

# ***2007 MSBC/2006 IBC Aircraft Hangar Buildings MN DLI-CCLD Code Commentary***

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The following commentary was developed to provide aircraft hangar building designers, local code officials, hangar building contractors, and airport managers a better understanding of some of the more confusing and misunderstood building code provisions relating to aircraft hangar building construction. References from this commentary are all found in the 2007 Minnesota State Building Code (MSBC) and the *2006 International Building Code (IBC)*.

Four primary issues will be addressed in this commentary. They include aircraft hangar building “occupancy” and “group types,” hangar fire sprinkler requirements, hangar building type of construction and allowable area provisions, and exterior wall fire-separation distance issues and fire-rating requirements. Options for subdividing an aircraft hangar building with “fire walls” or “fire barriers” will also be discussed. All issues will be covered in a question and answer format with additional BCSU staff commentary provided.

Information contained in this commentary should not be construed to be a complete compilation of all building code requirements relating to the design and construction of aircraft hangars. This information is simple CCLD staff commentary relating to some of the more complex regulations that are required by the 2007 MSBC. Note that final authority on all code issues rests with the local Building Official.

Information in this commentary was derived from the 2007 MSBC, the 2006 IBC, the 2006 IBC Code Commentary Manual - Volume I, NFPA 409, the 2007 International Fire Code, and International Code Council (ICC) staff interpretations and commentary resulting from specific requests for their opinion on the related subject matter.

***2006 International Building Code, Section 412  
Aircraft-related Occupancies***

***Question and Answer - Code Commentary***

**PART I** The key to understanding applicable code requirements for an aircraft hangar building is in your ability to separate the distinct use conditions and designations that go along with each type of hangar. One must understand that aircraft hangars should first be classified into one of two distinct types of “occupancy classifications” as defined in IBC section 311. Those classifications would be either Group S-1, or Group S-2. Each occupancy classification has specific code requirements that must be applied to each use condition. Additionally, through the special aircraft hangar provisions found in IBC section 412, you will find that aircraft hangars must be further designated into one of four distinct types of hangar “groups.” The hangar “group” type also carries with it a few construction prerequisites that must be incorporated into the design of the building. That is why it is so important to understand and know the correct occupancy classification and the correct group designation of every aircraft hangar building. In the following Q and A commentary, you’ll learn more about aircraft hangar building “occupancy classification” and “group” designations.

**Question 1:** What is the correct occupancy classification of an aircraft hangar building under the 2006 IBC?

**CCLD Staff - Code Commentary:** The IBC classifies aircraft hangars into two separate occupancy classifications, Group S-1 and Group S-2. One should not let themselves be confused by the terminology when analyzing aircraft hangar provisions. “Occupancy” classification (per the IBC) is different than hangar “group” designations (per NFPA). Every aircraft hangar building must be classified into both - an IBC “occupancy” classification - and an NFPA aircraft hangar “group” designation. The IBC “occupancy” classifications for aircraft hangars are as follows:

- 1) **IBC 311.2 - Moderate-hazard storage, Group S-1 Occupancy.** Buildings occupied for storage uses that are not classified as Group S-2 including, but not limited to the following: ***Aircraft “repair” hangar***
- 2) **IBC 311.3 - Low-hazard storage, Group S-2 Occupancy.** Includes, among others, buildings used for the storage of noncombustible materials such as products on wood pallets or in paper cartons with or without single thickness divisions; or in paper wrappings. Such products are permitted to have a negligible amount of plastic trim, such as knobs, handles or film wrapping. Storage uses shall include, but not be limited to, storage of the following: ***Aircraft hangar***

**Question 2:** As the code relates to IBC Section 412, what are aircraft hangar building “group” designations?

**CCLD Staff - Code Commentary:** IBC Section 412.2.6 refers to NFPA 409 for sprinkler requirements for aircraft hangars. When referring to NFPA codes under this section, one will see that NFPA 409 has divided aircraft hangar building uses into four different “groups” designations. They are Group I, Group II, Group III, and Group IV. Each hangar “group” is then further defined by “building fire area size,” “building/aircraft tail height conditions,” “building type of construction conditions,” and “building overhead door height.” The NFPA 409 aircraft hangar building “group” designations are as follows:

**Group I Hangar:** A Group I aircraft hangar building shall have ***at least one*** of the following features and operating conditions:

- 1) An aircraft access door height over 28-feet.
- 2) A single fire area in excess of 40,000 square feet.
- 3) Provisions for housing an aircraft with a tail height over 28-feet.

