Route Optimization Parameters

1. Fleet Specifications

Parameter	Value	Remarks
Truck Capacity	800 units/truck	Standard light commercial vehicle capacity for packaged perfume oils
Number of Trucks per Warehouse	3 trucks	Total fleet: 6 trucks (3 each)
Average truck speed	38 km/h	In the Bangladeshi road conditions (a mix of highways and local roads)
Loading/Unloading time	20 minutes per stop	Time to load/unload inventory and handle the paperwork

2. Cost Structure

Cost Component	Value	Remarks
Fixed Cost per Trip	BDT 1,400	Fuel, driver wages, etc
Variable Cost per KM	BDT 12/km	Additional fuel and maintenance based on distance
Driver Overtime Cost	BDT 600/hour	Beyond an 8-hour shift

3. Operational Constraints

Constraints	Value	Remarks
Maximum Delivery Hours per Day	8 hours	Standard driver shift
Maximum Route Distance	320 km	Limit for driver fatigue and vehicle capacity
Operating Days per Week	6 days	Monday-Saturday operations
Delivery Time Windows	8:00 AM - 5:00 PM	Distribution house receiving hours

Inventory Optimization Parameters

1. Lead Time & Service Level

Parameter	Value	Remarks
Lead Time (Warehouse → DH)	1-2 days	Depends on distance; next-day for nearby, 2 days for distant locations
Service Level Target	95%	Industry standard - allows 5% acceptable stockout risk
Safety Stock Multiplier	1.65	Z-score for 95% service level (normal distribution)

2. Inventory Holding

Parameter	Value	Notes
Holding Cost per Unit per Day	BDT 0.50	Storage, insurance, opportunity cost (~15% annual inventory carrying cost)
Stockout Cost per Unit	BDT 50	Lost margin + customer dissatisfaction
Order Processing Cost	BDT 800 per order	Administrative cost per replenishment order

3. Storage Capacity

Distribution House Size	Capacity (units)	Number of DHs
Large (demand >100/day)	1,500 units	~15 DHs
Medium (demand 50-100/day)	1,000 units	~25 DHs
Small (demand <50/day)	700 units	~10 DHs

4. Current Inventory Assumptions

Metric	Value	Notes
Average Starting Inventory	7 days of average demand	Baseline for optimization
Minimum Stock Level	3 days of demand	Trigger for emergency replenishment
Maximum Stock Level	15 days of demand	Avoid overstocking

WAREHOUSE INVENTORY LEVELS

Warehouse	Total Capacity (units)	Current Stock Level	Replenishment from Factory
Northern (W1)	50,000 units	35,000 units (70%)	Weekly bulk delivery
Southern (W2)	50,000 units	35,000 units (70%)	Weekly bulk delivery

Note: Warehouse capacity is sufficient to serve all DHs; the factory replenishes warehouses weekly.

HISTORICAL DEMAND VARIABILITY FACTORS

Factor	Consideration
Seasonality	Mild - perfume oils have a relatively stable demand
Day of Week Effect	Minimal - FMCG product
Coefficient of Variation	~15-20% (calculated from historical data)
Demand Distribution	Assume normal distribution for safety stock calculations

OPTIMIZATION OBJECTIVES (Priority Ranking)

Primary Objectives

1. Minimize Total Logistics Cost = Fixed Costs + Variable Costs + Holding Costs
2. Maintain 95% Service Level - No more than 5% stockout probability
3. Maximize Fleet Utilization - Reduce empty miles and idle trucks

Secondary Objectives

1. Minimize total distance traveled (environmental consideration)
2. Balance workload across trucks
3. Minimize the number of delivery trips

KEY METRICS TO TRACK

Route Optimization KPIs

1. Average cost per delivery
2. Truck utilization rate (%)
3. Average delivery distance per truck
4. Number of deliveries per truck per day
5. On-time delivery rate

Inventory Optimization KPIs

1. Inventory turnover ratio
2. Stockout frequency
3. Average inventory holding days
4. Fill rate (%)
5. Total inventory carrying cost