

Research Report
KTC-14-08/OHS-14-1F

Roadway Contributing Factors in Traffic Crashes

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ROADWAY CONTRIBUTING FACTORS IN TRAFFIC CRASHES

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Executive Summary

This project involved an evaluation of the codes which relate to roadway contributing factors. This included a review of relevant codes used in other states. Crashes with related codes were summarized and analyzed. A sample of crash sites was inspected to evaluate the accuracy and consistency of the data being evaluated.

The results of the study are recommendations for a coding format to enable accurate and consistent data concerning the roadway as it affected the crash as well as examples of areas of training to improve the accuracy and consistency of the data.

Recommendations relating to coding of the police crash report and related police training were made. The codes included in the analysis are for environmental contributing factors, traffic control devices, road surface condition, weather condition, and vehicular related factors. The codes for traffic control devices should be listed for each vehicle since traffic control may be different on the approaches to the crash taken by each driver.

Up to two environmental-related contributing factors can be listed. A factor should only be listed when it can be related directly to the cause of the crash. For example, a shoulder-related factor should not be listed when a driver travels off the pavement and collides with a fixed object close to the road unless the condition of the shoulder inhibited the driver's ability to reenter the roadway. The basis for listing the factor should be described in the narrative.

Some of the environmental contributing factors deal directly with potential roadway-related issues. The investigating officer should document the basis for listing the factor and notify the appropriate government agency when they identify a potential roadway-related contributing factor. The officer should also notify the appropriate agency if a crash damages a traffic control device. The Kentucky Transportation Cabinet (KyTC) should have a procedure to notify the appropriate highway district when a roadway-related contributing factor code is listed on a crash report and then investigate the crash to determine if any changes are warranted.

1.0 BACKGROUND

One of the three general areas of contributing factors in traffic crashes is the broad category of “environmental factors.” This category includes several factors which relate to the roadway (such as traffic control devices, drainage and limited view). The information contained in this code has the potential to provide valuable information to the Kentucky Transportation Cabinet (KyTC) to identify locations in need of improvement. However, the consistency and accuracy of this data has not been evaluated. When a factor in this category is noted in a serious crash (such as a fatal crash), this has been the basis for several Board of Claims cases against the KyTC. In many instances, an investigation has found that the information provided on the police report was not accurate and/or complete.

Crash data provided in this area would provide a valuable resource for the KyTC to identify locations in need of improvement. However, this data can be used only if it is accurate, consistent, and complete.

A recommendation in the KyTC risk management process is that crashes in which a roadway feature is listed as a contributing factor on the police report should be reviewed. It is also recommended that the coding of the police report should be reviewed to allow accurate and consistent data and that police agencies should be trained to ensure proper coding of roadway-related contributing factors.

This project involved an evaluation of the codes which relate to roadway contributing factors. This included a review of relevant codes used in other states. Crashes with related codes were summarized and analyzed. A sample of crash sites was inspected to compare the information found at the site with the data provided on the crash report in order to evaluate the accuracy of the data.

The results of the study are recommendations for a coding format to enable accurate and consistent data concerning the roadway as it affected the crash as well as areas of training to improve the accuracy and consistency of the data.

2.0 SURVEY OF STATES

A website was used to obtain the coding format used for each state’s crash report. The methods used by the various states to identify roadway-related contributing factors were reviewed. While there were many similar aspects of the coding format, no standard method was found. The review of the formats used by the various states was one source of input considered when making recommendations for coding.

3.0 EVALUATION OF ROADWAY CONTRIBUTING FACTORS

The codes currently used to identify environmental contributing factors were analyzed. This code is listed for each vehicle. The analyses included a summary of the number of instances where the various codes were identified as a contributing factor and an analysis of the basis for the code. A code could be listed more than once in a crash if it was given for more than one vehicle.

3.1 Improper/Non-Working Traffic Controls

This code was listed for 1,551 vehicles in the past 10 years (2004 through 2013). The number ranged from 101 in 2013 to 203 in 2008. The code was listed for 418 vehicles involved in an injury crash and 13 involved in a fatal crash. This code was listed most often in Highway District 5 and least often in District 10. The code was listed most often in Jefferson County with 31 percent in that county. This was followed by 11 percent in Boone County and 10 percent in Fayette County.

A review of crash reports found that a large number of the crashes with this code involved a traffic signal which was not operating due to issues such as a power outage or a storm. About 55 percent listed a traffic signal as the traffic control. Only about six percent had a stop sign as the traffic control. Disregarding the traffic control was only listed in about nine percent of these crashes.

Fatal and injury crash reports with this code were reviewed. Of 19 fatal or injury crashes in 2012, most (13 crashes) involved a traffic signal which was not working (with almost all noting the power was out). There were two in which a stop sign was missing with one having an issue with a railroad signal. No explanation for the code was given in three crashes.

There were 18 injury crashes with this code in 2012 with the traffic signal not working in 12 of those crashes. There were three involving an issue with a sign. One involved a problem with the traffic control at a railroad crossing with another noting there was no traffic control at a work zone while one had no explanation.

There were no fatal crashes with this code in 2013 and seven injury crashes. Three of the injury crashes were at a traffic signal (two with the signal on flash). In the other crash sun glare was noted as the reason the driver did not see the red indication so improper traffic control should not have been listed. Four of the crashes involved an issue with a traffic sign with two in a construction zone. One of the crashes in a construction zone involved a construction sign blocking the view of the stop sign. The other crash occurred in the transition zone where one lane was closed on an interstate. The narrative stated that the cones were out of line and spaced too far apart.

A potential problem with this code is the title of “improper/non-working traffic controls.” The officer could note that the traffic control was not working (such as a traffic signal which was not operating or flashing) or could note that the device was missing (such as a sign down or missing from the post). However, a code of “improper” requires more analysis than would be expected from the police report. The review of other states did not include the “improper” code. The recommendation would be to change this code to three codes of “traffic control device missing” and “traffic control device inoperative” and “traffic control devices (other).”

Police training should include instructions for the investigating officer to inform the appropriate government agency when this code is listed. For example, there were a few reports where there was a notation that the stop sign was down or missing. In one instance, the note was that the stop sign had been knocked down in a previous accident. If a crash results in damage to a traffic control device, the agency responsible for maintaining the device should be contacted. This was shown in another crash where the police narrative noted that the stop sign had been knocked down recently with the comment that the government officials were notified to prevent further collisions at the intersection.

3.2 View Obstructed/Limited

This code was listed for 33,731 vehicles in the past 10 years (2004 through 2013). The number varied from 2,851 in 2012 to 4,226 in 2004. The code was given for 7,756 vehicles in injury crashes and 352 vehicles involved in a fatal crash. The code was listed most often in Highway District 7 and least in District 10. The highest numbers were in Jefferson County followed by Fayette County.

A review of crashes with this code found that no explanation was provided in the narrative in many instances for the source of the limited or obstructed view. Of the 22 fatal crashes with this code in 2012, there was no explanation provided for 12 of the crashes with four related to weather condition and four related to a roadway-related issue. The two others noted the lack of lights on a bicycle and the dark clothing for a pedestrian with neither of these explanations appropriate for this code.

Of the 16 fatal crashes with this code in 2013, there was no explanation provided for six crashes with three related to the weather condition and two related to a roadway-related issue. Four involved lack of visibility of a pedestrian at night with one where the rear of a motor scooter was not observed at night. There are other codes to use for dark clothing for a pedestrian or the lack of lighting on a vehicle.

The available codes for a limited or obstructed view should be divided into roadway and weather categories. Also, an explanation in the narrative should be required when this code is listed. Fog was listed as the weather condition in about four percent of these crashes but was listed in 20 percent of the fatal crashes. A hillcrest was listed under roadway character in about 14 percent of all these crashes, 17 percent of the injury crashes, and 19 percent of the fatal crashes.

Crash reports were reviewed for 30 injury crashes occurring in 2013. Of the 30 crashes, eight involved weather limiting visibility. This shows the need for separating roadway and weather for limited visibility. There were eight crashes where another vehicle blocked the view of a driver. There should be a code listed as view obstructed (other) which would be described in the narrative. This code would include the view being obstructed by another vehicle. In six crashes the narrative showed no basis for listing limited view as a contributing factor. In four crashes some aspect of the vehicle limited the view. This shows that a separate code for limited view should be included in the vehicle factor category. In two cases there was no explanation. A roadway-related factor limited the view in only two of the 30 crashes with both dealing with a hillcrest.

Numerous crash reports were reviewed with this code. A substantial number involved the view blocked by another vehicle. This would be coded using an “other” code.

3.3 Water Pooling

This code was listed for 18,225 vehicles in the past 10 years (2004 through 2013). The number varied from 1,458 in 2005 to 2,338 in 2006. This code was given for 4,561 vehicles involved in an injury crash and 132 involved in a fatal crash. The largest number was in Highway District 5 with the fewest in District 10. Jefferson County had 21 percent followed by Fayette County with six percent.

