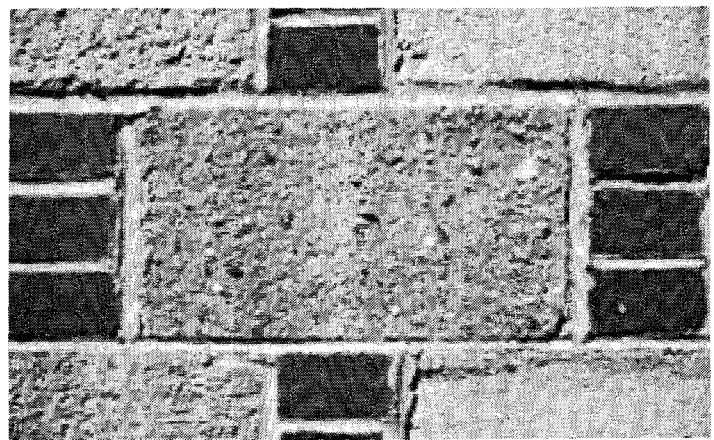


Fig. 14. *Tuskegee Block.* (Photo: Don Armstrong)

The walls constructed of the Tuskegee blocks magnify the attributes of sustainability and place making found in the individual block. The exterior wall fabric conserves energy through its rowlock construction and continues regional traditions of using exposed masonry block patterns aesthetically.

The wall contains two wythes of 3" blocks separated by a 1-3/4" air space. The wall therefore contains more than twice the amount of concrete than a standard concrete block wall.²⁹ The Tuskegee block walls have an insulation value of about R-1.35, compared to R-1.04 for standard unfinished concrete block walls. The walls' higher thermal resistance contributes to thermal comfort. Owners report that the houses are comfortable both in winter and summer. The walls' increased density due to the density and thickness of the blocks creates a greater thermal lag through the walls than standard block construction, slowing heat flow through the walls during times of outdoor temperature extremes.³⁰

The walls, in addition to their thermal efficiency, also have aesthetic significance. They impart a richer character than standard exposed or stucco concrete block walls. The walls'

bonding patterns in some houses are enlivened by using brick in place of the stretcher blocks, creating a quilt-like pattern of alternating block and brick. Brick was sometimes used as a band around doors and windows or to articulate certain building elements. In all of these cases the brick serves both a tectonic and aesthetic purpose. The combined effect of the rich, native heterogeneity of the block faces, the artful pattern of block and brick, and the carefully struck mortar joints between the courses blurs the line between utility and art.

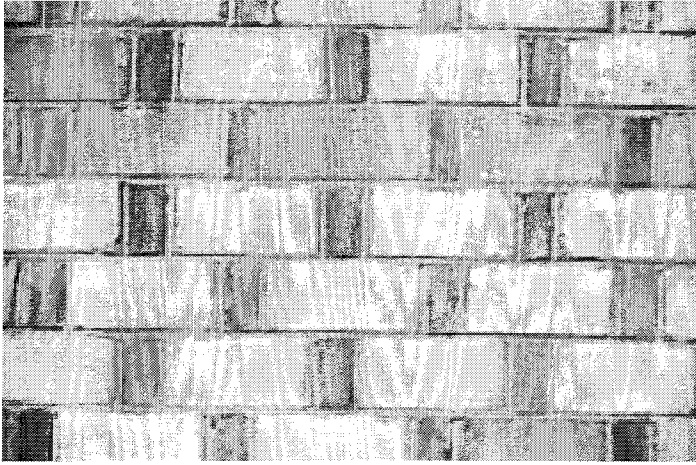


Fig. 15. Tuskegee Block Wall. (Photo: Don Armstrong)



Fig. 16. Standard Concrete Block Wall. (Photo: Don Armstrong)

Compared to the block walls, the roof, floor, fenestration, finishes and mechanical electrical systems of the house are more conventional. However, these features also contain examples of sustainable place making.

