"Federalized Prefabrication" Southeast Missouri Farms Self-help Housing in the 1930s

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Abstract

As agriculture in the "Bootheel" section of Missouri's collapsed in the early years of the great depression, sharecroppers sank into increasingly primitive living conditions as the land yielded less, the crops sold for less, and their landowners demanded more of their crop as rent. (Stepenoff 2003, Cantor 1969) As part of the second New Deal, The Farm Security Agency (FSA) undertook a program in 1937 called "The Southeast Missouri Farms Project" to build sanitary housing for sharecroppers evicted from the land in the bootheel counties, ultimately building barns, houses, privies, and small community centers and stores.

Faced with the need to quickly address housing concerns the FSA undertook field research to make an evidence-based decision[1] to employ "sectionalized" or "yard-fabricated" strategies for prefabricating buildings in addition to well-known precutting processes. The implementation of prefabrication techniques allowed for the construction of 100 homes in Southeast Missouri in 212 days using some local skilled and mostly unskilled owner-builder labor. (Resettlement Administration 1940) Compared to the production time for contemporary house construction where a production builder is focused on a 90-day schedule, 100 homes (with barns and privies) in 212 days is impressive.

This paper utilizes the final report of the Southeast Missouri Farms project written by FSA Head Engineer Edwin Crouch as a key primary source for insights into the organization, strategies, and implementation tactics Crouch and his team employed to enable former sharecroppers to become builders of prefabricated houses in Southeast Missouri on sustainable farmsteads. This effectively resulted in the most extensive self-help housing program in United States History to date. There is evidence that shows the Federal government employed prefabrication on other FSA subsistence homesteads and greenbelt towns subsequent to the Southeast Missouri Farms, however growing suspicions of socialism and a resurgence of labor union influence resulted in the end of the New Deal self-help experiments. The government would not revisit the idea of "mutual-self-help" again until the Department of Agriculture's Section 502 program in the 1960's,[2] and The Department of Housing and Urban Development's (HUD) Family Self-Sufficiency (FSS) program from 1990.[3]

This paper will present an overview of prefabrication in the 1930's, describe the Southeast Missouri Farms project and conclude with reasons for the discontinuation of self-help housing construction administered by Roosevelt's Resettlement Administration.

Keywords

FSA, Resettlement Administration, Unskilled Labor, Owner-built Homes, Prefabrication, Southeast Missouri Farms Project

Introduction

The Federal Government did not take part in the production of housing until Roosevelt's New Deal and the passage of the Wagner-Steagall Act of 1937.[4] Given this lack of experience, Roosevelt's "Brain

Trust" had few models to emulate as it grappled with the significant numbers of homeless and under-housed citizens in the years following the depression. It would experiment with a number of forms of project delivery ranging from the traditional expertise of general and subcontractors crafting each housing unit on site, to a more radical expertise-supported, owner's collective assembling each housing unit from prefabricated parts.

The report of the Resettlement Administration (RA) and its 1937 successor, the Farm Security Administration indicates that the agency was tasked with mitigating the environmental, social, and financial damage caused by the cultivation of unsuitable lands, as well as recurring erosion and flood damage caused by mining, logging, and other extraction processes.

Rexford Tugwell, Undersecretary of the Department of Agriculture, and a member of President Roosevelt's "Brain Trust" was tasked in 1935 with leading the RA, funded by an appropriation of $48 million dollars. Tugwell's group acquired some nine million acres of tax-delinquent land across America with a portion of this funding. The goals for this land varied from enlarging Native American lands, using wind-erodible rangelands for wildlife sanctuaries, establishing waterfowl sanctuaries and recreational lands near population centers, and re-constructing rural land use patterns to reduce the cost of services to far-flung farmsteads. Part of this last goal was achieved by developing new settlements for migrant farm workers, new agrarian towns, and new urban "greenbelt" towns.

Housing Context

Franklin Delano Roosevelt's administration formed the Resettlement Administration (RA) in 1935. The enabling legislation gave Roosevelt broad sweeping authority to provide relief to rural families. In the following years congressional oversight sought to cut back the government's role in acquiring lands for resettlement which greatly reduced the scope and impact of the Resettlement Administration.[5] A result of congress's concerns was the dissolution of the RA and the formation of the Farm Security Administration (FSA) in 1937 to complete the Resettlement Administration's projects and refocus efforts on making loans to displaced tenants who would purchase land and housing on land parcels purchased by the government. The loans came with conditions, borrowers had to learn bookkeeping and had to carefully track their expenses, agricultural production, and sales, reporting quarterly to the agency. Congress had been critical of the effectiveness of the RA and subsequently the FSA as a producer of housing. The FSA's reports show it built over 10,000 houses between its origin in 1935 and its annual report in 1939.[6] Through the use of prefabrication it had also lowered the cost per unit to between $1,000 and $1,500.00 by 1939.

