

Appendix B –
TMAS Quality Control Checks

APPENDIX B. TMAS QUALITY CONTROL CHECKS

TMAS 3.0 will read TMG formats 2001, 2013 and 2022 for motorized and 2016 and 2022 for micromobility

Station data

Fatal errors

- no S or 1 in the 1st digit of the record
- record length is less characters based on data type sent in
- no station ID in the record

Critical errors occur if:

- blank or invalid direction or lane
- blank or invalid functional classification
- blank or invalid state code
- improper vehicle classification designated

(all critical errors are correctable in TMAS)

Caution flags include:

- missing latitude/longitude
- missing year established
- missing route number
- missing number of lanes for volume, classification, or weight
- missing HPMS Sample (not for 2022 format), NHS or type of sensor

(all caution errors are correctable in TMAS)

Warning flags occur if:

- any two records that have all digits being exact duplicates will have one record removed
- any two records that are not exact duplicates within the batch but match same key fields.
User must select the appropriate proper record to utilize.

Note: 2022 TMG Station format is piped delimited only and the station ID can be from 6 to 20 digits. When utilizing 7 or more digits for the station ID, all other TMG formatted data must also be piped delimited.

Volume Data (TMG 3-card) - monthly

Fatal errors occur if:

- no 3 in the 1st digit of the record
- record length is less characters based on data type sent in
- no station ID in the record
- no corresponding station in National Database

Critical errors occur if (by system or by station parameters accepted):

- record includes 7 or more consecutive zero hours
- every DOW (day of week) not present for the given site/month/year
- record includes any zero hour volume with one or more boundary with over 50 vehicles
- 24 hours of data not in a given record
- any hourly volume exceeds the max per hour per lane value
- directional splits check show unbalanced directional volumes greater than 10%
variance from 50%

Monthly Average Daily Traffic (MADT) from same month previous year not within 20%
unless the state marks data as restricted column

when any 3 to 4 AM volume is \geq 3 to 4 PM volume for the same station ID and day
identical count check – for any consecutive series of reported values there will be no
more than 3 values in a row (values other than 0's) with the same values. This
check is performed on the individual submitted resolution

Warning flags occur if:

- any two or more records that have all digits being exact duplicates will have one record removed
- any two records that are not exact duplicates within the batch but match same key fields.
User must select the appropriate proper record to utilize.

Classification Data (TMG C-card) - monthly

Fatal error occurs if:

- no C in the 1st digit of the record
- record length is less characters based on data type sent in
- no station ID in the record
- no corresponding station in National Database

Critical errors occur if:

- volume checks done on all classification data – see volume section above
- all classification data utilizes the station file algorithm for vehicle classification and classification system for vehicle classification for determining the length of the given record.

Caution flags occur if (by system or by station parameters accepted):

- maximum percentage by classification by day check (done by direction)
- historical check for 6 weeks of prior approved data based on the same DOW for each class of vehicle by day percentage variance from the incoming same DOW. Threshold value is utilized and when historical value is above the threshold the % is utilized. When below the threshold the number of vehicles for the given class being checked is utilized with 100%, 75% and 25% of the threshold value utilized in incremented lower values used from the threshold down to zero vehicles.
- any historical quality control check where insufficient historical data is available

Warning flags

- any two records that have all digits being exact duplicates will have one record removed
- any two records that are not exact duplicates within the batch but match same key fields. User must select the appropriate proper record to utilize.

Speed Data (TMG T-card) - monthly

Fatal error occurs if:

- no T in the 1st digit of the record
- record length is less characters based on data type sent in
- no station ID in the record
- no corresponding station in National Database

Critical errors occur if:

- volume checks done on all classification data – see volume section above
- if the associated weight data is loaded and the weight average tandem spacing check was within range then all speed checks don't need to be completed
- historical 8 weeks check of 85% speeds with +/- 20% for same DOW
- extreme low – over 10% or daily volume under 20 mph
- extreme high – over 10% of daily volume over 85 mph
- 3 to 4 AM average speed is <= 3 to 4 PM average speed for the same station ID and day
- all speed data utilizes the speed file speed data time interval, definition of first speed bins reported and total number of speed bins reported in the vehicle speed format for determining the length of the given record.

Caution flags occur if (by system or by station parameters accepted):

Weight Data (TMG W-card) - monthly

Note – TMAS 3.0 permits all vehicle classes to be submitted as weight data.

