TECHNICAL NOTE

INSTALLATION IN UNSTABLE CONDITIONS

Concrete Pipe and Precast
Association of Australasia

Good reinforced concrete pipe installation practice is required to ensure that a concrete pipeline is provided with the essential bedding support.

Regardless of the nature of the foundation, **AS/NZS3725:2007 "Design for installation of buried concrete pipe"** (the Standard) requires that "Each pipe should be evenly and uniformly supported along the length of its barrel by suitable fill material in the various support zones".

In poor or variable ground conditions an appropriate installation method needs to be determined. The following possibilities should be considered:

a) Where local soft spots exist, remove all unstable material and replace with compacted select material.
b) Where general poor foundation conditions exist, over excavate unsuitable foundation material and replace with compacted select material.
c) If necessary widen the trench in conjunction with (b) to create a raft effect to spread the load to acceptable levels.
d) Geotextiles may be necessary to maintain the stability of constructed foundation outlined above. The geotextile is designed to stop the foundation and bedding material from migrating into the trench base or sides.
e) Construction of a uniform bed zone in accordance with the Standard paying particular attention to the uniformity of the contact zone between pipe and bed zone.
f) Minimise potential for foundation disturbance by specifying an installation that requires the minimum acceptable compaction levels (this may require a higher pipe class).
g) Select materials for the bed, haunch and side zones that compact to the required levels with the minimum effort. The Standard provides excellent guidance on suitable material, which ensures ease of compaction (The use of CLSM may present the best option). The use of materials that require high compactive efforts, may result in foundation heave or displacement destroying the bed uniformity.
h) In small diameter pipelines, particularly in road construction, the lack of bed uniformity resulting from (g) maylead to the development of circumferential cracks in the pipes (also known as "broken backs").
i) Similar lack of bed uniformity can be developed as a result of differential settlement and de-watering.
j) The use of excessive construction loads (traffic or compaction equipment) may damage otherwise well constructed pipelines. Refer to the CPPAA Construction Load Tables for limitations.
k) Consider reducing the length to diameter ratio of small diameter pipes by specifying larger diameter pipes.

The above considerations are applicable to all concrete pipe installations, but are particularly relevant to small diameter pipeline construction, especially under roads where road construction standards require very high compaction standards.

For more information refer to the CPPAA Engineering Guidelines for the Assessment and Acceptance of Longitudinal Cracks and Circumferential Cracks.