All Group I hangars are to be sprinkled throughout – Per NFPA 409, Chapter 6.

**Group II Hangar:** A Group II aircraft hangar shall have **both** of the following features:

- 1) An aircraft access door height of 28-feet or less; and,
- 2) A single fire area for specific types of construction in accordance with Table 4.1.2

All Group II Hangars are to be sprinkled throughout – Per NFPA 409, Chapter 7.

**Group III Hangar:** A Group III aircraft hangar shall have **both** of the following features:

- 1) A aircraft access door height of 28-feet or less; and,
- 2) A single fire area that measures up to the maximum square footage permitted for specific types of construction in accordance with Table 4.1.3.

Generally, an **S-2** aircraft hangar building is not required to be sprinkled (per NFPA 409) - as long as the building type of construction is consistent with the fire area allowed in Table 4.1.3 (see table in question 12) and no repair work or painting is being done in the hangar. IBC Section 903.2.10 however, applies to any building and/or any occupancy. IBC Section 903.2.10, essentially, requires any building not having proper/required exterior openings around the perimeter to be sprinkled. If the hangar building has proper exterior wall openings (per this code section), this will not be an issue.

All Group **S-1** occupancy aircraft hangar buildings are required to be sprinkled when their building fire area exceeds 12,000 square feet in area (per IBC Section 903.2.8), or when they do not have proper opening around their perimeter (per IBC Section 903.2.10). Both requirements must be checked to be sure of sprinkler requirements for S-1 aircraft hangars.

**Group IV Hangar:** A Group IV aircraft hangar shall be a structure constructed of a membrane-covered, rigid, steel frame. Unless the membrane structure is constructed of “non-combustible” construction, they will all be classified as Type V-B construction (see IBC Chapter 6 and IBC Section 3102).

In the case of an **S-2, Group IV** aircraft hangar building (membrane structure), is it does not exceed the maximum allowable area of IBC Section 3102.4, the hangar building would not be required to be sprinkled. However, if the **Group IV** aircraft hangar building is classified as an **S-1** occupancy, the hangar would be required to be sprinkled per NFPA 409, Chapter 9, when the fire area exceeds 12,000 square feet in area (per IBC Section 903.2.8). Again, both provisions must be checked for sprinkler verification.

**PART II** Once an aircraft hangar building has been properly classified into the correct occupancy classification and group designation, one can then move on to try and determine if the proposed hangar building is required to be sprinkled. There are a number of factors that must be checked and/or verified to determine this. In Part II of this report, you will find related fire sprinkler Q and A along with staff commentary which should assist you in determining if a specific occupancy type or group of aircraft hangar is required to be sprinkled.

**Question 3:** In general, how many different fire sprinkler conditions are there that must be considered to determine when or if a hangar building is to be sprinkled?

**CCLD Staff - Code Commentary:** There are generally four separate conditions that could dictate when or if a hangar building is required to be sprinkled in some fashion. They include:

- a. General - IBC Section 903.2.8 - for Group S-1 hangar buildings over 12,000 GSF in area,
- b. MSBC 1306 – Optional Fire Suppression Ordinance Rules – for Group S-1 Aircraft Hangars, (must be specifically adopted by the local jurisdiction to be applicable)
- c. Aircraft hangar building “Group” designation – As required by NFPA 409; and,
- d. Aircraft hangar buildings without proper exterior wall openings – per IBC Section 903.2.10

Each of these conditions must be verified separately to determine if the hangar building is required to be sprinkled or not. In some instances, more than one sprinkler condition may also apply, so you will need to verify all sprinkler criteria to see exactly what is required.

**Question 4:** It appears that NFPA 409 requires “all” **Group I** aircraft hangar buildings to be sprinkled with some type of fire suppression system. Is this a correct observation/application of the code for Group I hangar buildings?

