Building Metrication News

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This section appears in the fourth issue of 'Building' each month, and gives current news and information on metrication, as well as providing a forum in which the ramifications of the change to metric can be freely discussed. It is published in association with the Modular Society.

CONTENTS

METRIC MONTH

Training for the Change

If the meeting held at the beginning of the month at the RIBA is anything to go by, there is general agreement that there is little need for any formal retraining for the change to metric. At least this is true for the professions. What is needed is a consistent use of the metric system and in particular of SI units. It is agreed that fluency in the use of the system is only likely to be gained by practical application. Those on the drawing board or otherwise concerned with day-to-day application should not find the change too difficult. But others, perhaps older or more senior, may well find it hard to keep up. The key point at the moment is to ensure that one is in the picture and by now any office of any size should have appointed at least a staff member to keep up with the programme and to obtain, and read, the basic publications.

However, the change to metric includes the adoption of dimensional co-ordination. This is a subject which for some reason has always been difficult to teach. There is a great need for retraining and only too few skilled lecturers. The Building Centre, we understand, is preparing a second stage for its pool of speakers in which it will provide specialist talks as against the general introductory talks which have so far been given. As time passes audiences ask more detailed and better informed and more topical questions. In order to be able to cope with a limited list of lecturers, the preparation of talks becomes most important and the use of carefully prepared visual aids will be essential.

The RIBA is also considering courses on dimensional co-ordination and perhaps they, together with the Building Centre, should co-operate with the Modular Society—one of the few bodies which can provide people experienced in this field.

Metrication Board

The Construction Industry was the first industry to prepare a programme and to start implementing it. Draft programmes for the engineering and electrical industries have followed. But the Board of Trade has maintained an apparent silence ever since the President of the Board announced the Government's support in 1965. The recent action of the Decimal Currency Board in adopting the 'stop' as the decimal marker against the advice of BSI shows the need for collaboration in all sectors. It would be not only ridiculous but utterly confusing if we are to use the metric system from 9.00 to 5.30 in our offices and works and then go to the shops or the pub and have to order in imperial measure. Then to top it pay in decimal currency. So far no plans have been announced for the metrication of the retail industry. Perhaps, however, now that Sir Anthony Part has moved from MPBW to the Board of Trade we shall see some action. There is talk of establishing a Metrication Board to co-ordinate all metric change programmes. Certainly the change would be a much smoother operation if this were done.

Joints

From time to time one issue or another acquires particular importance, and certainly at the present time jointing is of this order. With the acceptance of dimensional co-ordination and the establishment of reference planes between components to which both are related, we have progressed some way. This month we publish a draft BSI Code of Practice for terms used in jointing. Such a document may appear academic at a time when results are urgently needed. But in fact this draft is important for two reasons. First, in its own right, agreement and particularly understanding of the words used is necessary in such a subject if any progress is to be made. Second, because it represents the beginning of a methodical study of a subject about which a lot of hot air has been talked with little result.

The Decimal Stop Wins

As has already been announced in 'Building,' BSI has deferred to the use of the full stop as the decimal marker. Despite the advantages of the comma for international agreement, the idea of using two systems in this country, one for currency and one for weights and measures, was intolerable. No announcement has been made or is likely to be made on the use of a marker to indicate the thousand position. But it would be an advantage to avoid the use of the comma because of confusion with international practice. Fortunately with the use of the millimetre and the metre thousands are seldom needed and the issue can be avoided.

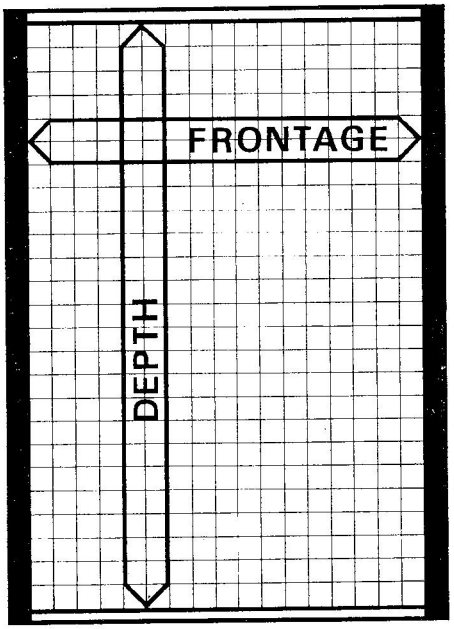
House Shells

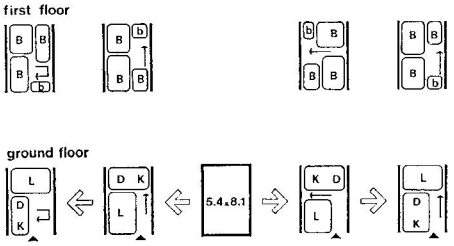
The metric plans developed by the National Building Agency for a selected range of house shells (described on the following pages) could well provide a timely impetus to the metric programme. By limiting the range of housing shells to 22, as against the hundreds in use today, there is an obvious saving in costs —the NBA put it at between 5% and 10% provided the run is long enough—which could go some way towards offsetting the expected rise in prices during the initial change to metric. What is more, the production of metric plans represents a small breakthrough of the chicken-egg problem (what comes first, designing in metric or making metric components?) and may help encourage manufacturers to take the plunge.

Metric House Shells

NEW PROPOSALS OF THE NATIONAL BUILDING AGENCY

In a new publication, 'Metric house shells,' the National Building Agency, suggests that architects, local authorities and builders should base their new metric plans on a limited range of shells—the main plan dimensions of frontage and depth between enclosing walls. This would encourage greater standardisation of components and site operations and cut design and administrative costs. The initial stage is concerned with two-storey rectangular houses.





