PROTIBESH

JOURNAL OF THE DEPARTMENT OF ARCHITECTURE, B.U.E.T. DHAKA

Vol. III No: 2, December 1989

PROTIBESH

JOURNAL OF THE DEPARTMENT OF ARCHITECTURE, BUET, DHAKA

প্রতিবেশ

Vol. III No. 2
December 1989

Bangladesh University of Engineering and Technology, Dhaka

Published by: Bangladesh University of Engineering and Technology, Dhaka.
Printed by : PIB Press, Phone: 400082

Editorial

The current issue of 'PROTIBESH' is bigger in size than the earlier ones and contains a variety of topics. Very many topics related to environment have been included in the text. The subject matters of the papers deal with Health Facilities, Housing, Finance, Institutional facilities, Environmental studies and Planning.

Difficulties at different stages caused unavoidable delay in the publication of this issue. Scheduled time for this number was December '89.

We have just started accepting papers from outsiders, meaning people not associated with Bangladesh University of Engineering and Technology. We would like to take this opportunity to invite research articles from readers. But it might take quite some time to publish the articles after they have been received. The articles have to go through review and modification, if necessary, before final acceptance.

We would like to encourage serious scientific writing in Bengali. It is not common in Bangladesh to have scientific papers written and published in Bengali. We would like to give it a try and now is as good a time as any to start. In future we intend to have a section in Bengali. Talking about future; we have very high hopes; with your co-operation and blessings of God we might be able to succeed.

Meer Mobashsher Ali
Professor
Deptt. of Architecture
and
Member, Board of Editor
Protibesh

CONTENTS

CLASSIFICATION AND CHARACTERISTICS OF INDUSTRIAL BUILDINGS

NIZAM AHMED*

ABSTRACT

There are as many types of industries as there are industrial or manufactured products. However, owing to similarities in the infrastructure required, the processes involved, the wastes incurred, etc it is possible to group a number of "similar" industries under large types. The knowledge of the types of industries is basic to understanding the role the architect or engineer has to play in the design, construction, operation and maintenance of any industrial unit. There are several sets of "types of industries" and they depend on as much as the background of their authors as on the approach chosen for each set.

INDUSTRIAL TYPES

All industries are devoted to manufacture by production and assembly but, because of the differing manufacturing processes employed and the varying conditions necessary within and about each premises, industries can be grouped in terms of their purpose, location, structure, end-products, etc. Such classification helps designers to identify the quality of the working environment necessary and demanded by each industrial type. It is essential to find out about the more common classifications because a study based on different types of industries will ensure that a broad spectrum of industries are covered.

Industries have often been classified as heavy, medium and light. Heavy industries are involved with making large-scale end-products and handling bulky and heavy raw materials. Light industry uses small amounts of easily handled raw materials to make its end-products. Medium industries are obviously between the two. These definitions to some extent correspond with another set comprising primary, secondary and tertiary, with primary corresponding with heavy industry. Sometimes a fourth group, quarternary industries, is identified as those "concerned with the provision of information and expertise" (1).

Primary industries are "those processes which require plant, machinery and transportation facilities of such scale that these parts must be built in-situ; e.g. steel work, mines, etc." (2). To a large extent they are concerned with natural resources and are important because they more often than not provide raw materials for other industries. Primary industries can again be sub-divided as "renewable" and "non-renewable". The industries which have to stop once the raw materials have been used up, as in oil drilling, quarrying, mining, etc, are called "non-

* *Associate Professor, Dept. of Architecture, BUET, Dhaka*

renewable". In industries such as fishing, farming, forestry, etc, the raw materials can be used and replaced and these are called "renewable" (3). Such industries have to be located at the source of the raw material.

Secondary industries are those "processes requiring special or fixed facilities of building, plant, services or environmental conditions, arranged in a given production sequence or sequences (4). Industries in this group "turns raw materials into other useful end-products" (5) or "recognisable products" (6). Such industries can be located almost anywhere. Some are thus located with close proximity of their raw materials, others near the market of their products and some between the two (7).

Tertiary (processes) industries are those "processes which require only general facilities not necessarily permanently fixed" (8).

In another set, primary industries provide raw materials, secondary manufacture the end products and the tertiary (services) industries "are concerned with providing a service and tend to be located where services are required" (9).

On the basis of the processes involved in different industries, most can be categorized into one of the following (10):

1. Light Production and Assembly
   (a) High Technology
   (b) Low Technology
2. Batch Production and Assembly
3. Mass Production and Assembly
4. Process-Based Production
   (a) Centralised facility: primary and secondary processing on one site
   (b) Dispersed facility: primary and secondary processing on different sites
5. Heavy Engineering

The term Light Production refers "variously to the amount of manual work involved, the amount of energy required in the process, or the size and specialisation of the plant or machinery employed" (11). The products are comparatively simple and the production processes "demand little of the building other than enclosure" (12).

In Batch Production the manufacturing processes of a number of products or components are broken up into distinct batches "to maximise the efficiency of machinery and personnel" (13).

Mass Production involves the production of a large volume of products by continuous and repetitive action by man and machine on a particular manufacturing process or assembly.

Process-based industries, as the name suggests, carry out production by means of chemical processes involving mainly liquid and powder materials. Centralised facilities are those industries where the primary bulk and the secondary products are directly related and both processes are carried out on the same site. On the other hand, dispersed facilities include those process-based industries where the primary bulk and the secondary products are processed on different sites.

Examples of the various categories are as follows:

Primary	-	mining, fishing, oil drilling, forestry
Secondary	-	textiles, food, drinks, tobacco manufacturing
Tertiary (Processes)	-	packaging
Tertiary (Services)	-	gas, electricity, water, transport, banking
Quarternary	-	universities, research establishments
Light Production and Assembly (a) High Technology	-	Electronics, Surgical tools
Light Production and Assembly (b) Low Technology	-	Light Engineering, packaging
Batch Production and Assembly	-	Food packaging, clothing
Mass Production and Assembly	-	Automobiles, clothing
Process-based Production (a) Centralised facility	-	Pharmaceuticals, tobacco
(b) Dispersed facility	-	Paper, plastics, paints

The British government recognizes 27 main groups of industries in its Standard Industrial Classification and they are listed under 27 Main Order Headings, based on type of industry. Each main group consists of several Minimum List Headings. The 27 Main Order Headings according to the Standard Industrial Classification 1968 are:

1. Agriculture, Forestry, Fishing;
2. Mining and Quarrying;
3. Food, Drink and Tobacco;
4. Coal and Petroleum Products;
5. Chemicals and Allied Industries;
6. Metal Manufacture;
7. Mechanical Engineering;
8. Instrument Engineering;
9. Electrical Engineering;
10. Shipbuilding and Marine Engineering;
11. Vehicles;
12. Metal Goods not elsewhere specified;
13. Textiles;
14. Leather, Leathar Goods, Leather Fur;
15. Clothing and Footgear;
16. Bricks, Pottery, Glass, Cement, etc;
17. Timber, Furniture, etc;
18. Paper, Printing and Publishing;
19. Other Manufacturing Industries;
20. Construction;
21. Gas, Electricity and Water;
22. Transport and communication;
23. Distributive Trades;
24. Insurance, Banking, Finance and Business Service;
25. Professional and Scientific Services;
26. Miscellaneous Services;
27. Public Administration and Defence;

Classification of industries is also possible in terms of landscape impact and problems. Tandy (14) classified industries on the basis of the above viewpoint as follows (the examples are samples and not exhaustive of the type):

Class I		Primary Industries (land based)
	(i)	Rural: agriculture and horticulture, fishing, forestry
	(ii)	Extractive: mining, quarrying, drilling (for rocks, minerals, coal, oil) cement works, brick works
Class II	(a)	Secondary Industries (making materials)
	(i)	Heavy : smelting and forging, rolling and tin-plate works, coke making, brick making
	(ii)	Medium: oil refining, grain milling, chemical works, paper making, spinning, weaving, tanning
Class II	(b)	Secondary industries (manufacturing products)
	(i)	Heavy: boiler making, ship building, engine making, metal fabrication
	(ii)	Medium: wire and cable making, tool making, motor vehicle making, mechanical equipment making
	(iii)	Light: clothing, footwear, furniture manufacture,plastics, scientific equipment
	(iv)	Light assembly: domestic equipment, electrical and telephone equipment
Class III	(a)	Other : Construction Civil Engineering, building, road making
Class III	(b)	Other: Distribution Wholesale and retail trade, warehousing
Class IV		Utilities (mainly public) Electric power generation, gas works, water supply sewage and refuse disposal
Class V		Transport Road, rail, sea-ports, inland water, airports

Industrial buildings may also be differentiated on the basis of the approach to their construction. Bates (15) mentions three fundamentally different approaches. These are:

Purpose-made units
Advance units
Standard units

Purpose-made units are industrial buildings which are specially designed to suit the process, services, handling facilities, etc. of particular industries.
Advance units are those which are constructed, particularly in new industrial estates, in advance of any knowledge of the processes which will ultimately be carried out in them.
Standard units are manufactured by several fabricators as standard buildings or standard components of buildings. Such buildings can be "very economical to construct" because of mass manufacture of standardized components.

The Government of Bangladesh recognises 29 industrial groups (1980), again based on the type of industry. They are (16):

Industry Code

BSIC 1980 (New)	PSIC 1956 (Old)	Title of Category
311-312	20	Food manufacturing
313	21	Beverage industries
314	22	Tobacco manufacturing
320-321	23	Manufacturing textiles
322	24	Wearing apparel except footwear
323	29	Leather, Leather products
324	24	Leather footwear
325	39	Ginning and processing of fibres
331	25 & 27	Wood and cork products
332	26	Wooden furniture and fixtures except metal
341	27	Paper and paper products
342	28	Printing and publishing
350	31	Drugs and Pharmaceuticals
351	31	Industrial chemicals
352	31	Other chemical products
353	32	Petroleum refining
354	32	Misc. products of petroleum and coal
355	24 & 30	Rubber products
356	39	Plastic products
361	33	Pottery and China-ware
362	33	Glass and glass products
369	33	Non-Metallic mineral products
371	34	Iron and steel basic industries
380-381	35	Fabricated metal products
382	36	Machinery except electrical
383	37	Electrical machinery
384	38	Transport equipment
386	39	Photographic and optical goods
393-394	39	Other manufacturing industries

According to Dutt, Dasgupta and Chatterjee (17) large industries, employing 20 or more workers and run by mechanical power, can be classified under four major groups:

1. Agro-industries:
   (a) Textiles - cotton-ginning, baling, weaving, spinning and hosiery, jute milling and baling
   (b) Food-processing - rice-milling, flour-milling, sugar, tea and vegetable oils
   (c) Raw material producing and processing - hides skins and leather works, wool and silk

2. Forest-based industries:
   (a) Timber - saw-milling, railway sleepers, boats and furniture

(b) Soft-wood - matches, plywood and newsprint
(c) Bamboo - Paper, rayon and nylon

3. Mineral and Metal using industries:
   (a) Cement, glass, chemicals and fertilizers
   (b) Aluminium and other metals
   (c) Steel
   (d) Oil refining
4. Engineering Industries:

   (a) General engineering, railway workshops and ship repairs

In Bangladesh in 1984-85 there were 3955 factories within the 29 major industrial groups (18). However, there are large numbers of smaller industries, which because of the size of the establishments, number of employees per establishment and the meagre amount of capital involved, do not merit the term "industry" as far as the official definition is concerned. Scattered all over the country, particularly within the perimeters of big cities and towns, there are numerous small manufacturing units which employ less than ten persons each but because of the processes involved are industries in every sense of the word. They do not come within the jurisdiction of industrial laws. and many of them function under apalling conditions, such as poor buildings, lack of sanitary and sewerage facilities, high risk of fire and a degrading level of working environment. These urban units are a major contributor to pollution of the air and water. Child labour is very high in these factories. According to an estimate by The Economist, London, (19), there are approximately 300,000 workshops, manufacturing engineering components and counterfeit goods. These workshops mostly work in rented places and therefore have no collateral.

The factories within the 29 major industrial groups in Bangladesh can be categorized as primary, secondary and tertiary; heavy, medium and light; or as Light, Batch, Mass, etc according to the systems followed in the West. Thus, a dockyard at Khulna is a heavy industry, a cosmetics industry is medium and a garments factory light.

It is useful for an architect to choose a set with more types than others and one in which the manufacturing process has been given precedence over other distinguishing factors. A large number of architectural factors such as layout, lighting, ventilation, facilities, finishes, fire protection, etc. will depend to a great extent on the process of production and assembly. Among the sets discussed in this paper, the one containing categories of Light, Batch, Mass, Process-based and Heavy production and assembly procedures seem most apt for architects and the characteristics of each type has been presented in Table1.1. However an architect will do well to keep in mind that other sets for various other reasons exist concurrently.

Table 1-1

Character	Type-IA High-tech Light Production	Type 1B low-tech Light Production	Type 2 Batch Production	Type 3 Mass Production	Type 4A Process-based Secondary Process	Type 4B Process-based Secondary Process	Type 5 Heavy Industries
General Description	Clean processes, some effluents toxic, requires controlled environment.	From simple to the more sophisticated processes.	Closely-spaced ranks of machinery served by overhead cranes; congested floors, cramped working conditions.	Dense layouts for machines, service and handling. Repetitive work, Components are also mass-produced	Primary & secondary processes on one site as transport and handling between processes is dangerous, and can affect sterility.	Easily transportable primary materials, from which secondary products manufaced.	Heavy assemblies broken down to be re-assembled on site. Now up to 1300 tonnes movable as assembled. Work piece moves from process-process.
Production Equipment	Dense planning, lab type benches, sophisticated equipment, eg. micro-welding techniques.	Autonomous; much equipment is old. eg sheet benders, welding plant, small offset printing press.	several machines but each one for one type of operation. Trend is to increase no, of operations on one machine, thus reducing movement and interprocess storage.	Sophisticated equipments and techniques. Automated control, robotics, self-changing tools. Components supplied at each manfg. stage.	Densely laid out. Primary-computer monitored and controlled processes. Secondary packaging bottling. Often sophisticated. Varies in scales depending on end-products.	Primary specialist rpocess plant. Secondary manufacturing finished goods eg. moulding, extrusion, printing, cutting, forming equipment, blending etc.	Specific to type of production. Bldg designed round equipment. Massive equipment so work piece moves. Now equipment moves workplece static.
Materials Handling	Wheeled cages, tote bins, monorail hoists, small forklift trucks.	Forklift trucks, lightweight hoists, eng, fabrication may require larger equipment.	Impt to prevent accumulation of materials between operations. Gantry cranes, hoists, forklifts, stillage trucks, conveyors. Modern equipment.	Integrated much handling system. Overhead cranes, roller, belt, overhead & slat conveyors. Automatic and computerized conveyors as storage.	Between primary & secondary pumped pneumatic & vibrating handling liquids, granules & powder, Belt conveyors, forklifts.	Primary-piped, pneumatic Secondary fork lift trucks, overhead hoists, conveyors.	Heavy overhead cranes, gantry cranes in pairs or more, heavy wheeled equipment, air cushions, oil pressure skids.
Services	Intensive, both for production & environmental control.	Low demand. Some special ventilation for welding, paint spraying.	Varying degree of production services. Flexible relation ships of services to roof structure necessary.	Very intensive. Increased energy costs justifies industrial waste recovery.	Controlled environment. Dense production plant services, Calling roof zones used.	Primary very dense, specialist design, installation. Secondary closely controlled environment.	Meat and funs generated, coolants & lubricants rend. Services for mobile toolk.
Personnel	Small groups of 2-3 specialists, high interaction between groups; or large groups where group interaction is not necessary.	Diverse skills, from female-intensive (clothing packaging) to general labour.	Distinct types for each production function. Some sectors are female dominated.	Little job satisfaction from repetitive work. Trend is to develop teams & remove the distinction between, manfg & organisations & admin staff.	Primary-specialist staff, Secondary female dominated. Hygiens & washing regulation strict.	Primary-plant intensive, specialist staff Secondary-similar to Batch Prod. Washing regulations.	Less manual than before, Labour and technicians. Scale or equip. demands care with working condition.
Growth and Change	Expansion, initially, met by increasing the production density, and re-arranging the facilities. Change must be quick eg. over weekend.	Rapid growth, but little capital. Quick, easy and cheap extension required. Change implies increased pressure on production area.	Expansion by lengthening bldg, duplicating bldg on parallel. Change may involve re-tooling, altering layout, reorganising machines within cells & regrouping inter-related cells.	Expansion met by acclerating machine or adding Shifts. May cause storage problems. Duplicate equip, expand building, improve machinery duplicate factory elsewhere.	For reformulated products, primary process remains unchanged, but secondary may have to be re-organised. Integration of high-tech, handling & storage techniques.	Expansion of secondary manf. similar to Batch production. Growth is contained in bldgs. by increasing density of services, size of storage tanks & employing mech. handling using volume of the bldg.	Growth along predominant axis by repeating bldg, alongside. Change involves replacing prod ,equip. Fixed machinery needs considerable work to floor slab & roof while mobile machinery is easier to adapt to changes.
Planning Implications	Buildings similar to offices and labs. Multi-storey possible.	Law investment in buildings., strong linear emphasis.	Cell concept of development. Cell may add on linearly or laterally. Expansion may cause materials handling and servicing problems.	Linear plan: Bldg. volume may be used. Wide open covered spaces for potential flexibility of operation.	Planning dominated by primary process requirements, intermediate storage. Secondary may be linear or flexibly arranged.	Primary processes have major env. implications, Secondary process-tend to be linear involving volume of building.	Larger scale developments, Generates noise. Heavy cranage demands bldgs. along predminant axis.
Location	Located in industrial areas, to meet the demand as a sub-contractor for high tech industries. Also in rural areas.	Speculative developments Development finance is short.	Located in industrial areas, localities with skilled labour Often housed in speculative developments.	Located in industrial areas, where good communication exists, labour is available. Not suitable for speculative development.	Purpose-built, high investments. Access for raw materials, power and distribution dictate location trends. Risk of contamination so location restricted in urban areas, towns.	Primary located near resources. Secondary located close to primary & markets. Simple processes housed in mobile units, exploiting market condition and land prices and rentals. More complex processes restricted by building needs.	Location governed by acceptibility of large built masses. Industrial areas, coastal sites. Rail access, and where labour is available.

(Compiled from pg. 11-22. DRURY, JOLYON., Factories: Planning, Design and Modernisation)

REFERENCES

(1) BALE, J., *The location of Manufacturing Industry,* Oliver and Boyd, Edinburgh,1981, p.12
(2) DARRINGTON, P., *"Factories", Planning: Buildings for Habitation, Commerce and Industry,* E. D. Mills (Ed), Newness Butterworths, London, 1976, pp. 7-1
(3) PRICE, N., BUDGE, C., *Industry,* Edward Arnold, London, 1983, p. 6
(4) DARRINGTON, P., Op Cit., p, 7-1
(5) PRICE, N., BUDGE, C., Op Cit., p.6
(6) DRURY, J., *Factories: Planning, Design and Modernisation,* RIBA, London, 1981, p. 11
(7) BALE, J., Op Cit., p. 12
(8) DARRINGION, P., Op Cit., p. 7-2
(9) BALE, J., Op Cit., p. 9
(10) DRURY, J., Op Cit.,p. 11
(11) DARRINGTON, P., Op Cit., p. 7-1
(12) DRURY, J., Op Cit., p.11
(13) Ibid, p. 11
(14) TANDY, C.R. V., *Landscape of London,* Leonard Hill Books, Industry, 1975, p. 61.
(15) BATES, W., *Introduction to the Design of Industrial Buildings,* Constructional Steel Research and Development Organisation, Croyden, 1978, p.3.
(16) BANGLADESH BUREAU OF STATISTICS, *Statistical Yearbook of Bangladesh,* 1984-85, Govt. of Bangladesh, Dhaka, p. 403
(17) DUTT, K., DASGUPTA, R., CHATTERJEE, A., *Bangladesh Economy: An Analytical Study,* People's Publishing House,New, Delhi, 1973, p.45
(18) BANGLADESH BUREAU OF STATISTICS, Op Cit., p. 403
(19) THE ECONOMIST, London, 18-24 October, 1986, p. 24

NATURAL VENTILATION : A DISCUSSION OF ITS ADEQUACY IN WARM-HUMID CLIMATES

ZEBUN NASREEN AHMED *

ABSTRACT

Natural Ventilation in Warm-humid Climates has a three-fold objective. These are the provision of health ventilation, to keep levels of Carbon Dioxide, odours and harmful gases to a minimum; the Provision of adequate means of structural cooling; and lastly but most importantly for this climate, the provision of a means for physiological cooling in order to achieve thermal comfort within the ventilated space. This paper discusses these three aspects of natural ventilation and the adequacy of available wind to serve these functions. Conclusions are drawn based on available climatic data of a typical warm-humid region, that the ventilation required for health and structural cooling can be adequately provided for but as thermal comfort requires high levels of air movement in such climates, it is often difficult to rely solely on natural ventilation to provide adequate physiological cooling for occupants and artificially induced air movement has to be resorted to.