The resettlement projects were begun in the mid 1930's following the great depression in an effort to stem the flow of unemployed and displaced agricultural workers into cities. As part of this effort, agencies of the federal government extolled the glories of farm living, promoting subsistence living even for those with low incomes.[7] The need to place as many families as possible on the land led to the development of scientific and economic analyses to determine the productivity of each parcel of land. This was to ensure a family's maximum plot size would provide a minimum of crop and livestock yield, plus provide basic subsistence with small surpluses to market to supplement a limited income. This, it was hoped, would help commodity markets recover from glut-induced crashes, and provide a self-sustaining path to a future when industry and manufacture might recover from the depression and begin absorbing the rural workforce.[8]

The Farm Security Administration (FSA), the 1937 successor agency to the Resettlement Administration

developed institutional expertise in prefabricated housing and in the training of workers in the production of prefabricated housing between 1933 and 1938 in a series of projects across America. In Spring 1938 one such project, "The Southeast Missouri Farms Project" focused on New Madrid county Missouri in the Bootheel region of Missouri. New Madrid county is located a few hundred miles south of St. Louis, 120 miles north of Memphis Tennessee but was considered geographically isolated in terms of access to skilled labor pools residing in St. Louis or Memphis.

In Southeast Missouri where cotton was the primary crop, most agricultural workers were not landowners but were tenants of large landholders who paid their rent with a share of the crop they raised. The dramatic fall in commodity prices in the Great Depression provoked landowners to increase the rent on their land, and in turn, tenant farmers began cultivating lands more prone to wind and water erosion in an effort to pay the rent. The wind erosion of lighter soils became the icon of the impact of the depression on American agriculture, Photographs of houses nearly covered over with windblown soil and of gaunt mothers looking over the bleak fields were the images recorded by notable photographers such as Dorothea Lange, Russell Lee, Arthur Rothstein and Marion Post Wolcott recorded these images by which we remember the desperation of the "dirty thirties" even today.[9]

Established farmers and landowners were struggling to pay their taxes and debts and struggling to find capital with which to purchase the seed and supplies to produce the crops urban America needed to survive. To support these established farmers, the Federal government offered direct payments and loan programs to take sub-marginal, highly erodible, land out of production, and to implement more productive (mechanized) farming techniques. This had the unanticipated effect of forcing tenant farmers and sharecroppers off the land. A popular sharecropper saying during that time was that they were "tractored-out" of farming because one tractor could till as much land as five tenant farmers and their horse-pulled ploughs.[10]

Prefabrication Context

White defines modern prefabrication as commenced "when the first building components were manufactured to a prearranged pattern for stock and distribution."[11] Prefabrication was known globally, and a common practice for timber framers building crucks for easy dismantling,[12] but made its modern emergence in Sweden with Fredrik Blom's demountable houses of 1781[13], in Britain with the Manning Cottages in 1833,[14] and the prefabricated iron greenhouses in Paxton's tour-de-force of prefabrication, the Crystal Palace, in 1851. Owner-builder self-help strategies were similarly widely known in Europe. France, Belgium, Sweden[15] and Germany and all had some kind of national policy on owner-builder housing. Prefabrication was connected to this owner-builder movement in Germany in 1925,[16] and in Sweden as early as 1920.[17]

Prefabricated housing was also known in America of the 1930s. It had been part of building culture since Col. Derrom's 1864 Patent for the "Portable House"[18] and had figured prominently in the gold fields of California.[19] Prefabrication had been extensively showcased in professional and popular journals and figured prominently in the American Exhibit at the 1867 Universal Exposition in Paris[20] and the 1933 Century of Progress Exhibition[21]. But while prefabrication was known to the American public and the government, it had failed to become competitive in the marketplace. The Alfred Bemis Foundation noted that between 1935 and 1940, only 10,000 prefabricated houses were produced, amounting to less than 1% of all single-family homes built in that time frame.[22] What was new to the American public and its building culture, was the U.S. Government's use of a diverse set of prefabrication methods to address shortages of both labor availability, and time.

