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COMPONENTS FOR SCHOOL CONSTRUCTION IN THE MID-HUDSON REGION. FINAL REPORT 3.

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THE FINAL REPORT OF A THREE PART FEASIBILITY STUDY OF THE COMPONENT CONSTRUCTION SYSTEMS SAMPLED APPROPRIATE ASPECTS OF THE SCHOOL CONSTRUCTION CLIMATE IN NEW YORK STATE. IT SOUGHT TO DETERMINE THE APPROPRIATENESS OF THE SCHOOL CONSTRUCTION SYSTEM DEVELOPEMENT PROCESS TO SCHOOL CONSTRUCTION IN THE MID-HUDSON VALLEY AND TO EXPLORE POSSIBILITIES FOR THE ACCOMPLISHMENT OF SUCH PROGRAMS. THIS COMPONENT APPROACH SEEKS TO ACHIEVE ECONOMIES BY STANDARDIZING CERTAIN UNITS OF CONSTRUCTION AND EQUIPMENT AND BY LARGE SCALE PURCHASING OF THESE COMPONENTS. THIS STUDY CONTAINS A SUMMARY OF THE EIGHT 'CLIMATE AREAS' THAT WERE INVESTIGATED AND CONCLUSIONS AS TO THE VARIOUS ASPECTS OF FEASIBILITY. (BD)

Components for School Construction in the Mid-Hudson Region

CENTER FOR ARCHITECTURAL RESEARCH
RENSSELAER POLYTECHNIC INSTITUTE

FINAL REPORT 3

Components for School Construction in the Mid-Hudson Region....

a feasibility study to sample all appropriate aspects of the school construction climate in New York State to determine whether the "SCSD Process" is applicable to school construction in the Mid-Hudson Valley and explore possible ways that such school building programs might be accomplished.

Rensselaer Polytechnic Institute

TROY, NEW YORK 12181

SCHOOL OF ARCHITECTURE

1 March, 1966

Dr. Harold Monson
President, Mid-Hudson School Study Council
Superintendent of Schools
Newburgh, New York

Dear Dr. Monson:

On behalf of Rensselaer's Center for Architectural Research, I am pleased to transmit to you this third and final report of our study "Components for School Construction in the Mid-Hudson Region".

Within the limitations of time and financial resources available for this study, we feel we have drawn a comprehensive and accurate picture of the school construction climate in the Mid-Hudson Region which, in turn, indicates the feasibility of concerted approach to the problems of school construction.

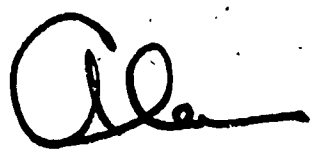
This report contains a summary of the eight "climate areas" we investigated, and conclusions as to the various aspects of feasibility. Most important, we have formulated an approach

and a series of recommendations constituting a program that we feel is suitable and appropriate for the Mid-Hudson schools to undertake. The basic theme of this program is that a united attack on several of the problems of school construction would be most appropriate at this time and that this would prepare the way for the large-scale development of school construction components.

We solicit your attention and reaction to the program outlined in this report, and offer to you our deep interest and continued assistance in this undertaking.

For all of us who have been involved with you and the others in the Mid-Hudson, it has been a distinct pleasure and a very stimulating undertaking.

Sincerely,



Alan C. Green
Associate Professor
Director - Center for
Architectural Research

FINAL REPORT 3

A

background / findings in the "climate areas"

Progress Report No. 2 contained detailed information and testimony on the school construction climate organized as eight climate areas. The following points constitute a summary of those areas:

1. EDUCATIONAL CONSIDERATIONS

- School district size, growth, and construction problems vary greatly in the Mid-Hudson, as do administrative and school planning methods and procedures.

- There is considerable interest among many area educators for conducting a project dealing with school construction.

- At this time, administrators of the larger districts are most interested. Some small districts show no great urgency and would probably not be active.

- There are few truly large fast-growing districts (such as those participating in the SCSD project) represented in the Mid-Hudson. This will affect the type and scope of project.

- The prime motivation for wholeheartedly entering a project will be the introduction of construction economies, both initial and long-term; rising taxes have already led to a great number of bond issue defeats.

- Any effort to save money will be most amenable to area taxpayers.

- Administrators desire a project based on educational needs and motivations. Providing a totally "flexible school" does not seem the only answer.

- School Boards take an active role in planning schools; changes in school buildings come about by following the example of innovative districts.

2. CO-OPERATIVE ENDEAVOR

- The existing spirit of co-operation in the Mid-Hudson indicates that districts are indeed willing and able to work together for common ends. Participation in the recent Elementary and Secondary Education Act will strengthen this spirit.

- Further co-operative efforts, based on past successes and the promise of future rewards, are definitely feasible.

