

ABSTRAK

Pertumbuhan industri manufaktur memberikan kontribusi terhadap pertumbuhan ekonomi, namun juga menimbulkan dampak negatif terhadap lingkungan, seperti limbah dan emisi. Penelitian ini bertujuan merancang strategi mitigasi dampak lingkungan pada industri *shuttlecock* UD. MixMex dengan menggunakan pendekatan *Life Cycle Assessment* (LCA) dengan metode EDIP 2003. Metode ini dipilih karena mampu mengevaluasi dampak lingkungan secara menyeluruh pada berbagai kategori dampak. Analisis dilakukan dari kedatangan bahan baku, proses produksi, hingga distribusi produk menggunakan *software* SimaPro 9. Hasil penelitian menunjukkan bahwa siklus hidup produk *shuttlecock* menghasilkan dampak lingkungan dalam sembilan belas kategori dampak, dimana lima belas kategori dampak menunjukkan pengaruh terhadap siklus hidup produk *shuttlecock*, dampak tertinggi berasal dari proses pendistribusian produk jadi dan kedatangan bahan baku. Proses pendistribusian produk jadi menyumbang total 285 Pt. Kategori dampak *Global Warming* sebagai kontributor utama 125 Pt, dimana satuan Pt (Points) merupakan unit kuantitatif dalam metode EDIP 2003 untuk mengukur tingkat dampak lingkungan secara agregat. Identifikasi akar penyebab dilakukan melalui *diagram fishbone* sebagai dasar penyusunan strategi perbaikan. Rekomendasi perbaikan disusun berdasarkan pendekatan *cleaner production*. mencakup penerapan kendaraan berspesifikasi Euro 4, yang mengacu pada Peraturan Menteri Lingkungan Hidup dan Kehutanan Nomor P.20/MENLHK/SETJEN/KUM.1/3/2017 tentang Baku Mutu Emisi Gas Buang Kendaraan Bermotor untuk mengurangi emisi, dan perencanaan ulang rute distribusi menggunakan metode *saving matrix*. Dengan demikian, strategi mitigasi yang tepat dapat difokuskan pada dua proses tersebut guna meminimalkan total dampak lingkungan dari siklus hidup produk *shuttlecock*.

Kata Kunci: *Life Cycle Assessment* (LCA), SimaPro, *Shuttlecock*, Dampak Lingkungan, *Cleaner Production*.

ABSTRACT

The growth of the manufacturing industry contributes significantly to economic development; however, it also causes negative environmental impacts, such as waste and emissions. This study aims to design an environmental impact mitigation strategy for the shuttlecock industry at UD. MixMex using the Life Cycle Assessment (LCA) approach with the EDIP 2003 method. This method was chosen for its ability to comprehensively evaluate environmental impacts across various impact categories. The analysis covers the stages from raw material arrival, production processes, to product distribution, using SimaPro 9 software. The results show that the shuttlecock product life cycle generates environmental impacts in nineteen impact categories, of which fifteen significantly affect the product life cycle. The highest impacts originate from the distribution of finished products and the arrival of raw materials. The distribution process contributes a total of 285 Pt, with Global Warming as the main impact category, accounting for 125 Pt. The Pt (Points) unit in the EDIP 2003 method represents a quantitative measure used to assess the overall environmental impact across categories. Root cause identification was conducted using a fishbone diagram as a basis for formulating mitigation strategies. The recommended improvements are based on the cleaner production approach, including the adoption of Euro 4-specification vehicles, in accordance with the Regulation of the Minister of Environment and Forestry No. P.20/MENLHK/SETJEN/KUM.1/3/2017 concerning Emission Standards for Motor Vehicle Exhaust Gases, to reduce emissions, and a redesign of distribution routes using the saving matrix method. Accordingly, appropriate mitigation strategies can be focused on these two processes to minimize the total environmental impact of the shuttlecock product life cycle.

Keywords: *Life Cycle Assessment (LCA), SimaPro, Shuttlecock, Environmental Impact, Cleaner Production.*