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ABSTRACT

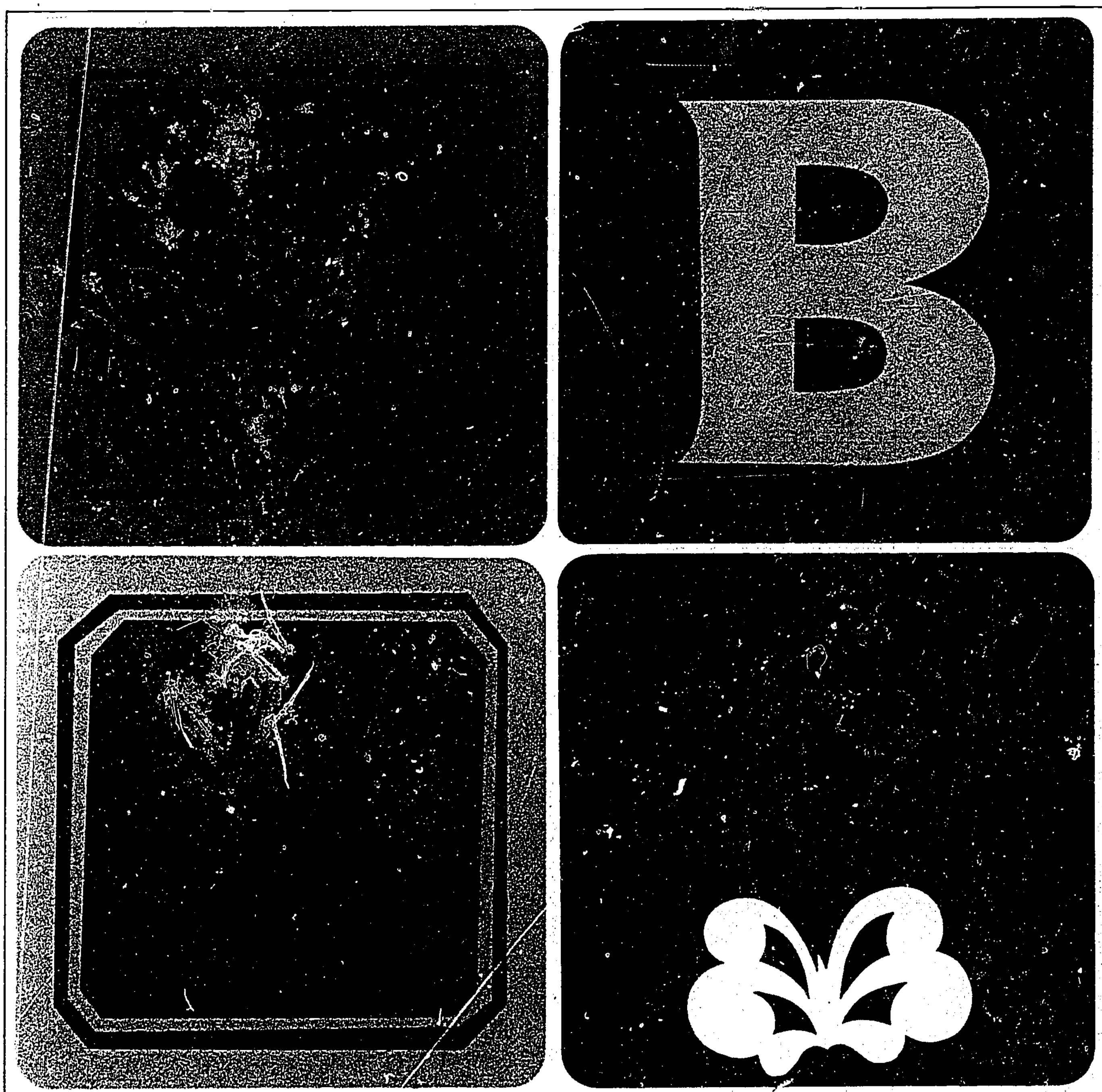
Floor plans and illustrations present a simplified building system for an elementary school that can be utilized by any school board. All components for the system can be drawn from existing products and readily integrated with the structure. The component assembly and connections are illustrated in detail. Factory production is utilized to reduce site labor time and to obtain improved technical performance. The system of construction consists of the assembly of a "kit" of components comprising steel joists, trusses, columns, and exterior metal panels. The school is designed on a horizontal module of five feet and future expansions can be provided in increments of 15 feet. (Author/MLF)

stelco

Trend

The School of the Future

NUMBER 34 IN A SERIES



The Problem and Solution

The problem: In recent years there have been many searching reassessments of the aims of education and the arts of teaching. In addition, there have been dramatic developments in school construction in Canada — and none more dramatic than systems building.