When water pooling is listed as a contributing factor, the roadway surface condition code should be consistent with a code of standing/moving water. However, only 23 of the 53 fatal crashes from 2008 through 2013 mentioned water pooling in the narrative or had a code of standing/moving water. In 2012 there were 1,370 crashes with the water pooling listed as a factor but only 396 crashes (29 percent) had a code of standing/moving water. In 2013 there were 1,560 crashes with the water pooling code but only 326 crashes (21 percent) had a code of standing/moving water. Only six of the 20 fatal crashes (30 percent) in 2012 and 2013 with water pooling listed as a factor had the standing/moving water code.

The roadway surface condition code was listed as standing/moving water in only five percent of all the instances where water pooling was listed. The pavement was coded as wet in 83 percent. The pavement was listed as dry in 10 percent which shows a lack of consistency.

Many fatal crashes listed both slippery surface and water pooling as contributing factors. It is logical that both should not be coded. Road surface condition would be a factor if the available friction of the pavement was reduced (due to such issues as rain, ice, snow, or oil) and this contributed to loss of control. However, water pooling is not just a slippery surface. It occurs when water is standing on the road and implies that drainage is a factor. When water is standing on the road, a “drainage-related issue” code would be appropriate. This would apply when either there is a problem with water draining from the pavement or water is draining onto the pavement from the roadside.

There was a reference to poor tire tread in several fatal crashes with a vehicle code of “other” listed. There should be a specific code under vehicular contributing factors for poor tire tread. The narrative could give a more detailed explanation.

Several crash sites were inspected where both slippery surface and water pooling were listed as factors. In these cases the pavement was wet but standing or moving water was not coded. No evidence of a condition which would result in water pooling was found. The review of the locations showed that an environmental factor of “road surface condition” should have been coded rather than water pooling for these reports.

3.4 Shoulders Defective/Drop-off

This code was listed for 3,393 vehicles in the past 10 years (2004 through 2013). The number varied from 222 in 2013 to 399 in 2006. There were 981 vehicles with this code involved in injury crashes and 63 in fatal crashes. The highest number was in Highway District 7 with the lowest in District 10. The counties listed most often with this code were Jessamine and Laurel Counties.

A driver factor code of overcorrecting was listed in only 17 percent of these crashes. Where a shoulder drop-off exists, a problem occurs when a driver, after allowing their vehicle to exit the travel lane, overcorrects rather than steering gradually back onto the pavement. Overcorrecting was listed in 25 percent of the injury and fatal crashes.

Of 29 fatal crashes from 2008 through 2013 there was only six with any type of explanation for the code. This code could note “shoulder-related issue” rather than the specific notation of a defect or drop-off. A detailed analysis would be necessary to determine if there was a defect or if the extent of a drop-off caused loss of control.

A review of the data found many crashes with this code where a driver failed to maintain control with their vehicle traveling off the roadway. While the shoulder-related factor was given, there was no evidence that the loss of control was due to a shoulder defect or drop-off. An impact occurred with a fixed object close to the pavement in many instances so there was not a wide shoulder. However, this is an issue with the necessary clear zone and not the shoulder. This code was also given many times where the basis was that the shoulder was not wide. This would not be the basis for a conclusion that the shoulder was defective. A more generic code of “shoulder-related issue” could be used rather than describing the shoulder as defective.

3.5 Hole/Deep Ruts/Bumps

This code was listed for 1,365 vehicles in the past 10 years (2004 through 2013). The number has varied from 88 in 2013 to 172 in 2009. There were 388 vehicles with this code involved in injury crashes and 16 in fatal crashes. The highest number was in Highway District 6 with the lowest in District 10. The counties listed most often with this code were Jefferson County followed by Fayette, Campbell, and Boone Counties.

Of eight fatal crashes in 2008 through 2012 with this code, an explanation was provided in only four of the crashes. One of these four crashes listed loose gravel as the explanation which should have been another factor (debris in roadway).

3.6 Debris in Roadway

This code was listed for 7,792 vehicles in the past 10 years (2004 through 2013). The number has varied from 730 in 2010 to 836 in 2004. There were 1,522 vehicles with this code involved in injury crashes and 40 in fatal crashes. The highest numbers were in Highway District 5, 6, and 7 with the lowest in Districts 10 and 8.

Of 21 fatal crashes from 2008 through 2013 with this code, a review found that 12 actually involved debris in the road which contributed to the crash. The most common debris was gravel with four crashes. Gravel was typically a factor for motorcycles. In a couple of crashes the type of debris was not described. Five crashes with this code involved a pedestrian in the road with most lying in the road. A couple of crashes involved a moving tire from another vehicle (which should have been listed as a vehicular factor). In a couple of crashes debris from a crash damaged another vehicle but was not a factor in the crash.

A review of several crashes with this code shows that many dealt with objects which were not related to the roadway (such as an object which had fallen from another vehicle or was blown into the road). The type of debris should be identified so that roadway-related issues (such as gravel) could be identified.

3.7 Improperly Parked Vehicle

This code was listed for 4,601 vehicles in the past 10 years (2004 through 2013). The number has varied from 405 in 2007 to 523 in 2004. There were 489 vehicles with this code involved in injury crashes with 26 in fatal crashes. The highest numbers were in Highway Districts 5 and 7 with the lowest in Districts 10 and 8. The counties with this code listed most often were Jefferson County followed by Fayette and Kenton Counties.

Of 12 fatal crashes in 2008 through 2013 with this code, only one was identified as being directly related to an improperly parked vehicle. Five involved vehicles disabled due to a mechanical issue and four involved vehicles disabled due to a previous crash. In one crash a vehicle was moving slowly to avoid an object in the road and in one crash the vehicle was stopped on the shoulder for an unknown reason.

There were 47 injury crashes in 2013 with this code. A review of the reports found 20 crashes (43 percent) which could be related to an improperly parked vehicle. The most common other reason was the vehicle disabled due to a mechanical problem (11 crashes). The data show the need to add a vehicle factor code for a disabled vehicle (either as a result of a mechanical problem or a previous crash). This is supported by the finding that only 67 percent of the vehicles with this code were also coded as being parked when the collision occurred. This shows lack of consistency in the data and would be a training issue.

3.8 Animals Action

This code was listed for 51,522 vehicles in the past 10 years (2004 through 2013). The number has varied from 4,490 in 2005 to 6,154 in 2013. There were 6,613 vehicles with this code involved in injury crashes with 80 in fatal crashes. The highest numbers were in Highway Districts 2 and 6 with the lowest in Districts 10 and 12. The counties listed most often were Hopkins and Boone. About 73 percent involved a coding of a collision with a deer or other animal.

In 2012 there were 5,652 crashes with this code (4.5 percent of all crashes). About one half of these crashes involved a deer.

There were 42 fatal crashes with this code from 2008 through 2013. The narrative described how the animal was involved in all but three of the crashes. The animal involvement was almost evenly divided between hitting the animal and having a crash as a result of avoiding the animal. Several of the crashes noted in the narrative that a deer was hit but the proper "1st event collision" code was not marked.

3.9 Construction Work Zone; Maintenance/Utility Work Zone

Separate codes are provided for a construction work zone and a maintenance/utility work zone. One of these codes was listed for 10,393 vehicles in the past 10 years (2004 through 2013). The number has varied from 846 in 2005 to 1,692 in 2011. There were 1,855 vehicles with this code involved in injury crashes with 80 in fatal crashes. The highest numbers were in Highway Districts 6 and 5 with the lowest in Districts 10 and 12. The highest number was in Jefferson County followed by Fayette and Campbell Counties.

There were nine fatal crashes with the maintenance/utility work zone code from 2008 through 2013. A review of the crash reports found that four of the seven were in a construction zone rather than involving maintenance or utility work. In some cases it may be difficult to distinguish the type of work zone.

There were 20 fatal crashes with the construction work zone code from 2008 through 2013. A review of the reports found that 14 of the 20 occurred on an interstate highway. Only one involved a maintenance activity rather than road construction. In three of the crashes there was no indication in the narrative that a work zone was a factor in the crash. The most common crash involved a rear end collision involving vehicles either stopped or slowly moving due to work zone activity.

Diagrams were included as part of some of the reports. In general, detailed information about the traffic control present in the construction zone was not provided. While the investigating officer should not be expected to conduct an in-depth analysis of the work zone, photographs and a description of the traffic control would be beneficial for a later investigation since the work zone changes. The traffic control devices will be changed and moved frequently.

This code has been used when the crash occurs at a location where there a work zone but the work zone may not have been a factor in the crash. For example, a fatal crash occurred in a work zone as a result of tire failure and was not related to the work activity. There is a code on the report to note where the crash occurred in the work zone (advance warning area, transition area, activity area, etc.). This code should always be used when the crash occurs in a work zone. However, the contributing factor code would not have to be used when the existence of a work zone was not a factor in the crash.

The analysis resulted in the recommendation to classify this type of factor as either “work activity (highway related)” or “work activity (non-highway related).”

3.10 Glare

This code was listed for 10,938 vehicles in the past 10 years (2004 through 2013). The number has varied from 955 in 2009 to 1,275 in 2013. There were 2,641 vehicles with this code in injury crashes and 72 in fatal crashes. The highest numbers were in Highway Districts 7 and 5 with the lowest in Districts 10 and 12. Jefferson and Fayette Counties had the highest numbers.

