

**The Effectiveness of  
Management Information Systems**

**by**

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## ABSTRACT

There are a large number of references in the literature to the problem of evaluating Information Systems in terms of both efficiency (the technical aspects) and effectiveness (the users' view, and the effect the system has on the organisation). Whereas efficiency can be defined clearly in mathematical terms, measurement of effectiveness tends to be subjective and is usually measured retrospectively (i.e. some time after installation) using a questionnaire approach, or by expensive simulators, prior to installation.

This presentation deals with the initial thinking behind the development of a quick and less costly system dynamics approach to measuring effectiveness, by using a simple model to examine the effect the proposed system will have on the organisation into which it is to be installed.

## **PROBLEM**

Present requirement analysis techniques do not take into account the influence a new information system will, or can, have on organisational structure and policies, therefore, new information systems often fail to meet expectations.

## **REQUIREMENT**

A technique which can be incorporated into requirements analysis to allow the analyst to model the organisation, quickly and simply, in terms of the interaction between the flow of information and the associated flow of goods/services which the organisation produces.

## **ANSWER**

A system dynamics model of a single representative function using DYSMAP2 software on an IBM PC/AT or compatible.

## **METHODOLOGY**

### **STAGE 1 - The MANUAL system**

Model a representative function of the organisation in terms of its physical and information flows, and the policies which represent the impact of one on the other.

### **STAGE 2 - The COMPUTERISED system**

Modify the attributes of the information flow (e.g. source, accuracy, content, amount, timeliness) to represent the effect of the proposed information system.

### **STAGE 3 - The ENHANCED system**

Use the model to investigate modifications to policies and structure which the proposed system would facilitate, such that the full potential of the system to improve organisational performance is realised.

# APPLICATION OF METHODOLOGY TO DEMONSTRATION MODEL

## ORGANISATION

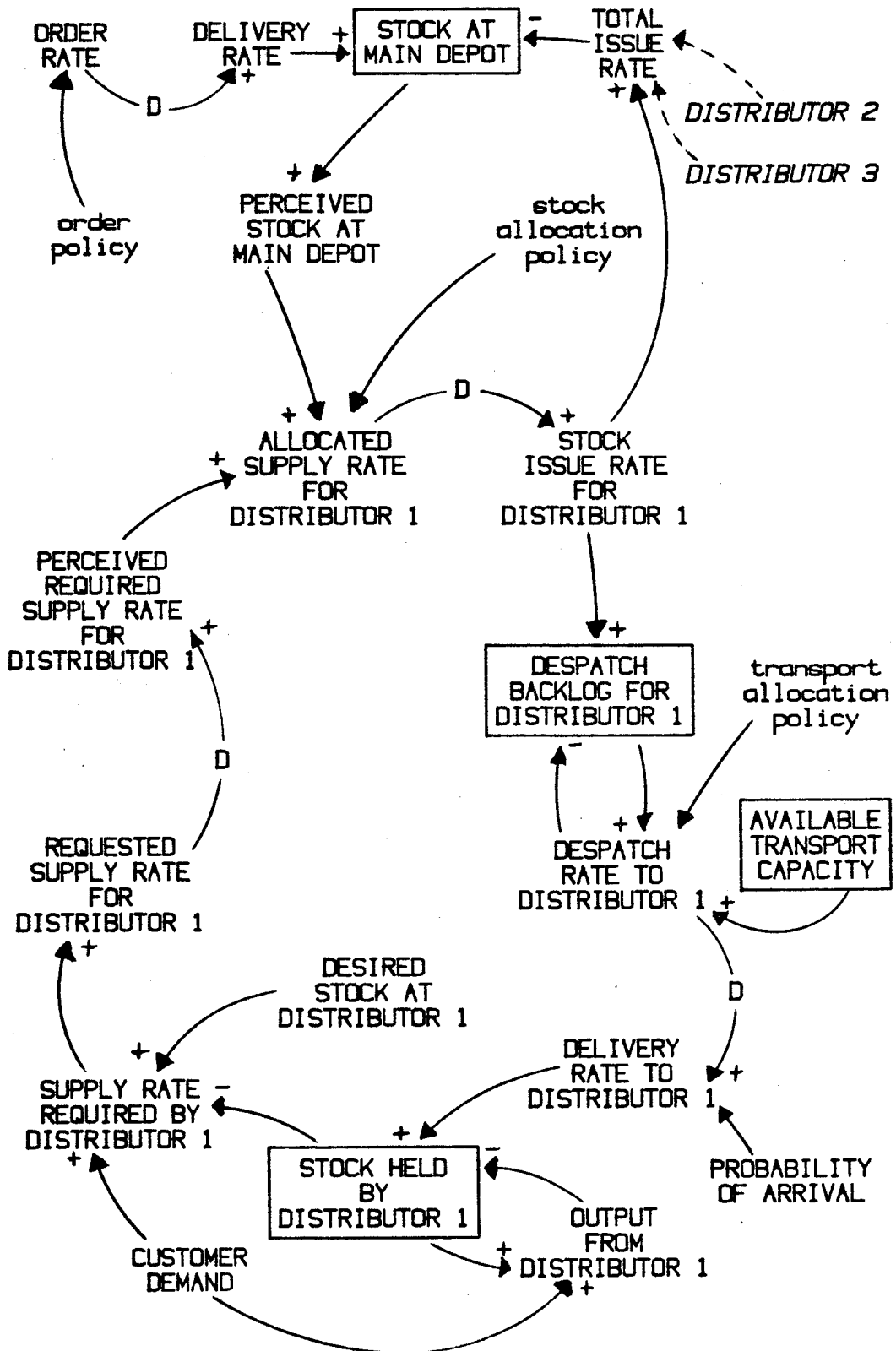
Logistics operation with one main depot supplying three distributors (see figure). The demands of Distributor 1 are seen to have priority over those of Distributor 2 who, in turn, has priority over Distributor 3.