The S.E.F. program initiated by the Toronto Metropolitan School Board is probably the most comprehensive example of the systems approach to school construction yet undertaken. A number of other smaller programs are also underway as a result of the initiative of individual architects and school boards.

In addition, there are still other boards looking for a systems approach to building which can be achieved with modest administrative resources and which is based on standard contracting procedures permitting participation by local contractors and fabricators.

E. R. Arthur, M.A., LL.D.

The solution: This proposal presents a simplified building system for an elementary school which can be utilized by any school board. The system comprises relatively few elements in the structural component while still retaining a high degree of flexibility.

All components for the system can be drawn from existing products and readily integrated with the structure.

The exterior skin is an insulated metal wall system of great durability and capable of re-use if the school is expanded.

The whole school is designed to maximize the local content of product and manufacture. The component assembly and connections have been illustrated in detail in this design. They can be readily built by normal construction techniques. It is anticipated that a number of smaller school boards would take advantage of this component standardization to achieve better and more functional schools at the best possible cost.

The school would have an ultimate accommodation equivalent to twenty-five classrooms. It would feature:

1. Adaptability of interior space design to accommodate changing pedagogical techniques.
2. Ease of expansion.
3. Economical construction utilizing currently available materials.
4. Speed of erection.

In this design, column-free space is provided with joist spans up to a maximum of sixty feet; trusses span fifteen feet. The plan is organized into "houses". Each house is basically a large open area, sixty feet by ninety feet, containing five teaching stations with common-participation area, teacher workroom and seminar room. Load-bearing masonry space dividers have been eliminated. Visual separation to suit individual teachers' preferences may be obtained by arrangement of movable screens providing display and writing s[illegible]

Book storage units in houses are movable and of countertop height. Each house is closely related to a central library-resource area. Gymnasium, library and administration facilities are adjacent to the main entrance for public access.

The aim is to utilize factory production to reduce site labour time and to obtain improved technical performance. Thus, the school is designed on a horizontal module of five feet. The system of construction consists of the assembly of a "kit" of components comprising steel joists, trusses, columns and exterior metal panels. These components can provide a variety of planned shapes and design. Future expansions can be provided in increments of fifteen feet.

Exterior metal panels are assembled in frames in the plant and interlocked on site. Supporting steel girts behind the panels are attached to the top chords of trusses or joists. The exposed faces of the metal panels may be treated in a variety of ways. Possibilities for exterior faces include application of expanded metal fabric or fence mesh on to weathering sheet steel. Interior faces may have cork surface or metal treated for writing or display.

Heating and ventilation is provided by roof top units eliminating the necessity for boiler and fan rooms.

Howard V. Walker

Engineering data: The structural steel work presented may be economically fabricated by most steel fabricators with present day equipment.

Based on the use of 55,000 psi yield strength steel the structural steel required for the above building was estimated at 6.25 pounds per square foot. This figure includes window mullions which account for 0.75 pounds per square foot. Mechanical ductwork is accommodated within the depth of the structure.

To achieve optimum economy, depth of the joists was varied between 30-foot spans and 60-foot spans; however, in order to provide flexibility in framing directions, the tops of trusses and joists were made flush.

The comparatively short span for the trusses makes it possible to use a small number of types for a larger number of loading conditions and provide in an economical way for future expansion.

The 60-foot span floor joists are designed for composite construction following the latest research at McMaster University for Stelco.

Loadings are based on requirements set forth in the National Building Code.

Joist design may be varied to suit the individual fabricator's present plant set-up.

