

UNITED NATIONS
ECONOMIC
AND
SOCIAL COUNCIL



Distr.
GENERAL

E/CN.14/HOU/60
16 February 1970

Original : ENGLISH



ECONOMIC COMMISSION FOR AFRICA

NOTES ON MODEL REGULATIONS FOR SMALL BUILDINGS
IN TROPICAL COUNTRIES

M70-439

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NOTES ON MODEL REGULATIONS FOR SMALL BUILDINGS
IN TROPICAL COUNTRIES ^{1/}

GENERAL

Model Regulations for Small Buildings in Tropical countries were set out in a previous document under No. E/CN.14/HOU/58. This new document entitled Notes on Model Regulations for Small Buildings in Tropical Countries is intended to be read in conjunction with the model regulations.

The intention of the Model Regulations is to set out the minimum acceptable standards and, for the guidance of local builders, to indicate in deemed-to-satisfy clauses some ways in which these standards can be met. The Code is phrased as simply as possible. It is assumed that these draft specifications will be checked in each country by the official professional staff and reduced, extended or altered to accord with good local practice.

^{1/} Model regulations prepared by the Building Research Station, Garston, Watford, Herts, England. These model regulations are being translated into the French language in collaboration with Centre Scientifique et Technique du Batiment (CSTB), Paris, and Secretariat des Missions d'Urbanisme et d'Habitat, (SMUH), Paris.

PART I. APPLICATION AND ADMINISTRATION

- 1.04 The maximum size of buildings to which this Code applies will vary from country to country: a suggested figure is 700 sq.ft. but some governments may decide on a higher figure.

The classes of building referred to are set out at length in the Main Ordinance which was circulated in August, 1960. Briefly the Code covers small dwellings and small dwellings of which one room is used as a shop or for a cottage industry: under paragraphs (d) (e) and (f) it covers also small buildings used for offices and workshops.

- 1.06 Generally it is neither necessary nor desirable to insist on complete drawings for such small buildings: the owner is put to unnecessary expense. However, if drawings are desired the draft 'application for a permit to construct' form can be amended to include them.

In the interests of the erectors of small buildings some Authorities may wish to see the title to the land before permitting the construction of a building: this is by no means uncommon in Planning Legislation.

- 1.07 This may be omitted where the existing Main Regulations are out of date.

PART II. SITING BUILDINGS

In some Local Authority areas there is in existence a complete development plan made and approved under Town Planning legislation: where this exists there will be no need for much of regulations 2.01 to 2.05 and 2.07; they can be replaced (for the convenience of users of this Code) by quotations from the Planning regulations.

For administering this Code where there is no such development plan it is assumed that there is a layout map of the area showing

- (a) the position of road reserves and building lines;
- (b) the position of plot corners;
- (c) the approved use of all plots (e.g. residential, commercial, noxious trades etc.)

It is also assumed that the plots will be beaconed on the ground.

The draft regulations set out herein are in no way an attempt to supplant planning legislation but are intended to provide a means of control where it does not exist.

- 2.01 It is understood that normal occupancy works out at about this figure.
- 2.03 This draft permits detached and semi-detached buildings only. In some countries plots are small and narrow and terrace development is normal and is undertaken by the builders who would use this code. It is for each country to decide whether it agrees to permit the construction under this code of a block of, say, 15 dwellings each of 700 sq.ft. on plots, say, 20 ft. wide: if the decision is yes it will be necessary only to delete the last sentence of this regulation. One objection to terrace housing is that through ventilation can be achieved only by leaving large openings at the top of internal walls and so removing the sound insulation between rooms. By restricting this code to detached and semi-detached buildings there can be cross ventilation through side windows and this, indeed, is encouraged in Part IV.
- 2.04 The alternative drafts cover -
- (a) the general case, and
 - (b) where it is desired to group latrines and/or ablutions at the back of the plot.
- Where the intention is to group water closets or aqua privies at the corner where four plots meet, it will be necessary to add a proviso to regulation 2.03.
- 2.05 The object of this Regulation is to enable the Local Authority to control the development of their town by restricting offices, factories etc. to certain parts of the town.
- 2.07 (2) and (3) These suggested distances are general and safe for most soils: however they are quite inappropriate to fissured limestone and some other geological formations. The views of the Medical Authorities are required in each case, perhaps with geological advice.
- 2.10 This regulation is suggested only for areas liable to hurricanes and is intended to reduce damage by them.

