BMN
Building Metrication News

CONSULTANT EDITOR:
ANTHONY WILLIAMS, AADipl, FRIBA, MSIA

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

Shot-Gun Advice Continued

On 4 October we published a leader under the title Shot-Gun Advice. In this leader we expressed concern that the Ministry of Housing proposed to use mandatory powers to enforce advice given in its latest Design Bulletin, No. 16. We also expressed concern that the Ministry were overruling BSI and the recommendations contained in BS 4330: Controlling dimensions. In brief the principal *advice* given in the Bulletin is that face planning only should be used for housing. Or, to put it another way since this advice is mandatory, that axial planning should be prohibited. This week we publish comments (p. 153) from a number of people involved in the changeover and a letter from the Construction Industry Metric Change Liaison Group (p. 121) which reinforces our views. David Llewellyn has replied on behalf of the Ministry, and if we take the opportunity of coming back on his letter in this issue, we assure him that space will always be available for him to reply.

The situation is that the British Standards Institution has been given the task of co-ordinating the programme for metric change. In order to carry out this task it is making use of its consultative machinery on which all sectors of industry, including government, are represented. Since its recommendations are approved by all sectors it is reasonable that they should be recommended for adoption by all sectors.

Has the Ministry adopted the recommendations of BS 4330, as is claimed in the introduction to the Design Bulletin? In our view it has not and by flaunting BSI's recommendations it is jeopardising its programme of work on metric change. We say this because we believe that to prohibit the adoption of a principal recommendation can hardly be considered to be a recommendation for the adoption of the Standard concerned. In the scope to the Standard it is stated that both axial and face planning are included because the two methods are appropriate to different constructional arrangements. And yet, as is pointed out in the CIMCLG letter, the Bulletin will effectively prohibit the use of centre line (axial) planning. Mr. Llewellyn says in his letter that it is said only that 'approval may be withheld if it (any metric scheme) departs unreasonably from those recommendations.' Could any manufacturer really proceed with a development which indicates advantages for axial planning when face planning has been advised by the Ministry? Would this not constitute an unreasonable departure? If it does not what is the intention of the Bulletin? We should also point out that BSI's recommendations omit any reference to building types. The recommendations were determined from information in DC documents and from other sources, which was based on building types but the recommendations themselves are general to all building types.

In his letter Mr. Llewellyn goes on to say that the Bulletin was prepared after much consultation, but he does not answer our question as to why BSI was not consulted. Surely it must have been apparent that the use of mandatory powers by the Ministry would exert a considerable influence on BSI's approach to the sizing of components, work which has been going on for many months against a very tight timetable. Indeed, members of BSI's key committees are now wondering what is to follow. Is the adoption of other of their recommendations going to be prohibited? Some are now questioning the value of their continuing this work if the Ministry is to ride over it rough-shod.

In the light of current uncertainty, we tentatively outline a number of points, for discussion, which if agreed we believe would clarify present objectives.

1. The present programme should be aimed at the standardisation of component sizes in accordance with BS 4011 and 4330.
2. To support industry in changing the sizes of components architects should be encouraged to specify standard components.
3. There should be no embargo on the use of a standard component in any particular building type.
4. Manufacturers and component designers should be encouraged to develop components for either or both face and axial planning according to their economic and functional advantages as appropriate to different forms of construction.
5. Architects should be free to select and locate standard components in the most economic manner that satisfies their client's brief.

BMN
Building Metrication News

Paper Grids

by ERIC CORKER

A previous article ('Building,' 28 August, pp. 102-107) outlined the general considerations for grid drafting facility.
The purpose of this article is to examine one particular aspect: to relate the units of measure which are most likely to be used in metric dimensioning in building to the BS preferred range of metric scales in order to show the type of grids which could suit the various conditions and requirements which arise.
The units of measure examined here are: (i) the metre; (ii) 300mm (analogous dimension 1ft.) which is the first preference of BS 4011 'Recommendations for the co-ordination of dimensions in building; basic sizes for components and assemblies' (note that 600mm. might also be used as it is a simple multiple of 300mm.); (iii) 100mm., the basic module (analogous dimension 4in.) and is the second preference of BS 4011; (iv) 25mm. (analogous dimension 1in.) which is the fourth preference of BS 4011; and (v) 10mm. (which is a little less than $\frac{1}{2}$in.).
There are two basic inherent difficulties in relating these dimensions to each other: firstly, 300mm. is not a factor of 1m. (as the lowest common multiple is 3m.). Secondly, it has not yet been established whether the basic module of 100m. will be divided into four parts (as suggested by the third and fourth preferences of BS 4011) or whether it will be divided in a decimal manner to 10, 20, 30mm., etc., intervals.
The BS preferred range of metric scales are:

1/500 for sketch and site plans

1/200, 1/100, 1/50 } for sketch schemes and general location drawings

1/20, 1/10, 1/5, 1/1 } for components and detail assembly drawings

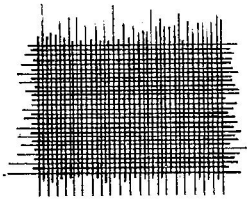
It will be seen that the relationship between adjacent scales is sometimes two times and sometimes two and a half times.
The lack of a constant simple relation between the dimensions on the one hand and the scales on the other means that there is no one 'perfect' gridded paper for each scale which is likely to be quite so appropriate for another scale.
The actual choice of the size of the paper grid itself is qualified within two parameters; it must not be so fine that legibility is lost because there are so many lines close together, nor must it be so coarse that it does not provide the registration appropriate to the accuracy of the scale that is being used.
Finally, there is the ultimate qualification of whether the grid is pleasant and comfortable to use. All the grids which arise from the mechanics of relating dimensions and scales have, therefore, been illustrated so that the factor of personal choice may be exercised on visual grounds.

SCALE 1/500

Required interval to be represented: 300mm. (analogous to 1ft.)

The paper grid
Lines 0·6mm. apart.

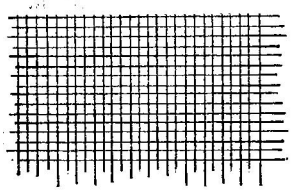
Comment
This mesh is too fine to be read.



Required interval to be represented: 600mm. (analogous to 2ft.)

The paper grid
Lines 1·2mm. apart.

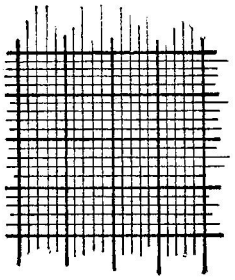
Comment
Although on the threshold of legibility, it is too fine for an overall pattern alone.



Required interval to be represented: 600mm. and 3m.

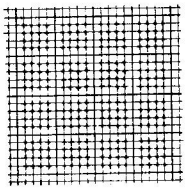
The paper grid
Heavy lines 6mm. apart to show every 3m. and thin lines 1·2mm. apart to show 600mm. intervals.

Comment
The lowest common multiple of 600mm. and the metre is 3m.



or

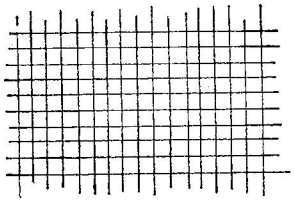
Lines at 6mm. apart to show 3m. and crosses 1·2mm. apart to show 600mm.



Required interval to be represented: 1m.

The paper grid
Lines 2mm. apart.

Comment
Easily legible individually but rather confusing as an overall pattern.

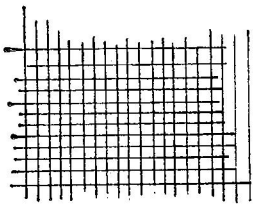


SCALE 1/200

Required interval to be represented: 300mm. (analogous to 1ft.)

The paper grid
Lines 1·5mm apart.

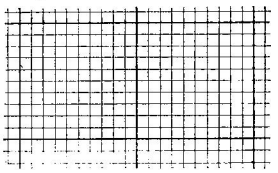
Comment
On the threshold of legibility but too fine for an overall pattern alone.



Required interval to be represented: 300mm. and 3m.

The paper grid
Heavy lines 15mm. apart to show every 3m. and thin lines 1·5mm. apart to show every 300mm. interval.

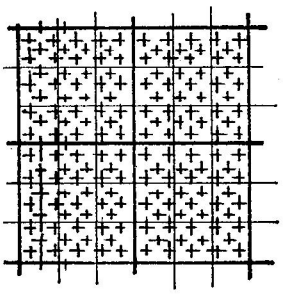
Comment
The lowest common multiple of 300mm. and the metre is 3m.



or

The paper grid
Heavy lines 15mm. apart to show the 3m. intervals, thin lines 5mm. apart to show 1m. intervals and crosses 3mm. apart in a diagonal pattern to show the 300mm. intervals.

Comment
1m. is not simply related to 300mm. and combination of these two grids is not very satisfactory as the grid of crosses only coincides with every third interval of the line grid.

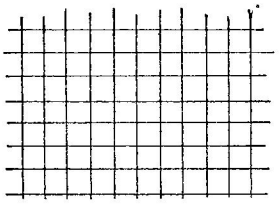


SCALE 1/200 *(continued)*

Required interval to be represented: 600mm.

The paper grid
Lines 3mm. apart.

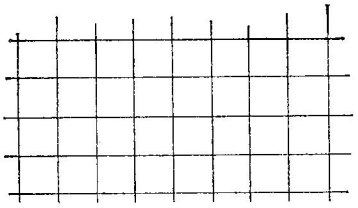
Comment
Good legibility.



Required interval to be represented: 1m.

The paper grid
Lines 5mm. apart.

Comment
Very clear legibility but there is no completely satisfactory way of modifying this grid to show 300mm. intervals (except that every third line corresponds to ten times 300mm. as shown in the 300mm./1m. grid on page 144).

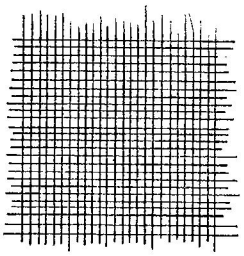


SCALE 1/100

Required interval to be represented: 100mm. (analogous to 4in., the basic module)

The paper grid
Lines 1mm. apart.

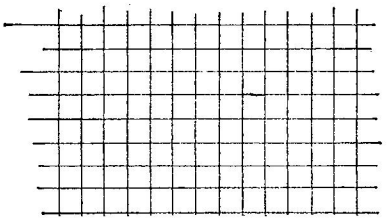
Comment
Although about on the threshold of legibility, it is too fine to be an overall pattern on its own.



Required interval to be represented: 300mm. (analogous to 1ft.)

The paper grid
Lines 3mm. apart.