Natural ventilation, which has been defined as the intentional displacement of air through specified openings such as windows, doors and ventilators (1), has a three-fold aim. These are

a. Health ventilation; maintenance of indoor air quality
b. Thermal Comfort Ventilation; provision of thermal comfort through heat loss by convectin and evaporation.
c. Structural Ventilation; prevention of structural overheating.

The relative priorities of the three objectives mentioned above is dependent on climate.

HEALTH VENTILATION

The purpose of the supply of fresh air in order to maintain the indoor air quality has been described by Bouwman (2) as;

1. The prevention of Oxygen shortage
2. Counteraction of rise in Carbon-dioxide
3. Keeping contents of annoying and/or harmful substances emanating from building materials (radon, etc.) within acceptable limits
4. Prevention of great intensity of odour
5. Maintenence of desired environment in terms of temperature, relative-humidity and air-movement.

* *Lecturer, Dept. of Architecture, BUET, Dhaka.*

It is obvious that the first three of the above-mentioned points are inter-linked and a satisfaction of the third point would ensure the satisfaction of the first two criteria.

Researchers have found a clear trend indicating that odour concentration in a space increases with increases in the $C0_2$ level above fresh air values (3). To keep odour complaints down to 5% of the occupants in a space, the minimum air supply was estimated at approximately 35 m^3/h/p, though acceptable levels are ultimately dependent on individuals and particular situations (4).
Minimum ventialation rates for different room usages have been set by authorities in different countries, either by specifying the number of air changes per hour or the quantitative airflow in m^3/hr or L/sec (Table 1) and it is clear that even in the absence of wind, there is sufficient air infiltration through door and window joints to fulfill minimum ventilation standards and only in the case of very effective weather-stripping, or where there is overcrowding resulting in excessive vapour production from cooking and laundering do special ventilation provisions have to be made to satisfy the health criteria.

In other words, there can be no doubt as to the adequacy of natural ventilation in its attempt to provide health ventilation under any climatic condition.

THERMAL COMFORT VENTILATION

Croome-Gale and Roberts (6) define thermal comfort ventilation as the air supply within a space through designed apertures. Its distribution can be controlled through design details, whereas infiltration, being the leakage of air due to imperfections in structure, cannot be controlled.

Though the ventilation existing in a room due to natural convection currents and infiltration may be sufficient for health purposes, it is not likely to be sufficient to provide the necessary air movement for a pleasant environment when temperature and humidity levels are high. Too much movement will cause draughts in cold climates, though in warm climates, there may never be too much. Too little movement in any climate will cause stuffiness, its extent being dependent on the degree of adverse conditions, elevating with rise in temperature and humidity.

Air movement can produce human comfort only within certain limits of air temperature and humidity. As long as the air temperature remains below skin temperature, air movement will always produce cooling, due to convection, irrespective of humidity levels. As the air temperature rises above the skin temperature, however, air movement produces cooling comfort as long as the evaporative heat loss

Table 1 Minimum Ventilation Requirements

1. If number of occupants is known

Room volume per person (m3)	Fresh air supply rate (l/s per person)		
	Minimum	Recommended	
		Non-smoking	smoking
3	11.3	17.0	22.6
6	7.1	10.7	14.2
9	5.2	7.8	10.4
12	4.0	6.0	8.0

remains higher than the conventive heat gain. In other words, even at very high temperatures, if the humidity in the air is relatively low, some comfort may be felt by air movement, provided enough moisture is present on the skin surface to enable evaporation and thus produce cooling. When air temperatures are below the thermal comfort level, air movement should not be perceptible and is considered unwanted.

2. If number of occupants is not known

Room type	Number of air changes per hour
Kitchen, other than domestic	minimum 20
Kitchen, domestic	10
Laundry, boiler room, operating theatre	15
Canteen, restaurant, dance hall	10-15
Cinema, theatre, lavatory	6-10
Bathroom, bank hall, parking station	6
Office, laboratory	4-6
Library	3-4
Stair, corridor (non-domestic)	2
All other domestic rooms	1

Source: Szokolay, S. V., Environmental Science Handbook, p. 401

Ventilation requirements for thermal comfort can either be specified in terms of air supply or air change rate or alternatively in terms of preferable indoor velocity distribution pattern. For warm climates Givoni (7) favours the latter, as there is no direct relationship between quantitative flow and the ultimate velocity through the enclosure.

This is because when high flow rates are in involved, the velocity distribution pattern has noticeable variations over a room space, depending upon geometry of space, location of openings and initial direction of the air stream. Thus, even when the velocity of flow is very high at the opening, due to these other factors, the velocity may be quite low in positions not in the path of the direct flow, bringing the average air velocity in the space down. Therefore, volumetric air flow is not a suitable criterion for judging ventilation requirements in hot climates, rather the required air velocity in the occupied space should be specified.

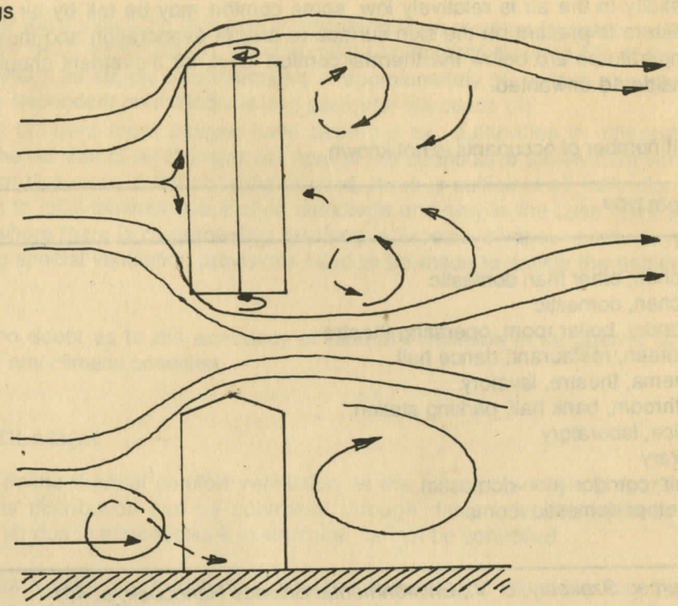
Ventilation in a space can be induced by two forces
a. By thermal forces ie Stack effect
b. By wind force

VENTILATION DUE TO THERMAL FORCE

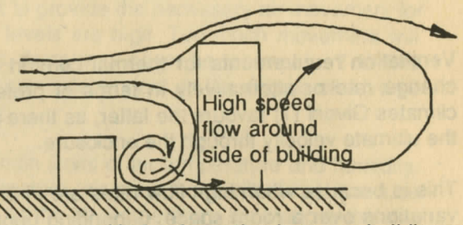
Ventilation due to thermal forces takes place when cool air entering a room is heated on coming in contact with heated interiors. This hot air rises and can flow out from openings positioned higher up on the walls. The vacuum created by the rising air is in turn filled by new incoming cooler air and the cycle continues. The phenomenon of flow induced by such temperature gradients is termed stack effect, the volumetric flow rate of which can be calculated bythe following expression (8):

Fig **1** Studies of wind patterns around buildings and other obstructions

Flow past a rectangular building.

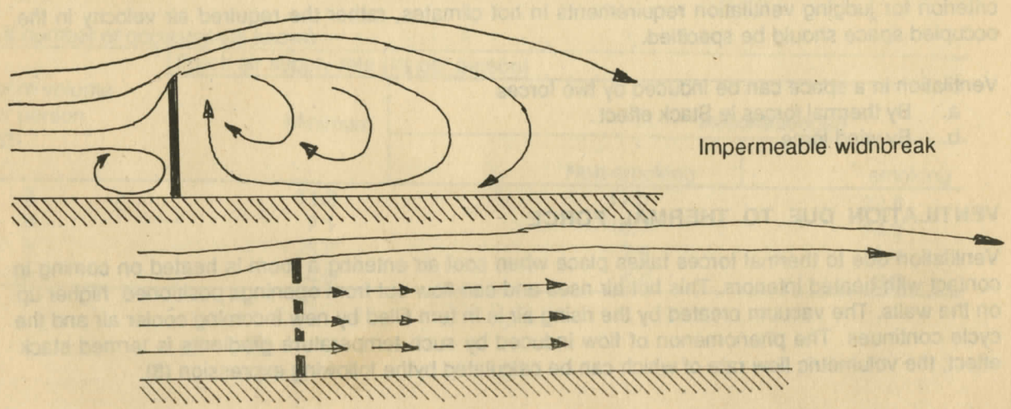


The flow diver is around the side of the building



Vortex formation between buildings of different hights.

Effect of permeability of windbreak in reducing formation.



Permeable windbreak

Q = 7A (h x t) m3/min/m2 of inlet area. where A is the area of opening his the vertical distance between the two openings tis the indoor-outdoor temperature difference.

The ventilation caused by stack effect is assumed to be negligible by Ali (9) in hot-humid climates, as buildings are usually built of materials with medium to high thermal resistance and low heat capacity and have shaded windows which bring daytime indoor temperatures to similar levels as outdoor shade temperatures.

As the air flow caused by stack effect does not induce perceptible air movement within a space, it cannot be an adequate means of providing thermal comfort, which happens to be the chief aim of ventilation in warm-humid climates.

VENTILATION DUE TO WIND FORCE

When wind flows directly into a solid object, there is a build-up of pressure on the windward face and the stream is deflected up and around the object, thereby creating a suction on the other faces. If openings were to be provided, joining the pressure and suction zones, a resulting flow from the high to low pressure through the interior of the object would result, its magnitude dependent upon the pressure difference. The flow would continue until this difference is neutralised. The air flow through a building on this principle depends on;

a. the initial windforce
b. the orientation of the building
c. the orientation of the openings
d. area of the openings
e. position of inlet with respect to outlet
f. detail of opening (frame, grille, screens, etc.)

Estimation of Natural Ventilation

Simple equations such as the following can be used to estimate volumetric airflow through an opening (10);

Q = E A V X 1000 lit/sec

where Q is the volumetric air flow

E is the effectiveness of an opening and has the value of 0.5 to 0.6 for perpendicular winds and 0.25 to 0.35 for diagonal winds.

A is the free area of inlet in m2,

V is the design outdoor speed in m/sec.

Fig. 2

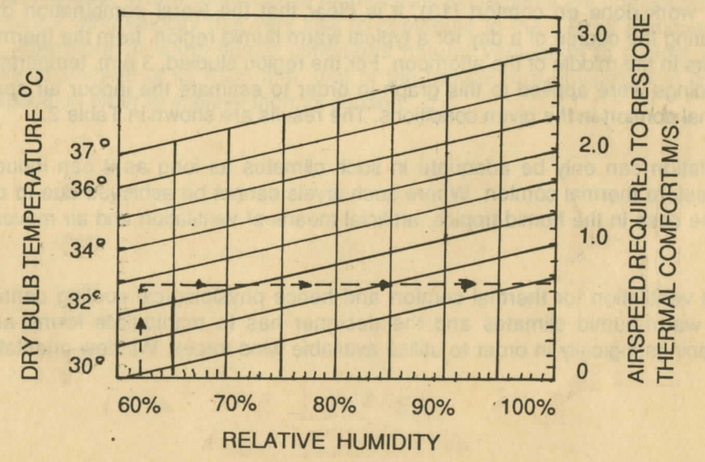


Fig : 3 Airspeed required to restore thermal comfort in warm-humid environments given DBT and RH

Table 2
3 pm Temperature and Relative Humidity Conditions and Indoor airspeed needed to restore comfort

Month	Temperature °C	R H. %	Airspeed for comfort m/sec
January	25.3	69.4	-
February	28.0	62.4	-
March	32.5	59.0	0.6
April	34.2	70.0	1.35
May	32.9	78.4	1.22
June	31.3	86.5	0.85
July	30.9	86.3	0.77
August	30.9	85.9	0.73
September	31.3	85.9	0.80
October	30.7	83.0	0.64
November	28.7	77.5	-
December	24.4	75.4	-

However such methods of estimation do not predict whether this volume of air entering is sufficient to provide thermal comfort to the occupant or not. In other words, the quantity of incoming air may be determined by such equations but the quality and effect of the air stream has to be assessed by other means.

Various studies have been undertaken in an attempt to establish links between temperature and humidity levels in warm-humid climates and the air speed required to achieve thermal comfort at these variables. Fig 3 shows graphically the airspeed necessary to restore thermal comfort in such climates for given combinations of dry bulb temperature and relative humidity (11, 12).

From recent work done on comfort (13), it is clear that the worst combination of environmental conditions during the course of a day for a typical warm humid region, from the thermal comfort point of view, occurs in the middle of the afternoon. For the region studied, 3 p.m. temperature and relative humidity readings were applied to this graph in order to estimate the indoor air speed required to restore thermal comfort in the given conditions. The results are shown in Table 2.

Natural ventlation can only be adequate in such climates as long as it can induce the airspeed required to restore thermal comfort. Where such levels cannot be achieved due to calm conditions, as is often the case in the humid tropics, artificial means of ventilation and air movement have to be employed.

Thus natural ventilation for thermal comfort and hence physiological cooling cannot be taken for granted in warm-humid climates and the designer has to manipulate forms and spaces and orientate openings logically in order to utilise available wind forces. Window orientation thus attains

great significance both in its ability to encourage breezes, as well as its importance with respect to the avoidance of solar input.

VENTILATION FOR STRUCTURAL COOLING

The function of ventilation which takes care of cooling the interior of a building and with it more importantly the structural elements, can only be performed when there is a favourable difference in the levels of temperature of indoor and outdoor air (14). This temperature difference can generally be induced by one of three main sources;

a. A high diurnal range of temperature, which is not the case in warm humid climates.
b. From heat gains from the exterior, ie excessive solar radiation on roof or particular walls. This is particularly significant in hot dry climates, though not in warm-humid climates, when quite a number of the daytime hours remain cloudy, thus obscuring the sun.
c. internally generated heat gains. This is quite significant in industries, kitchens, laundries, etc. and in spaces with overcrowding.

In warm humid climates, which necessitate the use of wide openings for thermal comfort, indoor outdoor temperature levels are generally almost at par and structural overheating is highly improbable in climatically designed spaces. In a space which is thermally comfortable the adequacy of ventilation for structural cooling is unquestionable as indoor-outdoor temperature difference remains insignificant.

CONCLUSIONS

From the above discussion, it is clear that for warm-humid climates, such as we experience here in Bangladesh for quite a substantial part of the year, there can be no doubt that natural ventilation is absolutely adequate for two of its three main purposes, viz. health ventilation and that required for structural cooling.

However, in such climates thermal comfort requires high levels of air movement and studies show that it is often difficult to rely solely on natural ventilation to help induce indoor air speeds of comparable levels. Not only is the prevailing level of outdoor wind speed quite low, but wire netting for mosquito prevention which is an absolute necessity in the. humid tropics further impedes what little movement is available. When conditions of high density settlements are compounded on these conditions the natural wind velocity has very little to contribute to the overall airmovement pattern within a space. Therefore in warm-humid conditions natural ventilation is almost always quite inadequate in the attainment of its main aim, that of the provision of physiological cooling to the occupants of a space in order to achieve thermal comfort.

REFERENCES

01. ASHRAE, THE AMERICAN SOCIETY FOR HEATING, REFRIGERATION AND AIRCONDITIONING ENGINEERING, *Handbook of fundamentals,* 1977 Chapter 21.

02. BOUWMAN, I. R. H. B.; *Minimum Ventilation Rate, An investigation into the Permissible Minimum Fresh air supply per person in Buildings,* Central Organisation for Applied Scientific Research in the Netherlands, TNO, The Hague, 1980. Abridged report.

03. ibid, p55-57

04. ibid, Conclusions.

05. SZOKOLAY, S. V. ; *Environmental Science Handbook,* p401.

06. CROOME-GALE, D. J., ROBERTS, B. M. ; *Airconditioning and Ventilation of Buildings,* International Series of monographs in Heating, Ventilation and Refrigeration, Pergamon Press, Oxford, 1975.

07. GIVONI, B.; *Man Climate and Architecture,* Elsevier Publishing Company Limited, London, 1969, p 239.

08. ibid, p 253.

09. ALI, M. M.; *Problems of Ventilation in high density, Low-rise Housing in Bangladesh, (hot-humid),* MPhil dissertation, University of Newcastle-upon-Tyne.

10. ASHRAE, *Handbook and Product Directory,* 1977, Fundamentals, ASHRAE, Newyork, 1978.

11. AYNSLEY R. M., MELBOURNE, W., VICKERY, B. J.; *Architectural Aerodynamics,* Applied Science, London, 1977, p183.

12. MACFARLANE, W . V.; *"Thermal Comfort Zones", Architectural Science Review* 1, No. 1 (1958), 1-14.

13. AHMED, Z. N.; *The Effects of Climate on the Design and location of Widows for Buildings in Bangladesh,* MPhil Thesis, University of Sheffield and Sheffield City Polytechnic, Oct 1987, Chapter 2.

14. EVANS, M,; *Housing, Climate and Comfort,* The Architectural Press, London, 1980, p125.

UTILIZATION OF PENSION BENEFITS IN HOUSING FINANCE

KHAIRUL ENAM*

ABSTRACT

The policy issue regarding pension benefits if modified to accommodate the housing loan most of the 1 to 14 grade pay scale holders are found to be able to afford the aspired flat housing.

A institution based Co-operative organization can effectively contribute to materialize such housing ventures.

UTILIZATION OF PENSION BENEFITS IN HOUSING FINANCE

INTRODUCTION

Housing is a durable asset that involves purchase of land, construction of dwelling units and provision of related physical and social services. The increasing gap between the housing cost and income level has created much interest in flat ownership in the recent years. The purpose of this paper is to investigate whether loan from pension benefits of fixed income group along with house building loans can produce a economically viable proposition in housing. The target group is considered to be the lower middle, middle and higher middle income group (Grade 1 to 14). It is assumed that land will be available from public sources like RAJUK or Housing and Settlement Directorate along with utility services. The price of land is considered to be Tk 10,00,000/- per 33 decimal (one Bigha/20 katha),

It is also assumed that the building will be of brick masonry constructin and will follow PWD rate of construction that may come to Tk 450/sqft including all services, boundary walls etc.

Five types of flats of 550, 800, 1000 and 1200 & 1500 sqft including stair are considered for project evaluation.

THE NATURE OF EXISTING HOUSING FINANCE

The main financing institution in the domain of housing construction is the House Building Finance Corporation (HBFC). It was established during 1973 by the Government of Bangladesh, previously it

* *Professor, Deptt. of Architecture, BUET, Dhaka*

was setup in East Pakistan in 1954. It is founded by the sale of debentures to the nationalised banks and insurance company. The objective of the HBFC to encourage house building in the private sector and grants the mortgage finance for the construction of new dwelling units. The loan is granted against the land that is kept as mortgage security. The HBFC generally does not exend loan for the purchase of already built dwelling units. The HBFC grants loan on the approved plans of the dwelling units by compitant authority like RAJUK, KDA, CDA etc. and the cost of the building is assessed according to prior stipulation which is much lower than the existing market rate. According to 1983 HBFC notification maximum limit, under general loan scheme a loan of Tk 4,00,000 is advanced with 13% interest rates. The amortization period is considered to be 25 years. At present HBFC follow the 1983 loan disbursment rate of Tk 236 per sft for ground floor and Tk 188 per sft for upper floors. A special rate is given for a higher standard of construction. The rate is assessed as Tk 300 for ground floor and Tk 252 for upper floors the extra Tk 2,00,000 is available on top of Tk 4,00,000 with different interest rates. For the latter amount interest is fixed at 16% repayable within 25 years. The onging construction rate is reached almost double the amount received from HBFC.

A multistory loan scheme is introduced in 1977 to encourage higher density residential developments. The schme includes 4 story (in Dhaka and Narayangonj) and 3 story dwelling in other urban areas. The loan upto Tk 8,00,000 are granted fro multistory project. The loan restricts the dwelling unit size not more than 1000 sqft. The amortization period for such project is extended to 30 years with $10\frac{1}{2}\%$ interest rate.

LOANS FROM NATIONALISED BANKS

A limited amount of housing loan is available from the commercial banks. Selectively Banks authorise loan for housing construction upto Tk 5,00,000 for a period of 15 years with 16% interest rate.

COST OF LAND

In recent years the price of land have observed to rise rapidly to a level that only the wealthiest families can afford to procure it. RAJUK is the main supplier of developed urban residential plots in Dhaka city. The receiver of such plots are very fortunate few. RAJUK leases plots for detached and indipendent residences. It is observed that majority plot reciplents have planned or built partly or completed construction of 4 to5 story flats on those plots. The growing popularity of flats have encouraged many housing companies on sale of built flats in Dhaka city. Multiownership flat have the opportunities of sharing cost of land, construction, services and management.

The land cost of residential plots in good neighbourhood like, Dhanmondi, Banani, Gulshan and Baridhara has reached Tk 4,00,000 to Tk 5,00,000 per katha in open market. However RAJUK price of land in those areas is Tk 60,000 per katha, RAJUK's price of land in Uttara Model town is fixed at Tk 50,000 per katha.