PART III. ACCESS AND ACCOMMODATION

GENERAL

When drafting this part of the Code we must bear in mind that our concern is for the health and safety of the occupants of a building. If we lay down accommodation standards higher than the minimum necessary for health we, in fact, ensure that men build a smaller number of more comfortable houses rather than a larger number of adequate ones. Most countries consider that, with limited resources and many needing housing, the second alternative is preferable.

In order to frame building regulations one is forced to adopt some minimum dimensions and to make some assumptions; in these notes are set out the assumptions on which the draft has been based.

- 3.01 Access is needed for normal use, for refuse collection and for escape from fire.

DEEMED TO SATISFY

- 3.02 The specification for a wooden stairway is a precis of B.S. 585. No short specification can be offered for reinforced concrete or metal stairways which are often prefabricated.

- 3.03 The provision of a store room is most desirable.

- 3.04, 3.05 The floor areas are based on 40 sq.ft. per person and at least two persons sleeping in each room. Two children under 10 years old are assumed to equal one adult. The size of shops and workrooms (vide definitions in reg. 1.02) will vary with the practice in each country.

The figure of 40 sq.ft. of room area per person has for years been adopted in many lands and the consensus of medical opinion is that it provides a satisfactory basis for design: nobody could state definitely that, say 38 sq.ft. would be inadequate or 42 sq.ft. unduly extravagant. For labour lines the figure of 50 sq.ft. was recommended by an ILO Conference for southeast Asia: of this 10 sq.ft. was to be provided in dining rooms, verandahs etc. and 40 sq.ft. in bedrooms.

The minimum heights of a habitable room or workshop is assumed to be 8 ft. in a hot/wet climate or 9 ft. in a hot/dry one. A note on ceiling heights is attached.

- 3.06 This wording is an attempt to insist on the provision of an adequate store-room (in which a bicycle can be locked up) while its size makes it difficult to use as a spare and very under-sized bedroom. Where the small house is on two floors this size of store can be fitted under the stairs if they rise in one straight flight.
- 3.11, 3.12 These draft regulations cover the provision of fittings which, though most desirable, cannot be afforded in all countries. The size of wash-hand basins is smaller than that shown in B.S. 1188 and 1329 this reduction was made for reasons of cost and to permit the economies inherent in using spray taps and no waste plugs. No provision has been made for the use of sitz-baths: a draft for these can be forwarded on request.
- 3.13 Countries may wish to delete one or more of the classes.

As aqua-privies are new to some countries it is suggested that Local Authorities should supply type drawings: details of this and other types of closets are given in Bulletin No.8 of June, 1960, entitled 'Rural Sanitation in the Tropics', issued by the Ross Institute, The London School of Hygiene and Tropical Medicine, Keppel Street, London, W.C.1. The effluent from aqua-privies can be led to soakaways in each plot or - preferably - to a sewage treatment works. Attention is invited to the modern method of stabilisation ponds which is very cheap.

PART IV. LIGHT AND VENTILATION

GENERAL

The desiderata for light and ventilation depend on the climate: the difficulty in preparing suitable legislation lies in the fact that in many regions the climate varies according to the season of the year. When drafting these regulations it was assumed that there are five main types of climate in the countries concerned:

- (a) 'Hot/wet', in low latitudes, except where the typical equatorial climate is affected either by altitude or great distance from the sea;
- (b) 'Hot/dry', in the arid regions of the deserts;
- (c) 'Monsoon' climates where there are distinct wet and dry seasons. Some of these climates approach climate (b) with long dry seasons and short wet ones: others approach climate (a);
- (d) 'subtropical' climates such as those on the high table-land which covers much of the middle of Africa.
- (e) 'Island' climates where the atmosphere is always moist and trade winds blow for most of the year.

For the purposes of these regulations two separate drafts have been prepared: they are intended to cover climates (a) and (b). It is for the committees considering building legislation in each country to decide what is applicable in a particular Local Authority's area.