- Administrative structures and legal provisions to accommodate future co-operative efforts pose no real problems.

- The MHSSC districts are contemplating more than $100 million of school construction in the next 5-7 years. Of course, not all of these districts can be expected to be involved in a project.

- If necessary, a MHSSC-centered consortium can extend to surrounding areas or pick up large districts across the state if required by future efforts.

- Future efforts, no matter how widespread, should begin

in the MHSSC to utilize available and established leadership.

- The size of the guaranteed market is debatable; a large guaranteed market does not insure success (New York City).

- On the state level, the Division of Standards and Purchase offers an opportunity for co-operative buying.

3. MANUFACTURERS

- Manufacturer roles in future projects are hard to predict without putting forth details of the project, but several alternative roles are possible.

- SCSD components, including those that were not successful in bidding, have been marketed and can be used in the Mid-Hudson, but with modifications in many cases.

- Manufacturers of the existing components will make small modifications to suit regional needs. However, such modifications will not be desirable if they do not also meet a national market.

- It will be hard to convince manufacturers of existing components to start again from the beginning.

- In new component areas, the affected industries will have to be analyzed individually. Many feel that consortium design, or partial design, of components may help the situation by cutting manufacturer research and development costs.

- Although the need for and size of a guaranteed, regional market varies with the components and manufacturer, the

potential national market is very significant to manufacturers.

4. DESIGN PROFESSIONS

- The role of the design professions in leadership and in implementing any project is very important.
- Many designers see the importance of new building approaches, but feel there are problems of responsibility and control which must be solved.
- Some past failures in new building approaches -- New York's Stock Plans are notable -- have supported a critical attitude.
- Some architects feel that local methods and materials can compete economically with large, structural components.
- Designers will react against large components which tend to restrict building layout, function, or aesthetics.
- There is fear that some components projects may not be flexible enough; that is, standard contracts and long-term bid awards "freeze" design, leave no room for product improvement, and limit competition.
- Most design firms are adaptable to new methods and techniques as long as they do not greatly upset established practice.

5. CONTRACTORS

- As a business philosophy, most contractors feel

compelled to "keep up" with new developments in their fields. Hence, as a group, they will not turn out to be a stumbling block in a components approach.

- Communication and close ties with contractors will greatly aid in moving a project forward.

- The New York four-contract system will provide problems for any approach which tries to make construction an integrated process. Generally, a Mid-Hudson components project should refrain from crossing many lines and jurisdictions.

- It does not appear realistic to expect a change in the mandatory four-contract system for school construction soon.

6. LABOR

- Mid-Hudson labor is directly affected by the New York City market.

- Labor is generally opposed to any construction technique which will create unemployment in its ranks.

- Components crossing trade lines will inevitably cause jurisdictional disputes. The seriousness of these disputes will depend on the current "job picture" in the region. There are no precedents for solving disputes involving new components, particularly in this region.

- Labor will gladly become involved in early planning stages (indeed they must) but will be hesitant to make judgments or commitments until something more concrete than words or drawings is produced.

7. STATE EDUCATION DEPARTMENT

- The State Education Department has followed the feasibility study with great interest and stands ready to assist in further efforts.

- State regulations, procedures, and aid criteria do not pose problems in considering a Mid-Hudson components approach.

- The Division of Educational Facilities Planning, in its current drive to provide leadership, not just regulation, in school facilities has indicated support for the study to date, and a permissive attitude in looking at future efforts.

- State regulations and procedures in facilities approval are becoming more flexible and do not portend as future barriers.

8. CODES AND REGULATIONS

- Since school buildings generally come under only one code and one approval (The State Education Department, with minor exceptions); there should be less problems in getting plans approved than have been encountered in California.

- Restrictions on components by applicable standards and codes will be known only after details of the components are determined; the overall picture, however, is one of permissiveness and few problems.

- Several existing regulations and code requirements mitigate against re-using the SCSD structural and heating-cooling components as they now stand.

Legal regulations in New York State controlling bidding and contracting all support open, competative bidding. Some procedures used in California and Nevada components projects would not be possible here.

B

conclusions / school construction in the mid-hudson region

Based on the information gathered during the study, and the summary of the eight "climate areas" presented in Part 1, the following conclusions seem appropriate:

1. Concerted action by the schools of the Mid-Hudson Region on the problems of school construction is a feasible concept which should be implemented immediately. The MHSSC organization with its basic staff and history of cooperative endeavors is a great asset and should form the focus of any project or series of projects in the Mid-Hudson.

2. Any concerted action and its program of implementation should be based on the strength of the Mid-Hudson Region, should avoid or resolve specific construction problems, and should reflect the unique needs of the Mid-Hudson Region.

