

## ABSTRACT

## MCATT

## Microcomputer Analysis of Tow-Train Systems

(May 1986)

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This dissertation presents a new microcomputer based simulation package for Tow-Train systems analysis. MCATT, a microcomputer based analysis package for Tow-train systems, has been designed and developed to investigate complex Tow-Train material handling systems. Analysis can be achieved with a minimum of effort and difficulty using an MS/DOS microcomputer.

MCATT is a network-based, interactive, and self contained simulation program written in FORTRAN. It is capable of generating graphics for a systems diagram, analyzing the operating system, and selecting the optimum number of vehicles for the system.

The Tow-Train system to be studied is represented by an MCATT network composed of nodes, boxes, and arcs. The MCATT network structure can represent complex combinations of material flow patterns and loading/unloading stations. Material flow can be characterized by stochastic behavior and complex queueing characteristics.

The MCATT model can be utilized to study various types of cart based material handling systems such as a cartrac system, SPMC (Self Propelled Monorail Carriers), AGVS (Automated Guided vehicle system), and towline systems.

MCATT provides the user with the full benefits of microcomputers for analyzing system operational characteristics, and includes the features of portability, interactive communication, graphics generation, and ease of usage. Consequently, the user can simulate and analyze complex Tow-Train systems with a minimum of difficulty; enjoying user-friendly data entry procedures, extensive error checking, graphic aids, an VSCR (Vehicle Search Configuration Routine) to search for the optimum number of vehicles, automatic filing systems, automated statistical collection procedures, and organized output reports.

This dissertation describes the concepts, network notation, simulation algorithm, optimization routine, FORTRAN based graphics generation procedures, and application of MCATT to a typical Tow-Train system.