Transit System Cost Allocation and Pricing

SURTC TEL8 Transit Technical Assistance Workshop

Friday, April 23, 2004
9:00 a.m. - 1:30 p.m. (CDT)

Small Urban & Rural Transit Center
Topics to be Covered

- Cost Allocation
- Setting Fares
- Setting Contract Rates
Cost Allocation

- Goal is to identify expenses associated with particular service, route, or trip
- Methods often directed by funding agencies and OMB Circulars
Why do we need to allocate costs?

- To divide expenses among funding sources
- To determine “fair” fares or billing rates
- To evaluate proposed service increases or reductions
- To provide cost information for performance evaluations
- To compare competitive service bids
What does cost allocation do?

- Estimates operating expenses for various services, routes, client groups
- Does not usually include capital costs
First Step: Separate Costs for Different Types of Operation

Mega Services Corp.

- Fixed Route Transit
- Demand Response
- Other Non-Transportation Operations
How to Allocate Costs Between Different Types of Service

- First, directly charge as many expenses as possible to specific service, e.g., fixed-route driver salaries to fixed route accounts, demand response scheduler salaries to demand response.
How to Allocate Costs Between Different Types of Service

Next, divide shared expenses based on factors related to how resources are used based on:
- Vehicle miles, vehicle hours
- Percentage of time spent by individuals working on specific activities
- Percentage of space used
- Arbitrary allocation (divide certain expenses equally among activities)
Cost Allocation Model for Similar Services

- If your organization provides only one type of service, e.g., demand response paratransit, or if you have already allocated costs among different types of services, then you are ready to proceed to cost allocation model.
The Purpose of the Cost Allocation Model

- Determine the cost of providing a portion of your service – a route, or service sector, or perhaps a specific agency contract.
Example

- Your entire system has the following characteristics:
  - Total Expenses: $423,500
  - Total Vehicle Miles: 190,000
  - Total Vehicle Hours: 12,500
  - Total Vehicles: 6
The Problem: What does it cost to operate the “in-town” van

- The “In-Town” van statistics
  - Total Vehicle miles: 20,000
  - Total Vehicle Hours: 2,000
Simple, but imprecise method

- **Cost per mile**
  
  System cost/mile = $2.23 so
  
  20,000 miles $ \times 2.23 = $44,600

- **Cost per hour**
  
  System cost/hour = $33.88 so
  
  2,000 hours $ \times $33.88 = $67,760

- Why the difference?
The Recommended Two-Variable Cost Model

- Unit Cost Model or Fully Allocated Cost model

Annual Cost for System or Route =
\[ a \times \text{miles} + b \times \text{hours} + c \times \text{peak vehicles} \]

Where:
\[ a = \text{unit cost of mileage-related expenses} \]
\[ b = \text{unit cost of hours-related expenses} \]
\[ c = \text{unit cost of peak vehicle-related expenses} \]
Steps Required to Apply the Unit Cost Model

- Determine allocation variables – decide what factors you will use to allocate costs. Most common factors are vehicle miles, vehicle hours, and peak vehicles.

- In most cases, a two-variable model that includes vehicle miles and vehicle hours is best.
Steps Required to Apply the Unit Cost Model

- Determine for each cost item for a transit system budget (or actual expense report) which of the allocation variables best explains the variation in the cost item. For example, fuel and maintenance costs are most closely related to distance traveled (vehicle miles), driver wages and fringe costs are most closely tied to vehicle hours driven, and overhead costs such as administrative salaries and other administrative expenses are also allocated to vehicle hours.
## Assign Expense Items to Cost Factors

