

ABSTRACT

The Further Department of PT Charoen Pokphand Indonesia Plant Ngoro Mojokerto generated plastic packaging waste amounting to 3% of total material usage in August 2025, while the company sets a maximum limit of 2%. This study aims to identify failure modes and their risk levels in the packaging process of Forming and non-Forming products, to analyse the root causes of the highest-priority failure mode, and to formulate mitigation strategies for plastic packaging waste. Data were collected through eight weeks of field observation on three Kawashima packaging machines, daily waste measurement, structured interviews, distribution of an FMEA questionnaire and a 5M+1E factor questionnaire to the same nine respondents, and a review of company production documents. Data were processed using descriptive statistics and a Pareto diagram to map waste generation, the Failure Mode and Effect Analysis (FMEA) method to compute the Risk Priority Number (RPN), and the Root Cause Analysis (RCA) method carried out through two separate techniques, namely 5-Why and a fishbone diagram based on the 5M+1E framework. Total plastic packaging waste over the observation period reached 869.69 kg from 283 occurrences, with non-standard product weight as the largest contributor at 515.36 kg or 59.3%. The FMEA placed non-standard product weight as the first priority with an RPN of 585, followed by damaged seals with an RPN of 206. The 5-Why analysis identified the absence of a daily checkweigher calibration procedure as the root cause, while the fishbone diagram placed Machine as the weakest factor with the largest contribution weight of 24.7%, followed by Man at 23.7% and Method at 22.6%. Five mitigation strategies were formulated, namely daily checkweigher calibration, standardised weight verification, SMED implementation, strengthening of Shift 3, and development of a real-time waste monitoring system.

Keywords: *checkweigher, FMEA, packaging plastic waste, Root Cause Analysis, waste*