



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 Articles 3.1.8.7. and 3.1.8.8. of Regulation 403, as amended by O. Reg. 22/98, 102/98, 122/98, 152/99, 278/99, 593/99, 597/99, 205/00 and 283/01 (the "Ontario Building Code").

AND IN THE MATTER OF an application by Nickolas Dorazio, Property Manager, Bodycote Property Holdings Inc. for the resolution of a dispute with Agris Robeznieks, Chief Building Official, City of Mississauga, to determine whether the compensating measures offered in a multi-tenant building containing Group F, Division 2 and Group D occupancies where the dedicated fume hood ductwork traverses the 2-hour fire separations between floors, will provide sufficiency of compliance with Articles 3.1.8.7. and 3.1.8.8. of the Ontario Building Code at the Bodycote Technology Centre, 2395 Speakman Drive, Mississauga, Ontario.

APPLICANT Nickolas Dorazio, Property Manager
Bodycote Property Holdings Inc.
Mississauga, Ontario

RESPONDENT Agris Robeznieks
Chief Building Official
City of Mississauga

PANEL Kenneth Peaker, Chair
Fred Barkhouse
Robert De Berardis

PLACE Toronto, Ontario

DATE OF HEARING October 25th, 2001

DATE OF RULING October 25th, 2001

APPEARANCES David Bailey, Operation Manager
Bodycote Materials Testing Ltd.
Mississauga, Ontario
Agent for the Applicant

Frank Spagnolo
Manager, Building Engineering & Inspections
City of Mississauga
Designate for the Respondent

RULING

1. The Applicant

Nickolas Dorazio, Property Manager, Bodycote Property Holdings Inc., has received a building permit under the *Building Code Act*, S.O. 1992, c. 23, as amended and has undertaken renovations to the Bodycote Technology Centre building at 2395 Speakman Drive, Mississauga, Ontario.

2. Description of Construction

The Applicant operates a research laboratory facility known as the Bodycote Technology Centre. The structure is four storeys in height and has a total building area of 22,100 m². The building is comprised of noncombustible construction and is classified as a mix of Group D and Group F, Division 2 major occupancies. The building is fully sprinklered and is equipped with a fire alarm system and a standpipe and hose system.

The building was constructed in 1967 at which time it contained an administrative wing and three floors of lab facilities. Approximately 10 years ago, the corporation received funding from the province to undertake improvements to the building. At that time, part of the facility was converted to rental accommodations. In addition, a number of renovations were undertaken. These renovations included improvements to building access, installation of an elevator and the addition of a sprinkler system. The building is now designed for multi-tenant use.

The construction in dispute involves the existing penetration of fume hood ductwork through the risers at each floor of the building. This ductwork serves as exhaust systems for each individual lab area. The main building contains over 168 risers and, of these, 104 have ductwork projecting through the floor and ceiling. This would account for over 273 sections of ductwork which is primarily comprised of heavy 16 gauge steel, with only 24 sections of ductwork composed of a lighter more conventionally designed steel. The ducts are able to withstand heat in excess of 400°C and are protected by adjacent sprinkler heads.

In all cases, the original construction is such that the concrete floor was cast in place leaving openings for the installation of the subject ductwork. As a result of the nature of the laboratory operation the owners have determined that the ducts cannot be equipped with fire dampers at the required fire-rated separations because of potential toxicity. In addition, in light of the existing spatial constraints within these areas, it is impractical and/or impossible to wrap the exterior of the ductwork. To compensate for this element of compliance, the Applicant is proposing certain compensating measures and safety features including alarm networks, safety lighting, improved sprinkler system (one sprinkler head every 6 feet and in each riser), etc.

In addition, a detailed Riser Inspection Report was completed which outlines the safety characteristics of the service risers. This report confirms that access doors to the risers have locking cylinders which will prevent the storage of combustible material; the risers are sprinklered with heads located near the ceiling and set at 165°C; there is “a continuous floor to ceiling rear block wall with limited access”; “all empty circular floor penetrations are filled with 3” of safing compressed to 50% and filled with ¼” 3M fire stop silicone. All metallic pipes or wire penetrating these circular openings are wrapped with 3” of safing compressed to 50% and filled with 3M fire stop silicone. All plastic pipes penetrating these circular openings are wrapped with 3M In Hole Plastic Pipe Fire Stop.” All features identified in the

Riser Report are offered to ensure the safety of the area in dispute in lieu of the inability to strictly comply with the present Building Code requirements.