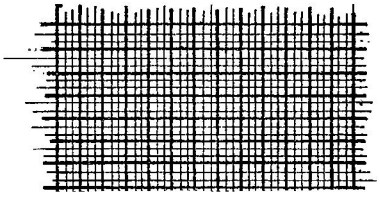
Comment
Good legibility.



Required interval to be represented: 100mm. and 300mm. in combination

The paper grid
Heavy lines 3mm. apart and thin lines 1mm. apart to register 300mm. and 100mm. intervals respectively.

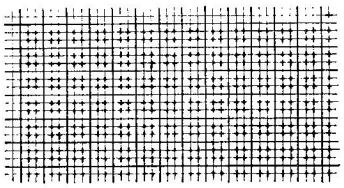
Comment
As this pattern is only just on the threshold of legibility, its use in practice is likely to be limited.



or

The paper grid
Lines 3mm. apart and crosses 1mm. apart to register 300mm. and 100mm. intervals respectively.

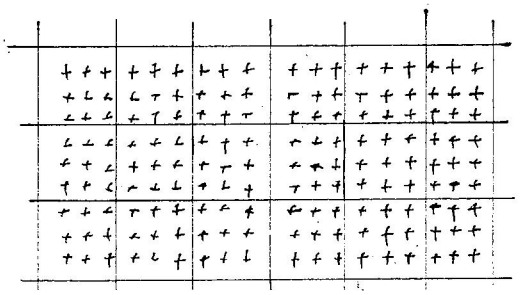
Comment
Since line thickness may be quite critical with such a fine pattern, this is an improvement on the above.



Required interval to be represented: the metre and 300mm.

The paper grid
Lines at 10mm. apart will register the metre; crosses at 3mm. apart will register 300mm.

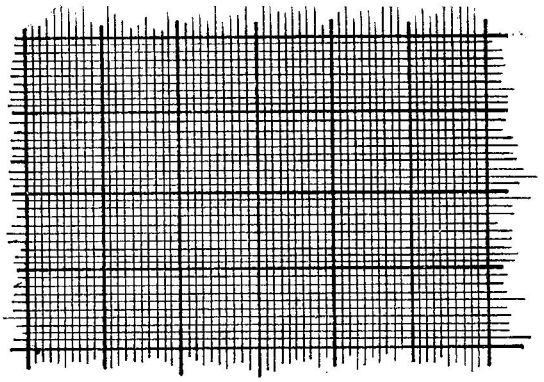
Comment
As the lowest common multiple of the metre and 300mm. is 3m., they would only coincide at every third line if used together; as the middle two lines would not coincide with the crosses, it could prove confusing in practice.



Required interval to be represented: the metre and 100mm. (the basic module)

The paper grid
Heavy lines 10mm. apart and thin lines 1mm. apart to register the metre and 100mm. respectively.

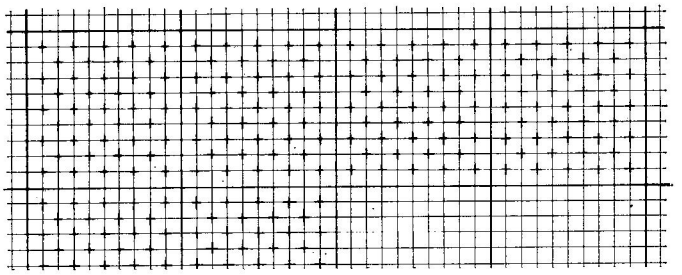
Comment
Only just on the threshold of legibility



or

The paper grid
Lines at 10mm. apart to register the metre and crosses 2mm. apart in a diagonal pattern to register 100mm. intervals.

Comment
A way of opening up the pattern above to give greater clarity yet retaining the same facility to register both the metre and the 100mm. intervals.

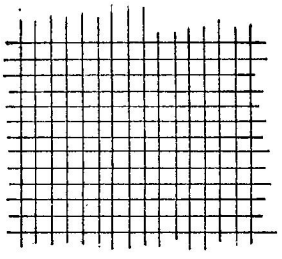


SCALE 1/50

Required interval to be represented: 100mm. (analogous to 4in., the basic module)

The paper grid
Lines 2mm. apart.

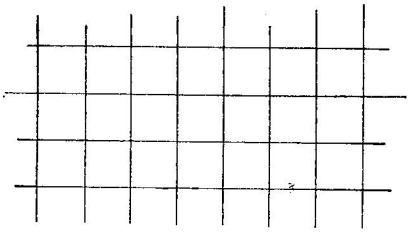
Comment
Quite legible but too fine to be an overall pattern on its own.



Required interval to be represented: 300mm. (analogous to 1ft.)

The paper grid
Lines 6mm. apart.

Comment
Very clear and open grid.



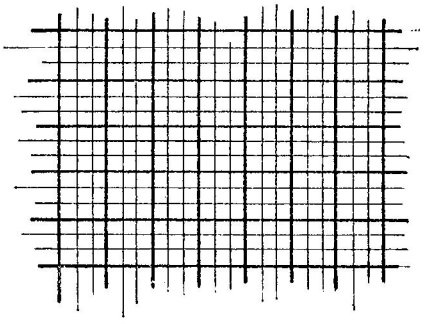
BMN
Building Metrication News

SCALE 1/50 *(continued)*

Required interval to be represented: 100mm. and 300mm. in combination

The paper grid
Heavy lines 6mm. apart and thin lines 2mm. apart to register 300mm. and 100mm. intervals respectively.

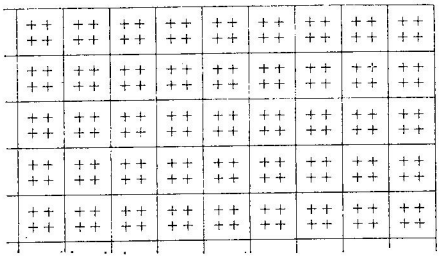
Comment
A very useful combination for this particular scale of drawing.



or

The paper grid
Lines 6mm. apart and crosses 2mm. apart to register 300mm. and 100mm. intervals respectively.

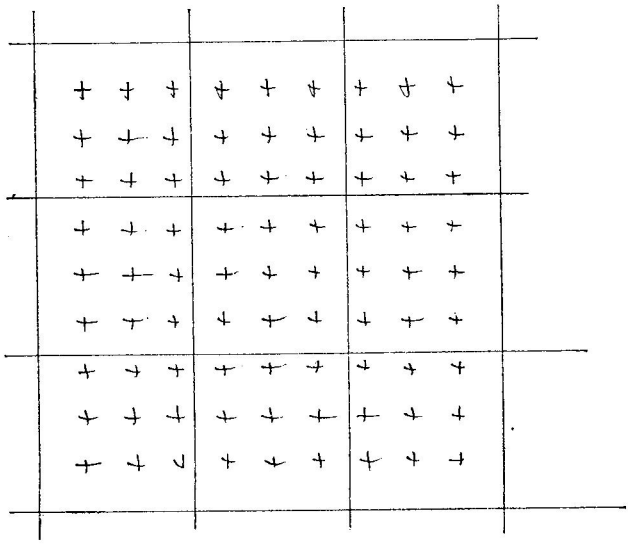
Comment
A more open version of the above pattern because it avoids the use of the thick line.



Required interval to be represented: the metre and 300mm.

The paper grid
Lines 20mm. apart will register the metre; crosses 6mm. apart will register 300mm.

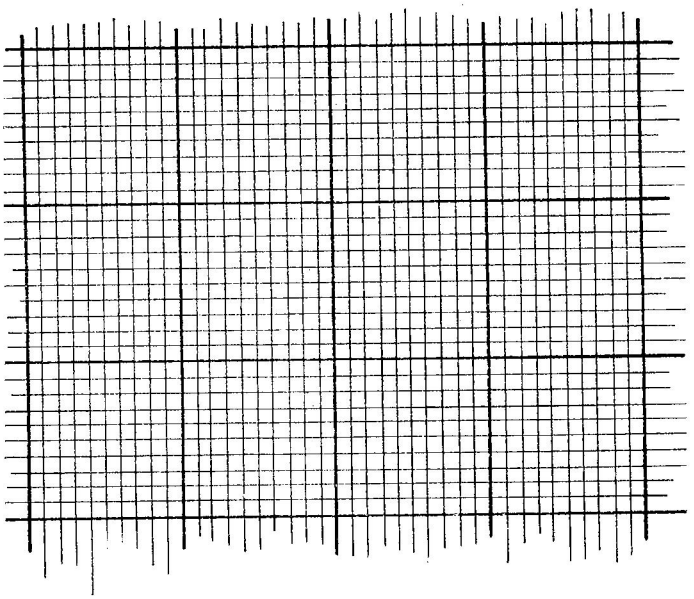
Comment
The lack of coincidence is because of the same reason given in the similar version shown in the scale of 1/100. It is also rather too coarse for the degree of precision likely to be wanted at this scale of 1/50.



Required interval to be represented: the metre and 100mm. (the basic module)

The paper grid
Heavy lines 20mm. apart and thin lines 2mm. apart will register the metre and 100mm. intervals respectively.

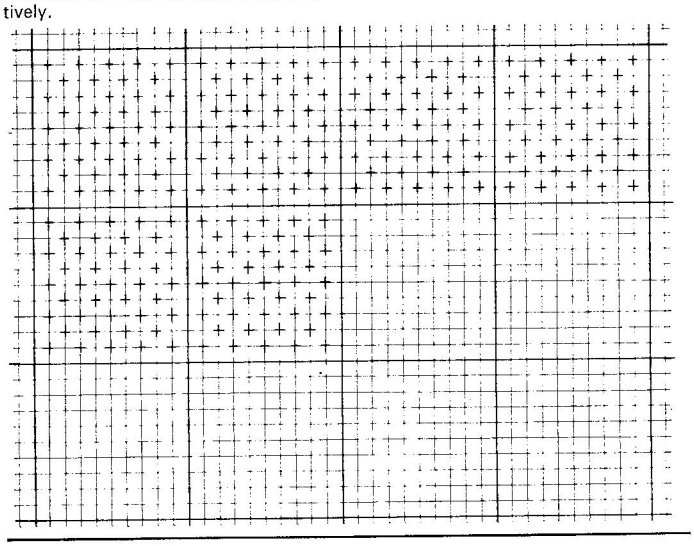
Comment
This pattern could be useful where the 300mm. preference was not required.



or

The paper grid
Lines 20 mm. apart and crosses 4mm. apart in a diagonal pattern will register the metre and 100mm. intervals respectively.

Comment
A finer version of the pattern above.

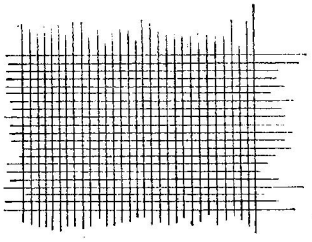


SCALE 1/20

Required interval to be represented: 20mm.

