



# National Transportation Safety Board

Washington, DC 20594

## Highway Accident Brief

### Pickup Truck Collision With Multiple Bicycles, Cooper Township, Michigan, June 7, 2016

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<b>Accident Number:</b>	HWY16MH014
<b>Accident Type:</b>	Pickup truck collision with multiple bicycles
<b>Location:</b>	5300 block of North Westnedge Avenue, Cooper Township, Kalamazoo County, Michigan
<b>Date and Time:</b>	Tuesday, June 7, 2016, about 6:29 p.m. eastern daylight time
<b>Vehicle:</b>	1996 Chevrolet Silverado 1500 pickup truck
<b>Bicycles:</b>	Trek Pilot 5.0 bicycle Raleigh Capri Carbon 3.0 bicycle Giant OCR Limited bicycle Giant TCR C3 bicycle Specialized Dolce E8 bicycle Raleigh Capri 2.0 bicycle Pinarello FP3 bicycle Trek 500 bicycle Trek DCLV 5200 bicycle
<b>Fatalities:</b>	5
<b>Injuries:</b>	4

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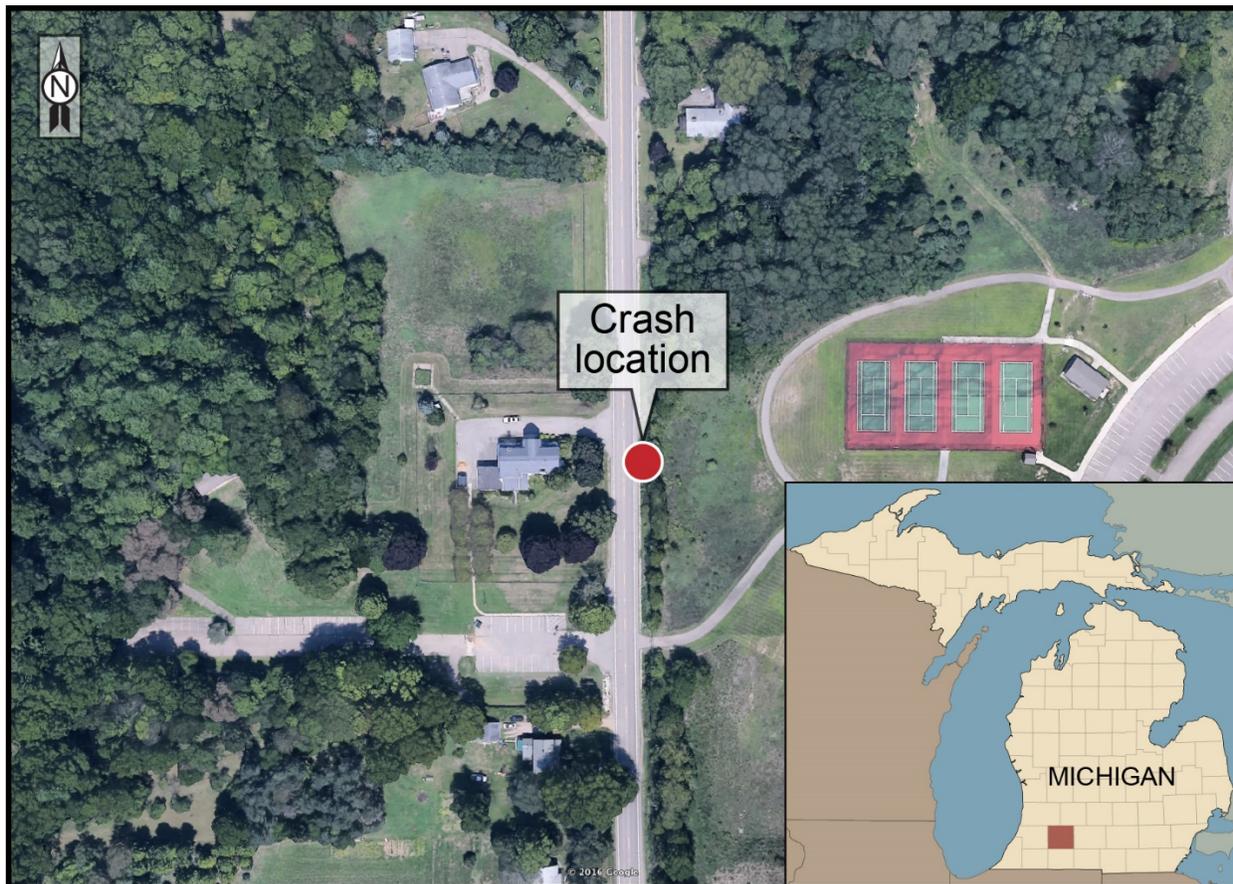
### Crash Description

