

## **BOMA MATH: Feature or Bug?**

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In addition to defining many technical terms, the BOMA Standard for measuring floor areas in office buildings (ANSI/BOMA Z65.1-2006) essentially addresses three general aspects of area calculation:

1. Classification of floor area (Gross Measured Area, Major Vertical Penetrations, Office Area, Store Area, Building Common Area and Floor Common Area)
2. Locations of boundaries between and within each class of space (dominant portion, finished surface, wall centerline)
3. The mathematics to be applied to allocate common areas to tenant suites.

The standard is especially clear on the mathematics. The last two pages of the current standard present a spreadsheet that shows unequivocally how to crunch the numbers. Let us refer to that as BOMA math.

BOMA math uses R/U ratios (R/U stands for Rentable area divided by Usable area) to allocate common areas to tenants. The measured area of a tenant's suite is multiplied by the R/U ratio to calculate the rentable area that in turn becomes the basis (using the rent rate) for computation of base rent. Prior to 1996, the BOMA standard did not distinguish between floor common areas (corridors, toilets and mechanical rooms serving only the tenants on a floor) and building common areas (the main building lobby, mail room, building mechanical rooms, etc.). R/U ratios were calculated on a floor-by-floor basis. Tenants that were located on floors that had lots of common areas (like the main entry level) had the misfortune of having a high R/U ratio. In some cases R/U ratios on some floors were so high that landlords could not lease the space on those floors. This caused them to lower the R/U ratio for those floors and lose rentable area.

The 1996 version of the BOMA Standard for the first time distinguished between building common area and floor common area. Furthermore, it precisely specified the method of calculating and applying both a floor R/U ratio and a building R/U ratio. One goal of BOMA math was to fairly lower the high R/U ratios on entry levels that had been a problem for property managers. To achieve that, BOMA math requires that the floor R/U ratio be calculated first and applied not only to tenant areas but also to building common areas. This yields an intermediate figure called "basic rentable area" that is not used in leasing, but is multiplied by the building R/U ratio to calculate the rentable area of each tenant suite. This approach was successful, causing the R/U ratios to vary much less wildly between the floors of a building, although they are usually different on every floor as a function of varying corridor layouts and floor sizes. Let's call this a "feature" of BOMA math.

So what's the bug? Comparison of some wording in the older versions of the BOMA standard with the 1996 version provides a clue. Older versions contained the phrase "The Rentable Area of a floor is fixed for the life of a building and is not affected by changes in corridor sizes or configuration." In the 1996 version, this phrase was eliminated from the definition of rentable area. Instead, in the definition of Floor Rentable Area (a new term and a different measure) a phrase was inserted that reads "It is *generally* fixed for the life of the building and *is rarely* affected by changes in corridor size or configuration." This statement no longer applies to rentable area and there is the bug. In the 1996 standard, the rentable areas of floors, and building R/U ratios, can change frequently.

An unforeseen bug in the new BOMA math is that any time a floor common area (like a corridor) changes on a floor that also has a building common area (like a mechanical room), the building R/U ratio will change. This is because the floor R/U ratio is part of the calculation for the building R/U ratio. The rentable area of every tenant in the building can be subject to fluctuation caused by changes in a corridor on only one floor. This is a problem for property managers because leases generally cannot be modified during their term and renewing tenants generally don't understand how their rentable areas can be affected by changes on other floors of their building. Changes in tenant rentable areas caused by changes in the building R/U ratio can cause loss of rental revenue and appraised value.

Is there a fix for this bug? Yes, there is, but it entails using a "Modified BOMA" measurement method that requires additional description in the lease document because it is not "strict BOMA". The fix is to modify BOMA math by eliminating the application of the floor R/U ratio to building common areas. The building R/U ratio is calculated using the actual measured area of building common spaces rather than their basic rentable area.

The impact of this modification is small for most buildings. Floor R/U ratios will be slightly higher and the building R/U ratio will be slightly lower than under a strict BOMA method. Floor-by-floor rentable areas will vary by a small amount from strict BOMA figures, but the total rentable area of a building should not change. The best features of BOMA math are retained while most unwelcome fluctuations in rentable area are eliminated.

To completely eradicate this bug, there is one other modification that should be made with regard to boundary lines. Under the current BOMA standard, tenant usable areas and building common areas are measured to the tenant (or building common) side of corridor walls. When a floor changes from multi-tenant occupancy to single tenant occupancy, the corridors generally go away and become tenant space. Tenant spaces abutting building common areas are measured to the centerline of walls that separate them. This means that building common areas adjacent to a corridor on a multi-tenant floor will expand by half the thickness of the wall between them if the occupancy changes to a single tenant. This also can change the building R/U ratio and the rentable areas of every tenant in the building. To avoid this, treat corridors as though they are tenant space when they abut building common area, using the centerline of the wall between them as the boundary line. This way, polylines will not have to be re-drawn and building R/U ratios changed when a floor changes from multi-tenant to single tenant occupancy. This change also needs to be noted in the lease as a modification to the BOMA standard.

The author has for several years made available through his web site [www.BuildingAreaMeasurement.com](http://www.BuildingAreaMeasurement.com) an Excel workbook that implements the calculations included on pages 26 and 27 of the BOMA standard. He has created a special version of the workbook that includes an additional spreadsheet implementing the modifications to BOMA math suggested above and comparing the modified and strict versions using sample data. Those interested in further studying or employing such a Modified BOMA method are encouraged to go to the website and obtain the Modified BOMA workbook.

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