The paper grid
Lines 1mm. apart.

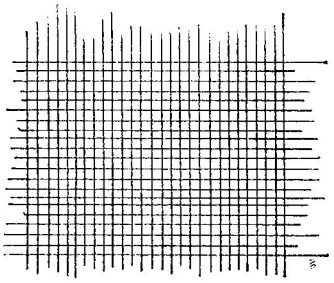
Comment
Although on the threshold of legibility, it is too fine to be an overall pattern on its own.



Required interval to be represented: 25mm. (analogous to 1in.)

The paper grid
Lines 1·25mm. apart.

Comment
On the threshold of legibility but too fine to be an overall pattern on its own.



(continued on page 148)

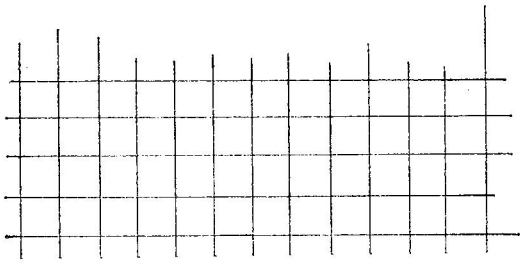
BMN
Building Metrication News

SCALE 1/20 *(continued from page 146)*

Required interval to be represented: 100mm., the basic module (analogous to 4in.)

The paper grid
Lines 5mm. apart.

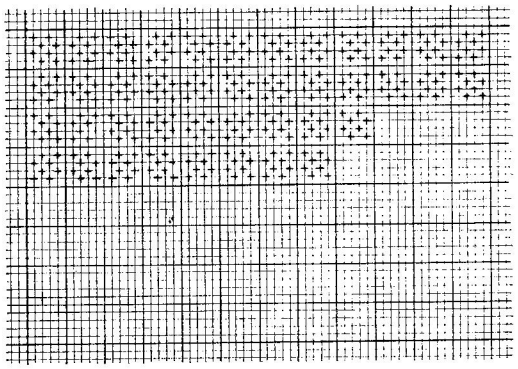
Comment
Very clearly legible but greater precision may be required at this scale. If 25mm. (analogous to 1in.) intervals are required as the submodular divisions, it is not difficult to judge them quite accurately enough by eye on this grid.



Required interval to be represented: 100mm. and 20mm. in combination

The paper grid
Lines 5mm. apart and crosses 2mm. apart on a diagonal pattern will register 100mm. and 20mm. respectively.

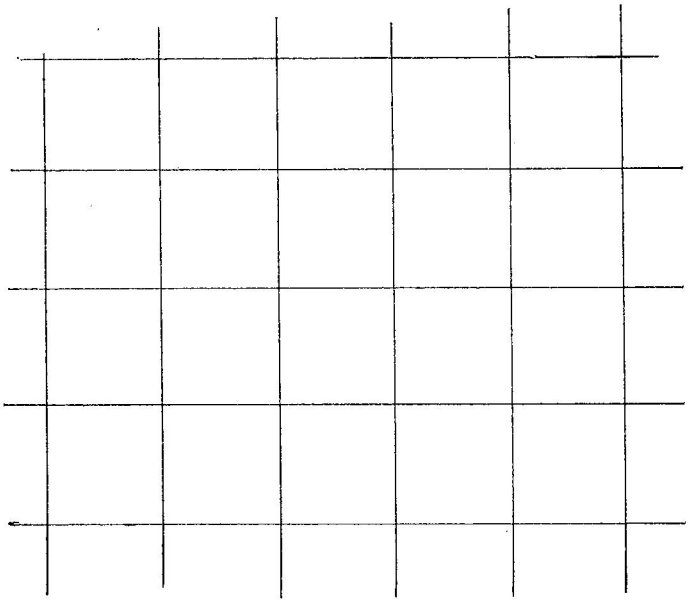
Comment
If submodular divisions are to be decimal based, they will have to be registered with some form of pattern because it is not easy to divide a space into fifths by eye.



Required interval to be represented: 300mm. (analogous to 1ft.)

The paper grid
Lines 15mm. apart.

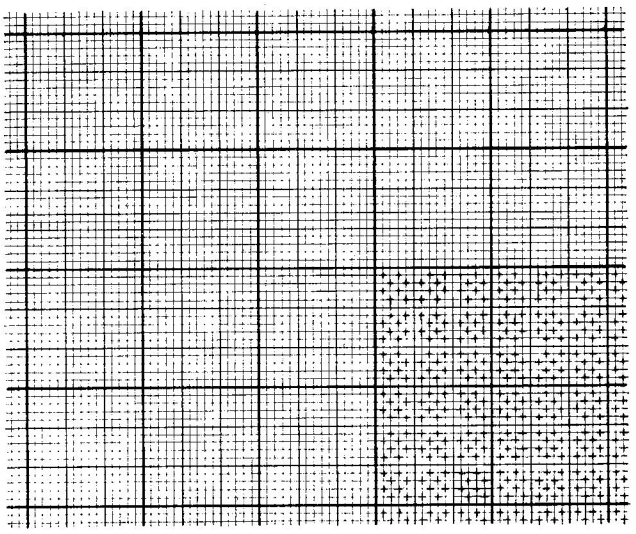
Comment
Too coarse to be very useful on its own for the degree of precision that is likely to be wanted for this scale.



Required interval to be represented: 300mm. and 100mm. in combination

The paper grid
Thick lines 15mm. apart and thin lines 5mm. apart to register 300mm. and 100mm. intervals respectively.

Comment
This may be a useful pattern for work at this scale even though it is rather coarse. Further degree of precision could be easily added by having diagonal pattern crosses 2mm. apart to register 20mm. intervals.

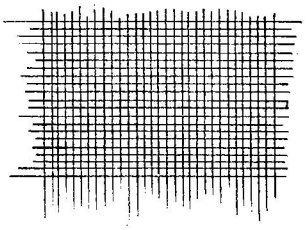


SCALE 1/10

Required interval to be represented: 1cm. (10mm.)

The paper grid
Lines 1mm. apart.

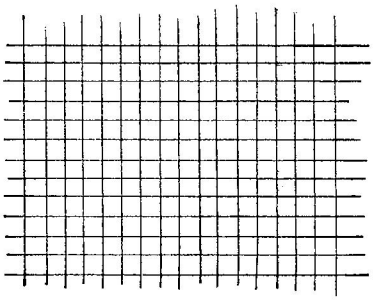
Comment
Although on the threshold of legibility, it is too fine to be an overall pattern on its own.



Required interval to be represented: 25mm. (analogous to 1in.)

The paper grid
Lines 2·5mm. apart.

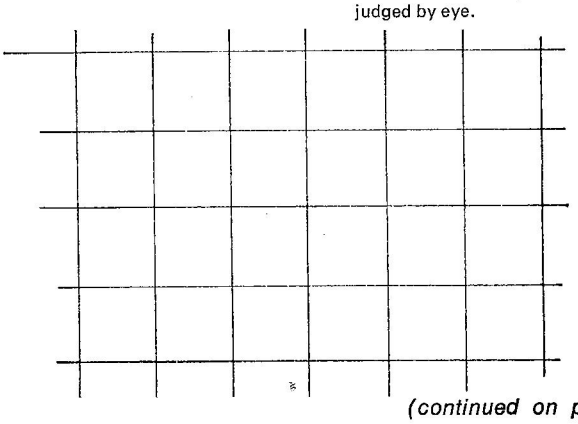
Comment
Good legibility but even so it may be a little too fine to be an overall pattern on its own.



Required interval to be represented: 100mm., the basic module (analogous to 4in.)

The paper grid
Lines 10mm. apart.

Comment
Too coarse to be used on its own for the precision likely to be needed at this scale–unless the submodular interval needed is 25mm., which could be judged by eye.



(continued on page 151)

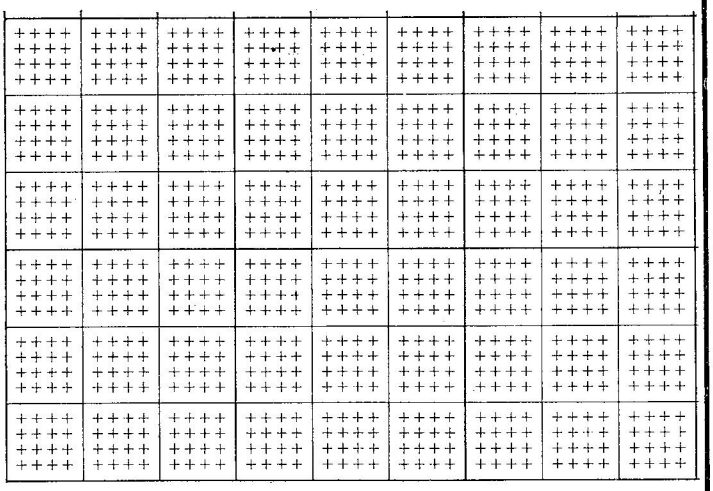
BMN Building Metrication News

SCALE 1/10 *(continued from page 148)*

Required interval to be represented: 20mm., 100mm. and 300mm. in combination

The paper grid
Heavy lines 300mm. apart, thin lines 10mm. apart and crosses 2mm. apart will register 300mm., 100mm. and 20mm. intervals respectively.

Comment
When submodular divisions are to be decimal, this pattern will provide the facility as well as giving satisfactory registration with both the basic module and 300mm.

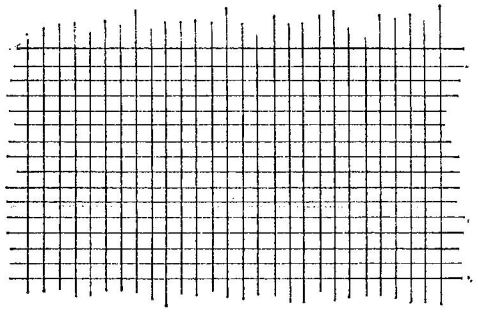


SCALE 1/5

Required interval to be represented: 1cm. (10mm.)

The paper grid
Lines 2mm. apart.