▲ = main entrance
⊐ = dog-leg staircase
↑ = straight staircase
L = living room
D = dining room
K = kitchen
b = bathroom
B = bedroom (double or single)

above, Fig. 3, different basic arrangements of spaces possible within a single shell
left, Fig. 1, a shell in this context means the main plan dimensions of a house between the face of the enclosing walls

This study is published by the NBA as a contribution to thinking about house design at a time when the construction industry is about to change to metric dimensions.

It presents a design technique based on a selected range of 22 metric house shells which will encourage greater standardisation of components and of site operations, and cut design and administrative costs.

The NBA contends that the work involved in designing, detailing, billing, tendering for and building the immense variety of house plans used by public authorities is a waste of national resources and a hindrance to the proper development of improved techniques for house-building. The design technique outlined in this study could make possible wider markets for standard components and more economic site operations while preserving an adequate variety of dwelling types. It is equally applicable to traditional building as to industrialised systems. It does not

Fig. 2, the complete range of shells based on 300 mm. increments of frontage and depth

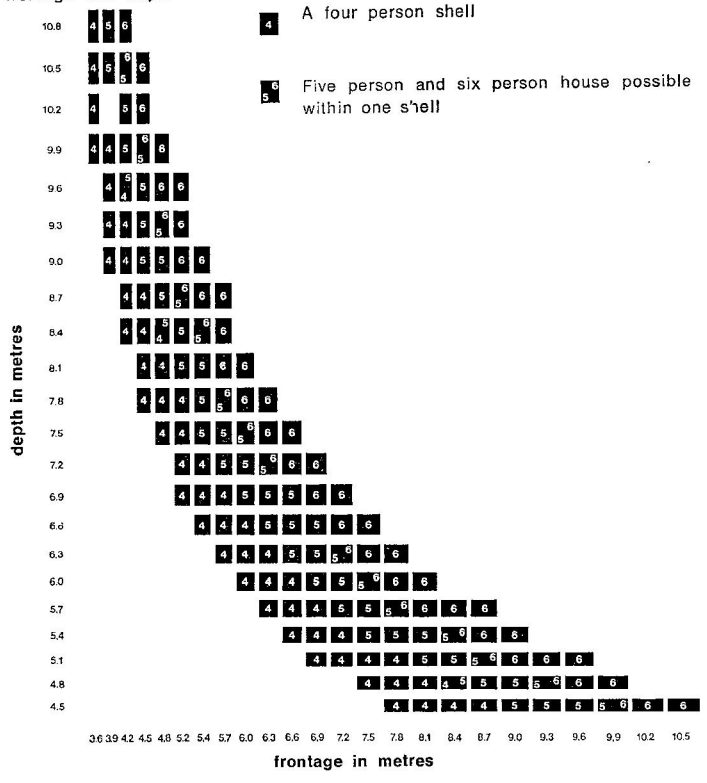
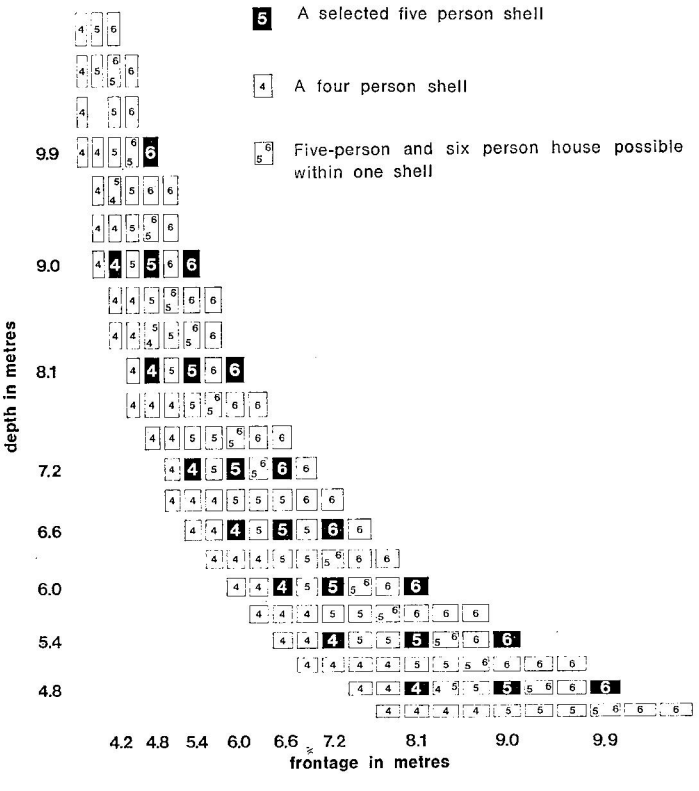


Fig. 4, the selected range of shells



interfere with the architect's freedom in design—in regard to choice of materials or components, elevational treatment or roof forms.

When allied to rational programming methods and contract procedures, it could make possible reductions of the order of 5 to 10% in the capital costs of housing superstructures, and 15 to 20% in administrative and professional overheads.

The present publication deals only with two-storey houses. Further studies are being carried out by the NBA to apply similar techniques to plans of single-storey houses and to low-rise flats and maisonettes. There are, of course, many other kinds of house plans which are valid for particular site conditions—three-storey or two-storey with unequal floor areas—but for economic reasons these constitute only a minor proportion of the total housing programme and are likely to remain so over the next few years.

If a substantial section of the industry and its clients were able to agree on the adoption of such a selected range of house shells when the change to metric takes place, a great step forward towards obtaining real economic benefits from improved techniques in house-building would have been taken.

Variety in House Plans

Over 400 rectangular two-storey house plans on offer by system sponsors have been approved by the Ministry of Housing and the NBA as being suitable for public authority requirements. There are as many again in sponsors' handbooks which have not been examined in detail and, of course, several thousand such house plans, with minor variations, in use by local authorities themselves.

Variety in house plans and flexibility in the arrangement of houses on a site are desirable and necessary for many reasons. This is not in dispute. What is questioned is whether or not the countless minor variations between essentially similar plans in use all over the country serve any useful purpose. They add to the cost of housing and frustrate attempts to increase productivity and to lower costs by rationalising site operations and component production.

