Maximum Spacing of Thermal Movement Joints

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Introduction

Although buildings are often constructed using flexible materials, roof and structural expansion joints are required when plan dimensions are large. The maximum distance between expansion joints is dependent upon many variables, including ambient temperature during construction and the expected temperature range during the lifetime of the building. This article summarises North American practice with respect to spacing of thermal movement joints (AISC, 2003). This is based upon *Federal Construction Council Technical Report No 65: Expansion Joints in Buildings* and recommendations by (Fisher, 2005).

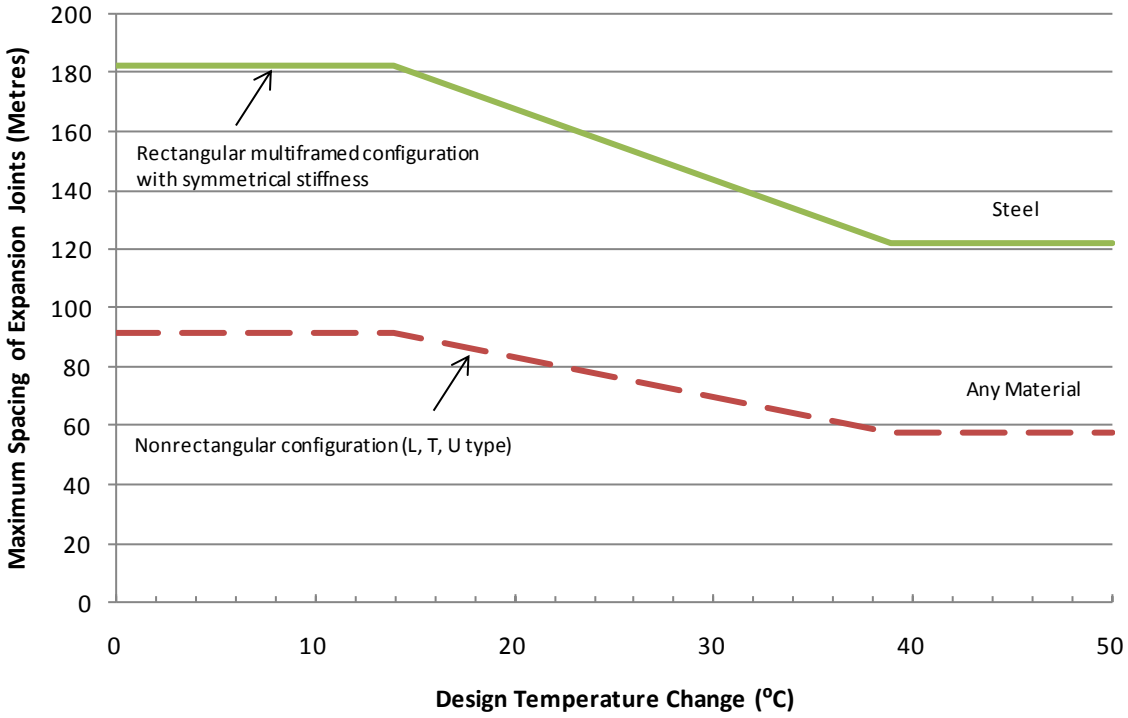

Figure 1: Recommended Maximum Expansion Joint Spacing

Maximum Expansion Joint Spacing

Figure 1 provides guidance based on design temperature change for maximum spacing of structural expansions joints in beam and column framed buildings with pinned column bases and heated interiors. This figure is from *Federal Construction Council Technical Report No 65: Expansion Joints in Buildings*. The figure has been converted from imperial to metric units. The report gives five modification factors to be applied as appropriate:

1. If the building will be heated only and will have pinned column bases, use the maximum spacing as specified
2. If the building will be air conditioned as well as heated, increase the maximum spacing by 15 percent provided the environmental control system will run continuously.
3. If the building will be unheated, decrease the maximum spacing by 33 percent
4. If the building will have fixed column bases, decrease the maximum spacing by 15 percent
5. If the building will have substantially greater stiffness against lateral displacement in one of the plan dimensions, decrease the maximum spacing by 25 percent.

When more than one of these design conditions prevails in a building, the percentile factor to be applied should be the algebraic sum of the adjustment factors of all the various applicable conditions.

Buildings may be required to have fire walls in specific locations. These fire walls often become default locations for expansion joints.

The most effective expansion joint is a double line of columns which provides a complete and positive separation. Alternatively, low-friction sliding elements can be used. Such systems, however, are seldom totally friction free and will induce some level of inherent restraint to movement.

References

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