Prefabrication was the strategy of choice to house construction workers and their families employed in rapidly developing Tennessee Valley Authority (TVA) public works projects such as the great dams and hydroelectric projects built in this time frame. The TVA developed innovative mobile/modular "demountable" homes which could be trucked in, rolled off, and then relocated to another temporary town when the project was completed.[23]

By the early 1930's there was a popular opinion that Federal stimulus in the housing sector could address the social, and economic crisis in the lingering depression. [24] The Federal role in stimulating the housing sector focused on housing deficiencies in the lower economic classes with projects like Eleanor Roosevelt's advocacy for the 1934 Arthurdale "New Town" (where prefabrication auspiciously failed in specification and coordination)[25] and its use of "sectionalized" houses. Precast Concrete systems had been developed and proven by Grosvenor Atterbury in the 1918 Forest Hills project[26], and were now used for new towns such as Greendale Maryland. Along with prefabricated concrete, the government was experimenting with stressed skin plywood prefabrication as well as with demountable mobile homes, modular homes and the hybrid prefab/precut methods of construction used at Southeast Missouri Farms.

Housing Prefabrication and the Southeast Missouri Farms Project

Within the broader history of prefabrication, Southeast Missouri Farms can be seen as a descendent of early panelizing and "sectionalizing" as patented by Col. Derrom in 1820, popularized by Lyman Bridges in 1895 and commercialized by E.F. Hodgson through the interwar years. Similarly, the concept of precutting lumber to increase precision and decrease construction time had been perfected by companies such as Sears "Ready-Cut" Aladdin, and Gordon Van-Tine. As such, the hybrid panelized/precut system used by the Southeast Missouri Farms project was not particularly innovative. What was notable about the Southeast Missouri Farms project was that it combined panelizing with precutting and was also designed to be constructed by the displaced sharecropper population. A group with minimal reading skills so that "standard" architects drawings had to be rethought and no carpentry skills.[27]

Formal project goals for the Southeast Missouri Farms project never included the words "self-help" or "aided self-help" but in practice, the Farm Security Administration was to practice "aided self-help" by employing and training the displaced tenant farmers occupying the project site for the Southeast Missouri Farms Project.[28]

The project duration established in the legislation required the project be completed in 212 days from November 21, 1937 to June 21, 1938. Accomplishing this task fell to Edwin Crouch, Region III District Engineer, author of books on military field fortifications. Crouch brought in his engineers to begin planning strategic road improvements, drainage improvements and plans for water utility and parcel layout while the district's architect, Rudolph Nodvod, was brought in to begin the design assignments. Crouch's team, in evaluating the problems of labor and transportation identified a strategy of "yard-built" or prefabricated construction as a means to overcome the critical shortage of skilled labor.

The Farm Security Administration purchased 6,700 acres (2711 hectares) of land In New Madrid County in early November 1937, and the families, comprising forty African American families and sixty Caucasian families, currently occupying the land were identified as the clients for the new homesteads. The Federal region III administrators brought in engineers, led by Chief Engineer Edwin Crouch who had a strong military background, to evaluate the problem and rapidly frame a course of action.

Crouch quickly identified problems, drainage, poor roads, a building season that would make

construction difficult and especially a lack of skilled labor. [29] The sufficiency of Labor Report showed a lack of skilled labor "across the board" for all trades. This was proven after the on-site advertising for 25 carpenter positions yielded only five. [30] Two General Superintendents were assigned to the project, one for prefabrication yard operations and one for field assembly of the prefabricated parts.

The solution, developed by Crouch's engineers required subdividing the 6,700 acres (2711 hectares) site into 50-acre (20 hectares) farmstead parcels, the size recommended by agriculture experts as a sustainable plot size for a family, and providing a three-bedroom house, privy, pump and barn for each. Evaluating each client led to a finding that given a forty-year loan, and average production income from their parcel, the client would be able to service a debt of approximately $6,000.

The decision to prefabricate the Southeast Missouri Farms project was proposed after analysis of the site, climate and availability of skilled labor. It would not be validated until comparisons of construction of a precut and prefabricated structure proved its time-saving value and its higher quality[31] with lower-skilled personnel.[32] An informal validation of the perceived value of the prefabricated panels came when a local foreman, put in charge of constructing barns from precut pieces, laid out the precut pieces and built them into wall panels, which he then erected. Ultimately, analysis proved that 48 labor hours were saved in the panelizing process, and that a higher quality build resulted even when undertaken by less skilled labor.[33]

Description of Prefab House Design

Nodvod assigned architect William Jones to La Forge Missouri to develop the prefabrication design alongside Crouch's construction managers and engineers. The team quickly settled on a modular design using 4-foot (1.2 m) increments to control panel sizes and provide for the most flexible use of the least number of panel types in constructing three house types.

