

ABSTRACT

The research reported in this thesis is related to the development and use of software tools for supporting warehouse design and management. Computer Aided Design and Simulation techniques are used to develop a software system that forms the basis of a Decision Support System for warehouse design.

The current position of simulation software is reviewed. It is investigated how appropriate current simulation software is for warehouse modelling. Special attention is given to Visual Interactive Simulation, graphics, animation and user interfaces.

The warehouse design process is described and common difficulties are highlighted. A Decision Support System (DSS) framework is proposed to give support during all the warehouse design phases.

The use of simulation in warehouse design is identified as being essential for evaluating different warehouse configurations. Several simulation models are used to show that the warehouse systems special characteristics require a new way of defining the simulation model and new modelling elements to represent the complex logic of a warehouse system.

AWARD (Advanced WAREhouse Design) is a data-driven generic model, developed to build warehouse simulation models. It uses Computer Aided Design (CAD) techniques for drawing the warehouse layout and configuring the simulation model. The user has no need for programming skills and a user-friendly interface makes it easy to use. High resolution colour graphics and a scale drawing of the warehouse makes the dynamic display of the model a good representation of the real system.

Several examples illustrate the use of the AWARD system. The experience and advantages of the AWARD approach is discussed and the extension of this approach to other areas is explored.