
Architecture for Social Change

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You do not have to be an architect to realize that there are serious inadequacies in the present means of solving community building problems. The capacity to handle an increased volume of building has not improved since 1966, although the Economic Council of Canada advocates an annual increase of 10 per cent to meet the goal of the early 1970s. The cost of construction is increasing at a far greater rate than the cost of other consumer products to a point where the necessities of accommodation are being considered as luxuries. Spiralling wage settlements bearing no relation to increased productivity have contributed to higher costs with no improvement of quality in the finished building. Unfortunately, the architectural profession has become the focus for much criticism, which is really an expression of dissatisfaction with the end product. However, the root of the difficulties lies in the incomplete and fragmented nature of the building process.

A study of the history of building reveals a diminishing relationship between the means of construction and architectural expression. Before the industrial revolution the means and ends were irrevocably linked together. Since the nineteenth century a dislocation has occurred between process and product. The architect's concern to express human needs in architectural terms, coupled with his traditional relationship to the client, has influenced the profession to continue thinking in a product-oriented way. The apparently limitless choice of materials and means has allowed design to become abstracted by the desire for effect. Today if the architect wishes to participate in providing solutions to the real needs of the community he must learn how to control the process of building.

Why is the present construction process inadequate and what are the conditions which have prevented an evolutionary change to solve these new problems? The building industry regards itself as a service industry, and factors which have contributed to a low capital intensification or industrialization are outside the control of its individual members. The general demand for investment in new building tends to be cyclical by nature, and individual clients have required space on a building-by-building basis. To be able to

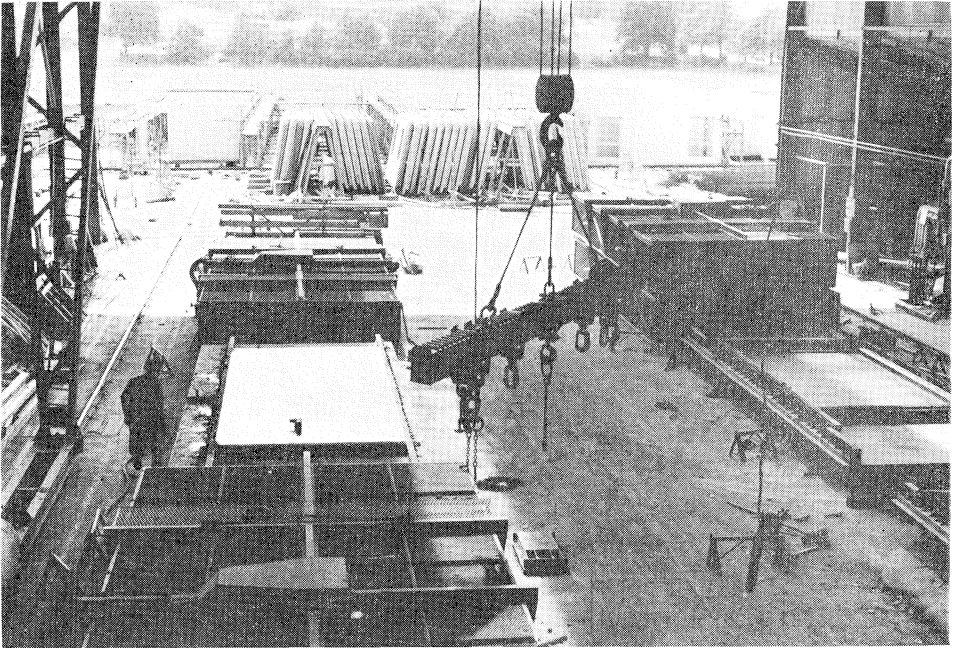


FIG. 1. Precasting factory for wall panels, TRACOBA system (French).



FIG. 2. Stock pile of timber wall components of the DERWENT system.



FIG. 3. A residential college of the University of York. The CLASP Mark IV system was used throughout the University for academic and residential buildings.

respond to these conditions on the site and in the factory, the building industry has used methods which require a limited investment in plant and a high labour content, thereby avoiding financial overcommitment. During a period of low demand, work crews can be laid off, leaving a minimum of capital tied up in plant and machinery. The high labour content of on-site construction methods combined in a limited way with manufactured components represents a means of building which appears to have reached an optimum point of development in its present form. The Honourable C. M. Drury, when he was federal minister of industry, noted that from 1961 until 1967 productivity increases in terms of output per person employed were 21 per cent in manufacturing industries, over 100 per cent in agriculture, but only 6 per cent in the construction industry. Despite lower productivity, wage settlements in the construction industry have on the average been 77 per cent higher than those in manufacturing in the last ten years. Consequently the cost of building is out of proportion to the value of the end product. The question is, therefore, are building resources being used effectively, not will traditional building methods continue to be used.