On Tuesday, June 7, 2016, about 6:29 p.m. eastern daylight time, a 1996 Chevrolet Silverado 1500 pickup truck operated by a 50-year-old male was traveling northbound on North Westnedge Avenue in Cooper Township, Kalamazoo County, Michigan. (See figure 1.) Approximately 3 miles north of downtown Kalamazoo, as the pickup truck approached the area of 5333 North Westnedge Avenue, nine bicyclists from a private bicycle club on a planned ride were also traveling northbound in single file on the 4-foot-wide paved outside shoulder. The pickup truck departed the travel lane to the right, entered the outside shoulder, and struck all nine bicyclists. The pickup truck then departed the paved roadway and came to rest across a drainage ditch facing west. The driver fled the scene but responding law enforcement officers later apprehended him. Before the truck struck the bicyclists, local law enforcement received three calls

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reporting a pickup truck matching the description of the vehicle involved in the crash as being operated in a reckless and erratic manner.<sup>1</sup> The crash occurred during daylight hours, the roadway surface was dry, and the weather was overcast with no precipitation.

As a result of the crash, five bicyclists were fatally injured and four sustained serious injuries. The pickup truck driver was uninjured.



**Figure 1.** Aerial view of crash location with inset map of Michigan showing the location of Kalamazoo County.

### Highway Information

In the area of the crash, North Westnedge Avenue is a north/south, two-lane asphalt roadway that consists of a single travel lane in each direction adjacent to 4-foot-wide asphalt paved shoulders. A single 4-inch-wide solid white pavement marking delineates the northbound and southbound travel lanes from the adjacent outside shoulders. No rumble strips are present. The

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<sup>1</sup> Further details are provided in the section on “Law Enforcement Response” in this report.

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posted speed limit for North Westnedge Avenue in the area of the crash is 35 mph.<sup>2</sup> Traffic in the northbound direction faces an uphill grade of approximately 4.3 percent.

Evidence collected at the scene provided information about the positions of the pickup truck and bicycles at final rest and during the crash sequence.<sup>3</sup> The evidence indicated that the area of impact was on the right shoulder of the roadway.

The bicyclists, traveling in single file, were struck from behind by the pickup truck while they were traveling on the right shoulder of the roadway. Two of the bicyclists were found on the roadway; the evidence showed that the pickup truck had struck and dragged them for some distance from the point of impact. The final rest positions of the other bicyclists were along the right shoulder and ditch.

### Vehicle, Bicycles, and Safety Equipment

The 1996 Chevrolet pickup truck sustained extensive front-end damage resulting from the impacts with the bicycles and bicyclists. During the postcrash inspection of the pickup truck, investigators found no indications of precrash damage or of mechanical or maintenance issues that would have led the vehicle to leave the travel lanes. No vehicle recalls were associated with the pickup truck.

All the bicycles involved in the crash were “road bicycles,” which are designed for speed on paved roadways and typically incorporate features such as a lightweight frame, narrow tires, and a geometry that promotes a more aerodynamic rider position than does a standard bicycle. The bicycles all sustained extensive crash-induced damage. The bicycles were equipped with several safety features to reduce risks for riders in traffic, including reflective material on the frame, reflectors, and “flashers” designed to increase visibility to vehicle drivers. All the bicyclists were wearing helmets and bright-colored, high-visibility clothing.

### Bicyclists’ Injuries

According to the Kalamazoo Office of the Chief Medical Examiner, five bicyclists sustained fatal injuries that were consistent with high-velocity impact; they were pronounced dead on the scene. The four surviving bicyclists sustained serious injuries and were transported to Level I trauma centers located within 7 minutes of the crash scene.

