



BUILDING CODE COMMISSION

IN THE MATTER OF Subsection 24(1) of the *Building Code Act*, S.O. 1992, c. 23, as amended.

AND IN THE MATTER OF Sentences 3.2.3.7.(1) and 3.1.5.11.(3) of Regulation 403, as amended by O. Reg. 22/98, 102/98, 122/98, 152/99, 278/99, 593/99, 597/99, 205/00, 283/01 and 220/02 (the "Ontario Building Code").

AND IN THE MATTER OF an application by Walter Harhay, Harhay Construction Management, for the resolution of a dispute with Jim Laughlin, Director & Deputy Chief Building Official, City of Toronto, to determine whether the proposed exterior wall system that incorporates foamed plastic insulation and exterior cladding in an exterior wall of a Group C (Part 3) major occupancy building provides sufficiency of compliance with Sentences 3.2.3.7.(1) and 3.1.5.11.(3) of the Ontario Building Code, at 42-44 Camden Street, Toronto, Ontario.

APPLICANT	Walter Harhay Harhay Construction Management Etobicoke, Ontario
RESPONDENT	Jim Laughlin Director & Deputy Chief Building Official City of Toronto
PANEL	Tony Chow, Chair Susan Friedrich Rick Florio
PLACE	Toronto, Ontario
DATE OF HEARING	November 4, 2004 - and - January 17, 2005
DATE OF RULING	January 17, 2005
APPEARANCES	Harold Locke Locke & Locke Inc. Vancouver, British Columbia Agent for the Applicant Peter Au Manager, Plan Review City of Toronto Designate for the Respondent

RULING

1. The Applicant

Walter Harhay, Harhay Construction Management, has received a building permit under the *Building Code Act*, S.O. 1992, c. 23, as amended, and is constructing a residential apartment building at 42-44 Camden Street, Toronto, Ontario.

2. Description of Construction

The Applicant is constructing a 9 storey, Group C residential apartment building having a building area of 3,851 m². The building is to be comprised of noncombustible construction and, when completed, will be sprinklered and equipped with both fire alarm and standpipe and hose systems.

The construction in dispute involves the use of foamed plastic insulation in the exposing building face of the subject building where the walls abut adjacent property lines and where the resulting limiting distance permits unprotected openings of not more than 10%. In this case, the Applicant is proposing the use of the ECO-Block wall system. The components of this wall system include a reinforced concrete core, sandwiched between expanded polystyrene foam (EPS), and a noncombustible ADEX base coat and finish coat measuring 6.35 mm (¼ in) thick, applied to the exterior of the wall forms. The ECO-Block insulating concrete forms terminate at the underside of each reinforced concrete floor slab. Furthermore, no unprotected openings will penetrate the wall assembly where it abuts the adjacent property lines.

3. Dispute

The issue at dispute between the Applicant and Respondent is whether the proposed wall assembly, incorporating foamed plastic insulation in the form of ECO-Block insulating concrete forms, provides sufficiency of compliance with the provisions of Sentences 3.2.3.7.(1) and 3.1.5.11.(3) of the Building Code.

Sentence 3.2.3.7.(1) provides that, except as permitted by Articles 3.2.3.9 and 3.2.3.10 of the Code, where a limiting distance is such that it permits an exposing building face to have unprotected openings of not more than 10% of the exposing building face, the construction of the exposing building face shall be of noncombustible construction having a fire-resistance rating of 1 hour. The exposing building face is also to be clad with noncombustible cladding.

Article 3.1.5.11. addresses the use of combustible insulation and its protection. Sentence 3.1.5.11.(3) prescribes protection for combustible insulation in exterior walls of a building where insulation is exposed to the adjacent spaces in the building.

In this particular dispute, the parties disagree as to the application and interpretation of the provisions of the Code. The Applicant argues that, by virtue of the protection prescribed in Sentence 3.1.5.11.(3), the Code would permit the use of foamed plastic insulation in an exterior wall of a building required to comply with Sentence 3.2.3.7.(1). On the other hand, the Respondent maintains that Sentence 3.2.3.7.(7) does not permit foamed plastic insulation for walls that are subject to the construction requirements of Sentence 3.2.3.7.(1) of the Building Code. Sentence 3.2.3.7.(7) provides that, except as permitted by Sentence (9) and, in addition to the requirements of Sentences (2), (3), (5) and (6), foamed plastic insulation must be protected on the exterior surface by

prescribed methods. Further, it is the Respondent's position that the subject ECO-Block insulating concrete forms and "cladding" are a joint system and cannot be considered as independent elements of construction.

A further aspect of the Code referenced in the consideration of this dispute involves the provisions of Sentence 3.1.5.5. as raised in the technical background information report prepared by the Building and Development Branch of the Ministry of Municipal Affairs and Housing in connection with this application. The Branch memo notes that Article 3.1.5.5. prescribes various conditions under which an exposing building face can contain combustible components. The Branch maintains, however, that these conditions do not apply to walls required to conform with Sentence 3.2.3.7.(1) or (4) or where foamed plastic insulation is protected in conformance with Sentences 3.2.3.7.(7) or (8). The Branch memo goes on to state that "Article 3.1.5.11. gives rules for the protection of combustible insulation when it is located in various parts of a building required to be of noncombustible construction. Provided the appropriate thermal barrier is used, and the combustible insulation is protected on the exterior by a cladding system conforming to Article 3.1.5.5. or Sentences 3.2.3.7.(7) and (8). However, this permission does not supersede the noncombustible cladding requirements of either Sentence 3.2.3.7.(1) or Sentence 3.2.3.7.(4)."