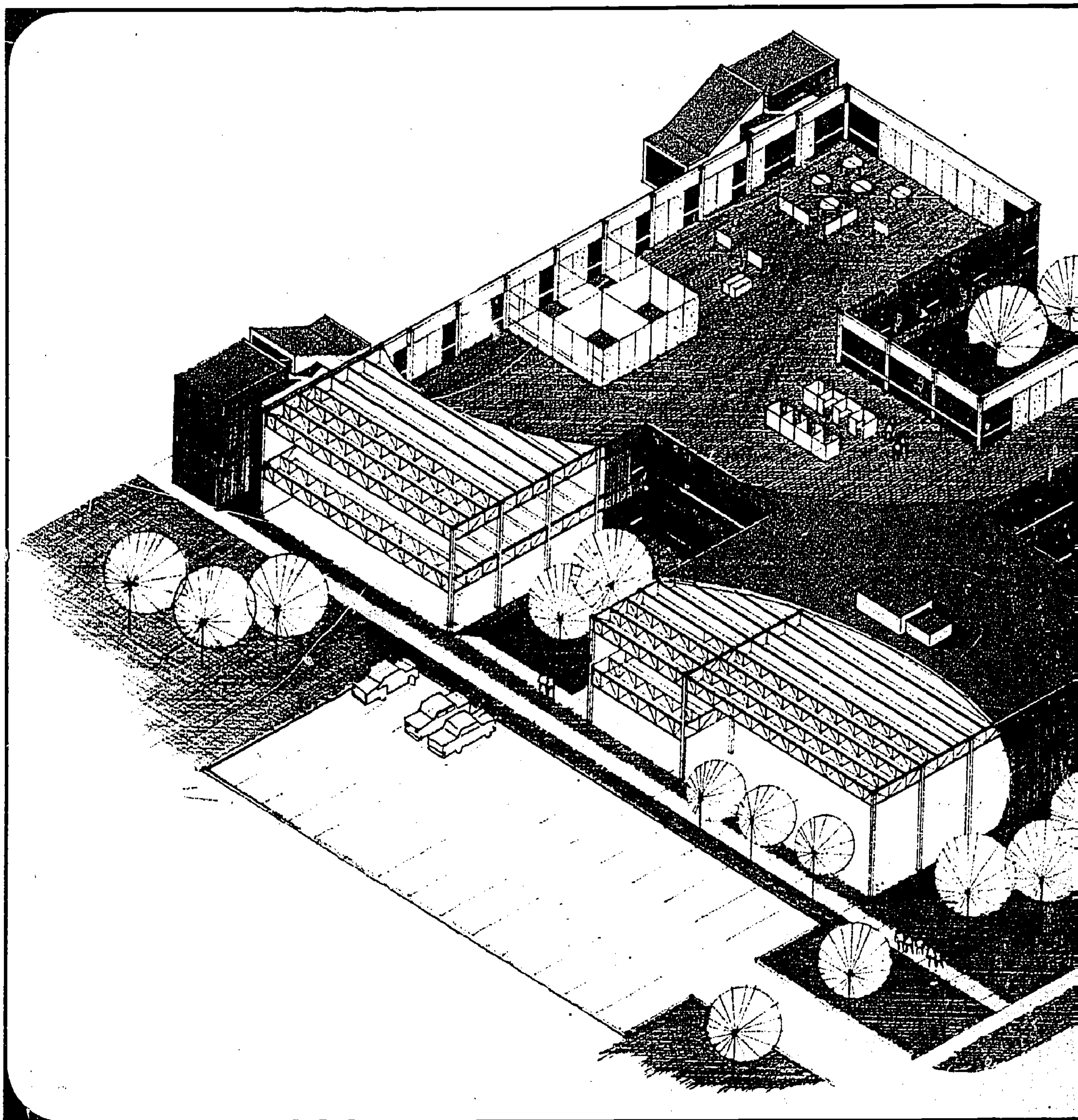
Seethaler and Bernard

Isometric

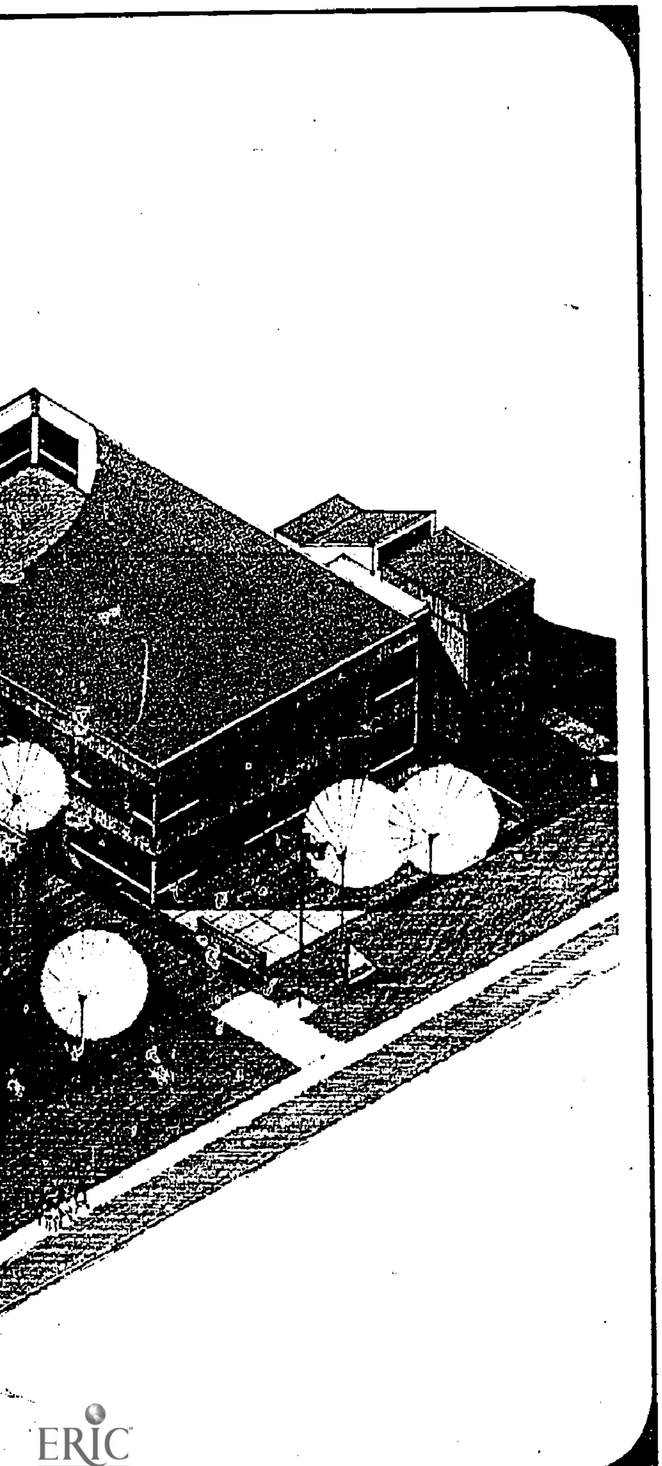
Howard V. Walker has been in practice since 1957 and has designed schools in metropolitan Toronto and elsewhere in Ontario. He is currently engaged on three schools in the S.E.F. program. In addition, he designed the North Bridlewood Junior Public School in Scarborough, Ontario, which was the first open plan-flexible school in the province. This and other projects of his