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Dear Mr Betts,

I write in response to your letter dated 30th April 2018 on the subject of “Approved Document B and the use of combustible materials in the cladding of high-rise buildings”.

In the attachment to your letter (and subsequently on the 8th May 2018), you also provided correspondence between the Committee and the Ministry.

As a structural engineer by training and practice, I do not consider that I have adequate competence to comment on the specific questions raised by your letter. Nevertheless, I have taken the time to consult with some of my academic colleagues (Drs Angus Law and Stephen Welch) who have competence relating to these issues and experience in the use of Approved Document B in practice.

I am specifically highlighting this, as Approved Document B should not be used by people without adequate competence.

Interpretation of Paragraph 12.6 and Diagram 40

Diagram 40(e) indicates that, for a building greater than 1000 mm away from the relevant boundary and a storey above 18m, the external wall surface classification should achieve Class 0 (national class), or class B European class, or better.

If viewed in isolation, this clause does not prohibit the use of materials that are not of limited combustibility. However, it would be a grossly inappropriate application of Approved Document B to view this clause in isolation. Paragraph 0.4 of Approved Document B indicates that *the guidance in the document as a whole should be considered as a package aimed at achieving an acceptable standard of fire safety.*

Paragraph 12.6 must therefore be reviewed in context with all other relevant paragraphs.

HEAD of SCHOOL: Professor Hugh McCann FREng

HEAD of INSTITUTE: Professor Alistair Borthwick

Interaction of Paragraph 12.6 with Paragraph 12.7

As identified in the correspondence attached to your letter, Paragraph 12.7 recommends that *any insulation product, filler material (not including gaskets, sealants and similar) etc. used in the external wall construction should be of limited combustibility* [as defined in Appendix A of Approved Document B].

There are two interpretations of this paragraph:

1. that this is a “catchall” paragraph that prohibits the use of materials that are not of limited combustibility in cladding arrangements (irrespective of the precise location); or
2. that this clause is ambiguous with respect to the elements of the cladding that should be of limited combustibility.

In the case of the former (i.e. the catchall interpretation), this paragraph supersedes Paragraph 12.6, thereby rendering Diagram 40(e) redundant.

In the case of the latter (i.e. some ambiguity about which elements are recommended to be of limited combustibility), the reader must refer to Paragraph 12.5.

Paragraph 12.5 provides a discussion about the intent of these paragraphs.

Intent of Paragraph 12.5

Paragraph 12.5 states that *the external envelope of a building should not provide a medium for fire spread if it is likely to be a risk to health or safety*. It is also stated that *the use of combustible materials in the cladding system and extensive cavities may present such a risk in tall buildings*.

This description clearly identifies that the intent of the subsequent paragraphs is to limit the use of combustible materials in the cladding system of the building.

This would lead the competent designer to reach one of four outcomes:

1. Adopt a conservative interpretation of Paragraph 12.7 and use materials of limited combustibility throughout;
2. Conduct a BS 8414 test of the system under consideration;
3. Make a distinction between the surface of the cladding and the rest of the cladding system (i.e. use materials of limited combustibility throughout – with the exception of the external surface); or
4. Conduct a bespoke engineering analysis of the proposed materials and system to determine whether the functional requirements of the building regulations are met.

The letter from the Minister on 1st May (provided to us on the 8th May) identifies outcome three as a possibility. This interpretation of the guidance immediately raises a further question regarding the definition of a surface.

In the absence of an agreed definition of surface, the designer would be obliged to conduct an engineering analysis to demonstrate adequacy (as per outcome four), or

follow outcomes one or two (i.e. use materials of limited combustibility throughout, or conduct a BS 8414 test).

The Minister is therefore correct to suggest that Approved Document B allows materials that are not of limited combustibility to be used on the surface of external walls provided they meet the recommendations of Diagram 40(e). However, it is our opinion that (unless supported by additional engineering analyses) the guidance of Diagram 40(e) is superseded by other clauses.

Previous Editions of Approved Document B

It is notable that the 2002 edition of Approved Document B highlights that the measures in Diagram 40 may not adequately address the risk of using combustible materials in tall buildings. Paragraph 13.7 of the 2002 edition states that “*The use of combustible materials for cladding framework, or of combustible thermal insulation as an overcladding or in ventilated cavities may represent such a risk in tall buildings, even though the provisions for external surfaces in Diagram 40 may have been satisfied.*”

The document then identifies that “*insulation material used in ventilated cavities in the external wall construction should be of limited combustibility.*”

Together with the functional requirements for B4, a competent designer would conclude from these statements that Diagram 40(e) may be superseded by other, more onerous, guidance.

The redundancy of some elements of Diagram 40(e) (both in current and previous editions of Approved Document B) raises a question with respect to the logic of its continued inclusion within the guidance.

Nevertheless, this background provides further insight into the intent of Paragraph 12.5 in the current edition of Approved Document B, and emphasises the fact that the document must be read by a competent person and as a whole.

Conclusion

It is our opinion that:

- Paragraph 12.6 and Diagram 40(e) are superseded by another clause for buildings above 18 m;
- Paragraph 12.7 introduces the expectation that materials should be of limited combustibility; and
- Any ambiguity in Paragraph 12.7 (including its heading “Insulation Materials/Products”) is clarified by the statements of intent in Paragraph 12.5.

We believe you are right to highlight the issues around Paragraph 12.6 and Diagram 40.

We are also in strong agreement with Dominic Raab MP’s statement that “the guidance should be read in full, in the context of the requirements of the regulation and then applied with professional judgement to the building in question.”

Further Opinion

We would like to offer further, unsolicited, opinion about this issue in the hope that you may find this useful as part of your work.

In recent months, we have become aware that there have been many instances where individuals and organisations within the construction community have sought to cite the perceived ambiguity within Approved Document B (Clause 12.6 in particular) as the basis (or even justification) for the widespread and inappropriate use of combustible building products (particularly Aluminium Composite Materials) above 18 m. We believe that this approach of “blame the guidance” is a disingenuous attempt to avoid taking responsibility (both professional and financial) for decisions that were wrongly made during the design process.

We believe that the culture change that Dame Judith seeks to achieve within the construction industry can only be achieved if individuals are held responsible for their design and procurement decisions.

As such, we would encourage the Committee to support MHCLG in:

- Openly acknowledging the potential ambiguities in specific clauses and headings in the current version of Approved Document B and to undertaking to remedy these as soon as possible;
- Strongly asserting that any ambiguity (real or perceived) within specific clauses of Approved Document B when considered in isolation does not, and cannot, justify the use of Aluminium Composite Materials (with a core that is not of limited combustibility) on buildings above 18 m in height; and
- Asserting that this should be plainly obvious to any competent designer in light of the functional requirements of the overarching Building Regulations, along with the other relevant clauses in ADB.

The questions raised by paragraphs 12.5-12.7 are an example of how ambiguities may arise in any design situation where prescriptive rules are applied in isolation or by individuals who lack the requisite competence, but also how these may be adequately resolved by a competent and responsible professional (as outlined above).

If you require any further information in respect of this or other issues, please do not hesitate to contact me.



Dr David Rush, Lecturer in Structural Engineering