**CCLD Staff - Code Commentary:** Yes. All **Group I** aircraft hangar buildings are required to be sprinkled/protected throughout. There are a multitude of options that may affect the actual design of the sprinkler system - all dependent on actual uses within the hangar building. In general, a combination sprinkler and foam system, or an all foam system is required. All systems are to be installed in accordance with NFPA 13 and/or NFPA 16. See NFPA 409, Chapter 6, for specific conditions and options allowed for Group I hangers.

**Question 5:** Does NFPA 409 require also “all” **Group II** aircraft hangar buildings to be sprinkled with some type of fire suppression system?

**CCLD Staff - Code Commentary:** Yes, but there are two different design standards that apply. Requirements are dependent on the IBC occupancy classification of the hangar building.

There is an exception in IBC Section 412.2.6 that is specific to **Group II** aircraft hangar buildings that are classified as “**S-2**” occupancies - where the hangar building is used only for storing private aircraft - where no major maintenance or overhaul is being done. In this case, the building is required to be sprinkled, but with a standard wet pipe system (no foam system required) only.

For **Group II** aircraft hangars that are classified as “**S-1**” occupancies, all are required to be sprinkled throughout as required by NFPA 409, Chapter 7. Like Group I hangars, there are options to the type of fire suppression systems required. At a minimum, an NFPA 13 wet pipe sprinkler is required throughout the hangar, but conditions may also warrant a combination foam and wet system. Actual requirements will vary depending on the actual use conditions within the building. All foam or combination wet/foam systems may be required in most instances. See NFPA 409, Chapter 7, for specific conditions and options allowed for Group II, S-1 occupancy hangars.

**Question 6:** Are **Group III** aircraft hangar buildings required to be sprinkled throughout?

**CCLD Staff - Code Commentary:** Not necessarily. **Group III** aircraft hangar buildings that are classified as an “**S-1**” occupancy where aircraft “repair” is done are all be required to be sprinkled throughout in accordance with NFPA 409, Chapter 8 – as required for a Group I hangar per Chapter

7. In this instance, like Group I hangars, there are options to the type of fire suppression systems required. Refer to NFPA 409, Chapter 8 and Chapter 7 for additional requirements/information.

For all “S-2” occupancy - Group III aircraft hangar buildings (where no “repair” work is being done), hangar buildings are generally not required to be sprinkled as long as they fit into the proper/required type of construction (meeting the fire area requirements as shown in Table 4.1.3, in question 12). Remember though, exterior wall openings must also be provided per IBC section 903.2.10 or that provision will require the hangar to be sprinkled.

**Question 7:** If the local jurisdiction has specifically adopted MSBC 1306 – Special Fire Protection Requirements, will this supersede minimum fire sprinkler thresholds found in IBC section 412 for a Group S-1 aircraft hangar building?

**CCLD Staff - Code Commentary:** Yes. Even if NFPA 409 (as referenced from IBC section 412) does not require the S-1 hangar building to be sprinkled, MSBC Rule Chapter 1306 will take precedence over all fire sprinkler requirements from the general code. Therefore, the S-1 hangar building would have to be sprinkled as required by the thresholds of MSBC 1306. Note that MSBC Rule Chapter 1306 does not apply to Group S-2 aircraft hangar buildings.

**Question 8:** How do the fire sprinkler requirements of IBC section 903.2.8 apply to a hangar building (general code requirements for sprinkling Group S-1 occupancies)?

**CCLD Staff - Code Commentary:** Regardless of the NFPA 409 provisions for sprinkling an aircraft hangar building, if the occupancy classification of the hangar is a Group “S-1,” IBC section 903.2.8 will require all S-1 hangars to be sprinkled when the buildings’ “fire area” exceeds 12,000 square feet (single story building). If one were to divide the single story hangar building into two separate “fire areas,” each being less than 12,000 square feet in area, the maximum allowable area of the building could then be 24,000 square feet - without being required to be sprinkled (per this IBC code section). Again, if the local municipality has specifically adopted MSBC 1306 – Special Fire Protection Requirements – this special ordinance rule will supersede the fire sprinkler thresholds found in IBC section 903.2.8 and section 412 and require the S-1 hangar to be sprinkled if the building exceeds 2000 GSF in area. In general, one should think of IBC section 903.2.8 as the maximum allowable Group S-1 hangar building “default threshold” for when a fire sprinkler system is required.

