



ADVISORY NOTICE BUILDING

12/06

Advisory Notices are issued to assist in the interpretation of the Development Act 1993

September 2006

TECHNICAL:

Building Code of Australia Applying energy efficiency measures to existing Class 2 to 9 buildings

The purpose of this Advisory Notice is to provide guidance on the application of the Building Code of Australia (BCA) energy efficiency provisions to existing Class 2 to 9 buildings.

BACKGROUND

BCA 2006 introduces energy efficiency provisions for Class 5 to 9 buildings. This follows on from the introduction of the energy efficiency provisions for Class 2, 3 and Class 4 parts of buildings in BCA 2005. The implementation date for the Class 5 to 9 provisions is 1 August 2006.

Designers are often required to consider the extent of BCA compliance required for existing buildings that are altered, extended or require a change of classification. Likewise, relevant authorities undertake the same process when assessing an application for compliance with the Building Rules. In principle, the approach taken to applying the energy efficiency provisions should be no different to the approach taken to the application of other BCA provisions. This Advisory Notice reinforces these principles with examples involving specific elements and systems to which the BCA energy efficiency provisions apply.

PERFORMANCE REQUIREMENTS JP1 AND JP2

When altering, extending or changing the classification of an existing building, there are a number of factors that may compromise the ability of the new building work to fully comply with the provisions. These factors are generally related to the location of the existing building on the site, which may for example prevent the addition of shading devices if they encroach over boundaries, and the internal configuration of existing spaces and mechanical services.

Performance Requirements JP1 and JP2 for energy efficiency contain the phrase '*to the degree necessary*'. This phrase allows flexibility in determining the compliance of Alternative Solutions for alterations, extensions or changes of classification to an existing building. This means that provided it is demonstrated that the '*degree (of compliance) necessary*' is achieved, the relevant authority may accept an Alternative Solution that is appropriate for that particular building. It should be noted that this is not an excuse for non-compliance. Consideration should be given to still applying the provisions, but in a less stringent manner, or by compensating in some way for the under performance of certain elements in the existing building. The Building Rules Assessment Commission (BRAC) can provide an opinion on a proposed solution and whether it meets the performance requirements.



A test of 'to the degree necessary' can be subjective in determining what is a reasonable degree of compliance for acceptance. The test of reasonableness should include consideration of how practical or constructible a provision may be in a particular instance and the likely cost and benefit. In some instances it may seem unreasonable to apply the provisions to an extension/alteration (eg the sealing requirements) because the nature of the existing building (unsealed) may compromise the benefits to be gained by constructing the new building work to the minimum provisions. However, such issues should be considered holistically as a building undergoes many redevelopments over its life and as such, it could be expected that at some point the remainder of the building will also be required to be upgraded to meet minimum provisions.

The energy efficiency of the existing building should be dealt with in the same manner as structural and building fire safety issues and access for people with disabilities in that it may form part of an overall Building Upgrade Plan to be implemented over the life of the building.

DEEMED-TO-SATISFY PROVISIONS

It is not possible to address all the possible scenarios involving alterations, extensions and changes of classification to existing buildings that may be confronted by a designer or relevant authority. For completely new buildings the application of the BCA provisions is straightforward as it is applicable to all aspects of the construction. However, for existing buildings being altered, extended, refurbished or subject to a change of classification, the BCA is generally only applicable to the new work, that is, to those parts of the building directly being affected by the new work or to those parts where the building's use is being changed.

PART J1 BUILDING FABRIC

Where a building is being extended, and the extension is likely to be conditioned, the fabric of the extension should comply fully with the BCA fabric provisions. Where the new work includes replacement of existing elements - such as roof cladding, wall cladding or wall lining, there would be little justification for not satisfying the BCA fabric provisions and adding insulation prior to the replacement of the cladding/lining. However, if the roof cladding, wall cladding or wall lining is only being repaired and repainted to match the new work, then it would be unreasonable to require this to be removed, solely to install new insulation. Similarly, if an internal refurbishment is being undertaken and the existing fabric is not being altered in any way, then the fabric would not need to be upgraded to comply.

