reduction, but it is still 33 percent higher than the 30 psf one would obtain were an area-based reduction to be applied to the 50 psf value for large bays as allowed in most standards. Also the variability of the maximum parking garage load effect is found to be small with a coefficient of variation less than 5 percent in comparison with 20 percent to 30 percent for most other live loads. The implication is that when a live load factor of 1.6 is used in design, additional conservatism is built into it such that the recommended value would also be sufficiently conservative for special purpose parking (e.g., valet parking) where vehicles may be more densely parked causing a higher load effect. Therefore, the 50 psf design value was felt to be overly conservative, and it can be reduced to 40 psf without sacrificing structural integrity.

In view of the large load effect produced by a single heavy vehicle (up to 10,000 lb), the current concentrated load of 2,000 lb should be increased to 3,000 lb acting on an area of 4.5 in. × 4.5 in., which represents the load caused by a jack in changing tires.

C4.7.6 Limitations on One-Way Slabs

One-way slabs behave in a manner similar to two-way slabs but do not benefit from having a higher redundancy that results from two-way action. For this reason, it is appropriate to allow a live load reduction for one-way slabs but restrict the tributary area, A_T, to an area that is the product of the slab span times a width normal to the span not greater than 1.5 times the span (thus resulting in an area with an aspect ratio of 1.5). For one-way slabs with aspect ratios greater than 1.5, the effect will be to give a somewhat higher live load (where a reduction has been allowed) than for two-way slabs with the same ratio.

Members, such as hollow-core slabs, that have grouted continuous shear keys along their edges and span in one direction only, are considered as one-way slabs for live load reduction even though they may have continuous shear transfer normal to their span.

C4.8 REDUCTION IN ROOF LIVE LOADS

C4.8.2 Flat, Pitched, and Curved Roofs

The values specified in Eq. 4-2 that act vertically upon the projected area have been selected as minimum roof live loads, even in localities where little or no snowfall occurs. This is because it is considered necessary to provide for occasional loading due to the presence of workers and materials during repair operations.

C4.8.3 Special Purpose Roofs

Designers should consider any additional dead loads that may be imposed by saturated landscaping materials in addition to the live load required in Table 4-1. Occupancy related loads on roofs are live loads (L) normally associated with the design of floors rather than roof live loads (L_r), and are permitted to be reduced in accordance with the provisions for live loads in Section 4.7 rather than Section 4.8.

C4.9 CRANE LOADS

All support components of moving bridge cranes and monorail cranes, including runway beams, brackets, bracing, and connections, shall be designed to support the maximum wheel load of the crane and the vertical impact, lateral, and longitudinal forces induced by the moving crane. Also, the runway beams shall be designed for crane stop forces. The methods for determining these loads vary depending on the type of crane system and support. MHI (2003, 2004a, 2004b) and MBMA (2006) describe types of bridge cranes and monorail cranes. Cranes described in these references include top running bridge cranes with top running trolley, underhung bridge cranes, and underhung monorail cranes. AISE (2003) gives more stringent requirements for crane runway designs that are more appropriate for higher capacity or higher speed crane systems.

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