In considering all relevant Code provisions and the specific nature of the subject construction, the Commission will consider whether the subject proposal sufficiently complies with the requirements of the Building Code.

4. Provisions of the Ontario Building Code

3.2.3.7. Construction of Exposing Building Face

- (1) Except as permitted by Articles 3.2.3.9. and 3.2.3.10., if a *limiting distance* shown in Table 3.2.3.1.A. or Table 3.2.3.1.C. for a Group A, B, C, D or Group F, Division 3 *occupancy* classification permits an *exposing building face* to have *unprotected openings* not more than 10% of the *exposing building face*, the *exposing building face* shall be
- (a) of *noncombustible construction* having a *fire-resistance rating* not less than 1 h, and
 - (b) clad with *noncombustible* cladding.

3.1.5.11. Combustible Insulation and its Protection

- (3) *Combustible* insulation having a *flame-spread rating* more than 25 but not more than 500 on an exposed surface, or any surface that would be exposed by cutting through the material in any direction, is permitted in the exterior walls of a *building* required to be of *noncombustible construction*, provided the insulation is protected from adjacent space in the *building*, other than adjacent concealed spaces within wall assemblies, by a thermal barrier as described in Sentence (2), except that in a *building* that is not *sprinklered* and is more than 18 m high, measured between *grade* and the floor level of the top *storey*, or in a *building* that is not *sprinklered* and is regulated by the provisions of Subsection 3.2.6., the insulation shall be protected by a thermal barrier consisting of
- (a) gypsum board not less than 12.7 mm thick, mechanically fastened to a supporting assembly independent of the insulation and with all joints either backed or taped and filled,
 - (b) lath and plaster, mechanically fastened to a supporting assembly independent of the insulation,
 - (c) masonry or concrete not less than 25 mm thick, or

(d) any thermal barrier that, when tested in conformance with CAN/ULC-S101-M, "Standard Methods of Fire Endurance Tests of Building Construction and Materials", will not develop an average temperature rise more than 140°C or a maximum temperature rise more than 180°C at any point on its unexposed face within 10 min.

5. Applicant's Position

The Agent for the Applicant submitted that the subject matter in dispute is relatively complex and noted that the issue may warrant future consideration, possibly involving an amendment to the Building Code, for clarification of this point. He provided the Commission with a history of Code development in respect to this issue, on both a national and provincial level. He stated that the Code Committees involved in the development of these provisions were not as concerned about the exposure from an exposing building face but, rather, were more concerned with the protection from fire on the interior of the building, i.e., through window openings, etc.

The Agent stated that it is important to note that all of the Code changes on this subject dealt with the cladding system itself and not whether foamed plastic could be used in exterior walls. He suggested that this supports the assumption that foamed plastic can be used if it is properly protected. He emphasized that nothing in the Code prevents the use of noncombustible insulation in an exterior wall assembly. The Code does, however, set limitations on the types of cladding that can be used. In this regard, he submitted, the subject proposal complies with the requirements of the Code.

The Agent for the Applicant suggested that the focus of this dispute should be whether the Code allows the use of combustibile insulation in wall assemblies constructed under 3.2.3.7.(1). In his opinion, the Code does allow for combustibile insulation provided that it is adequately protected. He submitted that Article 3.1.5.5. and Sentence 3.2.3.7.(7) do not apply. He pointed to the definitions for "Noncombustible" and "Noncombustible Construction" as outlined in the Building Code and submitted that, since many building materials do not meet the test criteria to be classified as "noncombustible", the Code included Subsection 3.1.5. for Noncombustible Construction. This Section sets out those combustibile materials that are permitted to be used in a building required to be of "noncombustible construction".

In support of this application, at the request of the Commission, the Applicant also submitted test results for the subject wall assembly, as well as cross-sectional drawings and a copy of the associated Minister's Ruling for ECO-Block, relative to Part 9 applications. In addition, the Commission was also presented with results from testing conducted under CAN4-S114 standards. At the continuation of the hearing, it was noted by the Agent that the ADEX cladding, which has been tested to the standards of CAN4-S114, is separate from the ECO-Block Wall assembly. The Agent stated that the ECO-Block was tested to CAN/ULC-S101-M and pointed out that the foamed plastic vaporized very quickly. This leaves the concrete as the protective element. He noted that the test on the wall assembly was performed for 5 hours and 39 minutes on a 10 ft by 10 ft sample. Further, the test was performed on the worst case scenario at a construction joint and a connector. Even still, he noted, it was given a 4 hour fire rating.