The team chose a redundant cotton gin facility, with long railroad frontage, a few buildings to store materials under, and a rudimentary office as the location for the prefabrication yard. However the location was compromised by limited space for completed components, insufficient space to drive trucks down a component aisle for loading, and a dangerous risk of fire from the placement of a large number of components and material in close proximity,

The team also developed drawings for the construction of template tables, upon which the sharecropper laborers who were the clients for the houses, could construct the variety of wall panels and roof trusses with great precision. Here, the correct precut lumber prepared by one of the five skilled carpenters hired for the project, was taken from the stores, placed in the slots on the table and nailed together. No inspection would be required because of the "foolproof" method of building on the template tables whereby the tables automatically tested for square and alignment. The jig tables were used for door panels, gable end panels, roof trusses and porch roofs. Precut lumber would be used for porch supports, exterior roof trim, and panel closure trim boards.

The design for the prefabricated wall panels kept to a standard 8-foot (2.4m) height, and never exceeded 12 feet (3.6m) in length so that four men could easily move the panels in the yard and in the field.

The most authoritative source on the prefabricated houses in the Southeast Missouri Farms project is the U.S. Department of Agriculture report titled "Plates to Accompany District Engineer's Report: Design and Construction: Southeast Missouri Project: La Forge, Missouri. Plate 16 of volume 2 shows three house plans, labeled in the index as "Sketch Designs of Southeast Missouri House." (Fig. 1)

