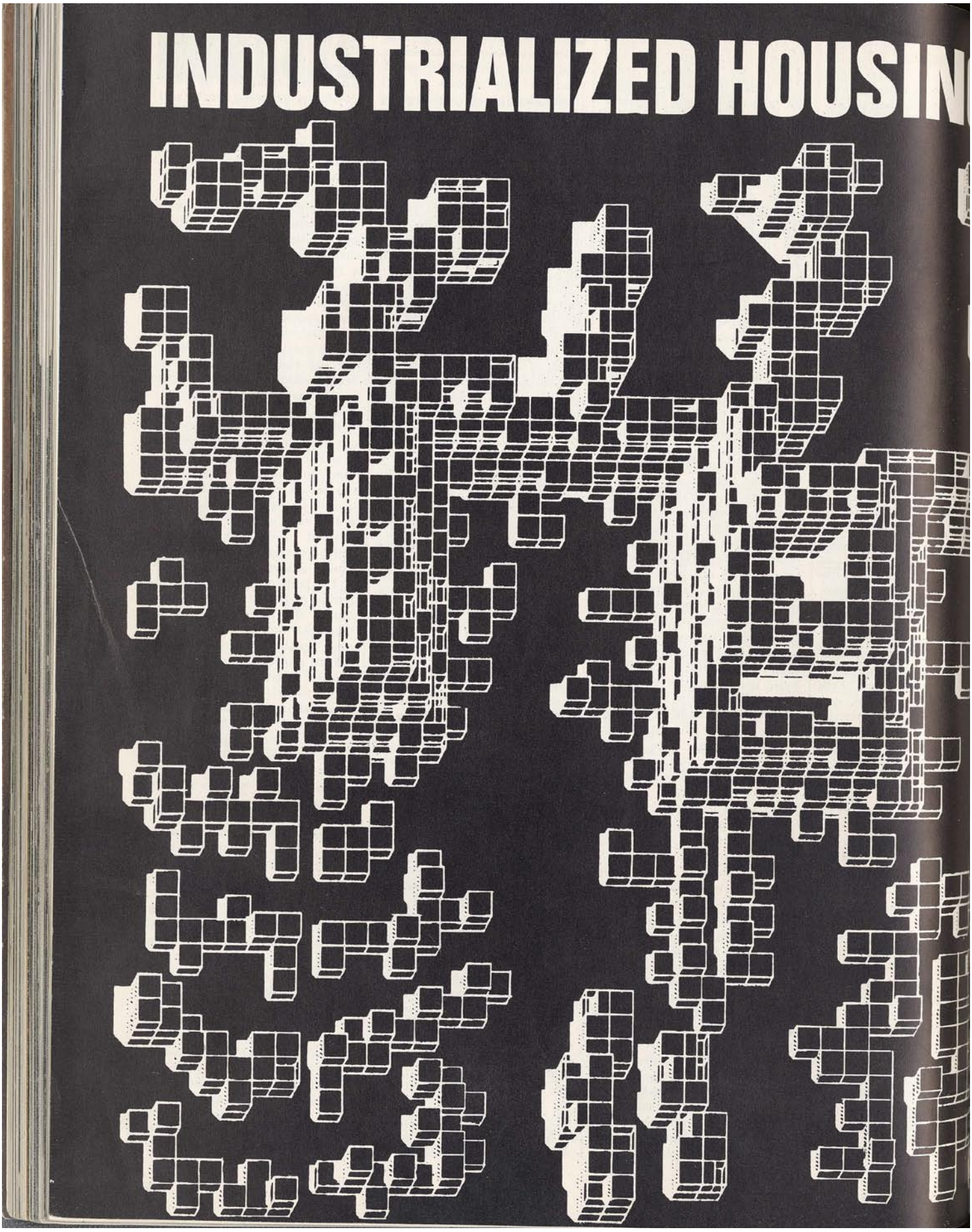
POLICY AND DESIGN FOR HOUSING
Lessons of the Urban Development Corporation 1968-1975

Journal Article

"Industrialized Housing: Can it happen here?"
by John Morris Dixon

INDUSTRIALIZED HOUSIN



...an it happen here?

The Housing and Urban Development Act of 1968 established a national goal of 26 million new housing units by 1978—that is, an average output of 2.6 million units per year. But in 1969, we are still building at the rate of 1.5 million per year—even fewer than we were building back in 1950. Unless there is a dramatic change, the chance that every American will be adequately housed by 1978 is nil.

The critical shelter shortage is felt at all income levels. The rocketing rise in the cost of new housing (now going up more than twice as fast as the overall cost of living) could not occur if there were not a yawning gap between our total demand and our capacity for production. The importance of shortage as a factor behind rising building costs is confirmed by the rapid rise in prices and rents for all kinds of housing—new and old, lavish and shabby.