LAND REQUIREMENT FOR FLATS

We have selected five sizes of flat types they are 550, 800, 1000, 1200 and 1500 sqft flats. The stair space is included in the flat size. These flats are 5 story walkup buildings. Land requirement for different sizes of flats are calculated providing 75' gape in between the buildings along with number of units per floor are shown in the Table-(1). After keeping appropriate setbacks and gapes between the buildings the total land requirement for each type of units are calculated in the Table-(1). It is assumed that the land will be developed and located within the city infrastructure providing utilities and services.

Table-1 Land requirement for flats

Type of flats in sqft	Number of flats in the row per floor	Average length and width of flats in ft. L	W	Share of land required after including setbacks in katha	Cost of land per unit in Tk
550	12	22	25	.75	37,500
880	8	33	24	1.10	55,000
1000	8	33	30	1.20	60,000
1200	8	40	30	1.40	70,000
1500	8	47	32	1.63	81,500

COST OF FLATS

The table-2 summarises the cost of the flats including land considering ongoing market rate of material. Here the labour rate is calculated according to PWD specified rates.

Table-2 Total cost of the flats including land and services.

Flat type in Sqft	Land cost in Tk	Cost of flats @ Tk 450/sft	Total in Tk
550	37,500	2,47,500	2,85,000
800	55,000	3,60,000	4,15,000
1000	60,000	4,50,000	5,10,000
1200	70,000	5,40,000	6,10,000
1500	81,500	6,75,000	7,57,000

To reduce the cost of the flats steel windows, steel frame with veneered flash doors, doors, patent stone finish in floors, mosaic works in bathrooms and kitchen are specified. There may be optional items like mosaic works in floors, plastic paint inside, glased tiles on bathroom and part of kitchen walls etc. The prospective owners if desired can pay extra cost for those optional items and that will further raise the cost of the flats to Tk 525 per sqft.

THE RETIREMENT BENEFITS AS ALTERNATIVE SOURCE OF FINANCE

Government have provided retirement benefits to the employees, employed both in the Government and autonomous bodies. The benefits are usually realised after fulfilment of certain length of services. The full benefit of pension which is 70 percent of last basic pay may be claimed after a minimum 25 years of services. There are provisions of 50% srrender of the pension fund at a rate varing from Tk 180 to Tk 210 depending on the length of the services.

According to the pension rules these fund cannot be used in any form before the retirement. The fund unquestionably is a security in old age but its benefits after 25 to 35 years may not be effective in terms of real value.

The object of this paper is to see whether early utilization of pension fund (PF) as loan for housing can produce a economically feasible project.

In a case study comprising of BUET employees (Salary scale 1 to 14 grade Table-3) it is found that there are bright prospects for housing when some part of pension benefits are granted as loan for housing construction. At the end of 20 years service the pension benefit deposit amount if allowed as loan can constitute along with HBFC loan around 80% of the cost of housing (Table-4). The remaining 20% of the cost is expected to be invested as equity by the aspirant employees. The loan from pension fund and major part of HBFC loan are assessed to be repayed within 15 years from the rent return (@ Tk 4.33 per sqft average) (Table-5).

Table 6 shows the mode of repayment of loan in a chart form. Here at the begining 5 years the rent return from the flat is considered to be low (@ Tk 3.33 per sqft). The rents are expected to increase in the next 5 years periods. The table-5 gives the average of rents during 15 years periods. However it could be inferred that from the rent return from the flats the BBFC loan and the loan from PF could be reimbursed without any difficulty. Although HBFC loan amortization period is 25 years, but if desired the loan could be returned within 15 years along with the PF loan.

The table-3 shows the existing salary scale of BUET employees. The present service lengths of the employees are considered to calculate the total amount of retirement benefits. As because pay scale changes with the promotion of the employee the average of pension benefits are worked-out for reference. The pay scale is further devided into three groups - the lower middle (11-14 grade), middle (6 to 10 grade) and higher middle (1 to 5 grade).

Table 3. Bangladesh University of Engineering and Technology The pension benefit of different pay scale of the end of 35 year of service.

Sl No	Salary Scale	Present service length	G. P. Fund contribution	Pension return with 50% option	Total	Average of the Total
1	6000 (Fixed)	32	360,257	360,000	720,257	
2	6000 (Fixed)	27	724,235	360,000	1084,235	
3	5700 (Fixed)	24	787,325	359,100	1146,425	901,000
4	4750-150-5500	25	501,695	346,500	848,195	
5	3700-125-4825	25	404,088	303,975	707,883	
6	2800-125-4425	22	513,898	278,775	792,673	
7	2400-120-3600	24	286,911	226,800	513,711	535,000
8	1850-110-3220	20	280,997	209,160	490,157	
9	1650-100-2250 -110-3020	20	267,793	190,260	458,053	
10.	1350-90-2250 -100-2750	20	249,313	173,250	422,563	
11.	1000-70-1560 -90-2280	20	197,027	143,640	340,667	
12.	900-65-1550 -75-2075	20	183,996	130,725	314,721	290,000
13.	850-55-1400 -60-1700	20	160,617	107,100	267,717	
14.	800-50-1300 -55-1630	20	137,827	102,690	240,517	

From the above tables it could be observed that even the 14th grade pay scale holder with proper equity amount can afford a flat. However it is not intended to level that flats for higher or lower income group. Any one from any income group will be allowed to select his flat size according to his 'demand'. Further there will be no restriction in changing the smaller flats for a larger ones or vice-versa when desired.

The unrefunded loan amount may be deducted from the due pension benefits at the and of the service of the respective employee.

Table 4. Distribution of loan from BBFC and Pension Fund

Housing Type	HBFC loan in Tk	Loan from Pension fund in Tk	Equity amount 20% of the cost	Total in Tk
550	110,000	118,000	57,000	285,000
800	160,000	172,000	83,000	415,000
1000	200,000	208,000	102,000	510,000
1200	24o,000	248,000	122,000	610,000
1500	300,000	307,000	150,000	757,000

Table 5. Mode of Repayment of loan

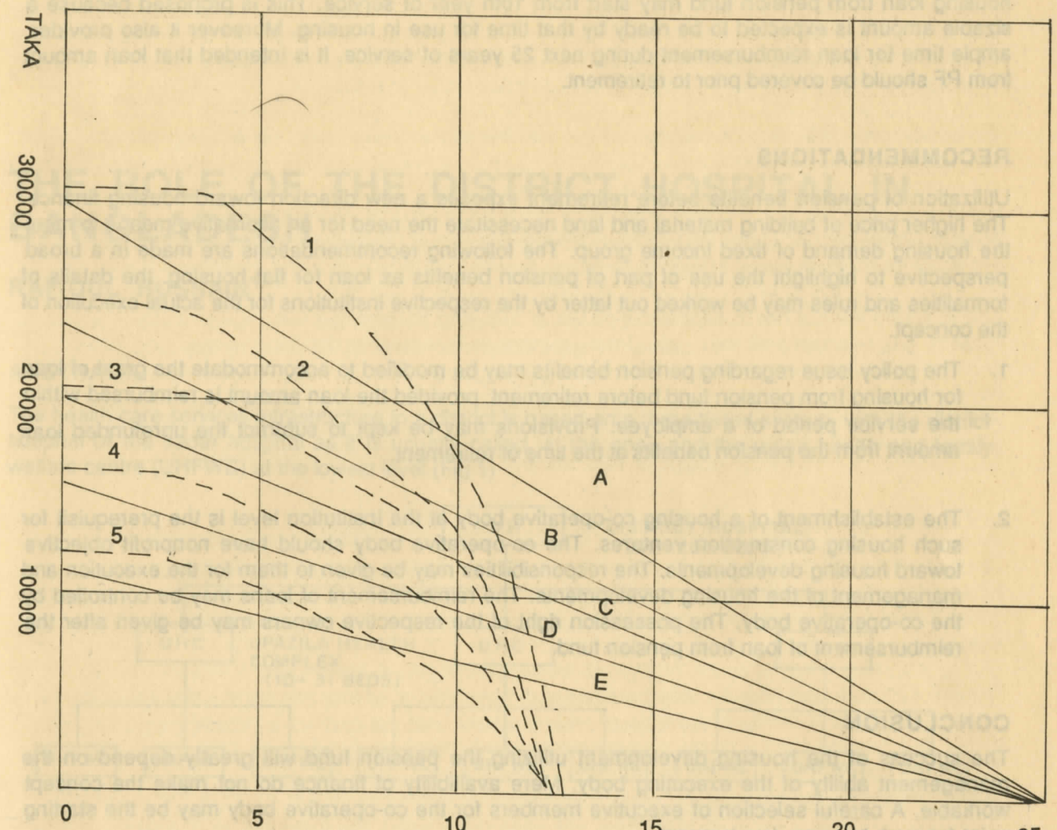
Housing Type	Monthly average rent return @ 4.33 taka per sqft	HBFC monthly due amount in Tk	Monthly savings	No. of years required for PF loan return
550	2381	1558	823	12
800	3464	2266	1198	12
1000	4330	2833	1497	12
1200	5196	3400	1796	12
1500	6495	4250	2245	12

This oportunities for housing will certainly discourage taking loan from pension fund for household needs which is found to be common practice at present. This may generate a large savings for productive investment in housing.

THE PROPOSED SYSTEM OF HOUSING DELIVERY

A institution based housing co-operative with non-profit objective is proposed for the execution as well as management of the housing schemes. The basic responsibilities of the co-operative may include procurement of land from public sources, finance from HBFC, finance from respective institution and equity amount from individual members. The responsibilities of selection of consultants, contractors and management of the housing estate may also lie on the co-operative body.

Table 6. Loan Repayments



AMORTIZATION PERIOD

Note : · · · · · · · (1) Reimbursement curb for pension loan (1500 Unit)

· · · · · · · (2) Reimbursement curb for pension loan (1200 Unit)

· · · · · · · (3) Reimbursement curb for pension loan (1000 Unit)

· · · · · · · (4) Reimbursement curb for pension loan (800 Unit)

· · · · · · · (5) Reimbursement curb for pension loan (550 Unit)

· · · · · · · (A) HBFC loan Reimbursement (1500 Unit)

· · · · · · · (B) HBFC loan Reimbursement (1200 Unit)

· · · · · · · (C) HBFC loan Reimbursement (1000 Unit)

· · · · · · · (D) HBFC loan Reimbursement (800 Unit)

· · · · · · · (E) HBFC loan Reimbursement (550 Unit)

The service length of a employee is considered to be 35 years and it is proposed that entitalement for housing loan from pension fund may start from 10th year of service. This is proposed because a sizable amount is expected to be ready by that time for use in housing. Moreover it also provides ample time for loan reimbursement during next 25 years of service. It is intended that loan amount from PF should be covered prior to retirement.

RECOMMENDATIONS

Utilization of pension benefits before retirement exposes a new direction toward housing finance. The higher price of building material and land necessitate the need for an alternative means to meet the housing demand of fixed income group. The following recommendations are made in a broad perspective to highlight the use of part of pension benefits as loan for flat housing. the datails of formalities and rules may be worked out latter by the respective institutions for the actual execution of the concept.

1. The policy issue regarding pension benefits may be modified to accommodate the grant of loan for housing from pension fund before retirement, provided the loan amount is reimbursed within the service period of a employee. Provisions may be kept to subtract the unrefunded loan amount from the pension benefits at the time of retirement.

2. The establishment of a housing co-operative body at the institution level is the prerequisit for such housing construction ventures. The co-operative body should have nonprofit objective toward housing developments. The responsibilities may be given to them for the execution and management of the housing developments. The reimbursement of loans may be controlled by the co-operative body. The possession right of the respective owners may be given after the reimbursement of loan from pension fund.

CONCLUSION

The success of the housing development utilizing the pension fund will greatly depend on the management ability of the executing body. Mere availibility of finance do not make the concept workable. A careful selection of executive members for the co-operative body may be the starting point for such housing development.

When housing is seen as security, object of pride possession and durable asset its investment becomes safe with secured return. Although the economic return is low compared with other lucrative investment but its social impact is much more valuable than the economic aspect. The efficiency and moral values of the employees will be greatly enhanced with the prospect of owning a long aspired housing, which under the present situation seems unatainable.

REFERENCE:

1 KHAIRUL ENAM The sharing problems of multiownership flats M. Arch. Thesis. 1984

2 Ministry of L. A, L. G. R. D and Co-operatives 1976 *Co-operative Societies Act 1940* (As ammended upto 30th June 1976) Published by Bangladesh Jatiya Samabaya Union

3 Ministry of Finance Govt of Bangladesh *The national pay scale 1985.*

THE ROLE OF THE DISTRICT HOSPITAL IN BANGLADESH

RAFIQUL HUSSAIN*

ABSTRACT

The health care services infrastructure in a district is based on a three tiered system, with the district hospital or the sadar hospital as it is usually called, at the apex and the union health and family welfare centre (UHFWC) at the lowest level (Fig 1)

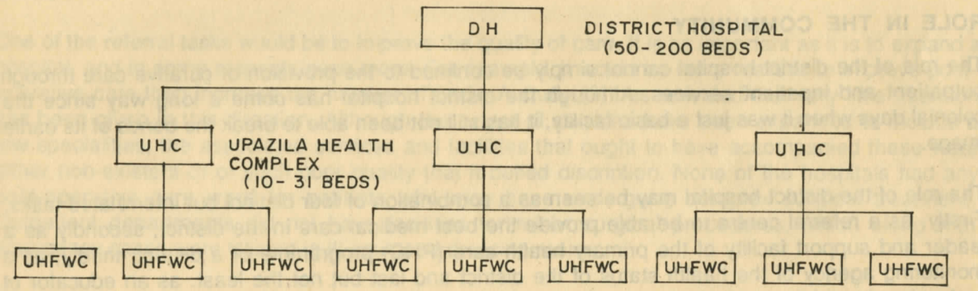


FIG. 1. HEALTH CARE SERVICES INFRASTRUCTURE OF A DISTRICT.

Thus the first referral hospital in this health care services infrastructure is the district hospital, and in most cases the largest health facility. At present these hospitals numbering about 58 vary in size from anywhere between 50 to 200 beds. Most are below 100 beds, for which particular attention will be given for their development in the future health facilities programme. Development will either mean expansion of existing facilities or building new ones. Whatever the case, the planning and design for such development should not be undertaken without a clear idea of what a district hospital should be. Unless a recognizable concept is developed with respect to its responsibilities and role within the health care system, appropriate functional programme cannot be formulated. Without which an architectural programme cannot take shape (1). This article therefore tries to define the role of this facility vis a vis the health care needs.

INTRODUCTION

The concept of a district hospital as a general hospital and a referral centre is still not fully

* *professor, Deptt. of Architecture, BUET, Dhaka*

understood, inspite of the fact that this is the idea protrayed in the development plans. The majority of the people still hold the view that a district hospital is simply a place where one can go for curative care services. This has led many to believe that these hospitals are only smaller replicas of the standard general hospitals seen in the industrialized and rich contries (2). Such outdated and obsolete ideas must be shelved and a concept developed from the point of view of health care needs which are so vastly different from those very countries we try to follow (3).

First and foremost it must be recognized that any hospital in Bangladesh will have to be equipped for preventive, promotive and curative care. The authorities generally tend to promote the idea that preventive & promotive health care should be the responsibility of the lower echelon rural facilities alone, when the towns and cities themselves present the same health problems as the rural areas. A hospital should not be given the glorified task of only curing sick people, but incorporate the humble but effective tasks of prevention and promotion as well.

The intention here is not to belittle the image of a district hospital but to enhance it with a stamp of realism. It is necessary to move away from the narrow confines of the existing role and give it wider and more diverse responsibilities. The role of this important institution has to be redefined. So that it does not function in isolation as it does at present(2). It must be viewed as a facility which understands best of all the myriad problems of district and plays a positive role in combating these. It will be on the basis of this role that the final form of the district hospital can take shape.

ROLE IN THE COMMUNITY

The role of the district hospital cannot simply be confined to the provision of curative care through outpatient and inpatient services. Although the district hospital has come a long way since the colonial days when it was just a basic facility, it has still not been able to break the bonds of its earlier image.

The role of the district hospital may be seen as a combination of four distinct but interrelated tasks. Firstly, as a referral centre to be able provide the best medical care in the district; secondly as a leader and support facility of the primary health care (PHC) programme of a district; thirdly, as a monitoring agency of the health status of the district and last but not the least. as an educator of professionals and the public.

REFERRAL TASKS

The referral tasks of the district hospital means the tackling of those problems which are beyond the scope of lower echelon faclities. The referral tasks should include the provision of services and facilities through which serious medical, surgical and other health related problems may be successfully treated. It is therefore essential that resources are mobilized, to provide an adequate range of referral services of acceptable quality.

The idea behind the provision of referral services at the district hospital level is to try and concentrate not only the very limited number of qualified and specialist manpower, but also equipment and drugs. The authorities should seriously consider the fact that equipment, like qualified personnel are scarce and should not be distributed haphazardly. In the case of drugs too, there should be a policy of keeping in stock in the district hospital those that are essential for treatment of complex ailments. Unless there is a clear cut policy which ensures that the district hospital has the resources to undertake referral cases, it will never trully be a referral centre. On the other hand it may not be possible to provide the same specialities in all district hospitals. The concentration of most number of

specialists should be attempted in district hospitals with the easiest and most convenient means of access from adjacent districts. In view of the present reorganization of the administrative infrastructure of the country the attempt could be to first strengthen the older district hospitals and subsequently upgrade the newer ones (Those which were sub-divisional hospitals originally).

The scope of the referral tasks should be dynamic in character and on no account be restricted to within the four walls of the hospital alone. Referral tasks should wherever possible be taken to the people.

It must be realized that for various reasons many really sick persons may not come to the hospital at all. In such instances, one cannot afford to sit back and take a detached view but initiate programmes through which specialists break the "hospital barrier" and go to the outlying areas. They could make their expertise available in the lower echelon facilities at regular intervals. Such outreach assignments will not only benifit the community, but at the same time help the doctors to understand the problem in the setting of the patient's home. Only such initiatives can help the hospital to come closer to the whole community.

This would also open up closer co-operation between the district hospital and the lower echelon facilities, which exists only in paper at present. All attempts should be taken to enable the district hospital to integrate itself into the health care system with as much speed and expediency as possible.

One of the referral tasks would be to improve the quality of care. It is as important as it is to expand a hospital, and in some respects even more. For example, it would be more realistic to improve post-operative care than increase the number of beds. A study (2) has revealed that very little attention has been given in this direction. Although the extent of services have been expanded to include a few specialities, the associated services and facilities that ought to have accompanied these were either non-existent or of such poor quality that it defied discription. None of the hospitals had any post-operative care ward for patients who may have undergone complex surgical treatment. Outpatient departments did not have facilities for minor surgical procedures, which along with emergency cases were treated in ill equipped dressing rooms.

There were many areas in the hospitals which could be improved in quality, and although it is true that the country does not have the capacity to raise the standards to those of the rich countries attempts should be made to introduce a minimum level of quality in hospital services.

An adherence to the conventional process of planning and designing will not help in the improvement of the quality of care. "Upgrading" of hospitals is presently miscunderstood only as expansion in terms of beds (4), but referral tasks simply cannot be performed by increasing the number of beds. The *quality of care* has to be improved too.

PRIMARY HEALTH CARE (PHC)

Till some time ago, primary Health care was considered to be the responsibility only of the lower echelon facilities. The same reason why the authorities in Bangladesh delegated this task to the UHFWC and the UHC. But this idea has given way to the belief that hospitals too have a very important role to play in the delivery of PHC.

According to Cox. A. and Groves, P., "Primary care embraces all the general health practice services. educational, preventive and curative, that are offered to the population at the point of entry into the system" (5). However, the district hospital in Bangladesh which is the point of entry for almost all the patients who go there, has no PHC role. Hospitals being established institutions, could use their

existing reputation, credibility and a large degree of good will in the community to further the cause of the PHC programme. It can do this by getting involved with PHC of its immediate surroundings, direct participation in the PHC of the district and as a source for training and experimentation in PHC.

Al Baala. D. M. (6) discussing about health care in developing countries mentions that "Traditionally cities have benifited from a disappropiate share of resources available for health care and as a result most developments in primary health care have been in the rural areas". It is not only people in the rural areas who suffer from common and infectious diseases. but most of the urbanites too. That is why every effort should be made to introduce PHC in the district towns. The district hospital may be given the responsibility of introducing and supervising the PHC programme of the immediate surroundings of the hospitals i.e. the town and its suburbs.

According to Carreon, G.G. (7) an effective PHC programme has been implemented in the city of Manila in the Philipines, through community health centres and pueri culture centres, which were integrated as PHC units. The four key health programmes under PHC were (i) maternal care and family planning (ii) paediatric care and nutrition (iii) treatment of infectious disease and (iv) environmental sanitation. Health education helped reinforce the programme. The Phillipines General Hospital, a 1000-bed institution formalized a linkage with its geographic catchment of health centres and community units. It provided active support to upgrade the standards of patient care in the health centres.

