

To: CRCOG Transportation Committee
From: Roger Krahn, Principal Transportation Engineer
 Devon Lechtenberg, Senior Transportation Planner
Date: November 6, 2020
Subject: Performance Measures – 2021 Annual CTDOT Safety Targets

In accordance with FHWA requirements, the Connecticut Department of Transportation (CTDOT) has established five (5) safety performance targets for calendar year 2021. FHWA requires Metropolitan Planning Organizations to either support the Department’s targets or to set their own within 180 days of the setting of state-level targets. To achieve this deadline, CRCOG will need to endorse safety targets no later than February 27th, 2021. Historically, CRCOG has supported CTDOT’s targets, as independent targets for the Region would require substantial data collection and analysis efforts.

CTDOT has chosen targets for 2021 that are more aggressive than those derived from a lagged five-year moving average, as was done in the past. The new method of target selection aims to strike a balance between conservative, attainable target setting and bolder, long-term goals for crash reduction. This is explained in CTDOT’s technical memo titled “Safety Performance Targets 2020-06-11” (13 pages) as attached. CTDOT’s safety targets for 2021 are shown in the table below and compared to previous years’ targets. It should be noted that these targets are **maximums** and should not be interpreted as desirable numbers to achieve.

Measure	2018 Target	2019 Target	2020 Target	2021 Target
Number of Fatalities	257	274	277	270
Fatality Rate (per 100 million VMT)	0.823	0.873	0.883	0.850
Number of Serious Injuries	1,571	1,574	1,547	1,360
Serious Injury Rate (per 100 million VMT)	5.03	5.02	4.93	4.30
Number of Non-Motorist Fatalities and Serious Injuries	280	290	307	300
Years of Moving Average	2011-2015	2012-2016	2013-2017	2014-2018

CRCOG staff suggests the Transportation Committee review these targets and the corresponding CTDOT technical memo. Attached is a draft resolution for approval of CTDOT targets by the Policy Board. It is recommended that the Transportation Committee adopt a recommendation for approval at the December Transportation Committee meeting.

CRCOG will continue to promote regional safety efforts, including:

- Supporting the efforts of CTDOT (and their consultant) in the preparation of the Regional Transportation Safety Plan (RTSP). A draft was distributed for review and comment to the Transportation Committee in May. CRCOG staff is currently reviewing the latest draft (October 13, 2020). A final report is anticipated to be submitted to CRCOG for approval in the months ahead. The RTSP will be an important tool in the Capitol Region's efforts to improve transportation safety and contribute to meeting the safety targets. The latest draft RTSP includes an analysis of 2015 to 2017 crash data to produce the following regional analysis:
 - Top 36 crash intersections and countermeasures
 - Top 39 crash corridors and countermeasures
 - Top 85 non-motorized crash corridors and countermeasures
 - Top 12 non-motorized cash intersections and countermeasures
- Integrating highway safety in the standard work tasks, and special studies and projects, that are included in the CRCOG Unified Planning Work Program, such as the Roundabout Safety Screening study (currently in consultant selection phase).
- Supporting the Safety Circuit Rider program and working in partnership with UConn Training and Technical Assistance Center to collaborate in promoting safety on local roads and incorporating safety countermeasures in projects.
- Promoting infrastructure safety improvements in LOTCIP projects.
- Administering the Greater Hartford Traffic Incident Management Coalition.

RESOLUTION REGARDING TARGETS FOR FIVE SAFETY PERFORMANCE MEASURES ESTABLISHED BY CTDOT

WHEREAS, the Capitol Region Council of Governments (CRCOG) has been designated by the Governor of the State of Connecticut as the Metropolitan Planning Organization responsible, together with the State, for the comprehensive, continuing, and cooperative transportation planning process for the Capitol Region; and

WHEREAS, the Highway Safety Improvement Program (HSIP) final rule (23 CFR Part 490) requires States to set targets for five safety performance measures by August 31, 2020, and

WHEREAS, the Connecticut Department of Transportation (CTDOT) has established targets for five safety performance measures for:

- (1) Number of fatalities
- (2) Rate of fatalities per 100 million vehicle miles traveled (VMT)
- (3) Number of serious injuries
- (4) Rate of serious injuries per 100 million VMT
- (5) Number of non-motorized fatalities and non-motorized serious injuries, and

WHEREAS, the CTDOT coordinated the establishment of safety targets with the eight Metropolitan Planning Organizations (MPOs) in Connecticut at the June 2, 2020 COG Coordination meeting, and

WHEREAS, the CRCOG may establish performance targets by agreeing to plan and program projects that contribute toward the accomplishment of the State's targets, or establish its own target within 180 days of the State establishing and reporting its performance targets, and

WHEREAS, the CRCOG wishes to maintain and enhance its focus on transportation safety in the region, and

WHEREAS, the CRCOG Transportation Committee has previously discussed and endorsed CTDOT's 2021 targets for the five safety performance targets,

NOW THEREFORE, BE IT RESOLVED, that the CRCOG Policy Board has agreed to support CTDOT's 2021 targets for the five safety performance targets.

BE IT FURTHER RESOLVED, that the CRCOG Policy Board will plan and program projects that contribute to the accomplishment of said targets.

CERTIFICATE: The undersigned duly qualified CRCOG Board Member certifies that the foregoing is a true and correct copy of a resolution adopted by the voting members of the CRCOG Policy Board on December 16, 2020.

Lori L. Spielman, Secretary
Capitol Region Council of Governments

Date

Safety Performance Targets

CTDOT's proposed targets for year 2021

2020-06-11

This technical memo documents the new safety target selection process used by CTDOT to select the 5 safety performance targets for 2021 that CTDOT will submit to USDOT in two separate reports.

- *The Traffic Engineering Division will submit the targets through the annual update of its Highway Safety Improvement Plan (HSIP) that is submitted to FHWA.*
- *The Highway Safety Office (HSO) in the Planning Bureau will submit the targets through the annual update of its Highway Safety Plan (HSP) that is submitted to NHTSA.*

The U.S. DOT requires that each state DOT evaluate highway safety in the state using 5 highway safety [performance “measures”](#) and data from motor vehicle crashes in the state for the previous 5 years.

1. **Number of traffic fatalities**
2. **Fatality rate/100 million vehicle miles**
3. **Number of serious injuries**
4. **Serious injury rate/million vehicle miles**
5. **Number of non-motorist fatalities and serious injuries¹**

Every year the state DOT must establish a specific [performance “target”](#) for each performance measure. The Traffic Safety Office in the Bureau of Engineering, and the Highway Safety Office in the Bureau of Planning must work collaboratively to establish a single common set of 5 performance targets. The shared targets are subsequently submitted to and tracked by the U.S. DOT through the Federal Highway Administration (**FHWA**) and the National Highway Traffic Safety Administration (**NHTSA**). Targets need to be Specific, Measurable, Achievable, Realistic and Time-Bound (SMART). Federal regulations require that states must achieve their targets or risk penalties applied to Federal Highway safety funds. There are 2 penalties, if states fail to meet at least 4 of the 5 targets:

- States lose the ability to ‘flex’ some of their FHWA safety funds to other programs, are required to spend 100% of their safety funds on safety projects.
 - This penalty has no real impact on CTDOT since safety is a priority and our goal for the last few years has been to spend all of our federal safety funds on safety projects.
- States must prepare a HSIP Implementation Plan that details how the safety funds will be spent and how the proposed program will improve safety.

The CTDOT tries to balance target setting process by selecting targets that:

- impact safety programming in a way that accomplishes the overall goal of reducing serious injuries and fatalities on the State’s roadways, and
- that are still practical and achievable.

¹ Non-motorists include pedestrians, bicyclists, and other users of the street right-of-way who are not in a motor vehicle or motorcycle.

Achieving the balance has proven difficult in the last few years as we adapt to new federal guidelines, and to changes in both national and state trends in fatalities and serious injuries. In the last 5-6 years, there have been noticeable changes in trends as fatalities and fatality rate rates jumped around 2014 and 2015 but seem to be slowing down or leveling off in the last few years. Of special concern in Connecticut, is the increase in [non-motorist](#) fatalities and serious injuries that also began around 2014-15.