office have been featured in architectural publications in North America and Latin America.

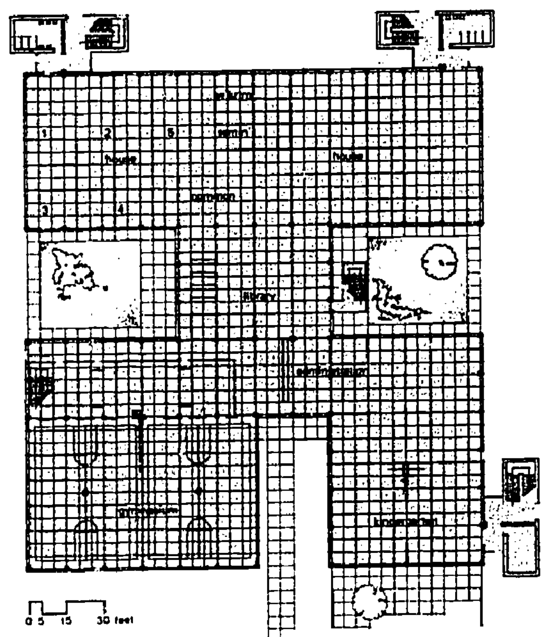
Seethaler and Bernard originated in 1961 and is today a partnership of two firms, one specializing in industrial projects, the other in commercial and institutional work. The firm has current projects in several provinces of Canada, also in the U.S. Mr. Bernard, a former manager of a structural steel fabricating plant, was responsible for the above design.