### Law Enforcement Response

#### *Local Law Enforcement Agencies*

The crash occurred in Cooper Township, which is in the northernmost portion of Kalamazoo County. Agencies responding to this crash included the Kalamazoo County Sheriff’s Office (KCSO), the City of Kalamazoo Department of Public Safety (KDPS), and the Township

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<sup>2</sup> About 430 feet north of the crash location, the speed limit transitions to 50 mph.

<sup>3</sup> The evidence consisted of scrape and gouge marks, material transfer left on the roadway, and the locations of various pieces of cycling equipment and personal effects.

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of Kalamazoo Police Department (KTPD). The KCSO provides law enforcement services for Cooper Township.

The Kalamazoo integrated dispatch center co-locates the communications and dispatch activities for the KDPS, KCSO, and KTPD.<sup>4</sup> All three dispatch functions take place in the same room; however, there is no unified command structure for the three agencies. Each jurisdiction's dispatch operates independently within the center on a radio talk group specifically designated for that agency, and each agency has its own internal policies and procedures. All three law enforcement agencies use a computer-aided dispatch (CAD) system that permits interagency communications by voice and through mobile messaging.

### *Pre-crash Emergency Communications*

At 6:07 p.m., the KDPS dispatcher received a 911 call reporting a Chevrolet pickup truck being operated in an erratic manner, heading north toward the boundary between the KDPS jurisdiction and the county's KCSO jurisdiction; the caller provided a detailed description.<sup>5</sup> At 6:08 p.m., the KDPS dispatcher put out a "Be On the Look Out" ("BOL") notice to the KDPS primary radio talk group; the information was not sent through the CAD system to the other jurisdictions.<sup>6</sup>

At 6:09 p.m., the KCSO dispatcher received a separate 911 call reporting that a Chevrolet pickup truck was driving toward the Township of Kalamazoo at a high rate of speed on the wrong side of the roadway in the city, had nearly collided head-on with oncoming traffic, and was driving other motorists off the roadway. At 6:13 p.m., the KCSO dispatcher sent a BOL message via the CAD system to all KCSO units and the KDPS and KTPD dispatchers about the erratic pickup truck driver.

At 6:19 p.m., the KTPD dispatcher received a 911 call reporting a hit-and-run event that had just occurred at a local high school; the caller provided a detailed description of the Chevrolet pickup truck involved. The high school was a short distance from the last reported sighting of the pickup truck in Kalamazoo County and was located within minutes of the KDPS, KCSO, and KTPD jurisdictions.

By 6:21 p.m., a KTPD officer was dispatched to the high school while another KTPD officer canvased the area around the high school for the pickup truck.

At 6:29 p.m., the KTPD dispatcher received the first 911 call reporting the crash involving the bicyclists.

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<sup>4</sup> Calls placed from Cooper Township are received by the KCSO.

<sup>5</sup> (a) Between 6:05 p.m. and the time of the crash, the pickup truck traveled in and out of three geographic areas represented by different law enforcement agencies: the City of Kalamazoo, the County of Kalamazoo, and the Township of Kalamazoo. (b) The caller reported the pickup truck make, model, and color, and described the driver.

<sup>6</sup> "BOL" is a term used by the police agencies that responded to this crash; such notices are also commonly known by the abbreviation "BOLO."

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In its April 11, 2017, Highway Safety Recommendation Report related to this crash, the National Transportation Safety Board (NTSB) concluded that the collision might have been prevented had the dispatchers for the KDPS, KCSO, and KTPD more effectively shared their 911 call information concerning the erratic behavior and route of the pickup truck driver as the event unfolded.<sup>7</sup> The NTSB issued two urgent recommendations to address this issue.