The floor is an exposed, smooth-finished, concrete slab, non-integral with the stem wall foundation. The floor surface is the final finish, reducing materials by eliminating the need for carpeting or other flooring which also eliminates the off gassing of toxic finish materials. The floor achieves a pleasing

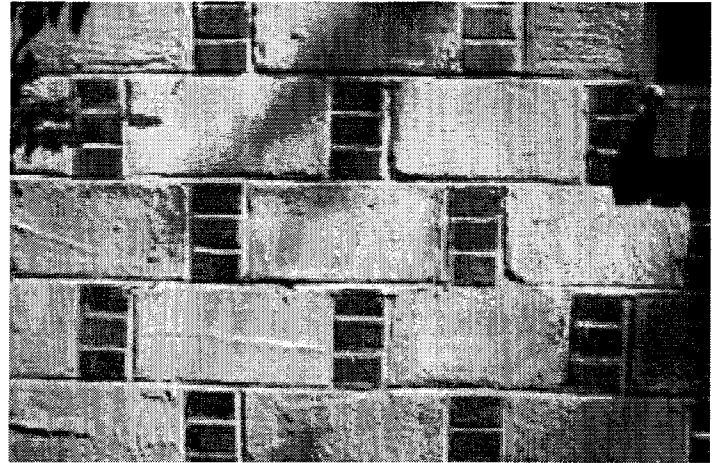


Fig. 17. Tuskegee Block Wall. (Photo: Don Armstrong)



Fig. 18. Tuskegee Block Wall. (Photo: Don Armstrong)

appearance by manifesting the skillful use of native materials by its makers.

The roofs of the houses are conventional for the time. They are typically constructed of 2 x 6 wood joists covered by sheathing and asbestos shingles. The roof was also the most expensive line-item in the construction budget – yet the least innovative aspect of the house.

The ceiling is the only interior finish material found in the house and is made of gypsum board. The houses avoid the indoor air problems caused by the toxic substances in paints and other finish materials because of the minimal use of finishes in the houses. The houses also require less repainting which reduces maintenance costs and life-cycle resource consumption.

The windows typically have metal or wood sashes and are hung singly or in rows. Window types include single- and double-hung, casement and fixed. Window trim is milled wood and sills

are typically made from brick. Exterior doors are typically wood panel doors. Floor plans show built-in features such as shelving and counters.

The mechanical-electrical components vary from house to house. Heating systems were, in some cases, wood-burning devices, although floor plans show a "heater space." Some floor plans show fireplaces and hearths. Air conditioning devices do not appear in the construction drawings and were probably not provided due to their relatively high initial and operating costs. Plumbing lines, and basic kitchen and bathroom fixtures, are indicated in the construction drawings but weren't always provided. Electrical wiring and devices were offered, although electrical service was probably not always available.³¹

The Low Cash-Cost houses manifest, through their wall fabric and other features, a spirit of innovation and community service. They endure as a symbol of the aspirations of tenant farmers in the Alabama Black Belt who built better life for themselves and their families.

CONCLUSION

The Low Cash-Cost house and its construction method provide several lessons for today's affordable housing programs. They provide a model for how to create a culturally responsive design based on a symbiotic relationship between sustainability and place.

The Low Cash-Cost house program anticipated the participatory housing approaches of such organizations as Habitat for Humanity. The program was unique, however, in that it focused on making construction materials. The Low Cash-Cost method could be used today on sites where raw materials are available. Recycled, as well as natural, raw materials can be used as proved by Auburn University's Rural Studio.³²

The Low Cash-Cost house foreshadowed the current sustainable design movement by emphasizing passive design, using low-toxic materials with low-embodied energy, recycling, and minimizing finishes. It also provides a lesson for constructing materials that evoke place. By familiarizing themselves with local raw materials and becoming involved in the design of materials as well as buildings, today's architects and builders can become better prepared to design buildings which are rooted in regional character.

The most significant lesson offered by the Low Cash-Cost housing program is how it effectively provided a culturally responsive design. Communities respond to design aesthetics which resonate with the cultural heritage of that community. The Low Cash-Cost program arose from within the cultural community it served. Design initiatives for minority communities ought to be lead by persons who can identify with the

ethnic heritage and socioeconomic status of the building's users and – even more importantly – be lead by persons with whom the users identify with.

Said a current owner, who arranged to have the house built for his sharecropper parents in 1951: "It makes me feel proud to have given them a better life. I consider this my home. I consider it a family thing – all the hard work that went into it. This house will be here long after I'm gone."³³ The descendents of the original Low Cash-Cost house owners attest to the enduring legacy of these houses, which was to break the cycle of poverty by using a culturally responsive, sustainable, approach to housing.