Although the district town in Bangladesh is much smaller in comparison to Manila, and the district hospital equally small and modest, it should be possible to organize PHC services along similar lines. An involvement in the PHC programme of its immediate surroundings will not only help in providing normal support and effective leadership to the rural PHC programme but at the same time provide a perfect training ground for PHC staff.

The close proximity of an ongoing PHC programme at its very doorstep would enable the hospital staff to observe the scope and limitations of different actions and help in the planning of subsequent measures accordingly. This would indirectly have a rippling effect on the PHC programme of the whole district.

According to Mutiso, R. C. M. (8) any effective system of PHC has to be tackled at four levels namely (a) household, (b) community (c) health unit, (d) hospital. And on this four tiered system the responsibility of the hospital should be to co-ordinate all the activities of the first three levels. Which in a sense means direct participation in the PHC of the district as a whole. The district hospital being the leading health care institution of the district, it should develop health care programmes which should include good quality services within its four walls and outside too. This can be achieved if the PHC, along with other services is totally integrated within the scope of the hospital health care services.

TRAINING & EDUCATION

One of the major involvements of the district hospital in PHC should be through a programme of training and education of staff, patient and public. A regular programme of training and inservice refresher courses could contribute a great deal to the strengthening of the PHC services. The lessons learnt, failures and successes experienced could be incorporated into the training programme so that field workers can get first hand knowledge of what constitute the most effective measures.

The training and education of staff can be done by concentrating the efforts within the confines of the hospital or by taking the training to the lower levels. Training in the hospital will expose the participants to the PHC actions taken by the hospital in its immediate surroundings. The

concentration of training and education in the hospital could specially be useful in the introduction of new techniques and courses of action.

In so far as the trainers and educators are concerned, it may also be useful for them to be exposed to the real situation in the outreach locations. The hospital could on a regular basis send experts to the lower level facilities to provide the necessary training.

Considering the fact that many patients would not have come to the hospital if they had known how to take precautions against certain types of ailments (9), it is incument that people be made aware of these precautions. This can be achieved through health education of the patient and the public. The district hospital can take the opportunity of getting across the message to those who visit the hospital by means of impromptu lectures. posters etc., and the public at large by means of message oriented plays and films as a part of a comprehensive promotion programme.

Besides these, all inpatients should be exposed to the benifits of PHC through films and slide shows, posters and group discussions. The patients stay at the hospital should be utilized to educate them on subjects like hygiene, nutrition, child health and prevention. Patients should be used as a media to propagate ideas about how to live a healthy life. People should be made to realize that it is not medicine but the way of life that can really contribute to their day to day well being.

SURVEILLANCE AND MONITORING

One of the ways to assess the viability of the health care programmes is by measuring the health status of the people at regular intervals. The district hospitals could start a programme to monitor the health status of the people within its catchment area while at the same time maintain a watchful eye on the eipdemiological pattern too. Information on the disease pattern and any changes in it, health standards and epidemiological trend can be useful tools for planning health care programmes. There is no denying the fact that the district hospitals are already seriously handicapped by shortages in staff, nonetheless a start could be made to keep a regular check on the morbidity and mortality pattern in their own areas.

Extensive surveys, exhaustive enguiries and a continuing analysis need to be made, and the district hospital can provide the perfect leadership in this. It could instill the support of the lower echelon facilities for assistance in such studies, and with adequate guidance from it useful material could be collected for both immediate and future use. The importance of surveillance and monitoring is especially applicable to PHC. The effect of different programmes on the health status of the community could be meausred recorded and used as a source of reference for any future actions.

EXTENT OF SERVICES AND FACILITIES

Once the role of the district hospital is understood, the extent of services that need to be incorporated may be defined on that basis. This will facilitate the preparation of an appropriate architectural brief for planning & design.

In terms of patient care it may be said that the district hospital, like any other hospital, will have to provide the following services: outpatient services, inpatient services, diagnostic and treatment services and emergency services. And along with this there should be the scope for the introduction of public health services now and rehalilitation services in the future. With the availability of more trained staff and the necessary equipment, these services should be made more widely available through the district hospitals. Ambulatory patients will form the bulk of the patients, some of course will have to be hospitalized: investigation and treatment of complex ailments will have to be carried

out; accidental injuries and medical emergencies must be tackled; and public health measures to eliminate the incidence of infectious diseases will have to be taken.

The facilities, i.e. the physical envelope and its contents for the provision of these service will depend on what is expected and how that service is to be given. For example, if outpatient services are expected to include both primary and specialized health care, then a decision has to be taken how to implement this and based on it what facilities could be provided.

Although it would neither be possible nor appropriate to provide all district hospitals with the same extent of services, an attempt should be made to provide each with a minimum acceptable level of services and facilities. With the limited resources in manpower and equipment, it would be logical to concentrate these in areas with greater number of people. For example, psychiatric care and physical medicine cannot at the moment be provided in all district hospitals.

Instead of trying to elaborate on the extent of the services in the conventional way i.e. by looking at the hospital as a whole the approach here would be to examine what will comprise the best combination of services for the three specific roles that the hospital is expected to play. For example what services should constitute a real referral centre for a district; what services are needed under primary health care.

AS A REFERRAL CENTER

The district hospital must have the best possible medical care facilities in the district. It should be able to handle most of complex ailments that it will encounter. It should be prepared to tackle referral patients in all the hospital departments. It will be inappropriate to consider that a hospital can provide good surgical services but does not have the necessary diagnostic services or nursing care to support these patients. There should be a compatible horizontal relationship between hospital departments so that each can support the other at the same level.

INPATIENT SERVICES

These should include the hospitalization of patients under the following specialities: internal medicine; obstetrics and gynaecology; paediatrics; ophthalmology.

Under internal medicine there should be facilities for very sick paitents through intensive care. For patients brought in with serious infectious diseases like tetanus, whooping cough diphtheria, diarrhoea etc. there should be proper isolation wards where the necessary treatments may be conducted as needed. For example diarrhoeal patients may have to be given i.v. fluids and antibiotics. For tuberculosis patients for whom the nearest T.B. hospital could be very distant, hospitalization, until sputum tests, indicate positive recovery, may be necessary. There should be adequate hospitalization facilities for patients with burns and other injuries too. The referral services under inpatient care cannot be called adequate if facilities for the above and other complex ailments are not available.

For example it is not only the operation itself but the kind of care after an operation that is as important for the speedy recovery of the patient. According to Putsep, E. (10) the success of any surgical procedure does anot only depend on the skill of the surgeon, but also on the care of the patient following an operation.

OUTPATIENT SERVICES

Outpatient services are very important when viewed within the context of Bangladesh. The cost of

hospitalization being much higher per patient, it is vital that the outpatient services are efficient enough so that patients be hospitalized only when absolutely necessary. According to Vogell, L. C., (11) "An adequately functioning outpatient department may reduce the number of admissions to a hospital and enable the hospital to raise the threshold of admissions. It may also ensure that only those are admitted who need inpatient care most or who are most likely to benifit from such care"

DIAGONSTIC SERVICES

Diagnostic services for a referral hospital means more than just a few routine lab tests and x-rays, because these are not enough for the detection of complex ailments. These services act as useful yardsticks for doctors and surgeons to gauge the condition of a patient so that appropriate treatment may be given.

The state of these services at the present compel patients to avail of such services in the private sector, which are sometimes financially beyond the capacity of poor patients.

This gives rise to two problems. Firstly, the doctor in the absence of adequate investigation can hardly be expected to provide an accurate diagnosis. Secondly, it deprives the patient of the chance where the doctor/surgeon. radiologist and pathologist can jointly discuss the ailment and prescibe a course of treatment. Death due to pneumonia and pulmonary tuberculosis accounted for 10.8% and 3.3% respectively of all death in the country (4) These are infections of the chest and, according to Palmer, P. E. S. (12), their treatment can better be guided by the support of adequate diagnostic radiological services, than by clinical examination. The diagnosis and treatment of trauma, especially common limb injuries is much advanced when radiology is available. The survey of the hospitals (2) indicated that the number of x-rays taken for limb injuries to be higher than any other.

Clinical pathology is another important diagnostic tool. The world has seen the great leap made by hospitals in the West whose laboratories increased the range of tests from around 60 in the late fifties to nearly 350 in the late seventies (13), whereas the district hospitals in Bangladesh perform with difficuly only about a score of routine tests for urine, stool and blood (2).

Considering the fact that most district hospitals have the services of a pathologist, it should be possible to provide all the essential services needed as a referral hospital laboratory. Since in essence it is expected to be a general hospital with all major specialities, the laboratory should be of adequate proportions. According to Barker, J.H. and Houang, L(14) the technical area for laboratory services in this type of hospital should include facilities for tests in haematology, urinalysis, biochemistry and serology/bacteriology.

Besides, these the hospital should have facilities for diagnosis of heart patients, and those with complication of internal organs. Facilities for ECG tests and endoscopy should be provided at least in some district hospitals.

The installation of sonography units in some of the larger district hospitals may be considered. The advantage of the ultrasound technique is that it provides answers to some clinical questions without discomfort, or great expense that otherwise demand hazardous, invasive and costly investigation, especially in the field of cardiology and obstetrics where it is considered to be indispensable as a source of diagnostic information not duplicated by other techniques. (13)

AS A PRIMARY HEALTH CARE CENTRE

The hospital as a primary health care centre will have to provide all those services that usually

comprise PHC and perhaps more. It is generally conceived that PHC can only be provided through ambulatory facilities such as health posts. dispensaries and health centres. But hospitals too can get involved in PHC, but then it will be in a different dimension. As a matter of fact the whole hospital including ambulatory, inpatient and the diagnostic services can contribute to PHC in some form or another.

INPATIENT SERVICES

The inpatient services can play a very useful role in the provision of PHC. First and foremost it mill supervise the immediate post- natal care of mothers and care of the new born infant. Before the mother leaves the hospital useful instructions regarding the feeding and caring for the baby may be given by the hospital staff. For some mothers it may not be possible to come back at regular intervals for check ups and further advice. These mothers will have to receive the preliminary instructions at the hospital during their very limited stay, especially those who had normal deliveries and whose infants are free from any complications.

OUTPATIENT SERVICES

The outpatient services will possible play the major role in the delivery of PHC to the community. Health measures such as mother and child health (MCH) care, family planning, immunization along with simple diagnosis and treatment will be provided to ambulatory patients. Here the role of the outpatient department will be very similar to that of a dispensary or a health centre or as in the case of rural Bangladesh the UHFWC or the UHC.

The first contact with the community will be through PHC services. The objective should be to take care of most of health problems using advice, simple treatment and prevention.

Mother and child living within the town limits and others who can manage should be advised to come regularly for check ups. The MCH clinic should be able to provide immunization against diphtheria, polio and typhoid. Complication with infants can be reported to the paediatrician.

DIAGNOSTIC SERVICES

The responsibility of the diagnostic services especially the laboratory services should be to provie simple routine tests for common problems. For example, the performance of stool test for parasitic infections. Sputum tests for the confirmation of T. B., blood test for hemaglobin.

EMERGENCY SERVICES

Inspite of the fact that an average of 25 emergencies are dealt with in a district hospital, it would be unrealistic to assume that this would be good figure to design with. Because the department deals with patients who are the victims of sudden illness or accidents, it may be subected to unpredictable peaks of activity at any time of the day or the night. Being possibly the only hospital of its kind in a district town, these hospitals should have the capacity to deal with sudden peaks.

Although many of the emergency patients may come on foot, there is no reason why they have to be mixed with the outpatients as is done in the existing district hospitals.

There is every possibility that the type of emergency cases, may vary depending on the locality. Some hospitals may have to deal with more traffic accidents such as the hospital in Manikganj a

district adjacent to Dhaka. The highway from Dhaka which passes through that town is considered a regular death trap with accidents practically a daily occurrence. Other hospitals may have to deal with industrial accidents. These trends will have to be investigated before the planning of the emergency services. Whatever the case may be, the emergency services should be able to provide the necessary treatment to most of the cases. Every emergency department should be capable of diagnosing problems at an early stage so that decisions may be taken quickly, Whether particular cases could be treated at the hospital or have to be referred to another hospital.

PUBLIC HEALTH AND THE DISTRICT HOSPITAL

The diagnosis and treatment of the health problems of a whole community is a public health concept (15) the objective of public health is to diagnose the disease pattern of a community and make necessary recommendations for the improvement of health of the people in it.

The existing public health programme of the country consists mostly of sinking tubewell for the provision of safe drinking water. This of course is an improtant public health activity, because it does help in the control of water borne diseases. But the scope of public health is much greater and should include involvement with wider range of community health problems, the task of public health is to acquire a sound knowledge of the diseases in the community and the make a "community diagnosis" (15). Therefore the foremost duty of public health is to gather epidemiological data.

The collection and analysis of information from the field will include among other things the investigation of large number of specimens of blood, stool and sputum etc. This will help in determining seasonal trends. geographic distribution, sex and age difference. For this well equipped public health laboratory facilities are needed. Since more than twenty years, the World Health Organization has strongly recommended and supported the development of Public Health laboratory services in its member countries (16)

In 1980 the government had drawn out an ambitious plan (17) to establish/expand the laboratories from the district hospital to the UHFWC to serve as a network, with each level doing a specific function. These would then be linked vertically to the National Health Laboratory which was to be established with the expansion of the existing Public Health Laboratory at Dhaka. The objective was to integrate the public health component into the "structure' of the existing laboratory, so that these could provide support to the activities of the field level health and family planning workers. But this programme still remains to be implemented.

CONCLUDING REMARKS

The attempt had been made to see the district hospital in the light of the diverse roles that it is expected to play. What has emerged from this is a hospital which is an institution with a multi-faceted character. The responsibilities are not limited to the curing of the sick, but the maintenance of the good health of the community too. The district hospital is not to be viewed as an institution whose help is sought by people in times of need only, but as one which constantly looks after their welfare too. It is conceived as an institution which is both vertically at the top of the health care delivery network of the district and horizontally at the same level as the most humble facility-the UHFWC.

A patient coming to the hospital could expect quick and efficient attention of the midwife, medical assistant, the health visitor or the detail and critical examination by a qualified medical personnel such as doctor, surgeon, paediatrician etc. As a result the district hospital is an institution where simple as well as complex health care techniques are practised and used for the benifit of the entire community.

BIBLIOGRAPHY

1. PRIMS, A. *medical care: Its nature, scope, objectives and components:* Working paper presented at the seminar on Functional programming of Hospital Facilities, Bandung Indonesia, 1973.
2. HUSSAIN, R. *The planning and Design of district Hospitals in Bangladesh. An alternative approach.* Doctorral dissertation presented to the Katholiek University of Leuven, 1988.
3. BRYANT, J. *health and the developing world. Cornell University* press, Ithaca.
4. Third five year plan 1985-90, Government of Bangladesh.
5. COX, A. and GROVES, P., *Design for Health care,* Butterworths, London.
6. ALBALA, K. M. , *Primary health care for the uiban poor in Bangkok,* World Hospitals, Vol 21, no 1, Feb 1987, p. 26-31.
7. CARREON, G.G., *The role of hospitals in promoting and providing primary health care,* World Hospitals, vol 17, no 1., Feb 1981, pp 9-12.
8. MUTISO, R. C. M., *Planning health care facilities at a regional level,* World Hospitals, Feb 1985, pp. 26-28.
9. NGURE, M.W., *The role of Hospitals in primary health care,* World Hospitals, Feb 1985, pp. 17-19.
10. PUTSEP, E., *Planning of surgical centres,* Lloyed Luke, London, 1973, 2nd Edition.
11. VOGELL, L. C., Outpatient department, KLECZKWOSKI, B. M. & PIBOULEAU, R. (eds), *Approaches to Planning and Design of Health Care Facilities in Developing Areas,* vol. III WHO, Geneva 1979.
12. PALMER, P. E. S., Radiology in the basic care hospitals and clinics., KLECZKWOSKI, B. M. & PIBOLEAU,. (eds), *Approaches to Planning & Design of Health Care Facilities in Developing Areas,* vol. III, Seneva, 1979, p.p 83-124.
13. PUTSEP, E., *Modern Hospital: International Planning Practices,* Lioyd-Luke, London, 1979.
14. BARKER, J. H. & HOUANG, L., Planning and design of laboratory facilities, KLECZKWOSKI, B. M. & PIBOULEAU, R., (eds) *Approaches to Planning and Design of Health Care Facilities in Developing Areas,* vol. IV, WHO, Geneva, 1983, pp. 45-71.
15. KING. M., An Approach to Public Health, King, M, (ed). *Medical care in Developing Countries,* Oxford University press, London, 1966, pp. 5:1-5:10.
16. TUXEN, T, & THIERS, G., *Central Public Health Laboratory,* Kingston, Jamaica. (Project appraisal report for the European Development Fund), Sept. 1984.
17. Second Five year plan, 1980-85, Government of Bangladesh.

SHAKHARI PATTI - A UNIQUE OLD CITY SETTLEMENT

ABU H. IMAMUDDIN*
SHAMIM ARA HASSAN**
WAHIDUL ALAM***

ABSTRACT :

Dhaka is famous for its traditional art and craft for centuries. Many of its old localities bear the names of the trades or crafts which were once practiced there. Shakhari Patti is one such old locality. The name implies that the area began as a settlement of 'Shakharees' or a community of craftsmen specialized in making conch shell ornaments. Most of the inhabitants of this area belong to a specific caste of the Hindu religion and practice till today the traditional craftsmanship handed down to them over generations. In the urban context of Dhaka, Shakhari Patti has its significance in more than one way, Culturally the area houses a specific ethnic group, socio-economically it provides trade and business for a very special kind of crafts and architecturally it offers a development pattern and morphological characteristics that is typical to the area. Recent condition of Shakhari Patti clearly indicates an active process of decay and destruction primarily attributed to unplanned growth, over densification and poor maintenance. The purpose of the paper is to make an objective analysis of Shakhari Patti and identify the area as a case for socio-economic conservation. The paper is based on a survey undertaken by fourth years students of architecture under the guidence of the authors.

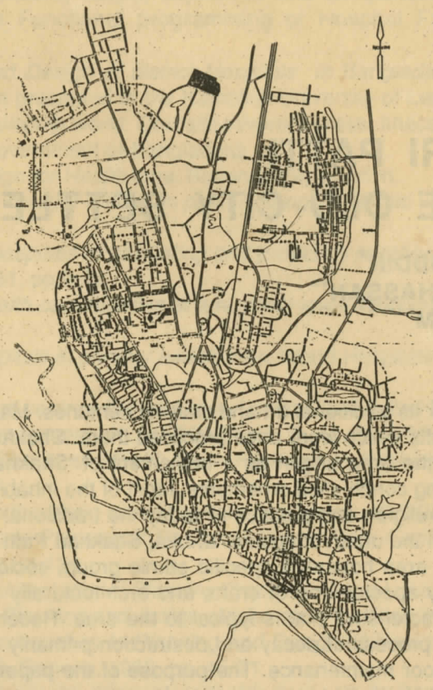
LOCATION AND IDENTITY

Shakhari Patti has grown over four centuries along a narrow 10-12 feet wide road, 600 feet long which connects Islampur Road with Nawabpur road. Rows of densely built walk up houses having very narrow frontages, 10-12 feet on the average flank the street. In the street front manufacturing and sale of conch shell and other items are carried out. The rear part of the ground floor and the upper floors are used for residential accommodations. A high plinth, triple arch in ground floor facade, overlooking balconies in the street front and a decorated parapet are the typical architectural features of shakhari patti. Building plots have great depths up to 90 feet compared to their narrow frontal widths. High population density, lack of open (space (percentage of built up area 80% - 90%) inadequate utilities and services, poor sanitation together with other socio-economic factors caused a general degradation of the area and that helped eventual degeneration of the buildings and their environmental condition. At present poor slum like condition persists all over the Shakhari Patti.