### Fire/Emergency Medical Service (EMS) Emergency Response

The KTPD dispatch center received the first call reporting the crash at 6:29 p.m. About 6:30 p.m., an off-duty Cooper Township firefighter, who was on his way to his fire station for a company drill, arrived at the crash scene and used his fire department-issued portable radio to notify the Fire Communications Dispatch Center of the crash and multiple victims on the scene. The Kalamazoo Life EMS Ambulance Service was dispatched with a field supervisor to coordinate medical services on the scene.<sup>8</sup>

The Cooper Township Fire Department was out of the area conducting a company drill at the time of the crash. An immediate “mutual aid” dispatch request was sent to the Kalamazoo Township Fire Department, which was closer to the crash than the Cooper Township units were. In total, six fire units responded to the scene.<sup>9</sup>

### Driver of Pickup Truck

#### *Licensing and Driving Record*

The 50-year-old pickup truck driver held a class “O” (operator) Michigan driver’s license that was issued in August 2015 and expired in April 2019.<sup>10</sup> The license had no restrictions, and the Michigan Department of Motor Vehicles had no record of previous crashes for this driver. Investigators checked the National Driver Register and found no revocations or suspensions for this driver in the Problem Driver Pointer System.

#### *Toxicology*

Postcrash, law enforcement officers recovered two bottles containing tablets and capsules from the pickup truck; subsequent testing indicated that the bottles’ contents were cyclobenzaprine

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<sup>7</sup> See *Addressing 911 Communication Problems in the Area of Cooper Township, Michigan*, Highway Safety Recommendation Report NTSB/HSR-17/03 (Washington, DC: National Transportation Safety Board, 2017). The report can be accessed at the [NTSB website](#), under report number NTSB/HSR-17/03.

<sup>8</sup> Four Life EMS ambulance units responded to the scene. The first unit was dispatched at 6:33 p.m. and reached the crash site by 6:35 p.m. All four seriously injured bicyclists had arrived at hospitals by 7:03 p.m. In addition to the ambulance service, an EMS physician responded to the scene to provide immediate advanced life support.

<sup>9</sup> Responding fire units came from Kalamazoo Township (two trucks), Cooper Township (three trucks), and Parchment Township (one truck).

<sup>10</sup> In Michigan, an operator’s license allows the operation of passenger vehicles and light-duty trucks with a gross vehicle weight rating of less than 26,000 pounds.

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and tramadol, respectively. Cyclobenzaprine is a muscle relaxant, and tramadol is an opioid analgesic.<sup>11</sup>

An acquaintance of the driver stated that about 5:00 p.m. on the day of the crash, the driver consumed an estimated 16–20 cyclobenzaprine tablets and at least 10 tramadol capsules. When interviewed by law enforcement in the hospital after the crash, the driver stated that he had taken some tramadol, cyclobenzaprine, and quetiapine fumarate (an atypical antipsychotic) earlier in the day. The driver also stated that he had taken methamphetamine (a central nervous system stimulant) on the day before the crash.

Following the crash, local law enforcement observed that the driver was having difficulty keeping his balance. An officer who tried to speak with the driver described him as unresponsive and trying to speak without discernible words. Due to the driver's unresponsiveness, law enforcement officers could not perform standard tests for impairment. The driver's condition prompted authorities to transport him to the hospital for treatment.

Upon arrival at the hospital, the driver had a Glasgow Coma Score of 8/15.<sup>12</sup> Before specimens were drawn for toxicological testing, he was treated with naloxone, lorazepam, and ketamine.<sup>13</sup>

Hospital staff drew blood samples from the driver at 9:25 p.m., approximately 3 hours after the crash; the samples were sent to the Michigan State Police (MSP) laboratory for testing. Results were negative for alcohol but positive for the following other drugs: THC-COOH at 14 ng/mL, methamphetamine (356 ng/mL), amphetamine (22 ng/mL), hydrocodone (11 ng/mL), tramadol (>1000 ng/mL), O-desmethyltramadol, cyclobenzaprine, ketamine, and lorazepam (levels not quantified).<sup>14</sup>

At the request of the NTSB, the remaining specimens were sent to the Federal Aviation Administration's Civil Aerospace Medical Institute (CAMI) for additional testing.<sup>15</sup> Results indicated the presence of methamphetamine (292 ng/mL), amphetamine (19 ng/mL),

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<sup>11</sup> The Forensic Science Division of the Michigan State Police verified the chemical composition of the medications in the bottles.