The question facing CTDOT as we prepare this year's report is whether some of these undesirable trends will continue, level off, or possibly even reverse themselves. There is recent evidence to suggest the negative trends might be lessening and conditions might be returning to levels last seen in 2015 or earlier.

Smoothing Data with 5-Year Moving Averages. Federal regulations require that state DOTs use [5-year moving averages](#) to identify trends in fatalities and serious injuries, and to use the averages to measure progress towards achieving safety goals and targets. The use of 5-year moving averages smooths out what can sometimes be significant fluctuations in data from one year to the next. Since large annual fluctuations in data are relatively common, basing performance targets on "annual" data alone can result in the selection of faulty targets and an inability to achieve the selected performance targets. The 5-year moving average is one method that can help avoid or reduce the problem caused by large "annual" fluctuations.

For this year's Safety Performance Target submittals to FHWA and NHTSA, CTDOT is required to report on the 5-year period from 2014 to 2019. While the targets are determined jointly, separate submittals are made to each federal agency. Planning's Highway Safety Office submits a report to NHTSA, and the Traffic Engineering Office submits a report to FHWA.

Disadvantage of 5-year Moving Average. Connecticut has not been satisfied with the prior practice of using the 5-year moving average as the sole indicator to set the future years' safety performance targets. While the moving average does smooth fluctuations, the use of a 5-year period means that we are including some fatality and serious injury data in our moving averages that is 4 and 5 years old. During that timeframe, motor vehicle crash trends might have changed. In fact, CT has experienced a change in trend for some performance measures in just the last 2-3 years. CT believes that the 5-year moving average is a "[lagging indicator](#)" that cannot serve as the sole or even primary guideline for setting safety performance targets.

New Target Setting Approach. This year, CT is using a modified approach to target setting. We are using both a 5-year moving average trendline and an annual trendline to guide the selection of targets. The final target selection is also based on professional judgement, and a strengthened commitment to advancing CTDOT's overall safety goal of improving the safety of all roadway users.² The Department is committed to setting "[aggressive](#)" safety targets and then developing a strong program to achieve the targets.

This aggressive target setting increases the risks of not achieving targets, but it is consistent with the high priority that CTDOT's has given to advancing its safety program. Additionally, FHWA recognizes states may choose to set aggressive targets as part of

Considerations for Aggressive Safety Targets

A State that chooses a very aggressive target is making a very strong commitment to safety. This approach will require aggressive implementation efforts to improve performance. While an aggressive target introduces greater risk of missing the target, it is an opportunity to emphasize commitment to safety, strengthen safety policies, and improve consideration of safety in investment decisions.

² For example, the Department's SHRP includes a goal of reducing the number of fatalities and serious injuries on all public roads in Connecticut 15 percent by 2021.

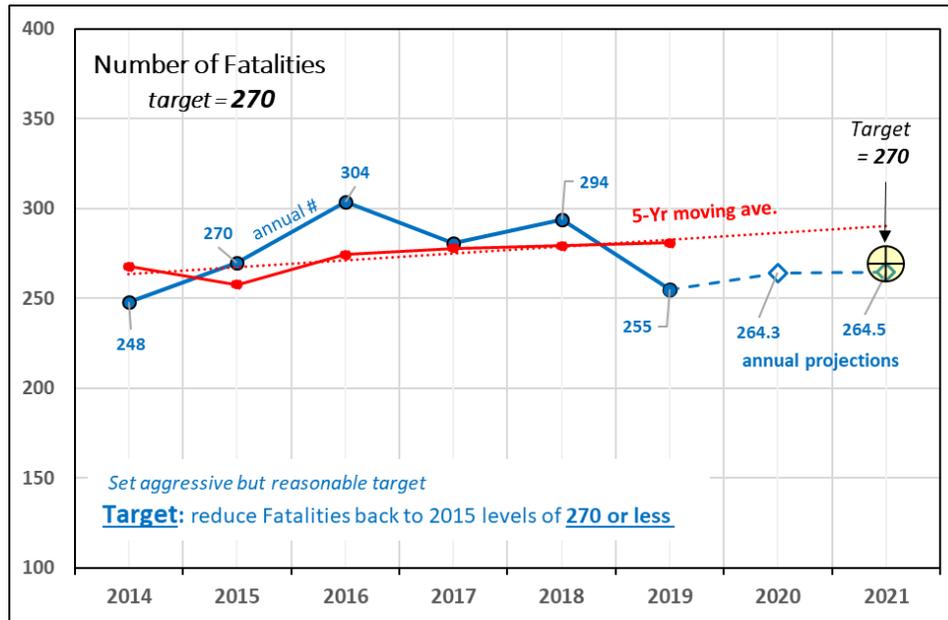
their strong commitment to safety. *See the FHWA statement to the right taken from page 14 of “Safety Target Setting Coordination Report,” FHWA, 2016 (https://safety.fhwa.dot.gov/hsip/spm/target-setting_resources.cfm).*