Some of the principles of natural ventilation are discussed in the note on ceiling heights which accompanies this Code. In all hot climates the buildings must have good thermal insulation from the sun: a simple metal or asbestos/cement sheeting roof is not enough. In the hot/wet climates there is need for shade and large ventilation openings, some of which should be near the floor and others near the ceiling. It is much more difficult to frame regulations for hot/dry climates because there are two different architectural solutions to the problem of designing cheap and reasonably comfortable small houses. The legislation must permit the adoption of either of these solutions. One is the traditional building with thick walls of stone or earth and only small clerestory windows. The walls absorb heat from the atmosphere during the day and radiate it at night. The other solution is the house with wide verandahs which ensure that the sun does not shine on the inner walls after, say, 9.0 a.m.: it is desirable that the windows in the main walls should be capable of being shut to exclude dust and heat during the day. In hot/dry climates the windows need not be large because the ground and other buildings reflect the brightness of the sunlight.

To turn the theories outlined above into legislation it is suggested that in hot/dry climates the openings for light and ventilation should depend on whether the walls are thick or thin.

HOT/WET CLIMATES

4.01-4.02 The wording allows openings for light and ventilation to have coverings of any desired material - other than those forbidden in Regulation 5.01 - or louvres. This is based on the assumption that the coverings will be, at any time, opened sufficiently to permit the movement of air and the entry of enough light for the occupants. Glass may be used anywhere but must be used in kitchens, see the note on Regulation 4.03.

Openings are specified as fractions of the floor area because concepts such as lumens per sq.ft. are foreign to most of the users of these regulations.

4.03 Most accidents happen, and fires start, in the kitchen: the insistence on glass ensures a good standard of natural light during daylight hours. This insistence is really a safety precaution.

4.04-4.05.4-10-4.11 In small houses these rooms will probably be near to the legal minimum so, for simplicity, the area of opening is given in square feet and not as a fraction of the floor area.

4.12 In most countries it is the custom to fix expanded metal or burglar bars to all ground-floor windows: this practice can raise a very grave fire hazard because it renders escape through a window impossible. The deemed-to-satisfy specification gives one method of avoiding this risk. A key in a glass-fronted box on the wall cannot be lost or reached by a burglar.

HOT/DRY CLIMATES

4.02 The draft distinguishes between buildings with thick, heavy walls and those where the walls are protected from the sun by shading. The reason for this is discussed in the general notes to PART IV.

OTHER The notes on Regulations for the HOT/WET climate apply here also.

CEILING HEIGHTS IN WARM CLIMATES

In nearly all countries there is the need to provide better housing for most of the inhabitants: the problem before governments is therefore to encourage public authorities and private builders to construct as many healthy dwellings as cheaply as possible. One way to reduce building costs is to reduce ceiling heights, and it is for each country to decide what is the minimum height compatible with health. The object of this note is to set out the known facts and the opinions of qualified and experienced observers.

To be healthy, a human being in a room needs an adequate supply of fresh air and a reasonably comfortable climate: the comfort is of importance because if the climate is much too hot he cannot sleep or work well. The height of the ceiling is one of the factors which affect comfort, but it cannot be considered in isolation without taking into account ventilation and the extent to which solar radiation warms the roof and ceiling. In warm climates it is most important that the top storey of any building should be adequately insulated from the sun's radiation: one thickness of corrugated iron is not enough. The ceilings of storeys other than the top storey have plenty of protection. Solar radiation also heats the walls, especially those facing west, so shading is most desirable.

When there is an appreciable wind velocity out of doors the ventilation of a room depends mainly on the size of openings in the walls and on whether or not there is cross ventilation. In the case of hot/wet climates it has been shown (1)

- (a) that the air outside an occupied room is normally cooler and drier than the air inside it: thence good ventilation is very important;
- (b) that there is little or no wind at about sunset, which is subjectively one of the warmest periods of the day and when the need for ventilation is most acutely felt. Therefore during these periods one must rely on the stack effect;
- and (c) that there is discomfort due to cold in the early hours of the morning.

