

The measurement and reduction of urban litter entering storm-water drainage systems: Paper 2 – Strategies for reducing the litter in the stormwater drainage systems

Mark Marais¹ and Neil Armitage²

¹ Formerly Department of Civil Engineering, University of Cape Town, now independent consultant

² Department of Civil Engineering, University of Cape Town, Private Bag, Rondebosch 7701, South Africa

Abstract

A previous South African study looked at the removal of litter from the drainage systems once it was already there. Yet the litter problem cannot be addressed in an effective and sustainable manner without an effective integrated catchment-wide litter management strategy. This strategy should include planning controls, source controls, and structural controls. The main focus of this paper is the source control of urban litter. It reviews international and local practice, and reports on the results of a two-year monitoring programme conducted in nine pilot catchments covering a range of different land uses, socio-economic levels and population densities in the City of Cape Town. It proposes preliminary guidelines for the reduction of urban litter loads entering the drainage system by dealing with litter pollution at its source.

Keywords: litter management, stormwater drainage systems, water quality management, source controls, reduction of urban litter, solid waste pollution control

Introduction

Few South Africans can have failed to notice the unsightly and often malodorous rafts of rubbish floating down our urban watercourses, and the ribbons of litter lining their banks. While the impact of litter pollution of urban stormwater runoff may appear to be mainly of visual and aesthetic importance, litter also seriously interferes with aquatic life in the receiving streams, rivers, lakes and oceans (Victoria Stormwater Committee, 1999).

Since the 1970s, littering has been considered a social behavioural and educational problem (Andres, 1993). As Senior (1992) comments: "it is not just the nature of the items themselves, nor the demands of retailers and manufacturers which are to blame, it is the community, whose behaviour, attitude and awareness are fundamental to the problem." The proliferation of litter is intensified by rapid urban growth, increasing mobility, and improper disposal habits (National Center for Environmental Decision-making Research, 1999).

A more sinister aspect of the presence of litter is that it is one of several environmental cues associated with neighbourhood decline. Litter is a physical "symbol of disorder" or "incivility" along with vandalism, dilapidated or abandoned housing, and dirty vacant lots (Florida Center for Solid and Hazardous Waste Management, 1998). Skogan (1990) in fact found that people identify the incidence of crime with environmental cues. His research indicated that physical and social disorder correlate very strongly. American researchers have even gone so far as to hypothesise that crime may be reduced by improving a neighbourhood's environment (DeFrances and Titus, 1994). In South Africa many environmentally degraded areas are subject to gangsterism and rampant crime. It would be too simplistic to blame this on excessive littering, but it certainly may be a factor in perpetuating an atmosphere of lawlessness.

A previous South African study concentrated on the removal of urban litter (here defined as urban solid waste lying in the public domain) from the stormwater systems once it was already there (Armitage et al., 1998; Armitage & Rooseboom, 2000a; b; c). One of the conclusions of this investigation was that this was addressing the symptoms of the problem rather than the cause. It was also important to consider reducing the amount of litter entering the drainage systems in the first place. In reality, the litter problem cannot be addressed in an effective and sustainable manner without the implementation of effective integrated catchment-wide litter management strategies. These strategies could include planning controls (adopting land-use policies which restrict the situation of litter-producing activities to areas where it is possible to contain and control litter accumulation), source controls (reducing litter loads entering the drainage system by dealing with solid waste at source) and structural controls (removal of urban litter from the drainage systems at specially engineered structures).

This paper focuses primarily on the source control of urban litter. It reviews international and local practice, and reports on the results of a two-year monitoring programme conducted in nine pilot catchments covering a range of different land uses, socio-economic levels and population densities in the City of Cape Town, South Africa (hereinafter called simply "Cape Town"). The paper proposes preliminary guidelines for the reduction of urban litter loads entering the drainage system by dealing with litter pollution at its source. It should be emphasised that the findings and the guidelines are largely based on Cape Town experience and that their applicability to the country as a whole has not been established. However, since the challenges are similar, it is likely that many of the findings will be equally applicable to the other urban areas of South Africa.

The development of integrated catchment litter management strategies

The basic assumption underpinning this study was that, for there to be effective reduction of urban litter in the drainage system,

* To whom all correspondence should be addressed.

☎ +2721 650-2589 fax: +2721 689-7471;

e-mail: armitage@ebe.uct.ac.za

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