Special Challenge Posed by Pandemic in 2020. The COVID-19 pandemic in 2020 poses an unusual challenge to state DOTs as they seek to set new safety targets for 2021. We know the pandemic caused traffic volumes to drop 40-50% of normal for a 3-4-week period in March and April, but since mid-April we have seen a slow increase in traffic volumes. It is not known when or if volumes will return to normal in 2020 or even 2021. While reduced traffic volumes should result in a similar drop in crashes, injuries, and fatalities; that is not necessarily the case. Early indications are that crashes, and serious injuries did drop proportionate to the drop in volume. However, fatalities do not appear to have dropped much at all. This might be caused by significant increases in the percentage of drivers driving in excess of 80 mph, but there is too little data yet to ascertain the real cause.

Due to these highly unusual circumstances and uncertainty about how long they might continue, CTDOT selected its safety targets based on the Fatality Analysis Reporting System (FARS) data by NHTSA for 2014 through 2018; and, CTDOT/CT Crash Data Repository preliminary data for 2019. In the future, we will have to carefully examine the 2020 data when the year is completed and after the 2020 data sets are fully compiled.

Performance Measure: CT Fatalities: 2014-2019

The trends in number of fatalities are illustrated in the graph below. Annual fatalities are shown in blue, and the 5-year moving average is shown in red. These two lines are compared and used to select a target for 2021 as described below.



Source: FARS Final files 2014-2017, Annual Report File 2018, Preliminary 2019 CTDOT Data as of 04/01/20

“Annual” Fatalities.

- The annual number of fatalities did fluctuate as expected from year to year, but the annual data also suggest a downward trend since a high point of 304 in 2016.
- A time series regression analysis was conducted to project the likely number of fatalities in 2020 and 2021 (our target year). Based on the regression analysis, we should expect the fatalities to drop to 260-270, but there is a significant amount of statistical variance around the projection.

5-Year Moving Average.

- In contrast to the annual numbers, the 5-year moving average is exhibiting a continuing upward trend. The trendline suggests the 5-year moving average could be as much as 20-25 fatalities higher than the likely annual trend. (The annual trend reflects the influence of decreasing fatalities since 2016.)

