

## NJRTM-E TABLES (GUIDE TO MATRICES)

### Highway Path Building:

There are five highway skim files.

There are three matrices used for mode choice: an uncongested skim file (hwyuncsmc.skm) and congested skim file (hwycssov.skm) for single occupancy vehicle trips and a skim file for high occupancy vehicle trips (hwycshov.skm). These matrices are all in the same format and split into four tables:

- Table 1: time (minutes)
- Table 2: distance (1/100 of miles)
- Table 3: time (1/100 of minutes)
- Table 4: costs (cents)

There are two matrices used for trip distribution: an uncongested skim file (hwyuncstp.skm) and a congested skim file (hwycstp.skm). The uncongested skim file is split into nine tables: for each vehicle mode (Single Occupancy Vehicle, High Occupancy Vehicle, and Truck) there is a time, distance and cost table. The table tabs are self-explanatory. The congested skim file is the same except it does not include the three tabs for trucks.

### Trip Generation:

The trip productions and attractions are stored on text tables by zone. Both the production table (genfprod\_bal.dat) and the attraction table (genfattr\_bal.dat) have 31 columns after the zonal column. These columns represent the trip purposes and income groups. See entry under Trip Distribution for the matrices njtparegpa.trp and nymtcregpa.trp for a definition of each of the 31 columns to the left of the zonal column.

### Transit Path Building:

There are four transit skim files: peak and off-peak drive to transit skim files and peak and off-peak walk to transit skim files. The drive-to-transit skim files (pk\_dr.skm and op\_dr.skm) have 70 tabs:

- Tabs 1-5: Total In-Vehicle Time (IVTT) for, in order, Rail, PATH, Bus, Ferry, and Light Rail transit modes. This sums all of the in-vehicle transit time including transfers (for example, if a transit path includes both bus and rail transit, IVTT includes the time on both the bus and the rail).
- Tabs 6-10: Total Wait Time for, in order, Rail, PATH, Bus, Ferry, and Light Rail
- Tabs 11-15: Total Walk Time for, in order, Rail, PATH, Bus, Ferry, and Light Rail
- Tabs 16-20: Fares (in cents) for, in order, Rail, PATH, Bus, Ferry, and Light Rail

- Tabs 21-25: Transfer Number for, in order, Rail, PATH, Bus, Ferry, and Light Rail
- Tabs 26-30: Drive Time for, in order, Rail, PATH, Bus, Ferry, and Light Rail
- Tabs 31-35: Park and Ride Cost for, in order, Rail, PATH, Bus, Ferry, and Light Rail
- Tabs 36-40: Drive distance for, in order, Rail, PATH, Bus, Ferry, and Light Rail
- Tabs 41-42: Bus Time for, in order, Rail and PATH transit modes
- Tab 43: PATH and ferry time for rail transit mode
- Tabs 44-48: Distance for, in order, Rail, PATH, Bus, Ferry, and Light Rail
- Tab 49: Rail time for the rail transit mode
- Tabs 50-54: Subway time, in order, Rail, PATH, Bus, Ferry, and Light Rail
- Tab 55: Bus time for the Light Rail mode
- Tab 56: Light Rail time for the Light Rail mode
- Tabs 57-61: Long Haul Ferry data, in order, IVTT, Wait time, Walk time, Fare costs, and number of transfers.
- Tabs 62-64: Long Haul Ferry data, in order, Drive time, Park and Ride costs, and Drive access distance.
- Tabs 65-67: Long Haul Ferry data, in order, Bus time, PATH time, and total distance
- Tabs 68-70: Long Haul Ferry data, in order, Long Distance ferry time, subway time, and rail or PATH time.

The walk-to-transit skim files (pk\_wk.skm and op\_wk.skm) have 52 tabs:

- Tabs 1-25: The same as for the drive-to-transit skim files (see above)
- Tabs 26-27: Bus Time for, in order, Rail and PATH transit modes
- Tab 28: PATH and ferry time for rail transit mode
- Tabs 29-33: Distance for, in order, Rail, PATH, Bus, Ferry, and Light Rail
- Tab 34: Rail time for the rail transit mode
- Tabs 35-39: Subway time, in order, Rail, PATH, Bus, Ferry, and Light Rail
- Tab 40: Bus time for the Light Rail mode
- Tab 41: Light Rail time for the Light Rail mode
- Tabs 42-46: Long Haul Ferry data, in order, IVTT, Wait time, Walk time, Fare costs, and number of transfers.
- Tabs 47-49: Long Haul Ferry data, in order, Bus time, PATH time, and total distance
- Tabs 50-52: Long Haul Ferry data, in order, Long Distance ferry time, subway time, and rail or PATH time.