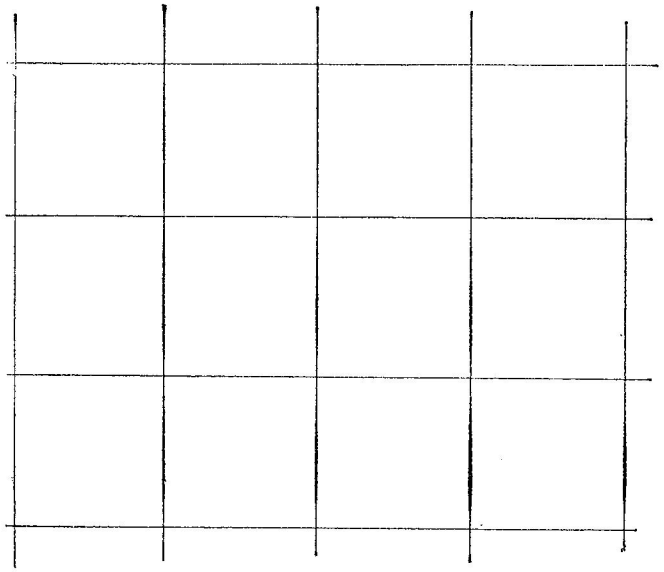
Comment
Quite legible but too fine for an overall pattern on its own.



Required interval to be represented: 100mm., the basic module (analogous to 4in.)

The paper grid
Lines 20mm. apart.

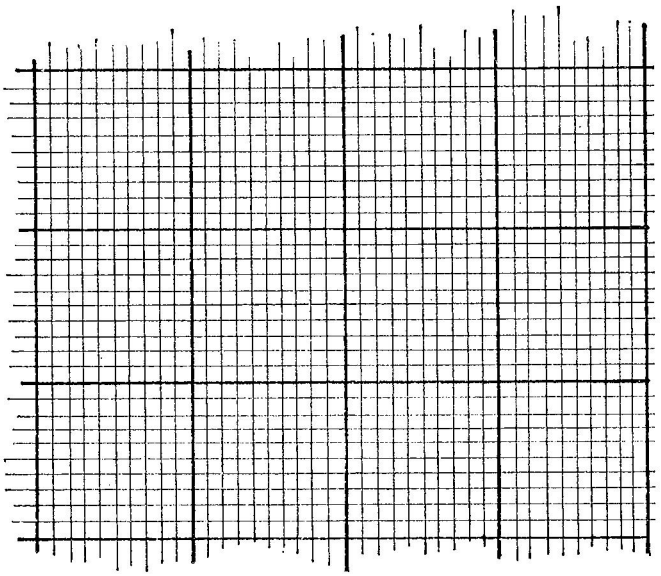
Comment
Too coarse for the degree of precision likely to be wanted at this scale.



Required interval to be represented: 1cm. and 100mm. in combination

The paper grid
Heavy lines 20mm. apart and thin lines 2mm. apart to register 100mm. and 1cm. intervals respectively

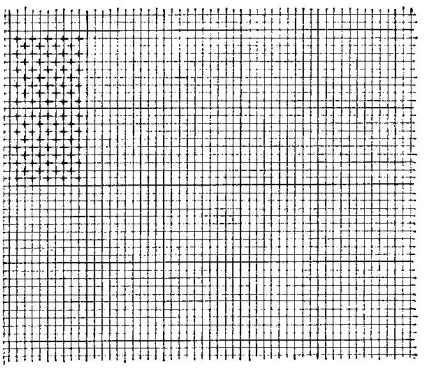
Comment
A good combination for this scale. It is not likely that 300mm intervals would be useful.



or

The paper grid
Lines 20mm. apart and crosses 4mm. apart on a diagonal pattern to register 100mm. and 1cm. intervals respectively.

Comment
A finer version of the above; if needed, every third line on this grid could be thicker to register 300mm. intervals.



BMN
Building Metrication News

Should Government Advise or Instruct?

COMMENT ON MHLG DESIGN BULLETIN No. 16

Under the heading 'Shot Gun Advice,' the first Building leader of 4 October issue was critical of the new Ministry of Housing Bulletin No. 16 ('Co-ordination of components in housing: Metric dimensional framework') for making face dimensioning mandatory. This runs contrary to BSI recommendations which, recognising the transitional state of dimensional co-ordination development, offered designers and manufacturers the choice of face dimensioning or axial dimensioning. It was felt that the Bulletin left a number of questions unanswered—Why was it necessary for the MHLG to invoke mandatory powers? Why were BSI's recommendations in BS 4330 overruled? Was the Ministry moving towards the usurption of BSI as the national standards body? — amongst others. Since the issue is an important one in the construction industry's change to metric, a number of key figures involved in the change have been asked for their comments. These are given below.

A NECESSARY CHOICE

from David W. Llewellyn, Housing Adviser to MHLG

The leader 'Shot Gun Advice' in the issue of 4 October states that in Design Bulletin 16, BS 4330 has been overruled, and refers to lack of consultation. To say the least, this is misleading. All the requirements of DB 16 are drawn from within BS 4330, and have been prepared after much consultation with local authority architects—who are the main people who will use the document, after consultation with industry and after much effort by both the R. & D. Group in the Ministry, and a Working Party with a wide range of housing experience.

BSI recommendations are intended to cover all types of building. MHLG are concerned to obtain the maximum value for the taxpayers', ratepayers' and tenants' money in the fields with which the Ministry are concerned. To this end the change to metric cannot pass by without rationalisation of that portion of housing financed by the public purse. DB 16 sets out to provide a framework for rationalisation. In order to rationalise to a reasonable extent in the housing field, it is necessary to choose between a face or axial grid, for the choice will affect many components. For example, both fixing and fire requirements will vary on 'front' and 'rear' wall units, and floor spans will vary unless the party wall happens to be 300 mm thick.

Do we need a variation of grid when much work has shown that all possible briefs can be met without it? The 'House Shells' papers published by the NBA are an even more rationalised discipline for two-storey housing, based on the requirements of both BS 4330 and DB 16, and they have rightly received credit for their contribution to progress from the greater part of the lay and technical press. 'House Shells' could provide the basis for even more rationalisation, if it were adopted by designers.

Those who are wise enough to develop and improve a given method of construction will find that the existence of a dimensional discipline will lay a foundation to improve other operations such as the preparation of Bills of Quantities on a component basis, the pricing of components and cost planning generally.

The question is asked why it is necessary for the Ministry to invoke mandatory provisions. The answer is that, given the desirability of rationalisation in this field, the Ministry must expect—and is indeed expected by the many thousands of architects employed directly or indirectly by local authorities—to give a clear lead in the field with which it is concerned. A simple request to take account of the published technical advice—not all of which is read by every single designer—could produce as many different interpretations as there are different designers. This would not produce rationalisation. But having said this I question, as an over-simplification, what the article of 4 October said about the Design Bulletin and the Circular. It is true that DB 16 said, on page 3, that the face grid would be required; but it went on to allow for important exceptions in the field of system building. It is also true that the circular said that design schemes submitted in 1972 or later would be required to be in metric dimensions, and that the specifications for components would be required to be in terms of metric British Standards; but as regards the standards incorporated in DB 16, it said only that 'approval may be withheld if it (i.e. any metric scheme) departs *unreasonably* from those recommendations." This scarcely justifies the heading 'Shot Gun Advice.'

Although I am temporarily seconded to the Ministry of Housing and Local Government, I am in no way responsible for the preparation of DB 16, so am not defending my own work. As a taxpayer, and one who takes an interest in building problems, I do however support it wholeheartedly.

DEGREE OF DICTATION

from Eric Thompson, Secretary, NFBTE Metric sub-committee

Apart from the technical implications, the publication by the MHLG of Design Bulletin 16 as a mandatory rather than an advisory document raises one important issue of principle: to what extent should central government dictate to local authorities? It can be argued that the most efficient and economic way of solving the country's housing problem would be to compel all local authorities to adopt the same building system with no variations whatsoever, either in plan form or in elevational treatment. Despite its economic advantages, few, we think, would be prepared to accept this solution. On the other hand, few would dispute the need to adopt some form of standardisation and rationalisation. It is really a matter of degree and this is the dilemma in which the Ministry of Housing and Local Government finds itself, and which one imagines it has attempted to resolve in this latest Design Bulletin.

It cannot be said that the recommendations in Design Bulletin 16 came as a surprise to us. We seem to have been one of the few representative bodies in the industry to be consulted by the Ministry. These discussions went on for many months. Both technical and administrative officials of the Ministry were involved as well as the Minister's industrial adviser. Our main objection to the mandatory requirement that all metric house plans 'should use a face grid for all building forms and methods of construction' is that it imposes a restriction upon the designer which cannot be justified at this stage. The change to metric and the introduction of dimensional co-ordination, with all the repercussions, must be regarded as a unified development project. We believe, therefore, that it is a mistake to apply an arbitrary decision which may well hinder logical development in future. In short, we believe that the issue of design disciplines has been pre-judged.

One of the principal reasons put forward by the Ministry for making a single design discipline mandatory is that it will encourage the use of a reduced range of standard components. This we do not accept. In our view, a much more fundamental approach is required to the vital problem of variety reduction. We believe that it is better to decide first upon the range of sizes of components that is required—a task which the highly qualified and fully representative BSI functional group panels and technical committees are doing. Then the designer will have freedom to use his ingenuity to make the best use of them. At the moment, opinion within the functional group panels is that the variety of components that will be needed to meet the standard cases of junction and grid planning will probably permit the choice of disciplines. It is unfortunate that the Ministry could not have left the choice open until practical experience of the use of co-ordinated components developed in accordance with BSI recommendations could provide adequate technical evidence on which a more rational decision could be made.

The relaxation permitted in respect of certain existing concrete systems is welcomed as far as it goes. We believe, however, that it holds the seeds of false hope for the sponsors of those systems which, at the moment are based on the axial grid. What firm, with vast capital resources invested in this type of system, would choose to continue with an axial based design merely in the hope that the Ministry *might* change its mind between now and the promised review at the end of 1972? It is unrealistic to think that any firm would.

The industry knows that it will have to

BMN
Building Metrication News

face increased costs in going metric. We believe that the Ministry's insistence on a single design discipline at this stage will do nothing to reduce that cost and might very well increase it. What, for example, will be the Ministry's attitude to a scheme based on axial grids using standard components if it is cheaper than comparable face grid schemes? Will it be rejected?

BSI SUPPORT IN QUESTION

from W. A. Balmain, President of the AIBCM

I feel that, even more serious than the detail questions which you ask in your leader, the action of the Minister of Housing in making face dimensioning mandatory raises an extremely serious question of Government policy which must be resolved.

The Government has entrusted the British Standards Institution with the task of organising and programming the change to metric in this country, and the Prime Minister has stated that the Government fully supports the British Standards Institution in their work. In spite of this fact, and under a cloak of appearing to agree with the BSI 'Standards on dimensional co-ordination,' the Minister of Housing has in fact overridden the British Standards Institution and the Government's own Interdepartmental Sub-committee on Component Co-ordination, both of whom, after very considerable and lengthy debate on the matter, decided that it was necessary to allow both face and axial dimensioning. Making face dimensioning mandatory must have an enormous and immediate practical effect on the change to metric programme.

