



CODE CONSULTANTS, INC.

September 16, 2005

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The Fire Protection and
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**RE: REQUEST FOR DECLARATORY STATEMENT
 SMOKE CONTROL FOR HIGH-RISE BUILDINGS
 MECHANICAL CODE SECTION 513
 BUILDING CODE SECTION 403.15
 (BUILDING CODE SECTION 909)
 NEW BUILDING PROJECT
 CCI PROJECT NO. 8067-0**

Dear Ms. Stanton; Mr. Madani:

In accordance with our recent conversation, I am submitting this letter to request a declaratory statement from the Florida Building Commission regarding the intent and interpretation of its action in modifying the International Mechanical Code and subsequently the International Building Code. In its present fashion the intent of the code could be misconstrued and applied inconsistently. Our specific request is stated at the end of this letter. First, allow me to describe the condition that will be present in the new project on which we will be engaged.

PROJECT DESCRIPTION

The project consists of an 47-story building to be located in southeastern Florida, within the Miami/Dade jurisdiction. The building will be primarily a condominium project with residential units on the upper floors. Ground level will be lobby and retail. Levels 2 - 10 will be passenger vehicle parking. The intent is to have these levels designated as "open parking" according to the code. On Levels 11 and 12 will be health club activities and facilities; such as exercise rooms, swimming pool, locker rooms, and saunas. The 13th through 47th floors will be residential levels. Some levels will have eight units per floor and some will have a single unit for the floor. On those levels with multiple residential units a common interior corridor will provide circulation and public access to each unit.

As is typical for residential projects, each unit will be provided with an individual HVAC unit to control comfort on the inside of that unit. The common corridor will be conditioned using a small air handler on a floor by floor basis. On the lobby level each retail space will also have an individual HVAC unit to control its area. The building is compartmentalized on all floor levels except the parking levels which are open to the air as is required for open parking structures. Therefore, major ductwork servicing each floor will not be provided. Nor will large vertical shafts be provided for branch distribution of air.

On residential levels, sliding glass doors will be provided for access to the various balconies. Windows are a combination of operable and fixed glazed. On the grade level, storefront glazing will be provided around the perimeter with glass doors for entry into the main lobby and into the retail spaces. A truck dock will also be provided for utility access and service for the building.

CODE LANGUAGE

Both the Florida Building Code and the Florida Mechanical Code make reference to smoke control for high-rise buildings. As my understanding is that the Mechanical Code TAC approved the recommendation that resulted in the present code text, that language will be used as the benchmark and the reflective language in the building code following.

Section 403 of the Florida Building Code states:

403.15 Smoke control shall be in accordance with § 909

Section 909 of the building code does not stipulate what type of smoke control is needed for high-rise buildings. Rather it leaves the option to the designer.

A review of the mechanical code does not add clarity. The mechanical code states:

513.1 Scope and purpose. This section applies to mechanical and passive smoke control systems that are required by the *Florida Building Code, Building, and shall apply to high rise buildings* as defined in the *Florida Building Code, Building*. The purpose of this section is to establish minimum requirements for the design, installation and acceptance testing of smoke control systems that are intended to provide a tenable environment for the evacuation or relocation of occupants. These provisions are not intended for the preservation of contents, the timely restoration of operations, or for assistance in fire suppression or over-haul activities. Smoke control systems regulated by this section serve a different purpose than the smoke- and heat-venting provisions.

[bold emphasis added]

The emphasized text was added to the mechanical code by the mechanical TAC but without specific direction. Within the remainder of Section 513, the code lists options of types of smoke control and identifies specific practices necessary for smoke-proof enclosures and atriums (added also by rule making action).

The implication is that:

- 1) Smoke control is required for high-rise buildings on a floor by floor basis; and
- 2) Section 909 describes the smoke control design options

However, within 909 - similar to 513 of the mechanical code - there is no specific text that states what is to be done for the design of the smoke control system for high-rise buildings.

UNDERSTANDING OF INTENT

Section 909 allows several options for the design:

- 1) passive ventilation (Section 909.1)
- 2) pressure differential across a membrane (909.6);
- 3) opposed airflow (909.7); and
- 4) exhaust (909.8)

There are inherent problems with each of these potential methods. The passive system requires an analysis based on comparable protection using a mechanical system. There are no models for this under the current IBC provisions since high-rise smoke control is not required. The only provisions that exist for passive protection are those in the prior edition of the Florida Building Code. However, that method of operable windows was primarily only to vent the smoke from a fire after the attack by the fire department. It was not a concept of occupant safety.

The pressure difference across a membrane could be used to distinguish one floor from another. However, it would require that all the individual HVAC units on all floors throughout the building be somehow interconnected and controlled from a central location. This is not possible with the "hotel" type air conditioning and heating units provided for residential buildings of this type. A central air handling system would be required in order to provide air control to the entire floor. To do so would add an extensive cost to the building and reduce the salable/leasable floor area.

The pressurization method could also be used on a more selective basis to isolate only specific areas within the building. However, there is no definitive direction as to whether such is acceptable. Where this provision has been used in other parts of the country, the building officials have indicated that only a floor by floor basis would be acceptable. As this is a new provision to Florida, there is no precedent as to what is and what is not universally acceptable.