In practice most public authorities and architects' offices with continuing housing programmes, as well as system sponsors, use ranges of standard plans. These broadly meet the public authority and Ministry of Housing requirements, and are essentially similar. The great majority of house plans are rectangular and on two storeys. In most of them the ground floor area approximates to that of the first floor, subject to minor variations such as recessed and projecting porches or stores. It is plans of these houses which form the first NBA study in variety reduction.

Variety Reduction and House Shells

A first step forward in variety reduction was the idea of dimensional co-ordination and the use of a 12 in. planning grid as recommended in the Ministry of Housing Design Bulletin 8 (1963) and the Ministry of Public Building and Works publications DC 1 and 2.

The application of these ideas to house plans was demonstrated in the NBA Generic Plans Book (1965). This showed 27 basic or 'generic' plans for two-storey houses with equal ground and first floor areas and these were capable of some 90 or so internal plan arrangements to meet differing conditions of access, aspect, kitchen-dining relationships and household size.

The Generic Plans Book has been widely used by architects and system builders as a plan quarry—and to that extent helped towards the adoption of standard plan ranges. It has provided a basic source of information on the relationships of the key elements within house plans (bathrooms, kitchens and staircases) and on problems of grid planning. It has helped to clarify the problems of designing standard components for small houses—in particular it has been used as a guide by manufacturers of standard fittings and built-in furniture—but it still leaves far too many variables of overall dimensions to have much effect on house structure—even within closed systems.

The present publication therefore proposes the use of a limited range of dimensions for house shells—that is a limited range of the main plan dimensions, of frontage and depth, between the faces of the enclosing external and party walls. Within such dimensionally standardised shells, a variety of internal room arrangements can be planned to meet differing layout requirements for access, aspect and orientation.

Advantages of Using a Selected Range of House Shells

The advantages which would flow from the widespread adoption of a selected range of house shells can be summarised as follows:

The shells could be used by architects at sketch layout stage in the knowledge that a number of system or traditional builders could be asked to quote in competition, without the subsequent necessity of having to readjust the entire site layout (house dimensions, drains, paths, roads, etc.) to the particular dimensions of the type of construction offered by the successful tenderer.*

Public authorities and private practices could produce standard sets of working drawings—and bills of quantities for traditional building—based on the house shell dimensions. They could more readily share work undertaken by other offices, exchange experiences and reduce design overheads.

System builders offering design/build services could produce standard designs based on the house shell dimensions and so reduce overheads. These are often high where individual house designs have to be prepared, and priced, in competition with some four or five other firms for quite small contracts.

Administrative and design costs to the public authority client would be reduced and the opportunities for competitive tendering between various methods of building would be increased.

The variety of components used might be reduced with cost savings in production, distribution and site assembly which would benefit the client. This would not only apply to kitchen fittings and door sets, but also to concrete or timber wall units, staircases, floors and roofs, and service cores.

The creation of a wider market for major new standard components such as partitions, wall units, service cores and so on, coinciding with the introduction of metric dimensions, would encourage technical innovation. It would also help manufacturers to introduce new metric components at economic prices and provide better value for money.

The Change to Metric and House Shells

The Ministry of Housing Circular 1/68 states that with the adoption of metric dimensions public authority schemes requiring loan sanction and subsidy approval will be required to comply with the various Ministry of Public Building and Works DC publications and with the Ministry of Housing metric bulletin equivalent to DB 8—to be published shortly.

The circular states that 'any metric scheme submitted at layout stage will be expected to conform to the recommendations in that Bulletin, and approval may be withheld if it departs unreasonably from these recommendations.' In effect this means that all public authority house plans in metric dimensions will be planned on the basis of a grid of 300 mm incremental dimensions between the internal faces of external walls and party walls.

This in itself will ensure a great reduction in the possible total number of different frontage and depth dimensions for metric house shells. The range of two-storey shells for four-, five- and six-person houses which is theoretically possible using a 300 mm planning grid is shown in Fig. 2. The total number is 159. These are based on the revised Parker Morris space standards, published in the Ministry of Housing Circular 1/68, which lays down minimum metric areas for each household size.

Correction: in Fig. 2 (opposite page) the frontage dimension between 4.8 metres and 5.4 metres should read 5.1 metres and not 5.2 metres as printed.

*With terrace houses minor differences may occur in the length of terraces, according to the thicknesses of party walls. In most cases these differences would not be significant enough to upset the validity of the technique of using the selected range of shells at layout stage. Future Ministry of Housing publications will, however, be making recommendations on party wall thicknesses.

it will be see nfrom Fig. 2 that for any selected frontage or depth there are several possible house shells for each household size. For example, at a frontage of 4.8 m, 4 four-person shells are shown at varying depths, having different areas. The reason for this is that a proportion of the storage area (4.5 sq. m) and possibly a proportion of the net living area (such as porches and ground-floor wc's) can be placed outside the shells. These areas have been used as a regulator and placed wholly outside or partly outside as necessary to relate the shells, the areas of which are determined by the 300 mm grid, to house plans of the correct Parker Morris areas.

Where houses are designed on a planning grid, a minus tolerance of 1½% below Parker Morris is permitted on the net floor space (Ministry of Housing Circular 1/68). In the selected range advantage has not been taken of this provision. Given the storage regulator referred to above, it has not generally been found necessary to have plus or minus tolerances on the net areas resulting from the grid in order to meet Parker Morris areas.

For the use of designers who will be faced with the problems of relating house plans derived from the 300 mm grid to Parker Morris areas, the technical supplement to this publication* gives schedules of shell areas calculated from Fig. 2. It also describes in detail the use of storage as a regulator and the minus tolerance of 1½%.

Certain of these theoretical house shells to Parker Morris metric areas are extremely difficult to plan in detail and would be of little practical value. On the other hand, some shells can be planned to give four or five internal plan arrangements to meet differing layout and constructional requirements.

