



Report to General Manager

Council (Property)

SUBJECT: Use of Hinged Joints in Council's Concrete Footpaths to Reduce the Stepping at Joints caused by Adjacent Tree Root Activity

AUTHOR: George Schadel, Works Engineer - 07/02/05

SUMMARY:

Notice of Motion No 42/04 by Councillor Reymond – 10/09/04 - called for an investigation and report on the use in North Sydney footpaths of the trip stopper device, as shown on the ABC New Inventors programme on 08 September 2004.

This report details the trials of hinged joints in concrete footpaths currently being undertaken in North Sydney Council.

RECOMMENDATION:

THAT Council receives this report.

Signed _____

Endorsed by _____
Director Engineering and Property Services

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Re: Use of Hinged Joints in Council's Concrete Footpaths to Reduce the Stepping at Joints caused by Adjacent Tree Root Activity

BACKGROUND

Seventy five percent of Council's footpaths are concrete. This represents an area of 324,200 square metres. Currently within this area there are approximately 2,500 stepped joints caused by the root activity of adjacent trees. Eighteen percent of these steps exceed 25 mm in height. Stepped joints caused by tree root activity account for about 65% of the defects found in concrete footpaths. These figures are a "snapshot" – no reliable growth models of the vertical displacement of concrete joints are available.

Recent practice to address the footpath root problem has depended on root cutting and replacement of the concrete slabs. When new trees have been planted, root barriers have been installed to force the roots to go deep.

With the present reduction in the feasibility of extensive root pruning, solutions which allow better control of joint stepping without the full removal of the roots have been sought. Installation of hinged joints permits the roots to grow immediately below the concrete slab with the effect of a slight ramping of adjacent slabs instead of the stepping at the joints. This ramp would provide a service life of the footpath around a tree site of approximately 8 years instead of the 4 years if the hinge joint were not installed. It is this increase in service life that provides increased value in using hinged joints.

The use of the "Tripstop" hinged joints would take the cost of repairing a typical three-slab tree site from about \$750 to \$870. If the "Tripstop" rubber joiners were used in a large footpath reconstruction context, the costs of the three slabs would increase from \$480 to \$600.

The increased cost would lead to a slight reduction in the number of tree site repairs undertaken initially, but the increased service life would lead to less tree sites requiring attention after 4 years.

CURRENT TRIALS

Discussions have been held with the supplier of "Tripstop" rubber joiners and trial sites selected within North Sydney Council.

A recent report by RMIT shows that the use of this particular hinged joint reduced the vertical displacement at the joint from 50 mm to 5 mm. These figures suggest that this hinged joint would accommodate most of the current steps at the joints of Council's concrete footpaths. The research paper at RMIT added that the materials used in this test may have been too soft with little resilience and concerns were raised over the joints' ability to handle sustained loading over time. Frankston City Council has used this hinged joint for more than two years with no problems reported.

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Council's trials will explore the effectiveness of this hinged joint in reducing the vertical displacement at joints in concrete footpaths. The durability of the materials will be monitored closely. Three slabs need to have the hinges installed for best results. Increasing the length of each slab reduces the gradient of the ramp and accommodates increased root growth but increases the cost of slab replacement. Determining the minimum slab length at the repair site is an important aspect of ensuring that the repair method is efficient as well as effective.

FUNDING

The cost of these trials will be approximately \$1,000 and will be funded from the recurrent footpath maintenance budget.