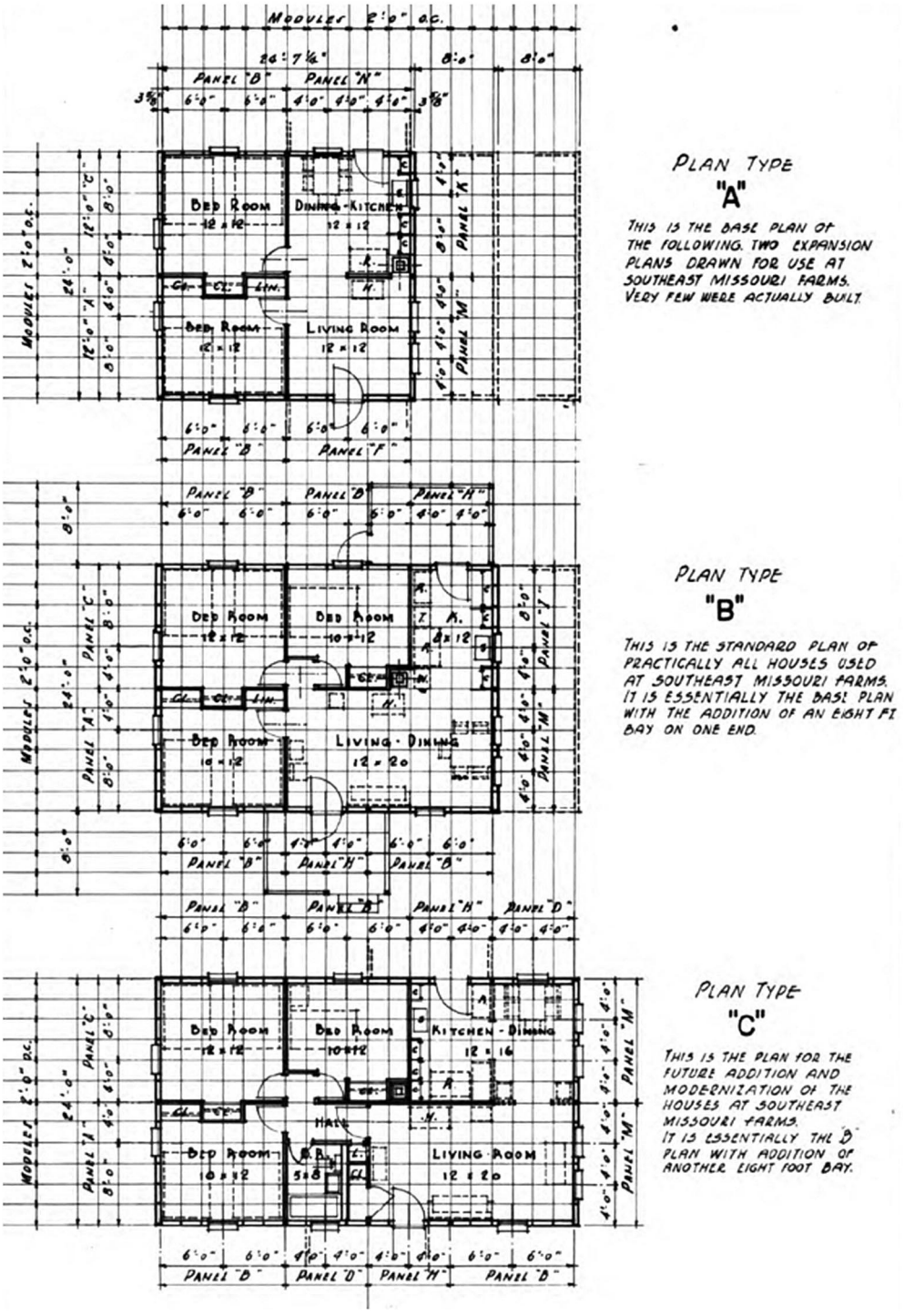

Figure 1. Types A, B and C Farmhouses, LaForge Missouri, Mo. 1933, FSA. Plan types "A", "B", and "C"

The plans are simply labeled A, B, and C. Plan A is a two bedroom, no bath, 576 53.1 sq.m.) square foot 24'x24' 4-room house. There is a notation in the margin indicating that not many of this "base" plan were constructed. Plan type A is made up of 6 exterior wall structural panels (1-A, 2-B, 1-C, 1-F, 1-K, 1-M, 1-N) and there are no porch components shown on Plan A.

Plan B is a 24'x32', 768 square foot (71.35 sq.m.) three bedroom no bath 5-room house with attached porches at the front and back doors. It is made up of 10 exterior wall panels (1-A, 4-B, 1-C, 2-H, 1-I, 1-M). Plan type B is noted as being "the standard plan of practically all houses used at Southeast Missouri Farms."

Plan C is a 24'x40', 960 square foot (89.19 sq.m.) "upgraded" version of the Plan B three bedroom with the addition of indoor plumbing. No plan C houses were initially constructed at Southeast Missouri Farms, but the precise count of the number of additional components were needed for expanding the A and B types to include indoor plumbing were calculated and documented in Crouch's final report.

While farm plots where type A and type B house plans were used had no indoor plumbing and were equipped with prefabricated privys and pumps, Plan type C included indoor plumbing but was noted as being a "future addition" Type C is a 960 square foot (89.19 sq.m.) three bedroom, one bath house and is drawn without porches at either the front or back door. Plan C is made up of 12 exterior panels (1-A, 4-B, 1-C, 2-D, 2-H, 2-M).

The houses were spartan, devoid of all ornament, carefully value-engineered, but built of "first-grade materials" to reduce maintenance and repair costs.[34] Prefabrication is extensively used as is precutting of materials, by a skilled carpenter at a central site where power saws speeded up the process and improved the accuracy of cuts. The sharecropper-labor produced roof trusses, gable panels, and wall panels, were stockpiled in the prefabrication yard for other sharecropper-laborers to select, load on a truck, and deliver to the house site. Here, under the guidance of a superintendent, they would assemble the wall panels and roof trusses to make the house enclosure.

Foundations were precast concrete piers set below frost depth with yellow pine joists and girders. Walls were assembled by the sharecropper labor out of studs and siding into panels that could be lifted by 4 to 5 people. Tarpaper was used as a modest wind and thermal barrier between outdoor temperatures and the interior. All door and window frames were prefabricated at a mill from softwood. Interiors had 1-inch insulation board ceilings and tongue and with groove finished interiors. A masonry chimney flue, masons were "imported" from St. Louis, was included in each house to allow for a coal or wood heater and cooking range.[35] Typically, no plumbing was provided indoors, the kitchen sink was connected to a dry well, and potable water was carried into the house from a pump placed outside. The privy was fully prefabricated, concrete base, crib, with timber enclosure, and was located away from the house. While porches were not indicated on the plans of type A or type B houses, a note in the "Small Houses" publication by the FSA indicates that all houses in the Southeast Missouri Farms project received a screen porch.[36]

The completed houses were austere, a design intention resulting from the team being cautioned against "lifting its standard of living unnecessarily higher than that of the region surrounding."[37] However, in comparison to the self-built shacks, shanties, and deteriorated cabins most families were moving from, it was a significant improvement in their quality of life.

