SECTION 600
EXPANSION AND CONTRACTION

601 MOVEMENT CRITERIA

601.01 MOVEMENT RATING

Provisions shall be made in the design of structures to resist induced stresses or to provide for movements resulting from variations in temperature and anticipated shortening due to creep, shrinkage or prestressing. Accommodation of thermal and shortening movements will entail consideration of deck expansion joints, bearing systems, restraining devices and the interaction of these three items.

The main purpose of the deck joint is to seal the joint opening to obtain a watertight joint while allowing for vertical, horizontal and/or rotational movement. The bearings are required to transmit the vertical and lateral loads from the superstructure to the substructure units and to allow for movement in the unrestrained directions. Restraining devices are required to limit the displacement in the restrained directions. Improper design or construction of any of these devices could adversely affect the operation of the other devices.

The required movement rating is equal to the total anticipated movement (i.e. the difference between the widest and the narrowest opening of a joint). The calculated movements used in determining the required movement rating shall be as specified in AASHTO except as modified below:

Mean temperature and temperature ranges shall be as specified in Section 201.08 of this manual.

To allow for the effects of long term creep and shrinkage in precast prestressed concrete members, the following additional shortening shall be considered:

Joints:	20 mm per 100 meters.
Bearings:	40 mm per 100 meters.

To allow for the effects of long term creep and shrinkage in post-tensioned box girder bridges, the following additional shortening shall be included:

Joints:	40 mm per 100 meters.
Bearings:	80 mm per 100 meters.

602 DECK JOINTS

602.01 GENERAL

The movement rating for joints for steel structures shall be based primarily on the thermal expansion and contraction characteristics of the superstructure, while for concrete structures the effects of shortening due to creep and shrinkage and where applicable, prestressing shall also be added. Movement ratings shall be based on temperature variations as measured from the assumed mean temperature.

Published movement ratings are usually based on the difference between the maximum and minimum openings without consideration to the required minimum installation width. In determining the movement rating, consideration must be given to the installation width required to install the seal element.

Other factors which should be considered in determining the required movement rating include consideration of the effects of any skew, anticipated settlement and rotations due to live loads and dead loads, where appropriate.

Items requiring attention include:

1) The type of anchorage system to be used.
2) The method of joint termination at the ends.
3) The method of running joints through barriers, sidewalks and/or medians.
4) Physical limitation on size of joints.
5) Susceptibility of joint to leakage.
6) Possible interference with post-tensioning anchorages.
7) Selection of appropriate modular proprietary systems that meet design requirements.
8) Forces applied to the surrounding concrete by the joint.