

GENERAL REGULATIONS

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A. METHOD OF APPLYING CHARGES

1. Rate Centers

Message Toll Service charges between points are based on the airline distance between rate centers. In general, each exchange has a designated rate center, except that in a large local service area there may be several rate centers.

2. Use of Vertical and Horizontal (V-H) Coordinates

- a. For the purpose of determining airline mileages vertical and horizontal grid lines have been established across Michigan. The spacing between adjacent vertical grid lines and between horizontal grid lines represents a distance of one coordinate unit. This unit is the square root of 0.1, expressed in airline miles. A four-digit vertical (V) and a four-digit horizontal (H) coordinate is computed for each rate center from its latitude and longitude location by use of appropriate map projection equations. A pair of V-H coordinates locates a rate center, for determining airline mileages, at a particular intersection of an established vertical grid line with an established horizontal grid line. The distance between any two rate centers is the airline mileage computed between their respective coordinate intersections, as explained in "Determination of Airline Mileages" following.
- b. The V-H coordinates for each Michigan rate center, including each Zone of a District Exchange, are listed in the Local Exchange Routing Guide (L.E.R.G.), issued by and available from the Traffic Routing Administration (TRA) office at Bell Communications Research, Inc., (Bellcore), Morristown, New Jersey.

(1) When service is available at a point not listed in the L.E.R.G., the rate center is considered to be the central office furnishing the exchange telecommunications service.

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c. Rate Mileages involving the Detroit Zone of the Detroit District Exchange:

(1) Messages between Wire Centers:

(a) A toll rate center - specifically described below - is established at the approximate geographical center of the central office locations of each of the Areas comprising the Detroit Zone. These centers are associated with a single V-H coordinate designation for the entire Detroit Zone.

<u>Area</u>	<u>Toll Rate Center</u>	<u>V</u>	<u>H</u>
1	Canfield at Hamilton - Detroit	5534	2833
2	Frankfort at Algonquin - Detroit	5519	2824
3	McDougall at Davison - Detroit	5522	2840
4	Lyndon at Mendota - Detroit	5535	2851
5	Grand River at McNichols Rd. (NW corner) - Detroit	5535	2866
6	Greenfield Rd. at River Rouge (South of Butler) - Dearborn	5554	2844

(b) Where the airline distance between an Area rate center and a rate center outside the Detroit District Exchange is 40 miles or less in length, the rate mileage is determined by using the V-H coordinates shown above.

(c) Where the distance involving an Area rate center is more than 40 miles in length, the rate mileage is determined by using the V-H coordinates for the Detroit Zone.

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3. Determination of Airline Mileages

a. To determine the rate distance between any two rate centers proceed as follows:

- (1) Obtain the "V" and "H" coordinates for each rate center.
- (2) Obtain the difference between the "V" coordinates of the two rate centers. Obtain the between the "H" coordinates.
- (3) Divide each of the differences obtained in (2) by three, rounding each quotient to the nearer integer.
- (4) Square these two integers and add the two squares.
 - (a) If the sum of the squares is greater than 1777, divide the integers obtained in (3) by three and repeat step (4). Repeat this process until the sum of the squares obtained in (4) is less than 1778.
 - (b) The number of successive divisions by three in steps (3) and (4)(a) determines the value of "N".
- (5) Multiply the final sum of the two squares obtained in step (4) by the multiplier specified in the following table for this value of "N":

<u>N</u>	<u>Multiplier</u>	<u>Minimum Rate Mileage</u>
1	0.9	-
2	8.1	41
3	72.9	121
4	656.1	361
5	5,904.9	1,081
6	53,144.1	3,241

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(6) Obtain square root of product in (5) and, with any resulting fraction, round up to next higher integer. This is the message rate mileage except that when the mileage so obtained is less than the minimum rate mileage shown in (5) preceding, the minimum rate mileage corresponding to the "N" value is applicable.

b. Example: The message rate distance is required between Detroit and Flint.

- (1) Respective V and H Coordinates:
- | | | |
|-------------|----------|-------------|
| <u>V</u> | <u>H</u> | |
| Detroit | 5536 | |
| 2828 | | |
| | Flint | <u>5461</u> |
| <u>2993</u> | | |
- (2) Difference: 75 165
- (3) Dividing each difference by three and rounding to nearer integer = 25 and 55
- (4) Squaring integers and adding: $25 \times 25 = 625$
 $55 \times 55 = \underline{3,025}$
- Sum of squared integers - 3,650
 Sum is greater than 1,777, so divide integers in (3) by three and repeat (4)
- (a) Dividing integers in (3) by three and rounding = 8 and 18
- (b) Squaring integers and adding: $8 \times 8 = 64$
 $18 \times 18 = \underline{324}$
- Sum of squared integers: 388
- (c) This sum of squared integers is less than 1,778 and was obtained after two successive divisions by three; therefore, "N" = 2.
- (5) Multiply final sum of squared integers by factor 388
 8.1 (corresponding to "N" = 2) x 8.1
3142.8
- (6) Square root of 3142.8 = 56.06, which is rounded up to 57 miles (fractional miles being considered full miles).
 The message rate mileage is 57 miles.

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