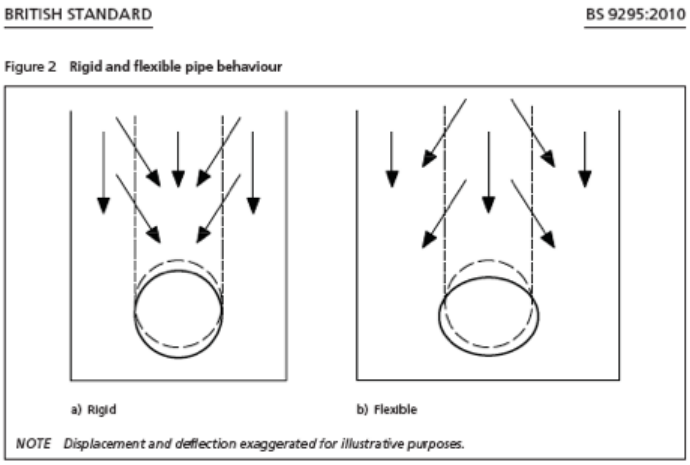
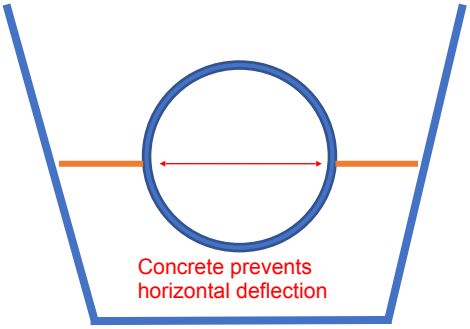
TECHNICAL NOTES

Backfilling buried PE pipe to the spring line with site concrete

For reference refer to:

British Standard ***BS9295:2010 Guide to the structural design of buried pipelines,*** Fig 2, where the effects of rigid pipes vs. flexible pipes are explained.





The effect of pouring concrete in a trench to the spring line (orange line above) prevents PE pipe from deflecting on its horizontal axis, as it is designed to do, when vertical loads (static and live loads) are applied to the pipe. This is indicated in BS 9295:2010 Fig 2 b) above.

Once side deflection is prevented by the concrete, this changes the PE pipe into a 'hybrid semi rigid pipe' where the top half of the PE pipe is partially flexible, however the lower half is rigid. This prevents the vertical loads interacting with the pipe and soil as they are designed to as indicated in BS 9295 Fig 2 b).

In a rigid (semi rigid hybrid pipe) the loads from above are diverted from the soil INTO the PE pipe (as indicated in Figure 2 a), rather than away from the pipe and into the soil, because the pipe is prevented from deflecting. This loads PE pipe in an undesirable way and is not how PE is designed to function. It creates point loading on the sides of the PE pipe at the spring line and is likely to cause the spring line concrete to partially crack in places unless it is reinforced creating point loading from broken concrete.

Finally, because the PE pipe is highly buoyant, as the concrete is poured into the trench the pipe will float, it is extremely difficult to hold the pipe evenly in the concrete to the spring line until the concrete sets because the PE is flexible, resulting in undulations inside the pipe along its length, effecting gradient.

Lining the base of the trench only with concrete is also not recommended in BS 9295, clause A13.1. PE is more that effective in accommodating changes in ground movement, settlement and undulation.

BS 9295, Fig A5 provides recommended burial design if ground conditions are poor and concrete binding is being used to stabilise the trench base, regardless there should only be excavated fill or bedding around a PE pipe.

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