Fig. 19. Mr. James Echols Jr. in Front of the Low Cash-Cost House Constructed for his Father in 1951. (Photo: Don Armstrong)

NOTES

¹ Camille Wells, "Old Claims and New Demands: Vernacular Architecture Studies Today," in *Perspectives in Vernacular Architecture II* (Columbia: University of Chicago Press, 1986).

² Charles Johnson, *Shadow of the Plantation* (Chicago: The University of Chicago Press, 1934) and Donald E. Armstrong, Jr., *Interview with James Echols, Jr.* (Unpublished, 2003).

³ Booker T. Washington, T., *Up From Slavery* (Secaucus, New Jersey: Carol Publishing Group, 1997) p. 315.

⁴ R. T. Thurston, "Annual Narrative Report of the Farm Demonstration Work Among Negroes in Alabama for the Year Ending December 31, 1947, Macon and Russell counties," records of the Alabama Cooperative Extension Service p. 14 and L. R. Daly, "Annual Narrative Report of the Home Demonstration Work Among Negroes in Alabama for the Year Ending November 30, 1947, Macon County," records of the Alabama Cooperative Extension Service p. 21.

⁵ Donald E. Armstrong, Jr., "Brick Making and the Production of Place at the Tuskegee Institute," in the proceedings of the 2001 ACSA Southwest Regional Conference.

⁶ Louis E. Fry, "The Tuskegee Institute Housing Program for Rural Betterment," in *Negro Year Book: 1947* (Tuskegee, Alabama: The Department of Records and Research, Tuskegee Institute, 1947) p. 179.

⁷ Frederick D. Patterson, *Chronicles of Faith* (Tuscaloosa, Alabama: The University of Alabama Press, 1991) p. 53-54.

⁸ *Ibid.*, pp. 15 and 54, Unattributed, *Low Cash-Cost Housing* (Tuskegee, Alabama: Tuskegee Institute, 1950) p. 23. B. D. Mayberry, *The Role of Tuskegee University in the Origin, Growth and Development of the Negro Cooperative Extension System 1881-1990* (Montgomery, Alabama: Brown

