Sugar Allocation and Purchasing System For Coca-Cola (Philippines)

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1.0 Background

Coca-Cola Bottlers Philippines Incorporated (CCBPI), formerly a subsidiary of San Miguel Corporation (SMC), is the local bottler of Coca-Cola products in the Philippines. CCBPI accounts for over 70% of the domestic softdrink market.

A critical raw material to softdrink manufacturing is sugar. CCBPI consumes over 250,000 MT of sugar per year valued at P5 Billion (approximately $131.6 Million). Currently, sugar is supplied to the 20 bottling plants all over the country based on a manual consideration of sourcing and availability of supply.

2.0 Problem

The *Sugar Allocation and Purchasing System (SAPS)* was developed to assist the Purchasing Group of CCBPI determine which of existing sugar offers to select. While a major factor, offer price is not the only basis of the decision to purchase. The System looks at the total cost of the offer, taking into account transport costs to destination plants as well as timing of demand and inventory carrying costs. Non-cost factors considered are availability of storage space and type of purchase order (PO). There are two types of purchase orders, the ex-refinery and direct delivery purchase orders. Ex-refinery POs are orders that are delivered to the contracted sugar refinery while direct delivery orders are orders which are delivered directly to the assigned softdrink bottling plant.

3.0 Process

The system generates a monthly allocation and purchase plan for sugar that satisfies bottling plant requirements and yields the least total cost. It determines how much of each existing purchase order to allocate to the bottling plants. Given new offers, the system also evaluates which ones to accept and determines the best delivery schedule for these contracts.

Sugar that cannot be stored in the bottling plants may be stored in external warehouses. In these cases, the system determines which external warehouses to use and gives a schedule of deliveries to and withdrawals from these warehouses. In addition, the system allows the user to compare his own schedule to see how it compares with the system-generated output in terms of costs and implementation schedules.

4.0 Approach

Delphi Programming language was used in designing the user interface for this system while AMPL/CPLEX was the modeling-solving environment used in determining the optimal allocation and purchase plan for sugar on the basis of minimum total cost. The system considered the following relevant cost in its analysis:

1. Purchase cost of sugar
2. Transportation cost from sugar refineries to softdrink bottling plant
3. Transportation cost from/to external warehouses

4. Storage cost at bottling plants, refineries and external warehouses
5. Inventory carrying cost for unused sugar
6. Fixed rental cost of external warehouses

The system determines the optimal plan, at the same time, ensures that: (1) all bottling plant requirements are met, (2) desired inventory levels are maintained, and (3) storage capacities at sugar refineries, bottling plants, and external warehouses are not exceeded.

5.0 Implementation

The system was turned over in May 1998.

Prior to its turnover, parallel runs were conducted to quantify the potential savings of the system. Manual allocation of sugar was gathered and inputted to the system to compute for its total cost, and later compared to the total cost generated by the system. As a result, an estimated P4.5 Million savings was generated for the period August to December 1997 with the bulk of the savings coming from transportation cost.

Cost Item	System generated	Manual Plan	Savings
Purchase Cost	1360.2	1360.2	0.0
FTH Cost	60.6	65.1	4.5
Storage	0.0	0.0	0.0
Holding Cost	31.0	31.0	0.0
Total Cost	1451.9	1456.4	4.5

On top of these savings, assistance to the decision maker also comes from being able to quickly spot and accept offers, taking into account the nationwide allocation of these supplies.

CCBPI continues to use the system particularly in determining the sugar shipments to each of its bottling plants.

6.0 References

[1] Marco Cantu. *Mastering Delphi 2.* 1996.

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[4] Robert Fourer, David Gay, and Brian Kernighan. *AMPL: A Modeling Programming Language.* 1993.

[5] Coca-Cola Bottlers Philippines Incorporated. *Manual of Sugar Allocation and Purchasssing System.* 1998.