<sup>12</sup> The Glasgow Coma Score provides an objective means of assessing the conscious state of a patient by assigning values to eye, verbal, and motor response. Scores range from 3 (deeply unconscious) to 15 (awake, aware, and responsive).

<sup>13</sup> Naloxone is an opioid antagonist. Lorazepam is a benzodiazepine, and ketamine is a dissociative anesthetic.

<sup>14</sup> (a) THC-COOH is the main secondary metabolite of tetrahydrocannabinol (THC), the principal psychoactive constituent of cannabis (marijuana). THC-COOH is not itself psychoactive and may remain in the body for days or weeks after cannabis use. (b) Amphetamine is a central nervous system stimulant and a metabolite of methamphetamine. (c) Hydrocodone is an opioid pain medicine. (d) O-desmethyltramadol is an opioid pain medicine and an active metabolite of tramadol. (e) In the course of treatment, the hospital took a blood sample from the driver at 12:30 a.m. on June 8, 2016. Testing of this sample indicated the presence of phencyclidine. The presence of phencyclidine was confirmed by testing a urine sample taken from the driver at 5:48 a.m. This urine sample was the first available for testing.

<sup>15</sup> The Bioaeronautical Sciences Research Laboratory at CAMI, which conducted the testing, can identify more than 1,300 different chemicals, including a wide variety of drugs and their metabolites.

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tramadol (980 ng/mL), THC-COOH (16 ng/mL), ketamine, and norketamine.<sup>16</sup> The specimen was deemed unsuitable for confirmatory testing of cyclobenzaprine.

### **Medical Conditions**

The physicians who treated the driver in the hospital did not find any traumatic injuries or medical conditions that they believed would have caused his behavior. Investigators located medical providers that were treating, or had treated, the driver.

NTSB investigators checked local pharmacies and did not locate any prescriptions for cyclobenzaprine or tramadol in the driver's name. However, investigators did find prescriptions in the driver's name for Adderall XR—a combined central nervous system stimulant—and for quetiapine fumarate—an atypical antipsychotic. On at least two occasions, the driver told his healthcare providers that he used marijuana.

### **Bicycle Transportation on Public Roadways in the Kalamazoo Area**

According to Michigan state law, bicycles are not considered vehicles; however, they are entitled to use public roadways for travel.<sup>17</sup> The law requires that bicyclists ride on the far right side of the travel lane or on the shoulder, with no more than two bicycles riding side by side. At the time of the crash, the group of bicyclists was traveling in single file on the paved right shoulder and was complying with the applicable Michigan state laws for bicycle traffic.

Paved shoulders are often used to accommodate bicyclists on roadways with higher speeds or traffic volumes.<sup>18</sup> Most often found along rural roadways, paved shoulders also provide benefits to motorists, such as protecting the edge of the travel lane from deterioration and providing a location outside of the travel lane in which to park disabled vehicles. When paved shoulders are also used by bicyclists on roadways similar in design to North Westnedge Avenue, the shoulders should be at least 4 feet wide to accommodate bicycle travel; they should also be placed on both sides of the roadway. The paved shoulders adjacent to the northbound and southbound travel lanes of North Westnedge Avenue met these guidelines.

North Westnedge Avenue had no longitudinal rumble strips on its shoulders or along the edges of the travel lanes. Although rumble strips can be effective in preventing drowsy or inattentive drivers from becoming involved in certain types of crashes, they can also be a hazard to bicyclists trying to use the same section of roadway.<sup>19</sup> To determine where longitudinal rumble strips should be installed, the Road Commission of Kalamazoo County (RCKC) performs engineering studies and annual safety reviews to identify county roadways that have had crashes that rumble strips might have prevented. The RCKC did not identify North Westnedge Avenue as

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<sup>16</sup> Norketamine is a metabolite of ketamine.

<sup>17</sup> See *Michigan Motor Vehicle Code* §257.657 and §257.660(a) and (b).

<sup>18</sup> See section 4.5, "Paved Shoulders," *Guide for the Development of Bicycle Facilities*, American Association of State Highway and Transportation Officials (AASHTO), 4th edition.

