

***A LAYOUT PLANNING FRAMEWORK FOR FOOD  
PROCESSING INDUSTRY***

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## Declaration

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The above candidate has carried out research for the Master's thesis under my supervision.

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Name of the supervisors : Dr. HKG Punchihewa Dr. RARC Gopura

Date :

## Abstract

Food processing factories face unique problems compared to other manufacturing organisations. Hence the facility layout problem (FLP) of food processing has to be treated in a separate context. This research is an attempt to formulate a methodology to resolve the FLP and introduce a model to simplify the layout planning process in food processing facilities (FPF).

The existing layout planning methods and the nature of FPF are studied. A generalised framework is developed using information in the literature to understand the FLP. It can be adapted to any manufacturing industry and it provides a platform to gather information to resolve the FLP. It also looks at the practical application of layout development by considering factors such as the cost, project timeline and regulatory compliance.

Then a layout planning model for the FPF is developed. This model classifies areas of FPF into five sections as primary, secondary, utilities, warehouse and administration. This categorisation is based on activities and the risk level in the manufacturing process. It proposes specific locations for five sections in the factory layout. The model proposes a unique colour scheme to easily identify these sections in layout drawings.

A case study is conducted in a FPF of Sri Lanka to test the framework and the model. The framework helped to gather information and design the layout. The study revealed that the model proposed for FPF simplified the FLP.

The study showed an increase of overall equipment efficiency (60% to 80%) and a decrease in material waste (2.4% per batch to 0.8%), CO<sub>2</sub> emissions per metric ton of production (62.5 to 51.6 Kg/MT) in the new layout. There was a clear reduction of distance travelled (36%) and distance into weight matrix (29%).




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