- Printing Company, 1939) p. 124, and Unattributed "Schedule of Tour of Rural Housing Projects for Extension Service Directors from India," (1952), records of the Alabama Cooperative Extension Service.
- ⁹ *Housing Act of 1949*, Public Law 171, July 15, 1949 (Washington, D.C.: United States Government Printing Office) p. 1, Patterson, *Chronicles*, p. 55, and *Low Cash Cost Housing*, pp. 25 and 70.
- ¹⁰ *The Negro Farmer*, February, 1950 p. 4, Patterson, *Chronicles*, p. 55, and *Low Cash Cost Housing*
- ¹¹ *Low Cash Cost Housing* and James R. Ward, *Popular Mechanics' Famous Concrete Block House* (Chicago: Popular Mechanics' Press, 1949).
- ¹² Patterson, *Chronicles*, p. 55. Letter from Cannon C. Hearne to D. W. Mullins dated March 9, 1954, Unattributed (1952). "Schedule for Post-Conference Tour, International Conference on Agricultural and Cooperative Credit," records of the Alabama Cooperative Extension Service, and Unattributed (1952). "Schedule of Tour of Rural Housing Projects for Extension Service Directors from India," records of the Alabama Cooperative Extension Service.
- ¹³ *The Negro Farmer*, March, 1954, p. 4 and the 1954 Supplement to Negro Annual Report for Macon County.
- ¹⁴ L. R. Daly, "Annual Narrative Report of the Home Demonstration Work Among Negroes in Alabama for the Year Ending November 30, 1948, Macon County," records of the Alabama Cooperative Extension Service, p. 15, and Unattributed (1948). "Rush York Family in New Low Cost Home," *The Negro Farmer*, January, 1948, pp. 1 and 4.
- ¹⁵ For FmHA loan procedures and policies see "Rural Housing Program Explained for Farmers," *The Negro Farmer*, January, 1950.
- ¹⁶ Construction drawings: "Practice Cottage No. 4, Housing Project, Concrete Block cottage #1, Tuskegee Institute, Alabama," (May 15, 1947), "Faculty Housing, Concrete Block Cottage, Tuskegee Institute, Alabama," (May, 26, 1948), "Proposed Concrete Block Cottage, Tuskegee Institute, Alabama (January 30, 1951), and "Tuskegee Institute Housing Project, Tuskegee Institute, Alabama," (no date)
- ¹⁷ *Low Cash Cost Housing*, pp. 3 and 26.
- ¹⁸ *Low Cash Cost Housing*, pp. 7 and 8.
- ¹⁹ Fry, "Tuskegee," p. 180. This process followed the traditions of the Institute students and faculty who, under Washington's leadership, quarried clay on the campus and used it to make bricks for the early campus buildings, see Armstrong, *Brick Making*.
- ²⁰ The ratio of cement to the mix of sand and gravel varied with the percentage of gravel in the sand-gravel mix, from 1:4.5 for a low percentage of gravel, to 1:6 for higher percentages of gravel and for when cinders were substituted for gravel. For making Tuskegee block, see *Low Cash Cost Housing*, pp. 8-10, 12 and Fry, "Tuskegee," p. 180. For standard methods of making concrete blocks in the early 1900's see *International Library of Technology*, (Scranton: International Textbook company, 1909) Section 27, p. 14.
- ²¹ Charles George Ramsey and Harold Reeve Sleeper, *Architectural Graphic Standards* (New York, John Wiley & Sons, Inc. 1946) The 1946 Architectural Graphic Standards recommends an un-reinforced footing with a minimum thickness of 12" and a minimum width of 20" (p. 3). It also recommends 8" thick foundation walls for private dwelling foundation walls less than 20' in height. (p. 5) The Popular Mechanics house has 12" thick by 24" wide footings with a 10" thick foundation wall for exterior walls and a 12" thick foundation wall for an interior bearing wall. See Ward, *Popular*, p. 16.
- ²² *Low Cash Cost House*, p. 13.
- ²³ *Low Cash Cost House*, p. 12 (Figure V).
- ²⁴ For pouring the floor slabs for the Low Cash Cost houses see Fry, "Tuskegee," p. 180 and *Low Cash Cost Housing*, p. 18. For comparison to standard construction see Ward, *Popular*, p. 16 and Ramsey and Sleeper, *Architectural*, p. 62. The instructions for the Popular Mechanics house characterize the slab pour as "the hardest job on the house unless you have a mixer," which it recommends renting. This may be an expected bias for mechanized construction methods or an acknowledgement of the fact that their (primarily white) reader-builder would prefer – and could afford – this less labor-intensive approach. Comparing the Bulletin to the Popular Mechanics guidebook brings to light the cultural biases of the former in many instances. In addition to the above example, these include the more wordy written explanations, use of more complex tools and inclusion of costly yet un-functional features such as interior finishes and decorative shutters. All of the home-owners depicted are white.
- ²⁵ *Low Cash Cost Housing*, p. 19.
- ²⁶ For an account of a Low Cash Cost house with no electrical, water supply or sewage services, see Armstrong, *Interview*. For details on electrical system design for the Low Cash Cost House, see *Low Cash Cost Housing*, p. 20. All wiring in the Popular Mechanics house was overhead, dropping down into the walls, requiring long runs of wire to reach the wall receptacles. The Tuskegee method predates the common practice today of using wiring raceways installed in concrete floors. *Low Cash Cost House* recommends using "lead cable" to protect wiring from moisture, probably a reference to the flexible armored cable containing lead sheathing commonly used at that time for wiring in damp locations. See Frank E. Kidder, *Kidder-Parker Architects' and Builders' Handbook* (New York, John Wiley & Sons, Inc., 1946) p. 1852.
- ²⁷ *Low Cash Cost Housing*, p. 21.
- ²⁸ *Low Cash Cost Housing*, p. 11 (Figure IV).
- ²⁹ 6" of the 7-3/4" wall of Tuskegee block is solid concrete, more than twice the 2-1/2" for standard concrete block walls.
- ³⁰ For subjective accounts of thermal comfort see Fry, "Tuskegee," p. 180, Armstrong, *Interview*, and *Low Cash Cost House*, p. 26.
- ³¹ Armstrong, *Interview*.
- ³² Andrea Oppenheimer Dean and Timothy Hursley, *Rural Studio: Samuel Mockbee and an Architecture of Decency* (New York, Princeton Architectural Press, 2002)
- ³³ Armstrong, *Interview*