### **Composite Impedance:**

There are two composite impedance skim files: for peak period (pkcompimp.skm) and for off-peak (opcompimp.skm). Each skim file has five tabs:

- autoCI: The auto composite impedance term

- finalCI: The final composite impedance term (including transit)
- time: Total travel time (in minutes)
- CRatio: Auto composite impedance divided by the final composite impedance \* 100-99 (used in calibration)
- Distance: Total distance (in miles)

### **Trip Distribution:**

Matrices by purpose and income type (HBWDPTRP, HBWSPTRIP, HBSPTRP, HBOPTRP, WBOPTRP, NHNWPTRP) located under Trip Distribution in the Peak and Off-Peak Distribution boxes: Each matrix has five tabs for each income group:

- Income Group 1: <=\$14,999
- Income Group 2: \$15,000 - \$34,999
- Income Group 3: \$35,000 - \$74,999
- Income Group 4: \$75,000 - \$149,999
- Income Group 5: >=\$150,000

During model convergence process, different matrices are created for the home-based work trips (hbwdmsa.trp and hbwsmsa.trp). These matrices are also split into the five income group tabs described above.

The matrix for truck trip distribution (intruck.trp) is split into three tabs:

- MEDTRK: Medium trucks (two axle, six tires)
- HVYTRK: Heavy trucks (3+ axle)
- COMMTRIP: Commercial vehicles (two axle, four tires)

There is also a truck type matrix (trktype.trp) that includes eleven tabs:

- IIM: internal to internal medium truck trips
- IIH: internal to internal heavy truck trips
- COM: commercial vehicle trips
- EIHYM: external to internal highway based medium truck trips
- EIHYP: external to internal highway based heavy truck trips
- EIMCM: external to internal to an intermodal facility medium truck trips
- EIMCH: external to internal to an intermodal facility heavy truck trips
- EIEM: external to external medium truck trips routed through an intermodal facility
- EIEH: external to external heavy truck trips routed through an intermodal facility
- EEM: external to external medium truck trips
- EEH: external to external heavy truck trips

The airport trip matrix (airtrips.trp) is split into four tabs:

- DAY\_AIR1: business trip from a resident
- DAY\_AIR2: business trip from a non-resident
- DAY\_AIR3: non-business trip from a resident
- DAY\_AIR4: non-business trip from a non-resident

These airport trips are split into peak and off-peak trips with a resulting eight tabs: one for each of the four airport trip types for both peak and off-peak (e.g., pk\_air1 and op\_air1 are the peak and off-peak tables for business trips by residents of the region).

The matrices njtparegpa.trp and nymtcregpa.trp are the trip distribution matrices split into trips controlled within the NJTPA region and trips controlled in the NYMTC region for mode choice processing. Each matrix has 31 tables: by trip purpose and income group:

- M1-M5: Home-Based work direct trips (one for each income group from low to high)
- M6-M10: Home-Based work strategic trips (one for each income group)
- M11-M15: Home-Based shopping trips (one for each income group)
- M16-M20: Home-Based other trips (one for each income group)
- M21-M25: Work-Based other trips (one for each income group)
- M26-M30: Non-home non-work trips (one for each income group)
- M31: Home based university trips with all incomes grouped together

Combining the njtparegpa.trp tables with the nymtcregpa.trp tables equals the original trip distribution tables (for home-based work this would be the hbwdmsa and hbwsmsa trip tables).

Matrices by Purpose split by Peak and Off-Peak located in the “Mode Choice Time-Of-Day Allocation box (HBWD\_PK, HBWD\_OP, etc.) are also by income group.

### **Mode Choice:**

Matrices by Purpose (Home-Based Work Direct-HBWD, Home-Based Work Strategic-HBWS, Home-Based Shopping-HBS, Home-Based Other-HBO, Work-Based Other-WBO and Non-Home Non-Work-NHNW; both Peak/PK and Off-Peak/OP): Located under Mode Choice and NJTPA Peak Mode Choice Process or NJTPA Off-Peak Mode Choice Process. Each matrix has 16 tables:

- Table 1: SOV
- Table 2: HOV2
- Table 3: HOV3+
- Table 4: HOV4
- Table 5: Walk to Rail
- Table 6: Walk to PATH
- Table 7: Walk to Bus

- Table 8: Walk to Ferry
- Table 9: Walk to Light Rail
- Table 10: Walk to Long Distance Ferry
- Table 11: Drive to Rail
- Table 12: Drive to PATH
- Table 13: Drive to Bus
- Table 14: Drive to Ferry
- Table 15: Drive to Light Rail
- Table 16: Drive to Long Distance Ferry

Trips from the NYMTC Controlled region are located in a series of four tables: two are for the home-based work trips and two are for the non-work trips. There are tables in a production-attraction format and an origin-destination format.