<table>
<thead>
<tr>
<th>Cost Factor</th>
<th>Miles</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td><strong>Transportation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Driver Wages and Fringe</td>
<td></td>
<td>X</td>
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<tr>
<td>Fuel and Oil</td>
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<td>X</td>
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<tr>
<td>Insurance</td>
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<td>X</td>
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<tr>
<td><strong>Maintenance Expense</strong></td>
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<tr>
<td>Mechanic Wages and Fringe</td>
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<td>X</td>
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<td>Tires, Tubes, Parts</td>
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<td>X</td>
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<tr>
<td>Contracted Maintenance</td>
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<td>X</td>
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<td>Facility rental, utilities</td>
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<td>X</td>
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<tr>
<td><strong>Call Taking/Dispatching</strong></td>
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<tr>
<td>Labor and Fringe</td>
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<td>X</td>
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<tr>
<td>Telephone Expense</td>
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<tr>
<td>Computer Expense</td>
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<td><strong>Administrative Expense</strong></td>
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<td>Salaries and Fringe</td>
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<td>Materials and Supplies</td>
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<td>Rent, Utilities</td>
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</tbody>
</table>
### Calculating Miles, Hours Factors

<table>
<thead>
<tr>
<th>Category</th>
<th>Actual Expense</th>
<th>Miles</th>
<th>Hours</th>
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<tbody>
<tr>
<td><strong>Transportation</strong></td>
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<tr>
<td>Driver Wages and Fringe</td>
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<td>Fuel and Oil</td>
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<td>Insurance</td>
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<td><strong>Maintenance Expense</strong></td>
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<td>Mechanic Wages and Fringe</td>
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<td>Facility rental, utilities</td>
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<td><strong>Call Taking/Dispatching</strong></td>
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<td>Labor and Fringe</td>
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<tr>
<td>Salaries and Fringe</td>
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<td>Materials and Supplies</td>
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<tr>
<td>Rent, Utilities</td>
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<td>$7,500</td>
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<tr>
<td><strong>Total Expenses</strong></td>
<td>$423,500</td>
<td>$88,000</td>
<td>$335,500</td>
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</table>

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Calculate Unit Cost Factors

- **Miles Related Expenses**
  \[
  \frac{88,000}{190,000 \text{ miles}} = 0.46
  \]

- **Hours-Related Expenses**
  \[
  \frac{335,500}{12,500 \text{ hours}} = 26.84
  \]
The Unit Cost Model for this Example

Total expense =

$0.46 \times \text{vehicle miles} +$26.84 \times \text{vehicle hours}
Applying the Cost Model to the “In-Town” Van Example

- Total expense for “In-Town” Van
  \[
  \begin{align*}
  &= 0.46 \times 20,000 \text{ vehicle miles} \\
  &+ 26.84 \times 2,000 \text{ vehicle hours} \\
  &= 62,943
  \end{align*}
  \]
Compare the Results

- Simple, but imprecise
  - Cost/Mile method: $44,600
  - Cost/Hour method: $67,760

- Cost Model: $62,943
Setting Fares or Billing Rates

Balancing Act between fairness (accuracy) and Ease of administration and understanding
Typical Choices for Fares or Trip Charges

- Flat rate per person trip
- Distance-based rate per person person
  - Zones or grids
  - Passenger miles
- Vehicle hourly rate
- Vehicle mile rate
Factors to Consider when Selecting “Best” Approach

- Major differences in trip lengths among users or sponsoring agencies
- Differences in average occupancy of vehicles
- Exclusive vs. shared use of the vehicle by clients of an agency
How to pick

- If an agency has exclusive use of a vehicle for a specific time then a per-vehicle-hour rate is the best and simplest approach.
If you operate a general public service, or clients of multiple agencies can ride a vehicle at the same time then:

- The simplest method is a flat per-person-trip charge that is very easy to understand and apply, but it is also the least accurate.

- A per-passenger-mile rate is probably the fairest method, but very hard to administer.
Special Considerations when Contracting for Services

Best method depends on:
- Who does the dispatching
- Whether your clients have exclusive use of contractor vehicles
Dispatching

- If you arrange the rides and assign trips to specific vehicles, then best to pay by the vehicle hour.
- If contractor mixes your trips with others, and controls dispatching, then better to pay by the person trip.
In Conclusion

- These presentations and other supporting materials will be posted on the SURTC website [www.surtc.org](http://www.surtc.org)
- Additional questions [jmiller45@mindspring.com](mailto:jmiller45@mindspring.com)