

ABSTRACT

OPTIMIZATION OF SOLID WASTE TRANSPORTATION SYSTEM IN SOUTH SIDOARJO

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Sidoarjo City is one of the areas that has problem with solid waste level service on transportation system which is around 19%. A target of reduction was 2% per year made by Sidoarjo City's government. This reduction activities allow to increase percentage of transportation system. The objective of this research is to optimize the condition of South Sidoarjo's solid waste transportation, to analyze the transportation system in 2025, and to estimate the amount of greenhouse gas emission.

In this research, existing condition in 2013 was analyze using mapping method for 6 days in landfill area and observation on the efficiency of rotation numbers on 7 vehicles. The observation was based on service areas and type of vehicle with routing method. Optimization was done based on 2013's condition by means of standardizing working hours of each personil. The generation and composition of solid waste in landfill area and transfer depo was analyze based on SNI 19-3964-1995 to calculate reduction of solid waste and transportation system in 2025. The methods used to estimate the greenhouse gas emission especially CO₂ emission was using IPCC (International Panel on Climate Change). Optimization was done by three conditions, analysis of solid waste transportation system and CO₂ emission without reduction, with optimum reduction, and with gradual reduction.

The result of this research shows that percentage of solid waste service on transportation system in 2013 was 15%. Combustible

waste is the major of percentage composition in landfill area and transfer depo. Solid waste density of Lingkar Timur depo in landfill area was 337,57 kg/m³ and Pasar Larangan depo in landfill area was 347,382 kg/m³, then solid waste density of Lingkar Timur depo was 297,381 kg/m³ and Pasar Porong depo was 310,182 kg/m³. Solid waste generation of Lingkar Timur depo was 7.137,153 kg/day and Pasar Porong depo was 9.925,84 kg/day. Solid waste transportation system in 2025, vehicles without reduction were 18 units of arm roll truck and 41 units of dump truck, vehicles with optimum reduction were 17 units of arm roll truck and 40 units of dump truck, and vehicles with gradual reduction were 18 units of arm roll truck and 41 units of dump truck. The calculated amount of greenhouse gas of CO₂ emission in 2013 was 487,45 tons/year, CO₂ emission with optimization in 2013 was 717,39 tons/year, CO₂ emission without reduction was 1.250,83 tons/year, CO₂ emission with optimum reduction was 1.204,84 tons/year, and CO₂ emission with gradual reduction was 1.250,83 tons/year.

Keyword: carbon dioxide (CO₂) emission, solid waste transportation, optimation, reduction.