E. R. Arthur, M.A., LL.D., professional consultant.

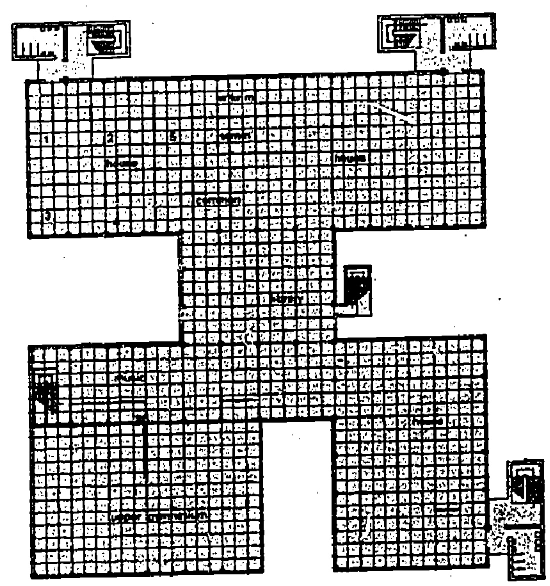


First Floor and Second Floor Plans



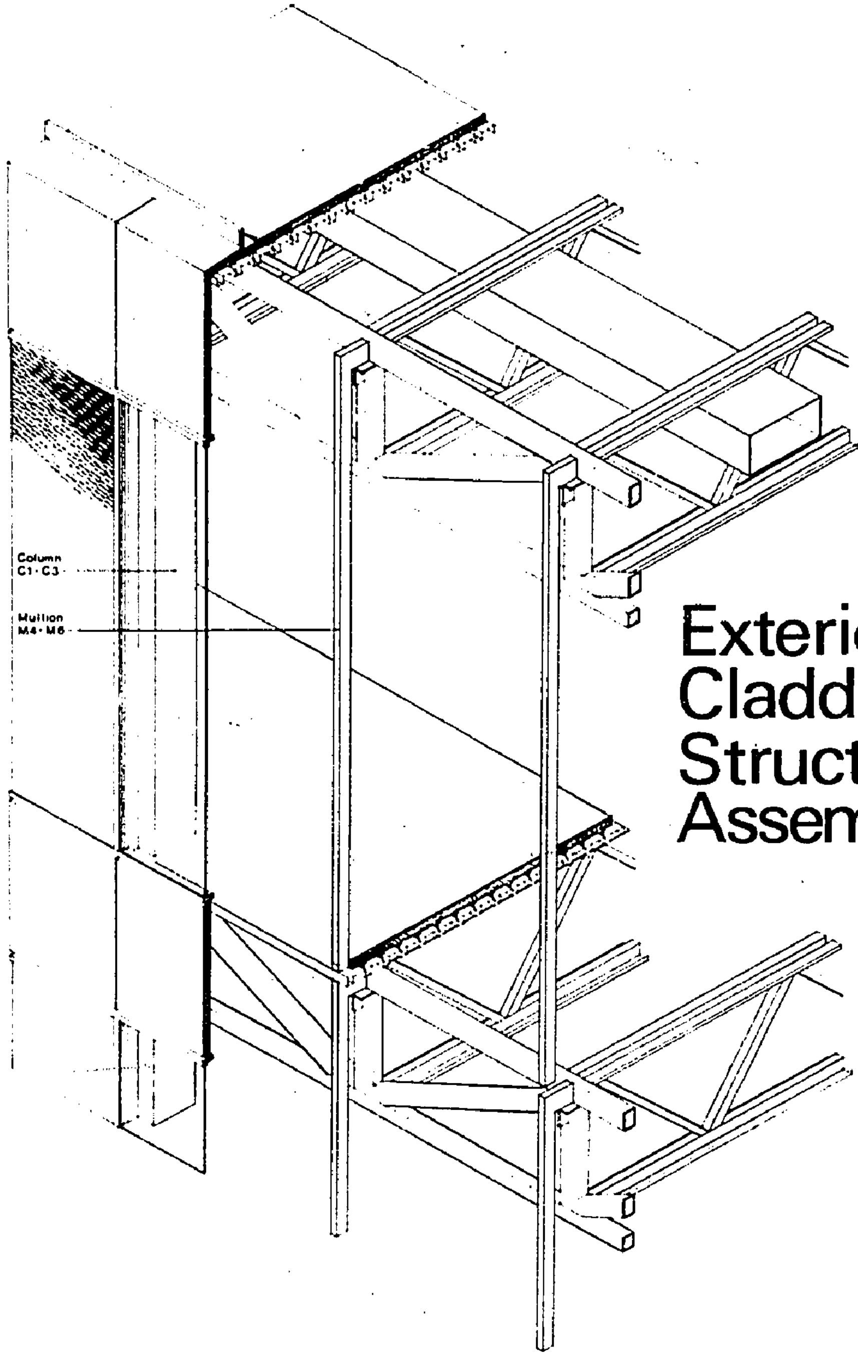


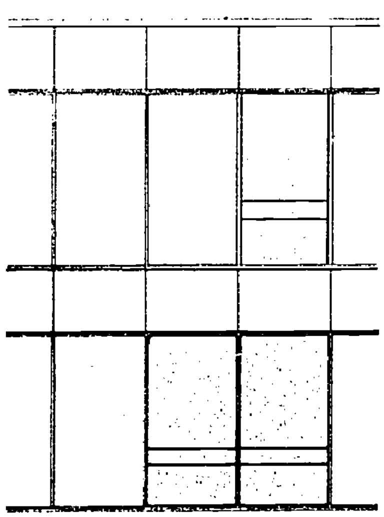
First Floor Plan



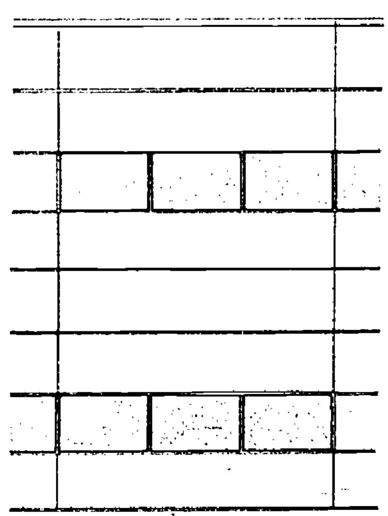
Second Floor Plan

Exterior Cladding and Structural Assembly





Elevation
Vertical Cladding



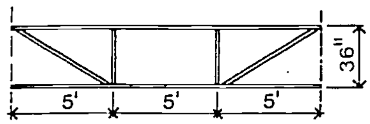
Elevation
Horizontal Cladding

Structural Components

LIST OF STRUCTURAL COMPONENTS

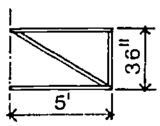
Total Number 34

TRUSS