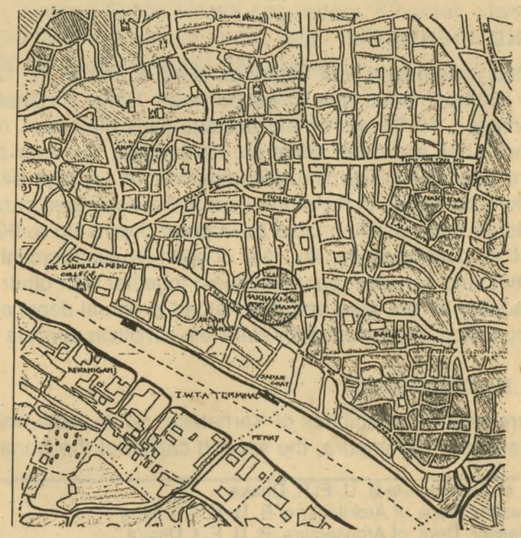
HISTORICAL BACKGROUND

Shakharees were original inhabitants of Karnataka, South India, migrated to this region some 800 years ago and settld in vikrampura, the second capital of the Senas, during the reign of Maharaja

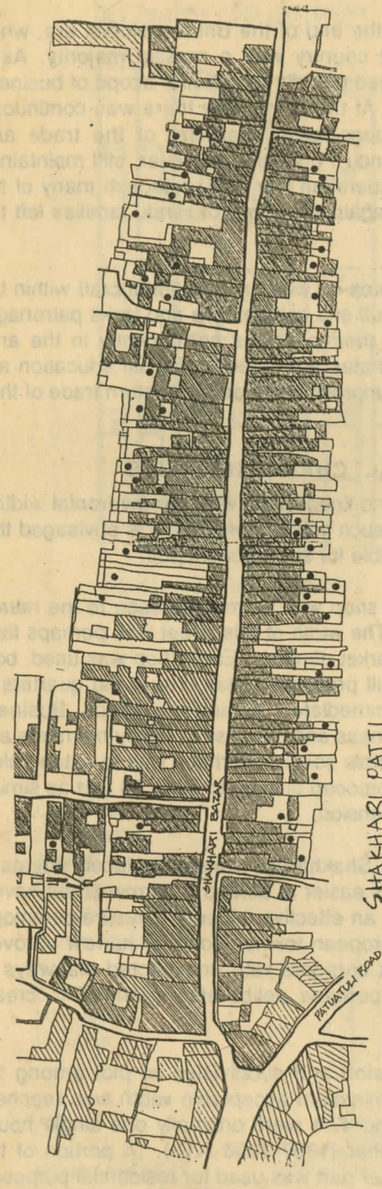
* Professor Dept. of Architecture B. U. E.T., Dhaka
** Associate Professor, Dept. of Architecture, B. U. E. T, Dhaka
*** Assistant Professor, Dept. of Architecture, B. U. E. t, Dhaka.



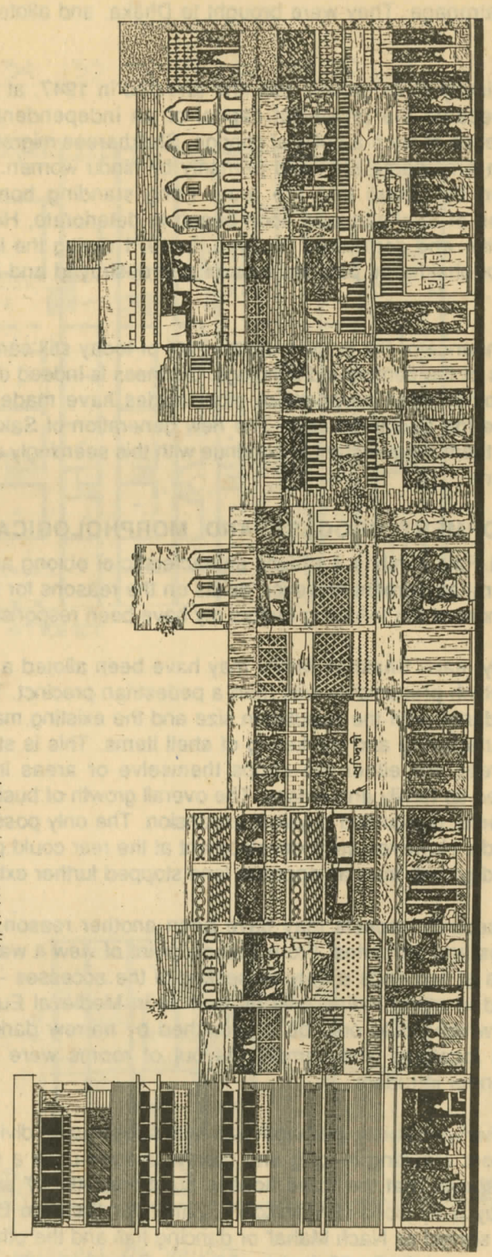
LOCATION
OF SHAKHARI-PATTI
IN DHAKA CITY.



LOCATION
OF SHAKARI-PATTI
WITH RESPECT
TO OLD CITY



SHAKHARI PATTI



STREET ELEVATION

Fig. 4

Ballal Sen (1158-1179 A.D.). In the following period during the Moghul rule, Sakharees received official patronage. They were brought to Dhaka, and alloted free land in the present Shakhari Patti area.

The continuity of its growth was first arrested in 1947. at the end of the British colonial era, when Dhaka became the provincial capital of an independent country with a muslim majority. As a consequence of such a political change, Shakharees migrated to India for a better scope of business as Shaka ornaments are used primarily by hindu women. At the same time there was continuous infiltration by others into the area. Long standing homogeneous character of the trade and population of Shakhari patti soon began to deteriorate, Hindu Population however, still maintained its majority and dominated the area. In 1971 during the liberation war of Bangladesh many of the houses of shakharee patti were burnt and destroyed and again a number of Hindu families left the country.

As a remnance of the past Shakhari Patti of today still carries on with the traditional craft within the premises of the century old buildings. Business is indeed dull and competetive and lacks patronage. On the other hand a varient of other trades have made their positions permanently in the area alongside the traditional craft. The new generation of Sakhaies are receiving formal education and many of them are reluctant to continue with this seemingly unprospective and low return trade of their forefathers.

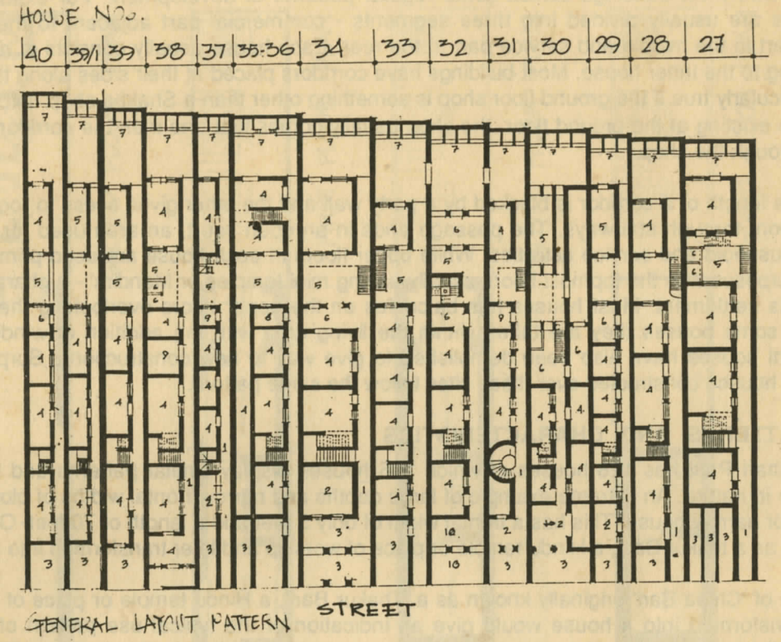
DEVELOPMENT PROCESS AND MORPHOLOGICAL CHARACTERISTICS

Shakhari Patti exhibits a striking characterstic of oblong and linear plots with narrow frontal widths. No general agreement however, exists on the reasons for such linearity of plots. It is envisaged that one or more of the following factors my have been responsible for such plot shapes:

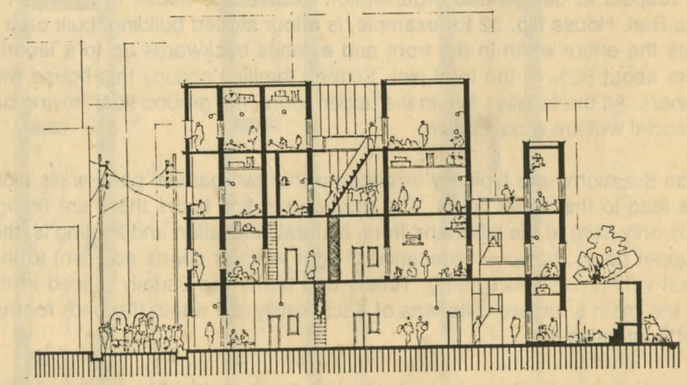
1. Initially, each Shakhari family may have been alloted a shop with a small frontage to the narrow street, which presumably was then a pedestrian precinct. The width of this street was perhaps fixed in accordance with the population size and the existing market demand. Each shop was used. both for manufacturing and marketing of shell items. This is still practiced today. The living quarters of Shakharees are either the shops themselve or areas immediately behind the shops. Business developed as family enterprises. The overall growth of business and increase in family members and labour force, demanded physical expansion. The only possible solution perhaps was to extend plots backwards. However, such development at the rear could proceed only up to 70 to 80 feet as similar backward growth from an opposite lane stopped further extension.

2. The security aspects may have been another reason. Shakharees constantly faced threats of burglaries and robberies. From security point of view it was easier to defend a narrow street having openings at two ends simply by sealing of the accesses - an effective security measure cemmonly practised in many Indian citie as well as in Medieval European towns. Rows of narrow introvert houses which could only be approached by narrow dark corridors with unexpected stairways in different locations and complex layout of rooms were perhaps deliberately planned to create confusion for intruders.

3. Another possibility perhaps was the subsequent division and subdivision of plot among the successors resulting in long and narrow shapes untill a minimum acceptable width was reached. Survey shows that the three houses numbered 46, 47 and 47/1 were originally one single house owned by a landlord of Manikganj, Zamindar Balaram Dhar (1857-1906 A.D.). A portion of the building served as Nach Mahal' or dancing hall and the other part was used for residential purposes. The plot was initially 60 feet by 90 feet. Successers have now divied the original plot into three smaller ones.



GENERAL LAYOUT PATTERN



1. CORRIDOR
2. WORKSHOP.
3. SHOP.
4. LIVING.
5. BATH.
6. KITCHEN.
7. TOILET.
8. TERRACE.
9. TEMPLE
10. OFFICE

SCALE: 1/16"=1'-0"

HOUSE NO. 32 / TYPICAL LAYOUT PATTERN OF HOUSES

Shakhari Patti has developed virtually on a piecemeal basis over a long span of time. In spite of such sporadic growth, most buildings exhibit some regular patterns of development. For example the ground floors are usually divided into three segments - commercial part adjacent to the street. residential part in the middle and service part at the rear. Each house usually consists of a narrow crridor leading to the inner house. Most buildings have corridors placed at their sides along the edge of plots, particularly true if the ground floor shop is something other than a Shakha shop. In case of a Shakha shop existing at the ground floor, the shop usually comes first and then the corridor runs to the house through the shop.

Typically, one length of a corridor is blacked by a party wall and the other gives acess to rooms and the upper floors through stairways. The passage ends in an open court, an area used for various domestic, household and service activities. While upper floors in each house are used primarily for residential purposes with the topmost floors usually having mini temples or Mandirs' - a characteristic feature of this settlement. Most houses has balconies on the upper floors overlooking the street. However, in some houses they are taken within the living area with the addition of windows. In Shakhari Patti houses have also been demolished to give way to new constructions. Surprisingly enough, new houses constructed over those sites follow the same pattern.

HOUSE PATTERNS AND CHARACTERISTICS

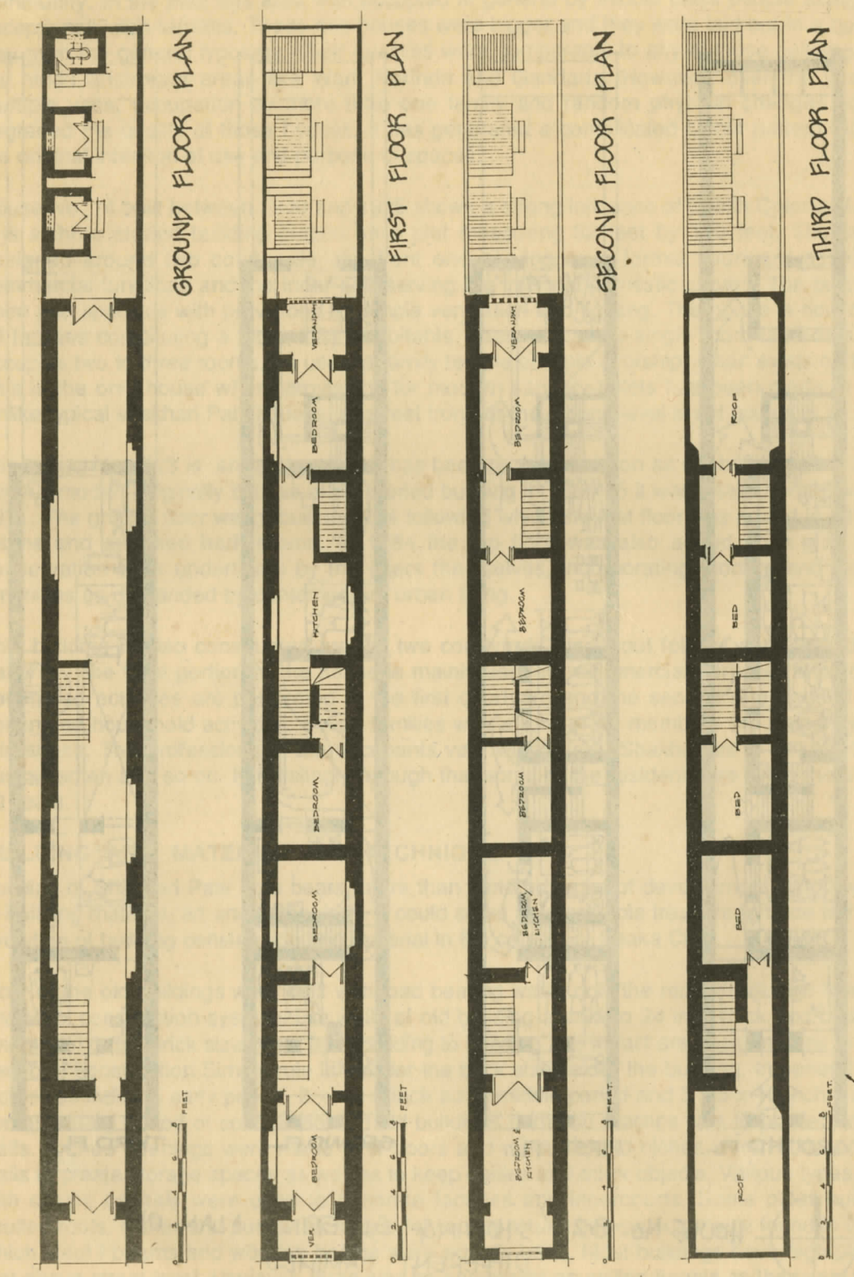
In total Shakhari Patti has 126 houses of which 115 houses display similar patterns and the rest being diverse in nature. An extreme example of large depths and narrow frontal widths of plots is the 'Chipa Bari', or narrow house. This has a frontal width of only 5 feet and a length of 70 feet. Originally it was known as a thakur Ban', a Hindu temple or place of worship and later transformed into house.

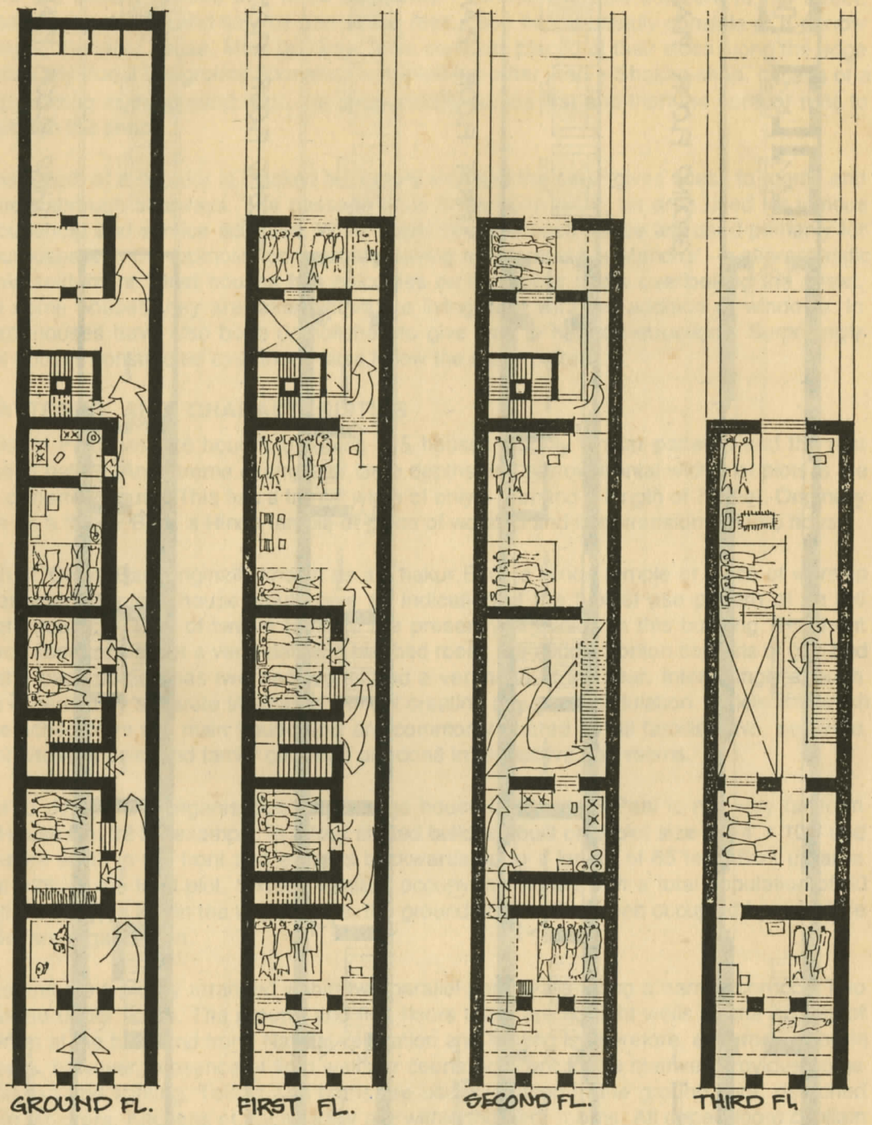
A description of 'Chipa Bari' originally known as a 'Thakur Bari', a Hindu temple or place of worship and later transformed into a house would give an indication of the typical use pattern of an old Shakhari Patti house. A total of twelve families are presently presiding in this building. The front portion of each floor consists of a verandah and two bed room, the middle portion consists of one bed room while the back portion has two bed rooms and a verandah at the rear. Interestingly enough each portion is served by separate staircases without creating any cross circulation. Toilets and wash areas are detached from the main house and are commonly shared by all families. No. separate provisions for kitchens exist and family cookings are done in respective bed rooms.

With respect to design and organisation an average house in Shakhari Patti is not very far from Chipa Bari. House No. 32 for example, is a four storied building, built on a plot size of 14' x 105' and covers the entire width in the front and extends backwards up to a length of 85 feet. Built up area covers about 92% of the total plot. Sixteen families occupy this house with a total population of 60 members. All the families live in the upper floors, the ground floor having been occupied by the office of a social welfare organisation.

In plan the rooms are typically arranged within two parallel party walls along a narrow corridor. Two stairs lead to the upper floors. The ground and first floors there are no light wells so the access of light is only from at the back and front. Natural ventilation and lighting is, therefore, extremely poor. In the upper floors, however, presence of light wells or courts adjacent to the stairwell provides some natural ventilation and lighting. Toilets and baths are usually placed in the ground floor, detached from the main structure. Kitchens of each family are within the bed rooms. All upper floors contiain street front balconies.

Narrow plot configurations has imposed so much restrictions on the physical growth that the people were left with very limited choices. This typology appears to be a natural outcome of the very socio-physical condition within which the people had to operate.





HOUSE No. 32 / SHOWING SLEEPING PLAN OF DIFFERENT FAMILIES.

Shakhari Patti now appears no more than an inner city slum inhabited by a poor section of Hindu community. In the past this area was occupied in general by middle class people along with some exceptionally rich families. Those rich houses were bigger and they were laid out in a quite different way from the general typology. Their qualities were comparable to any of those buildings located in the hindu aristocrat areas like Wari, Narinda and Gandaria. However, over the years through multiple uses, occupation by more than one family and random physical changes have greatly degraded the quality of those houses. It has generated a complicated layout pattern that confused the original intention of use and purpose of spaces.

House No. 14 built between 1900 and 1925 shows a strong influence of British Colonial Architecture. It is a three storied building placed on a plot measuring 32 feet by 100 feet. The building was designed around two courtyards, the front one serving as a formal courtyard associated with commercial functions and the inner one serving the informal domestic chores. The building plan is open and spacious with provisions for ample ventilation and lighting. The house is now occupied by 13 families constituting a total of 73 inhabitants. There are some single room families and the rest occupies two to three rooms. As usual a family temple or 'Puja (worship) Ghar' exists on the roof top. This is the only house where provisions for modern sanitary toilets has been made in each floor. Unlike typical shakhari Patti houses, its street front or the ground level is not occupied by shops.

The house No. 123 is an unique one. It has been recently built on an old building site following the original model. Originally built as a two storied building in 1894-95 it was totally burnt down by fire in 1971. The ground floor was rebuilt in 1974 following which the first floor was added in 1980 with bed rooms and attached bath rooms. In 1984 the top floor was also added. In a way this was a conservation work undertaken by the users themselves, incorporating modern and technological amenities as demanded by contemporary urban living.