There were 38 fatal crashes with this code from 2008 through 2013. In 21 of the crashes sun was noted in the narrative as the source of the glare. The basis for listing glare was not described in the narrative in the other reports but reviewing the time and the direction of travel shows that sun was the probable source of glare in these crashes. This shows that a code should be “glare/sun.”

A possible glare factor which could be related to the roadway would be glare from an opposing vehicle’s headlights. An additional code noting “glare/other” could be added with the requirement that an explanation must be added when this factor is given.

An example which illustrates why environmental factors should be monitored by the KyTC is the coding of glare as the reason a traffic signal indication could not be observed. This could indicate the need to make the signal head signal more visible by using a backplate or reflective tape or that an additional signal head should be installed.

3.11 Fixed Object

There has been limited use of this code which has been listed for 556 vehicles in the past 10 years (2004 through 2013). The number has varied from 49 in 2012 to 66 in 2009. There were 87 vehicles with this code in injury crashes and five in fatal crashes. The largest number was in Highway District 7 with the fewest in District 8.

When a vehicle collides with a fixed object there is another code (1st and 2nd event collision) which can be used to identify that a fixed object was involved. The number of instances in which fixed object is coded for an environmental factor is only a very small percentage of crashes in which a fixed object was involved and coded in the “1st and 2nd event collision” code. A review of the 67 crash reports in 2013 in which fixed object was listed as an environmental factor shows the inconsistency of this data. There were several crashes in which a fixed object obstructed the view. The view obstruction code was typically listed which would be the correct code. The source of the obstruction should be noted with no need to list fixed object as a factor. The analysis shows that this code can be removed as an environmental factor code.

3.12 Slippery Surface

This code has been listed for 170,789 vehicles in the past 10 years (2004 through 2013). The number has varied from 14,337 in 2012 to 19,878 in 2004. There were 39,077 vehicles with this code in injury crashes and 977 in fatal crashes. The largest numbers were in Highway Districts 7 and 5 with the lowest in Districts 8, 9, and 1. Counties with the highest numbers were Jefferson and Fayette. The road surface condition was wet in 71 percent with snow or ice in 27 percent. An issue with consistency is shown in that 1.1 percent had a road surface condition of dry.

This is the most common code used for an environmental factor. In 2013, approximately one third of the crashes with a wet surface condition listed slippery surface as an environmental factor. This percentage increased to 70 percent when snow was the surface condition and 86 percent when ice was the surface condition.

All of the 63 fatal crash reports with slippery surface listed as a contributing factor were reviewed. Only three of the reports also listed water pooling. The basis for listing slippery surface was provided in several of the report narratives. However, in several instances, there was no description provided to describe the basis for the slippery surface code. While the road surface was listed as wet the circumstances of the crash did not indicate that the surface condition was directly related to the crash. Also, in a few instances, poor tire tread was noted in the narrative with “other” listed as a vehicular factor. There should be a separate vehicular factor relating to tire tread.

4.0 TRAFFIC CONTROL DEVICES CODES

Several accuracy issues were found with the current codes used to document the traffic control devices existing at the location of a traffic crash. For example, there are separate codes for centerline and no passing zone which would be a duplicate. There is a general code for warning signs but also a code for a curve sign which is one type of warning sign. There is a code for a flashing light but no description of whether it at an intersection or another application. Railroad signs and signals are placed in the same category. Also, a review of crashes found that there has been a tendency to not include all the relevant traffic control devices on the report.

There is a code for “officer or flagman” but it is unknown if this is related to a construction zone or another activity. A review of fatal crashes with this code noted found several where there was no information to determine how an officer or flagman was involved.

The existing codes were reviewed and compared to those found in other states. A list of traffic control devices was prepared.

This code lists the traffic control devices at the accident site. If the device was missing or inoperative, that would be listed as an environmental contributing factor.

5.0 ROADWAY SURFACE CONDITION CODES

This code describes the condition of the roadway surface. It does not describe the type of roadway surface. This code should be consistent with any environmental contributing factor code. For example, with the existing coding, if water pooling was listed as a factor, then standing/moving water should be listed as the roadway surface condition. However, only 19 of 46 fatal crashes from 2008 through 2012 which listed water pooling also coded “standing or moving water” as the road surface condition. In 2012 there were 1,370 crashes with water pooling with only 396 having a code of “standing or moving water.” Many fatal crashes listed both slippery surface and water pooling where one or the other should be used (typically slippery surface).

One current code combines sand, mud, dirt, oil and gravel. These represent various types of material which may be on the surface. It would be useful to divide these into a few categories.

6.0 WEATHER CONDITION CODES

The coding for weather condition should provide consistent information with environmental contributing factors. If limited visibility is a contributing factor the data should indicate whether the limitation was due to weather or a roadway-related factor. The weather condition code should provide consistent information.

7.0 VEHICLE CONTRIBUTING FACTORS

A review of the other coding revealed some issues with the codes for vehicle contributing factors. One example involves the “improperly parked” code. Specifically, when a vehicle was disabled due to a mechanical issue, a code of “improper parking” has been listed. Crashes were found where a vehicle disabled from a previous crash was listed as being improperly parked. This code should only be listed when a driver intentionally parks the vehicle at an improper location. For example, the “improperly parked” code can be used when a truck driver parks his vehicle on the shoulder of an interstate to rest rather than for an emergency.

In addition to a vehicle being stopped due to a mechanical problem, several crash reports noted that the vehicle was stopped due to the vehicle running out of gas. This would be considered a vehicular-related factor. A code of “disabled vehicle” could be added to cover situations where the vehicle was stopped due such situations as a mechanical problem or involvement in a previous crash.

Another issue was the condition of the tires. The current code for a problem with the tires is tire failure. When the pavement was wet the police narrative in some crashes noted the lack of tire tread. A factor of “other” was listed under vehicular factors. To increase accuracy, lack of tire tread should be added as a separate code.

Crashes have occurred with tractor trailers when the truck could not turn due to a combination of the length of the truck and the turning radius. There have evidently been problems with truck drivers being routed onto roads by their GPS which should not be used by large trucks. To more accurately identify this situation, a code of “restricted turning radius” should be added as a vehicular factor.

8.0 CASE STUDIES

A sample of crash reports were reviewed with the crash locations inspected as case studies to determine the accuracy and consistency of the data. The case studies covered the various environmental codes as well as the coding of traffic control and related vehicular factors. The case studies illustrate the recommendations which were made to improve the accuracy and consistency of the crash reports. Descriptions of the case studies and their relationship to the recommendations are given in the appendix.

9.0 RECOMMENDATIONS

Following is a summary of recommendations for coding of the police crash report and related police training. The coding areas included are for environmental contributing factors, traffic control devices, road surface condition, weather condition, and vehicular related factors.

Up to two environmental-related contributing factors can be coded for a vehicle. A factor should only be listed when it can be related directly to the cause of the crash. For example, a shoulder-related factor should not be coded when a vehicle travels off the pavement and collides with a fixed object close to the road unless the condition of the shoulder inhibited the driver’s ability to reenter the roadway. The basis for listing the factor should be described in the narrative portion of the report.

Some of the environmental contributing factors deal directly with potential roadway-related issues. The investigating officer should document the basis for listing the factor and notify the appropriate government agency when they identify a potential roadway-related contributing factor. The officer should also notify the appropriate agency if a crash damages a traffic control device. The KyTC should have a procedure which would notify the appropriate highway district when a roadway-related contributing factor code is coded on a crash report and then investigate the crash to determine if any changes are warranted.

9.1 Environmental Contributing Factors

Following are recommended codes (with reference to the current code) and related training for the various environmental contributing factor codes.

Current Code: Improper/Non-working Traffic Controls

Recommended Codes:

- traffic control device missing
- traffic control device inoperative
- traffic control devices (other)

Training:

- Inform the appropriate government agency (responsible for the maintenance of the roadway and the traffic control devices) when this code is used.
- Inform the agency responsible for maintaining the device when a crash results in damage to a traffic control device.
- If “person” is coded for traffic control the narrative should describe their involvement.
- The code should not include reference to improper traffic control since that requires an engineering evaluation. The narrative could include a reference to the traffic control and the appropriate agency could be contacted if there was a question about the existing traffic control.
- The “traffic control devices (other) code should be used if, in the officer’s opinion, there is an issue in the existing traffic control (which must be explained in the narrative).

Current Code: View Obstructed/Limited

Recommended Codes:

- weather condition (visibility limited)
- view obstructed/limited (roadway)
- view obstructed (other)

Training:

- An explanation should be provided in the narrative when this code is listed.
- The weather code should be consistent if the code of weather condition (visibility limited) is listed.
- A vehicular factor code should be used if the obstruction or limited view was related to the vehicle (such as an object in the vehicle or a part of the vehicle).
- The agency responsible for maintenance should be notified if the view obstruction is related to the roadway.