In hot/dry climates the outside air during the least comfortable hours of the day is normally hotter than the air in a room: hence large openings are not desirable. However for comfort the air in rooms should move slowly so, again, the stack effect is important. Nights in these regions are frequently cold.

The stack effect occurs when the hot air in a room rises and is replaced by cooler air entering at a lower level: the reverse stack effect occurs (in hot/dry climates) when hot air enters a room near the ceiling and slowly cools and sinks, before leaving at a lower level. Thus for efficient stack ventilation some openings should be as high as possible and others near the floor. The stack effect varies with the square root of the vertical distance between the middle of the top and bottom openings. It has also been shown that any air above the top of the high ventilators is stagnant and so of no advantage to persons in the room. Hence the upper ventilating openings should be in or as near to the ceiling as possible.

The maximum benefit from the stack effect would be obtained by having other ventilators at floor level. However, experience has shown that fixed ventilators at this level are often blocked up, and kept blocked up, by the occupants of the room: there are various reasons for this behaviour, such as fear of the entry of snakes and insects and the discomfort of a draught on a cool night. Therefore any floor level ventilators should be made to be opened or closed at will.

In hot/wet climates - where as much ventilation as possible is required - it would be wise either to insist on the provision of floor-level ventilators or to lay down the maximum height of window sills above floor level. In hot/dry climates there is no such need for having low ventilation openings.

In warm and moist places where there is an appreciable wind movement during the important times of day the gain in comfort due to the stack effect is not large compared with that obtained from moderate increase in the size of the ventilation openings. The upper storeys of multi-storey buildings benefit from the fact that wind speed increases as one rises above ground level.

With this very brief outline of the need for insulation and the correct ventilation we can consider minimum ceiling heights.

Research has been carried out in three countries (2) (3) (4) into the effect of ceiling heights on room temperatures. However these experiments were made in empty rooms and the results cannot be assumed to hold for rooms with people in them. Once a room is occupied the conditions in it become very complex: the number of occupants varies, and some or all of them may move about. All these factors, and others, affect the motion and the degree of turbulence of the air to such an extent that the question appears not to have yet been subjected to scientific analysis.

Research in England (5) was concerned with ceilings 8 ft. 0 in. or 7 ft. 6 in. high; few people were made unhappy by adopting the lower figure.

The consensus of opinion of skilled and experienced observers (6) (7) (8) is that there is no reason to insist on high ceilings, but every reason to require good ventilation during the day. It has also been pointed out that bedrooms get too cool at night and so the occupants must be able to close the windows if they are to be warm enough.

Very brief summaries of these references are as follows:

- Ref (2) Recommends a reduction from 3.00 metres (9 ft. 10 in.) to 2.50 metres (8 ft. 2 in.)
- (3) Reports no temperature difference below ceilings 12 ft. 0 in. and; 8 ft. 0 in. high;
- (4) Favours 9 ft. 0 in. minimum in hot-arid climates and ventilation which can be opened or closed at will;
- (5) Reports no temperature difference in England below ceilings 8 ft. 0 in. and 7 ft. 6 in. high; the question in this instance was whether ceiling height could be reduced by 6 inches;
- (6) Recommends for hot/wet climates a height of 2.50 metres (8 ft. 2 in.) or 2.60 metres (9 ft. 10 in.) if a ceiling fan; for hot/dry climates a height of 3.00 metres (9 ft. 10 in.) 'appears reasonable' for airconditioned rooms 2.50 metres (8 ft. 2 in.) and corridors 2.30 metres (7 ft. 6 in.);
- (7) Recommends 8 ft. 0 in. except perhaps in hot/dry climates: with a ceiling fan there must be 8 ft. 6 in. In both cases there is the proviso that vents must be near the ceiling and the roof adequately insulated;
- (8) Considers 9 ft. 0 in. reasonable for flat roofs and 8 ft. 6 in. for pitched roofs. This paper was written before any of the others and so advised a lowering of ceiling heights before the research work quoted above: flat roofs were more common in the drier climates.