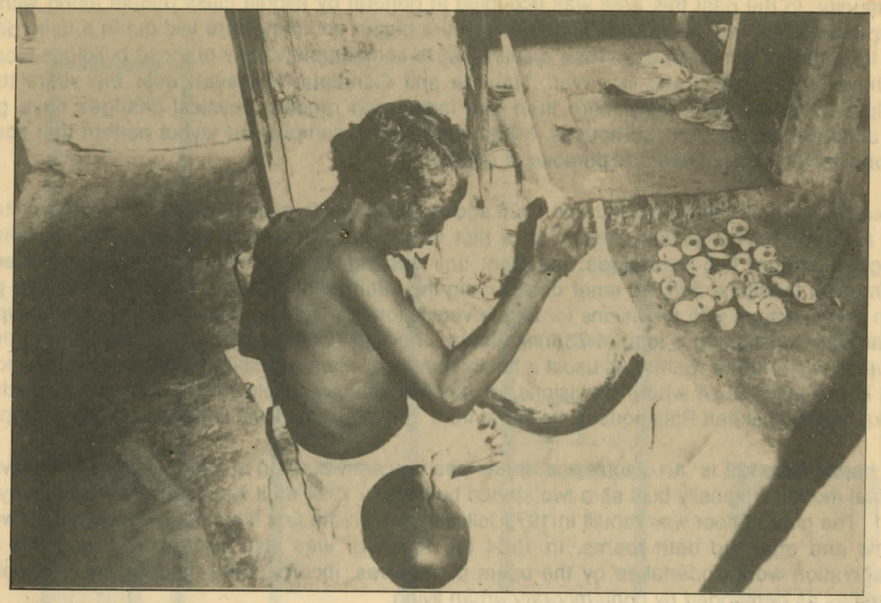
This building is also constructed around two courtyards. Its layout follows some standard activity patterns. The front portion of the house is mainly used for commercial purpose. Most of the male dominated activities are performed in the first courtyard and the second one is used for female dominated household activities. Seven families with a total of 43 members are presently occupying this house. The professions of the occupants vary widely from Shakharees to goldsmiths, artists, businessmen and so on. Interestingly enough that some of the residents are living there as long as 90 years.

BUILDING ART, MATERIAL AND TECHNIQUE

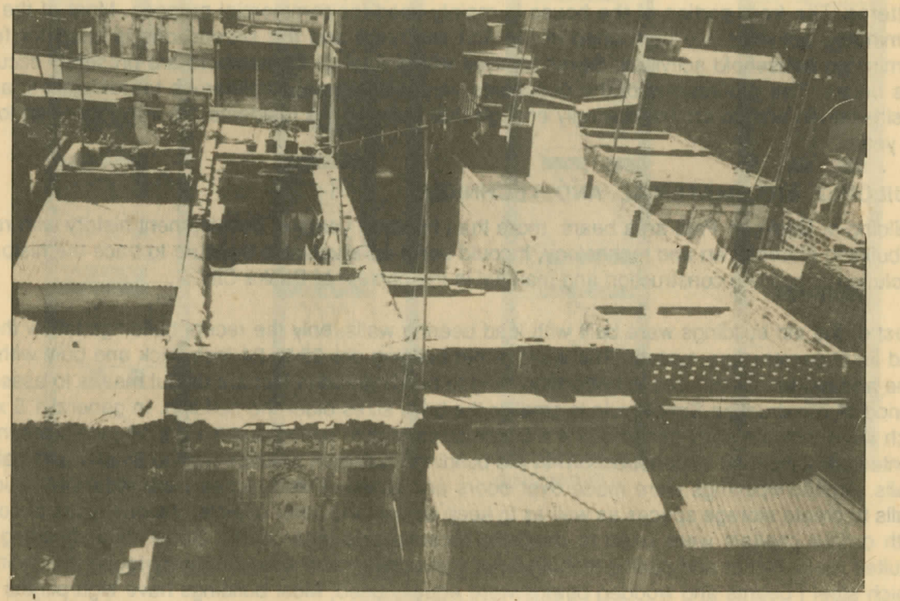
Building of Shakhari Patti area bears more than hundred years of development history with respect to building material, art and technology. It could serve as a valuable treasure to trace the history and evolution of building construction and material in the context of Dhaka City.

Most of the old buildings were built with load bearing walls, only the recent buildings follow the post and lintel construction system. The walls of old building are 20 to 24 inch thick and built with brick, lime and mortar. Brick sizes vary from building to building and in fact are useful means to assess the period of construction Simple rule is smaller the brick sizes older the building. In general 1.5 x 4 x 6 inch sizes indicate early period, 2 x 4 x 8 inch sizes middle period and 3 x 5 x 10 inch sizes indicate contemporary period of construction. In old buildings common practice was to plaster and paint the walls. Arched openings were made over doors and windows and niches were recessed inside the walls to create storage spaces as well as to keep deities and other objects. Various types of columns with ornate capitals were used to decorate facades and innercourts. Some older building have vaulted roofs. Rafter and purline technique for roof consturction was commonly found in buildings for which steel I beams and wooden beams were equally used, Most buildings have high plinths of 2-3 feet above street level. However, three was no agreement on ceiling heghts as they very widely from

safely while watching the Shakharees at work thereby feeling nostalgia of the past.

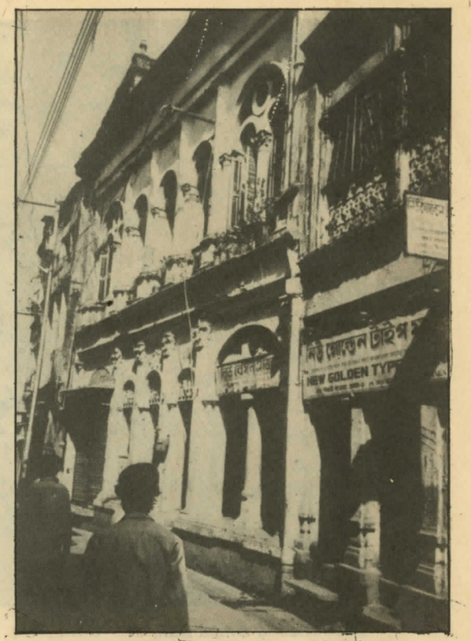


A Shakharee at work

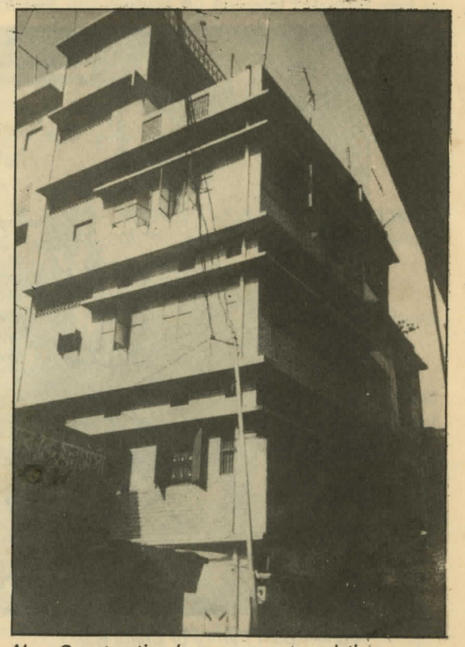


Parapet Walls in roofs Showing Narrow Plot Divisions.

Narrow Street of Shakharee Patti Defined by Building Line



Decorative Facades of Shakharee Patti



New Construction Incongruoos to existing Built-Forms

Enetrance to Chipa Bari

A one Room Family of China Bari

building to building. In some extreme cases they are so low that they barely miss the head in upright position.

Repetition of some common building features and uniformity in architectural treatment has brought about a harmony and continuity in the overall development of Shakhari Patti area. For example, in the treatment of ground floor facades triple arches are found common to almost all old buildings. Only the ornate works surrounding the arches vary widely from building to building. It is interesting to note that while the rear portions of most buildings are either unfinished or incomplete stage of construction, the street front of each building invariably possesses a finished or complete appearance. There seems to be an inharent desire and a concerted effort on the part of the inhabitants to provide this complete look to the buildings when viewed from the street. To achieve this, decorative parapet walls have often been constructed to terminate buildings. As regards to building crafts, a high stage of development was undoubtedly reached which is evident from the intricate designs visible in the cast iron balcony railings, brackets and column capitals in Nach Mahal.

In contrast to the decorative building fronts interiors of the rooms are relatively simple and unadorned. Only the niches or recesses in the thick walls contain elaborate carving. Interiors are mostly painted white using lime mortar. Most of the doors and windows of the buildings originally made of expensive wood with decorative designs, have now been replaced by low quality wood, steel or mild steel sheets. Old cast iron railings with their ornate works have been replaced in many buildings with ordinary metal grills.

CONCLUSION

The ownership pattern of Shakhari Patti houses are very complex. In recent times many of the ownership are through prolonged occupation rights. Houses are owned by several families and in fact ownership is limited to rooms only and that gives the right to use other services as well. The complex ownership pattern and insecurity due to declining business of Shakharees and dilapidated condition of houses leading to poor rent structure are the primary factors responsible for the degradation of the whole area. Hence, the conservation of Shakhari Patti would mean a socio-physical conservation. Simply because one is not possible without the other. To do such a conservation work the following recommendations are made:

1. Like other cottege industries Shakhari business are to obtain official support and patronage by means of soft loans, better market facilities and easy system of procurement of raw materials which comes from abroad. In this respect Shakharees do not receive any such incentives.

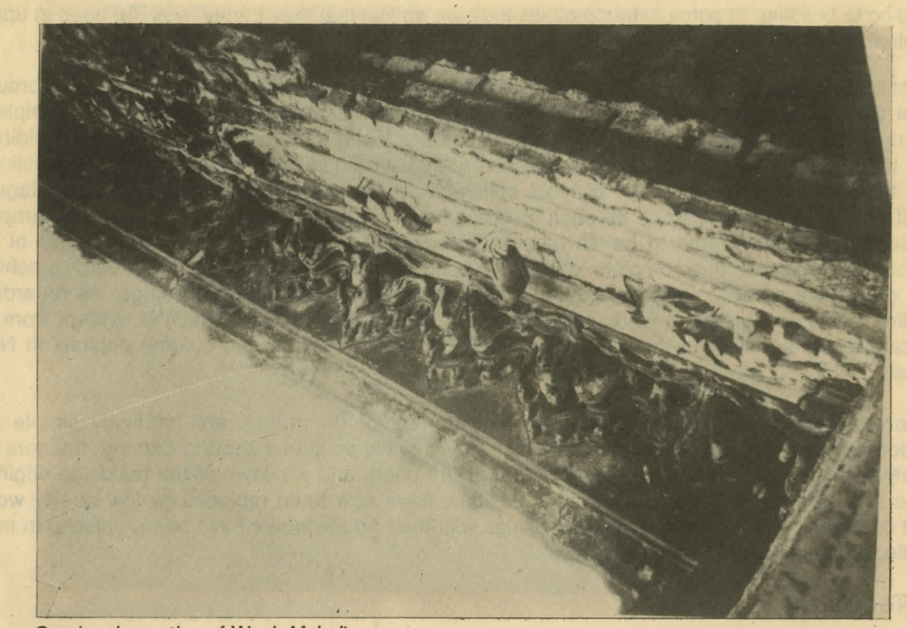
2. Infiltration of other business in that area are to be discouraged or stopped through restrictive laws. The area should be considered as an Artisans Village to encourage the traditional craft.

3. Legislation or by-laws should be formulated to declare the site as an area for architectural conservation to restrict demolition of old buildings and to preserve the traditional flavour. To do that following necessary measures are to be taken to resolve some of the basic problem of the area:

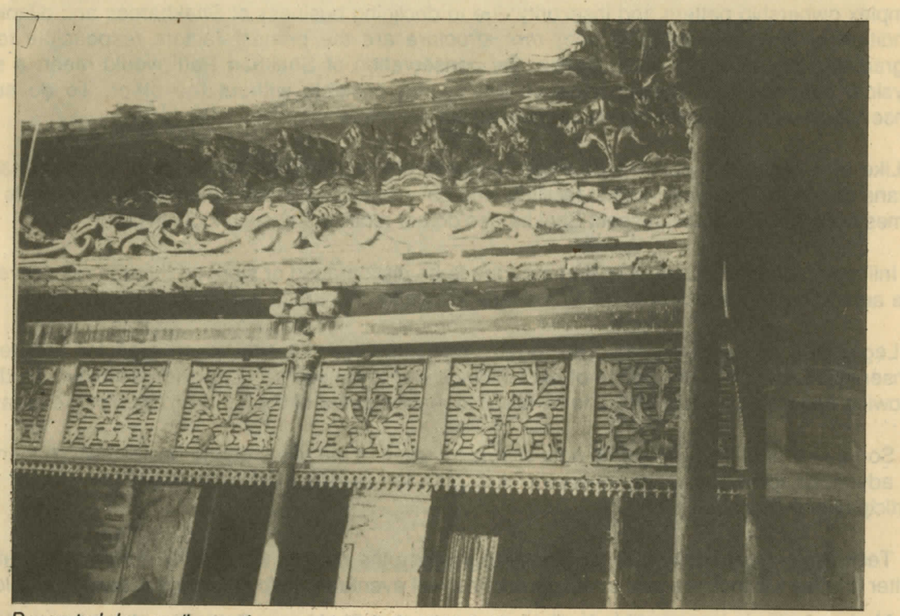
(a) Some kind of official ownership right should be given to the users on the basis of which loans can be advanced for property improvement. Any plan for development will simply fail without users participation in Shakhari Patti.

(b) Technical assistance will be necessary to improve the houses which should be made available. Better houses will improve rent structure and that will eventually help to lower the density problem.

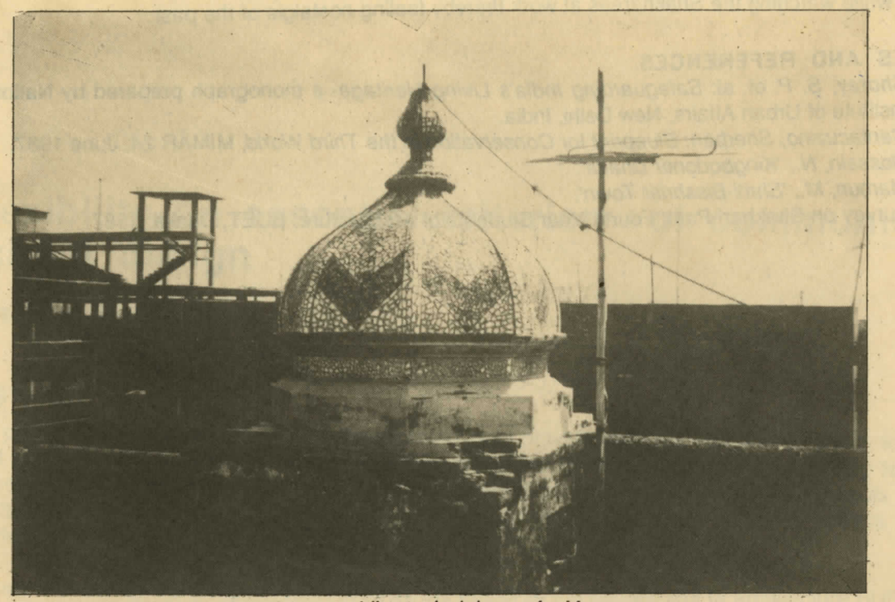
(c) Modern traffic is incompatible for the narrow street of Shakharee Patti. The street has a pleasant pedestrian scale and therefore, should be converted to a pedestrian lane so that one could walk



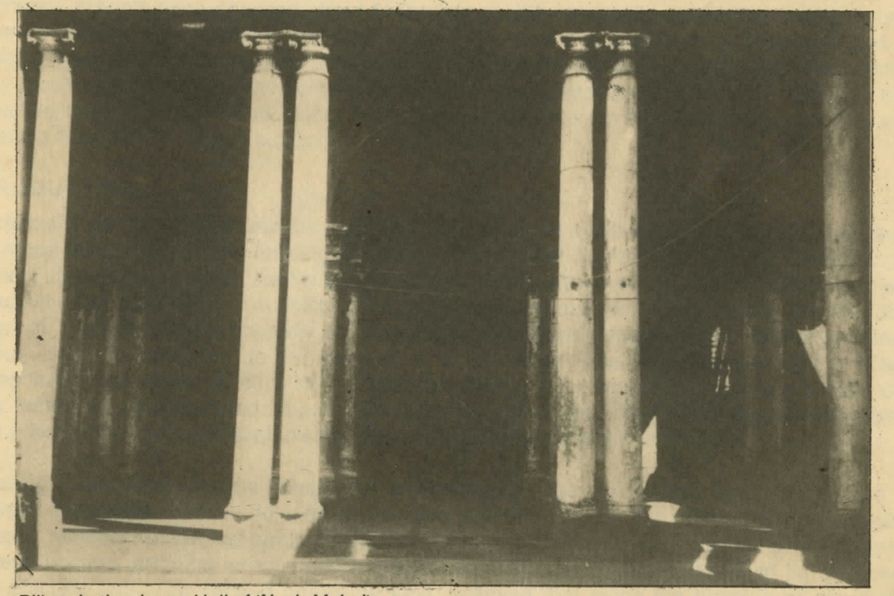
Cornice decoration of `Nach Mahal'



Decorated drop wall over the verandah of 'Nach Mahal'



Roof top Mandir in 'Nach Mahal' resembling typical dome of a Mosque



Pillars in the dance Hall of 'Nach Mahal'

safely while watching the Shakharees at work thereby feeling nostalgia of the past.

NOTES AND REFERENCES

1. *Shorey, S. P.* et. al: *Safeguarding India's Living Heritage*- a monograph prepared by National Institute of Urban Affairs, New Delhi, India.
2. *Cantacuzino, Sherban: Blueprint for Conservation in the Third World,* MIMAR 24, June 1987.
3. *Hossain, N., 'Kingbqdontir Dhaka'.*
4. *Mamun, M., 'Shriti-Bisshritir Town'.*
5. Survey on Shakhari Patti, Fourth Year Students of Architecture, BUET, Dhaka;,1987.

Flexibility-An essential criterion of community school design

FARUQUE A. U. KHAN *

ABSTRACT

The primary objective of community school project is to provide low cost vocational training for the rural populace and to link up nonformal skill development in rural areas with the existing formal school system. In order to achieve this objective, two hundred community secondary schools were established over a period of four (1981-82 to 1984-85) years at different selected upozila head quarters. One thousand teachers were specially trained for this purpose([1]).

A study and survey were organised in 1984 by the author in the department of architecture BUET on different types of government managed and privately organised community schools of Bangladesh. This paper is the outcome of this study. It is found from the survey that while government financed community school authorities went for five common and generalised trades, the privately managed community schools were selected about twentyfive number of locally demanded trades. It is also observed that the type, number and curriculum of the trades change from time to time and from locality to locality. A flexible type of school building is suitable for these changes to accomodate the newly demanded activities of the communities. This paper represents an attempt to elaborate on the subjective term 'flexibility'. The author also attempts to focus on the need, ways and means of achieving 'flexibility' in school building.

INTRODUCTION

School buildings are many a time the most important structure in the localities of rural Bangladesh. In very many landscapes school building is the largest and most dominating structure. School is by far the most important community facility in the soceity and community life to a great extent rotate round the activities of the school. Technical personnel and architects today are getting involved in the design of these buildings, specially so, through the Facilities department of Education ministry. Various elements contribute to the success of an educational building. Location of the building, spaces for various functions, circulation, layout and design, form and visual aspects are some of the major factors to be considered. In school building design another vital factor should essentially be given priority even at the initial phases of design. This important factor is flexibility.

According to architect Mathew Nowick the architects could be divided into two groups-those who practised functional 'exactitude' and those who practised 'flexibility'. These are two opposite concapts. Members of the first group believed that the truth of architechture was the exact expression of every function, and that when a building become technically obsolete, it was to be replaced by more efficient one. The second group, he said, believed that since the function of any building

* *Associate Professor, Deptt. of Architecture, BUET, Dhaka*

changes from year to year, each should be designed to allow changes to be made efficiently and economically without marring the beauty or distorting the truth of expression(2). Considering the reality of our under-developed economy, it would not be wise to go for 'exactitute' concepr of design. Rather school building could be designed with the flexible spaces for double or triple use considering our future crowded years ahead.

The curriculum and technique of education change with time. Changes are apparent in Bangladesh also. Science and other divisions are gradually being introduced in more schools. A rather new programme called the community school programme is already being advocated. This programme will try to take care of out of school children and drop outs along with regular students. In addition to its normal functioning as a school, the community school acts as a socio-cultural, recreational and educational centre participated by the people of all age groups for community activities utilizing the community resources in improving the quality of living. The school buildings are oftern being used as shelters for the less previledge section of the community, in case of natural calamities like floods and cyclone. When the term community school is mentioned, it will mean regular school with the new community programme added to it.

