

VEHICLE ROUTING AND SCHEDULING

Vehicle routing and scheduling is an extension of the basic vehicle routing .i.e., travelling salesman problem .some restriction are now included such as;

- Each stop may have volume to be picked up as well as delivered
- multiple vehicles may be used having different capacity limitation to both weight and volume.
- a minimum total driving time is allowed on a route before a rest period of at least 10 hours.
- stops may permit pickups and deliveries only at certain times of the day (called time windows)

- pickups may up may be permitted on a route only after deliveries are made.
- drivers will be allowed to take short rests or lunch break at certain times of the day.

- Principles of good routing and scheduling

Decisions makers such as truck can go a long way towards developing good trucks and schedules by applying eight guideline routes principles .

1. Load trucks with the stop volumes that are in closest proximity to each other.

Truck routes should be formed around clusters stops that are nearest each other in order to the inter stop travel between them . this alsominimises total travel time on the route.

2 .Stops on different days should be arranged to produce fight clusters

When stop are to be served during different days of the weeks ,the stop should be segmented in to separate routing and scheduling problems for each day of the week. the daily for each routes and schedule are to be segments for which routes and schedules are to be developed should avoid overlapping stop clusters . this will help to minimize the number of trucks needed to serve all stops as well as to minimise truck travel time and distance during the week.

3 .Build routes beginning with the farthest stop from depot.

Efficient routes can be developed through building stop clusters around the farthest stop from the depot and then working back towards the depot .once the farthest stop us identified ,selecting the volume from the tightest cluster of the stop around this key stop should be used to fill out the assigned truck capacity. After the stop volumes have been assigned to the vehicle ,select another vehicle and ,identify the farthest stop from the depot among the remaining stop not yet assigned to a vehicle. proceed in the manner until all stop volume have been assigned to a vehicle.

4. The sequence of stop on a truck route should form a teardrop pattern.

Stop should be sequenced so that no route paths cross , and the route appears to be a teardrop shape.

Time window restrictions and the forcing of stop pickups after deliveries may cause route path to cross.

5. The most efficient routes are built using the largest available.

Usually using a vehicle which is large enough to handle all stops in one route will minimize total distance on time travelled to serve the stop . therefore the largest vehicle among the multiple sizes in a fleet should be allocated first ,providing that good utilization for them can be realize.

6. Pickups should be mined in to delivery routes rather than assigned to the end of routes.

Pickup should be made as much as possible during the deliveries are made . the extent that this can be done will depend on the vehicle configuration the size of the pickup volumes and the degree to which they may block the access to delivery merchandise inside the vehicle .

7 . A stop that is greatly removed from a route cluster is a good candidate for an alternate means of delivery.

Stops that are isolated from the stop clusters ,especially those with low volumes are served at great driver time and the vehicle expenses .using small trucks to handle such stops may prove to be more economical ,depending upon the isolation of particular stops and their volumes .also using a for hire transportation service would be a good alternative.

8. Narrow stop time window restriction should be avoided .time window restriction on stop where they are narrow can force stop sequencing away from ideal patterns .since time window restriction are often not absolute ,any stops forced to be served in a less then desired routing pattern should have its time window limits renegotiated and hopefully widened.