# Goal Programming Approach to Production Planning of a Roll Forming Plant in the Philippines

**Nilo T. Dela Cruz II**
Institute of Mathematical Sciences and Physics, University of the Philippines
Los Baños, Philippines
Email: ntdelacruz4@up.edu.ph

**Gimelle B. Gamilla**
Institute of Mathematical Sciences and Physics, University of the Philippines
Los Baños, Philippines
Email: gbgamilla@up.edu.ph

**Allen L. Nazareno**
Institute of Mathematical Sciences and Physics, University of the Philippines
Los Baños, Philippines
Email: allennazareno@gmail.com
Corresponding Author

**Abstract**
This paper addressed the production planning problem specifically the minimization of the amount of daily pending requests per machine with different operational constraints such as production capacity, machine utilization, storage space and other resource limitations using pre-emptive goal programming. A production plant in the Philippines was considered to be the subject under study. The formulated programming model was used to minimize the amount of pending requests and limit the total procurement cost of additional machines of the production company. A set of data from the company was used to test the effectiveness and efficiency of the proposed model. The result of this study demonstrated the flexibility of the proposed model by changing the parameters and constraints involved.

Keywords: *goal programming, production planning, roofing industry, Philippines*

## 1 Introduction

The subject of the study is the leading manufacturer of pre-painted steel roofing and other galvanized products in the Philippines. It has an extensive distribution network with roll forming plants, warehouses and sales offices located in key municipalities all over the archipelago. The company provides reliable and steady supply of high-quality galvanized products used in building residential, commercial and industrial structures. The main plant is located in a particular municipality in the Philippines and it holds the largest production among the rest of the plants. The production plant is divided into two production areas: the Roll Forming and Distribution (RFD) site and the Color Coating Line (CCL) site. The raw materials ordered abroad were processed first in CCL site where it will be colored in different variants and consequently be delivered on RFD site where it undergoes a continuous bending process to produce the preferred finished form.

Currently, the company has undertaken different problems in delay. Delays in production process usually occur in a production plant because of the low capacity of machines that operate and produce the products. These delays can cause too much costs such as equipment maintenance costs, material costs and the like, which clearly may bring a big loss for the company. However, delays are often unavoidable and the best approach to minimize these problems is to monitor the impact of the dilemma and look for suitable ways and adjustments to address this.

One of the major problems that the RFD site is facing the problem on pending requests. Pending requests are job orders that are not done within the day by the machines due to many factors like unavailability of materials, low-capacity problems, on-hold job orders and so on. These are accumulated daily and will be added to the job demand of machines for the following day. A solution to this problem is essential for the companys profitability and quality assurance branding. Delays can create domino effect for the whole production process and can lead to serious financial problems if neglected.

According to Aouni and Kettan [1], in the past 40 years,