**Question 9:** Assuming the local jurisdiction has not adopted MSBC 1306, and assuming the proposed hangar building is not specifically required to be sprinkled by NFPA 409 (as referenced from IBC section 412), are there any other code requirement that might require a fire suppression within an aircraft hangar building?

**CCLD Staff - Code Commentary:** Yes. One must keep in mind that IBC Section 903.2.10 will require any/all windowless buildings (any building not having exterior service doors, windows, or overhead/sliding doors properly located around the perimeter of the building) to be sprinkled. This is a basic sprinkler default that applies to all types and uses of buildings regulated by the MSBC.

**PART III** Knowing how to identify and choose a hangar buildings’ “type of construction” for both design and code review purposes is critical. Type of construction will specifically dictate possible construction materials that may be considered and it will be a determining factor when computing the maximum allowable size of the building. The term “fire area” is also discussed in this section. “Fire area” relates to the size of the building and the potential for determining when or if the hangar building is required to be sprinkled. In Part III of this report, Q and A will focus on how and why you should consider “type of construction” an important factor in the building design. “Fire area” and potential requirements for sprinkling due to fire area thresholds will also be discussed.

**Question 10:** IBC Section 412.2.6 references NFPA 409 for fire sprinkler requirements for aircraft hangar buildings. When I go to NFPA 409 though, it appears that I must convert NFPA building “type of construction” categories into an “IBC - type of construction” format to properly apply the MSBC. Is this true?

**CCLD Staff - Code Commentary:** Yes. The NFPA “type of construction” classification is different than the classifications used in the IBC, so a conversion must be done to determine how the MSBC is to be applied. From NFPA 409, once the building has been classified into one of the four hangar “group” designations, the buildings’ type of construction must be determined. The following type of construction conversion table should be used to convert and classify accordingly:

<b>TYPES OF CONSTRUCTION</b> <i>(Comparison of Classification)</i>		
<b>2006 IBC:</b>	<b>NFPA:</b>	<b>COMMON TERMINOLOGY:</b>
-----	I (443)	Fire Resistive, Non-combustible
Type I-A	I (332)	Fire Resistive, Non-combustible
Type I-B	II (222)	Fire Resistive, Non-combustible
Type II-A	II (111)	Protected Non-combustible
Type II-B	II (000)	Unprotected Non-combustible
Type III-A	III (211)	Protected Ordinary
Type III-B	III (200)	Unprotected Ordinary
Type IV	IV (2HH)	Heavy Timber
Type V-A	V (111)	Protected Combustible
Type V-B	V (000)	Unprotected Combustible

Note that every building/aircraft hangar must be classified under one of the “type of construction” categories identified in the 2006 International Building Code. Do not use or classify type of construction as noted from the NFPA manual.

**Question 11:** Once the proper “type of construction” conversion has been completed for a **Group II** aircraft hangar building, how do I go on to apply maximum allowable “fire area” thresholds from NFPA 409 into the maximum allowable area “fire area” thresholds of the IBC to determine the allowable size of the building?

**CCLD Staff - Code Commentary:** The following Table has been developed using IBC type of construction designations along with the appropriate NFPA 409 fire area thresholds to show when

(under the appropriate type of construction) a **Group II** aircraft hangar building is to be sprinkled. The Table also indicates when the type of construction must be upgraded to a higher type of construction classification (when you exceed the maximum area threshold of a fire area).

**Group II Aircraft Hangar - Table 4.1.2 - Conversion to 2006 IBC**

Type of construction requirements identified are equivalent to those of NFPA 409

<b>2006 IBC Type of Construction</b>	<b>Single fire area equal to but not larger than <sup>a</sup></b>	<b>NFPA Fire Sprinkler System Required</b>
Type I	30,001 - 40,000 ft <sup>2</sup>	YES
Type II-A	15,001 - 40,000 ft <sup>2</sup>	YES
Type II-B	12,001 - 40,000 ft <sup>2</sup>	YES
Type III-A	15,001 - 40,000 ft <sup>2</sup>	YES
Type III-B	12,001 - 40,000 ft <sup>2</sup>	YES
Type IV	15,001 - 40,000 ft <sup>2</sup>	YES
Type V-A	8,001 - 40,000 ft <sup>2</sup>	YES
Type V-B	5,001 - 40,000 ft <sup>2</sup>	YES

**Group II - Table 4.1.2 Footnotes:**

- a. Hangars having a fire area larger than 40,000 square feet in area shall be classified as Group I hangars. All Group I hangars are required to be sprinkled.