3. Dispute

The issue at dispute between the Applicant and Respondent is whether the compensating measures proposed for where the dedicated fume hood ductwork traverses the 2-hour fire separations between floors in a multi-tenant building containing Group D and Group B occupancies, provide sufficiency of compliance with Articles 3.1.8.7. and 3.1.8.8. of the Ontario Building Code (OBC).

Article 3.1.8.7. requires that a duct which connects two fire compartments or penetrates an assembly be a fire separation and be equipped with a fire damper. In addition, where a required fire damper is used as a closure in a fire separation it shall have a fire-protection rating conforming to Sentence 3.1.8.4.(2). This requirement for the provision of fire dampers at every penetration of a required fire separation is intended to limit fire exposure through ductworks between compartments.

As an exception to Article 3.1.8.7., Article 3.1.8.8. outlines circumstances where the requirements for fire dampers would be waived. Sentence (1) of this Article permits the waiver of dampers where noncombustible ducts, which have a melting point above 760°C, penetrate a required fire separation provided that these ducts serve only air-conditioning units or combined heating/air-conditioning units discharging air not more than 1,200 mm above the floor. This Sentence also permits the connection of these ducts to exhaust duct risers that are under negative pressure and in which the air is flowing upward and carried up, inside the riser, not less than 500 mm.

Sentences (2) through (7) of Article 3.1.8.8. outline other exceptions to the provision of fire dampers. These would include a) a continuous noncombustible duct which penetrates a vertical or horizontal fire separation which is not required to have a fire resistance rating, b) a noncombustible duct which penetrates a fire separation that separates a vertical service space from the rest of the building provided that the duct has a melting point above 760°C and that each duct exhaust directly to the outside at the top of the vertical service space, c) a continuous noncombustible duct with a melting point above 760°C that penetrates a vertical fire separation as required by Sentence 3.3.1.1.(1) between suites other than residential, care or detention occupancies, d) a duct that serves commercial cooking equipment, and e) a duct having a melting point above 760°C located in elementary and secondary schools that pierces a fire separation having a resistance rating of 30 minutes.

The ductwork subject to this dispute penetrates the required fire separations between floor assemblies, however, no fire dampers are proposed in light of the potential for the spread of toxic gases throughout the building. It is recognized that the existing ductwork does not meet any of the specific criteria for an exemption from the provision of fire dampers. In light of this, measures to compensate for the fire damper requirement are proposed to achieve a measure of sufficiency of compliance in this situation.

4. Provisions of the Ontario Building Code

3.1.8.7. Fire Dampers

(1) Except as permitted by Article 3.1.8.8., a duct that connects 2 *fire compartments* or that penetrates an assembly required to be a *fire separation* shall be equipped with a *fire damper*.

(2) A *fire damper* required by Sentence (1) or a *fire damper* used as a *closure* in a *fire separation* shall have a *fire-protection rating* conforming to Sentence 3.1.8.4.(2).

3.1.8.8. Fire Dampers Waived

(1) *Fire dampers* need not be provided in *noncombustible* branch ducts that have a melting point above 760°C (1,400°F) and that penetrate a required *fire separation* provided the ducts

- (a) serve only air-conditioning units or combined air-conditioning and heating units discharging air not more than 1 200 mm (3 ft 11 in) above the floor and have a cross-sectional area not more than 0.013 m² (20 in²), or
- (b) are connected to exhaust duct risers that are under negative pressure and in which the air flow is upward as required by Article 3.6.3.4. and are carried up inside the riser not less than 500 mm (19¾ in).

(2) A continuous *noncombustible* duct penetrating a vertical *fire separation* not required to have a *fire-resistance* rating need not be equipped with a *fire damper* at the *fire separation*.

(3) A *noncombustible* duct that penetrates a horizontal *fire separation* not required to have a *fire-resistance* rating need not be equipped with a *fire damper* at the *fire separation*.

(4) A *noncombustible* duct that penetrates a *fire separation* that separates a *vertical service space* from the remainder of the *building* need not be equipped with a *fire damper* at the *fire separation* provided

- (a) the duct has a melting point above 760°C (1,400°F), and
- (b) each individual duct exhausts directly to the outside at the top of the *vertical service space*.

(5) A continuous *noncombustible* duct having a melting point above 760°C (1,400°F) that penetrates a vertical *fire separation* as required by Sentence 3.3.1.1.(1) between *suites* of other than *residential* or *care or detention occupancy* need not be equipped with a *fire damper* at the *fire separation*.

(6) A duct that serves commercial cooking equipment and penetrates a required *fire separation* need not be equipped with a *fire damper* at the *fire separation*. (See also Article 6.2.2.6.)