In total it is considered that the 159 shells can be planned in detail to provide over 400 different house plans. Fig. 3 shows, for example, four different basic plan arrangements within 1 five-person shell. Within each of these, further minor variations and room rearrangements are possible.

On the basis of experience derived from the NBA Generic Plans Book, and from discussions with industry, this figure of over 400 plans is considered to be far too high a number to provide a useful degree of standardisation in terms of component production, organisation and management or of site operations. It is difficult to justify such an immense variety on grounds of user requirements or of housing layout. Clearly no single authority or system sponsor would attempt to develop such a wide variety of plans and the working drawings, bills and documentation which accompany them. Each designer will, therefore, need to select a preferred range of plans to meet his own constructional and design requirements.

*available from NBA

Selecting the Limited Range of Shells

A selection of a more limited range of house shells can be made from Fig. 2 on a purely arbitrary basis. Existing ranges of plans used by particular authorities or system sponsors can be compared with the most appropriate and nearest dimensional equivalent shell in the total metric range and the selection made in this way. A number of such ranges have been proposed during the course of these studies. However, it is not difficult to substitute alternative shells in such ranges to arrive at a common range which satisfies similar requirements but which uses far fewer dimensions for frontages and depths.

For example, 5.4 m is the minimum satisfactory frontage needed to accommodate a dining room and kitchen side by side allowing for through circulation via the dining room or kitchen. The addition of a shell with a frontage of 5.7 m does not provide any significant design amenity not already given by a shell with a frontage of 5.4 m.

The number of frontage dimensions has, therefore, been limited by selecting increments of 600 mm for narrow and medium frontage houses and 900 mm for wide frontage houses. Similar increments have been used for house depths, the larger increments relating to narrow frontage and the smaller to wide frontage houses. In addition, the frontages and depths selected have been determined by structural considerations (floor and roof spans) and by the calculation of house areas and the extent to which storage is planned inside or outside the shell. A further factor has been the critical dimensions of rooms and combination of rooms derived from the sizes of furniture and the space required for activities within a home, described in the Ministry of Housing Design Bulletin 6, 1968 (Metric Edition) and Circular 1/68. Some of these requirements will be mandatory from 1 January 1969.

In most public authority housing it is clear that designers commonly need house types to accommodate four-, five- and six-person with either common frontage or common depth dimensions. The common dimensions of frontages and depths for different types also give economic advantages in maintaining standard floor spans and roof trusses, standard lengths of cross walls, gable walls, partitions and so on. They also contribute directly to internal dimensional standardisation and make it possible to use a wide range of standard metric internal components as and when these become available.

The Selected Range of Shells

The selected range is illustrated in Fig. 4, superimposed on the total range of shells from Fig. 2. With this selection of house shells, it will be noted that they form a series of overlapping cruciform patterns in which the five-person shell is

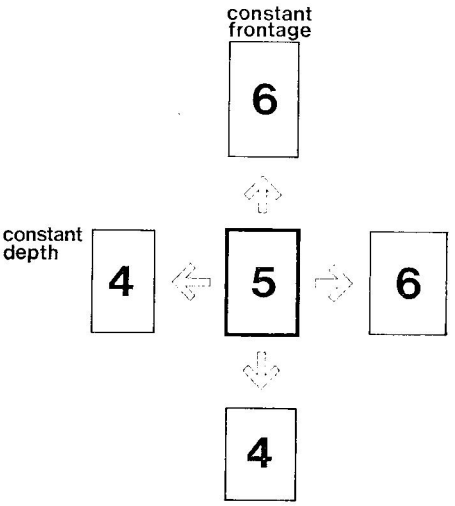


Fig. 5, two sets, each of four-, five- and six-person shells of common frontage or depth, arranged as a cruciform with the five-person shell common to both sets

the core of each cruciform. Each cruciform (Fig. 5) comprises five house shells with a maximum of six basic shell dimensions.

Vertically the cruciform contains three shells with a common frontage. Horizontally it contains three shells with a common depth. On this basis, the selected range gives a series of sets of four-, five- and six-person shells with common frontages (read vertically) or common depths (read horizontally). The total number of shells in the range is 22; the number of dimensions for frontage or depth is only nine.

Initially this study has concentrated on the most used types of houses: two-storey terrace houses for households of four, five and six persons. Smaller households are usually accommodated in flats or in single-storey houses and seven person houses account for a very small proportion of new housing. Studies are in progress to test plans for seven-person houses, either using an additional number of shells based on the dimensions from the selected range or by adding a bedroom at either ground or first-floor level to six-person house shells.

Plan Types Based on the Selected Range

The NBA document shows plan arrangements, utilising nearly all the shells in the selected range and demonstrating the wide coverage of local authority requirements which it gives—from narrow to wide frontage, with single and dual access and aspect.

These plan arrangements can be detailed to use standard components or assemblies such as service cores. Standard relationships between kitchens, wc's, bathrooms, staircases and structural floor and wall units over a set of four-, five and six-person plans can greatly help standardisation and cost reduction in documentation and in site organisation.

Full version obtainable from NBA at 5s.

Joints and Jointing

DRAFT BRITISH STANDARD FOR COMMENT

This draft BS is for comment only. Comments, or an indication of general acceptance, should be sent to the Secretary of Code Drafting Committee, BSI, 2 Park-street, London, W1, not later than 7 May.

Draft British Standard Code of Practice for JOINTS, JOINTING AND JOINTING PRODUCTS IN BUILDING PART I: TERMINOLOGY

INTRODUCTION

For the purpose of this Code, a joint is defined as a place where two or more adjacent building components are put together, fastened or united with or without jointing products. Jointing is defined as putting building components together with or without jointing products. The concept of jointing includes positioning, fixing and filling.