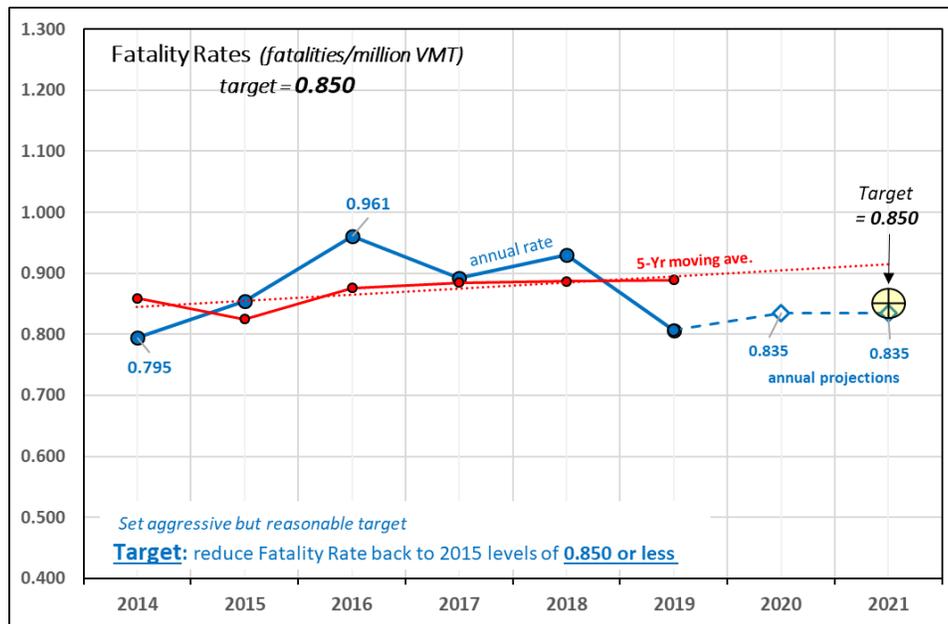
TARGET:

- CTDOT is choosing to set a 2021 fatality target of **270**. The selection is based on careful consideration of the following:
 1. The 2 trendlines in the graph suggest the actual value should lie fall between 260-290.

2. CTDOT wants to set an aggressive target that will move the state back toward fatality levels experienced in 2015 and earlier.
3. CTDOT recognizes that 2019 had an exceptionally low number of fatalities. The unusually large reduction of 39 fatalities between 2018 and 2019 could be a statistical anomaly.

Performance Measure: CT Fatality Rate per 100M VMT: 2014-2019

The trends in the fatality rate³ are illustrated in the graph below. Annual fatality rates are shown in blue, and the 5-year moving average is shown in red. These two lines are compared and used to select a target for 2021 as described below.



Source: FARS Final files 2014-2017, Annual Report File 2018, Preliminary 2019 CTDOT Data as of 04/01/20

“Annual” Fatality Rate.

- The annual fatality rate fluctuates as expected from year to year, but the [annual data](#) also suggest a [downward trend](#) since a high point of 0.961 fatalities/100M VMT in 2016.
- A time series [regression analysis](#) was conducted to project the likely number of fatalities in 2020 and 2021 (our target year). Based on the regression analysis we should expect the fatality rates to [drop to 0.835](#), but there is a significant amount of statistical variance around the projection.

5-Year Moving Average.

- In contrast to the annual numbers, the 5-year moving average is exhibiting a continuing [upward trend](#). The trendline for the 5-year moving average suggests the fatality rate could be up to 8% higher (or a rate of 0.910 versus 0.835) than rates suggested by the “annual” projection. (The annual trend reflects the influence of a decreasing fatality rate since 2016.)

TARGET:

- CTDOT is choosing to set a 2021 fatality rate target of **0.850**. The selection is based on careful consideration of the following:

³ Fatality rate is calculated as the number of fatalities per 100 million Vehicle Miles Traveled annually. Comparing the number of fatalities relative to the volume of annual travel eliminates annual fluctuations in fatalities that one might expect due to differences in travel volumes from year to year. It adjusts for one source of variation that is known to directly impact the number of fatalities.

1. The 2 trendlines in the graph suggest the actual value should lie fall [between 0.835 and 0.910](#).
2. CTDOT wants to set an [aggressive target](#) that will move the state back toward fatality rate levels experienced in [2015 and earlier](#).
3. CTDOT recognizes that 2019 had an [exceptionally low fatality rate 0.807 fatalities/100M VMT](#). The unusually large rate reduction between 2018 and 2019 an could be a statistical anomaly.