**Question 12:** Once the proper “type of construction” conversion has been completed for a **Group III** aircraft hangar building, how do I go on to apply maximum allowable “fire area” thresholds from NFPA 409 into the maximum allowable area “fire area” thresholds of the IBC to determine the allowable size of the building?

**CCLD Staff - Code Commentary:** The following Table has been developed using IBC type of construction designations along with the appropriate NFPA 409 fire area thresholds to show when (under the appropriate type of construction) a **Group III** aircraft hangar building is to be sprinkled. The Table also indicates when the type of construction must be upgraded to a higher type of construction classification (when you exceed the maximum area threshold of a fire area).

**Group III Aircraft Hangar - Table 4.1.3 - Conversion to 2006 IBC**

Type of construction requirements identified are equivalent to those of NFPA 409.

<b>2000 IBC Type of Const.</b>	<b>Single fire area less than or equal to:</b>	<b>NFPA Fire Sprinkler System Required <sup>a, b</sup></b>
Type I	30,000 ft <sup>2</sup>	NO
Type II-A	15,000 ft <sup>2</sup>	NO
Type II-B	12,000 ft <sup>2</sup>	NO
Type III-A	15,000 ft <sup>2</sup>	NO
Type III-B	12,000 ft <sup>2</sup>	NO
Type IV	15,000 ft <sup>2</sup>	NO
Type V-A	8,000 ft <sup>2</sup>	NO
Type V-B	5,000 ft <sup>2</sup>	NO

**Group III - Table 4.1.3 - Footnotes:**

- a. Where hazardous operations including fuel transfer, welding, torch cutting, torch soldering, doping, and spray-painting are performed in a Group III hangar, the hangar building must be sprinkled per NFPA 409 – regardless of its size.
- b. Note that sprinkler provisions from the IBC (section 903.2.8 and/or 903.2.10 may apply. Verify compliance with these provisions in addition to NFPA 409.

**Question 13:** When applying Tables 4.1.2 or 4.1.3 (as referenced herein), if the gross square footage of my proposed hangar building is in excess of that maximum allowable fire area size (GSF) for a specific “type of construction,” what can be done to gain more square footage?

**CCLD Staff - Code Commentary:** One would have to jump up to the next higher “type of building construction” as designated in the table, or into a type of construction category that “fits” the desired square footage of the building. If the hangar building is to be fully sprinkled however, one could maintain a lower type of construction category and apply IBC sections 503, 504 and 506 (taking advantage of fire sprinkler requirements/installation), as allowed, and increase the buildings size accordingly.

**Question 14:** The term “fire area” has been used throughout this document and is referenced in the IBC. What is a “fire area” and how does it apply to an aircraft hangar building?

**CCLD Staff - Code Commentary:** Per the IBC, the term “fire area” refers to the actual gross square footage (GSF area) of a building or occupancy, or portion thereof. As stated, “fire area” is usually applied to a specific occupancy group within a building, or the entire building. If a building has different occupancies within, each is usually classified as such. When referring to Chapter 9 of the IBC for fire sprinkler requirements, you’ll find that sprinkler prerequisites are usually based on occupancy classification. From there, the code will usually reference an occupancies’ “fire area” (gross square footage of any specific occupancy housed therein). In addition, you’ll usually see criteria regulating the occupancies maximum “fire area” threshold (square footage). In general, if the building fire area threshold exceeds a certain square footage (or number of stories above grade plane), the fire area, or in some cases, the building, may have to be sprinkled throughout. Through this “fire area” criteria, the code provides a building designer with an ability to “compartmentize” a building into multiple “fire areas” by using fire-resistive-rated horizontal assemblies (rated floor/ceiling assemblies), or by using fire-resistive rated “fire walls” or “fire barrier” walls. It should also be noted that a building’s “exterior walls” are also used to define fire area (at building perimeters). When a building has been divided into multiple compartments by using one or more of the aforementioned conditions, the gross square footage of that individual “fire area” is the area the code is referring to for applications of this requirement. See IBC sections 706.3.9 and 901.7 for specific code requirements. This information is important because in some instances, a building designer can use “fire areas” to avoid the sprinkling requirements for an aircraft hangar building. An example might be in the case of an S-1 occupancy, Group III hangar building. If one wants to have a one-story building that is 15,000 gross square feet in area, the building could be divided into two separate “fire areas” by using a fire wall or fire barrier wall to compartmentize it into two separate fire areas. Of the two compartments, neither could exceed 12,000 GSF in area (per 903.2.8). In this circumstance, and assuming the building has proper exterior wall openings (and the jurisdiction has not adopted MSBC 1306), the hangar building would not have to be sprinkled.