Fatal error occurs if:

- no W in the 1st digit of the record
- record length is less characters based on data type and class sent in
- no station ID in the record
- any record with more than 25 axles will not be kept in TMAS 3.0

Critical error occurs if:

- none

Caution flags

- total weight not equal to the sum of all axle weights
- every axle weight not within acceptable range (100 lbs. to 50 kip)
- any inter-axle spacing not within acceptable range (1' to 50')
- sum of axle spacings by vehicle classification not within acceptable range
- number of axles by vehicle class exceeded
- historical average tandem weight check for 8 weeks of data using the average tandem weight for the same DOW by day by lane check based on class 9 vehicles
- historical check for 8 weeks of data using the steering axle weight average (SAWA) by day by lane check based on the same DOW for class 9 vehicles
- historical check for 8 weeks of data using the average tandem axle spacing (ATS) average by day by lane based on the same DOW for classes 8-13 vehicles
- any historical quality control check where insufficient historical data is available

Warning flags

- any record with between 13 and 25 axles will not be processed in TMAS 3.0 but will be placed in a special database.
- any two records that have all digits being exact duplicates will have one record removed

IVR Data (TMG I-card) - monthly

Fatal error occurs if:

- no I in the 1st digit of the record
- record length is less characters based on data type and class sent in
- no station ID in the record

Critical error occurs if:

- none

Caution flags

- volume checks done on all IVR data – see volume section above
- class and/or speed checks done on all same associated data – see section above
- every axle weight not within acceptable range (100 lbs to 50 kip)
- any inter-axle spacing not within acceptable range (1' to 50')
- sum of axle spacings by vehicle classification not within acceptable range
- number of axles by vehicle class exceeded
- left and right axle weight balancing checked (when Z variant reported) within +/- 20%
- gap between vehicles (when 15' to 32') with class 6 and class 1 check – report when over 5 per day found

Warning flags

- any record with more than 25 axles will not be processed in TMAS 3.0 but will be placed in a special database.
- any two records that have all digits being exact duplicates will have one record removed
- any two records that have all primary key digits and time stamp being exactly the same remove secondary record(s)

Micromobility Station Data (TMG) - quarterly

Fatal error occurs if:

- no L in the 1st digit of the record
- record length is less characters based on data type and class sent in
- no station ID in the record

Critical error occurs if:

- blank or invalid direction or lane
- blank or invalid functional classification
- blank or invalid state code

Caution flags

- missing Latitude/Longitude
 - missing year established
 - missing route number
 - missing number of lanes for count
 - missing type of sensor
- (all caution errors are correctable in TMAS)

Warning flags

- any two records that have all digits being exact duplicates will have one record removed
- any two records that have all primary key digits and time stamp being exactly the same
remove secondary record(s)

Micromobility Count Data (TMG) - quarterly

Fatal error occurs if:

- no N in the 1st digit of the record
- record length is less characters based on data type and class sent in
- no station ID in the record

Critical error occurs if:

- no state FIPS code
- no county FIPS code
- no functional classification of road
- no direction or location to the roadway code

Caution flags

- historical check for 6 weeks of prior approved data based on the same DOW for each class of vehicle by day percentage variance from the incoming same DOW. Threshold value is utilized and when historical value is above the threshold the % is utilized. When below the threshold the number of vehicles for the given class being checked is utilized with 100%, 75% and 25% of the threshold value utilized in incremented lower values used from the threshold down to zero vehicles.
- year over year MADT = 20% (same month for the prior year MADT +/- tolerance)
- consecutive zero's = 7(no overlapping days – any count interval consecutive 0's)
- any zero adjacent hour check when over 50 (check both sides of any zero unless interval is first or last one for the day)
- total hourly count (maximum) = 4,000 (sum all count intervals and directions for the hour)
- total minimum daily count = 100 (sum all count intervals and lanes/directions for the day)
- total maximum daily count = 10,000 (sum all count intervals and lanes/directions for the day)
- multiple identical counts for any 3 consecutive identical counts – independent of time interval counted)
- 3 am to 4 am < 3 pm to 4 pm comparison check

Warning flags

- any two records that have all digits being exact duplicates will have one record removed
- any two records that have all primary key digits and time stamp being exactly the same remove secondary record(s)