Current Code: Water pooling

Recommended Code:

- drainage-related issue

Training

- Do not list both slippery surface (road surface condition) and water pooling (drainage) as contributing factors in the same crash.
- List standing/moving water as the roadway surface condition code when water pooling (drainage) is listed as a contributing factor.
- This factor would not apply when water is draining normally from the roadway as a result of a heavy rain.
- The factor would apply if water was not draining properly from the road or if water was in the road from an overflowing ditch or adjacent property. The agency responsible for maintenance should be notified of the specific issue which resulted in the water standing on the road.
- This factor would not apply to a roadway flooding situation.

Current Code: Shoulder Defective/Drop-off

Recommended Code:

- shoulder-related issue

Training

- An explanation should be provided when this code is listed.
- If a shoulder drop-off is an issue, it should be documented with measurements showing the height and slope of the difference in elevation between the pavement and adjacent turf.
- The condition of the shoulder should be described with no conclusion concerning whether the shoulder condition was defective since that opinion would require an engineering evaluation.
- If the lack of shoulder width is the issue, the width should be documented.

Current Code: Hole/deep ruts/bumps

Recommended Code:

- holes/ruts/bumps

Training

- An explanation should be provided when this code is listed.

Current Code: Debris in roadway

Recommended Code:

- debris in road

Training

- Describe the type of debris and the source if known.
- The code would not include a pedestrian lying in the road.
- Only include the code if the debris was a contributing factor to the crash.
- The roadway condition code should be consistent with this code. For example, if gravel was the debris in the road the roadway condition code should list gravel.

Current Code: Improperly Parked Vehicle

Recommended Code:

- improperly parked vehicle

Training

- Only include this factor when a vehicle has been parked improperly when the driver had other options. An example would be a truck driver stopping on the shoulder of an interstate to rest.
- Do not include this factor when a vehicle is disabled due to either a mechanical problem or a previous crash. The appropriate code for this issue is provided under the vehicle factor category.
- The code should be consistent with the “pre-collision vehicle action” code showing a vehicle was parked when the collision occurred.

Current Code: Animals Action

Recommended Code:

- animals action

Training

- Describe how the animal contributed to the crash in the narrative.
- When a deer is hit, the proper “1st event collision” code must be noted.
- If possible, note the specific type of animal involved in the narrative.

Current Codes: Construction Work Zone; Maintenance/Utility Work Zone

Recommended Codes:

- work activity (highway related)
- work activity (non-highway related)

Training

- Describe the type of work activity in the narrative.
- Inform the responsible highway agency when a crash occurs in a work zone.
- Only include this code when the work activity was related to the crash. This code does not infer that there was any problem with the traffic control or design of the work zone. The code noting where the crash occurred in the work zone (advance warning area, transition area, activity area, etc.) can be used to identify the crash as occurring in a work zone even if the work activity was not a contributing factor.
- Prepare a diagram describing the locations of the traffic control devices.
- Code the traffic control devices at the work activity area.

Current Code: Glare

Recommended Codes:

- glare (sun)
- glare (other)

Training

- The source of the glare should be described in the narrative if the “glare/other” code was listed.

Current Code: Fixed Object

Recommendation: Do not use this code for an environmental factor.

Training

- If a collision occurs with a fixed object, it should be coded using the “1st and 2nd event collision” codes. A list of fixed objects is included with this code.
- If a fixed object obstructs the view of a driver, the “view obstructed/limited (roadway)” code should be used.

Current Code: Slippery Surface

Recommended Code:

- road surface condition (refer to road surface condition code)

Training

- Do not code this contributing factor if “drainage-related issue” is listed as a factor.
- Only list this factor when the road surface condition was a factor in the crash. A wet pavement would not automatically make road surface a contributing factor to the crash. All the circumstances relating to the crash must be considered.

Considering the preceding discussion the following codes were identified to use for environmental contributing factors.

- traffic control device missing
- traffic control device inoperative
- traffic control device (other)
- weather condition (visibility limited)
- view obstructed/limited (roadway)
- view obstructed (other)
- drainage-related issue
- shoulder-related issue
- holes/ruts/bumps
- debris in road
- improperly parked vehicle
- animals action
- work activity (highway related)
- work activity (non-highway related)
- glare (sun)
- glare (other)
- road surface condition (refer to road surface condition code)

9.2 Traffic Control Devices

The following codes were identified to be used for the traffic control devices at the crash location.

- no controls
- traffic signal
- intersection beacon
- stop sign
- yield sign
- other regulatory sign
- curve sign
- other warning sign
- advisory speed sign
- school zone sign/device
- pavement markings (lane/centerline)
- pavement markings (edge line)
- crosswalk
- other pavement markings
- railroad crossing device (sign/signal/gate)
- person
- unknown

The coding should allow for up to three traffic control devices to be identified. An explanation should be given if “person” is listed to document whether the person was a police officer or a flagger. A description should be given in the narrative for the traffic control device codes which are not specific. For example, when an advisory speed is given, the speed should be noted as well as the warning sign with which it was associated. When “other warning sign” is coded the specific warning sign should be noted in the narrative.

The codes should be provided for each vehicle. An example would be a crash at an intersection where a driver pulled from a stop sign into the path of a driver on a major road with no stop sign but an intersection warning sign with an advisory speed. In this example, the code for the first vehicle would be stop sign with the codes for the second vehicle “other warning sign” and “advisory speed sign” (with the type of warning sign and advisory speed noted in the narrative). For a rear end collision the codes would be the same for all vehicles involved since they would be traveling on the same approach.

It is important to document the traffic control devices when a crash occurs at a work zone. For example, diagrams should be provided to document the type and location of advance warning signs since they will be moved.

A review of crash reports and site visits found that “no traffic control” was coded in many instances where signs and markings were present. Also, “advisory speed sign” was listed in several instances where the site visit found no sign.

9.3 Roadway Surface Condition

The following codes were identified to be used for roadway surface condition existing when the crash occurred. The code can relate to a weather condition such as wet or ice or it can relate to other situations such as gravel on a paved surface.

- dry
- wet
- snow/slush
- ice/frost
- water (standing/moving)
- water (roadway flooded)
- sand
- gravel
- mud, dirt
- oil
- other
- unknown

If drainage is listed as an environmental factor standing/moving water should be coded for roadway surface condition. If there is a substantial height of water across the road, the “roadway flooded” code should be used.

This code should be consistent with the other codes. For example, if “debris in road” is coded as an environmental factor the type of debris could be coded using the roadway surface condition code.

9.4 Weather Condition

The following codes were identified to be used for weather condition existing when the crash occurred.

- clear
- cloudy
- rain
- snow
- sleet, hail, freezing rain
- fog
- smog, smoke
- severe crosswinds
- other
- unknown

If limited visibility due to weather conditions is listed as an environmental factor a consistent weather condition code should be provided.

9.5 Vehicular Related Factors

The following codes should be added to the current vehicular-related contributing factor codes.

- disabled vehicle
- tire tread
- view obstructed/limited
- restricted turning radius
- improper use

When these codes are noted, the narrative should provide an explanation. For example, describe why the vehicle was disabled (either a mechanical problem or a previous crash), the issue with the tire tread, or how the view was obstructed or limited due to an issue with the vehicle. If the vehicle was disabled from a previous crash, the crash should be identified as a “secondary crash.” The “restricted turning radius” would typically occur when a combination truck could not turn left or right in or out of an intersection or driveway. An example of improper use would be driving an ATV being driven on a paved public road.

The current code for load securement should include an uncovered load where an object fell and contacted another vehicle. An object falling from another vehicle would not be coded as debris in roadway.

9.6 Intersection Crashes

A review of the crash reports found a common problem was not properly coding the indication that the crash occurred at an intersection. In many instances the narrative described the crash as occurring at an intersection but the intersection code was listed as “no.” There should be a “yes” code for the intersection indicator when the crash occurred at an intersection. This is an example of an inconsistency in the crash report.

The case studies includes crashes in which a traffic signal was listed as the traffic control with an angle collision but the intersection code was “no.” A comparison could be made between the traffic control and intersection codes to determine if they are consistent.

APPENDIX
CASE STUDIES

Case Study 1

This crash involved a fatal motor vehicle/pedestrian collision. A contributing factor listed for the driver was “view obstructed/limited.” The report noted a slight hillcrest but the narrative stated the hillcrest did not obstruct the line of sight. This was confirmed with a site visit. The crash occurred during a heavy rain which was the basis for noting limited view. This case study supports the recommendation that there should be separate codes for limited visibility as a result of either weather conditions or when the view is obstructed or limited due to roadway factors.

Case Study 2

A KyTC Board of Claims case involved a single vehicle where water pooling was listed as a contributing factor. The vehicle exited the road in a curve and on a downgrade. The end of the downgrade and start of an upgrade occurred a short distance past the location where the vehicle exited the road. Further investigation found that the investigating officer was noting possible water pooling at a location past where the loss of control occurred. Therefore, if water pooling did exist at the location noted, it would not have been a factor in the crash. The case study supports the recommendation that the listed factor should only be noted if it was a contributing factor to the crash.

