

SOME EXTENSIONS OF THE CLARKE AND WRIGHT METHOD

S.J. Farlow

The University of Maine
Orono, Maine, U.S.A.

ABSTRACT

The Clarke and Wright method is one of the more commonly applied heuristic methods used for finding solutions to the vehicle dispatch problem. This paper describes useful extensions of the method and in particular (i) a scheme for handling dynamic end points; and (») a family of Clarke-Wright savings matrices-called sensitivity savings matrices.

I. Introduction

The vehicle dispatch problem (a variation of the travelling salesman problem) in which a fleet of vehicles is dispatched from a central terminal and services a number of demand points is well known in Operations Research [2]. Although several techniques have been used to solve these problems, including linear, integer and dynamic programming, these methods are not streamlined enough for the special structure of network problems and so special methods have been developed. The most successful and commonly used methods for the dispatch problem are those that are heuristic in nature, the Clarke-Wright method being very popular [2]. These methods have the advantage that they generally are easy to computerize and require little memory. The recent publication by Zankis and Evans [6] on heuristic optimization discusses several features required by a good heuristic.

The purpose of this paper is to describe some extensions of the Clarke-Wright method and to show, by means of examples, how the extensions improve the original method. The first extension involves problems with dynamic end points whereby the vehicles are not constrained to return to the central depot. This situation arises when the delivery truck radios

back to the dispatcher for new instructions. The second extension is more basic and it modifies the usual Clarke and Wright savings matrix by constructing a sensitivity savings matrix.

(etc)