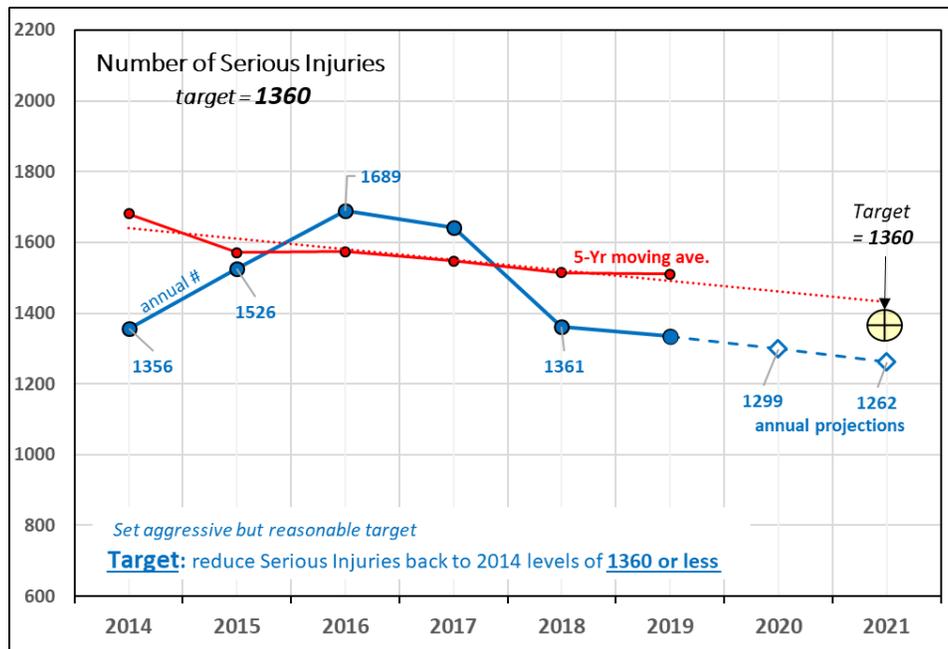
CT fatality rate among lowest in nation:

- CTDOT failed to meet its fatality rate target last year, but this must be considered in the context of two major factors.
 1. [CT 2018 fatality rate “among nation’s lowest.”](#) Historically, CT achieves one of the lowest fatality rates in the country. In 2018, it has a rate of 0.930 that was the 11th lowest rate nationwide. The national average of 1.13 was 20% higher

Despite having an already exceptionally low fatality rate, CT is choosing to strive for an even lower rate by setting target at 0.850 for 2021. The goal is to return to 2015 levels.
 2. [5-Year moving average is a “Lagging Indicator.”](#) CT believes relying exclusively on a lagging indicator like the 5-year moving average can result in selection of poor targets. This clearly was the result last year, and we propose to modify our approach as explained on page 1 of this report.

Performance Measure: CT Serious Injuries: 2014-2019

The trends in number of serious injuries are illustrated in the graph below. Annual serious injuries are shown in blue, and the 5-year moving average is shown in red. These two lines are compared and used to select a target for 2021 as described below.



Source: CT Crash Data Repository

“Annual” Serious Injuries.

- The annual number of serious injuries fluctuated as expected from year to year, but the annual data also suggest a major downward trend since a high point of 1689 in 2016.
- A time series regression analysis was conducted to project the likely number of serious injuries in 2020 and 2021 (our target year). Based on the regression analysis, we should expect large drop in serious injuries. The drop is expected to bring the annual number down to 1260 -1300, but there is a significant amount of statistical variance around the projection.

5-Year Moving Average.

- Unlike the case for *fatalities*, the 5-year moving average for *serious injuries* is exhibiting a steady downward trend. Nonetheless, there is still a large difference between the 5-year average trendline and the annual regression analysis forecast. The 5-year average is expected to drop to around 1410, while the regression forecast is 1260 -1300.