Case Study 3

A right angle fatal crash occurred at an intersection controlled by a stop sign on two of the approaches. The narrative noted that “improper/non-working traffic controls” was a factor. Specifically, a stop sign had been knocked down due to a crash three days prior. A review of the previous crash found that a vehicle had stopped on top of a stop sign. This case study supports the recommendation that the police officer should notify the appropriate government agency when a traffic control device is missing. Notification should have been made when the stop sign was knocked down in the crash previous to the fatal crash.

Case Study 4

A fatal head-on crash occurred on an interstate when a tire failed with the vehicle then crossing the median. Tire failure was properly listed as a vehicular contributing factor. While the crash occurred in a construction zone where a lane was closed, the tire failure was not related to the road construction. The report listed “construction work zone” as a factor. The question is whether this should be listed since the road work did not contribute to the crash. Another code on the report will allow the crash to be identified as occurring in a work zone.

Case Study 5

An injury crash occurred at an intersection of a state and county road. The police report listed limited view as a contributing factor. The narrative noted a hillcrest on the state road as the reason for the limited view. However, an inspection of the site showed that a brick mailbox was the major view obstruction. Moving the mailbox would address the view obstruction. This case study supports a recommendation that crashes with certain roadway-related contributing factors listed should be investigated by the KyTC.

Case Study 6

An injury crash occurred where the narrative noted that bushes blocked the view of a driver who pulled in front of another vehicle. The environmental factor listed was “fixed object” rather than “view limited.” This case study supports the recommendation that fixed object should be removed as a code for an environmental factor.

Case Study 7

A fatal rear end collision occurred on an interstate when a tractor trailer driver lost control due to diesel fuel on the pavement from a previous crash. The crash was correctly coded as a secondary collision. The environmental factor listed was slippery surface although the roadway condition was coded as dry. The evidence indicates that the road surface condition was a contributing factor. This case study supports the recommendation that the proper environmental code would be “road surface condition” which should be coded when there is evidence that it was a contributing factor. When this code is listed, the roadway condition code should be consistent. In this case study the roadway surface condition code would be oil.

Case Study 8

A fatal collision occurred on a wet pavement when a driver lost control of their vehicle. Slippery surface was listed as a contributing factor. The narrative noted lack of tread on the rear tires with good tread on the front tires. The vehicular factor listed “other” as a contributing factor. There should be a specific code for tire tread as a vehicular factor. The environmental code should be “road surface condition” and the specific road condition code would provide the existing surface condition (wet, snow, ice, etc.).

Case Study 9

A fatal angle collision occurred at an intersection when a driver pulled into the path of another vehicle. It was raining heavily with the narrative noting poor visibility. Contributing environmental factors were slippery surface and “other.” There was no evidence that the surface condition was a contributing factor. There should be a code for visibility limited by weather condition.

Case Study 10

An injury angle collision involved a driver disregarding the red indication at a traffic signal with improper traffic control coded. However, witnesses noted sun glare obstructed the view of the signal indication (which was consistent with the time and direction of travel). The environmental factor should have been sun glare rather than improper/non-working traffic control. This is a training issue.

Case Study 11

An injury angle collision occurred when a driver did not stop at a stop sign. The driver said she did not see the stop sign and the police narrative noted that the stop sign was blocked by a construction sign in a work zone. There was no indication that the appropriate officials were informed of the problem noted by the investigating officer. The environmental factors coded were improper traffic controls and maintenance work zone. This crash illustrates the need for communication between the police and governmental officials when a crash occurs in a work zone.

Case Study 12

An injury rear-end collision occurred at an interstate work zone in the transition zone where one lane was being closed. The environmental factors listed were both improper traffic control and construction work zone. The driver stated he was confused by the traffic cones and the police narrative stated that the cones were out of line and spaced too far apart. The police officer stated that he had the construction company place more cones and realign the cones. This crash illustrates proper communication between the police and responsible entity when a crash occurs in a work zone. The “traffic control devices (other)” factor should be coded.

Case Study 13

An injury collision occurred when a driver turning right at an intersection hit a pedestrian walking across the intersecting street in a crosswalk. The driver stated his view of the pedestrian was blocked by the “A-pillar” in his vehicle with an environmental factor of “view limited” listed on the report. The object that limited the view of the driver was related to the vehicle rather than the surrounding environment. This crash shows that a code of “view obstructed/limited” should be added as a vehicular factor which would apply when a part of the vehicle or an object in the vehicle was the source of the limited view.

Case Study 14

A head-on injury collision occurred when ice on the windshield limited the view of a driver. A code of “view obstructed” was listed as an environmental factor. This crash is another example that this code should be added as a vehicular factor since the obstruction was related to the vehicle.

Case Study 15

A single vehicle collision occurred when a vehicle slid off the outside of a left-hand curve into a tree. The road condition was listed as snow covered. Defective shoulder was listed as a contributing factor although there was no mention in the narrative relating to the condition of the shoulder. The evidence is that the driver lost control in the curve due to a speed too fast for the roadway conditions. This crash illustrates a training issue in that the investigating officer should relate the contributing factors to the facts of the crash, and there was no evidence that the condition of the shoulder was a contributing factor.

Case Study 16

A fatal single vehicle crash occurred when a driver lost control in a curve. The traffic control only listed an advisory speed sign as the traffic control. An inspection found that a 25-mph advisory speed sign was posted with a reverse turn warning sign. The traffic control code should have included a curve sign and the narrative should have noted the advisory speed compared to the 55-mph speed limit. Numerous crashes were reviewed where an advisory speed sign was listed with no other sign. An advisory speed sign is only used as a supplement to a warning sign. This is a training issue.

Case Study 17

A fatal crash occurred when a motorcycle crossed the centerline into the opposing lane. The traffic control listed was an advisory speed sign and no passing zone. An inspection showed that there was an advisory speed of 25 mph on a curve warning sign. The traffic control should have listed the curve warning sign. Chevrons were installed through the curve so “other warning sign” should also be noted under traffic control. The narrative should list the specific advisory speed. This is a training issue.

Case Study 18

An angle crash occurred at an intersection where the traffic signal was inoperative due to a storm. The only traffic control listed was “median” with “non-working traffic controls” listed as a contributing factor. Traffic signal should have been listed as the traffic control with a contributing factor code of “traffic control device inoperative.” This inconsistency was noted in numerous crashes.

Case Study 19

A fatal crash occurred at a curve when a motorcycle collided with a tree. The traffic control code noted was “officer or flagman” but there was no information in the narrative relating to either an officer or flagman. Training should require the narrative to describe how a person was involved in the traffic control when this code is listed.

Case Study 20

“Non-working traffic control” was listed as a factor with the report narrative stating that the stop sign had recently been torn down and the driver was not aware she must stop. The narrative noted that the appropriate government agency was notified that the stop sign should be replaced. The code would be “traffic control device missing” using the recommendations. This report illustrates proper documentation of contact with the appropriate government agency concerning the missing device. An inspection found the stop sign had been replaced. It was also noted that the other stop sign at the intersection was not installed properly.

Case Study 21

An injury crash occurred at an urban intersection when an intoxicated pedestrian (wearing dark clothing at night) walked into the path of a vehicle. The weather was rain with “standing or moving water” noted as the roadway condition and water pooling and slippery surface listed as contributing factors. An inspection of the site showed no pavement condition which would have resulted in water pooling and there was no reference to standing water in the narrative. This is a training issue related to only listing contributing factors when the factor is related directly to the crash (since there is no evidence that water pooling occurred or contributed to the crash).

Case Study 22

The narrative noted that the height of the water on the road was up to the bumper of the car. The roadway condition code was “standing or moving water.” An additional code should be added to the roadway condition codes noting “roadway flooded” to more accurately describe the situation where the roadway is impassible.

Case Study 23

A vehicle exited a two-lane road and collided with a utility pole located close to the edge of the pavement. A contributing factor listed a shoulder problem. However, an inspection found no problem with the shoulder. The driver failed to maintain control of his vehicle and impacted a pole located close to the edge of the pavement. The lack of a wide shoulder would not be a shoulder defect. This would be a training issue.

Case Study 24

A rear end crash occurred on an interstate when a driver had a mechanical problem with his car and stopped in a travel lane. The report listed “improperly parking” as an environmental factor. In this case, the vehicle stopped because it was disabled rather than being parked. This report illustrates the need to add a code of “disabled vehicle” as a vehicle factor and an inappropriate use of the “improperly parking” code.

Case Study 25

A code relating to a problem with the traffic control was listed in an injury crash where the driver failed to maintain control through a curve. However, there was no explanation and the only traffic control listed was centerline. An inspection found a curve warning sign with an advisory speed at the curve. This illustrates a problem found in several crashes concerning the accuracy and completeness of the traffic control coding and is a training issue.

Case Study 26

Water pooling was listed with a roadway condition code of “water standing or moving.” The narrative noted that there were several calls the day of the accident to report water standing in the road, but a review of crash data did not find any other crashes on the date of the case study crash. An inspection found there is a drainage ditch adjacent to the road. The report listed an advisory speed sign as traffic control but a site visit did not find such a sign. Also the report did not list the “road may flood” warning sign which was observed during the site visit.