<sup>19</sup> In the case of this crash, given the pickup truck driver's impaired state, rumble strips would not have been effective in alerting him to his departure from the travel lane.

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a candidate for rumble strip installation. Not installing rumble strips at this location was consistent with available design guidance for paved shoulders where there is known bicycle traffic.<sup>20</sup> The absence of rumble strips made the roadway more bicycle-friendly.

An alternative facility to the roadway is available to bicyclists in this area; the Kalamazoo River Valley Trail (KRVT) is a free-use multipurpose trail that generally parallels North Westnedge Avenue in the area of the crash. This segment of the KRVT is a bidirectional paved asphalt path with one approximately 5.25-foot-wide lane for each direction of travel. The KRVT is open to all forms of non-motorized transportation, including, but not limited to, bicycling, jogging, walking (often with pets and/or strollers), rollerblading/skating, and skateboarding. Road bicyclists often travel at substantially higher speeds than other recreational users of this type of trail. Additionally, road bicyclists frequently ride in a single file pace-line, where riders take turns being at the front of the line over the course of the ride. When riding in a pace-line, each bicyclist will rotate the lead position, first being the lead rider and then moving to the side and allowing the other riders to pass before falling back in line at the rear of the group. The difference in speeds, as well as the additional space required to effectively ride and switch leaders in a pace-line, often deters road bicyclists from using multipurpose facilities like the KRVT because of the risk of colliding with other trail users.

### Development of Kalamazoo Area Non-Motorized Facilities

Non-motorized transportation facilities in the Kalamazoo area have been developing and expanding for several years. The Kalamazoo Area 2045 Metropolitan Transportation Plan (MTP) was adopted approximately 6 weeks before the crash; it replaced the 2035 MTP, which had been in place since its adoption in June 2011.<sup>21</sup>

The non-motorized element of the 2045 MTP includes an inventory of the existing non-motorized transportation network, proposes future improvements, and discusses funding options. The plan identifies several benefits of non-motorized transportation, such as providing transportation and accessibility options; supporting other forms of mass transit; and improving air quality, economic conditions, health, and quality of life. The plan also discusses some of the many challenges to non-motorized facilities, including the need for cross-jurisdiction cooperation; the lack of adequate facilities; seasonal concerns; land use patterns; and multiple safety, maintenance, and funding options.<sup>22</sup>

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<sup>20</sup> See section 4.5, “Rumble Strips,” *A Policy on Geometric Design of Highways and Streets*, AASHTO, 6th edition; section 12.2, “Signing, Marking, and Delineation,” *Roadside Design Guide*, AASHTO, 4th edition; section 6F.87, “Rumble Strips,” *Manual on Uniform Traffic Control Devices for Streets and Highways*, US Department of Transportation, Federal Highway Administration, 2009 edition; and section 4.5.2, “Rumble Strips,” *Guide for the Development of Bicycle Facilities*, AASHTO, 4th edition.

<sup>21</sup> The Kalamazoo Area Transportation Study (KATS), which is the metropolitan planning organization for the greater Kalamazoo area, developed the MTPs. The metropolitan planning boundary considered by KATS includes all of Kalamazoo County and four townships—Almena, Antwerp, Waverly, and Paw Paw—in Van Buren County.

<sup>22</sup> Maps showing the proposed non-motorized facilities, identified bicycle commuter routes, and Kalamazoo Metro transit routes, in combination with existing and proposed non-motorized facilities identified in the 2045 MTP, can be found in the NTSB public docket for this investigation.

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### Probable Cause

The National Transportation Safety Board determines that the probable cause of the Cooper Township, Michigan, crash was the impairing effects of the driver's polysubstance abuse in the hours before the crash.

**Adopted: April 25, 2017**

For more details about this crash, visit the [NTSB public docket system](#) and search for NTSB accident ID HWY16MH014.

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The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, "accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties . . . and are not conducted for the purpose of determining the rights or liabilities of any person." 49 *Code of Federal Regulations*, Section 831.4. Assignment of fault or legal liability is not relevant to the NTSB's statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report. 49 *United States Code*, Section 1154(b).

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