The aim of the organisation is to operate in such a way that each distributor can satisfy as near to 100% of customer demand as possible.

## STAGE 1

Models the distribution of one item, in terms of the flow of that item from depot store to the distributors, the associated flow of information and the policies (stock allocation, transport allocation and resupply policies) which affect these flows.

# DEMONSTRATION MODEL



# APPLICATION OF METHODOLOGY TO DEMONSTRATION MODEL

## STAGE 2

Models the effect of the proposed installation of a computerised system to give the inventory controller on-line access to both transport availability and the current stock situation, such that stock will only be released if sufficient transport is available to deliver it.

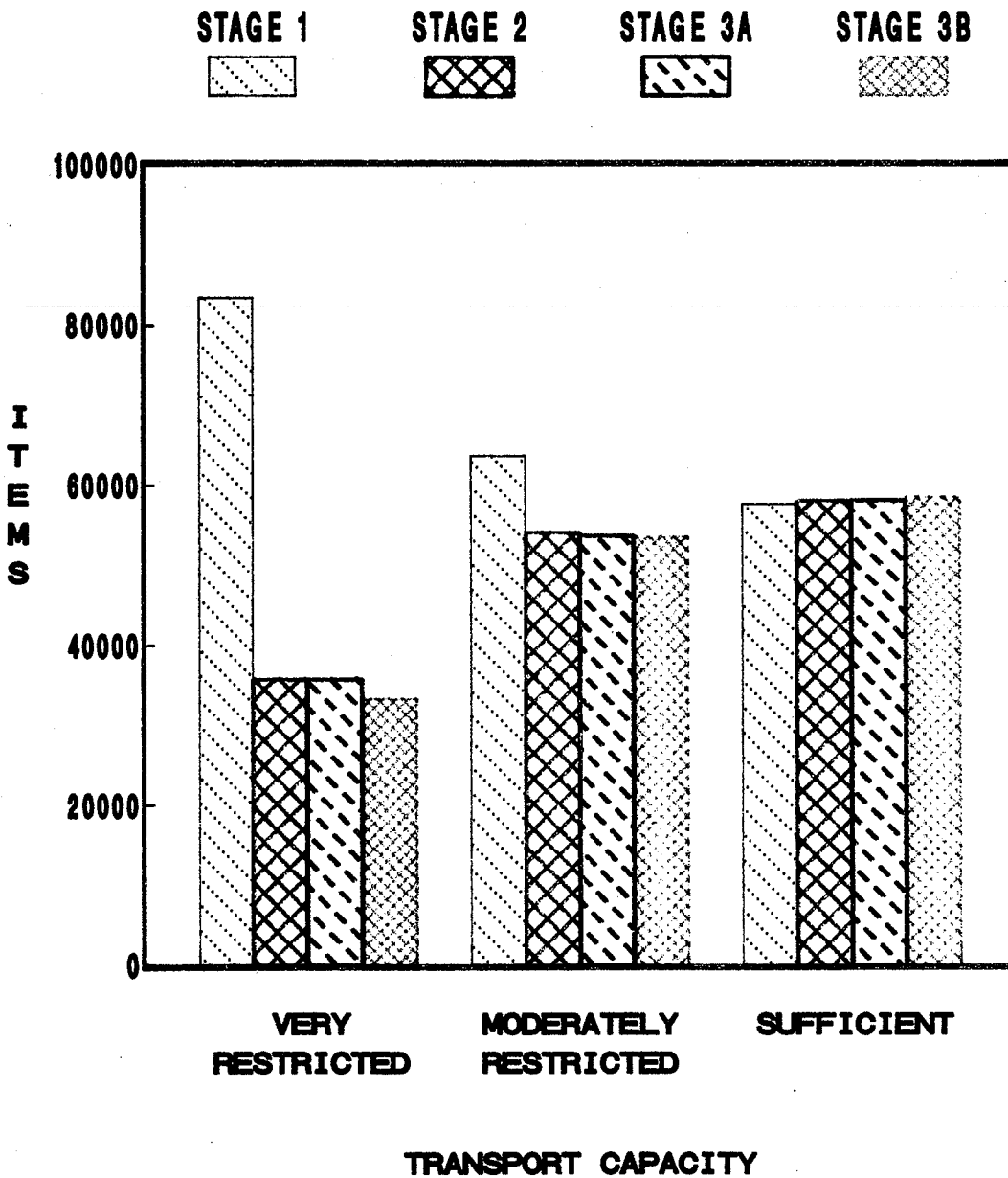
## STAGE 3A

Investigates the effect of a change in transport management from a priority to a proportional allocation policy.

## STAGE 3B

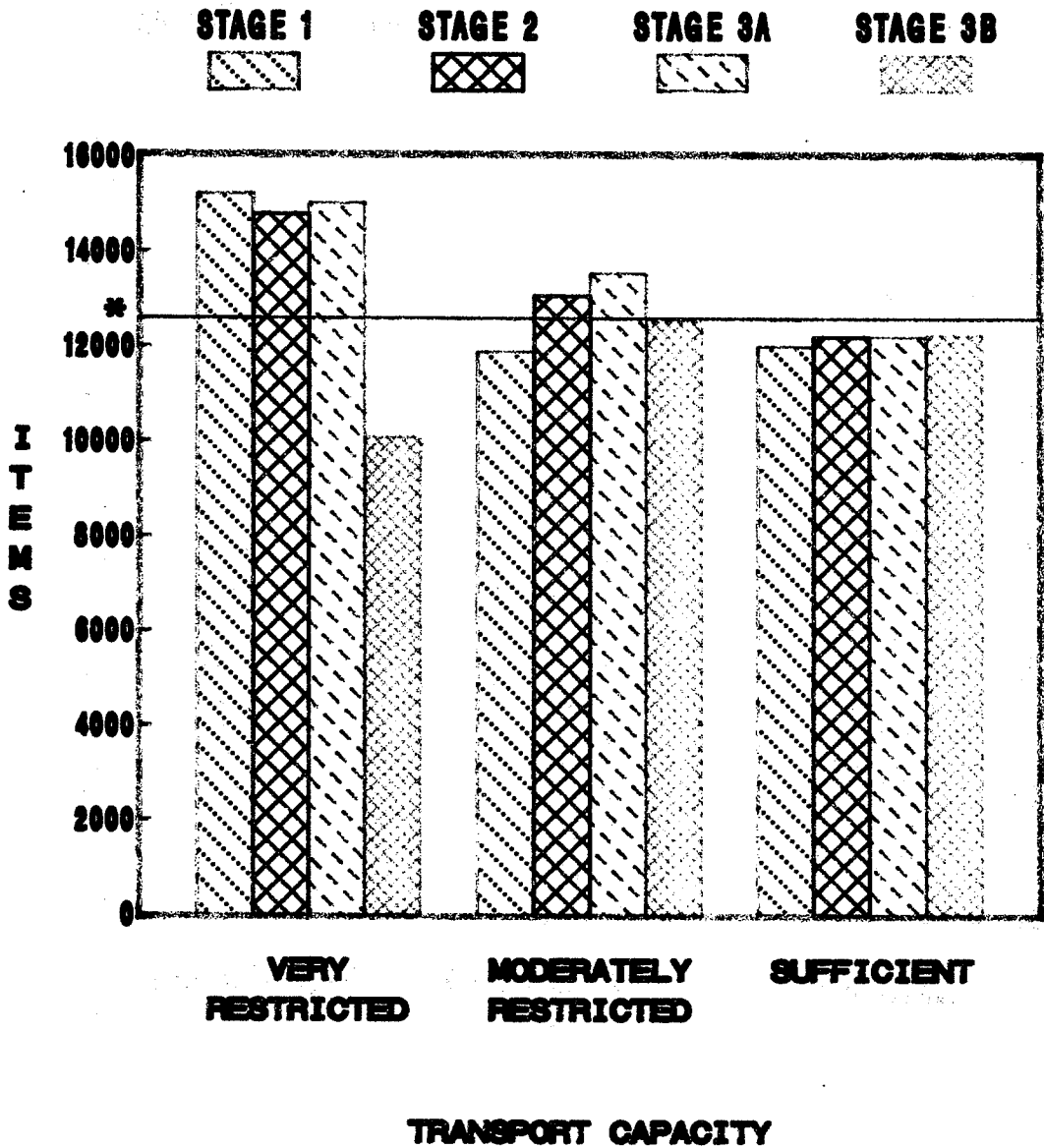
Investigates the additional effect of a reduction in safety stock-holding by the Distributors.