DESIGN PRINCIPLES FOR FLEXIBILIY

The curriculum and the technique of education change with time even within the same community. When some courses are added or taken away, the function of atleast some of the internal or external spaces required for teaching courses, is changed accordingly. Education makes this change continuous which demands the change of the internal and external spaces of the school buildings. Therefore and in order that the available community school sturcture and the school campus be better utilised, should easily accomodate the growth, change and improvement.

GROWTH

Since for various reasons the community school building is not completed at a time, it must be planned from the very beginning for continuous grouth and expansion. For this reason the end walls in each unit should not be load bearing walls. A truss supporting the pitched roof at the ends will facilitate putting up of additional bays. Incase of concrete roofs an end beam will facilitate similar addition. In this way the community school buildings allow for flexibility and growth depending for future needs. The phasing at any time in the school building complex is essential. The extent of growth of any school building is not easy to predict, so the architects and designesrs should understand the pattern of growth of community school buildings. For this reason, we can arrive at a hierarchy of phases of construction for community school buildings.

CHANGE

The community school needs the internal or external changes both micro and macro levels. As, it is considered that a community school building is never finished, the changes are inevitable, therefore, it must be designed to grow without growing pain; addition may be very expensive if provision has not been made to accomodate them.

The change at any level may be both of qualitative or quantitative. The spaces classified and designed according to their functions may become obsolete after certain period of time. For example, in the case of micro level change, with the availability of better workshop equipments, the design and equipment arrangement within the carpentry and mechanical workshop may be changed. The macro change is applied to the level of change where the function of a particular area is replaced by another function. For example, community school during the initial stage might requir only a smaller workshop for mechanical trade; but at a later stage when number of pupils increased, more equipments available and more staff is available, the mechanical workshop could be used to accomodate another function, such as the textile workshop. All these are based on the assumption that substantial economic and social development will take place in formseable future which is

essential for the survival of the community.

The change in the different places should be done in minimum cost and with the least disturbance of the pupils and users. The eassy way to accomodate these changes is to standardise similar activity spaces as much as possible throughout the whole community school programme and within the modular system.

IMPROVEMENT

Construction method and the selection of materials for community school building should be studied in such away that the system and materials employed should allow improvement from the standpoint of permanance. The system should be so flexible that the less permanent materials and components can easily be replaced by more permanent building materials and components. The ultimate objective is to construct permanent buildings with more permanent materials. The construction system and the materials can be specified in such away that it is possible to construct relatively inexpensive but more flexible community school building which, when more funds are available can be improved as to become better and permanent structures.

ELEMENTS OF FLEXIBILITY

In reality it is very difficult to make a building trully flexible. The conventional and indigeneous architectural style, common building materials, conventional structure and culture etc, make school designer's job very difficult. The degree of flexibility of school design depends on the different qualities of spaces. There are different elements that make the spaces of the school buildings flexible.

FLUIDITY OF SPACES

The open plan of different teaching and workshop spaces give to school architecture one of the impotant innovations in school design. The open plan affords a free flow of spaces in the main teaching area. By the use of large window and openings school designers can make inner spece seem to flow to the outside and fuse with immeasurable space of nature. More planning techniques could be developed to take advantage of the fludity of educational spaces.

VERSATILITY OF SPACES

The school spaces may be used for more than one purpose. The similar spaces could be combined for better use and for saving the cost of construction. Large space might have very many uses. Gymnasium and auditorium is a good combination; this might not sound be very fesasable within strict financial constrain. Assambly, examination hall, occassional meething place etc. are other use for large space wherever available. In this way not only the class rooms or commonspaces but corridors could be designed for more potential versatility.

CONVERTIBILITY OF SPACES

The skeleton structure with the temporary thin partition walls is suitable for the convertibility of spaces. The continuous changes in curriculum for adding and for taken away of the courses for satisfying the community needs, demands the characteristics of convertibility in school architecture. Therefore the school designers should develop the technique for dividing the educational spaces with light, thin and temporary partition walls. The school designers should give much consideration to the convertibility of interior and exterior spaces. However acoustics of various spaces should be taken into consideration.

EXPANSIBILITY OF SPACES

The increased enrolment, change of curriculum and the introduction of new trades etc. demand the

addition of new structure and spaces. A rational way is to 'plan' for expansion, but 'build' only for immediately foreseeable needs. Skeleton and skin construction is better adapted to planning for expansibility.

CRITERIA FOR FLEXIBLE SCHOOL DESIGN

Design criteria and space standards could be formulated to achieve the reasonable flexibility of the planning and designing of the schools in the context of prevailing socio-economic and cultural conditions of the community. The degree of flexibility depends on the achievement of these design criteria. In absence of such basic criteria for flexibility, it is difficult to carry out such complex operation to make a school design suitable for flexibility.

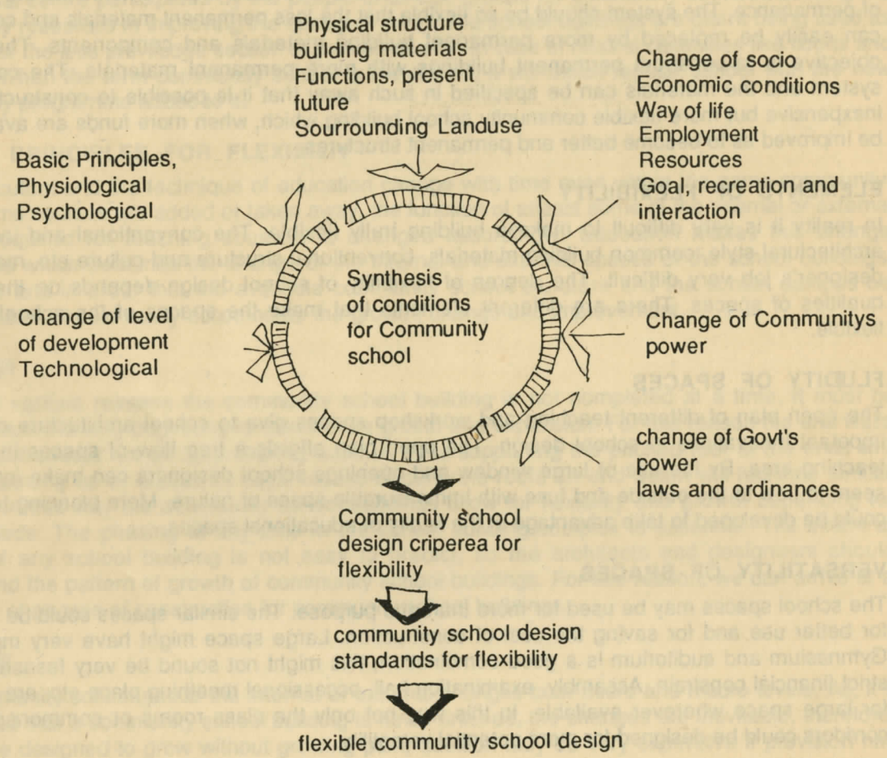


Fig. 1 Diagramatic summary of the factors influencing the development of flexible community school design

LAYOUT AND DESIGN

The basic layout and pattern of school building are often derived from the rational arrangement of different school activities and functions, circulation and cultural heritage of the community etc. The simple elongated rectangular layout with gable roofing having varendah at one side facing the court or play ground is considered the basic or popular plan of the school building in Bangladesh. The court (sometimes the field) is considered as the basic reference for progression. The varendahs are considered to be meaningless without the court. This layout is independent of location of the site.

This layout is also independent of structural system, building materials, local technology and environmental factors. These are the modifying factors and do not change the basic layout; it only change the shape, size and the details of the school building. The school plan mentioned here is much flexible to accomodate all the changes, growth and improvement. As for example, the roof of the school building may be initially constructed with less permanent C. A. sheet. This hipped shaped C.A. sheet roofing can be changed by more permanent flat roof with R. C. slab and long overhanging in all direction, which does not require to change the design of the school building.

The layout of the school should be compact, leading itself to optimum economy. To make the school layout more flexible the primary activities and the building blocks of the different functions like class rooms, laboratories, administrative, library, common room, workshops etc. are to be grouped within the proximity around a main corridor. Entries are to be provided on both sides of the main corridor which ensure the problem of providing access to the school from all directions. Finger planning of school building is convenient to accommodate the addition of new functions in the schools.

STRUCTURAL SYSTEM

The skeletal type of structure is the appropriate approach for the flexible school design, where the structure is completely free of wall panels and allow greater possibilities of changes by rearranging the non-structural wall partitions. The end walls of the class room and laboratory blocks may have to be altered, so these should be left free; free from load, free from electrical utility installation, free from important fenestration. If trusses are used for the roof system, a truss should be repeated at the ene walls too, to make it easy for further alteration and expansion.

CIRCULATION

The adaptation of an open ended circulation system in finger plan design minimises the length of corridors and easily allow the change and growth by extending the existing corridors in the school buildings.

Corridor should be more functional than mere walkway and it should contribute to the educational gain of the users. The wall magazine, display boards etc. may be placed in the corridors at the entrances and other suitable places. The entrance to the school should generously be designed so that it is inviting and at the same time it acts as a space for exhibition, notice boards and wall magazine etc.

MULTI-USE OF SPACES

A school building design should satisfy the flexibility both for change and for 'multiple use of space'. This multiple use of spaces is an important aspect of flexibility, from two counts : one, it may be a space adapted for several kinds of subjects matter-a special class room for both social science and geography, a multiuse laboratory space for both chemistry, physics and biology, a multiuse workshop for both mechanical and carpentry trades or a multiuse workshop for type writing, technical drawing and electrical trades, two, it may be a multiuse room for use by community people outside of school hours. As for example, the gymnasium-auditorium may be used as indoor games, T.V. and radio room for the community people.

The outdoor spaces also can be designed for multiple uses. Exterior social courts both for male and female are to be provided between two class room wings. All the rooms, connected by corridors facing the courfts make these courts more meaningful. The doors of all the rooms open up to the corridors facing this social courts and then helped the expansion of the interior activities on to these social terraces or courts which is much expected in the school design. There are many ways to achieve these desired characteristics of a good school campus. The school designers should give

more emphasis upon volume instead of mass, they should work with space rather than rooms and with environment instead of buildings. School designers should think in terms of three dimentional spaces rather than of two dimentional areas. Finally flexibility should be the key note of our school architeture.

REFERENCES

1. P-13, Project proforma, Community school project, 1982. Facilities department, Govt. of Bangladesh

2. Mathew Nowick, *Composition in modern architecture,* 'The magazine of art', March, 1949.

3. William W. Caudill, *Towards better school design,* F. W. Dodge corporation, N. Y. 1954.

4. Lawrence B Perkins, *Walter D. Cocking, School,* Reinhold Publishing corporation, N.Y. 1957.

5 FARUQUE A. U. KHAN, *An approach to the formulation of design criteria and space standards for community secondary school and designing a prototype in Bangladesh,* M. Arch. (unpublished) theses. BUET. 1984.

INDICATORS OF HOUSING QUALITY: SUBJECTIVE VERSUS OBJECTIVE

MAHBUB RAHMAN *

ABSTRACT

Components of housing are only a constituent component of overall satisfaction with the living environment. Satisfaction with the living environment form a part of the satisfaction with life. Attitudes towards these components will be affected by peoples concepts related to other components of life satisfction; similarly other components of satisfaction with life will be influenced by individual evaluations of the neighbourhood components.

Indices composed of descriptors describing different components of housing should measure the quality of that built environment, thus becoming a part of the design brief. This paper put light on a critical issue related to housing quality indicators, that is which of the indices we should cater for in the design or include in the brief, how and where from to gather these.

INDICATOR OF NEIGHBOURHOOD QUALITY

Housing related indicators are determinant and components of wellbeing. Hence searching for good housing indicators is important. A house represents the broad system in which we live. It comprises of elements of satisfaction which lies both in that system and also in the physical system of the dwelling. Success lies on the ability to distinguish between what elements of design itself can feed into overall satisfaction and what elements belong to the process of design, management practices and wider social system. For example: livability, users' pacticipation in design process, one-site designer's office, family type etc. all could contribute towards satisfation. But these are parts of overall satisfaction, design process, management and social system respectively.

Scientists have paid less effort for systematically characterizing situations or environments. But it is necessary to identify the experience and quality of living. Once these variables are distinguished, efforts to improve and ameliorate conditions can be more effectively planned and evaluated.

Very few researchs outside of public housing on peoples' perception and evaluation of housing quality have been developed. Home has been recognised as an important source of gratification, but the assessments of housing quality by government agencies have been based upon objective measures of housing satisfaction and the contextual social environment have been omitted. Early attempts to develop a scientific index was rather crude by present standard (for example: selecting those which all reasonable persons would regard as significant for the goodness of life). Yet those provided models for other empirical studies that followed. More recent attempts have relied upon

* *Lecturer, Dept. of Architecture, BUET, Dhaka.*

more sophisticated statistical techniques to generate categories of attributes.

TALE OF TWO INDICES

Concept of quality (of life) suggests a subjective experience, still there are attempts to take an objective approach. In a study described in Krupat and Guild (1980), scores on economic, political, environmental, health and educational and social components were summerized as grades and added to give a total score. But efforts to reduce the multi-dimensional quality of neighbourhoods to a single indicator are misleading. The components itself may not be strongly correlated despite some of those achieving consistent scores across the components. Another question is how to combine and weight the various indices. It might seem difficult to measure and standardize these qualities. Yet they insisted that it would be worth-while to make an effort to include and measure all five components.

It seems that, planning and policy potentials of social indicators have not been fully realized. Hempel and Tucker (1979) identified two reasons behind this as: 1. factors are difficult to separate out into dimensions for which relevant social indicators can be developed; 2. operational concern of many planners has emphasized on objective measures due to the belief that subjective measures are too idiosyncratic to be of use at larger scale planning.

Campbell et al (1976) cast doubt on how well objective measures would reveal the underlying psychological states, or in opposite to this how affectively social indicators can represent the quality. Relative contribution of objective environmental attributes has been investigated where objective variables were found to have considerable effect, though their ability to account for satisfaction was strongly mediated by peoples' subjective assessments.

There is a lack of association between the two measures. Because comparing data at the individual level (subjective data) with that at the aggregate level (objective measures) faces difficulty. Each one's judgement is not of the same object since the knowledge is idiosyncratic. Objects may appear different depending upon the nature of the assessing criteria. For example, either police crime record or perception of security by residents or both can be taken as the indicator of safety in a neighbourhood. This categorization should be decided by the nature of expected outcome since these can mediate or accentuate each other. People like Lynch (1960) primarily focussed on the measurement of spatial images rather than socio-evaluative components.

WHICH INDICES-SUBJECTIVE OR OBJECTIVE?

Historically everybody have placed their reliance on objective measures as it appears self-evident that these conditions are part of the "good life" and can be measured directly. Most of them have acted as if subjective factors are non-existent. They argue that, objective conditions act directly and provide perspective for action and place constraints upon behavioural instances. For example, city size determines the form of urban social interaction in a way that the effects of individual differences, subjective perceptions and personal beliefs are relatively unimportant.

Other objective views minimize the subjective elements as they believe that these can not be assesed reliably or if when measurable, these come out as another dimension shaped by the objective environment. Crowding is one such example which can be interpreted by both types of indices. To somebody, it can be a kind of feeling called crowdedness, yet objectively the degree of crowdedness depends on number of people in an unit area (density).

Supporters of subjective approach argue that if our interest is in how people behave in certain

situation, then their perceptions, cognitions and evaluations determine this most directly. Regarcless of the nature of the environment, somebody acts only after considering and evaluating alternatives. This will vary person to person as a function of cognitively mediated appraisal. One man will possess kind of information different from another and will process this information in different ways and will evaluate accordingly. There is actually a great deal of subjectivity in recording objective measures.

Two different kinds of indicators may be most useful in explaining different urban outcomes. For example, perception of safety and rate of crime in an area combine to produce a certain level of utilization of that area which affects both future crimes and future perceptions in an endless feedback loop. A concerned scientist should specify the particular behaviours, and examine the objective characteristics of the neighbourhood that might affect these perceptions and resulting attitude. These two may combine to make a more appropriate index.

Studer and Stea (1966) identified an urgency to evolve an entirely new taxonomy of problem formulation without redefining the terms. According to them, environmental designer's task is to bring the designed setting into equilibrium with biological and non-biological human systems. Form, structure and space, rather than considered as ends in themselves, become the means which may be employed to establish this equilibrium. Accomodation of both objective and subjective requirement of human organisms through the appropriate organisation of relevant variables in the designed environment has been recognised by them.

They farther added that imposed bias by environmental designers place both objective and subjective constraints on environmental decision making which are rarely overcome. Hempel and Tucker (1979) were concerned with environmental planners' inablity to relate people's subjective reaction to their own housing situation. Urban renewal programmes are the best examples of these short-sighted efforts of community upgrading which sometimes intensify the very problems they are supposed to alleviate.

Indicators of a neighbourhood environment should be chosen in response to psychological variable as well as others like functional variables. Functional and physical factors, though are important, can not have objective status only. These can be understood in the light of meaning for peoples' lives. This in turn is determined by cultural and social values. Galster and Hesser (1982) identified that objective characters directly determine overall satisfaction with residence and neighbourhood and indirectly through mediations of additional subjective evaluations. For example, attitudes towards the actual size of a room will be influenced by the feeling of the room as a space for the intended function. This feeling may again be generated from and shaped by the cultural norms.

Needs and aspirations perceived by an individual are a complex of both individual characters and cultural norms impinging upon the individual. Michelson (1970) admitted that objective characteristics may not exclusively influence overall residential satisfaction, but can do that indirectly or partially through its effect on individual's subjective assessments of more limited aspects of physical and social environment contributing to satisfaction. Numerous combinations of both orientations have produced many different measures and all these are assumed to tap attitudes towards a neighbourhood equally well. These constitute complementary rather than mutually exclusive and competitive ways of describing the neighbourhood. (1)

SOURCE OF DESCRIPTORS

Most of the scientists have evaluated neighbourhood quality against indicators of quality, descriptors of the setting, or aspects of satisfaction etc. Everybody has emphasized on ensuring adequacy of coverage while judging a neighbourhood. According to them, a large number of indicators describing different components have to be listed so that all possible dimensions are gathered.

Carp (1976) advised to ensure stability and eliminate personal bias in accumulating descriptors. According to him the proper procedure would be to elicit a comprehensive set of items which reflects from a resident's perspective. All such possible facets of residential quality must be included. It should be judged by a large number of adults representing a major portion of the residents. Finally, the overlaps in items should be identified to produce a set of nonredundant dimensions which define the domain by revealing the basic dimensional structure. For example, the basic domain underlying the descriptors airyness, size of the window, amount of opening, stuffyness and location of window can be comfort-ventilation. Identification of this basic domain will save a study from creeping redundancies. He suggested the use of empirical measures for either gathering items or for reducing lists of items into dimensions, but not for the both requirements.

Peterson (1974) and Campbell et al (1976) have insisted on identifying specific sources (components) of satisfaction and dissatisfaction which are attributes of that domain and evaluating the relative contribution of each towards the development of an overall index of quality (or satisfaction) (2). People compare their perceptions of each domain's quality against their standard for that domain to arrive at a evaluation. The belief-affect approach has emphasized on identifying the aspects of the component about which people have beliefs and examining how the evaluation of each belief contributes to the evaluation of the whole. To include a large number of components on which the judgement would be obtained has been a necessary part of these approaches (3).

Zehner (1980) gathered components empirically from the residents and then categorized the responses. But he realized that the resultant indices may or may not reflect the view of the respondents. In a study described by Carp (1976), the inmates of a senior citizens' home produced the items which constituted an open-ended question which was then elicited for a variety of descriptors. No system of categorization was imposed upon the responses. Though it ensured the richness of the data, yet functional redundancies creeped in.

Some other studies have used factor analysis to reveal indices (Factors) within the data. Yet Donnelly (1970) has rightly agrued that there is more to its (housing satisfaction) investigation and measurement than factor analysis of questionnaire surveys. Factors like freedom of choice and the means to participate play important roles and all such factors should also be catered for. Galster and Hesser (1980) suggested that, given a set of felt needs and aspirations, (then) individual would evaluate his current housing situation with respect to both the dwelling unit and the neighbourhood.

The sources, dimensions or components of the house and the settlement (neighbourhood), against which the satisfaction would be measured, can be gathered in many other ways. Literatures are a good source to build up an inventory, check list table is another one (Kerlinger, 1964). A third choice is making an initial compilation from residents' responses. Combining two or more of these methods might help in developing even a bigger glossary. Another underlying goal should be to ensure that such an inventory has included specific predesired descriptors of one or more components as well.

EPILOGUE

The freedom of choice with respect to where one lives and to adjust the immediate living environment to individual preferences are basic outlets of self-expression which contributes to many aspects of individual happiness. Living environment is a critical area of interaction and is the most familiar environment to people. People will seek that which is satisfying, because generally what is satisfying reinforces those behaviours which lead to the satisfaction (shelly, 1972).

As Burisch (nd) said that at the end of the day, it is the architect who is to decide what to include and what to reject, so he should be well conversant with all the components of the environment he is to design, type of functions to provide and the characteristics of the users. Whatever environment is

evauted, let alone it be a neighbourhood, should be legible even to a layman so that he can response to the stimulii produced by the confronted environment in a familiar fashion.