The indispensable prerequisite for greater housing production, of course, is *money*. Right now, money for construction is very hard to get—either for financing of private projects or for federal support of subsidized housing. But even if substantially more money were poured into a construction establishment which is incapable of rapid growth, much of it would end up in higher profits and wages; the effect on output would be disappointing.

There is mounting pressure to deal with our housing needs by adding a whole new production capacity to our present inadequate mechanism—a capacity for large-scale, industrial production of housing.

What's in a system?

Countless building systems have already been proposed. But so far only a handful of Americans are living in housing that was produced by really industrialized methods.

Thousands of "mobile homes" come off factory assembly lines annually, but most are produced by traditional carpenters' techniques (using glue and staples instead of nails); in general, they are not durable enough to offer long-range economies. The use of more permanent units of the same wood-framed type in low-rise housing has passed beyond the demonstration phase; over 1,000 units of this type are now occupied and the rate of production is rising sharply. But so far none of the proposals for stacking fireproof "mobile home" units in highrise structures has reached even the demonstration stage.

So far, only one American system involving factory produced components for fireproof, urban housing has been applied beyond the scale of a demonstration project. The Techcrete system (page 105) devised by Architect Carl Koch and Engineer Sepp Firnkas, has now been used in about 600 low- and middle-income units.

A workable building system must be more than a kit of parts that can be assembled—somehow—to form a structure. To have any significant impact on the cost or output of housing, the system must not only represent a major part of the total building cost, but it must account for the whole *process* of building: capitalization of plant and equipment, financing of construction, and management of production—both in the plant and at the site. It must also be geared to available labor supplies, work rules, lending policies, building codes—all of the factors that will affect the actual application of the system.

If the system is to have any future, there must be a definite strategy for its introduction. It must either fit into the present relationship of contractors, fabricators, and building trades unions or it must leap-frog over the whole existing establishment—capitalizing new kinds of production organizations and changing traditional labor practices.

Structurally, most proposed systems fall into three broad categories: the frame type, into which wall and floor panels are inserted; the bearing wall and slab type; and the major module, or "box" type. One convincing proposal has been made by Craig Hodgetts (page 107) for a hybrid system, in which box-like mechanical cores would play a structural role in a system that includes slabs and columns.

The advocates of various systems are intensely competitive. Each talks as if only his system solves all problems effectively. The producer of one component system may call another one unrealistic because building trades unions will oppose it; the promoter of the second system may claim, on the other hand, that the first one cannot make any economic breakthroughs if it remains tied to existing labor practices. The proponents of a box system may claim that their system is truly economical because everything—down to the carpet—can be installed in the factory; the component producers, however, will argue that the box-maker is paying dearly to ship volumes of air.

Whatever the type of system, the selling point to government and investors is invariably the *reduced cost* that the system is supposed to offer. And there are potential savings: in labor costs, of course; in construction time saved; in the predictability of building cost; perhaps even in transportation cost—compared with the aggregate costs of shipping and on-site materials handling in the usual process.

What is not stressed enough, however, is that *immediate* savings will be modest compared with *eventual* ones. The major economies of mass production are realized only after the initial investment has been amortized, when volume of output is high enough for truly efficient production and management.

Who will put up the money?

It will take some outlay of capital to put any industrialized building process into use. Generally speaking, the greater the system's potential for reducing cost or increasing output, the higher the required investment in plant and equipment. There will also be significant but elusive transition costs—for retraining labor (and management) and for ironing out bugs in the process (even after bugs in the *product* have been revealed in costly prototype structures).

For a highly industrialized system, such as the Balency system (page 104), the initial capital required is estimated at $2 million. A minimum guaranteed market of 2,000 units would be needed to justify setting up one Balency plant in this country.

Even systems designed to be produced by established fabricators (usually precast concrete producers) could not be introduced without some capital outlay. The Componoform system (page 103), for instance, could be turned out by any precaster licensed by the corporation, but his initial outlay for expansion and special molds would be about $500,000.

One reason capital for introducing building systems is so

...posite, a sketch by German architect Rudolf Doernach for an urban ...stem with three-dimensional growth ...pacity, made up of "regenerable ...ular units" analogous to human ...dy cells.

hard to obtain is that no real "building industry"—in the sense of a highly organized, heavily capitalized production system—even exists in this country. Building production is now in the hands of innumerable firms operating with an absolute minimum of capital. As one promoter of a highly industrialized system puts it, "The typical contractor operates as a broker," buying and coordinating the services of subcontractors. Expensive pieces of equipment, such as cranes, are almost invariably rented.

New kinds of organizations will be required to raise the capital to introduce highly industrialized systems. And the capital will not be forthcoming unless there is assurance of a large, stable market—most likely guaranteed by government action.

Who will do the work?

Besides the problem of securing capital, the main obstacle to industrialized housing is the reluctance of labor to revise its rules. No significant change in cost or production capacity is made unless traditional divisions between trades can be broken down, and workers can be assigned any role in the process that efficient operation demands.