### TOTAL NUMBER OF ITEMS ORDERED BY MAIN DEPOT





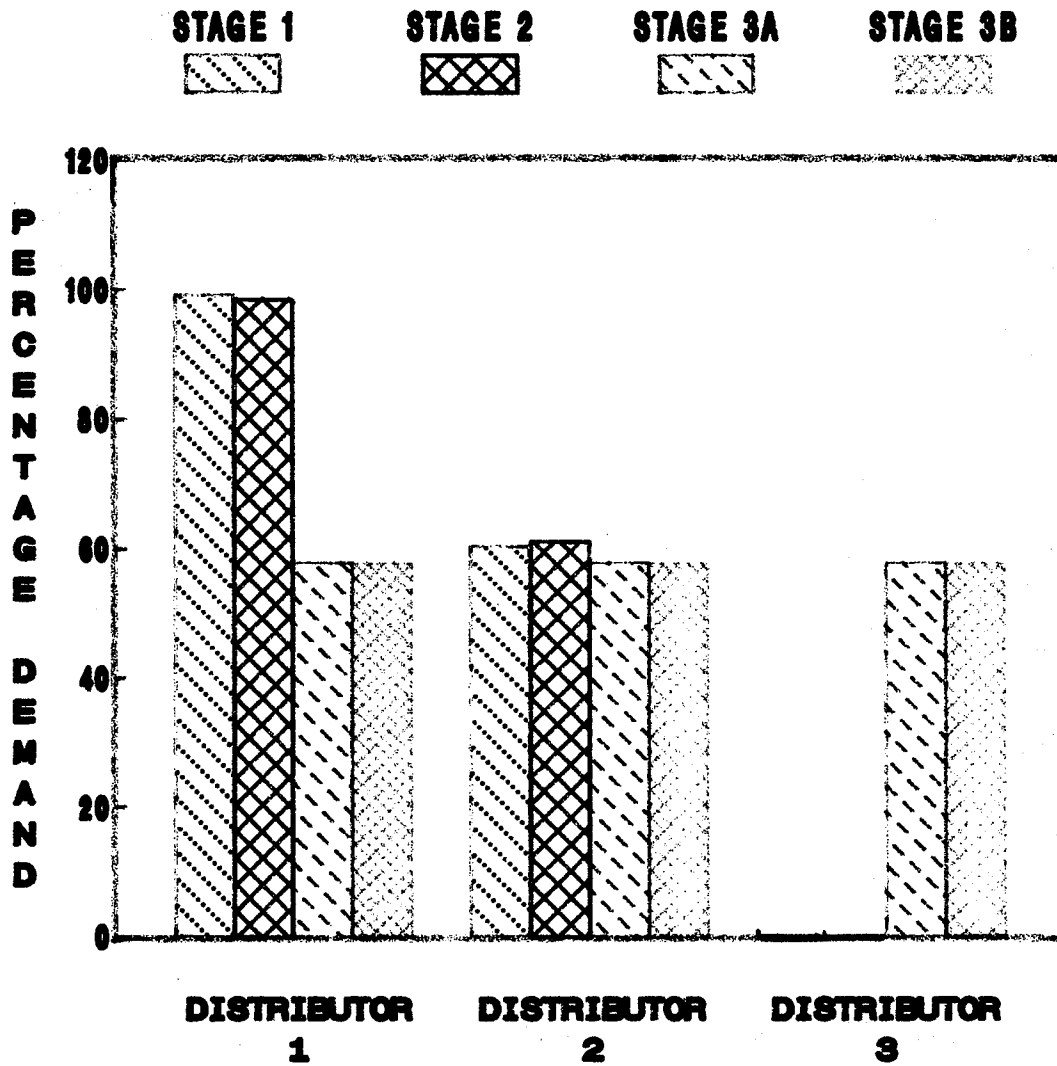
# MAXIMUM LEVEL OF STOCK HELD AT MAIN DEPOT



