Object-Oriented Database for Engineering Application

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The term 'database' can be defined as data content or computer locations in which data reside. In engineering application data collection and accessibility are critical to improve product design and manufacturing. Throughout a product life cycle information must be collected and structuted in the database in order to form a complete and accurate model of the product.

Information to be represented in a database for engineering application is usually so complex that simple data structutes, for example records of relational database, are not appropriate. The design environment causes other problems such as version control, long transaction, etc. Although there are several studies based on traditional database systems, they lack the essential features to provide the desired data management for production systems such as new data types, rich data model contructs, and multiple versions of information.

In this paper, we describe an object-oriented database system which can properly support the data management requirements for engineering application. The features provided include dynamic evolution of schema, version control, and CAD information management.

approach for one period. The problem was originally modelled as a nonlinear mixed integer problem in order to reflect the complex situation in one model. Hence we've simplified the problem by estimating the linearized aggregate unit trunking cost from plants to DCs and by estimating the linearized unit delivery cost.

The mathematical model we formulated is for one echelon distribution network(plants - DCs - customers). But note that the zero echelon case can be handled as a subset of one echelon case by introducing "dummy DCs" at the plants.

We suggested a heuristic technique for solving the model. In broad terms, our solution technique combines a heuristic method for determining which candidate DCs to open and an exact method for minimizing costs given a set of open DCs.

The formula to estimate the linearized aggregate unit trunking cost from a plant to a DC on a transpotation mode is derived by analyzing the trade-off between transpotation cost and cycle inventory cost.

We suggested a methods for developing linearized estimates of local delivery costs, which is a modification of a Daganzo[1984a,b]'s formula.

We've also derived an improved formula for calculating an economic order quantity which balances transpotation costs and inventory costs. Our formula generalizes the work done by Blumenfeld, et al[1985]. While they consider the restricted case in which shipment size cannot exceed vehicle capacity, we give results for the general case where the order quantity can be either multiple of vehicle capacity, or can be more or less than vehicle capacity. Even though larson[1988] had developed a ETQ(Economic Transportation Quantity) model which simultaneously determines the optimal transportation alternative and lot size or shipping quantity, they did not consider vehicle capacity.

Perl and Sirisoponsilp[1988] had developed a distribution system model similar to that presented here. Unlike our distribution system model, their model dose not consider local delivery costs and uses a linear, instead of concave cost curve for DC's operating expense. And they do not give a solution technique for their model.