From Eq. C27.3-7

$$F_{\Delta K}(x) = \log_{10}\left(\frac{6.21}{0.36}\right) / \log_{10}\left(\frac{6.21}{0.00241}\right) = 0.36$$

Therefore from Eq. C27.3-6

$$\Delta K = (1.00 - 0.67)\frac{0.82}{0.67}0.36 = 0.15$$

Note that because $|\Delta K|$ is 0.15, which is less than the 0.38 value of $|K_{33,u} - K_{33,d}|$, 0.15 is retained. Finally, from Eq. C27.3-5, the value of K_z is

$$K_z = K_{zd} + \Delta K = 0.82 + 0.15 = 0.97$$

Because the value 0.97 for K_z lies between the values 0.88 and 1.16, which would be derived from Table 27.3-1 for Exposures B and C respectively, it is an acceptable interpolation. If it falls below the Exposure B value, then the Exposure B value of K_z is to be used. The value $K_z = 0.97$ may be compared with the value 1.16 that would be required by the simple 2,600-ft fetch length requirement of Section 26.7.3.

The most common case of a single roughness change where an interpolated value of K_z is needed is for the transition from Exposure C to Exposure B, as in the example just described. For this particular transition, using the typical values of z_0 of 0.066 ft (0.02 m) and 1.0 ft (0.3 m), the preceding formulae can be simplified to

$$K_z = K_{zd}\left(1 + 0.146\log_{10}\left(\frac{6.21}{x}\right)\right) \quad \text{(C27-9)}$$
$$K_{zB} \le K_z \le K_{zC}$$

where x is in miles, and K_{zd} is computed using α = 6.62. K_{zB} and K_{zC} are the exposure coefficients in the standard Exposures C and B. Figure C27.3-2 illustrates the transition from terrain roughness C to terrain roughness B from this expression. Note that it is acceptable to use the typical z_0 rather than the lower limit for Exposure B in deriving this formula because the rate of transition of the wind profiles is dependent on average roughness over significant distances, not local roughness anomalies. The potential effects of local roughness anomalies, such as parking lots and playing fields, are covered by using the standard Exposure B value of exposure coefficient, K_{zB}, as a lower limit to the calculated value of K_z.

Example 2: Multiple Roughness Change Suppose we have a coastal waterway situation as illustrated in Fig. C27.3-1, where the wind comes from open sea with roughness type D, for which we assume z_0 = 0.01 ft (0.003 m), and passes over a strip of land 1 mi (1.61 km) wide, which is covered in buildings that produce typical B type roughness, i.e. z_0 = 1 ft (0.3 m). It then passes over a 2-mi (3.22-km) wide strip of coastal waterway where the roughness is again characterized by the open water value z_0 = 0.01 ft (0.003 m). It then travels over 0.1 mi (0.16 km) of roughness type B (z_0 = 1 ft) (0.3 m) before arriving at the site, station 3 in Fig. C27.3-1, where the exposure coefficient is required at the 50-ft (15.2-m) height. The exposure coefficient at station 3 at 50 ft (15.2 m) height is calculated as shown in Table C27.3-1.

The value of the exposure coefficient at 50 ft at station 3 is seen from the table to be 1.067. This is above that for Exposure B, which would be 0.81, but

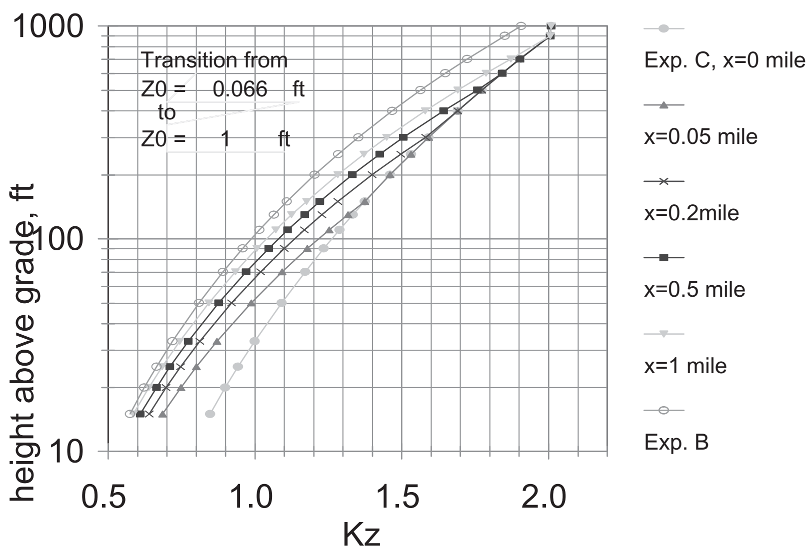

Figure C27.3-2 Transition from Terrain Roughness C to Terrain Roughness B, Eq. C27.3.1-9.