

make these densities possible. The proposed town of Hock, England, a landmark residential development would have had 100 people to the acre in the centre, a bordering area with 70 persons to the acre, and another area with 40 persons to the acre. The 1943 Rotshaw Apartments report proposes for the county of London densities of 75 and 100 persons per acre maximum in parts immediately adjacent to the county boundary, followed by an extensive strip, the suburban type, having a maximum of 50 persons per acre. For new sites, an overall net density of 30 was adopted combined with a maximum net density of 50 persons per acre. The Federal Housing Administration (FHA) of U.S.A. has undertaken extensive studies on density and has emphasized the importance of considering basic amenity in relation to density. FHA standards operate within a range of from 12 persons per acre in small single family houses to 850 persons per acre in 24-story high rise apartments (suitable to a very few people and ill-suited to children). Hans Blumenfeld in his final address at the 1957 meeting of the American Society of Planning Officials (ASPO) placed his remarks by posing the question, "Does anybody know what the right density is?" He answered his own question immediately by replying, "I do not. It is 15000 to 80,000 persons per square mile of residential area, 150 to 100 persons per acre. The range is broad and wide, enough to accommodate a great variety of consumer preferences. Yet in giving this range Blumenfeld established that there is both a lower and an upper limit of acceptable density."

Residential areas of excessively low density development (with 5 houses per acre) have many disadvantages which can be summarized as follows: very large investments for roads and utilities to serve the extensive area; low density neighbourhoods have insufficient provision of civic and cultural facilities, and to work the low density neighbourhoods have insufficient provision within easy walking distance to support a primary school.

RESIDENTIAL DENSITY : A PLANNING DILEMMA

A.S.M. Mahbub-Un-Nabi*

The density standards for residential areas provide a very useful guide for various planning calculations, specially in housing. The importance of density standard as a planning consideration is reflected in the fact that the density standards are valuable planning tools for preliminary design schemes and for reflecting the important characteristics of site planning. Density measurements provide a uniform and objective method of estimating population loads and required areas of land for general openness, amenity and livability. They make it convenient to calculate the various possible combinations of dwelling types desired to make up a neighbourhood. Proper standards, carried out through competent design, have major value as controls in zoning ordinances, subdivision regulations and the like. The adequacy of city-wide utility systems, transits, education, recreation and other municipal services is affected by the density pattern, which, if unplanned, may cause serious spot over-loading.

It is very difficult to prescribe the right density for a residential area. The acceptable conditions can be created over a wide range of densities. The appropriate density for a particular case is determined by various factors like the location, family-type, consumers' preferences etc. Low density American suburbs, with house on generous lots, contain only 6 persons per acre. Typical American suburb has average densities of about 25 people to the acre. Chandigarh in India was planned for 56 people per acre. Ping Yuen, in San Francisco's China town, has 365 persons per acre. Recent development in high-density residential design would

*Assistant Professor and Head, Department of Urban and Regional Planning, Bangladesh University of Engineering & Technology, Dacca, Bangladesh.

make these densities possible. The proposed town of Hook, England, a landmark in design, would have had 100 people to the acre in the centre, a bordering area with 70 persons to the acre, and another area with 40 persons to the acre. The 1943 Forshaw Abercrombie report proposes for the country of London densities of 75, and 100 persons per acre maximum in parts immediately adjacent to the county boundary, followed by an extensive area, 'the suburban ring,' having a maximum of 50 persons per acre. For new sites, an overall net density of 30 was adopted combined with a maximum net density of 50 persons per acre.¹ The Federal Housing Administration (FHA) of U.S.A. has undertaken extensive studies on density and has emphasised the importance of considering basic amenity in relation to density. FHA standards operate within a range of from 12 persons per acre in small single family housing to 850 persons per acre in 24-story high rise apartments (tolerable to a very few people and ill-suited to children)². Hens Blumenfeld in his brief address at the 1957 meeting of the American Society of Planning Officials (ASPO) prefaced his remarks by posing the question, "Does anybody know what the right density is?" He answered his own question immediately by replying, "I do,—It is 12000 to 60,000 persons per square mile of residential area," (20 to 100 persons per acre). The range is broad and broad enough to accommodate a great variety of consumer preferences. Yet in giving this range Blumenfeld established that there is both a lower and a upper limit of acceptable density.³