As regards aesthetics, one should also remember that one's judgment on the necessary minimum height is apt to be clouded by a sense of architectural proportion; a low and very large room offends the eye and so does a high and very small one. The minimum legal height should always be thought of in relation to the minimum room sizes. A more affluent house occupier will demand - and get - both room sizes and heights above the minimum and will be more comfortable.

Taking all these factors into account the regulations being drafted here will require adequate ventilation and that the height of habitable rooms in residential buildings should be at least:

8 ft. 0 in. in hot/wet climates

9 ft. 0 in. in hot/dry climates

The introduction of these ceiling heights would affect considerable economies and there seems to be no evidence that it would adversely affect the health of the occupants provided that there is adequate ventilation and overcrowding is controlled. For multi-storey buildings the percentage of the total cost which is saved by reducing ceiling heights is greater than for single-storey buildings.

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- (6) Ceiling Heights. A review of factors which determine the height of rooms in warm climates. G.A. Atkinson. 1955 Conference at Nairobi on Medical, and other aspects of African Housing. (Mr. Atkinson was Head of the Tropical Division, Building Research Station, Watford, England).
- (7) Modernisation of indigenous housing practice in tropical countries. Dr. J.C.R. Buchanan. Jnl. Royal. San. Inst. vol. LXX. 1950. (Dr. [now Sir J.] Buchanan was Chief Medical Officer at the Colonial Office, London).

PART V. MATERIALS AND CONSTRUCTION

- 5.01 It seems desirable to list the forbidden forms of construction and so save queries.

Some governments may decide to permit the use of pise-de-terre provided the soil is stabilised with cement or lime. This is safe where there is available either close control of the quantities of stabilising agent used and of the mixing or where skilled workmen have used this method for years.

- 5.02 In areas where hard rock is at ground level it will be necessary to replace the first sentence of para (1) (c) of the regulation by - "be set in trenches or holes excavated to rock or solid ground: provided that where hard rock exists at or near ground level then it shall be chipped and the foundation keyed to it to the satisfaction of the Buildings Authority. Where rock is not encountered the depth to the bottom of the foundation shall be not less than 1 ft. 6 in."

- 5.03 If other forms of wall construction are expected it will be necessary to add suitable deemed-to-satisfy clauses.

- 5.04 Local tradition and crafts should be kept in mind when considering this regulation. For instance in the U.S.A. and Canada the tendency is not to use nogging pieces for the walls but to provide lateral stiffening by a stronger covering than that specified here. Nailing has been specified in detail to reduce site disputes;

- 5.06 Local tradition and the use of strong timber may permit greater spans in the deemed-to-satisfy section. The draft is based on not particularly good timber;

- 5.07 A termite barrier is necessary in most countries and a type drawing for issue under para (1) (e) of the deemed-to-satisfy clause is attached as the sixth schedule.

- 5.08 Except in hot/dry climates a damp-proof course is desirable.

- 5.09. Deemed-to-satisfy clause for solid floor on the ground. Para (3) can be omitted in many lands.

- 5.10 Para (3) of the deemed-to-satisfy clause is based on not particularly good timber: if only strong timber is used the spans may be increased.

- 5.11(2) The proviso is to permit economies to be made by rendering only the walls on the sides from which rain comes.

5.13 Where timber lintels are permitted it will be necessary to alter the first paragraph (2) of the deemed-to-satisfy clause and add a paragraph (4).

5.15 The word louveres is used here: in the West Indies the word for the same thing is jalousies.

5.23 When deciding which chemicals to accept and the minimum permissible degree of absorption it is necessary to consider three points

- (a) the local species of termite,
- (b) the chemical or mixture of chemicals which will be effective,
- and (c) the absorptive power of the timbers concerned.

Advice should be obtained from an organisation such as the Termite Research Unit, British Museum (Natural History) London, S.W.7. or the Forest Products Laboratory, Princes Risborough, Aylesbury, Bucks, England, or a similar institution overseas. The principles are set out in the book 'Termites' by W.V. Harris. pub. Longmans Green & Co. Ltd., London. (1961).

5.25 This regulation is phrased to cover the three contingencies in which an Authority should control painting under Building Regulations. The deemed-to-satisfy clauses include good modern practice: they will need careful scrutiny to ensure that nothing is included which is not available or likely to become available in any particular country.