The industrialized building system is a process-oriented concept which provides the organization and the means of solving the building problems of our mass society. The approach simplifies construction methods by rationalizing the assembly operations and utilizing factory-made building components. It is a means of speeding up the industrialization of the building industry by creating an organization which changes the relationships between clients, architect, contractor, and manufacturer to achieve a more effective team. The public client holds the opportunity to initiate this approach, because public building programs are large enough to provide the incentive for the building industry to improve its methods. The architect must take a hand in this change by providing sound advice to the public client who will ultimately determine the effectiveness of the organization – and the quality of the buildings.

Parts of Europe and Britain faced the problems of limited resources and shortage of skilled labour after the second world war. The impetus of the post-war reconstruction program started a trend, supported by national government policies, towards the industrialization of building methods for housing and schools. A technological explanation of the concept is relatively easy to grasp. A “meccano set,” or range of components, is developed which can be used by architects to provide a variety of designs (variety of appearance and plan) for specific local housing conditions or educational requirements. The building components that comprise a system must be capable of being fitted together to construct a complete building. Each individual component will have been designed and manufactured according to the conventions of modular co-ordination in order to ensure that the problems of preferred dimensions, tolerances, and joining details have been solved. This differs from the present use of factory-made components, which are mostly custom

made for each individual building and consequently are not interchangeable. However, the benefits of this approach depend upon a sustained program of construction of sufficient volume to allow manufacturers to reorganize their methods for peak productivity. The scale of operation required for this approach puts it beyond the scope of individual companies' marketing programs and at the level of government policy. If the approach is completely administered the following benefits can be expected: the initial capital cost of the individual building will be reduced (European experience indicates savings of 8 to 15 per cent over traditional methods); on-going maintenance costs will be reduced because of the high quality of factory finishes; on-site construction time will be reduced and the results will be predictable, consequently building deadlines can be more readily met; quality control of the finished building will be assured because of factory production methods.

The introduction of the systems approach to building reflects an entirely new attitude towards the co-ordination of the building process. The establishment of universal conventions for dimensions, joining, and tolerances will enable new materials to be used to their full potential. A consistency of scale can be designed into the systems approach which will allow for change and growth of individual buildings without destroying the visual continuity of an area. It can represent a catalyst for change in the building industry which may achieve a renaissance of the modern movement in architecture. Here we are discussing an architecture that relates to social change through process, an architecture that is capable of resolving some of the problems of the aesthetic and social conflicts of a mass society. If we continue to build in the traditional manner, with emphasis upon the "set-piece," we will eliminate the flexibility and quality which must exist to ensure a stimulating social milieu. The systems approach is by definition responsive to changing community needs. Visually the buildings are likely to be more matter of fact about their purpose and less self-conscious or monumental in the traditional sense. With the systems approach there is a balance between the problem and the means; architecture is no longer an end in itself, the outcome of a commitment of a younger generation of architects to the changing scale of society's problems and values.

The inevitable question then is why has this approach not been used in North America. The answer is a complex one. First, the building industry is subject to the fluctuations of the open market. The problems of this situation have been compounded at times because the federal government has traditionally manipulated the interest rate and other factors affecting the market to achieve an overall balance of the economy, sometimes at the expense of the building industry. Secondly, the building industry cannot be expected to industrialize its own processes unless there is firm assurance of a market demand and consequently that the economic risk is a worthwhile one. The fragmented nature of space requirements in Canada to date has

meant that neither the professional designers nor members of the building industry have had the incentive to reconsider the approach to the problems of construction. The political conditions that existed in Britain and Europe after the war were sympathetic to any concept that could ensure effective use of building resources with a planned approach, whereas legislative means that seek to regulate the economy have not been accepted in North America until quite recently.

In Canada and the United States needs are changing, new standards of performance are being required of the building industry, new methods are being sought. The American Federal Department of Housing and Urban Development (HUD) has recently awarded a \$4.9 million research contract to an interdisciplinary team from the building industry. The program is for the design and construction of specific housing experiments in various major cities throughout the United States. In Canada the inevitability of the industrialization of construction methods has already been recognized by federal government policies: the Department of Industry's BEAM program is being acknowledged and adopted by other departments; CMHC and the federal Department of Public Works have adopted the principles of modular coordination for their building programs.

How can the concept be applied in British Columbia? The question here is: What kind of existing building programs lend themselves to a systems approach? Technically it is possible to rationalize the design of most building types to use factory-made components, so the choice is not limited to a specific kind of building. The approach depends upon a recurring substantial volume of work. It is apparent that housing and school construction represent a demand of this kind. Although housing is a current political issue and governments at both the federal and provincial levels have overlapping responsibilities in this field, the actual commercial free-wheeling development process does not lend itself to organized programs. However, the provincial school building program must necessarily be administered with a concern for the long-term responsibilities of investing public funds. The organization of the existing captive market is a major administrative problem that may require special legislation. It is apparent that the present cost-sharing method of school financing does not encourage co-operation between local school districts for any purpose, and placing the entire responsibility for the initiation of school building at the local level tends to emphasize the parochial interests of each district. Consequently, although it is feasible to consider the captive market of the provincial school building program as a unit, the initiative for such a step rests in the hands of the provincial government.