Example:

An existing office building between a main street and a rear lane is being extended to the adjoining side allotment boundary. For aesthetic reasons, the existing facade is being replaced. The fabric of the extension needs to comply with the BCA fabric provisions. Because the facade is being replaced, it is reasonable to expect that insulation can be added to that external wall of the existing building. However, as work is not being carried out on the rear wall of the existing building (other than painting), requiring that wall to be insulated is not considered 'reasonable'.

PART J2 EXTERNAL GLAZING

If all the existing glazing in a building is being replaced, then the new glazing should comply with the current BCA glazing provisions. Where an existing building is being extended, the glazing in the extension should comply with the BCA glazing provisions. However, this can be complicated by the fact that the glazing provisions are determined on the basis of either a whole storey (for Glazing Method 1 in Volume One), or for each facade in each storey (for Glazing Method 2 in Volume One). This means that the existing glazing also needs to be considered in order to determine compliance.

In some cases, it may be unreasonable for new glazing in an extension to compensate for the poor performance of existing glazing. In this instance, it would be reasonable to determine compliance by applying the performance of the new glazing uniformly to the whole storey (for Glazing Method 1), or just the facade (for Glazing Method 2), but only require the complying glazing to be installed in the extension.

Shading is an integral part of a building's performance. However, there may be site constraints or planning requirements that prevent external shading from being added to an existing building. In such instances, the required level of performance may still be achieved by unshaded glazing; however, this could result in the use of unreasonably costly glazing. It would therefore be reasonable to allow a reduced level of glazing performance where there are constraints on shading.

Example:

A restaurant with a floor area of 470 m² is situated between two other buildings, a main street and a rear lane. It is to be refurbished, with new and larger glazing installed facing the main street. This new glazing should comply with the provisions. The glazing for a Class 6 building can be assessed using either Glazing Method 1 or Glazing Method 2. Glazing Method 1 is based on an allowance per storey. As the glazing away from the main street is unlikely to be upgraded, the aggregate performance of the glazing using Glazing Method 1 must be based on the performance of the existing glazing facing the lane, in conjunction with the new glazing facing the main street. However, if Glazing Method 2 is used, then only the new glazing facing the main street is considered, as this method is based on an allowance for each facade of each storey.

PART J3 BUILDING SEALING

Where an existing building is being extended, the extension should comply with the BCA sealing provisions. In the case of a new extension to an existing unsealed building, a practical approach would be to accommodate the differing degrees of sealing in the new and existing parts of the building by installing sealed doors which isolate the two parts of the building from one another.

PART J4 AIR MOVEMENT

The air movement requirements only apply to a habitable room in a sole-occupancy unit of a Class 2 building or a Class 4 part of a building. The BCA air movement provisions generally require two openings in a room, or a breeze path through to another room. In the case of some extensions to existing buildings, it may not be possible to comply with these requirements. Where there is insufficient room for the two openings to be installed in the external walls of the new building or the existing building does not have

complying breeze paths, lesser compliance may be compensated for by the addition of ceiling fans, ventilated skylights (that comply with the BCA) or by increasing the openable proportion of a window elements.

If an existing room that has previously complied with the minimum requirements for natural ventilation (5%), is being refurbishment and glazing elements are being replaced, it would be unreasonable to require larger glazing elements to be installed to achieve the increased ventilation opening area stated in the provisions (7.5% or 10%). However, in replacing the glazing elements, it would be reasonable to expect that the glazing element selected would have a greater openable area.

PART J5 AIR-CONDITIONING AND VENTILATING SYSTEMS

Air-conditioning and ventilating systems may be new systems that are installed in a new building or in a new extension. They may also be partly new and partly existing systems within the existing building. New systems and elements in new parts of a building and new elements and systems in existing parts of a building should all comply with the BCA services provisions.

Some BCA air conditioning provisions relate to the system, while others relate to the equipment. System related aspects include outside air cycles, controls, time switches and fan motor power. If these aspects are part of the new building work then they should comply with the BCA provisions. If they are existing but may affect the operation of the new part of the system then they should be made to comply with the new provisions. If the system aspects are existing, only affect existing elements and are not part of the new building work, it would be reasonable to not seek compliance.