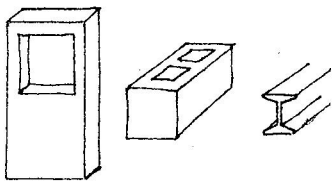
The list of terms with their definitions has been compiled following an analysis of the words used in documentation in recent years. Attention is drawn to the habit of using a term to describe a jointing product which really only describes one of a number of functions of a jointing product. An example is the use of the term 'seal.' It is felt that many of the terms, whether or not included in this draft, have developed somewhat loose associations hitherto and it is the primary purpose of this terminology to designate meanings of terms based upon a systematic approach to the study of joints and jointing in building technology.

SCOPE

It is intended that this Code shall embrace joints and jointing in building technology relating to all products, components and assemblies which go to make up the structure, fabric, internal division, fitting out and servicing of buildings. It includes joints made both on site and off site but not those made during factory processes involving the fixing or bonding of materials to produce a component that is an entity.

TERMINOLOGY

1. BUILDING COMPONENT



A part or complex of parts preformed as a discrete unit.
Note: This is a general term.*

2. JOINTING PRODUCT

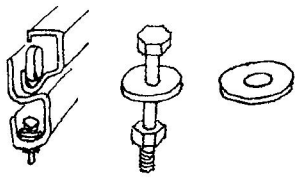
A formed or unformed building product used for *jointing*.

- Jointing Product
  - Jointing Component
    - Assembly
    - Sub assembly
    - Part
  - Sectional Jointing Material
  - Jointing Material

3. JOINTING COMPONENT

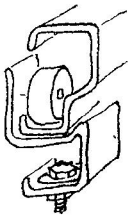
A part or complex of parts preformed as a discrete unit for jointing.

* *This definition to be the same as the revised B.S. 290.*



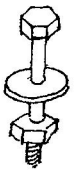
Illustrations of jointing components

4. JOINTING COMPONENT ASSEMBLY



A *jointing component* formed as an assembly of *jointing parts, jointing sub-assemblies* and/or *jointing materials,* manufactured as an independent unit.

5. JOINTING COMPONENT SUB-ASSEMBLY

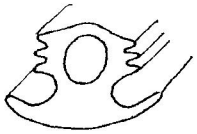


A *jointing component* formed as an assembly of *jointing parts* and *jointing materials,* manufactured as an independent unit.

6. JOINTING COMPONENT PART

An elementary *jointing component.*

7. SECTIONAL JOINTING MATERIAL



A *jointing product* or an assembly of *jointing materials* formed only to specific thickness or cross-section.

8. JOINTING MATERIAL (joint infill)**

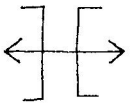
An unformed *jointing product,* processed or unprocessed.

9. JOINTING

Putting together, fastening or uniting *building components* with or without *jointing products.*

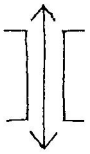
* *Deprecated.*

10. FIXING



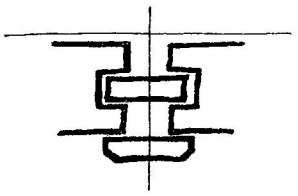
That aspect of *jointing* by which one of more functions of an assembly of *building components* are generally maintained ACROSS their joints.

11. FILLING



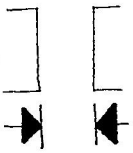
That aspect of *jointing* by which one or more functions of an assembly of *building components* are generally maintained ALONG their *joints.*

12. JOINT



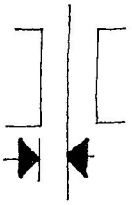
A place where two or more adjacent *building components* are put together, fixed or united with or without *jointing products*

13. JOINT WIDTH (joint thickness)** (clearance)**



The distance between the faces of adjacent *components.*

14. GAP

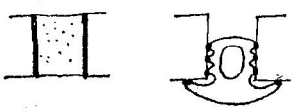


The distance between the co-ordinating face of a component and the corresponding grid plane.

15. JOINT CLEARANCE

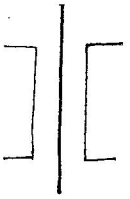
1. Empty space persisting after installation, between a movable component and a fixed component or between two movable components.
2. Size of this space.

16. (JOINT) INTERFACE



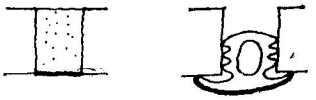
The meeting plane of a *jointing product* and/or a *building component.*

17. JOINT REFERENCE PLANE



A reference plane from which the measurements and position of the co-ordinating faces of adjacent *components* and/or any *jointing products* may be determined.

18. JOINT SURFACE



The visible surface area of the *jointing product* which is exposed to the surrounding environment.

19. JOINT FUNCTION

One of a number of attributes of a *joint,* e.g. fire resistance, stability, light transmission, etc.

20. JOINT PERFORMANCE

The levels of attainment of one or more functions of a *joint.*

21. JOINT PERFORMANCE SPECIFICATION

A statement as to the levels of attainment of one or more functions which are required for a *joint.*

22. JOINT SPECIFICATION

A statement for a particular *joint* describing how it is to be made and the *jointing products* to be used.

23. JOINTING PRODUCT FUNCTION

One of a number of functions of a *jointing product.*

24. JOINTING PRODUCT PERFORMANCE

The levels of attainment of one or more functions of a *jointing product.*

25. JOINTING PRODUCT SPECIFICATION

A statement of the form and/or material of a particular *jointing product* to enable it to be made.

26. JOINTING PRODUCT PERFORMANCE SPECIFICATION

A statement as to the levels of attainment of one or more functions which are required for a *jointing product.*

** *Deprecated.*

The Metric Change

8. THE GYPSUM PLASTERBOARD DEVELOPMENT ASSOCIATION

For number 8 in our series on the change to metric we turn to industry. The GPDA has received many inquiries concerning details of new metric sizes of gypsum plasterboard products and when they will be available. In response to this interest, the association summed up their position at the present time in the March edition of the 'Gypsum Journal,' which is reprinted below.