Origins of the Prefab Panel Process

The prefabrication approach used was not an invention of the Farm Security Administration, rather it was an adaptation of the techniques used since the 1870's by firms such as the Lyman Bridges Company, Derroms Portable House company, and most notably, the E.F. Hodgson Company.[38] (Fig. 2) Hodgson had the most well-developed approach to panelized construction at the time and was supplying houses from Minnesota to Florida in 1938. Hodgson's design and fabrication process resulted in long narrow homes, arranged in "L" or "T" configurations deemed inefficient by the FSA due to their additional exterior surface area. The FSA innovation brought to the panelized home technology was the integration of site-fabricated floors and site installed precut roof purlins, along with site built interior partitions. This innovation allowed sharecropper labor to undertake simple construction operations, while the critical structural components would be prefabricated. The prefabrication process on jigs and layout tables allowed unskilled labor to build precise, robust, high quality structural components for walls and roofs in short time frames with little or no supervision.[39]

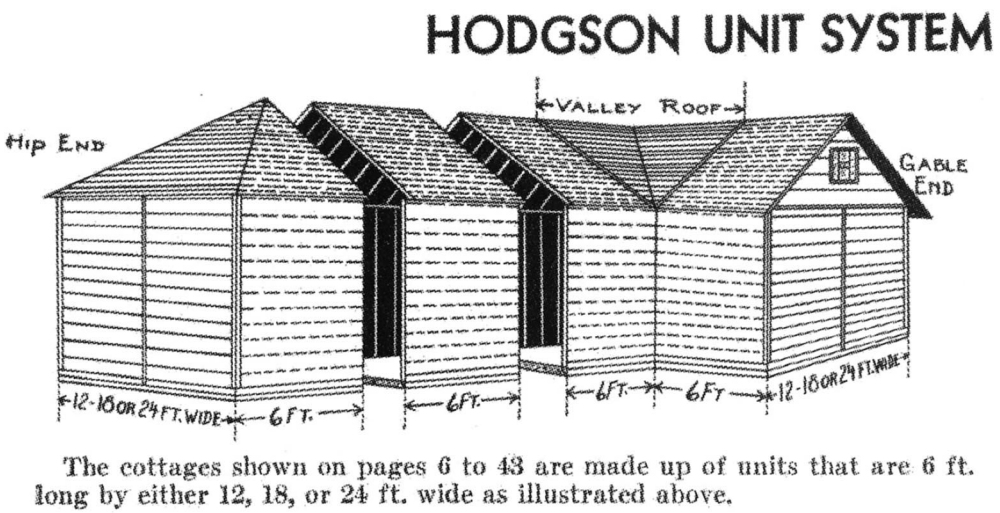

Figure 2. E.F. Hodgson Prefabricated House

The Fabrication Yard

The center of the project site, La Forge, Missouri was selected as the location for the construction plant, due to its railroad access. Here a former cotton gin and warehouse was converted into a yard used for prefabrication, precutting, and building material storage.[40]

The FSA's product produced at this site in La Forge was a new model farm, including a house, a barn, a well, a privy, and a concrete food storage shed. Each of these structures was prefabricated in part or in whole in a small prefabrication yard at the intersection of Highway "P" and route 725 in La Forge Missouri. The site today is a farm, orchard, and home sites, but in 1938, it was a bustling railroad siding, storing the lumber, paint, tools, and supplies needed to prefabricate and equip approximately 100 farms in the 6,700-acre (2711 hectares) region.[41] (Fig. 3)