As there are already indications in a paper produced by the Department of Education & Science of a similar disregard by a Government Department of the British Standards Instituition's findings, the immediate necessity would appear to be for the Government to make its attitude to the BSI perfectly clear. Either it supports the work of the Institution or it does not. If it does, the Minister of Housing ought to withdraw Bulletin No. 16. It if does not, it must say so quite clearly, and we must abandon the attempt to produce a rational and agreed system of dimensional co-ordination and submit to mandatory dictates from the various Ministries concerned.

RESTRICTIONS ON DESIGNERS

from Peter Cocke

It appears to be the season for each ministry to publish its own treatise on the co-ordination of dimensions. Design Bulletin 16 is such a treatise from the Ministry of Housing and local Government.

It contains excellent general statements on component co-ordination, the determining of the dimensional framework and the application of the dimensional framework, but all that is said in this section of the Bulletin applies equally to any type of building. Building Bulletin No. 42 of the Department of Education and Science has covered some of the same ground. Discourses on these subjects are extremely valuable, particularly at the present time, as in due course there must be an authoritative text book on the subject for designers, but it seems a pity that this material should be mixed up with mandatory statements concerning housing when it would be better published as a working paper for everyone to read, digest and comment upon. So would the mandatory statements be better published separately so that we know exactly what is mandatory?

The Ministry of Housing and Local Government circular 1/68 gave promise that the Ministry would support the work of BSI and it is disappointing that in certain respects Bulletin 16 fails to do so.

On page 3 of British Standard 4330, 'Controlling Dimensions,' is a list of co-operating organisations. In this list is the Ministry of Housing and Local Government and against its name an asterisk. Reference to a footnote tells us that organisations marked with an asterisk 'were directly represented on the Committee entrusted with the preparation of this Standard.' The section headed 'Scope' on page 5 of the Standard says, 'horizontal spacing dimensions may be either between axes or between boundaries of zones for load-bearing walls or columns, and as both methods are appropriate to different constructional arrangements, dimensions for both are included.' If we then turn to the Ministry of Housing and Local Government Bulletin No. 16 we find that the use of a face reference system for dimensions is mandatory for housing.

The Ministry may argue that standards are recommendations and it therefore has the right to choose which dimensional discipline it adopts. But if the alternative systems quoted in the Standard are—and I agree that this is so—applicable to different forms of construction, then the Ministry's statement prohibits the use of some forms of construction for housing. The argument in Appendix 2 is of great interest but it appears to prove conclusively that the two systems should be retained and not, as it claims, the reverse. The mandatory storey height of 2,600 can be criticised in a similar manner. When the standard storey height was established, and this was not long ago, it was a reasonable expedient but developments in the field of co-ordination of dimensions has been so rapid in the interval that it is now clearly apparent that the relative importance of storey height and ceiling height depend on the system of construction employed. If external cladding extends from floor to floor and is of an inflexible form, this relatively expensive element of a building will dictate a preference for standardising the storey height. If, on the other hand, cladding as well as internal partitions extend, or in the former case can extend, from floor to ceiling, a ceiling height may become the more important dimension. Generally it seems preferable to have floor to ceiling heights as controlling dimensions as they relate more closely than do storey heights to the requirements of the user of the building.

To restrict to too great an extent the number of alternative floor zone dimensions may inhibit technical developments within the floor thickness. The bulletin seems to admit this argument as although 2,600 storey height is mandatory and there is a first preference for a 250 floor thickness, there are second preferences for the floor zone of 200 and 300; but with a floor zone thickness of 200 and a 2,600 storey height the ceiling height and cube of the building are unnecessarily increased. If the 300 second preference floor zone thickness is used with a 2,600 storey height, the ceiling height is reduced. If this reduced height is acceptable then the ceiling height with 250 floor and 2,600 storey height zone is excessive and uneconomic.

Housing includes not only low rise but high and medium rise, and the range of different methods of building which can be used is therefore wide. To eliminate some of these not only restricts designers unreasonably but prevents some of the industrial resources available being used to help in meeting the ever-present housing shortage.

Standards for controlling dimensions are clearly necessary in order to fix dimensions of components so that they are interchangeable. But controlling dimensions are primarily a means to an end and not an end in themselves and once the comprehensive set of metric co-ordinated parts is available it should be these which discipline the designer.

Ultimately it may be reasonable to make the use of standard co-ordinated components mandatory but the designer should be free to use his ingenuity in assembling these in any manner which meets user requirements and is economic.

Such need for flexibility is accepted by the Bulletin to some extent. Diagram 7G on page 16 even shows an axial partition and elsewhere the designer is given freedom to place site finishes either outside or within the zones. These parts of the text reinforced my belief that a flexible design approach must be possible.

During the transitional period when only some components are available with co-ordinated metric dimensions we shall no doubt come up against problems which we cannot now anticipate. It is much more likely that satisfactory solutions to these problems can be found if dimensional disciplines are used but not enforced. A principle within which architects have learnt to work and which they accept as reasonable is that a maximum cost should be laid down and minimum user requirements, which must be pro-

(continued on page 157)

BMN
Building Metrication News

SHOULD GOVERNMENT ADVISE OR INSTRUCT?

(continued from page 154)

vided within the cost, are properly defined. To make a dimensional discipline mandatory conflicts with this principle.

In any case, to have a dimensional discipline mandatory for a particular building type is contrary to the aim, at least of the private sector of the construction industry, to have a completely interchangeable set of building components for all types of buildings.

So far as I know the RIBA has not been officially consulted recently and on at least one occasion emphasised to the MHLG the need for retaining both disciplines.

It is impossible to anticipate whether other ministries will invoke mandatory powers in favour of axial or face dimensioning but it is interesting to note that the Department of Education & Science Building Bulletin No. 42 is published as a working paper and invites comments, though the invitation is limited to 'systems and component designers and sponsors.'

It seems clear that the Ministry is, whether intentionally or not, usurping the position of BSI which was appointed by the Government to organise the change to metric and the co-ordination of dimensions. My third paragraph clearly shows that the Ministry is acting contrary to a BSI recommendation which has been arrived at in the most democratic manner possible and with the assistance and knowledge of the Ministry.

TIME FOR DISCUSSION

from Philip Dunstone

I cannot believe that the Ministry of Housing, in their Bulletin No. 16, really intend to inhibit the use and further development of axial dimensioning. But because they are in the forefront of the metric/dimensional co-ordination change and control a large volume of building work, this is what they are likely to be doing by influencing opinion generally at a time when discussion should still be possible.

Some such phrase as 'the Ministry will look with favour on face dimensioning' would have been sufficient.

The cost picture is not yet in focus, but what will be the Ministry's attitude to a particular project or system using axial dimensioning if it proves to be cheaper than one using face dimensioning?

The point is, it is too soon to go firm on any aspect of dimensional co-ordination and we shall learn a lot more about the subject in the next few years as it comes into more general use.

RIGHT TO MAKE A CHOICE

from Hugh Clamp, chairman of Functional Group Panel No. 2: External envelope

It is difficult to comment authoritatively on the new MHLG Bulletin No. 16, since to date I have been able to only glance at a copy shown to me, and as far as I know is still not available to the general public. Only detailed study can show if it gives fair and reasonable advice to the building industry but I would feel you are being unfair in suggesting they are usurping the position of BSI as the national standards body.

BSI have the task of setting out the requirements of the country as a whole, including industry and designers both private and public. BS 4330 provides for dimensioning either to axial lines or boundaries of zones. Although opinion is now almost universally in favour of the latter, Educational spacing is exclusively axial and Health exclusively to boundaries of zones. For all others, including Housing, the choice was open but a footnote to Table A6 points out the need for reference to MHLG Bulletins for Public Sector Housing and DC 6 states that the various Ministries, including Housing, will shortly issue detailed information about their respective building types.

If the Ministry choose one of the two alternatives set down by BSI for the industry as a whole, for the buildings they are commissioning and paying for, and the one they select follows both accepted and recommended practice, it would seem that they not only have every right to do so but they should also be thanked for a step towards 'variety reduction.'

CIBT RETRAINING AIDS

The Construction Industry Training Board is now distributing a free set of general metrication re-training aids to all levy payers in the construction industry. These include three learning texts developed on self teaching principles for individual use by employees. Also included are two guides designed to show employers how to get the best results from the aids. There is a general guide to all the publications, and an administration guide to the use of the metrication learning texts.

The five general aids are:

Metriconstruction—a learning text for small firm management, surveyors, estimators and technical staff in general who are already competent at decimal calculations. Ref. MT/1. Price 4s. 6d. (CITB levy payers 3s.).

Use of Metric Units in Construction—a hand-on learning text for working managers, general foremen, other supervisors, surveyors, estimators and clerical staff who might require practice or revision in decimal calculations. Ref. B/1. Price 4s. 6d. (CITB levy payers 3s.).

Metric in the Office—a short exercise followed by a job reference chart for typists, secretaries and clerks. Ref. C/1. Price 9d. (CITB levy payers 6d.).

Conversion Tables—pocket sized conversion tables for site staff covering linear, superficial, volume, mass, capacity, area and temperature measurements, foot/inch to metric, metric to foot/inch. Ref. MCT. Price 4s. to levy payers. (Not available to non-levy payers.)

Metric summary card—for management and technical staff in large companies. Ref. MSC. Price 9d.

Further aids of a more specialised nature have also been prepared. One free copy of each of these will be issued to levy payers who complete a request form. These aids are:

Scales on Metric Drawings—a learning text which, by sequenced exercises, provides practice in using scales and metric dimensions together. Ref. BT/2. Price 3s. (CITB levy payers 2s.).

Taking-Off in Metric—a hand-on learning text including two drawings for estimators, surveyors and others who take-off quantities for drawings. Ref. T/5. Price 4s. 6d. (CITB levy payers 3s.).

Metric Design for Heating and Ventilating Services—instruction for design staff, surveyors, estimators and other technical staff in the use of metric units when carrying out heating and ventilating design calculations. Ref. T/3. Price 9s. (CITB levy payers 7s.).

Metric Design for Electrical Services—a learning text with instruction for design staff, surveyors, estimators and other technical staff in the use of metric units when carrying out electrical design calculations. Ref. T/4. Price 6s. 6d. (CITB levy payers 4s. 6d.).

Fitters and Plumbers Reference Card—a job reference card for fitters, plumbers and supervisors with easily used conversion factors of appropriate units. Ref. B/3. Price 6d. (CITB levy payers 4d.).

To help firms in the industry, course material has been prepared to familiarise supervisors with the metric system.

COMING EVENTS

MONDAY, 11 NOVEMBER

Metrication as it affects the civil engineering industry: by F. Walley. Informal discussion organised by the Society of Civil Engineering Technicians at the Institution of Civil Engineers, Great George-st., London, SW1. Starting at 5.30.