The home based work matrix production attraction matrix (nymtcreg\_pa\_hbwmode.trp) has six tables:

- HBWD1: Home-Based Work Direct Single Occupancy Vehicle trips
- HBWD2: Home-Based Work Direct High Occupancy Vehicle 2 trips
- HBWD3: Home-Based Work Direct High Occupancy Vehicle 3+ trips
- HBWS1: Home-Based Work Strategic Single Occupancy Vehicle trips
- HBWS2: Home-Based Work Strategic High Occupancy Vehicle 2 trips
- HBWS3: Home-Based Work Strategic High Occupancy Vehicle 3+ trips

The home based work matrix origin-destination matrix (nymtcreg\_od\_hbwmode.trp) has eight tables:

- HBWSOVAM: Home-based work single occupancy vehicle trips AM time period
- HBWHOAM: Home-based work high occupancy vehicle trips AM time period
- HBWSOVPM: Home-based work single occupancy vehicle trips PM time period
- HBWHOVPM: Home-based work high occupancy vehicle trips PM time period
- HBWSOVMD: Home-based work single occupancy vehicle trips Midday time period
- HBWHOVMD: Home-based work high occupancy vehicle trips Midday time period
- HBWSOVNT: Home-based work single occupancy vehicle trips Night time period
- HBWHOVNT: Home-based work high occupancy vehicle trips Night time period

The non-home based work matrix production-attraction matrix (nymtcreg\_pa\_nhbwmode.trp) has twelve tables. It includes three tables each (SOV, HOV2, HOV3+) for: HBS (home-based shopping), HBO (home-based other), WBO (work-based other) and NHNW (non-home non-work).

The non-home based work matrix origin-destination matrix (nymtcreg\_od\_nhbwmode.trp) has twenty-four tables. Each of the four purposes (HBS, HBO, WBO, NHNW) has two vehicle trip tables (SOV and HOV) each with four time period tables (AM, PM, Midday, and Night). For example, for the home-based shopping purpose there are eight tables: four tables (each time period) for Single Occupancy Vehicle home based shopping trips and four tables for High Occupancy Vehicle shopping trips.

There are eight air trip files that are also produced and used in highway and transit assignment; four peak and four off-peak files (PK=peak, OP=Off-peak). The files are labeled AIR1\_XX, AIR2\_XX, AIR3\_XX, and AIR4\_XX (the XX is PK=peak, OP=Off-peak). AIR1 through AIR4 are the same airport trip purposes as on the airport trip tables from trip distribution (see trip distribution section). Each of the eight matrices have eleven tables.

- M1=auto
- M2=Walk to Rail
- M3=Walk to Path
- M4=Walk to Bus
- M5=Walk to Ferry
- M6=Walk to Light Rail
- M7=Drive to Rail
- M8= Drive to Path
- M9= Drive to Bus
- M10= Drive to Ferry
- M11= Drive to Light Rail

### **Time-Of-Day Trip Tables**

This is where the matrices are converted from P-A to O-D and where person trips are converted into vehicle trips. There are four **vehicle** trip tables (HWYAMVTRP.MAT, HWYPMVTRP.MAT, HWYMDVTRP.MAT, and HWYNPVTRP.MAT) , each by one of the four times of day:

- AM: 6:00am-9:00am
- MD: 9:00am-3:00pm
- PM: 3:00pm-6:00pm
- NP: 6:00pm-6:00am

Each matrix has nine tables (vehicle mode and purpose type):

- HBWSOV: Home-Based Work Single Occupancy Vehicle
- HBWHO:V: Home-Based Work High Occupancy Vehicle
- HBSSOV: Home-Based Shopping Single Occupancy Vehicle
- HBSHOV: Home-Based Shopping High Occupancy Vehicle

- HBOSOV: Home-Based Other Single Occupancy Vehicle
- HBOHOV: Home-Based Other High Occupancy Vehicle
- NHBSOV: Non-Home Based Single Occupancy Vehicle
- NHBHOV: Non-Home Based High Occupancy Vehicle
- TRK: Trucks

There is also an Airport Vehicle trip table (airtodveh.trp) with four tables for each time-of-day period.

### **Highway Assignment:**

There are four vehicle trip tables (AMPKALLV.TRP, PMPKALLV.TRP, MDTPALLV.TRP, and NTPDALLV.TRP) which are basically the same as the time of day trip table except the files have 15 tabs (only 9 are used)

- M1=HBW SOV
- M2=HBS SOV
- M3=HBO SOV
- M4=NHB SOV
- M8=Truck
- M9=HBW HOV
- M10=HBS HOV
- M11=HBO HOV
- M12=NHB HOV
- M5, M6, M7, M13, M14, M15 are blank

### **Transit Assignment:**

There are four matrices: peak and off-peak matrices for drive access and walk access transit trips. These matrices are located under transit assignment (time-of-day box). Each matrix has six tables for each of the six modes:

- WKRAL/DRRAL: Rail trips
- WKPTH/DRPTH: PATH trips
- WKBUS/DRBUS: Bus trips
- WKFER/DRFER: Ferry trips
- WKLRT/DRLRT: Light Rail trips
- WKLHF/DRLHF: Long Distance Ferry trips