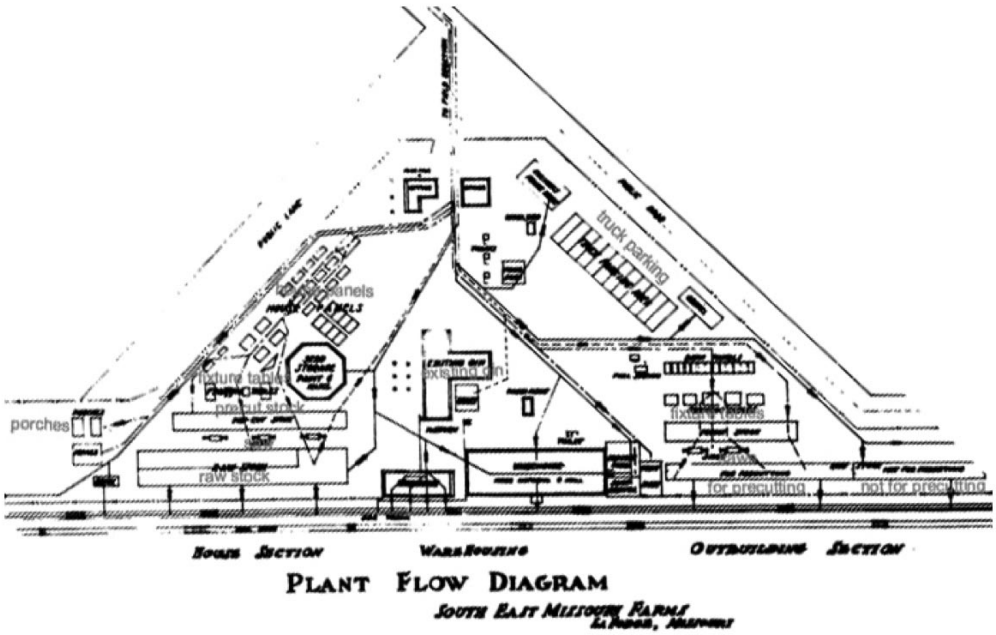

Figure 3. Type B and C Farmhouses, LaForge Missouri, Mo. 1933, FSA. Prefabrication Plant Layout LaForge Missouri

The prefabrication facility took most of the railroad siding and staging area amounting to approximately ten acres (4.0 hectares).[42] The site was laid out around stored raw materials along the St. Louis Southwestern Railway rail spur and the five saw stations (one for each of the hired carpenters) were placed immediately adjacent to the spur. Prefabrication tables were adjacent to the saw stations and completed component storage was placed between the prefabrication tables and truck storage. The saws, provided by the Chain Belt Company of Milwaukee, Wisconsin, (Fig. 4) were gasoline powered as most power tools were at that time, and included a blade guard, a safety device that is part of every table and cutoff saw made today. The gasoline engines for these saws were also used to generate electricity for various tools and office lighting when not in use in the yard.

This seemingly efficient layout provided smooth raw material flows from unloading and storing material to cutting and assembling to storing completed components. Ultimately, the site was found to be too small, too dense, making the movement of large components like wall panels and trusses a difficult manual process. In the final project report, the engineers noted:

> "Before any further description of this operation is considered, it should be stated that the District Engineer and his entire staff, if they had this work to do over again, would select a site remote from this congested area of buildings".[43]

The team had initially only considered the flow of materials *into* the site and overlooked the flow of large-scale components on vehicles *out from* the site.

Like present day prefabrication plants, there is a minimum scale of operation and a maximum effective delivery distance, the prefabrication plant at La Forge, Missouri needed to build components for at least fifty houses within twenty miles (32 km) to be cost effective.[44]

Figure 4. Type B and C Farmhouses, LaForge Missouri, Mo. 1933, FSA. Cutoff saw and guard at prefab plant

Description of Prefabrication Process

The prefabrication process began with sorting lumber into stacks that needed no further cutting, and those that needed cutting to length or angle by one of five skilled carpenters to become a wall, floor or roof component. Sharecropper laborers, those not qualifying as carpenter or carpenter second-class pulled materials of appropriate length and dimension and placed them on the prefabrication tables against slots or blocks to insure dimensional accuracy prior to nailing. (Fig. 5) Once nailed, the raw frame of a wall or gable end panel would be flipped and precut exterior siding was fixed and trim nailed to the studs. If insulation was to be added, it would be added once the siding was in place, then the panel would be placed in a standing position next to the other wall panels of the same type. It was here in the standing stack that the siding was painted. This required yet another modification of the fabrication yard design, as there needed to be a stack of painted, dried, and ready-to-ship panels, as well as a stack of panels still needing to be painted, doubling the stacking area required for wall panels and gable end roof components.

The panel and truss stacks served as the kit of parts for these prefab homes. Panels and trusses were pulled by the sharecropper labor according to a simple panel setting drawing that showed only the panels in their proper adjacencies and relevant connection details. Panels would be pulled from this stack and placed vertically on a truck, (Fig. 6) and hauled to the site. Panel lengths were determined to afford the most flexibility in the design application and to be within the weight four adults could carry.