**Question 15:** If I were to try and divide or compartmentize my aircraft hangar building into separate “fire areas” (to try and avoid fire sprinkler requirements), how do I determine what the required fire-resistive rating must be for the walls used to divide the building into fire areas?

**CCLD Staff - Code Commentary:** The code states that only “fire walls” or “fire barrier” walls may be used for this purpose. See IBC section 705 and/or 706 respectively. Each wall type has different construction conditions, so be sure you define the wall exactly as you desire. Note that there are significant pro’s and con’s to using one type of wall over the other.

For “fire barrier” walls, you need to refer to IBC Table 706.3.9 to obtain the required fire-resistive hourly rating of the fire barrier wall assembly. For “fire walls,” you need to refer to Table 705.4 to obtain the required fire-resistive hourly rating of the fire wall assembly. In either case, if the walls are constructed according to code, you may use either type of wall assembly to subdivide the building into one or more “fire areas.” Also see IBC sections 706.3.9 and 901.7.

**PART IV** Some of the most frequent questions received relating to aircraft hangars are those relating to a hangar buildings’ proximity to a property line, the use of hangar building “lease lines” for site development, and the proper application of assumed property line code provisions. As such, exterior wall fire-resistive rating and opening protective requirements are also tops on this list. The requirements and options for when there are multiple hangar buildings located on the same piece of property, or when the airport “leases” lots for private aircraft hangar development appears to be the centerpiece of this concern. These issues, along with questions relating to property ownership conditions (leasable hangar lots) will all be covered in this part of the document. Before doing so however, we have to acknowledge that there are a few “grey areas” in the code with respect to some of the requirements relating to these issues. ICC Staff also pointed out some of these same concerns when specifically questioned; hence, the reason for this document. Therefore, in an effort to provide for consistency and uniformity in your administration of the 2007 MSBC, you should consider the answers provided in this document to be the consensus of CCLD staff on the select subject matter.

**Question 16:** For applications of IBC section 412.2.1, is a “property line” to be considered the same thing as a “lot line,” or is there a difference between the two (i.e., as it relates to leasable hangar building lots on a total airport site)?

**CCLD Staff - Code Commentary:** The term “lot line” and “property line,” when used in this code context, should be considered to have the same meaning. We believe the author of the actual code language mistakenly used similar references to the same condition - with the idea that they mean the same thing. Upon question to ICC staff, they agree and support this belief. Elsewhere in the code, you’ll find references to the term “property lines” and “lot lines.” Again, for applications of building frontage increases (IBC 506.2), open space limits (IBC 506.2.2), fire-separation distances (IBC Chapter 7), exterior wall fire-resistance rating requirements (IBC Table 602), buildings on the same lot (IBC 704.3), and/or exterior wall opening protective requirements (IBC 704.12) - for aircraft hangar buildings - the terms “lot lines” and “property lines” should be considered to be the same thing.

**Question 17:** For applications of IBC section 412.2.1, would any of the code requirements be different if the “lot” that the hangar building is to be located on is privately leased from an airport commission when the individual lot is located on part of a larger airport complex/site?