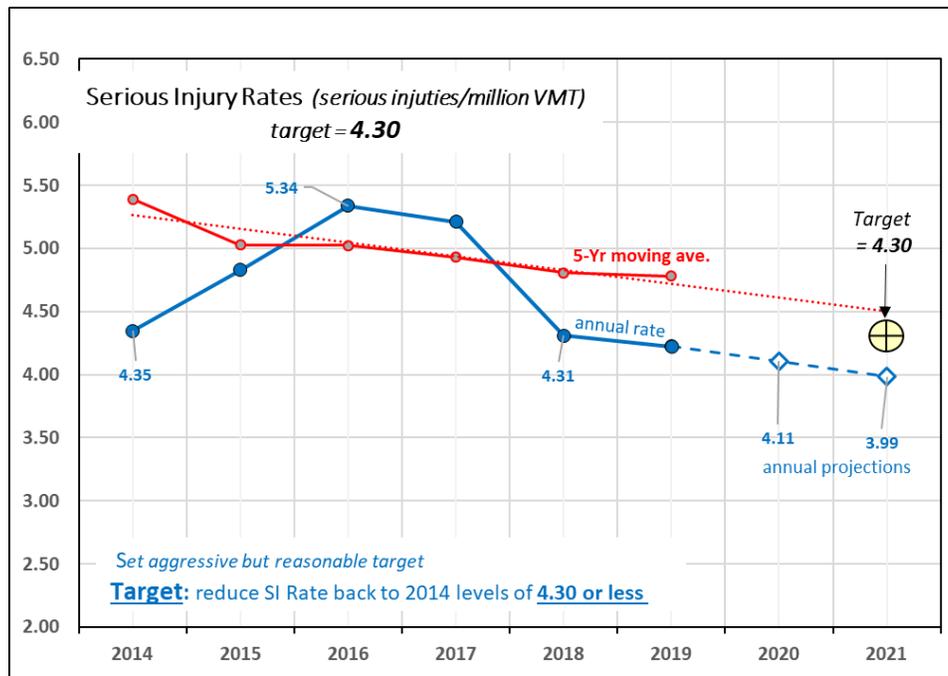
TARGET:

- CTDOT is choosing to set a 2021 fatality target of **1360 serious injuries**. The selection is based on careful consideration of the following:
 1. The 2 trendlines in the graph suggest the actual value should lie fall between 1260-1410.

2. CTDOT wants to set an aggressive target that will move the state back toward fatality rate levels experienced in 2014 and earlier.

Performance Measure: CT Serious Injury Rate per 100M VMT: 2014-2019

The trends in serious injury rates⁴ are illustrated in the graph below. Annual serious injury rates are shown in blue, and the 5-year moving average is shown in red. These two lines are compared and used to select a target for 2021 as described below.



Source: Connecticut Crash Data Repository

“Annual” Serious Injury Rates.

- The annual serious injury rates fluctuated as expected from year to year, but the annual data also suggest a major downward trend since a high point of 5.34 serious injuries/100 million VMT in 2016.
- A time series regression analysis was conducted to project the likely serious injury rates in 2020 and 2021 (our target year). Based on the regression analysis, we should expect large a drop in the serious injury rates. The drop is expected to bring the annual rate down to 3.90 -4.10, but there is a significant a amount of statistical variance around the projection.

5-Year Moving Average.

- Unlike the case for *fatality rates*, the 5-year moving average for *serious injury rates* is exhibiting a steady downward trend. Nonetheless, there is still a large difference between the 5-year average

⁴ The serious injury rate is calculated as the number of serious injuries per 100 million Vehicle Miles Traveled annually. Comparing the number of serious injuries relative to the volume of annual travel eliminates annual fluctuations in injuries that one might expect due to differences in travel volumes from year to year. It adjusts for one source of variation that is known to directly impact the number of serious injuries.

