The sizing of lift systems to meet passenger demands is normally carried out in a quantitative way by calculation. Nothing is done to determine the quality of service provided. This paper describes how a computer aided design suite using discrete simulation techniques coupled to extensive graphic displays overcomes these deficiencies.

INTRODUCTION

Lift (elevator) systems make it possible for high rise buildings to function. Without these vital transportation systems the occupants of buildings over 4 or 5 storeys high are crippled. A few texts exist (Strakosch 1967, Phillips 1973) which describe some of engineering and traffic design procedures used by lift makers, architects and consulting engineers. Little or nothing has been done, however, to provide a facility for a thorough understanding of lift operation, control and usage in the 130 years of the lift industry’s existence!

This paper describes the design of graphic displays associated with a computer aided on-line lift simulation and design suite developed to overcome these deficiencies.

THE CONVENTIONAL DESIGN PROCEDURE

The sizing of a lift installation is normally carried out against the up peak traffic pattern, (Barney 1975). Simplistically the Round Trip Time (RTT) of a single car is computed, whilst serving this traffic pattern using the formula:

\[ \text{RTT} = 2 \text{Rtv} + (5+t) \text{ts} + 2 \text{Ftp} \]  

(An explanation of the terms is given in the Appendix).

Then knowing or estimating the number of lifts (L) used the average interval of service (UPPINT) at the main terminal can be calculated:

\[ \text{UPPINT} = \text{RTT}/L \]

and hence the handling capacity (HC) for the peak 5 minute period is obtained viz:

\[ \text{HC} = 300 \text{P}/\text{UPPINT} \]

where P is the average number of passengers carried on each round trip. This is usually statistically assumed as 80% of the contract capacity (CC) for a conventional up peak calculation.

Although this procedure provides a standardised method of sizing lifts and of comparing competitive quotations, it is based on a large number of assumptions, (Alexandris 1977). It says nothing about passengers waiting times, car loads,