3. An SCSD-type of program does not seem to be the most appropriate first step for the Mid-Hudson Region. A basic motivation involving economy first, rather than added quality in school construction, together with the attitudes of labor, reservations by the architectural and design professions, problems of the four-contract system, and other factors mentioned in the Summary, indicate that to initially undertake a major program for the development of components, together with concerted bidding and buying such as in the SCSD program, is not the most

feasible way to begin an attack on school construction problems.

4. The greatest single problem to which concerted action should be directed in the Mid-Hudson is that of building schools more economically. The initial undertakings by a consortium in the Mid-Hudson should introduce undeniable economies in school construction. Projects with the potential for unquestionable success in meeting this objective, even though not particularly dramatic or sensational, should be the initial undertaking of the consortium in order to gain confidence and support for future, more encompassing projects.

5. A parallel effort should be the development of voter confidence in the school building programs of the Mid-Hudson to improve the acceptance of bond issues for construction and to develop local support and encouragement of the building program.

6. The development of large components forming integrated systems for school construction is a most appropriate approach to extensive school construction. It is a solution that seems inevitable. Eventually, school designers will have available a variety of components - structural, ceiling, wall, partition, mechanical, floor, - all of which will be interchangeable and compatible to form total, prefabricated construction systems. This is an extension and refinement of present methods where the designer may pick preassembled case work, door and window units, partition elements, and mechanical packages from a catalog.

   The development of large components must be co-ordinated nationwide to produce interchangeable, yet locally acceptable parts. It would be inappropriate for each region, locality, or state to develop components which

do not have application elsewhere in the country. This seems the paradox - developing economical components for local use, which have appropriateness and application nationwide. The success of a components approach seems to rest on resolving this paradox. Concerted action by the schools of the Mid-Hudson can add to the selection of components available locally and on the national market, but this seems to be a later undertaking in the Mid-Hudson, not the first one.

7. Some components now available nationally could be used for constructing schools in the Mid-Hudson, but their success would be measured first in terms of the economy of the solution.

C

recommendations / an approach to school construction in the mid-hudson

We feel that a staged program which attacks school construction problems from several directions would hold building costs at an appropriate level and would encourage voter confidence, interest, and support of building programs in the Mid-Hudson Region. Voters must pass bond issues before schools can be built. For this, they must be convinced that school administrators and boards are doing a significant job in providing the most schools and the best schools for the dollar outlay. Such a program can be effectively accomplished by school districts acting co-operatively.

An attack on school building problems would take several different directions:

- careful analysis of school needs to insure the construction of exactly what is needed
- application of national research results to local problems of construction technology, selection of materials and finishes, etc.
- co-operative, competitive bidding for standard parts used in schools throughout the entire region
- public information programs which bring the problems and solutions of school construction to the attention of parents and taxpayers

Such a many-faceted attack, building success upon success, might lead to the development of school construction components and systems; the program can best be undertaken by a consortium of school districts in the Mid-Hudson using the existing Mid-Hudson School Study Council as its base.

Based on the philosophy of such an approach, and in the interest of structuring an attack on school construction problems in the Mid-Hudson Region, we recommend the following phases in a long-term program:

A. SCHOOL BUILDING ADVISORY GROUP. Within the MHSSC, a School Building Advisory Group should be formed to provide administration, guidance, and co-ordination for the broad program. The School Study Council would appoint the membership of the Group which would include architects, manufacturer representatives, contractors, labor leaders, Education Department representatives, engineers, citizens and others concerned with school construction. A chairman and executive committee would guide the work of the Group which would be organized for an indefinite period. Administrative staff, specifically an Executive Director, would be provided through the MHSSC.

1. The Advisory Group should undertake, as soon as possible, a detailed study of school construction costs in the Mid-Hudson. The study would include the assembly and analysis of statistical data on past, present, and anticipated construction projects, and an analysis of cost factors; costs by trade and contract, cost by locale and characteristics of construction in the Mid-Hudson. This study would have four major objectives:

   a. To identify exactly where and for what school construction dollars are spent,
   b. To identify any potential economies inherent in financing, construction or planning procedures,

c. To identify in detail the extent of the proposed building programs in the Mid-Hudson,
d. To identify repetitive parts or elements in school buildings that could be standardized and purchased in quantity.

2. Parallel with the cost study, an analysis of educational programs and their facility needs should be conducted. This would establish school building needs in terms of instructional methods, group sizes, organizational patterns, flexibility requirements, staff needs, and other criteria.

3. The Advisory Group would retain the services of competent educational facilities programmers to assist all school districts in the region in arriving at realistic, comprehensive, and economical school building programs. These services might be retained by hiring an individual as a part of the MHSSC staff, or by retaining the services of an architectural firm, a school of architecture, or some other such group. A part of these services would be the application of computer simulation to test the validity of building programs, and the introduction of appropriate innovations in scheduling, administration, and financing that might aid the local districts in realizing more economical construction programs.