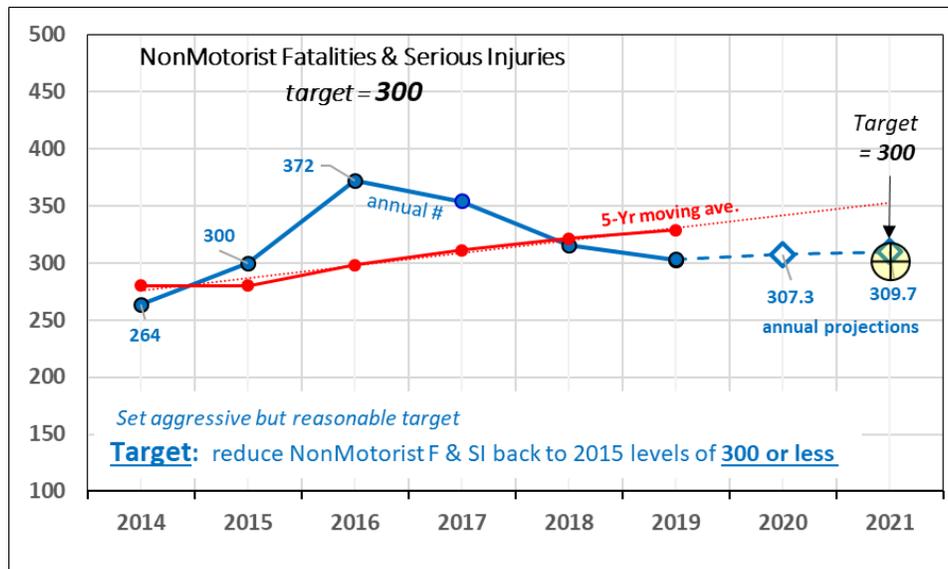
trendline and the annual regression analysis forecast. The 5-year average is expected to drop to around 4.50, while the regression forecast is 3.90 -4.10.

TARGET:

- CTDOT is choosing to set a 2021 fatality target of **4.30 serious injuries/100M VMT**. The selection is based on careful consideration of the following:
 1. The 2 trendlines in the graph suggest the actual value should lie fall between 3.90-4.50.
 2. CTDOT wants to set an aggressive target that will move the state back toward fatality rate levels experienced in 2014 and earlier.

Performance Measure: CT Non-Motorist Fatalities & Serious Injuries: 2014-2019

The trends in number of non-motorist fatalities and serious injuries are illustrated in the graph below. Annual fatalities & serious injuries for non-motorists are shown in blue, and the 5-year moving average is shown in red. These two lines are compared and used to select a target for 2021 as described below.



Source: FARS Final files 2014-2017, Annual Report File 2018, CT Crash Data Repository

“Annual” Non-Motorist Fatalities & Serious Injuries.

- The annual number of non-motorist fatalities and serious injuries fluctuated as expected from year to year, but the annual data also suggest a major downward trend since a high point of 372 in 2016.
- A time series regression analysis was conducted to project the likely number of non-motorist fatalities and serious injuries in 2020 and 2021 (our target year). Based on the regression analysis, we should expect a drop in fatalities and serious injuries. The drop is expected to bring the annual number down to **300-320**, but there is a significant amount of statistical variance around the projection.

5-Year Moving Average.

- Unlike the “annual” projections of fatalities and injuries, the 5-year moving average for non-motorist fatalities and serious injuries is exhibiting a steady upward trend. The diverging trends yield a significant difference between the 5-year average trendline and the annual regression analysis forecast. The 5-year average is expected to increase to around **350**, while the regression forecast is **300-320**.

TARGET:

- CTDOT is choosing to set a 2021 target of **300** non-motorist fatalities and serious injuries. The selection is based on careful consideration of the following:

1. High Priority for Pedestrian Safety. The safety of pedestrians and bicyclists became a major issue in CT when pedestrian and bicyclist fatalities unexpectedly jumped in 2014. While it was part of a larger national trend, it raised great concern in a state that is heavily urbanized, and walking and bicycling are essential modes of transport for many residents. These forms of active transportation are also increasingly popular forms of physical exercise. CTDOT adopted pedestrian safety as a high priority, and it has major program to improve safety and expand opportunities for walking and bicycling. We remain committed to those goals.
2. 5-year Moving Average Trendline is Problematic. Given CTDOT's commitment to pedestrian safety, we are unwilling to accept the higher a higher performance target of 350 fatalities and serious injuries that is projected using the 5-year moving average trendline.
3. "Annual" Trendline More Acceptable. The projection using regression analysis suggests a value between **300-320** that we believe to more likely than the 5-year average, and it is more acceptable given CTDOT goal to improve non-motorist safety.
4. Aggressive Target. The CTDOT wants to set an aggressive target that will move the state back toward fatality rate levels experienced in 2014 and earlier.