\* = CAPACITY  
OF STORE

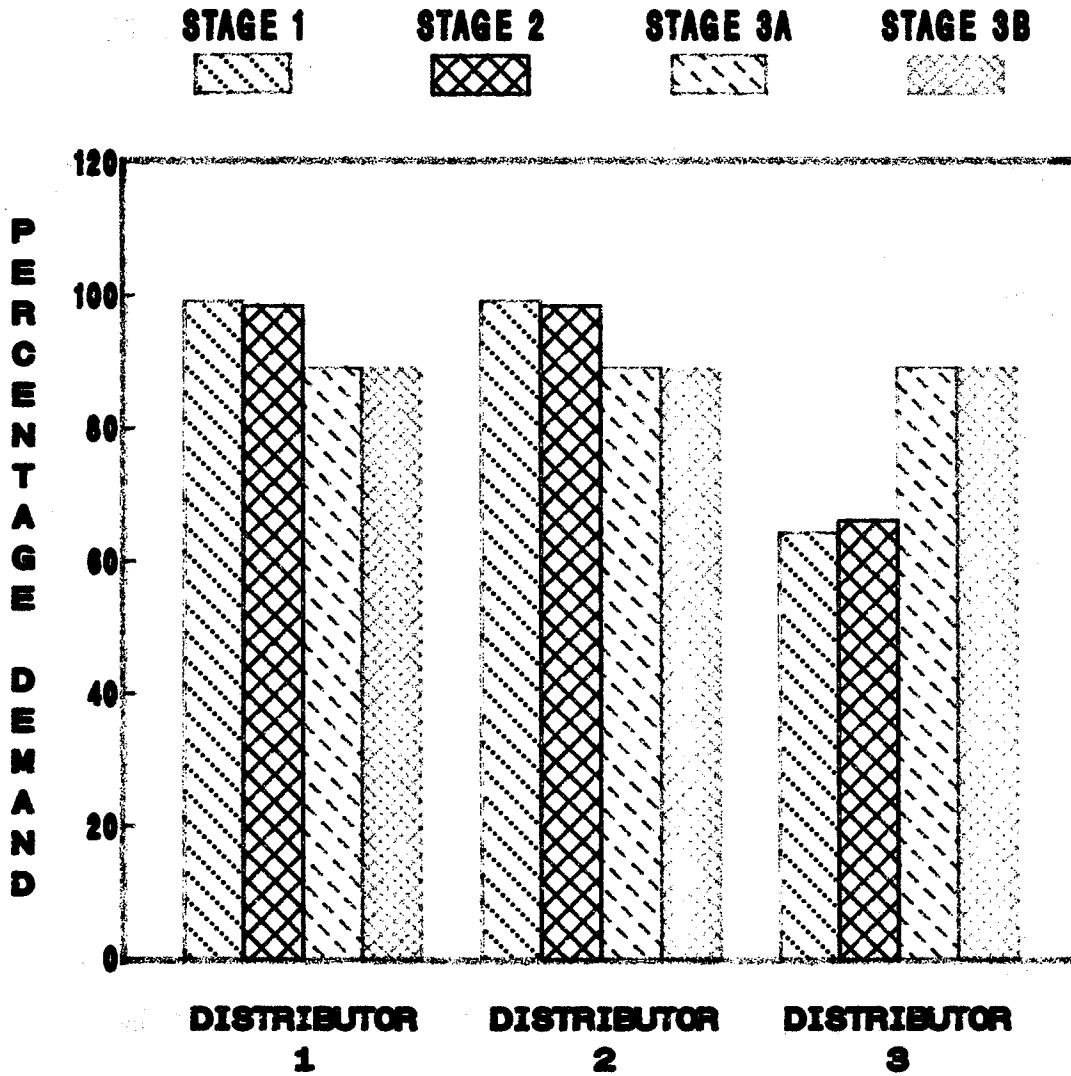
# PERCENTAGE CUSTOMER DEMAND ACHIEVED

## TRANSPORT CAPACITY VERY RESTRICTED



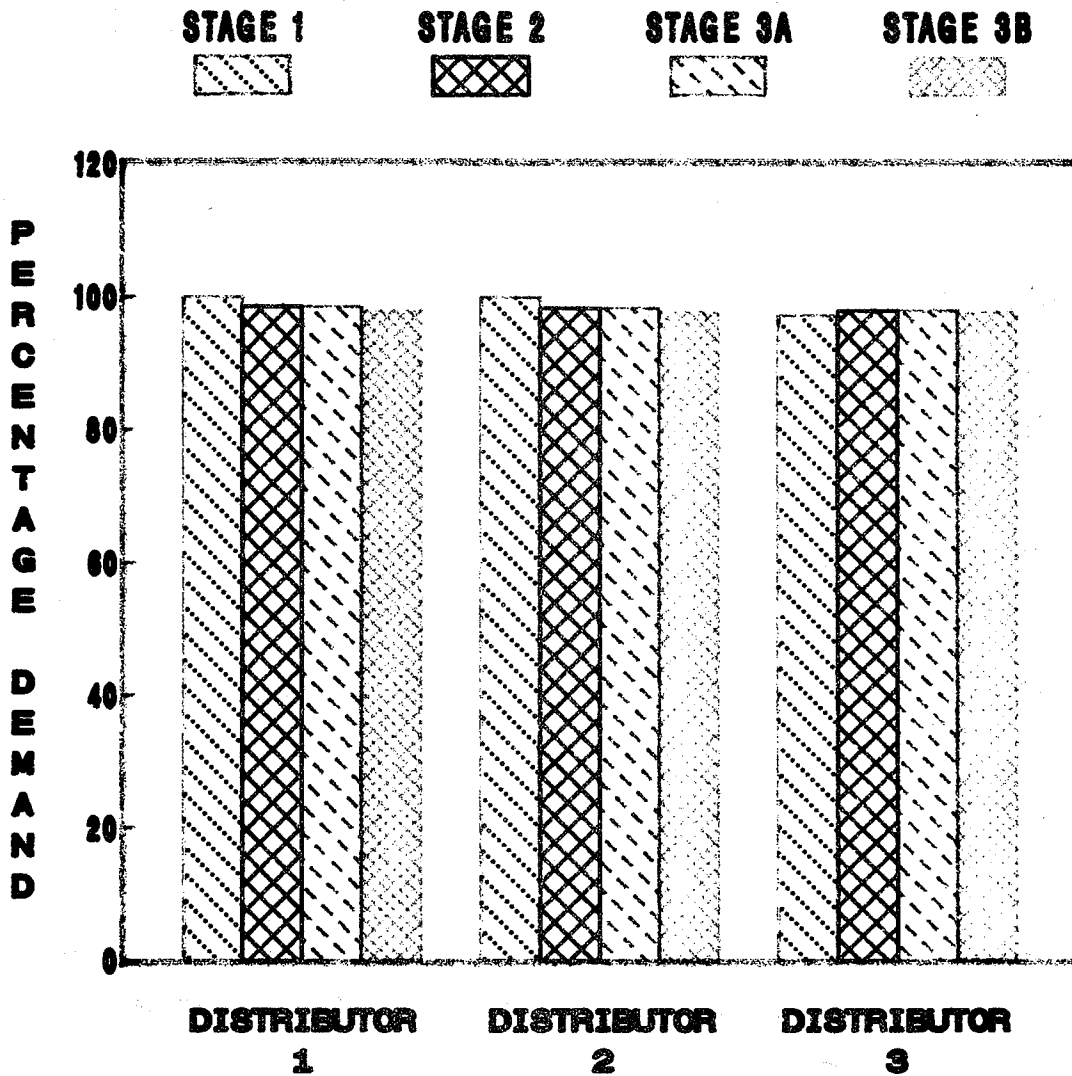
# PERCENTAGE CUSTOMER DEMAND ACHIEVED

## TRANSPORT CAPACITY MODERATELY RESTRICTED



# PERCENTAGE CUSTOMER DEMAND ACHIEVED

## TRANSPORT CAPACITY SUFFICIENT



# MAXIMUM STOCK HELD BY DISTRIBUTORS

## COMPARISON OF STAGE 3 POLICIES ONLY