Residential areas of excessively low density development (with 4.5 houses per acre) have many disadvantages which can be summarised as follows : very large investments for roads and utilities to serve this extensive area; long travel distance from the outer areas to the commercial, civic and cultural facilities, and to work; the low density neighbourhoods have insufficient population within easy walking distance to support a primary school, a shopping centre or other facilities. "In low density areas, the accents and community focal points, which would give identity to the grouping, are missing. There is too loose a relationship between building forms and open spaces. Social contact is frustrated."⁴ "The housewives at such areas of low densities lead isolated lives resulting in lack of participation in civic, school, church, social and cultural affairs."⁵ On the other hand, very high density increases congestion, specially in transportation. High density forces high rise construction which are unsuitable for the children. "Like very low density development, very high density developments, too, tend to exclude the poor unless, of course, their housing is subsidised."⁶

The intensity of residential use can be expressed by different types of density calculations: population density, dwelling density, building coverage and building bulk, etc. The dwelling density i.e. the number of dwellings per acre of land have the limitation that they do not measure the exact population load on residential land. The number of persons will vary with dwelling sizes and with occupancy conditions. Population densities which measure the number of persons per acre of land should, under no circumstances, be so high that the out door residential space requirements cannot be met.

The building coverage bears an obvious relationship to population density; (building coverage is the proportion of net residential land area taken up by ground area of buildings). It is obvious that if the buildings cover too large a percentage of the land, insufficient outdoor space will remain for various uses conducive to health, and this lack of space may also result in inadequate arrangements for circulation. The intensity of land use should not be so great as to cause congestion of building or to preclude the amenities of good housing.

Specially, building densities should be limited to provide adequate daylight, sunlight, air and usable open space for all dwellings, adequate space for all community facilities and a general feeling of openness and privacy.

'The figures for building coverage are more tangible standards than those which it has described for light and air, and for other criteria that would affect buildings spacing, and therefore recognizes their usefulness in municipal regulation. At the present time, 20 to 30 per cent coverage of land within property lines appears to be practical and to permit conformity with standards for light, air and open spaces. Control which set maximum net coverage exceeding 35 percent may fail to provide sufficient open space and may lead to overcrowding of people on the land'.⁷

'Building bulk' in terms of 'floor area ratios' provide a very useful measurement as a density control, and it is being increasingly applied by the planners in many countries including the U.S.A. and U.K. 'Floor area ratio' is the total floor area of all stories used for residential purposes, divided by the area of residential land, and it establishes a mathematical relation between the land area, the floor area of the building and its height.

The mathematical relationship is expressed by the following formula :

$$F = \frac{G \times S}{A} = B \times S$$

Where, F=Floor area ratio
G=Ground area of building
S=Number of stores
A=Area of land
B=Building coverage.

The floor area ratio is considered as one of the most accurate indices for adequacy of light and air. This is apparent because floor area ratio is related to the spacing of building and their height. If, for example, parallel rows of four-story buildings are spaced two and a half times their height to permit proper sunlight admission, the floor area ratio must be approximately 1.20, assuming 10 ft. story height and 35 ft. building depth. In other words, if the floor area ratio in some residential district is set at 1.20, it means that it is equivalent to four-story buildings at 30 per cent land coverage, or five story buildings at 25 per cent coverage and so on.

It should be noted that the floor area ratio does accurately reflect the population density without the use of an additional index of 'floor area per person'. The floor area per person generally varies according to the standard of living, usually increasing as income increases. So it is possible to relate population density with floor area ratio if the floor area per person is determined.

References

1. Brown, A.J. and H.M. Sherrard; *Town and Country Planning*. (Victoria, Australia : Melbourne University Press, 1959) P. 243.
2. Spreiregen, Paul D., *Urban Design The Architecture of Towns & Cities* (New York, McGraw-Hill Book Company, 1965) P. 147.
3. Ibid. P. 146
4. Ibid. P. 147
5. Blumenfeld, Hans, *The Modern Metropolis—Its Origin, Growth, Characteristics and Planning* (Selected Essays) Edited by Paul D. Spreiregen, (Massachusetts, The M.I.T. Press Ltd.) P.177.
6. Spreiregen, Paul D., op. cit. P. 147.
7. U.S. Public Health Association, Committee, on the Hygiene of Housing. *Planning the Neighbourhood : Standards for Healthful Housing*. (Chicago: Public Administration Service, 1960) P. 40.