The sponsorship of an industrialized building system is the key to the entire problem. Someone must be prepared to make a substantial investment into the research, design, and development of building components

manufactured specifically to meet the requirements of educational buildings. Whose interests are great enough to justify the investment and to carry the risk until the benefits become fact?

Commercial sponsorship is a possibility, although it is subject to certain limitations. The sponsor must have reasonable assurance that his product will be purchased in sufficient volume to make it competitive with traditional methods. If a number of projects are successfully completed, there is every likelihood that a competitor will develop a new building system to compete for the same market. In this eventuality there can be a proliferation of building systems of commercial interests trying to jump on the bandwagon, which will cancel out the broad social benefit of the concept. In Britain, where the Hertfordshire County Council successfully pioneered the first educational building system in 1947, there are now over three hundred educational and housing systems of which only about forty are economically viable. The proliferation of commercial systems in this province is particularly undesirable because of the limited size of our school building program. Another limitation of the commercially sponsored system is that the factor of repetition in factory production which provides savings for the purchaser will provide increasing profit for the manufacturer only so long as there are no major design changes. This means that there is no built-in incentive for a commercial sponsor to modify the design to adapt to new curriculum patterns, or to meet the more sophisticated requirements of an expanding market. It is understandable that private interests are reluctant to invest in such a demanding field.

The client (who for school buildings are the elected representatives, the trustees, and the provincial government) is in a much stronger position to initiate a building system if the program is large enough. For example, 75 per cent of all school construction in Britain utilizes systems building methods. Two client-orientated public building consortiums – CLASP and SEAC – have educational building programs in excess of \$55 million annually. The new universities of York and Bath are constructed with the CLASP, Mark IV system. Thirteen school districts in Southern California, together with the Educational Facilities Laboratories Inc. (an agent of the Ford Foundation), sponsored the School Construction System Development (SCSD), which was used in 1966 to build \$25 million of school space. In Canada at the present time the Catholic Schools Commission in Montreal and the Metropolitan Toronto School Board have commissioned major research and development projects on building systems for educational facilities. Tenders have already been called for manufacturers to bid on two million square feet of school space in Toronto.

The issues are clear, it remains for us to benefit from this experience in order that we may achieve the best features of all that has already been done.

Let us assume that the initial problems of sponsorship have been over-

come successfully, and that a public building consortium for educational facilities is operating in the lower mainland. What are the implications for the community? Experience in Britain indicates that educational building consortiums tend to snowball in size. The initial members, the local boards and perhaps a regional college board, have administered the organization effectively and have been paid off with better buildings. The neighbouring districts which are still using traditional building methods on a one-building-at-a-time basis are impressed by the results. The board visits the systems built schools and is agreeably surprised by the high quality of finish together with a great many design features that it has been forced to consider as luxuries in its own district. The approach is explained, and the political and administrative advantages of a controlled predictable process become clear. It is pointed out that participating members are currently using the savings of the systems approach on special local projects. The completed buildings are the most persuasive arguments of all, and the visiting board makes a request to become a full member of the consortium. The community architect will then be asked to design the school, although he will choose from a catalogue of preferred components determined by the systems sponsor. The choice available to him and consequently the opportunity for variety in plan and appearance will have been predetermined by the initial user studies. If that job was well done the consideration given to educational problems will be more comprehensive and far reaching than has been economically possible before. The designer will be able to spend more time on local educational requirements, because the majority of the technical problems will have been solved in the design of the system. The use of improved technology will enable the architect to provide flexibility and a far richer variety of interior spaces, but the opportunity for custom design remains the same as it is now. The administration of the consortium will achieve an equalization of resources between wealthy school districts and less fortunate, so that all participants will enjoy a high quality of school space at a cost that the community can afford. An affluent district may wish to build special features or embellish a school with architectural cosmetics, but the fundamentals will be available for all. The product will be better because the process is controlled.

By anticipating our future urban growth now and by considering educational problems on a long-term policy basis, we can avoid the kind of construction crisis that we are faced with at the moment. The key to this problem is to ensure the effective use of our present building resources. It is no longer reasonable nor is it in the public interest to continue to tackle the construction of each school as if it had never been done before. An approach to the total problem must be established which will provide the professional decision-makers with a knowledge of the collective experience of the building industry.

The client has become conditioned to expect a custom service, because in the past the building industry has traditionally regarded itself as a service industry. However, the increase in the volume of construction has revealed the inadequacies of the traditional approach and brought about a reassessment of the effectiveness of present relationships within the industry. The client must be prepared to rethink his role and realize that the systems approach depends upon a consistent relationship between client and professional. The client is the only group with the power to bring about change within the industry, and the professional group holds the comprehensive knowledge of the organizational and technological problems. It is essentially a people problem, that is, a question of awareness on the part of the individuals who hold the responsibility for action. If the benefits are great enough, then they warrant the increased involvement and responsibilities that will be placed upon the elected representative, the client.