Neither a single category of descriptors can describe the components of an environment, nor any particular set of indicators can measure its quality. Indices ought to be constructed according to the situation considering the space, people, function and purpose.

Reference

1 BURISCH, M, (ed): *Expert and Lay Opinion in the Evaluation of Housing;* mimeographed lecture note, Deptt. of Psychology, University of Hamburg.

2 CAMPBELL, ALLAN; P. E. CONVERSE and WILLIAM L. RODGERS (1976): The Quality of *American Life- Perceptions,* Evaluations and Satisfactions; Russell sage Foundation, NY.

3 CARP, F M.; R. T. ZAWADSKI and H. SHOKRKON (1976): *Dimensions of Urban Environmental Quality;* Environment and Behaviour, Vol. 8, no, 2.

4 DONNELY, D. (1980): *Are We Satisfied with Housing Satisfaction? Built Environment,* Vol. 6, No. 1.

5 GALSTER , and HESSER (1982) *Environment and Behaviour, Vol. 14.*

6 HEMPEL, D. J. and L. R. TUGKER (1979): *Citizen Preferences for Housing as Community Social Indicators,* Environment and Behaviour, Vol. 11, no.3

7 KERLINGER, F. N. (1964): *Foundations of Behavioural Research;* Holt, Rinehart, and Winston, NY.

8 KRUPAT, E. and W. GUILD (1980): *Defining the City-Use of Objectives and Subjective Measures for Community Descriptions;* Journal of Social Issues, Vol. XXXVI, No. 3.

9 LYNCH, KEVIN (1960): *The Image of the city;* M. I. T. Press, Cambridge, MA.

10 MICHELSON, WILLIAM (1970): *Man and His Urban Environment;* Addison Wesley, Reading, MA.

11 PETERSON, G. L. (1974): *Evaluating the Quality of Wilderness Environment;* Environment and Behaviour, Vol. 6, No. 4

12 SHELLY, M. W (ed.) (1972): *Analysis of Satisfaction;* MSS Information Corporation, NY.

13 STUDER, R. G. and D. STEA (1966): *Architectural Programming, Environmental Design and Human Behaviour;* Journal of Social Issues, Vol. XXII, No. 4

14 ZEHNER, R.B (1980): *Satisfaction with Neighbourhood;* Unpublished Phd Dissertation, University of Michigan, Ann Arbor.

PROFESSIONAL ETHICS AND SOCIAL MORALITY—AN INTERFACE.

HAROON UR RASHID*

ABSTRACT

The shared social concept of justice, virtue and sense of duty is the fountain-head of professional codes. There may be ethical considerations which transcend national boundaries, but universal and uniform rules of conduct are inconceivable in diversity of values and norms. Despite occasional coincidence of self-interest and ethics, individual or group interests are independent of ethical codes. Codes, therefore, appeal to an individual's sense of morality rather than self-interest. While professional codes assure society of professional sincerity and integrity of architects, they enhance standard and promote the profession -- both professed objectives of the Institute of Architects Bangladesh.

INTRODUCTION

Division of labour and differentiation of functions in society produce a vocabulary which describes men in terms of roles they fulfil. The doctor treats the sick, the lawyer defends the accused, the architect designs and the builder builds. Every profession fulfils a social need. Professionalism is a result of social needs without which there would be no professionals. Professionals, therefore, operate within a social framework and are subject to the norms and values of the society. Hence their prime duty is to serve the society justly and virtuously. It is in the social concept of justice and virtue that ethics find their roots.

SOCIAL MORALITY

Injustice, as elucidated by Aristotle, is "to have more than one ought and to suffer it is to have less than one ought."[1] Justice, in short, is getting what one deserves. Modern ethics asks, "What ought I to do if I am to do right?" and puts the question in a way which implies that doing right is quite independent of faring well. In this respect justice has no justification which Plato believes in. As Prichard contents, "..... to justify justice is to show that it is more profitable than injustice, that it is to our interest to be just."[2] But if we do what is just and right because it is in our interest, then we are not doing it because it is just and right at all. Morality cannot have any justification external to itself. If we do not do what is right for its own sake, whether it is in our interest or not, then we are not doing what is right. The notion of what is in our interest or what is profitable to us, is logically independent of the concept of what is just and right for us to do. If what is profitable is also just, this, so far as ethics is concerned is a mere happy coincidence.

* *Architect, Project Consultant, UNDP WORLD BANK DANIDA Project Dhaka.*

Virtues are not inborn, but a consequence of training. Virtuous action cannot be specified without reference to the judgement of one who knows how to take account of circumstances. Consequently knowledge of the means cannot be knowledge of formula, it must be the ability to apply rules to choices. What is of interest in ethical deliberations is not which actions are just or virtuous, but what is it that makes them right? What is it that enables us to mark off those cases which belong on one list from those that do not? What is the criterion? Wittgenstein suggests that the criterion is embodied in a rule and the rule is a socially established practice. Others, like Augustine, suggests devine sanctions.[3] In other words the answers to 'What is moral, right or wrong?' have their roots in value systems; be it individual, social or devine. Moral concepts change from one society to another and also within a society over time. In periods of stable social order all moral questions can be answered from within the context of the norms which a community shares; but in periods of instability the norms themselves are questioned and tested against the criteria of human desires and needs. Same ethical question have different answers in different context and may change with time and circumstances. Questions on freedom of speech are not answered in the same way in capitalist and socialist societies. Or the concept of democracy in medival Europe was different from the present concept. The existing Code of Profession Ethics of American Institute of Architects (AIA) is very different from the codes a few decades ago.[4] While the concept of right and wrong are common to all societies, they vary widely in content. The difference in answers to the same ethical question is related not only to the value system but also to the individuals making the choice. The utilitarians assign much importance to consequence of actions or decisions, as opposed to moral idealists who do not believe in external justification of right action. Stoics believe in ignoring that which is not within ones power to rectify. There are many schools of thought and diverse kinds of investigations have been called 'ethics'. It is perhaps impossible to systematize all the variety into one organising idea. But well known systems of ethics are related to deliberative questions. If we take a set of deliberative questions as our point of departure, we may proceed in one of the two possible directions. We may ask the question in action-situations, applying ethical standards to practical problems or we may study the theoritical complexities suggested by the ethical standards. The latter have held interest with philosophers. But the concern in formulation of code of ethics is with practical relevance of ethical concerns.

CODE OF ETHICS

Ethics is ordinarily conceived of as an effort to introduce some principles into practical life. It would be unrealistic to adopt completely empirical case methods. Ethical investigations look for desirable and undesirable results; for consistencies and inconsistencies; and also for those considerations which according to various philosopies constitute the basis of value judgements. Ethical investigations apply ideas to actual situations seeking facts that can be interpreted by general ideas, rather than guessing the situations that must correspond to ideas. Ideas, however, need not correspond to utilitarianism or moral idealism or any one system of deliberative questions in particular, but may be pragmatic which in essence, is a mixture of all or some of the systems. Ley's contention that, "Practical arts....have virtually abandoned 'principle approach' in favor of 'the case method'....."[5] provides a procedural frame-work to resolve ethical questions.

Ethics is concerned with human actions. They are aimed at serving a purpose which constitutes a part or the whole of the actor's intention in doing what he does. Where observance of rules has no or relatively little connection with achievement of ends, the observance of rules becomes an end in itself -- a private ideal for individuals and perhaps a requirement of social morality. If the achievement of ends on the other hand, is independent of the observance of rules, then ends become dissociated from the requirements of the public domain. It is natural in such circumstances to conceive of the pursuit of pleasure and the pursuit of the virtue as mutually exclusive alternatives. Moral advice then, most naturally, takes the form analogous to 'Gather ye rose buds while ye may' or ' Do what is right

regardless of the consequences.' But this is hardly the intention of code of ethics of professional societies. Professional societies have a purpose and the code of ethics has to uphold that purpose.

CODE OF ETHICS FOR ARCHITECTS

Society designates functions to professional architects and rightly expects a high standard of service. The Institute of Architects Bangladesh (IAB) stands to, promote just and honourable conduct, enhance excellence and advance the profession.[6] Such expectation devolves on architects duties and obligations to clients, fellow architects, related professionals and the society at large. The wide range of issues and conflicts the codes have to contend with, are not always clear and specific. Consensus among architects is a pre-requisite for an effective code of ethics. This, however, is not without complexity. Consensus on issues are often achieved by defining them in terms that are abstract and general. Issues so defined have little operational value. Specific issues, on the contrary, are susceptible to dubious and contradictory interpretations making consensus rather difficult. Public interst, for example, is a general concept. Few, if any, will disagree that architects should uphold public interest. But public interest is difficult to identify in specific situations. Indivisual or group interest distorts judgement and shrouds 'public good' beyond easy recognition.

Codes, therefore, have to address issues that are both specific and general. Only in less controversial situations can codes maintain specificity; the codes otherwise have to be on a level of generality. The general codes, despite operational problems, do have a purpose - that of providing guidelines within which individuals may exercise their value judgement.

NEED FOR CODE OF ETHICS

Architects operate in a social framework subject to the values and norms of the community. There is also a legal system, which, as members of the community, one has to respect. Why then, the need for professional ethics?

Professional ethics and legal provisions may derive inspiration from one value system, but they are not conceptually the same. While some ethical issues may also have legal validity, this is more of an exception than a rule. What is unethical may not be illegal at all. Racial discrimination, for instance, may offend the moral sensibility of some South Africans but it is an expressed legal policy of apartheid. Manipulating an architect out of a design commission in hand does not infringe the law, but is a transgression of professional ethics.

Architects increasingly confront issues that are important in advancing and sustaining professional standards, but are unfortunately without legal sanctions. The concern of professional codes and the Institute are with these issues. Professional codes, therefore, are only applicable to those members of the profession who subscribe to them. An architect practising the codes is honouring the values shared in common by the members of a professional body. A professional body may censure, condemn, penalise or even expel members who violate its codes, but it cannot prevent them from practising the profession. Violation of codes born of social need is a breach of trust; a disregard for social and professional duty. Professional architects who do not practice the code of ethics care neither for the society nor for the profession.

CONCLUSION

Professional codes owe their origin to social morality. The commonly shared social concept of justice, virtue and sense of duty is the fountain-head of professional codes. There may be certain ethical considerations which transcend national boundaries, but universal and uniform rules of conduct are inconceivable in diversity of values and norms.

Despite occasional coincidence of self-interest and ethics; individual or group interests are independent of ethical codes. As codes serve the society and not the individual; they appeal to an individual's sense of morality rather than self-interest. It is the professional codes that assure society of sincerity and integrity of architects; it is the codes which enhance and promote the standard and practice of the profession. Professional code of ethics serves a noble end. Professional Institute formulates code of ethics and mandates that they be followed by its members. But reality is different. Command does not always assure compliance.

NOTES

The article is based on moral and ethical concepts elaborated in Alasdair MacIntyre's *A Short History of Ethics, Macmillan, New York, 1973.* The quotations of Aristole (1) , Prichard (2), Wittgenstein (3) and Ley (5) are as cited in the same work.

4. *AIA Code of Professional Ethics,* American Institute of Architects, Washington, 1961.

6. *IAB Directory,* Institute of Architects Bangladesh, Dhaka, 1985.

THOUGHTS ON URBAN PLANNING AND DEVELOPMENT IN BANGLADESH

KHALEDA RASHID*

ABSTRACT

Bangladesh is a densely populated and predominantly rural country. Resources to bring about development are limited and will remain so in the future. The expected growth of urban population will put greater pressure on the already inadequate basic urban services and bring even greater imbalances in development. Strategy for urban development realistic to the situation and replicable on the large scale necessary. It must concentrate on expanding and increasing the efficiency of urban economy, strive to promote urban services by means that are cost effective and introduce planning controls that will promote desirable growth without stifling private initiative and support.

INTRODUCTION

Growth of towns and urban planning are comparatively recent but increasingly important process in Bangladesh. But there is no comprehensive development plan, which has been adopted or is being implemented even in the major cities. Comprehensive city planning on a deliberately loose and open definition may include "all the subject concerns for which the city claims responsibility". Comprehensiveness also "refers primarily to an awareness that the city is a system of interrelated social and economic variables extended over space".[1] But comprehensive planning incorporating all aspects of urban dynamics is hardly possible in an environment beset with primary constraints of data, finance and skilled personnel.

The level of available skill for urban planning exercise is minimal. There are only a few physical planners (about 100) and only a handful (on an average of about 5 planners) are added to the list every year.[2] There is no way that this deficiency will be made up in the near future. This, however, should not be a matter of deep concern. The control of physical environment is not among the first priorities in a country struggling with the fundamental problems of increasing agricultural output, establishing a more effective communication, education, public health, utilities and striving to create more employment opportunities for its burgeoning population. There is little prospect of resolution of these problems in the near future. It is unlikely that serious damage can be done in the next few years by the inadequacy of physical planning mechanism except in a few key areas of major cities.

Advocates of immediate and strong planning interventions often forget that industrialization, high level of urbanisation and growth of wealth in developed countries started more than a century ago, but it was only after the World War II that governments in those countries established a comprehensive and partially effective landuse control. In the initial periods bye-laws, controls and

* *Associate Professor, Dept. of Architecture, B. U. E. T., Dhaka.*

standards were more important. It is premature to assume that Bangladesh will establish a strong and effective planning overnight. To start with planning, in Bangladesh has no legislative backing. A draft Physical Planning Legislation is under the consideration of the government, but is yet to be enacted into law. Whatever little planning and landuse control powers the pourashavas have are seldom acted upon and the procedure of land acquisition is painfully slow. Furthermore the little urban planning that is practised in Bangladesh draws inspiration from western concept of organisation of space and activities. The morphology of urban areas in Bangladesh is different from cities of the west. So are the circumstances of their origin, the context and the social system that gave rise to the cities. Should we emulate the west or attempt principles and standards born of our own experience? It is only through a slow and steady process that answers to such questions and support for planning will evolve. For the present incremental development with some controls seems a realistic option.

IMPORTANCE OF URBAN PLANNING

Urban growth and development in Bangladesh depend on actions taken by numerous individuals based on immediate needs and without reference to a plan or what others are doing. There is no indication in the history of land development that individuals left to their own, serves public interest.[3] Unfettered market forces leads to congestion, land speculation, social deprivation for the poor and deterioration of the environment. It is for these reasons that the questions of spatial distribution of population visa vis urban-rural, urban-urban and a land-use control mechanism have to be grappled with. A pattern must emerge to bring together the numerous activities of the private and the government such that they supplement each other in an ordered growth. It is not sufficient to integrate the sectoral investments of different ministries with five-year plans. The integration must be in time and place. To put it in specific terms, creation of industrial opportunities must be accompanied by better access to urban functions, public utilities, workers' housing, educational and social facilities and all other activities necessary to develop a satisfactory physical, social and cultural environment. Every investment must supplement each other as pieces in a zigsaw puzzle. For separating them would be encouraging failures and wastages. The national government must have a clear locational policy and the local agencies must be able to give shape and supervision to the integral development before and while it is taking place.

In Bangladesh there is a progressive imbalance developing between its population and its land. From one third of an acre per person in 1974 land-man ratio has decreased to one fourth by 1981. No other country of major importance suffers such an acute shortage of land. Yet this consciousness is not reflected in the way land is used for urban activities. Though national figures do not exist for the amount of land which has been taken from agricultural use for the purpose of building, but bits and pieces of information indicate that more agricultural land is being used than necessary. Rajshahi University, for instance, had acquired 743 acres of land in the fifties, but even after a few decades of development it has used only about 300 acres.[4] By the year 2000 the loss of agricultural land may be 2 million acres — about 10% of the total cultivated land.[5] There is therefore, a very strong case for minimising this loss by planning controls and guidelines.

PLANNING PROCESS

For rational planning it is important to examine the past shift of population and the likely changes in future in relation to the land resources and what an optimal pattern of urban growth might be.

Upon this likely future state and the existing conditions of social and physical services, future investments in land development and infrastructure can be based. The process of urban planning will require the consideration of the present nature of urban settlements, their urban to-urban and

urban-to-rural relationship. It must also consider the effective organisation for implementing the desired pattern of growth, eradication or alleviation of the present weaknesses and what consequences there are for skilled personnel and training.

STRATEGY FOR URBAN DEVELOPMENT

The towns of Bangladesh face an overwhelming problem of population growth and extreme poverty. In this context, the objectives of an urban development strategy through public and private initiatives should be (i) to expand the urban economy in order to create greater amount of productive employment and (ii) to provide increased urban services to the urban population.[6] It would first be necessary to improve the planning, executing and administrative capacities of the urban sector institutions. It would also be necessary to revise many of the existing sub-sector strategies for the provision of urban services. If Bangladesh is to cope with its urban problems, it must begin by improving the institutional framework in the urban sector and develop the capacities of the individual institutaions. An improved planning capacity at the National level to co-ordinate national sectoral planning with local priorities and capacities. Responsibility for local physical urban planning should be clarified. The development authorities should take the lead in this function. Traditional master planning should be replaced with the type of planning used in the 'Dhaka Metropolitan Area Integrated Urban Development Project (sponsored by UNDP and the Asian Development Bank).[7] Cities are dynamic social organisms in a process of growth. The variables are too numerous and dynamic to draw an end-state map of any settlement. Preparing such master plans as are being presently done, is using scarce human and financial resources to little purpose.

Instead urban development guidelines should first be established based on economic, social and administrative realities and then plans for specific areas should be developed when needed and resources are available. This type of planning can be more closely linked with project implementation and national sector planning and budgeting.

Most project implementation will continue to be the responsibility of national sectoral ministries. For example, in the case of shelter, the present agencies within the Ministry of Public Works and Urban Development could continue to implement shelter projects but on the basis of an improved sub-sector strategy focusing on area development schemes. In the larger cities the development authorities could play a role in land acquisition and development. At the same time, the capacity of the pourashavas to provide urban services and maintenance should be improved. This will, however, require an improved local administrative capacity and financial resource mobilization. Ultimately, some of the larger pourashavas may be able to shoulder responsibility to plan and implement urban development projects.

The overwhelming population growth forecasts for towns in Bangladesh and the extremely low income levels of most of the urban poplulation require decisive new strategies for providing land, shelter and urban services. Means should be sought to increase the supply of urban land for low income settlement through large-scale, very minimal standard development. This could be combined with other measures such as improved land taxation to reduce speculative demand in the urban land market. The present government policy of providing subsidised high cost shelter to the rich should be reassessed.

A strategy for urban transport should aim at making better use of the existing circulation network through improved traffic management, rather than high cost new construction. Transport policies should not aim at reducing the use of rickshaws which provide affordable service and large amount of employment. At the same time, urban transport development strategies should help to increase the access of low income groups to land and urban functions. Accessibility to urban functions is very often confused with mobility. It must be realised that it is accessibility and not mobility which is

important in urban communication.

Environmental sanitation needs to be improved, especially in medium and large cities. A greater co-ordination of sanitation, drainage and solid waste management is necessary. Such improvement should be combined with improvements in pourashava management and finance.

The improvement of institutions in the urban sector and the re-orientation of sub-sector strategies are long term efforts. Initial project support should be considered as only the first steps of a long term programmatic effort to augment the capability of Bangladesh to manage its urban problems. The success of initial urban sector projects should be measured in terms of their contribution to increasing the capability as well as immediate benefits to the intended beneficiaries. Projects that provide the opportunities for both institutional development and sub-sector strategy orientation as well as for meeting immediate needs should include area development schemes, transportation and environmental sanitation schemes.

CONCLUSION

The problem of urban planning and development has to be seen in the regional and national context. The planning of a single town or area in isolation will not solve the long term urban problems. A strategy of urban development in Bangladesh must be formulated within the context of overall national development goals and objectives. Bangladesh is a very densely populated and predominantly rural nation. Throughout the country there is very low labour productivity, under-employment and unemployment. Resources to bring about improvement are limited and will remain so in future. The expected growth of urban population will put greater pressure on basic urban services and bring even greater imbalances in urban development. Strategy for urban development should be realistic to our context and replicable on the large scale necessary. It must reckon with high rate of urban growth and poverty of government and people. It must concentrate on expanding and increasing the efficiency of urban economy, strive to provide urban services by means that are cost-effective and introduce planning controls that will promote desirable growth without stifling private initiative and support.

REFERENCES

1. Friedmann, John, *Comprehensive Planning as a Process,* Journal of the American Institute of Planners 31, 195-7, 1965.
2. Bangladesh Institute of Planners, 1989.
3. Kapatur, Maria, C., *Neighborhoods and Urban Policy.*, Practicing Planners, Sept., 1978.
4. Choudhury, A. K. M. K. *Landuse Planning in Bangladesh,* NILG., Dhaka, 1985.
5. James, Prof. John, *Some Aspects of Town and Country Planning in Bangladesh,* (An unpublished paper), The Ford Foundation, Dhaka, 1973.
6. Urban Sector. Report, The World Bank Dhaka 1981
7. Ibid.