During recent months the Gypsum Plasterboard Development Association has received a number of inquiries from the construction industry requesting details of the new metric sizes of gypsum plasterboard products and asking when these will be available. The following paragraphs sum up the association's position in the present stage of the change to metric.

The Gypsum Plasterboard Development Association is represented on various BSI committees concerned with the change to the metric system in the construction industry and has approved the BSI programme for the change laid down in documents PD 6030 and PD 6249. To conform with this programme, the full production of new metric dimensionally co-ordinated products is not required to commence earlier than 1 January 1970.

Dimensions

We have already taken certain decisions concerning the change to metric and, so far as the width of gypsum wallboard is concerned, we anticipate producing 600, 900 and 1,200 mm boards. These widths conform with the first preference for the selection of basic component sizes laid down in BS 4011 : 1966, namely nx3 decimetres. We do not intend to alter the thickness of plasterboard, as this would affect the physical properties of the material, and therefore plasterboard will be available in 9.5, 12.7 and 19.0 mm thicknesses corresponding to $\frac{3}{8}$, $\frac{1}{2}$ and $\frac{3}{4}$ in.

As to the new metric lengths for plasterboard, it is more difficult for us to anticipate what will be required until the work of Functional Group Panels 2 and 3 set up under BSI Committee B/94/4 has been completed. The programme for the work of these committees is laid down in PD 6249 and, as far as plasterboard products are concerned, may not be finalised until 1969. In the meantime, we are somewhat disturbed at the proliferation of floor-to-ceiling heights proposed in the draft British Standard Dimensional Co-ordination in Buildings: Recommendations for Controlling Dimensions (Document 67/27945). In the case of housing, five floor-to-ceiling heights have been proposed, ranging in 50 mm. increments from 2,300-2,500 mm. and we feel that, if these five floor-to-ceiling heights are ratified, this will lead to an increase in the variety of building components, which is contrary to one of the main objectives of the modular co-ordination aspect of change to metric.

Floor to Ceiling Heights

A point which must be borne in mind is that we would hope that the sizes required to satisfy floor-to-ceiling heights would also be suitable for ceiling lining, which is therefore dependent upon a decision on joist spacing. If joists were to be spaced, for example, at 400 and 600 mm., then we would expect to offer boards in lengths of multiples of 400 and 600 mm., as it is essential that the ends of the boards centre over a joist.

So far as boards for wall lining are concerned, it seems probable that some account will need to be taken of BS 3626 : 1963 Recommendations for a System of Tolerances and Fits for Building, as it may be extremely difficult to use boards in wall linings of exactly the same length as the basic space allocated between floor and ceiling. The length of the boards required to occupy basic spaces of, for example, 2,300, 2,350 and 2,400 mm. may need to be shorter than these measurements in order to take into account positional and manufacturing tolerances. This is a matter which will need to be considered very carefully by the BSI Functional Group Panels, who are required to operate within the framework of the recommendations given in both BS 4011 and BS 3626.

Until these matters are settled we cannot define the lengths of gypsum wallboard which will be required when full production of the new metric sizes is undertaken.

Information Sheets

As the changeover to metric progresses we shall be including, within this section, details of metric products, and manufacturers will be invited to support these with information sheets. Manufacturers wishing further information on this service are invited to contact the Advertisement Director of 'Building.'

METRIC INSTRUMENTS

As metric items for the drawing office become available we are publishing details in 'BMN.' For the provision of this information we are indebted to DOMMDA, 157 Victoria-st., London, SW1

Calculating Aids

Blundell Harling Ltd
Metriverter slide rules.
Purpose made calculators and converters.

British Thornton Ltd
Slide rule—250 mm scale length; metric based but with conversion scales mm/in.

Publications

AJ Metric Handbook

The AJ Metric Handbook, compiled by Jan A. Sliwa, Diplng, DipArch, ARIBA, and Leslie Fairweather, ARIBA, and available from the Architectural Press, price 15s., provides an introduction to metric data on anthropometrics, building types and environment, structure and materials. It would appear to be a useful collation of existing data converted to sensible metric sizes. Some care should be taken in using the controlling dimensions which are based on a draft British Standard, which in turn is known to be in the process of being modified.

METRICATION INDEX

An index of references to metrication published in 'Building' since Building Metrication News last appeared.

BSI accede to the Decimal Currency Board's decision to use the point as the decimal marker. (5 April, p. 80)

Functional Group panels hold first meetings, the eventual outcome of which will result in recommendations for dimensional co-ordination. Initially an order of component priority will be drawn up and the list published in June or July. (5 April, p. 80)

MPBW expect to issue plans and bills of quantity using the metric system from the latter part of 1969—answer from Mr. Mellish to question in the House. (5 April, p. 116)

Report on the RIBA meeting entitled 'Change to metric' in which four architects, each in a different field of architecture, discuss the effects the metric change will have on their work. (12 April, p. 89)

Building Centres formulate plans to meet information requirements of building industry in metric change. (19 April, p. 82)

An experiment in working to metric measurement formed part of the last of the winter Professional Collaboration Exercises, run by the MPBW. (19 April, p. 120)

NEWS FROM THE INDUSTRY

Later Than You Think

A five minute film on the change to the metric system in the construction industry has been produced by The Building Centre Trust in collaboration with the BSI and the Construction Industry Research & Information Association. The film, 'It's Later Than You Think,' has been financed by grants from CIRIA and The Building Centre Trust. This is the first contribution by CIRIA from their government grant for improving the flow of information for the construction industry.

The script is based on proposals by Michael Clarke of BSI and Peter Cocke, RIBA metric convenor. It is intended primarily for architects but is relevant to the whole construction industry.

'It's Later Than You Think' was made by World Wide Pictures Ltd., and will be initially circulated to 750 architects' and contractors' offices by Architectural Newsreel Ltd. Although the film treatment of the subject is humorous, the prime intention is to make viewers more aware of the implications of the metric change and its immediacy. It should make a very acceptable aperitif to a lecture session on metric and this, in fact, is one way in which it is to be used, i.e. by members of The Building Centre/BSI panel of speakers.