(7) In elementary and secondary schools, a continuous *noncombustible* duct having a melting point above 760°C (1,400°F) that pierces a *fire separation* having a *fire-resistance* rating of 30 min need not be equipped with a *fire damper* at the *fire separation*.

5. Applicant's Position

The Agent for the Applicant outlined the key issues in dispute. Essentially, the ducts which penetrate required fire-rated separations are not provided with fire dampers and cannot be successfully wrapped. He explained that the building was constructed in 1967 and has been used for laboratory services. The facility is designed with individual independent labs, each with the capabilities for performing different services or testing.

The Agent advised that, approximately 10 years ago, funding was received from the province to facilitate building improvements. As a result, a number of changes were proposed to improve the facility. When examining the situation involving the risers questions were raised with respect to Code compliance. A review of all risers was undertaken and a Riser Inspection Report was generated to address each

individual riser. Each of the 168 risers, he explained, have access doors and many have ductwork which penetrate the fire separation between floors. At this point, he emphasized that Bodycote was meticulous about removing combustibles from the risers. He stated that all doors are locked and supervised by the property manager. Staff and maintenance workers do not have free access to these areas.

The Agent submitted that the duct work is essential for the operation of this building as it is used to exhaust fumes that may be generated by the labs. He explained that the ducts are in close proximity to the block walls (within a few millimetres) surrounding the risers. As a result, it would be difficult, if not impossible to adequately wrap the ducts. He also submitted that the fume hoods which the ductwork serves are the first line of defence if smoke was detected within a lab. These are not automatically activated but are turned on by personnel within those areas. Fire dampers would defeat that purpose and would pose a potential hazard where toxic chemicals inside the labs are present. The fume hoods, he also submitted, are inspected monthly and audited for function.

In summation, the Agent noted that Bodycote would like to rent space to prospective tenants and is requesting a finding from the Commission for sufficiency of compliance based on the compensating measures being proposed to ensure the safety of both persons and property. He suggested that the function of the building, despite having multiple tenants, will not have changed significantly from its original purpose. He also advised that an approved fire safety plan is in place and a number of safety features that would maintain the spirit of the OBC requirements are being offered.

6. Respondent's Position

The Designate for the Respondent submitted that as a result of the change in use from a single tenant building to a multi-tenant format, safety concerns were identified and many have been addressed by the Applicant. Items such as exit doors and the provision of public corridors have been upgraded to meet the current Code standards. He advised that the Applicant has been very responsive to concerns that have been raised. Only the issue with respect to the subject duct penetrations remains outstanding. He submitted that it was originally thought compliance could be addressed by wrapping ducts but it was discovered that this would not be possible given the physical constraints of the space in question.

The Designate advised that it was their position that Article 3.1.8.8. did not provide the flexibility for him to find this situation in compliance with the Code. The fire separation, he submitted, must be maintained because none of the exceptions warrant the waiver of fire dampers. He had no discretion in this regard and therefore had no option but to deny the proposal, despite the compensating measures proposed.

The Designate advised that his primary concern is with respect to the increased risk associated with a multi-tenant building in relation to the 168 risers at issue. He stated that this building was constructed under the previous Building Code requirements and acknowledged the tight constraints and the numerous services located within the disputed areas. Despite this retrofit situation, however, he was unable to accept the proposal under Part 11 of the Code now that the use of the building has changed.

7. Commission Ruling

It is the decision of the Building Code Commission that the compensating measures offered in the multi-

tenant building containing group F, Division 2 and Group D occupancies where the dedicated fume hood duct work traverses the 2-hour fire separations between floors, will provide sufficiency of compliance with Articles 3.1.8.7. and 3.1.8.8. of the Ontario Building Code at the Bodycote Technology Centre, 2395 Speakman Drive, Mississauga, Ontario on condition that:

- a) The vertical separation between the labs and the corridor must be continuous from one floor slab to the underside of the floor slab above.
- b) The vertical service shaft must be separated between the lab and corridor from the floor slab to the underside of the floor slab above.
- c) The metal doors in the floor slab, that are not being used as service penetrations, must be protected with rated separations equivalent to the floor rating.
- d) The sprinkler system must be expanded to include the concealed space above the corridor ceiling.

8. Reasons

- i) With implementation of the above conditions, the requirements of the OBC will be adequately addressed and sufficiency of compliance will be achieved.

Dated at Toronto this **25th** day in the month of **October** in the year **2001** for application number **2001-60**.

Mr. Kenneth Peaker, Chair

Mr. Fred Barkhouse

Mr. Robert De Berardis