Case Study 27

A rear end crash occurred on an interstate when a vehicle ran out of gas and the vehicle stopped in the roadway. The crash occurred during darkness and the vehicle was stopped in the road with no lights. The contributing factor given was “limited view” with no vehicle factor noted. This illustrates the need for a “disabled vehicle” code under vehicular factors. The narrative noted a “blind curve” in reference to the limited view but design standards on interstates would not result in a limited line of sight. This illustrates a training issue noting that comments related to the roadway design should not be given unless there is a basis for the comment.

Case Study 28

A fatal crash occurred when a vehicle hit a flagger in a construction zone. The driver said that glare from the sun restricted his view and glare was listed a contributing factor. An investigation found that the sun would have been directly in the line of travel. However, the construction zone was not listed as a factor. While there is no evidence that there was any problem with the work zone, the existence of a work zone with the flagger was a factor in the crash. This is a training issue. There is a recommended code of “glare (sun).”

Case Study 29

An injury crash occurred when a pedestrian crossed an urban four-lane street at a traffic signal against the green indication. The crash occurred during darkness with the pedestrian wearing dark clothing. An environmental contributing factor of “limited view” was listed although the approach was straight and level. The view of the pedestrian was limited due to a combination of the lighting condition and dark clothing with no basis to list “limited view.” Using this logic the “limited view” code could be listed routinely during nighttime conditions. The lighting condition code describes the visibility due to daylight or darkness.

Case Study 30

An injury crash occurred when a vehicle became disabled in the travel lanes on an interstate. A rear end collision occurred when a driver swerved around the disabled vehicle and the following vehicle could not avoid the collision. The vehicular factor was “other” but the “disabled vehicle” code would be used with the recommended codes.

Case Study 31

A driver lost control on a wet pavement on an urban interstate. Both water pooling and slippery surface were listed as factors. The pavement condition was wet with the narrative noting the rear tires were nearly bald. An inspection found no basis for water pooling to be listed. The environmental factor would be “road surface condition” using the recommendations. The roadway condition code of “wet” would describe the basis for the environmental code. A vehicular factor of “other” was listed and would be “tire tread” using the recommendations.

Case Study 32

An “opposing left turn” crash occurred when a driver failed to yield the right-of-way while making a left turn on a green ball traffic signal indication. The weather was rain with a surface condition of standing or moving water. Environmental factors listed were “view obstructed” and water pooling. The narrative did not explain the reason for these codes. A site visit showed there was a long line of sight so the view obstruction may have been the rain or the A-pillar in the car. There was no evidence of an issue which should cause water pooling. This report illustrates the importance of documenting the reason for the listed contributing factors.

Case Study 33

A driver lost control with a large amount of snow on the road. A factor of bumps and ruts was listed although a site visit found no pavement defect. Slippery surface was also listed as a factor. The bumps and ruts were related to the snow and not the pavement condition. The environmental factor code should be “road surface condition” with bumps and ruts only used when there is an issue with the condition of the pavement.

Case Study 34

A fatal crash occurred when a driver allowed his vehicle’s tires to drop off the shoulder. The driver overcorrected and struck a utility pole on the opposite side of the two-lane road. A witness noted observing “sparks” from under the vehicle when it was off the shoulder. The police report stated that gouge marks were observed from the undercarriage and listed shoulder drop-off as a contributing factor. A site visit found the pavement dropped to an adjacent ditch. A code of “shoulder-related issue” would be appropriate. This report supports the conclusion that the Transportation Cabinet should review all fatal crashes where a roadway-related contributing factor is listed.

Case Study 35

A fatal crash occurred when a driver crossed the centerline on a wet pavement. Alcohol was listed as a factor. A site visit found no problem with the roadway. Slippery surface was listed as a contributing factor. The recommended factor would be road surface condition. The traffic control listed an advisory speed sign and a curve sign which were confirmed. The report illustrates the recommendation that the warning sign should be listed when an advisory speed sign is listed. However, the advisory speed was not given in the narrative to compare to the posted 55-mph speed limit.

Case Study 36

A fatal crash occurred when a driver lost control of her vehicle at a location where water was crossing the roadway. The vehicle then collided with a tree. Water pooling was listed as a contributing factor. The recommended code would be “drainage-related issue.” No vehicular factors were listed as a contributing factor although the police narrative stated that worn tires contributed to the crash. This supports the recommendation that “tire tread” should be added as a code for vehicular factors.

Case Study 37

An injury crash occurred when a driver did not stop on a side road approach to the intersection. The narrative noted that there was no stop sign and an environment code of “improper traffic control” was listed. The recommendations are that the code should be “traffic control device missing’ and that the investigating officer should inform the appropriate agency when a problem with traffic control was noted. A site visit showed that a stop sign has been installed at the intersection.

Case Study 38

A fatal crash occurred when a driver lost control in a curve. The police report noted no traffic control. However, a site visit showed there was a curve sign (with no advisory speed) at the accident site. Also, there were pavement markings (both centerline and edge line). Accurately documenting the traffic control is an important part of the police report since it can be used to determine if additional traffic control is needed.

Case Study 39

A fatal crash occurred when a motorcycle driver lost control due to excessive speed in a curve. The traffic control listed an advisory speed sign. However, a site visit found no advisory speed sign. There was no curve warning sign and the site visit showed the shallow curve did not warrant a curve sign. This report illustrates the need for the accuracy of the traffic control, and the need to document the warning sign related to an advisory speed sign.

Case Study 40

“Debris in roadway” was listed as contributing factor with the notation that a large rock blocked the road on the southbound lane of travel on a rural, two lane road. The site visit revealed that the accident site was in a cut rock section. No traffic control was listed on the police report. However, a “falling rock” warning sign was installed for northbound traffic but not southbound. This report illustrates the need for accurate traffic control coding. Any traffic control which is directly related to the crash should be listed. Also, the KyTC should review crashes where a roadway contributing factor is listed.

Case Study 41

A fatality occurred in a secondary collision after a vehicle became disabled in the road as a result of an initial collision. The narrative described the second collision as a “secondary collision” with a time period of several minutes between the collisions. However, the two collisions were listed as one crash, and the fatal collision was not listed as a secondary collision. A limited view was listed as a contributing factor. However, the narrative noted that there were no roadway obstructions or visibility issues. The crashes occurred during darkness and the first crash resulted in a vehicle being disabled in the road with no lights. This report illustrates the importance of consistency between the narrative and coding of the report.

Case Study 42

An injury crash occurred when a driver did not stop at a four-way stop intersection. Both drivers noted that a stop sign was on the ground at the intersection. The narrative stated that the Transportation Cabinet was contacted to have the stop sign replaced. This report illustrates the recommendation that the police should inform the responsible agency when a traffic control device is missing.

Case Study 43

A driver disregarded a stop sign with “non-working traffic control” coded on the report. The driver stated that he did not see the stop sign since it was covered by foliage. The officer noted in the narrative that an inspection found the sign was obscured by tree branches and brush. However, there was no indication that the responsible agency was contacted as recommended. The recommended code would be “view obstructed/limited (roadway).

Case Study 44

A driver stated he was avoiding an opposing vehicle with in his vehicle sideswiping a guardrail located a couple of feet from the road. The report listed “shoulder defective” as a contributing factor. However, a site visit showed that, while the guardrail was located close to the pavement, there was no evidence of a defect with the shoulder. This supports the recommendation that “shoulder-related issue” could be listed as a factor rather than noting a defect. However, there was no reason to code a shoulder issue since the guardrail was properly installed.

Case Study 45

A driver stopped at a stop sign and then pulled into the path of a vehicle that did not have a stop sign. The driver stated she thought the intersection was a four-way stop. The report listed improper traffic control as a contributing factor with the notation that the intersection should have a four-way stop due to the crash history. The decision to determine whether the appropriate traffic control is a two-way or four-way stop should be based on an engineering study. A stop bar was installed on the two stop approaches. A review of the crash history found one other crash in the past four years where the driver thought the intersection was a four-way stop. The officer could contact the appropriate agency about the concerns about traffic control. The recommended codes do not include a code for improper traffic control since that conclusion should be based on an engineering study.

Case Study 46

A fatal motorcycle crash occurred when the motorcyclist lost control in a curve and slid into the opposing lane. The police report listed a curve sign and advisory speed sign as traffic control. An inspection of the site showed that there was a curve sign in one direction but the sign was missing in the direction of travel of the motorcycle (although the advisory speed sign was present). The officer should have noted the condition of the curve sign and notified the responsible agency for repair.

Case Study 47

A fatal motorcycle crash occurred when the motorcycle contacted the rear of a vehicle (in a construction zone) and slid into the opposing lane where a collision occurred with another vehicle. The only traffic control listed was a curve sign although the roadway character listed the roadway as straight. Road construction was not listed as a contributing factor which would be appropriate if it was not a factor in the crash. However, the fact that the crash occurred in a construction zone was not noted in the narrative. The crash site should be identified as occurring in a construction zone even if this was not a contributing factor.

