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## 5.5 Requirements for specific bridge types

### 5.5.5 Rigid frame types and integral abutment types

#### 5.5.5.2 Integral structures

Design of these structures must take account of the zone of soil/structure interaction behind the abutments, specifically the lateral soil pressure build-up and settlements that will occur in this zone as a result of thermal cycling.

Integral abutments shall not be constructed on spread footings founded on or keyed into rock.

Movement calculations shall consider temperature, creep, and long-term pre-stress shortening in determining potential movements at the abutment.

The maximum skew angle for integral abutment designs shall be 30°. Skew angles greater than this shall preclude the use of integral abutment bridge construction.

Design shall follow published design criteria from a recognized source applicable to the type of jointless bridge under consideration.

The designer shall provide details regarding construction constraints, sequencing of work etc. on the Plans.

**Commentary:** *Some suitable design guides are:*

- *BA 42/96 including Amendment No. 1 dated May 2003, [Design Manual for Roads and Bridges](#), ISBN 115524606 [www.tso.co.uk].*
- *Integral Bridges: A Fundamental Approach to the Time-Temperature Loading Problem, George England, David Bush & Neil Tsang, ISBN 0-7277-2845-8.*
- *NJDOT Design Manual for Bridges and Structures, Section 15 – Integral Abutment Bridges.*
- *Ontario Ministry of Transportation, Structural Office Report #SO-96-01, Integral Abutment Bridges*
- *Ontario Ministry of Transportation, Bridge Office Report #BO-99-03, Semi-Integral Abutment Bridges*

*Experience in North America with jointless superstructures of limited backwall height using integral pile-supported end-diaphragms, or semi-integral abutment designs has demonstrated that superstructures of this type may be designed longer than the 60 m limit in BA 42/96, provided that the effects described therein are properly accounted for.*

**5.7**

**Live load**

**5.7.1**

**Simplified methods of analysis**

**5.7.1.1**

**Conditions for use of simplified analysis**

Add to Item (j):

Bridges comprised of twin cell Ministry standard concrete box stringers are categorized as multi-spine bridges that sufficiently meet the conditions for use of the simplified analysis approach.

Add to Table 5.7.1.1 Group (2) Multi-spine Bridges:

Twin cell Ministry standard concrete box stringers are defined as shear-connected beam bridges with clauses 5.7.1.3, 5.7.1.5 and 5.7.1.8 therefore being applicable.