Metric Conversion

At a recent Modular Society (Functional Group No. 2, External Envelope) meeting in London, discussion indicated that the interim period of straight conversion from imperial to metric equivalent was of little value. Manufacturers, it was suggested, will be reluctant to support sales and reference literature which will serve a very limited period of time. It was hoped that all manufacturers will set about metric co-ordinated dimensions as the immediate necessity related to the change rather than as a supplementary problem.

P. Gardiner (Gardiner Sons & Co. Ltd.) produced, and briefly explained a schedule of recommended increment sizes for aluminium purpose made windows other than housing that he had produced for the Metal Window Association at that association's request. At the moment this information is not available for general release.

Comment was made that if the co-ordinated dimensions enabled window manufacturers to work almost exclusively from standard catalogue, it could reduce their drawing office costs from as high as 11-12% to 4%. There were, it seemed, no great problems for the metal window industry in the change to metric. The vast stocks of standard units held present a problem of duplication in transition. It was suggested that windows to BS 990 on 4 in. modular could change early to metric and be used (−1.6%) in imperial work. MWA will certainly not rethink window sections for a long time.

I. S. Wilson (Concrete Ltd.) stated that floor units will probably be produced in the following widths, 400, 600, 800, 900 mm. It was suggested that 700 in lieu of 600 would produce greater overall flexibility.

Sheet manufacturers—plasterboard, etc. —seem far more likely to produce 1,200 mm wide material (4 ft. existing building width) rather than retool for 900 mm sheet widths. If this is general it will have a strong effect upon planning/structural grids. Several at present are already basing the re-appraisal of their work on 1,200 (Mace will be 900 + 100).

Again at this forum discussion developed on jointing, tolerance and fit for components and assemblies. This is fundamental to co-ordinated dimensioning of related components and therefore of prime importance as a Modular Society concern.

Irish Group

On 15 March, Group members met at the Building Centre of Northern Ireland in Belfast for a lecture on the change-over to the metric system entitled 'Thoroughly modern millimetre.' Speakers were Shane B Belford, Director of the Building Centre of Northern Ireland, and Jack Morrison, of the Ministry of Finance. Both are members of the BSI's Panel of Speakers for the metric system.

Manchester Symposium

Two hundred and fifty delegates attended a symposium on the change to metric, sponsored by the Manchester and District Branch, IAAS and held at the University of Manchester on 5 April. The chair was taken by a past-president of the association, R. M. Silber, FIAS, who opened the conference by briefly outlining the history of the change and giving an idea of the confusion of measures with which we work at present compared with the coherency of SI units.

The first paper—'Change to metric—an architect's view'—was given by W. J. Nicholson, lecturer in the Department of Architecture, University of Sheffield. Mr Nicholson's Department decided to change to metric units of measure in its work in March 1967, and made the change in October, and he co-ordinated this changeover. His paper pointed out the advantages of metric, concentrating on the opportunity it gives for rationalisation through dimensional co-ordination.

The second paper, given by T. N. W. Akroyd, a consultant engineer in structural design, was entitled 'The structural aspect—design and construction.' This pointed out the advantages of the SI system—its uniformity, especially if adopted by all metric countries, and its disadvantages in the strangeness and newness of some of its units, not the least being the large and unwieldy figures which will result from calculations being carried out in Newtons per square millimetre, instead of kilograms per centimetre.

N B. Harris, lecturer in the Department of Civil Engineering, University of Salford, gave the third paper showing how metrication affected the building contractor and the quantity surveyor. Mr. Harris pointed out the difficulties that the contractor will have in re-educating his site workers: the onus being on the contractor to see that his key workers attend suitable training courses.

Problems raised for the manufacturers were covered in the fourth paper by W A. Balmain, controller, Building Development Department, Turner & Newall Ltd. Mr. Balmain raised doubts as to whether we could afford, financially, to change to metric at this time. He estimated that the transitional period for manufacturers would be at least 15 years, and also was of the opinion, as were the other speakers, that the programme for the changeover was at least six months behind schedule—the dates set by the Ministry of Housing and the University Grants Committee for applications to be submitted in metric being unrealistic.

Manufacturers' Problems

Problems facing manufacturers in the change to metric were discussed at a meeting of the South West Regional Group of the Modular Society, held at the University of Bristol in January. The chairman, Mark Hartland Thomas, opened the meeting with a statement on the rôle of the Modular Society in the impending change to metric in the construction industry.

Experience showed that no difficulty was encountered in designing in metric dimensions provided that the draughtsman thought in modular terms. By working over squared paper, the unit could be either 4 in. or 10 cm and could be read as either. The designer soon came to think in multiples of M.

It appeared that with some products a rise in price would be inevitable on changing to metric-modular sizes as costly machinery would have to be scrapped and replaced. This would be counterbalanced by the need for the normal replacement due to obsolescence and wear and tear, but in industries such as the brick industry entirely new plant would be required, e.g. kilns, whereas only working parts would need replacing through normal use.

There might be some hiatus at first while products obtained from abroad were still produced to traditional sizes before manufacturers realised that it was in their interests to adopt metric-modular

dimensions. Until then there would be inevitable wastage of time and material in 'cutting down.' It was reported that foreign wallboard manufacturers were ready to change from 4 ft. widths to 1200 mm.

Doubt was expressed on the possibility of manufacturers sinking their capital in changing to metric sizes before there was a demand from the trade. It was emphasised that the change must be universal and that all branches of the industry must work to the time-table.

The problem of modular bricks was perhaps the greatest one to solve. Small brick plants could change without much expense and could continue to make bricks of several different sizes, but the big brickworks would have to redesign their plants from the size of the basic pallet, otherwise the existing pallets would pass through the kiln under-loaded with a proportional extra cost of production per brick. Ideally the difference in size should be as small as possible. Though there was much to be said for the 8 in. x 4 in. x 4in. the 12 in. x 3 in. x 4 in. was preferable, particularly as it would bond with existing work. The only acceptable alternative was 8 in. x 3 in. x 4 in. but this was aesthetically bad. This should be settled quickly.