Only a few years ago, it looked as if all of organized labor would stand behind the traditional trade jurisdictions. But recently trade unions have shown a willingness to negotiate. In some cases joint work forces have been formed to assemble factory-produced units at the site. Just this June, the huge United Brotherhood of Carpenters and Joiners signed an agreement with a corporation which plans to produce thousands of prefabricated wood box-type units complete with wiring and plumbing. A precedent-setting aspect of the agreement was an arrangement between the union, the corporation, and the National Urban League to set up training centers for unskilled and unemployed residents in cities where the units will be manufactured.

At least a few union leaders now seem to realize that industrialization can open up a large, stable market for union labor, *in addition to* conventional building activity. Industrialization could offer the building trades an opportunity to expand with security, and to admit significant numbers of urban minority groups to membership as they expand. If, instead, the unions fall back to their old position of limiting membership (a position borne of a traditionally unstable construction labor market) competing unions are likely to grow up in the field of industrialized building.

What happened in Europe?

Industrialized housing already accounts for a major part of the market in several European countries—France, Great Britain, the Scandinavian countries, West Germany, and, of course, the Soviet Union. Industrialization has advanced faster in Europe not because the Europeans thought of it first, or showed more ingenuity in designing systems. Industrialization took place there first because a critical need for housing, coupled with a shortage of skilled construction labor, occurred there first.

Of course, there are important differences between our situation now and the situation in Europe in the early 1950s, when industrialization began there in earnest. For one thing, "conventional" construction is much more efficiently organized here today than it was then in Europe. For another, our shortage of skilled construction labor is balanced by a surplus of unskilled labor; we must be sure that introducing industrialization does not reduce the *total* demand for construction labor, even temporarily.

It took large-scale government commitment to get European building systems through the initial period of capitalization and transitional costs, and almost all of the producers still rely on government subsidized housing for their market. It should be possible, however, for an established producer in a free market to outgrow its dependence on government. One producer which seems to have jumped that hurdle is the MBM Corporation of Milan, licensee of the Balency system (page 104), which is now selling about 50 per cent of its production in the privately-financed housing market.

What can government do?

Government intervention will be absolutely essential for the establishment of industrialized housing here, just as it was in Europe. One step the Federal government has taken so far is to provide special financing for experimental projects. Unfortunately HUD, which is perennially short of funds, has tended to support only schemes that involve a minimum of capitalization. "If you go to HUD with a scheme that calls for an investment of $500," says Guy Rothenstein, vice president of Balency's U. S. marketing organization, "you are likely to get the money." But schemes that can be initiated with little investment can generally do little to shift the proportions of labor vs. equipment in housing production, and so can have little long-range economic effect. Up to now, HUD has offered hardly any help for technologically advanced systems which require large investments.

HUD's recently announced "Operation Breakthrough" (page 110) seems to be its strongest effort yet to test industrialized building at a reasonably large scale. The program's main objective is to encourage state and local governments to organize aggregate markets for housing systems and to find ways to revise obstructive and inconsistent building codes. The limited funds the program will probably have to operate with raise some doubts about its producing any real breakthroughs—at least in the type of systems that require high capital input.

Even if Operation Breakthrough does not succeed in establishing any sophisticated systems on a economically sound basis, it will at least stimulate a round of intensive research and evaluation of the many systems currently waiting on the drafting boards.

And HUD's enthusiasm is being echoed at lower levels, at the level of city housing and development authorities; promoters of housing systems who have found them hard to reach until recently are now being *invited* to present their systems. Of course the chance of having even a bit of HUD's limited demonstration housing built in their cities can be a lure to local authorities facing a desperate housing crisis.

The housing shortage may have to go even farther beyond our ability to produce—to the point where the secure middle class is seriously affected—before government at all levels will put real commitment and real money behind industrialized housing systems. —John Morris Dixon

The concrete frame of the Com... form building system is based o... unusual "cross beam" column ... photo) which can support struc... bays as large as 34 ft. square. ... itect Egon Ali-Oglu, who deve... the system, is convinced th... frame system, with a set of ... patible slabs, wall panels, etc., ... the greatest potential for mas... duction savings, since it can be ... for a wide variety of building ... Componoform's structural co... nents have already been appli... the Trowbridge Apartments in ... bridge, Mass. (construction sequ... right), as well as in a dormitory ... a nursery school. FHA has ap... the system, and so far building ... and labor unions have raised ... stacles, mainly because the s... allows for on-site installation of ... trical and mechanical equip... With an initial investment of ... $500,000 for equipment, a fi... precast concrete fabricator ca... up a plant to produce Compon... parts for 1-1.25 million sq. ... construction per year.

The Mitchell Framing System ... veloped by Engineers Neal Mitch... Associates, is based on a skele... small-scaled concrete columns ... beams. The frame and lightw... infill components can be fabri... with simple forms and erected ... light cranes. The test group of ... houses shown here was erect... the city of Lancaster, Pa. (Jan... issue) without Federal aid. A p... developer is about to put up ... more units in Lancaster.