

TECHNICAL NOTE

TECHNICAL INFORMATION FROM THE CONCRETE PIPE ASSOCIATION OF AUSTRALASIA

Page 1

May 2013 – No.3

CURING, STRIPPING AND HANDLING OF CONCRETE PIPE

AS/NZS 4058 "Precast concrete pipe (pressure and non-pressure)" has tight performance provisions that must be met for all machine made concrete pipe.

To ensure that this performance criteria is met, the concrete needs to be of the highest quality. To facilitate this, immediately following the casting process, concrete pipe is required to be cured. As AS/NZS 4058 is a performance based Standard, there are no prescriptive requirements for curing. The manufacturer must prove that the concrete pipe is fit for purpose before being released. To emphasise this, the Standard notes that manufacturers must produce concrete with properties that provide a durability consistent with the water absorption limits specified in the Standard, and strengths that are appropriate for the nominated load class requirements.

Like many types of precast concrete, the product is heated to accelerate the strength gain of the concrete, enabling one or more daily uses of the mould. This early curing treatment also serves as a first stage in achieving the strength and durability required for the product in service. Curing is optimised by control of the environment in which it is cured. This allows the rate of hydration of the cement to be controlled.

Depending on the production method, concrete pipe is either cured while in the form or immediately following its removal from the form.

In the concrete pipe industry, low pressure steam is the curing method adopted by most manufacturers. In this process it is essential that the relative humidity surrounding the pipe be as near as possible to saturation. The principle of low pressure steam curing is that an accelerated rate of hydration produces concrete pipe of required strength in a shorter time than possible when curing at ambient temperatures. This also gives the manufacturer the opportunity to "strip" the product from the mould at an early age and storing it on the factory site where it will naturally cure until the concrete is strong enough for the pipes to be tested.

Concrete pipe can be cured in the open air provided temperatures are high and constant. It is necessary under these conditions to maintain the pipe in a moist condition. Concrete pipe that is removed immediately from the form is generally placed in a temperature controlled room that promotes humidity and moisture through steam or mist. Combined with the elevated temperatures, this part of the curing process takes place over an 18 to 24 hour period before pipes are able to be stored on the factory where they will naturally cure until the concrete is strong enough for the pipes to be tested.

The three essential factors to properly curing concrete are time, temperature and moisture. To maximise efficiency and still achieve the required strengths, an increase in temperature usually permits a shorter curing period. However, it is important to note that with concrete pipe, the time-temperature relationship is not the same for all mixtures, materials, and conditions and the optimum curing procedure is determined by the manufacturers' experience.

FURTHER READING:

Curing of concrete pipe:

http://www.cpaas.asn.au/images/publications/technical_papers/cpaas_curing_of_concrete_pipe.pdf

Optimum curing cycles for precast concrete:

http://www.cpaas.asn.au/images/publications/technical_papers/cpaas_optimum_curing_cycles.pdf



Concrete Pipe Association
of Australasia

admin@cpaa.asn.au www.cpaas.asn.au