

ABSTRACT

Environmental legislation is becoming more stringent as people are realising the need for conservation and a reduction of environmental degradation in order to facilitate sustainable development. To ease legislative pressures, companies need to work together in symbiotic networks, whereby co-operation between companies results in far more innovative practices than if the companies acted individually. Success in an industrial network is largely dependent on cleaner production, where industries seek to redirect from waste treatment to waste minimisation. Cleaner production has already received international recognition and waste minimisation initiatives have been used as a tool of cleaner production. Two polluting industrial sectors within South Africa, the textile and metal finishing sectors, were chosen to investigate waste minimisation concepts. One company from each sector was used as a case study. The dissertation followed company network identification, potential to participate within an industrial symbiotic network, and waste minimisation opportunities. Suppliers and buyers, up and down the product line were identified. Relationships with these partners should be advanced such that environmental concerns are at the forefront of any decision-making. In light of developing industrial networks and maintaining symbiotic relationships, the company's potential was investigated by interviewing employees of various ranks. Both companies were partially suited to participate within an industrial symbiotic network and company-specific barriers were identified, such as ineffective internal communication. The waste minimisation investigation followed a four-phase approach of planning and organisation; pre-assessment; assessment; and feasibility study. In both the companies investigated, water savings were identified as the waste minimisation focus area with potential for improvement. In total, potential water savings of over R80 000 per annum were identified. In the textile company, the weaving department and bleach house were further investigated. Cloth weaving errors were attributed to machine stops, as each stop has the potential to result in a cloth fault. In the bleach house the potential existed to reduce the number of rinse tanks. Although a modern and automated process, the plating plant in the metal finishing company was identified as having potential waste minimisation opportunities. Of particular interest was the reduction of solution carry over from the plating tanks into subsequent tanks. Extended drip times were investigated. Additional waste minimisation opportunities included repairing pipe leaks, replacing the degreasing solvent, trichloroethylene, with a less harmful cleaning agent and establishing a symbiotic relationship with the oil supplier, Castrol. Over and above the main waste minimisation opportunities highlighted, other recommendations and potential savings were identified. Each case study emphasises that simple waste minimisation initiatives, without expending capital, reduce demands on natural resource, such as water, and benefit the company financially. Successful waste minimisation leads to further cleaner production initiatives, which may then initiate better network interactions with the further potential of promoting sustainable development.