Case Study 48

A fatal crash occurred between a train and an ATV on a low volume county road. The narrative noted that no crossing gate was present with a code of no traffic control. However, a site visit confirmed a railroad crossbuck was present along with a yield sign. This illustrates the importance of properly identifying the traffic control at an accident site.

Case Study 49

A motorcycle lost control in a curve with the narrative noting gravel was in the road and a contributing factor of debris in roadway. However, the roadway condition code given was dry rather than listing gravel which would be consistent with the other information provided in the report. A site visit noted a curve warning sign with an advisory speed plate was installed. The traffic control listed an advisory speed sign but did indicate a curve sign. The type of sign should always be shown when an advisory speed sign is coded.

Case Study 50

An object fell from a vehicle and struck an oncoming vehicle. The contributing factor code of “debris in roadway” was coded with no vehicular code. The debris code is not appropriate under these circumstances. A load securement code should have been used for the vehicle from which the object fell.

Case Study 51

A rear end collision occurred at an intersection where the traffic signal was in a flash mode. The traffic control given was flashing light with “improper/non-working traffic controls.” The proper coding under the recommendations would be a traffic control code of traffic signal with “traffic control device inoperative.”

Case Study 52

An “opposite direction sideswipe” collision occurred on a narrow rural, two lane road. The narrative noted that the pavement markings were worn and the drivers were traveling too close to the center of the road. The report had a code of no traffic control. A site visit showed that the crash occurred in an area adjacent to a truck entrance where the centerline was worn off the pavement. The recommended coding would be pavement markings (lane/centerline) for traffic control with an environmental code of traffic control device missing if the centerline could not be seen. The responsible agency should be notified of the worn centerline.

Case Study 53

A fatal crash occurred when a driver overcorrected and lost control when he allowed his vehicle to travel onto the turf shoulder. Alcohol was listed as a factor. The crash occurred in a curve with a curve sign coded as traffic control. However, the report failed to note there was an advisory speed plate associated with the curve sign. The pavement was wet and slippery surface was coded as a contributing factor. However, the recommendation would not have resulted in road surface condition being coded as a factor since the pavement condition was not a contributing factor.

Case Study 54

A fatal crash occurred when an ATV driver lost control when attempting to turn left at an intersection. The crash occurred on a paved public road where use of an ATV is prohibited. While the report did not list a vehicular factor the recommendation would be to code “improper use” as a vehicular factor since an ATV is not designed to travel on this type of surface.

Case Study 55

A fatal “opposing left turn” crash occurred at an intersection when a driver turned left into the path of an approaching motorcycle. The traffic control listed an advisory speed sign with no associated warning sign. An inspection found no warning sign or advisory speed sign. There was a speed limit sign on either side of the intersection. This illustrates the issue with the inappropriate listing of an advisory speed sign as a traffic control measure.

Case Study 56

An injury single vehicle crash occurred when the vehicle traveled from the roadway into an adjacent creek. The report narrative stated no signs or traffic control were present. However, a site visit showed a centerline marking was present. A contributing factor of “shoulders defective/drop-off” was coded. The site visit showed there was a narrow turf shoulder along the rural road. The recommended code of “shoulder-related issue” could be used relating to the narrow shoulder width but there is no evidence of a defect.

Case Study 57

An angle collision occurred at an interstate entrance ramp between drivers turning right and left onto the ramp. The police report noted that the yield sign was missing and listed “improper/non-working traffic controls” as a contributing factor. The recommendation would be to code “traffic control device missing” and to notify the KyTC of the missing sign. A site visit confirmed that the sign had been replaced.

Case Study 58

A fatal collision occurred when a driver lost control on an interstate with his small car hit by a tractor trailer. The police report listed rain with the narrative stating that water was standing at the end of a long bridge. Water pooling was listed as a contributing factor. Slippery surface was also listed as a factor and the recommendation is that both water pooling and slippery surface should not be coded. The roadway condition was listed as wet while the recommendation is that standing water should be coded when a drainage-related issue is coded. The narrative described the lack of tire tread with a code of “other” given as a vehicular factor. The recommendations added a specific code for tire tread. An advisory speed sign was coded under traffic control although the site visit did not show this sign. Pavement markings should be coded under traffic control.

Case Study 59

An angle collision occurred at an intersection when one driver disregarded the traffic control. The only traffic control listed on the police report was an advisory speed sign. The site visit showed that the driver did not stop at a stop sign. Also, although the narrative described the crash as occurring at an intersection, the intersection indicator was coded as “no.” A contributing factor of “improper/non-working traffic controls” was coded although no explanation was provided in the narrative and the site visit did not reveal any problem with the traffic control.

Case Study 60

An intersection crash listed a contributing factor of “limited or obstructed view.” However, there was no explanation in the narrative and a site visit showed no problem with the line of sight. The recommended codes in this area would provide a better explanation for an obstructed view and the reason for the code should be provided in the narrative.

Case Study 61

An angle crash occurred at an intersection when a driver did not stop because she stated there was no stop sign. The narrative stated that the officer observed a metal pole bent to the ground with no sign. The traffic control code was “none” with an environmental factor of “improper/non-working traffic controls.” The traffic control should be coded as a stop sign with the recommended code of “traffic control device missing.” The officer did include a description of the basis of the coding.

Case Study 62

A fatal head-on crash occurred when a driver was attempting to pass a vehicle. The narrative noted a heavy fog with view limited as an environmental factor. The recommendation would be more specific with a code of weather condition (visibility limited). The weather code was “fog/smog/smoke” with the recommended code of fog which is more specific.

Case Study 63

A single vehicle crash occurred when a tire blew with the driver losing control of her vehicle which then hit a culvert headwall and overturned. The police report listed “tire failure” as a factor. The report also listed a defective shoulder as a factor. While the shoulder at the accident site is not wide, an inspection found no defect. This crash shows a common occurrence when a code relating to the shoulder is listed which evidently relates to the shoulder width (although the width is typical for the type of road where the crash occurred).

Case Study 64

A driver encountered a patch of ice and slid off the roadway into the adjacent ditch. A defective shoulder was listed as a contributing factor although the inspection found no problem with the shoulder. There was no explanation for this code in the narrative. This illustrates the problem with coding a contributing factor with no basis. Also, the traffic control code listed was none although pavement markings should have been coded

Case Study 65

An angle crash occurred at an intersection when a driver disregarded the red traffic signal. While “disregard traffic control” was listed as a factor the intersection code was “no” rather than “yes” as it should. The weather was rain with the roadway condition wet. Both “slippery surface” and “water pooling” were listed as factors. There was no basis provided for the “water pooling” code.

Case Study 66

A single vehicle crash occurred in a curve on wet pavement. An inspection found the traffic control codes of curve sign, advisory speed, and no-passing zone were correct. The roadway condition code was wet with “slippery surface” given as a factor. However, water pooling was also listed with no basis. The recommendation would be to list road surface condition as the environmental factor.

Case Study 67

A fatal collision occurred on an interstate when a driver attempted to turn from the shoulder across the travel lanes to use a median crossover. The narrative noted that a no turn sign was installed in the median. However, the traffic control listed no signs. The current categories do not have an appropriate code. The recommended codes include a code of “other regulatory sign” which could have been used (with an explanation provided in the narrative).

Case Study 68

A crash occurred in a construction area at an interstate ramp. The environmental factors included “construction work zone” and “improper/non-working traffic controls” with an explanation that drivers were confused concerning the proper path to drive. The recommended code would be “work activity (highway related)” with the code explained in the narrative. The report stated that the KyTC was contacted to place additional barrels to direct drivers (which is in conformance with a recommendation).

Case Study 69

A fatal crash occurred when a truck turning right at an urban intersection collided with a pedestrian. The truck driver said he did not see the pedestrian, and a view obstruction was listed as an environmental contributing factor. A site visit showed that the roadway environment did not limit the view of the truck driver. The recommendation would list the view obstruction as a vehicular factor since it was related to the line of sight from the driver position in the truck.

Case Study 70

A rear end collision occurred when a driver slowed due to water standing in the road (as described in the narrative). A site visit showed there was a dip in the road at a railroad overpass. Water pooling was listed as a factor and the roadway condition was consistent (standing water). The recommended code would be “drainage-related issue.” The weather was rain. Slippery surface was properly not listed since it should not be coded along with water pooling. However, traffic control was listed as none when pavement markings should have been coded.

Case Study 71

An angle collision occurred when a driver pulled from a stop sign into the path of another vehicle. A view obstruction was listed as a contributing factor and a site visit showed that a bridge pier did limit the line of sight. However, the narrative did not provide any description or explanation for the view obstruction code.

Case Study 72

A crash occurred on a parkway during a heavy rain with the narrative noting that the vehicle encountered water pooling. The narrative stated that the rain was so hard that the driver’s view was limited. The recommended environmental code would be “weather condition (visibility limited).” The roadway condition was coded as wet but should be coded as “standing water” to agree with a “drainage-related issue” code.

Case Study 73

A single vehicle crash occurred when a driver drifted off the road into a ditch with their vehicle then impacting a fixed object. A defective shoulder was listed as a contributing factor. A site visit found that the shoulder is narrow and the recommended factor would be “shoulder-related issue.” The traffic control listed centerline while there is also an edge line which is relevant with a driver drifting off the pavement. The recommended traffic control codes would be pavement markings (lane/centerline) and pavement markings (edge line) which would provide more accurate and complete information.