The opposed airflow could not be used since it would require a fan greater than what is needed for any condition on the floor and is not appropriate for the condition since opposed air flow only functions properly when there is a permanent opening between two areas. Such is not the case. Even if it were employed, the application would only be from one room to another room or to the corridor.

The third option is the exhaust method. This would require an interconnection of the residential units to the air handling for the corridor. Exhaust would be needed for all the units on the floor at a rate that would maintain a smoke layer higher than the ceiling height. This is almost certainly not what was intended as it is impractical and impossible to meet for most residential buildings. For these reasons and empirical data showing that such is not warranted, smoke control for high-rise buildings was removed from the International Building Code (IBC).

On the ground level individual retail spaces, being compartmentalized from the remainder of the floor are subject to similar discussions regarding the ability to provide smoke control. However, without a clear understanding of the intent, a smoke control system cannot be effectively designed. Unfortunately, even the prior provisions that allowed for break-out panels is no longer a viable option. The new requirements in the code for impact resistant glazing precludes the ability to break the windows. Again, an exhaust system would mandate a certain clear ceiling height in order to work and that would be dictating to the potential lessee how they must design their space internally with limited benefit. If the requirement for smoke control is for "high-rise" then these areas are more similar to "at grade" spaces and not affected in the same manner.

It could be argued that the open parking levels are naturally ventilated due their compliance with the open parking structure. According to the way in which the code is currently written, a rational analysis would need to be prepared to determine that such is true and that it would be acceptable to the jurisdiction. The code does not give this condition an "automatic OK."

Anecdotally, we are aware that this issue is causing concern in the area. In dialogues for another project the local officials indicated that they do not understand the new requirement and do not offer any assistance in understanding what the intent is to be. When asked as to how the system should be designed, the reply is

that it must be designed by the engineer and submitted for review. But, no basis for compliance is given. Hence there is no way to determine in advance if the concept can be considered acceptable or not. The department has indicated that they will test with smoke bombs even though such is not indicated in the new Florida Building Code.

CONCLUSION

The current text contains a lack in clarity. The original Florida Building Code was based on the Standard Building Code which simply required operable windows/panels around the perimeter of the building. In this manner the window could be opened to allow smoke to migrate out of the space, hopefully with fresh air entering. The operation of this was on a case by case basis and largely used solely for the fire department's ability to vent smoke after the fire had been extinguished. The argument that "smoke control has always been in the code" may be applicable to history but it does not give guidance as to how the various methods of the current code can be made to apply.

For example, using the logic that the previous code application is applicable, a solution may be to convert the HVAC unit to 100% exhaust in the area with the fire detected. While this may be consistent with the prior code it does not meet any of the specific provisions in the current Florida Building Code. If, on the other hand, the system is designed to pressurize the corridor against the flow of smoke into it from a fire in a residential unit then air should be admitted into the corridor and the residential units left alone. While this may make sense it does not convey to the officials that a smoke test in the corridor will yield no effective result since it is being ignored as a source of smoke (the assumption being that the smoke originates in the residential unit). Consequently the official may fail the system because they want to see what happens when smoke is in the corridor. If the corridor is then converted to exhaust to address smoke from a fire in the corridor, it would draw air from the residential units. Should the fire be in a residential unit such a system would provide the path for smoke to enter the corridor where it would not otherwise tend to go. It is this lack of clarity and the local jurisdiction's lack of understanding from that lack of clarity that is causing confusion and poses the possibility for arbitrary regulations within jurisdictions based on each case and inconsistent enforcement from one jurisdiction to the next.

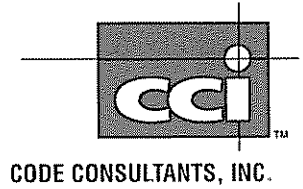
It is also understood that the issue of smoke control in high-rise buildings is a subject of discussion for the Commission in this next "glitch-fix" cycle. A portion of that discussion includes many of the items noted above. Until additional clarity can be added or the requirement removed, this confusion will continue.

REQUEST/QUESTION

Given the factors above, it is requested that this Declaratory Judgement grant direction to the project as to a potential solution. There are several issues at question:

- 1) As noted above in the discussion for pressurization, is it acceptable to provide a mechanical smoke control system that operates on a selective basis to provide a pressurization only to the public/common corridor with the intent to limit smoke migration from the guestrooms to the corridor? This will not provide "smoke control" within each guestroom but will provide a safe means of egress.
- 2) Is it acceptable to consider the open parking garage as inherently smoke protected though passive means by virtue of it being categorized as an open parking garage?

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- 3) Is it acceptable to provide direct egress to the exterior for the ground level retail spaces in lieu of a mechanical smoke control system? Since the intent is for occupant safety having egress directly to the exterior means that interior spaces can be designed without the need for mechanical systems

I wish to thank you for taking the time to review this condition and the effort in attempting to resolve the issue. If you should have any questions, please feel free to contact me

Sincerely,

A handwritten signature in black ink, appearing to read 'Gene Boecker', written over a horizontal line.

Gene Boecker, AIA
Project Manager