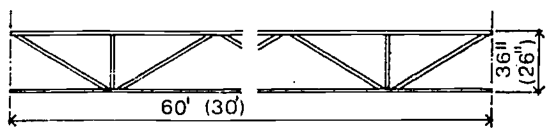
Loading Area	60'x15'	45'x15'	30'x15'
Roof	T1	T2	T3
Floor	T4	T5	T6

TRUSS CANTILEVER



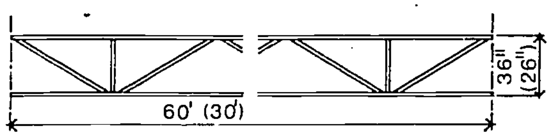
Loading Area	60'x 5'	45'x 5'	30'x 5'
Roof	TC1	TC2	TC3
Floor	TC4	TC5	TC6

JOISTS



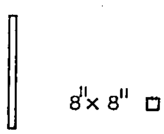
Span	* 60'	30'	*Composite Design
Roof	J1	J2	
Floor	J3	J4	

TIE JOISTS



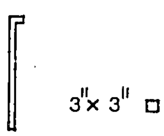
Span	* 60'	30'	*Composite Design
Roof	TJ1	TJ2	
Floor	TJ3	TJ4	

COLUMNS



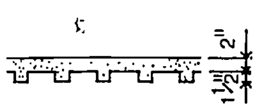
Loading Area	60'x60'	60'x30'	30'x30'
Roof	C1	C2	C3
Floor	C4	C5	C6