TUESDAY, 3 DECEMBER

Change to Metric: a two-day course for architects, quantity surveyors and engineers to bring them up-to-date with current metric proposals. Organised by the Institute of Advanced Architectural Studies at the King's Manor, Exhibition-square, York. Fee, 11 gns.

METRICATION INDEX

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

Review of Design Bulletin No. 16. Guide for architects preparing metrically dimensioned housing plans published by MHLG. (4 October, p. 137.)

The mandatory nature of Design Bulletin No. 16 is questioned and criticised in the Leader article 'Shot-Gun Advice.' (4 October, p. 101.)

BMN
Building Metrication News

GOING METRIC

NBA METRIC SYMPOSIUM FOR MANUFACTURERS

In a few years' time, most UK industries might be so industrialised and automated that a change as fundamental as the change to metric could not have been undertaken because of the resulting disruption. In a paper presented to an NBA symposium in London last week, Michael Clarke, co-ordinator of the change and head of the construction group of the BSI, said that Britain was at last 'facing up to the metric system' after 100 years or more of procrastination. Starting with industry, the change from the imperial system with its 54 different quantity concepts to the metric system with its single decimal concept should be substantially complete by 1975.

Architects and the remainder of the building design team were being encouraged to start preparing new contracts in metric terms from 1 January 1969, onwards. 'Contractors can expect to be working on site in metric to these contracts from the beginning of 1970,' Mr. Clarke added.

'At all levels there will need to be much training in the use of the metric system. Most educational bodies serving the construction industry have now made plans in this matter.'

International Liaison

It was vitally important, he warned, that dimensional agreements be complemented by international agreements. 'It would be folly for the UK to work out a metric building technology which was not acceptable to the rest of the metric-using world and in particular the rest of Europe, with whom trade is essential.' For this reason, Mr. Clarke said, a dimensional co-ordination programming committee had been set up.

Alluding to the benefits of dimensional co-ordination, he said that 'the metric change was a heaven sent chance for the building industry to 'compress into a five-year period an amount of progress which, without the excuse of metrication, would surely take nearer 20 years to achieve.'

Required Information

In a paper underlining architects' early requirements when they start to prepare designs to metric modular sizes, Bruce Martin said that preliminary information on new metric modular components would be needed from early 1969 onwards. What should this early information be? It would be important to be able to distinguish the new components which are both metric and modular from anything else, i.e., those components which are simply straight metric conversions from existing imperial sizes. The architect then needed to know when it would be available so that he would know whether or not to include it in his design. Next the metric modular sizes—the sizes of the spaces into which the components go on site—should be given (in millimetres) followed by the sizes of the components themselves, the difference showing the allowance that had to be made for jointing.

These, said Mr. Martin, were the immediate requirements if architects were to be in a position to start designing in metric during the period laid down. One further thing. It was difficult to consider a new component unless its competitiveness in price with its equivalent current article was known. What architects also needed to know is: 'What are the prices?'

Contractors' Problems

At the end of the chain comes the contractor. He has to ensure that the components on which his tender is based will be available at the right price and in the right quantity when the time comes to purchase them. Any failure on the part of the designers or the manufacturers to communicate their plans could have serious consequences for the contractor, according to A. W. Rickard giving his paper on the requirements of the contractor.

The problems which faced the contractor in making the change were briefly outlined by Mr. Rickard. The problems of retraining employees—how and when? How long would it take before they became familiar with metric units and how much financial loss would be incurred through increased errors. There would be problems with co-ordinating with sub-contractors who might not be prepared to work in metric terms and there was the general task of organising, planning and administering all aspects of the changeover. There would be problems of supply of materials and components and finally there was the problem of costs. Generally it was not possible for contractors to offset short-term costs against long-term benefits as other sectors of the construction industry could do.

From the construction point of view the critical changeover period would be from 1 January 1970 to 31 December 1972. It was in this period that contractors were going to have to administer different projects in different units. There was a need for designers to indicate very clearly whether the components required for a particular project are designed for metric or imperial measure.

It will help contractors, said Mr. Rickard, if manufacturers were to give full information in their catalogues as soon as new metric sizes were known, and an indication of prices and delivery dates. According to the BSI programme, manufacturers were being asked to supply technical information in metric terms for their products as they were now produced. Some had already done this but it was important that the remainder should do so by the end of the year.

The main task facing the industry in its change to metric was to do it in such a way that confusion was avoided, unavoidable additional short-term costs minimised and the long-term benefits realised as soon as possible. This could only be done by the fullest co-operation between all sectors of the industry.

The Manufacturers' Side

Since they have already produced a standard range of windows, and therefore encountered some of the problems that metrication and dimensional co-ordination will bring, it is not surprising that Crittall Manufacturing Co. should supply the speaker to recount the manufacturers' problems. J. S. B. Colombi, their technical director, had experienced some difficulties with paper sizes and thought that the ISO 'A' series had much to recommend it with its relationship of 1:2 which made photographic reproduction easier. He made a plea to editors of technical journals to consider A4 sizes. This would avoid the situation, which he had experienced not long ago, of having nine technical journals on his desk, each a different size.

In changing to metric he thought it useful for an organisation to make a preliminary network analysis chart. Then there had to be a preliminary assessment of the cost. If there was going to be a rehash of the products it was a good thing to have a market assessment. For instance where one product joins another it was essential to find out what the other manufacturer was doing. Having done a market survey it might be best to get out a bar chart showing when each department had to start working in metric on each product.

Timing, said Mr. Colombi, was important. Once started, the changeover should be made as soon as possible to save the costs of double stocks. Eventually the imperial product would no longer be stocked and would become the purpose made article at a higher price.

DB16

The morning session ended with a general discussion on the MHLG's Design Bulletin 16 and the mandatory powers adopted over face to face dimensioning. Department spokesmen present were asked some pertinent questions such as—Why Housing should take mandatory powers when Public Building and Works have indicated that they accept the BSI recommendations which offer a choice between face dimensioning and axial dimensioning? If manufacturers were to produce components to axial design, would they subsequently have them turned down by the Ministry? The Ministry's case is that they felt it necessary to give a clear indication to designers in the public field of housing, and that it helped towards variety reduction. The chairman of the conference, Kenneth Wood, speaking as a building manufacturer, seemed to come down on the side of the Ministry. Taking everything into consideration he felt that a clearcut decision was probably of help to him.

BMN
Building Metrication News

Metrication, the Computer and SI

This series of conversion tables, compiled by R. M. E. Diamant and A. L. Hart, will be appearing monthly. They are to be used like logarithmic tables, using a ruler to make sure that one does not mix up the horizontal lines. For example, if one wishes to look up the imperial equivalent of 275 MN/m² on table one, one places one's ruler at the bottom of the figure 270 which appears in the left-hand column and follows the line to the column marked 5. The figure which appears there is the equivalent value in pounds per square inch, i.e. 39,885 lb./sq.in. The tables have been set with the help of the English Electric KDF 9 computer at the University of Salford.

About twenty or even ten years ago it would have been virtually impossible for Great Britain to take the fateful step of going metric. Everyday calculations would have been so laborious that the expense of doing so would have outweighed by far the advantages gained. But now the development of electronic digital computers has made it possible for us not only to decimalise our currency but even to abandon at last our illogical system of measurement, which has hampered British industry for so long and has enabled our trading rivals to beat us in many fields. While we are at it, we are going the whole hog. Instead of adopting some of the metric illogicalities which are bound to exist in a system which is, after all, almost 200 years old, the type of system adopted in the UK is the brand-new SI (Système International d'Unités), which reduces the basic units down to a mere six:

Length	metre	m
Mass	kilogramme	kg
Time	second	s
Electric current	ampere	A
Temperature	degree Kelvin	°K
(also degree Celsius °C)		
Luminous intensity	candela	cd

From these basic units a number of compound units are built up, of which the most important are:

Unit of force:	Newton	N	kg m/s²
Work, energy and quantity of heat:	joule	J	kg m²/s²
Power and heat flow rate:	watt	W	kg m²/s³

Quite a number of other units are retained as so-called 'permitted units' but such metric units as the calorie, the atmosphere, the mm of mercury, the Angstrom unit and the kilogramme force (kp) are all relegated to history together with the rod, pole or perch. It is also good-bye to the dyne and to the erg, to the Thermie and to the metric horsepower.

Soon you will get used to the various

Table 1
Pressures 1
1 MN/SQM = 145.0377 lb./sq.in.
Note: DIFF signifies single units, so that the reading for any number required is taken at the intersection of the appropriate horizontal ten unit line and the vertical single unit column.

DIFF	0	1	2	3	4	5	6	7	8	9
MN/SQM					LB/SQIN					
0		145	290	435	580	725	870	1015	1160	1305
10	1450	1595	1740	1885	2031	2176	2321	2466	2611	2756
20	2901	3046	3191	3336	3481	3626	3771	3916	4061	4206
30	4351	4496	4641	4786	4931	5076	5221	5366	5511	5656
40	5802	5947	6092	6237	6382	6527	6672	6817	6962	7107
50	7252	7397	7542	7687	7832	7977	8122	8267	8412	8557
60	8702	8847	8992	9137	9282	9427	9572	9718	9863	10008
70	10153	10298	10443	10588	10733	10878	11023	11168	11313	11458
80	11603	11748	11893	12038	12183	12328	12473	12618	12763	12908
90	13053	13198	13343	13489	13634	13779	13924	14069	14214	14359
100	14504	14649	14794	14939	15084	15229	15374	15519	15664	15809
110	15954	16099	16244	16389	16534	16679	16824	16969	17114	17259
120	17405	17550	17695	17840	17985	18130	18275	18420	18565	18710
130	18855	19000	19145	19290	19435	19580	19725	19870	20015	20160
140	20305	20450	20595	20740	20885	21030	21176	21321	21466	21611
150	21756	21901	22046	22191	22336	22481	22626	22771	22916	23061
160	23206	23351	23496	23641	23786	23931	24076	24221	24366	24511
170	24656	24801	24946	25092	25237	25382	25527	25672	25817	25962
180	26107	26252	26397	26542	26687	26832	26977	27122	27267	27412
190	27557	27702	27847	27992	28137	28282	28427	28572	28717	28862
200	29008	29153	29298	29443	29588	29733	29878	30023	30168	30313
210	30458	30603	30748	30893	31038	31183	31328	31473	31618	31763
220	31908	32053	32198	32343	32488	32633	32779	32924	33069	33214
230	33359	33504	33649	33794	33939	34084	34229	34374	34519	34664
240	34809	34954	35099	35244	35389	35534	35679	35824	35969	36114
250	36259	36404	36549	36695	36840	36985	37130	37275	37420	37565
260	37710	37855	38000	38145	38290	38435	38580	38725	38870	39015
270	39160	39305	39450	39595	39740	39885	40030	40175	40320	40466
280	40611	40756	40901	41046	41191	41336	41481	41626	41771	41916
290	42061	42206	42351	42496	42641	42786	42931	43076	43221	43366
300	43511	43656	43801	43946	44091	44236	44382	44527	44672	44817
310	44962	45107	45252	45397	45542	45687	45832	45977	46122	46267
320	46412	46557	46702	46847	46992	47137	47282	47427	47572	47717
330	47862	48007	48153	48298	48443	48588	48733	48878	49023	49168
340	49313	49458	49603	49748	49893	50038	50183	50328	50473	50618
350	50763	50908	51053	51198	51343	51488	51633	51778	51923	52069
360	52214	52359	52504	52649	52794	52939	53084	53229	53374	53519
370	53664	53809	53954	54099	54244	54389	54534	54679	54824	54969
380	55114	55259	55404	55549	55694	55840	55985	56130	56275	56420
390	56565	56710	56855	57000	57145	57290	57435	57580	57725	57870
400	58015	58160	58305	58450	58595	58740	58885	59030	59175	59320
410	59465	59610	59756	59901	60046	60191	60336	60481	60626	60771
420	60916	61061	61206	61351	61496	61641	61786	61931	62076	62221
430	62366	62511	62656	62801	62946	63091	63236	63381	63527	63672
440	63817	63962	64107	64252	64397	64542	64687	64832	64977	65122
450	65267	65412	65557	65702	65847	65992	66137	66282	66427	66572
460	66717	66862	67007	67152	67297	67443	67588	67733	67878	68023
470	68168	68313	68458	68603	68748	68893	69038	69183	69328	69473
480	69618	69763	69908	70053	70198	70343	70488	70633	70778	70923
490	71068	71214	71359	71504	71649	71794	71939	72084	72229	72374