PART VI. HEARTHES FIJES CHIMNEYS AND HEAT PRODUCING APPLIANCES.**GENERAL**

Part VI has been divided into four sections so that the fire precautions can be made less stringent where the risk is smaller.

Throughout the regulations in this Part the recommended dimensions are based on British traditional practice, not on scientific experiment: so it will probably be safe to vary them slightly to suit the materials and usages of other countries.

FOR SOLID FUEL

- 6.01 Open cooking slabs with portable charcoal cooking stoves are used in Asia and elsewhere.
- 6.03 (1) (b) and (2) (b) The projection in front is to allow for burning fuel falling from the fire area.
- (3) This is intended to prevent the edge of a combustible floor covering from catching fire.
- (4) This dimension of 6 in., (4 in. hearth thickness plus 2 in. air space) should not be reduced.
- 6.04 (3) This may be considered to be unduly stringent, and can therefore be deleted.
- 6.05 Flue pipes and chimneys collect soot which may subsequently catch fire: hence the precautions against fire. Flue pipes taken up outside the walls of houses are cheaper than chimneys, and will often be used for small buildings.
- 6.06 A circular flue can be smaller than a rectangular one because it is swept clean by a brush: the corners of rectangular flues are not always cleaned.
- 6.08 These rules should prevent down-drafts and nuisance from smoke.
- 6.09 See the note on 6.05.
- 6.10 Hoods will not normally be necessary in a small dwelling serving only one family: however they will be needed in kitchens where cooking is done for many (small restaurants etc.) and perhaps elsewhere (workshops etc.). So this Regulation is included to enable the Buildings Authority to insist on the provision of hoods where it considers them necessary.
- 6.12 (2) This Regulation is useful to enable the Authority to condemn a dangerous (and perhaps home made) appliance. It may or may not be desirable to include a list of appliances which will be deemed to satisfy the requirements.

GENERAL FOR LIQUID FUEL

It is assumed that regulations exist elsewhere covering the size of fuel tanks and fuel storage in general. If no such regulation exist some should be included in this section.

- 6.15 Ordinary cooking appliances fall into group (1)
- 6.16 This is less stringent than 6.03
- 6.18 This is a repeat of Regulation 6.04
- 6.19 Soot is less likely to collect in flue pipes from appliances which burn liquid fuel, but it may happen: so the requirements of Regulation 6.19 are only somewhat less onerous than those of Regulation 6.05.
- 6.20 Please see the note on Regulation 6.10.
- 6.21 Where a chimney is provided there is always a chance that solid fuel will be used at a later date: so no relaxation is suggested for chimneys.
- 6.22 Please see the note on Regulation 6.12.

GENERAL FOR GASEOUS FUEL

It is assumed that regulations concerning storage etc. exist; if there are none some should be included in this Section.

This section differs but slightly from the section dealing with liquid fuel, and the Notes on that section apply here also: the requirements for hearths have been reduced.

FOR ELECTRICITY CONSUMING APPLIANCES

- 6.36 This reduces the requirements to a minimum.
- 6.38 Please see the note on Regulation 6.10
- 6.39 and 6.40 These are presumably covered by the Electricity Regulations: if so they can be deleted and Regulation 6.41 retained.

PART VII. MISCELLANEOUS PROVISIONS

GENERAL

These regulations cover the rooms of a small building which are used for a 'cottage industry' and some other regulations. There is no reason why - if a Government so desires - these regulations should not be rephrased to cover also detached small buildings which are used as laundries, commercial kitchens etc. There is, in fact, much to recommend this. If it is done there will be consequential changes in Regulation 1.04.

7.05 In many districts the keeping of animals other than domestic is either:

- (a) forbidden under Town Planning Legislation, or
- (b) impossible to prevent, or
- (c) both

In such places this Regulation would clearly not be needed. However, it was considered that there might be a need for it in some places, and the draft is included. If it is used there will be a consequential amendment to Regulation 1.04 to include Buildings defined in Class 4(1) of Section 2 of the Buildings Ordinance.