MULLIONS



Framing to	Truss	Joist	Column
Roof	M1	M2	M3
Floor	M4	M5	M6

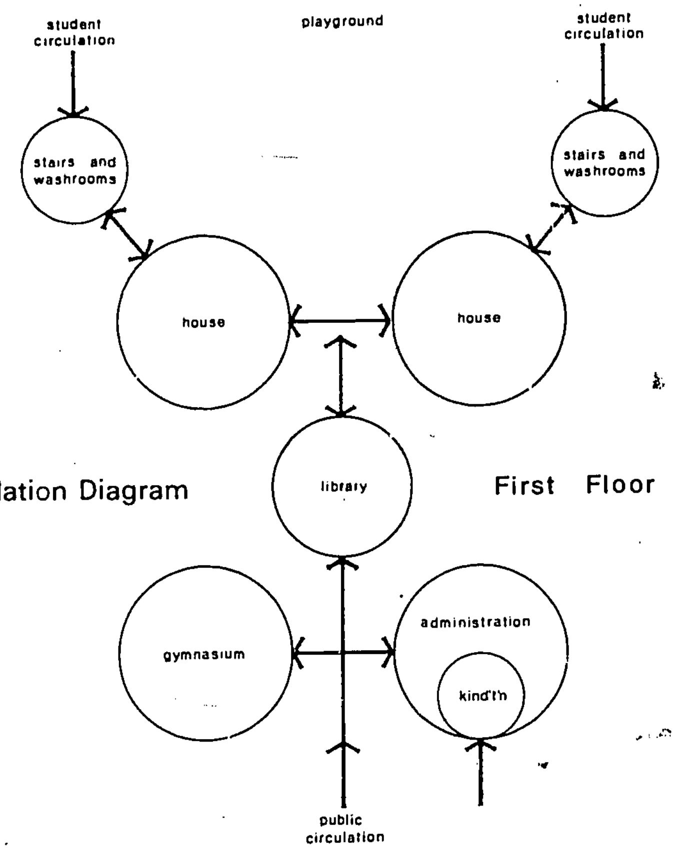
DECK



Roof	D1
Floor	D2

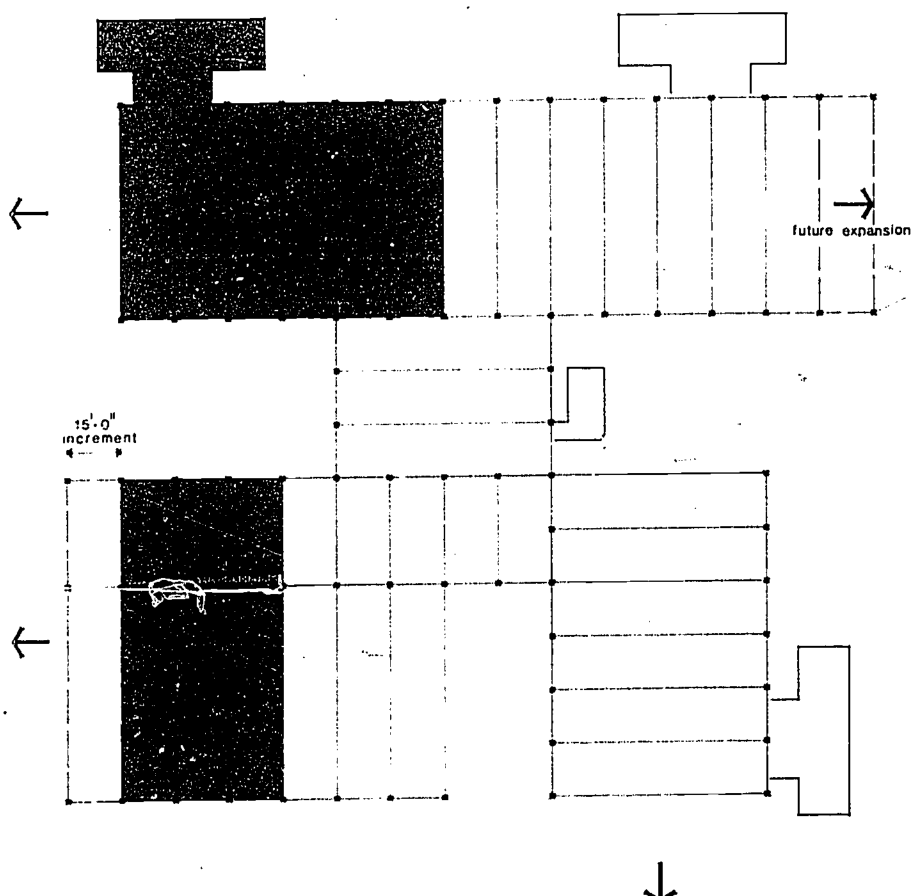
Standard Composite Steel Deck

Circulation and Structural Diagrams



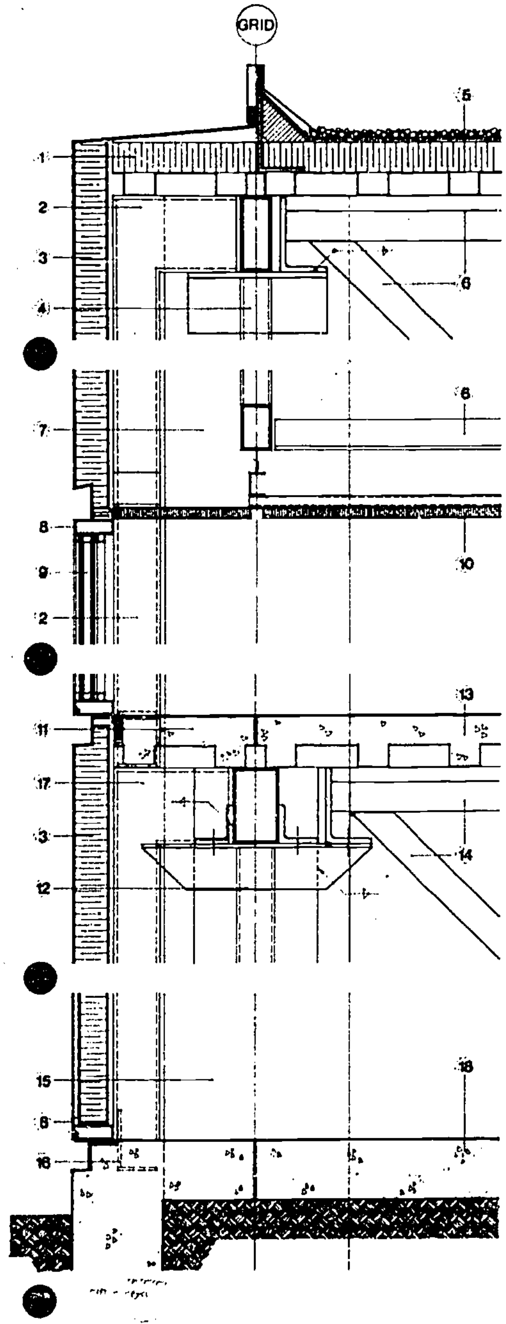
Circulation Diagram

First Floor

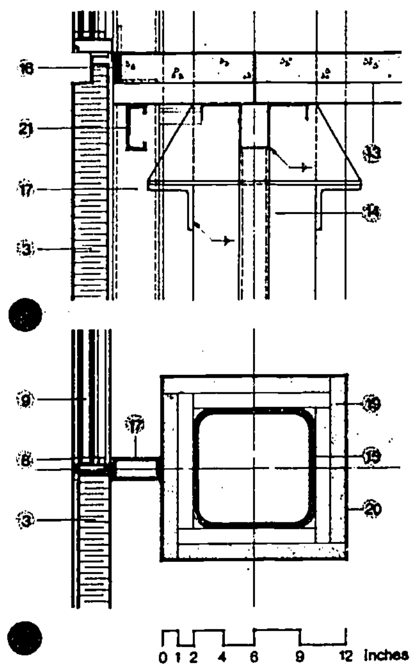


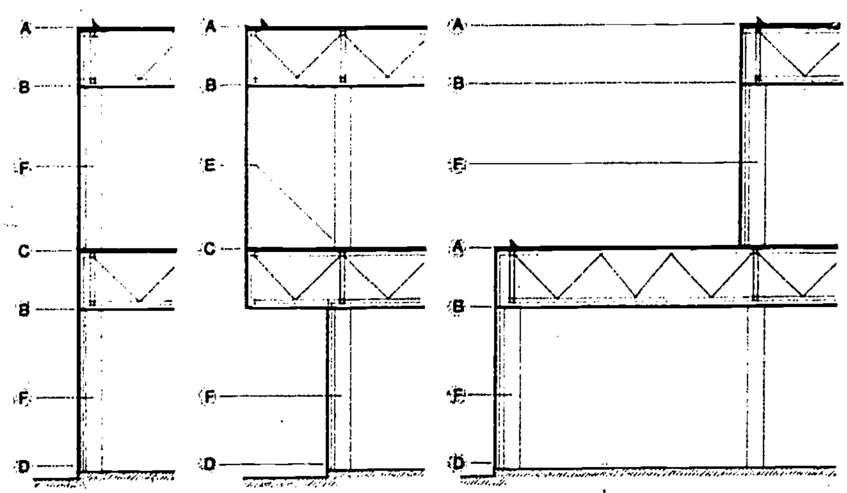
Structural Diagram

Plan and Section Detail



1. Removable Insulated Roof-deck Panel
2. Removable Mullion M1-M3
3. Insulated Metal Panel
4. Truss T1-T3
5. Insulated Roof-deck D1
6. Joist J1-J2
7. Column C1-C3
8. Frame
9. Sealed Double-glazing Unit
10. Suspended Acoustic Ceiling (Fire-rated)
11. Removable Composite Floor-deck Panel
12. Truss T4-T6
13. Composite Floor-deck D2
14. Joist J3-J4
15. Column C4-C6
16. Mullion Anchor
17. Mullion M4-M6
18. Poured-in-place Concrete Floor Slab
19. Vermiculite-board Fire-proofing
20. 24 gauge Sheet Steel Column Cover
21. Floor-support Channel





Optional Exterior Wall Sections

25M WLG 7001/1