New equipment such as a boiler, chiller, package air conditioner, piping insulation (for new piping) and the like should comply with the BCA provisions. New piping and ductwork, whether within a new or existing part of a building, should comply with the BCA provisions. It would be unreasonable to expect an upgrade of existing ductwork serving areas that are not being altered or refurbished or ductwork that is concealed behind ceilings and risers. If existing ductwork and piping is changed as part of a new refurbishment, the new ductwork and piping, including terminal flexible ductwork, must comply with the BCA provisions. A typical example would be new rooms added to an existing building, or a refurbishment of an existing building. The new or refurbished space may be served by a totally new air-conditioning system, or by extending the existing system. If it is a totally new air conditioning system, then it will need to comply in all respects with the BCA provisions. If an existing system is extended, then it would be reasonable to only require compliance for the new components.

Example:

The air distribution elements of an existing air conditioning system are being modified as part of a refurbishment. Some of the existing uninsulated ductwork is being repositioned and some is being replaced. Ideally, all ductwork in the area being refurbished should be insulated to the current BCA requirements. However, an assessment made on installing new insulated ductwork, including the cost of lowering ceilings and obtaining access to tight locations, may demonstrate that it is not reasonable.

Example:

Another floor is being added to an existing building and the existing air-conditioning system is being extended and its capacity increased to serve the extension. The new floor will have ductwork that complies with the current BCA provisions, but the central air-conditioning unit in the basement is simply being modified (if the existing unit is not adequate) to provide more capacity. The main ductwork runs are not being replaced, because of limited riser space. It would be unreasonable in this case to require the main ductwork to comply with the current BCA provisions for insulation, because of the limited space and access. It would also be unreasonable to require the central air-conditioning unit to comply with the BCA provisions, such as the fan shaft power limit, because of the increased resistance in the air ducts and because of the difficulty posed in installing an outside air cycle.

PART J6 ARTIFICIAL LIGHTING AND POWER

Lighting is very similar to air-conditioning and ventilating systems, in that new elements and new systems in new parts of a building need to comply with the BCA provisions, as should new elements and new systems in existing parts. However, unlike air-conditioning and ventilating systems, most lighting components are in or adjacent to the space being served, which means that they are generally more accessible and therefore more easily upgraded. Where works are being undertaken in a section of the building, only the artificial lighting in that area needs to be considered when assessing the artificial lighting against the BCA.

Example:

A shop in a shopping centre is being totally refurbished for a new tenant and it is proposed to replace some lights and relocate others. The existing wiring is being reused. The lights must comply either in their own right, or in conjunction with the appropriate adjustment factor prescribed in the BCA lighting provisions. As the BCA lighting provisions are based on an allowance for the whole shop, then that allowance cannot be exceeded by the existing and new lighting combined.

PART J7 HOT WATER SUPPLY

The supply and installation of heated water services in South Australia is regulated by Directions issued by the South Australian Water Corporation pursuant to Regulation 17 of the Waterworks Regulations 1996. Directions were issued on 21 November 2005 advising that all plumbing installations to new and existing buildings must comply with Australian/New Zealand Standard AS/NZS 3500 Parts 0, 1, 2 and 4 as published in 2003, (and Amendment 1 as published in November 2005) which contains the requirements for energy efficiency.

PART J8 ACCESS FOR MAINTENANCE

Access should be provided for the maintenance of new building services. Providing the ideal level of access to new building services located in existing parts of a building may be difficult. The test for reasonableness may reveal that the level of access provided in such instances should be tempered by what is practical and acceptable.

In considering access for maintenance, designers should also be aware of the requirements under the *Occupational Health, Safety and Welfare Act and Regulations*.

Example:

A building is being extended, but the air-conditioning plant for the extension is to be located in the rooftop plant room of the existing building. Restrictions on the height of the extension have meant that a rooftop plant room could not be located on top of the extension. Because the new air-conditioning plant is being placed in the existing plant room, it would be reasonable to accept that only limited access can be provided for maintenance purposes.



Further information

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