The Agent also responded to issues raised by both the Respondent and staff representing the Building and Development Branch of the Ministry of Municipal Affairs and Housing. He submitted that the implications of their positions would mean that any exterior wall that must comply with

3.2.3.7.(1) or (4) could contain no insulation as there is no insulation that meets the CAN4-S114 standard. He further argued that Sentence 3.1.5.11.(3) permits the use of combustible insulation in buildings required to be of noncombustible construction.

In summation, the Agent for the Applicant concluded that the Building Code, in "Clause 3.2.3.7.(1)(a) requires the exposing building face to be of noncombustible construction and have a fire resistance rating of 1 h. Sentence 3.1.5.1.(1) permits the use of combustible materials in buildings required to be of noncombustible construction by reference to Articles 3.1.5.2. to 3.1.5.23." He further noted that "Sentence 3.1.5.11.(3) allows the use of combustible insulation having a flame spread rating greater than 25 but not greater than 500, provided the insulation is protected from adjacent spaces within the building in accordance with Sentence (2) or any of Clauses (3)(a) to (d)." In his opinion, therefore, the Building Code permits the use of combustible insulation in the construction of an exposing building face that is required to comply with Clause 3.2.3.7.(1)(a). He further submitted that the "relaxation permitted by Sentences 3.2.3.7.(7) and (9) does not apply to Sentence (1). The foamed plastic is not required to be noncombustible in order to meet Sentence 3.1.5.11.(3)." In respect of the subject proposal, the Agent noted that the "cladding system complies with the definition of noncombustible i.e. it meets the acceptance criteria of CAN4-S114, 'Standard Method of Test for Determination of Non-Combustibility in Building Materials'."

6. Respondent's Position

The Designate for the Respondent submitted that the subject building falls under the construction requirements of Article 3.2.2.42. of the Building Code. He further submitted that the exterior walls of the subject building are located adjacent to the property line and, in accordance with the provisions of Sentence 3.2.3.7.(1), the walls must be comprised of noncombustible construction having a fire-resistance rating of at least 1 hour and must be clad with noncombustible cladding. The Designate then referred to the provisions of Sentence 3.2.3.7.(7) which restrict the use of foamed plastic insulation in exterior walls. He pointed out that Sentence 3.2.3.7.(7) states that (except as permitted in Sentence (9)), in addition to the requirements of Sentences (2), (3), (5) and (6), foamed plastic insulation used in an exterior wall is to be protected on the exterior surface by concrete or masonry not less than 25 mm in thickness or noncombustible material that meets the criteria of acceptance under 3.2.3.7.(8) when tested to CAN/ULC-S101-M. In his opinion, therefore, the Building Code, as written, does not permit foamed plastic in a wall assembly that is subject to the construction requirements specified in Sentence 3.2.3.7.(1).

At the continuation of the hearing, the Designate for the Respondent advised that he is in agreement with the position put forward in the technical memorandum prepared by the Building and Development Branch of the Ministry of Municipal Affairs and Housing in connection with this dispute. He reiterated his position that exterior walls, adjacent to the property line, where only up to 10% openings are permitted, do not allow for foamed plastic insulation. His position is that, by virtue of the provisions of 3.2.3.7.(7), foamed plastic insulation would be allowed under the relaxed requirements of 3.2.3.7.(2) because the wall is further away from the property line. He argued that, if the Code was not interpreted to differentiate between Sentence 3.2.3.7.(1) and Sentence 3.2.3.7.(2) then there would be no need to include both as separate provisions in Article 3.2.3.7.

In summation the Designate submitted that, in his opinion, the ECO-Block system coated with ADEX base coat cannot be used in situations where the permitted unprotected openings is less than 10%.

7. Commission Ruling

It is the decision of the Building Code Commission that the proposed exterior wall system that incorporates foamed plastic insulation and exterior cladding provides sufficiency of compliance with Sentences 3.2.3.7.(1) and 3.1.5.11.(3) of the Building Code at 42-44 Camden Street, Toronto, Ontario.

8. Reasons

- i) The exterior cladding has been tested to CAN4-S114 "Standard Method of Test for Determination of Non-combustibility in Building Materials" and meets the material requirements for noncombustibility as defined in the Code.
- ii) The ECO-Block wall forming system has been tested to CAN/ULC-S101-M "Standard Methods of Fire Endurance Tests of Building construction and Materials".
- iii) The ECO-Block wall, including insulation, terminates at the underside of each floor slab creating a fire-break and fire compartments at each floor level.
- iv) CCMC Evaluation Report no. CCMC 12966-R and Minister's Ruling No. 04-12-116 (12966-R) have approved this wall forming system for limited use. In this particular application, sealed architectural drawings and certification by a Professional Engineer under Part 4 of the Code have been submitted.
- v) There are no unprotected openings penetrating this exterior wall assembly.


Dated at Toronto this 17th day in the month of **January** in the year **2005** for application number 2004-50.

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Tony Chow, Chair

A handwritten signature in black ink, appearing to be 'Susan Friedrich', written over a horizontal line.

Susan Friedrich

A handwritten signature in black ink, appearing to be 'Rick Florio', written over a horizontal line.

Rick Florio