Mega newtons per square metre to pounds per square inch: 1 MN/m² = 145.0377 lb./sq.in. To be used for tensile strengths, compressive strengths, shear strengths, rupture strengths and Young's modulus of building materials.

BMN
Building Metrication News

METRICATION, THE COMPUTER AND SI

prefixes of which the most important ones are:

micro	μ	×	10^{-6}
milli	m	×	10^{-3}
kilo	k	×	10^{3}
mega	M	×	10^{-}
giga	G	×	10^{6}
tera	T	×	10^{12}

Quotation of values in the new units will be somewhat unfamiliar at first. To be told that the final compressive strength of a high alumina concrete after 7 days is 90 MN/m² may mean very little to us at first, but one soon gets used to the new figures, as they are only comparative after all. Rapid hardening Portland cement has a strength of only 18 MN/m² after 7 days, so that one simply compares 90 against 18. Some SI units are far simpler than equivalent imperial ones. The thermal conductivity of a substance is measured in the imperial system as:

Btu in.
sq.ft. hr. °F

This compares with an SI system W/m °C.

Table 2
Pressures 2
1 N/SQM = 0.0209 lb./sq.ft.
Note: DIFF signifies single units, so that the reading for any number required is taken at the intersection of the appropriate horizontal ten unit line and the vertical single unit column.

DIFF	0	10	20	30	40	50	60	70	80	90
N/SQM					LB/SQFT					
0		0.21	0.42	0.63	0.84	1.04	1.25	1.46	1.67	1.88
100	2.09	2.30	2.51	2.72	2.92	3.13	3.34	3.55	3.76	3.97
200	4.18	4.39	4.59	4.80	5.01	5.22	5.43	5.64	5.85	6.06
300	6.27	6.47	6.68	6.89	7.10	7.31	7.52	7.73	7.94	8.15
400	8.35	8.56	8.77	8.98	9.19	9.40	9.61	9.82	10.02	10.23
500	10.44	10.65	10.86	11.07	11.28	11.49	11.70	11.90	12.11	12.32
600	12.53	12.74	12.95	13.16	13.37	13.58	13.78	13.99	14.20	14.41
700	14.62	14.83	15.04	15.25	15.46	15.66	15.87	16.08	16.29	16.50
800	16.71	16.92	17.13	17.33	17.54	17.75	17.96	18.17	18.38	18.59
900	18.80	19.01	19.21	19.42	19.63	19.84	20.05	20.26	20.47	20.68
1000	20.89	21.09	21.30	21.51	21.72	21.93	22.14	22.35	22.56	22.77
1100	22.97	23.18	23.39	23.60	23.81	24.02	24.23	24.44	24.64	24.85
1200	25.06	25.27	25.48	25.69	25.90	26.11	26.32	26.52	26.73	26.94
1300	27.15	27.36	27.57	27.78	27.99	28.20	28.40	28.61	28.82	29.03
1400	29.24	29.45	29.66	29.87	30.07	30.28	30.49	30.70	30.91	31.12
1500	31.33	31.54	31.75	31.95	32.16	32.37	32.58	32.79	33.00	33.21
1600	33.42	33.63	33.83	34.04	34.25	34.46	34.67	34.88	35.09	35.30
1700	35.51	35.71	35.92	36.13	36.34	36.55	36.76	36.97	37.18	37.38
1800	37.59	37.80	38.01	38.22	38.43	38.64	38.85	39.06	39.26	39.47
1900	39.68	39.89	40.10	40.31	40.52	40.73	40.94	41.14	41.35	41.56
2000	41.77	41.98	42.19	42.40	42.61	42.82	43.02	43.23	43.44	43.65
2100	43.86	44.07	44.28	44.49	44.69	44.90	45.11	45.32	45.53	45.74
2200	45.95	46.16	46.37	46.57	46.78	46.99	47.20	47.41	47.62	47.83
2300	48.04	48.25	48.45	48.66	48.87	49.08	49.29	49.50	49.71	49.92
2400	50.12	50.33	50.54	50.75	50.96	51.17	51.38	51.59	51.80	52.00
2500	52.21	52.42	52.63	52.84	53.05	53.26	53.47	53.68	53.88	54.09
2600	54.30	54.51	54.72	54.93	55.14	55.35	55.56	55.76	55.97	56.18
2700	56.39	56.60	56.81	57.02	57.23	57.43	57.64	57.85	58.06	58.27
2800	58.48	58.69	58.90	59.11	59.31	59.52	59.73	59.94	60.15	60.36
2900	60.57	60.78	60.99	61.19	61.40	61.61	61.82	62.03	62.24	62.45
3000	62.66	62.87	63.07	63.28	63.49	63.70	63.91	64.12	64.33	64.54
3100	64.74	64.95	65.16	65.37	65.58	65.79	66.00	66.21	66.42	66.62
3200	66.83	67.04	67.25	67.46	67.67	67.88	68.09	68.30	68.50	68.71
3300	68.92	69.13	69.34	69.55	69.76	69.97	70.17	70.38	70.59	70.80
3400	71.01	71.22	71.43	71.64	71.85	72.05	72.26	72.47	72.68	72.89
3500	73.10	73.31	73.52	73.73	73.93	74.14	74.35	74.56	74.77	74.98
3600	75.19	75.40	75.61	75.81	76.02	76.23	76.44	76.65	76.86	77.07
3700	77.28	77.48	77.69	77.90	78.11	78.32	78.53	78.74	78.95	79.16
3800	79.36	79.57	79.78	79.99	80.20	80.41	80.62	80.83	81.04	81.24
3900	81.45	81.66	81.87	82.08	82.29	82.50	82.71	82.92	83.12	83.33
4000	83.54	83.75	83.96	84.17	84.38	84.59	84.79	85.00	85.21	85.42
4100	85.63	85.84	86.05	86.26	86.47	86.67	86.88	87.09	87.30	87.51
4200	87.72	87.93	88.14	88.35	88.55	88.76	88.97	89.18	89.39	89.60
4300	89.81	90.02	90.22	90.43	90.64	90.85	91.06	91.27	91.48	91.69
4400	91.90	92.10	92.31	92.52	92.73	92.94	93.15	93.36	93.57	93.78
4500	93.98	94.19	94.40	94.61	94.82	95.03	95.24	95.45	95.66	95.86
4600	96.07	96.28	96.49	96.70	96.91	97.12	97.33	97.53	97.74	97.95

Newtons per square metre to pounds per square foot: 1 N/m² = 0.0209 lb./sq.ft. To be used for floor loading, roof loading, wind loading, etc. of building structures.

BMN
Building Metrication News

NEWS FROM THE INDUSTRY

Merchants Worried by Change

In a recent survey conducted amongst the members of the NFBPM to try to identify problems facing the trade, well over 80% of the replies indicated concern with difficulties arising from metrication, according to C. N. Norton, president of the NFBPM. Speaking at the opening of the new heating centre in Bedfordshire last month he said that a similar percentage of members thought that manufacturers were not providing merchants with sufficient information. Less than a quarter of manufacturers express dimensions in metric terms in the catalogues. A negligible number have indicated the details of their planned rationalisation to their product ranges.

Mr. Norton thought that the most immediate and apparent difficulty which merchants face is the need to maintain parallel stocks throughout the changeover period. 'Without the most careful planning this operation is likely to result in many merchants suffering quite considerable losses. At the same time there is an enormous job to be done in the retraining of our own staffs. It isn't simply a matter of dimensions being expressed in metric terms. A very large number of items will be rationalised and this will make existing stocks and some existing knowledge obsolete.'

Cement Industry's Metric Switch

Policy decisions for the simultaneous switch to metric weights and decimal currency have been taken by the cement industry. From 1 January 1971, all deliveries will be in metric tonnes or 50kg. bags and invoices will be made out in decimal currency.

South African Programme

The programme for the change to metric in South Africa was outlined by J. L. Whitewell, speaking at a Johannesburg conference in August. The S.A. Metrication Advisory Board have decided that, logically, metrication should start with basic materials used by all industries. At the moment the aim is to have all basic materials made to metric sizes by January 1971, but this date is by no means a firm one. Once the timing for basic materials has been settled, however, technical committees will be set up to plan conversion within groups of industries. Nine such groups, including one for the construction industry, have been suggested.

One of the major decisions yet to be made in the building industry is whether the opportunity should be taken to go modular as well as metric. At the moment the question is being considered by a committee of the National Advisory Council of Building and Construction under Professor T. H. Louw.

A decision that has been made is that the decimal point, as in this country, is to be used as the full stop. It was felt that the use of the continental comma would cause confusion.

Michael Clarke, BSI co-ordinator for the construction industry, who visited South Africa in August, spoke to the conference about the U.K. move towards metric.

