



# REPAIR/REPLACEMENT OPTIONS FOR CONCRETE LINED IRRIGATION CHANNELS

## CASE STUDY

### JOINT REPAIR WITH PLASTIJOINT SEALANT

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# Case Study – “Plastijoint” Flexible Sealant

## 1 Background

This case study is based on a method employed in the Mareeba Dimbulah Irrigation Area (MDIA) in North Queensland -for the repair of concrete lined channel joints. The MDIA has about 400 km of channels and pipeline, of which about 59 km is concrete lined trapezoidal channel and 29 km is box flume channel.

The method described in this case study was employed primarily on joints in box flumes. It involves the application of a malleable sealant material to replace the existing joint sealant. The product used was “Fosroc - Plastijoint” supplied by Parbury Technologies. The product is suitable for bonding in vertical joints as well as across the base of box flumes. This method may be applied to many types of joint repair as the sealing agent has a suitable consistency to bond to a wide variety of surfaces and locations.

## 2 The Problem

The problem of failing joints in concrete lined irrigation channels in the MDIA is quite significant and can directly contribute to loss of water and loss of potential revenue. The channel discussed in this case study was first highlighted as leaking by local maintenance staff. Leaks in above ground box flumes like these are normally quite easy to find as there is often a trickle of water down the outside of the channel or excessive green vegetation at the joint. In this case, the channel was leaking enough to form large boggy holes in the access road adjacent to the channel.

In this case study, the box flume units themselves have survived relatively intact, with little or no loss of structural integrity. It is the joint sealant between box flume units that has failed due mainly to age and exposure to UV radiation. In other areas joint failure has occurred due to foundation movement usually associated with poor backfill around cross drainage culverts beneath the box flume.

There are two particular difficulties with box flumes. Firstly they have vertical walls which make it difficult for conventional sealants to bond to the faces while maintaining a positive pressure. Secondly as the sections of precast concrete are internally jointed, the sections cannot be easily opened up to insert a new internal rubber joint.



### 3 Solution

The following step-by-step procedure is one of the methods that has been employed in the MDIA for the repair of joints in box flumes.

#### Step 1.

The channel was drained and allowed to dry. The drying and repair will take time and the channel will need to be out of service for this period. The length of time for channel closure will depend largely on the proposed scope of the works.

#### Step 2.

All joints were thoroughly cleaned before the installation of new joint sealant. All accessible deleterious substances were removed from the joint seal reservoir before the application of the new sealant. The accessible sealant in cracks or joints is removed with a joint plough, or other equipment. The use of any equipment or procedure that results in damage to the concrete should be terminated and other methods employed. Hand tools are used to remove bulk materials from irregular joint faces.

#### Step 3.

The exposed joint is cleaned using a high-pressure water jet, which removes all remaining debris. High-pressure air is used to blow out residual free water and debris in the joint reservoir. After air blowing, joint faces are inspected for cleanliness and loose debris

**FIGURE 1**





#### Step 4.

All porous surfaces (eg. concrete, brickwork, timber etc.) need to be primed before application of the joint sealant. The primer is painted on to the joint faces and allowed to dry before application of “Plastijoint”. The primer is usually touch dry within 30 to 60 minutes of application, and must be sealed the same day it is applied. Where sealing cannot be completed on that day then a further coat of primer should be applied and sealed as noted above.

#### Step 5.

“Plastijoint” is heated to 50 –60°C by placing the can in boiling water for approximately 1 hour. When heated the material forms putty like consistency and can be pushed by hand into the exposed joint (see Figure 1). This material has a suitable consistency to bond to concrete surfaces on a vertical face. Care is taken to ensure that the sealant is well packed and all possible voids are filled.

#### Step 6.

“Plastijoint” sets as it cools, however a 3 day consolidation period is recommended before refilling the channel.

## 4 Conclusions:

- Some sealant products previously used have proven to be unsuitable to the relatively harsh conditions of an irrigation channel environment for example: rapid wetting/drying and sunlight.

## 5 References/Acknowledgments:

Parbury Technologies, Plastijoint Data Sheet, North Wyong

Brett Stevenson, Project Engineer DNR Engineering Services, Mareeba

### Further Information

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