4. The latest research findings in improved construction technology and selection and use of materials and finishes should be brought to bear on the design and construction of schools in the Mid-Hudson through analysis and dissemination of research information to all school boards, architects, and contractors involved in building programs in the Mid-Hudson. This information service would be performed as a staff function of the MHSSC through its School Building Advisory Group.

5. A public information program should be undertaken to provide pamphlets, materials, special TV programs and public hearings on school construction problems and approaches in the Mid-Hudson. This program would include the involvement of taxpayers and those responsible for school design and construction.

Funding and support for the activities of the School Building Advisory Group can come from many sources. Some of the projects involved may be funded by foundations, the State Education Department, or through Title III of the Elementary and Secondary Education Act of 1965. Since the Advisory Group is formed within the MHSSC and serves the entire Council, member schools would help out in its support. Finally, close relations should be engendered between the Advisory Group and the MHSSC Research and Development Project; some projects may be jointly undertaken and supported.

B. SCHOOL CONSTRUCTION AGENCY. Once the appropriate groundwork has been laid by the School Building Advisory Group, it is recommended that a School Construction Agency, formerly organized under Article 119-0 of the General Municipal Law, be formed by the MHSSC and interested school districts. Its sole purpose will be to provide the appropriate legal structure for buying, developing, bidding, and using components in member districts. Its life would be interim, and the enabling documents will set out provisions for leadership, board of directors, etc. It would hire staff, and in partnership with the School Building Advisory Group, carry out many functions:

1. A list of repetitive building elements appropriate for use in all schools should be developed. This list would be standardized, and the selected elements should be bid and purchased in large quantities for school building programs to be undertaken in the next few years.

The Division of Standards and Purchase might assist in this phase.

2. As a result of the careful analysis of educational programs and building needs, several components which would most immediately stimulate educational programs or introduce economies in construction, might then be designed and bid in concert.

   These components would not necessarily be part of an integrated system, and might involve modification of existing components. These components would be designed to upgrade the quality of facilities provided in the Mid-Hudson without adding extra cost; they might include special case work, lockers, lab furniture, audio-visual units, communication systems, and "service components". Generally, they would avoid the areas of building construction technology which present inherent labor and contractural problems.

3. A school anticipated for construction would be chosen as a pilot project for a full component-systems approach. This pilot school would be chosen as being reflective of the type of educational program and plant desired in the Mid-Hudson. Funds for this comparative study might be solicited from Educational Facilities Laboratories; the contract documents would be prepared and bid as a conventional school and as a components school.

   This project would be undertaken to give an idea of the economic feasibility of a components approach and as a means of testing its acceptance. It would also become the case study for evaluating administrative, planning, and contracting procedures. The components used would be available nationwide and would be carefully selected and used to overcome labor and

contractural problems.

4. Then, if found to be desirable, a full-blown program of construction utilizing components would be undertaken for a series of schools in the Mid-Hudson. This program would be based on a combination of direct use of existing components, the adaptation and modification of existing components, and development of new components to suit the particular needs of the Mid-Hudson. This project would be similar in concept to the "SCSD Process" involving a guaranteed local market, joint development of components, joint bidding and buying of components, and guaranteed use of the components in school building projects designed individually and bid individually by the districts making up the consortium.

   The School Construction Agency would be the formal means for handling all bidding procedures, contract awards, etc. The Division of Standards and Purchase might assist in this phase.

   At this point, the consortium would bring in large, fast-growing districts from all around New York State, guided and possibly financed in part by the State Education Department.

C. ASSOCIATION OF ARCHITECTS. Early in the project, when the School Building Advisory Group is just beginning its work, it is recommended that an Association of School Architects be formed in the Mid-Hudson to serve as an advisory and communicative arm of the Council and its Advisory Group. Structure of the organization would be informal, and would bring in all architects doing work in interested districts and any others interested in following the project.

Study Committee ....

The study committee was established to provide guidance and direction to the study staff in carrying out the project. It includes the superintendents of three fast-growing MHSSC districts and the Executive Secretary of the Council; it is headquartered at Grimm House, State University College at New Paltz.

Dr. William J. Hageny, Professor of Education and Executive Secretary, Mid-Hudson School Study Council, State University College at New Paltz, New York. Chairman.

Dr. Harold Monson, Superintendent, Newburgh City Schools, Newburgh, New York.

Dr. E. Joseph Kegan, Superintendent, Wappingers Central Schools, Wappingers Falls, New York.

Dr. Walter Panas, Lakeland Central Schools, Mohegan Lake, New York.

Study Staff....

The study staff includes members of the faculty, Center for Architectural Research, School of Architecture, at Rensselaer Polytechnic Institute, Troy, New York.

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