# ECONOMIC AND ENVIRONMENTAL MODELS FOR RECTIFYING INSPECTION
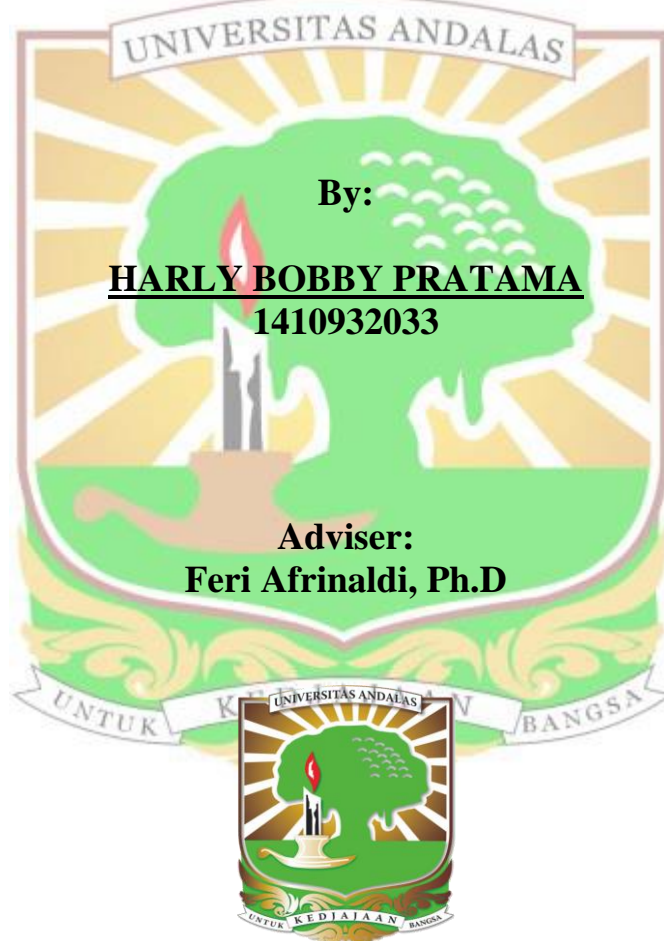
## FINAL PROJECT

*As Requirement for Accomplishing Bachelor Program in Industrial Engineering Department Engineering Faculty Andalas University*

**By:**

**HARLY BOBBY PRATAMA**
**1410932033**

**Adviser:**
**Feri Afrinaldi, Ph.D**

**INDUSTRIAL ENGINEERING DEPARTMENT**
**ENGINEERING FACULTY**
**ANDALAS UNIVERSITY**
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# ABSTRACT

Quality is one of the most important factors for consumers in selecting competing products. Moreover, cost and sustainability must not be overlooked to make quality products. The sampling plan is one of the methods for maintaining the quality of products through inspection. There are so many research conducted regarding sampling plan or quality inspection and some of them considered each cost, quality, or sustainability. However, none of them considered cost, quality, and sustainability simultaneously.

This research has designed models and procedure to determine option applied to a lot of products such that the resulted total cost and environmental impact are at the lowest or near the lowest points. The options are sampling inspection, no inspection, or total inspection. A case study has been implemented to the procedure for hollow brick product produced by PT Igasar, Padang. The environmental impact considered in the case study is only carbon dioxide ($CO_2$) emission. The procedure is also constructed into a computer program with Visual Basic for Application (VBA) in Microsoft Excel to ease the calculation of the proposed procedure.

Implementation of the proposed models and algorithm has been conducted and the result is sampling inspection becoming the best scenario. Sampling inspection gives the lowest total cost and environmental impact if it is compared with other 2 scenarios. The proposed sample number and acceptance number by the procedure are 703 units and 24 units respectively. This sampling inspection will save 11% of the total cost and 16% of the total $CO_2$ emission if it is compared with no inspection scenario. Moreover, sampling inspection will result in 79% savings in term of total cost and $CO_2$ emission if it is compared with the total inspection.

Keywords: cost, inspection, sampling plan, sustainability, quality