Concrete Society Meeting

The Concrete Society had a full house for their recent Metric Symposium held at the South Bank Arts Centre. An audience of 380 heard six speakers explain what the change is about and its effects, after which there was an active discussion.

LETTERS

Selection of Basic Sizes

Sir,—May I draw attention to BS 4011: 1966—Recommendations for the Co-ordination of Dimensions in Building—on its own, not a statutory document, but one which is having a far-reaching effect on the development of the building industry.

After having put forward some ideas as to the possible working sizes of bricks and blocks when the nation changes to the metric system, I find that hopes of logical change are severely hampered by B—Stranglehold 4011.

This has been achieved by a system of selection of basic sizes for co-ordinating of components and assemblies in a descending order of preferences with a first preference of n x 3 decimetres (where n is any natural number including unity). One might ask why such a strange choice for first preference was made and n x 1 decimetre—the basic module—relegated to second preference. The figure 3 is not compatible with the decimal system and results in using $3\frac{1}{3}$ units to the metre. A further result is that many responsible organisations in the building industry are seriously thinking in terms of a given number of bricks per 0.81 sq. metre instead of using the SI Units of the metre and square metre (m and sq. m).

Surely it would have been more logical to have given first preference to 10 decimetres and powers thereof—10^1 and 10^0 giving the metre and the decimetre —'the basic module.'

Second preference could then be given to 2 metres and powers thereof namely 2^0 = metre (not required as already in first preference); 2^{-1} = 5 decimetres; 2^{-2} = 2.5 decimetres and successive halving providing $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$ and $\frac{1}{16}$ metre which system has been in operation from the first days of mankind.

Such a second preference would enable the brick manufacturers to consider the production of four bricks to the metre, hinted at in the article, entitled 'The Output of Bricklayers' which stated 'a ready-made solution to higher productivity in bricklaying is to use a larger size of brick' based on a report of the Building Research Station ('Building' 26 Jan., pages 145 and 146). The 250 mm. by 225 mm. (including 10 mm. for joint) brick would enable the bricklayer to continue with half or quarter bond. The height could be varied to give a whole number of bricks to the square metre, such a brick being designed, to quote Mr. N. Brown in Building Metrication News of 26 January, 'to have aesthetically pleasing proportions and be of such weight and/or design that the bricklayer can handle them no less efficiently than existing bricks.'

What this British Standard needs is the same treatment as a newly planted rose bush—it should be pruned hard back so that vigorous growth from units of 10 and 2 decimetres and their powers can be made, and the weaker side shoot of 3 decimetres retained whilst it serves a useful purpose. The committee responsible and its co-operating organisations (which include many responsible for the design of buildings and its components) should meet to carry out this necessary pruning, so that the building industry of the future can benefit from their action.

J. N. STEARN,
Loughborough.

A Series Drawing Paper Sizes

Sir,—The solution to all Mr. Lisle's worries ('Building,' 22 March, p. 126) is in the answer to his point c. Heaven forbid that AO should become a norm, or even be used at all for drawings. It is indeed a hopelessly clumsy size.

But so also is the old 40 in. x 27 in. sheet, anywhere off an actual drawing board. As a norm it has already been abandoned in many drawing offices in favour of A1, or even smaller sheets produced photographically—with cost savings. I have yet to see any presentation or working drawing that with willing imagination could not be shown readably and very conveniently in the pages of 'Building.'

The traditional $\frac{1}{8}$ in. : 1 ft. scale drawing showing everything from setting out of drainage to door stop fixing positions may well be a tight fit on the old 40 in. x 27 in. or even the antiquarian (well named) sheets. The effective answer is to abandon the traditional type of working drawing—often unreadable anyway—and show overall arrangement at 1 : 192 or 1 : 200 scale supplemented by 1 : 48 or 1 : 50 sectional details. An incidental advantage is that the old laborious half-inch (1 : 24) details are not then needed.

A1 and smaller sheets can, if you want, be derived without waste from the old standard 40 in. (1,015 mm.) paper roll, first cut with a hacksaw into 594 mm. and 420 mm. lengths. There is absolutely no need to replace existing drawing boards, plan chests, etc. (or foolscap filing drawers), but accepting A1 as the largest sheet to be worked on does allow economies in any new furnishing, and comfort and convenience in the drawing office space needs.

VIVIAN LEVETT [ARIBA],
18 Wingrave-close, Coventry.

Sir,—Following the letter from Mr. C. J. Lisle in Building Metrication News, I thought you might be interested in our experience in this department where we have been using 'A' series drawing paper sizes for the past four years.

We find that the A0 size paper is not often required and that most drawings are more conveniently arranged on two A1 sheets. This size sheet is also considerably more convenient to handle in a high wind on site.

A0 sheets can be used on antiquarian boards if one accepts that it may be necessary to move the sheet down or up to complete the small percentage of drawing work which occurs on the top 2 or 3 in. of the sheet.

A0 sheets are difficult to fit in the traditional drawer type plan chest but will fit into a vertical plan file cabinet of normal size.

If A1 is accepted as the largest normal size of sheet used, then the drawing office can be equipped with standard double elephant drawing boards and the space saving in using these boards rather than antiquarian boards can be considerable.

B. WARREN [ARIBA, AMTPI],
City Architect, Sheffield.

COMING EVENTS

FRIDAY, 21 JUNE

System Building and the Change to Metric: a weekend seminar at the Conservatoire de Musique, Bruges, Belgium. Eight lectures as well as a general tour of North Belgium. Concludes on Sunday, 23 June. Cost £22 10s. Inquiries to The Acting Secretary, Faculty of Architects and Surveyors, 68 Gloucester-place, London, W1.