Figure 5. Type B and C Farmhouses, LaForge Missouri. 1933, FSA. Prefab Yard showing wall panels and roof trusses. Southeast Missouri Farms

Figure 6. Type B Farmhouse, LaForge Missouri. 1933, FSA. Loading wall panels toaster style

Once on site, panels were off loaded directly into position under the supervision of the field superintendent. These panels were installed to be self-bracing i.e. attached at a corner to form a stable "L" shape or were braced with lumber. Once all wall panels were installed, a gin-pole a form of simple hoist, was raised at the location of the gable end. The gable end panel was rigged, hoisted into place, nailed and braced, and the gin-pole was removed. (Fig. 7) All subsequent roof trusses were light enough to be raised to the top of the wall panels and rotated into position by hand. Trusses were braced together as they were installed, and finally, skip sheathing installed to support the cedar shingles. (Figure 7)

Figure 7. Type B Farmhouse, New Madrid County, Mo. 1933, FSA. Completed house, gable end and rafter setting, wall panels setting, skip sheathing

Prefabricated kitchen cabinets and shelves followed, as did the installation of the tongue and groove wall and ceiling surfaces. The field assembly, supervised by a general superintendent became a rapid process

Labor

The Southeast Missouri Farms, unlike other FSA/RA projects, did not involve displacing the people who lived on and worked the land as they were to become the inhabitants of the project. The project provided them with acreage, agricultural buildings, fencing, a modern privy and well, and a home. These sharecroppers made up most of the unskilled labor for the project, their skill level being described by Engineer Couch as follows; "These results were obtained with labor who, outside of the superintendent, the supervising foreman and one or two men in the mill doing special cabinet work, could not have been classified by even the most liberal labor union standards as carpenters, second-class carpenters or apprentices."[45]

At times, field assembly was slowed by weather and poor roads, and at other times field assembly exceeded yard assembly. The personnel would be reassigned to support the yard activities, unload rail

cars, paint assembled panels or sort delivered lumber into that which required cutting to length and that which was already cut to length. Cross-training seems to have been the rule, labor foreman would function as the field foreman when in the field and as a yard foreman when in the production yard.[46] Production records were kept and the engineers report noted that "records" for production of precast concrete piers were set by a crew of three sharecropper laborers who produced ninety concrete piers in one day.

The prefabrication yard included the millwork shop where six first-class carpenters would work when the precutting work was caught up. The millwork shop produced doors, screen doors, cabinetry, window screens and windows for the project.

Once all the housing units were complete, the jig tables used to guide the construction of wall panels and roof trusses were disassembled and used to construct the last barn structure of the project, an effort indicative of the serious approach to minimizing production waste that characterized the project.

Labor records show that 156,000 labor hours went into the prefabrication and field assembly processes. These hours break down into roughly two thirds of the hours logged by "skilled labor" which was defined as auto mechanics, lather, carpenter, painter, plumber bricklayer and plasterer and one third as "unskilled" or "intermediate" labor which included truck drivers, tractor operators, blade operators and plumber/electrician helpers.[47]

Conclusions

In his concluding chapter on the construction of the Southeast Missouri Farms Project, FSA Engineer Crouch noted "The design and construction of the Southeast Missouri House has received a considerable amount of publicity as an outstanding example of low-cost housing. It would be more nearly correct to regard it as a low-cost farmstead construction."[48] While the focus of this paper has been on the construction of the houses through prefabricated means, the production goal of 100 farmsteads laid out, drained, well drilled, privy dug, barn, coop, fences and roads constructed in 212 days makes the achievement all the more impressive.

The early inclusion of construction and engineering disciplines was a critical factor in completing the mandated 100 houses within the legislated 212-day project duration, before the project's conclusion.[49] Crouch further restates his position on the use of the hybrid precut/prefabricated methods employed in the project stating "We would not use the method of construction employed at Southeast Missouri unless there were special conditions warranting it."[50] He follows this statement by affirming the success of the method, noting that his engineering group will continue to use these precut/prefabrication principles on future projects.

The Southeast Missouri Farms project was the last project undertaken by Crouch's District III engineering staff. After 20 projects, and 22 million dollars in construction funds expended, the FSA's experiments in prefabrication would come to an end. Crouch's engineering, architecture and construction staff were quickly absorbed into other federal agencies tasked with the rapid development of factories, infrastructure and the associated new and temporary towns needed to house the workers in the rapidly escalating pre-war economy.

Projects like Southeast Missouri Farms and the prefabrication designs and techniques they developed with them became a critical resource for America as it prepared for the Second World War and have survived to this day.

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