Measuring in Metric

The Bucks Building Board, a joint arrangement between the Buckinghamshire County Architect's department and the Buckinghamshire builders, is getting down to business. It has reproduced part of a bill of quantities for an existing project in metric measurement and this has been priced. This bill of quantities has highlighted some of the more important problems which will arise when metric bills are introduced next year.

Bills of quantities for live projects in metric measurement and decimal money will start to leave the County Offices next year and it is hoped that local builders will be able to participate in a major proportion of these works.

The County aims to continue the whole of its building programme in traditional construction. Mr. Geoffrey Gates, President of the Southern Region of the NFBTE and a member of the Bucks Building Board, feels that whilst the introduction of metric measurement might well initially increase the administration costs of the building industry by as much as 3%-5%, this increased cost will decline and in the long run the change will be to the advantage of the industry.

US Study

President Johnson recently signed a Bill ordering a three-year study of the question of whether the United States should go over to the metric system.

Information Service

A metric information service which will keep subscribers up-to-date on the changeover to metric is offered by the Building centre of Northern Ireland, 4 Arthur-place, Belfast. The service will cover publications of a general nature, such as those issued by BSI and other organisations involved in the mainstream of the changeover. Copies of any important new document will be sent as it is published. A subscription charge of 30s. covers the period up to 31 December 1969, when the scheme will be reviewed and continued as required.

Metric Library

In preparation for the metric changeover, Alex Gordon & Partners, architects and planning consultants, have established a metric library at their Cardiff office. The library is divided into trade and technical sections of which the former, with literature from some 350 manufacturers representing well over 700 listed products, is growing more rapidly. Enquiries for most products up to now, however, are based on a straight conversion from the old imperial.

The firm also made a short survey on manufacturers' plans for changing to metric with somewhat disappointing results. On the basis of a short questionaire they found that only two representatives out of 40-odd questioned could give any indication of when their products would be made to metric.

It was noted that manufacturers who have consistently produced good information literature in the past are the ones who are making most effort to replace existing imperial data with metric. Unhappily they are only a small proportion of the manufacturing field.

Widening Gap

J W. Jackson, president of the NFBTE, speaking at the annual dinner dance of the Yorkshire Region this month, referred to the lack of awareness of the implications of the changeover to the metric system. He said the building industry, which was frequently classed as a backward industry, was not only leading the field in the metric changeover, but the gap between building and other vital industries was widening to such a degree that it threatened to throw the whole operation into jeopardy. He called for speedy action at Government level and among other industries and added 'guidance and co-ordination are required to permit the economy as a whole to move forward towards metric on a broadly similar time scale and in an orderly way.' Much more needed to be done in the provision of metric text books for schools and colleges, particularly the technical colleges teaching building subjects, and colleges teaching building subjects.

Energy Conference

Sir Leonard Drucquer, Chairman of the Council of Engineering Institutions, has accepted the invitation of the Minister of Technology, Anthony Wedgwood Benn, to act as president of the two-day national conference on 'The change to the international system (SI) units for energy,' to be held at Church House, Westminster, on 31 October and 1 November. The conference is being planned for senior engineers and personnel engaged in the heat and power fields as part of the Government plans to assist industry in the adoption of the metric system.

Export of Metric System

Paris architect Roland Schweitzer has chosen A. H. Anderson Ltd's. A75 system of component building for a youth hostel at Rueil Malmaison on the outskirts of the city. Work started last month and the building is expected to be completed by the end of the year. The system uses steel, concrete and timber components and is based on a 100mm metric module.

Building Systems on Show

NATIONAL HOUSING & TOWN PLANNING EXHIBITION AT BRIGHTON

This year's exhibition, held from 28-31 October, has attracted more than 100 exhibitors. It occupies approximately 33,000 sq.ft. of stand space in the Brighton Hotel Metropole exhibition halls and an outside display area on the sea front. At the same time a conference will be held in one of the ground floor exhibition halls, extending over the three days and including Lord Robens, A. W. Cleve Barr, Neil Wates and Dr. L. Farrer-Brown among the speakers.

Several building systems, covering both the public and private sectors are on display. Some schemes are also concentrated on the needs of elderly people. The Modus system of **Amey Chivers Housing Co. Ltd.** utilises large concrete panels of sandwich construction. Flexibility of design and layout is a key point of this system. Photographs of schemes featuring Bison Wall Frame of **Concrete Ltd.** also emphasise the wide variations possible. This company's display is mainly concentrated on examples of low/medium rise housing.

Other examples of low rise housing can be seen at the **Guildway Ltd.** stand—components for the timber-framed structures are manufactured and assembled at the factory and delivered to site for erection; and **Holland & Hannen and Cubitts Ltd.** whose Lowton-Cubitt system includes new house types using narrow-front and wide-front designs.

John Laing Construction Ltd. systems cover all housing types; Easiform which has been used for low rise housing in the UK over many years now, 12M Jespersen, a factory-based system for medium-rise buildings of up to 14 storeys and Sectra and Storiform, available for high-rise blocks up to 30 storeys. **Wates (London) Ltd.** also have a number of systems, illustrated by photographs, a low rise system of timber frame construction, an all pre-cast concrete system for multi-storey structures and the M system which is particularly suitable for medium rise.

Industrial Pioneers

One of the pioneers of industrialised building, **Reema Construction Ltd.,** are introducing their new Contrad range of housing which features an industrialised inner shell combined with brick or reconstructed stone cladding. **Trusteel Corporation (Universal) Ltd.** are showing their Trusteel system of building low rise housing which has been developed over 23 years from a steel frame. Another well established company in this field is **George Wimpey & Co. Ltd.** The centre point of their stand is a model of a three-storey flat development at St. Giles Cross, Shoreham.

Some companies specialise in providing design and construction services for local authorities. One such firm is **Drury Design Service Ltd.** whose principal feature at this year's exhibition is System 3, a new construction technique for low-rise housing. **Selleck Nicholls Williams (E.C.C.) Ltd.** are another company who offer a complete package to local authorities from single units to major contracts, such as 2,500 dwellings now being built for Runcorn Development Corporation.

Kenkast Buildings Ltd., who will make and erect all types of single-storey buildings, provide a complete service for municipal programmes such as those concerned with community developments for elderly people. **Quikbild Homes Ltd.** have an interesting old peoples' complex within a nearby local authority contract at Newhaven.

The Surebuilt rationalised traditional system for low rise municipal housing covers a complete range of types, from old peoples bungalows and flats to four-storey maisonettes. This system is shown by **Pearce & Barker Ltd.** Other firms exhibiting are **James Riley & Partners Ltd.** (Frameform), **Camus (Gt. Britain) Ltd., Sir Lindsay Parkinson & Co. Ltd.** (Parkwall) and the **Shepherd Building Group Ltd.** (Spacemaker range). **Truscon Ltd.** feature a new form of precast construction developed for car parks. **The National Building Agency,** who have a special interest in the advancement of system building, are also present.

Heating the Home

Next to the industrialised systems, the largest section at the exhibition is that on home heating. All the fuels are represented and a number of new units are on display. Amongst their range of gas and solid fuel and water heating appliances, **Radiation Ltd.** have three new gas fires on display, one, the Reviera, a flueless convector heater, rated at 7,500 btu/h, available with two alternative textured finishes complimenting the teak-toned outer casing. **Lennox Heating Co. Ltd.** are showing two new gas-fired air heaters in the 25,000 btu to 30,000 and 34,000 btu range. One is designed for the optional integral fitting of a domestic hot water circulator. **Redfyre Ltd.** have a new warm air unit, fired by solid fuel, which will heat four rooms through outlets and provide domestic hot water. Emphasis on the **Copperad Ltd.** stand is given to their Monarch gas-fired warm air range, 25,000-80,000 btu. Smallest unit is the Mini-Monarch, just 8in. wide.

Another new warm air heater is the Hull Rad 271 of **Hull Steel Radiators Ltd.** This is a gas-fired, conventional flue, fully automatic unit rated at 27,500 btu. **Falks Heating Ltd.** are exhibiting the Electricaire directed warm air central heating storage system. In this unit the air is drawn through the storage material to minimise standing losses.

Allied Ironfounders Ltd. claim an important advance in gas-fired boilers brought about by new controls, and are also showing a smokeless fuel burning room heater with back boiler for domestic hot water. Similar duties are provided by **Ideal Standard Ltd.'s** Trident, a gas-fired unit which will heat the room in which it is installed and also provide heat for four radiators and domestic hot water. The fire and boiler may be operated quite independently. **Thomas Potterton Ltd.** have both gas and oil-fired central heating units on display; **Crane Ltd.,** in addition to gas and oil, are also showing solid-fuel central heating boilers and some ducted warm air heaters, gas-fired. **Baxi,** as well as their open fire central heating system, have two gas-fired systems on show, whilst **Dunham Bush** are exhibiting a range of products for achieving comfort conditions in the home and in public assembly buildings.

On the stand of **Shell-Mex and BP Ltd.,** specialists are available to discuss the use of oil for all forms of heating whilst, on their stands, the **Gas Council** and the **National Gas Board** are looking after the interests of gas and solid fuel.

Bathroom and Kitchen Units

Besides putting the world's first plastic hot water cylinder on show, **Osma Plastics Ltd.** are introducing an interesting handwash unit which provides warm water without plumbing and with or without mains electricity. A complete range of sanitary equipment is exhibited by **Shires Ltd.** They also have an ergonomically designed bathroom suite, Orchid Isle, which includes many original features.

In kitchen furniture, **Thomas Eastham & Son Ltd.** are showing their recently introduced Stelvac range. These units make extensive use of pvc coated galvanised steel which makes for quietness and easy cleaning as well as long life. They are designed to a metric module as is the kitchen unit range of **John Sadd & Sons Ltd. W. & G. Sissons Ltd.** have a new stainless steel single drainer sink with a work surface alongside. The whole is in one piece and, when supplied on a suitable undercabinet, makes a fairly economic unit.

For bathrooms, kitchens, special effects and fire surrounds, **H. & R. Johnson Ltd.** are introducing the Kontract range of glazed and unglazed ceramic tiles. These will provide a covering for both walls and floor. **GD Wall Units Ltd.** are showing foamed polyurethane prefabricated walls with plumbing and other services built in. These can cut site installation times for bathrooms and kitchens by 85%. All pipework and ducting is carried inside the wall which, because there are no design limitations, can be made to any size.

Other exhibitors over a fairly wide range of products include **Peter Cox Preservation Co. Ltd.** illustrating their chemical transfusion system of dampcoursing; **Cape Insulation Ltd.** and **Fibreglass Ltd.,** both showing insulation materials.

The exhibition is open from 2-6 p.m. for delegates on Monday, from 9.30 a.m. to 6 p.m. on Tuesday and Wednesday and closes at 5 p.m. on Thursday, 31 October.