Case Study 74

The driver said she lost control due to a wet roadway while driving through a curve. The weather was reported as rain with the roadway condition wet. Both slippery surface and water pooling were listed as contributing factors. The recommendation is to list “road surface condition” as the contributing factor with a reference to the road condition code. A site visit revealed no basis for the water pooling code.

Case Study 75

A “same direction sideswipe” collision occurred on an urban interstate when a driver changed lanes. The narrative noted that an object on the vehicle obstructed the driver’s view in the side mirror. The environmental contributing factor listed was a view obstruction. The recommendation would be to list the view obstruction as a vehicular related factor (rather than environmental). The traffic control coded was centerline. The recommended codes for traffic control would be pavement markings (lane line and edge line).

Case Study 76

An angle collision occurred at an intersection when the traffic signal was not operating. The recommended environmental code is “traffic control device inoperative.” The traffic control listed on the report was “none” while traffic signal should be coded with the narrative stating it was not operating.

Case Study 77

A motorcyclist lost control when he traveled over a slight difference in elevation at a bridge overpass. “Holes/ruts/bumps” was listed as a contributing factor with a detailed description in the narrative describing the condition of the pavement. It was noted that an asphalt wedge had been placed at the location of the difference in elevation between the asphalt pavement and concrete bridge deck. This is an example of the recommendation that an explanation be provided for a contributing factor.

Case Study 78

The driver of a van pulling a trailer lost control in a construction zone when the load shifted contacting a bridge abutment. The vehicle then traveled into an adjacent closed lane where there was a drop in elevation due to a paving operation. The report listed a contributing factor of “shoulder defective/drop-off” but should have listed “work activity (highway related)” as the factor. The difference in elevation was related to the construction activity and was not related to the shoulder condition.

Case Study 79

A vehicle dropped off the pavement and the driver could not regain control due to a steep shoulder. The recommended code would be “shoulder-related issue.” The narrative indicated that the police appropriately notified the responsible agency that there was a problem with the shoulder stability at this location.

Case Study 80

An angle collision occurred at an intersection when a driver pulled into the path of a vehicle. The crash was in a construction zone which was coded as a contributing factor. The narrative noted that visibility for the driver pulling onto the main road was limited due to the placement of construction barrels but there was no indication that this information was forwarded to the appropriate agency. Right-of-way at the intersection is controlled by a stop sign on the side street but this sign was not coded as traffic control.

Case Study 81

An angle crash occurred at an intersection with an alley and an urban street. The driver on the alley stated she was not aware she had to stop and the police narrative noted there was no stop sign. A site visit confirmed there was no stop sign on the alley approach of the involved driver but there was a stop sign on the opposite approach. The police officer should inform the responsible agency of the situation. The traffic control listed was stop sign which is incorrect.

Case Study 82

A rear end collision occurred at an intersection where a right-turning vehicle did not observe a stopped vehicle. The report listed a limited view as a contributing factor and the narrative noted foliage as the basis. A site visit confirmed the limited view due to foliage. The situation should be reported to the responsible agency. Also, the traffic control was coded as none although there were pavement markings and related signs at the intersection.

Case Study 83

A driver lost control in a curve on wet pavement. The police report listed water pooling as a factor although there was no indication of standing water. A site visit showed the pavement was new with no basis for this factor. The recommended factor would be road surface condition with reference to the wet pavement.

Case Study 84

A motorcyclist lost control while passing at a high speed. Holes and bumps were listed as a contributing factor. An inspection showed the pavement would be described as traveled asphalt with no holes or bumps. There was no mention of a pavement problem in the narrative.

Case Study 85

A driver was attempting to make a U-turn on a four-lane road when he turned too wide and lost control when he traveled onto the turf shoulder adjacent to the shoulder. The report improperly listed a defective shoulder although there was a full-width paved shoulder. The traffic control listed an advisory speed sign which is not present. Centerline was also coded with the recommendations providing a more accurate description of pavement markings (lane and edge line).

Case Study 86

An “opposing left turn” collision occurred when the left-turning driver said her view of the opposing vehicle was blocked by a large truck. The view obstruction code was coded. The more code of “view obstructed (other)” would be used since the view obstruction was not related to the roadway.

Case Study 87

A rear end collision occurred when, according to the drivers and also observed by the investigating office, a traffic signal cycled quickly from green to red. The traffic control device inoperative code could be used with a description in the narrative to describe the issue.

Case Study 88

A collision occurred when the driver did not observe another vehicle due to a cooler in his vehicle. A code of view obstruction was provided as an environmental factor with no vehicular factor. The recommendation would be to code a view obstruction as a vehicular factor rather than an environmental factor.

Case Study 89

A right-turning driver hit a pedestrian crossing the street in a cross walk at a traffic signal. An environmental factor of view obstruction was coded. The narrative noted that the driver stated his view of the pedestrian was blocked by the A-pillar in his pickup. The view obstruction should be coded as a vehicular factor.

Case Study 90

A motorcyclist lost control when his motorcycle traveled over a metal covering in a construction zone. The recommended code would be work activity (highway related). The traffic control was coded as none. Pavement markings are provided on the urban street. The related work zone traffic control devices should have been coded.

Case Study 91

A rear end collision occurred when the driver stated her view was obscured by fog on the windshield and she could not stop due to a wet pavement. The report listed environmental factors of a view obstruction and water pooling. The recommended environmental code would be road surface condition with a vehicular code of a view obstruction.

Case Study 92

A driver lost control on a snow-covered pavement on a rural interstate. The environmental factors listed were slippery surface and water pooling. The narrative noted the slush from the snow. The recommended code would be road surface condition.

Case Study 93

A driver lost control when she hit what was described as a puddle of water with water pooling listed as a contributing factor. However, the roadway condition was listed as wet instead of standing water which should be coded when water pooling was coded. The crash occurred on a road with a depressed grass median with median listed as traffic control. The recommendations does not include median in this category since it is not a traffic control device. The pavement marking should have been coded as traffic control.

Case Study 94

Two large vehicles met on a rural road resulting in an “opposite direction sideswipe” collision. A defective shoulder was coded as an environmental factor but the investigation found no basis for this code. Traffic control was coded as none although both a centerline and edge line markings were present.

Case Study 95

A rear end collision occurred when a driver could not brake to stop to avoid a vehicle stopped to turn. Both slippery surface and water pooling were coded as environmental factors. The roadway condition was coded as wet with no evidence of standing water. The recommended code for an environmental factor would be road surface condition.

Case Study 96

The passenger tires on a vehicle left the pavement at a location on a rural road with a narrow shoulder. The vehicle then rolled down an embankment when it encountered a soft turf adjacent to the narrow paved shoulder. An environmental factor of defective shoulder was coded. The recommended code would be shoulder-related issue since the width of the shoulder was found to be typical for the type of road. The traffic control was listed as other. A site visit showed the proper coding for traffic control would be pavement markings (centerline) and “other warning sign” with an explanation of object markers which had been installed along the side of the road.

Case Study 97

An angle collision occurred when a driver exited a driveway (in a residential area) into the path of a vehicle. A view obstruction was coded as an environmental factor. A site visit showed that a fence at an adjacent property did limit the line of sight. The recommended code would be view obstructed (other) with an explanation that a fence installed on private property was the source of the view obstruction.

Case Study 98

An “opposing left turn” collision occurred when a driver attempted to turn left between stopped vehicles and was hit by a vehicle traveling on the shoulder (around stopped vehicles to turn onto an interstate ramp). A view obstruction was listed as an environmental factor. Vehicles limited the view of the left-turning driver so the recommended factor would be view obstructed (other). Improper traffic control was also listed as a factor with a statement in the narrative that the pavement markings caused drivers to believe they were in a turning lane. An inspection did not confirm a conclusion that a driver on the shoulder would believe they were in a turn lane. Evidently this occurred regularly with the narrative noting a sign instructing drivers to not drive on the shoulder. This is an example of the report providing detailed information to explain the coding.

Case Study 99

A fatal head on collision occurred when a driver allowed the passenger side tires on her vehicle to exit the pavement and then overcorrected with her vehicle crossing the centerline into the opposing lane. A defective shoulder was coded as a contributing factor. An inspection shows the rural two-lane road has a narrow paved shoulder. There is turf adjacent to the road and the vehicle traveled on the turf before the driver overcorrected. The narrative stated there was a lack of shoulders but the type of shoulder is typical for the type of road.

Case Study 100

A fatal collision occurred at a work zone where a driver encountered stopped traffic and steered off the road resulting in a collision with a tree. A maintenance work zone was listed as a factor with the recommended code of work activity (highway related). The narrative noted that warning signs were installed with “other” listed under traffic control. The recommended code would be “other warning sign” with a more detailed description given in the narrative. A diagram was not provided. It is important in work zone crashes that specific information be provided for the traffic control devices and their location since they will be moved before a more detailed investigation can be conducted.