**CCLD Staff - Code Commentary:** No. As long as the “lot” that the hangar building is located on has its own platted property lines (as defined in a certificate survey with platted property lines), the site must be analyzed as such. All related property line setbacks, or frontage increases, or fire-resistance rating requirements (of exterior walls) would be considered by using the platted property lines of the lease site – not the entire airport site boundary property lines.

Based on the many questions we (MN DLI-CCLD) receive on hangar buildings, this seems to be the primary point of contention. The reason is obvious. If the hangar building is located on a lease lot that is the same size as the hangar building, the building code would not allow one to have doors or openings on any of the exterior walls of the hangar and all exterior walls would have to be rated 2-hours (per IBC 412 and Table 602).

To try and resolve this issue, many Building Officials look for alternative methods as a means to solve the problem. Under MSBC 1300 (the administrative provisions of the state code), the code allows for an applicant to request the use of an “alternate design or method of construction.” Under this provision, it is the responsibility of the applicant to request the alternate - and to provide an accurate alternative solution to the Building Official. The alternative measure must be supported by evidence that shows that the alternative method offered is equivalent to actual code intent, and as prescribed for quality, strength, effectiveness, fire resistance, durability, and safety. As with any provision of the code, if confronted with this issue, the project applicant/hangar developer should consult with the local Building Official on departmental procedures for pursuit of an alternate design.

**Question 18:** For application of IBC section 412.2.1, when measuring the distance from the hangar building to a “public way,” do we measure to the nearest point (property line) of the public way, or can we take advantage of the width of the public way and measure to the center or opposite side of the public way (as if the public way was a street 60-feet wide) to gain in overall yard width?

**CCLD Staff - Code Commentary:** Unlike the measurement we use in code applications for determining general “fire separation distance,” this particular measurement is to be measured from the building to the nearest point of the public way/property line. So, the answer is “no.” You cannot take advantage of the extra width of a public way. For some reason, this condition is specific to aircraft hangar buildings only though. We would not measure in this manner under other code applications or conditions. This question was also posed to ICC staff and they agree with this concept.

**Question 19:** For application of IBC section 412.2.1, the 30-foot fire-resistance exterior wall rating separation distance requirement is specific. With this in mind, do provisions from IBC Table 602 also apply to the hangar building’s exterior walls?

**CCLD Staff - Code Commentary:** No. As mentioned, the requirement for exterior wall fire-resistance rating is specific to a designated setback condition (30-feet) for aircraft hangar buildings only. As such, Table 602 should not be used when determining exterior wall fire-resistance rating requirements for a hangar building. This question was posed to ICC staff and they agree with this concept.

**Question 20:** With reference to the above question - and IBC section 412.2.1, how are exterior wall openings required to be treated when in close proximity to a property line?

**CCLD Staff - Code Commentary:** Exterior wall opening protectives for aircraft hangar buildings may be provided as regulated by IBC section 704.8 and Table 704.8. In addition, if the building were fully sprinkled, options allowed by IBC sections 704.8.1 and 704.8.2 could also be appropriately used.

**Question 21:** For application of IBC section 412.2.1 and exterior wall opening protective requirements from Table 704.8, is footnote “i” from this Table applicable to aircraft hangar building construction?

**CCLD Staff - Code Commentary:** No. The reason can be explained in looking into the history of footnote “i” - back in the original code change process (FS11-04/05) - where the author of the provision inserted references to Table 601 and Table 602 into the footnote. This was done to specifically address a situation where exterior walls (or portions of the framing within it) were required to be rated for reasons other than based on it’s type of construction or location on property. For an aircraft hangar building, the exterior wall is required to be rated not because of Table 602, but because of a special requirement from section 412.2.1. Therefore, permitting this building to have “unlimited unprotected openings” would seem contrary to the intent of the code. This same question was posed to ICC staff and they agree with this position.

**Question 22:** For application of IBC section 412.2.1 (when the exterior wall is required to be rated because it is less than 30-feet from a property line), can the provisions of IBC section 704.5 also be used if applicable?

**CCLD Staff - Code Commentary:** Yes. If the exterior wall is located such that it is more than 5-feet from an adjacent property line or public way, the exterior wall may be constructed as a 2-hour fire-resistive rated assembly having been tested under fire conditions from the inside of the wall only. (Nonsymmetrical wall construction per IBC 703.2.1 having a fire-resistive rating from the inside only could be used if the exterior wall is located more than 5-feet from the adjacent property line.)