No standards of accommodation (stall sizes etc.) for animals have been suggested. Those published by the Ministry of Agriculture and Fisheries in London can be provided on request: these standards refer to British practice only.

PART VIII DRAINAGE AND SANITATION

GENERAL

Before dealing with Part VIII it is worth considering the usage of the words 'sewer' and 'drain'. In Regulation 1.02 a sewer is defined as meaning an underground pipe conveying foul water and a drain as an underground pipe conveying surface water or subsoil water or both. These definitions have several advantages: they are simple; they avoid confusion in the text of the Regulations; and they facilitate translation into other languages.

In English legal history there have been various interpretations of these two words: in general a 'drain' means a pipe taking the effluent from one house only, and a 'sewer' means a pipe taking the effluent from several houses. This leads to the use of cumbersome expressions such as 'foul-water-drain' or 'fresh-water-sewer'. For all practical purposes it is of more importance to distinguish the contents of a pipe than whether it serves one or several houses.

The definitions proposed in Regulation 1.02 are already in use in some areas. Indeed it is known that in one place the rule is that round manhole covers are always used on sewers and rectangular covers on drains. It is then obvious on the ground which pipe is which. An alternative technique for sewers is to use triangular covers pointing in the direction of flow. If any country decides to adopt one of these practices it will only be necessary to amend Deemed-to-Satisfy clause (5) to Regulation 8.04.

- 8.01 (2) In existing overseas legislation this figure varies from 100ft. to 210 ft. from any point on the plot to the public sewer. In England and Scotland the figure is 300 ft. from the building.
- (3) (c) In some countries it is a common practice to collect bath water in containers and use it daily on the garden: where this is permitted there should be mention of it here and/or in the next paragraph.
- (3) (d) Taking waste water to soakaways is not good practice because the ground near the soakaway becomes choked up and unhygienic. However in some places this cannot be avoided. It is hoped that it will be possible nearly everywhere to delete all references to cess pits.
- (4) See the 'general' note above.

8.02 (2) (a) Effluents from aqua privies and septic tanks may be less than 4 in. diameter.

(3) For small buildings this is the simplest rule.

8.04 (2) In existing legislation this figure varies: in several African countries it is 50 ft.: in England and Scotland it is 150 ft: in Aden the rule is 75 ft. between manholes, but this phrasing makes no reference to the distance from a soil pipe to the first manhole.

8.06 (4) This is applicable only in some areas.

8.09 (1) To supply drawings is simplest. The specification in the deemed-to-satisfy clauses can be deleted where drawings are supplied.

8.10 (1) To supply drawings is simplest; however, the use of cess pits is to be discouraged. The specification in the deemed-to-satisfy clauses can be deleted where drawings are supplied.

8.11 (1) Modern thought is against interceptors for several reasons: they do little good: the air inlet frequently has the mosquito gauze broken and so the interceptor becomes a breeding place for insects: they are expensive the cost cannot be justified and they choke.

(2) Many authorities have a fixed charge for making connections, or two charges, one for distances up to 'x' feet and one for longer connections. Where the charge is not fixed there should be a sentence authorising the Authority to collect the estimated cost in advance and, after the work is completed, to return any balance or to claim where the actual cost exceeds the estimate. The fixed charge scheme saves paperwork and argument.

B. SURFACE AND SUBSOIL WATER

Two drafts are attached for these regulations. In most countries eaves gutters are permitted and the draft for these conditions contains Regulations 8.20 to 8.26 inclusive.

In some countries, however, no gutters are permitted because there is a fear that mosquitos will breed in them if the gutters either move in their fixings or become blocked with dead leaves. The alternative draft for these countries comprises Regulations 8.20 to 8.25 inclusive and permits a drip preventer over doorways.

Where eaves gutters are permitted

- 8.23 (1) (a) The specification in the deemed-to-satisfy clauses is inadequate.

This is because these tanks are either manufactured (usually to a good standard) or, as in the West Indies, made by local craftsmen who are highly skilled. I regret that any detailed specification will have to be written locally.

Where eaves gutters are not permitted

- 8.21 (2) If the single length of gutter over a doorway is to be forbidden it will be possible to reduce these Regulations and the deemed-to-satisfy clauses.