**Question 23:** For application of IBC section 412.2.1, if multiple hangar buildings are constructed on the same piece of property, do the provisions of IBC section 704.3 apply (assumed property lines between buildings)?

**CCLD Staff - Code Commentary:** Yes. If multiple buildings are constructed on a single piece of property, then either assumed property lines shall be defined (to determine allowable area and exterior wall fire-resistance rating requirements), or the buildings may be computed “together” as if one large building, as outlined in section 704.3. Options in 704.3 are at the discretion of the designer/applicant. When assumed property lines are used, IBC section 412.2.1 then applies to the assumed property line from the new hangar building and any other hangar building affected by the designated location of the new assumed property line. As referenced, when/if assumed property lines are used, those lines must be used to analyze both existing buildings that they may be affected by their location, and the new building resulting from the proposed assumed property line. If the

location of the assumed lot line affects existing buildings (i.e., allowable area, exterior wall fire-resistive rating, exterior wall opening protection requirements, etc.), those existing building's must be upgraded as required by the code - at the same time the new building is constructed. This is why determining a defined location for the assumed property line is critical to a buildings design.

**Question 24:** For application of IBC section 412.2.1, if multiple hangar buildings are constructed on the same piece of property, can one “combine” the area of multiple hangar buildings as provided for in IBC section 704.3 (assumed property line provisions), to define larger building fire areas and avoid assuming lot lines between “each” hangar building?

**CCLD Staff - Code Commentary:** Yes. If multiple buildings are constructed on a single piece of property, the code does allow for combining multiple building areas (even if individual buildings are privately owned) as if they were one building – for the purpose of creating and defining larger fire areas. The combined areas must then be evidenced by the appropriate computations that prove that the combined buildings meet code for type of construction, occupancy, allowable area, and building height - per IBC Chapter 5.

**Question 25:** Are “helicopter” hangars required to be regulated in the same manner as “airplane” hangars with respect to the IBC section 412 aircraft-related occupancies?

**CCLD Staff - Code Commentary:** Yes. A helicopter hangar and an airplane hangar are regulated by code in the same manner under the same code provision because the recognized hazards are similar in nature.

## **Other aircraft hangar building code issues to consider:**

- Once defined by occupancy group and hangar designation, the use of the hangar building may not be changed (for any purpose) unless a new Certificate of Occupancy has been issued by the Building Official. The proposed new use may require additional upgrades or changes to the building and the Building Official needs to verify that these items have been completed as required by code before the new use is continued.
- If other occupancy use groups, such as Group R (residential) or Group H (hazardous) were also located within a hangar building, the fire sprinkler provisions of those occupancy uses may take precedence over general sprinkler requirements of the aircraft hangar building. See IBC Chapter 4 and Chapter 9 for fire sprinkler requirements of other special uses and/or occupancies.
- The inability to have or maintain required Fire Department vehicular access (per IFC Section 503) to the hangar building, or if acceptable fire protection water supply is not available to the site and/or building where the hangar(s) is located (per IFC section 508), may provide due cause to the Fire Chief to require additional forms of building fire fighting features. Fire Department access and fire protection water supply to a hangar building is critical to providing a reasonable level of life safety and property protection for the building and its occupants.
- As Group S occupancies, aircraft hangar buildings exceeding 3000 GSF in area are all required to be designed and certified by Minnesota licensed professional Architects and Engineers. See Minnesota Rules 1800 and 1805.
- Do not let yourself be confused when referring to NFPA 409 (from IBC section 412) for aircraft hangar sprinkler requirements. It is only the “fire sprinkler system requirements” that you are being scoped to. You should not be referring to other aircraft hangar use conditions, or building construction requirements for the aircraft hangar building unless they are part of or alternatives to the specific fire sprinkler requirements of NFPA 409. All general building construction requirements must be obtained from the 2007 MSBC/2006 IBC.

### ***Contributing Editors/Information Sources:***

***ICC Staff, International Code Council***

***MN Metropolitan Airport Commission, Building Department Staff***

***MN DLI-CCLD Plan Review Staff***