



Ohio Bureau of Criminal Identification & Investigation
INVESTIGATIVE REPORT



12/12/2012 REPORT RECEIVED FROM OHIO STATE HIGHWAY PATROL

Summary

On December 12, 2012 Special Agent (SA) Mark Kollar met with Sgt. Thorn and Lt. Sheppard of the Ohio State Highway Patrol. This meeting took place at 4055 Highlander Parkway Richfield, Ohio 44286. The meeting took place at 1:30 pm.

Details

On December 12, 2012 at approximately 1:30 pm, SA Kollar met with Sgt. Thorn and Lt. Sheppard at the BCI Richfield Office. Sgt. Thorn completed a speed determination assessment from a video supplied to Thorn by BCI. Thorn turned over his report and drawings which will be attached to this report. Sgt. Thorn reports that he estimates the vehicle in question to be traveling approximately 66 miles per hour.

File Number: SI-18-12-82-1493	File Title: Timothy R. Russell (S) Malissa A. Williams (S)
Case Agent: Mark Kollar	Authoring Agent: Mark E. Kollar <i>MK</i>
Date of Report: 12/12/2012	Exhibit #: N/A
Investigative Activity: Report Received from OSHP	Supervisor Approval: Dennis Sweet JAN 14 2013 <i>[Signature]</i>

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Ohio State Highway Patrol

Reconstruction Report

2012-531-00

*Case Report #12-200064-0300
205 W. St. Clair Ave.
City of Cleveland / Cuyahoga County*

RECONSTRUCTION INFORMATION

Case Number: 12-531-00

Reconstructing Officer: Sgt. J. Thorne/ OSP Massillon DHQ

Start Date: 12/7/12

Reconstruction Aids:

Trimble S3 total station
Surveillance video from 11/29/12 at 205 W. St. Clair Ave.

Reconstructive Efforts Requested:

- 1) Determine speed of vehicle from surveillance video

REQUEST FOR ASSISTANCE

On December 5, 2012, I was notified by S/Lt. M. Morgan of a request from the Ohio Bureau of Criminal Identification and Investigation (BCI) to determine the speed of a vehicle captured on a surveillance camera on the evening of November 29, 2012 at approximately 2234 hours. S/Lt. Morgan informed me the vehicle in question was the same vehicle involved in a subsequent police pursuit and shooting later in the evening of November 29, 2012. I obtained the surveillance video on the afternoon of December 7, 2012 from S/Lt. E. Sheppard.

The camera is located at 205 W. St. Clair Ave., between W. 3rd and Ontario St. It is mounted to the side of an administration building for several City of Cleveland agencies, slightly east of a parking garage. The camera faces northeasterly from the south side of St. Clair Ave., with the entrance to the Cleveland Police Department visible in the center of the camera's focus. The camera's sight line extends northeasterly, with numerous light poles, parking meters, and a traffic signal visible in the distance. W. St. Clair Ave. itself travels from the southwest to the northeast in the area of the camera's view.

The video itself is of November 29, 2012 from 2214 through 2314 hours. When I obtained the video, there was a time stamp on a printed paper directing me to time stamp 22:34:17:140. I located the time stamp in the video and documented the following sequence of events. What follows is the video time stamp or range and a description of the events that take place at each time stamp.

<u>Time</u>	<u>Event</u>
22:33:01:125	A police cruiser enters the camera's field of view from the southwest. The vehicle pulls up to another parked vehicle across from 205 W. St. Clair Ave.
22:33:17:140	The police cruiser comes to a stop and its rear tail lights deactivate.
22:33:42:031	An individual exits the police car.
22:33:45:375	The individual exiting the police cruiser walks around its rear as another individual exits from 205 W. St. Clair Ave. The two begin to walk towards one another. The two individuals remain on the right side of the police cruiser after meeting one another.
22:34:01:187	A sport utility vehicle enters the camera's field of vision from the southwest. It continues northeast past the stopped police cruiser. This vehicle will partially obscure the entrance of the suspect vehicle into the camera's field of vision.
22:34:10:140	The first set of head lights possibly attributed to the suspected vehicle become visible. Because of the location of the SUV described in the stamp above, ambient lighting from surrounding businesses and the quality of the video, I can not definitively state this is the first appearance of the suspected vehicle.
22:34:13:875	Head lights of the suspected vehicle break the silhouette of the SUV. The headlights at this point can be directly related to the suspected vehicle and

	tracked easily throughout the remainder of the video.
22:34:15:078	The right front head light of the suspected vehicle becomes obscured by a light pole at the corner of St. Clair and an alley leading south to Rockwell Ave. An individual standing by the police cruiser appears to have just closed the trunk of the police cruiser. The individual begins walking south back towards 205 W. St. Clair.
22:34:17:468, 22:34:17:546	These two time stamps split the time where the front head lights of the suspected vehicle would be obscured by a light pole to the south of the camera's view point. The vehicle appears to be straddling the northern center turn lane pavement markings.
22:34:17:937	The suspected vehicle is completely outside of the camera's view.
22:34:21:015	An individual is at the left rear corner of the police cruiser, moving quickly towards the front of the vehicle.
22:34:24:750	The rear lights of the police cruiser activate. The cruiser pulls away from the roadside and initiates a turn heading southwest on St. Clair. The second individual near the police cruiser runs toward 205 W. St. Clair
22:34:32:156	The police cruiser is completely out of view of the camera.

Based upon viewing the video, I determined I could estimate a speed of the suspected vehicle using constant or average speed equations. To use these equations, however, I needed an accurate determination of the distance traveled by the suspected vehicle at specific points throughout the surveillance video.

SPEED DETERMINATION

Forensic Mapping

The area of 205 W. St. Clair was mapped using a Trimble S3 electronic total station on December 10, 2012. I was assisted with traffic control by Tpr. T. Bradic, but mapped all of the evidence points myself using the total station. During the forensic mapping, I mapped the actual location of the surveillance camera using the direct reflect capability of the total station as well as with the marking prism. I mapped numerous other landmarks depicted in the surveillance video as well.

Once the forensic mapping was completed, I imported all of the measurements into Crash Zone Ver. 9.2 and used them to create a detailed scale diagram of the area. I also took several pictures of the area to assist with map construction and detail. All measurements and distances subsequently referred to in this report were obtained from the scale diagram.

W. St. Clair, in this area, is a four lane city street that generally travels southwest to northeast. Eastbound and westbound lanes of travel are divided by painted dashed white lines. There is also a center turn lane denoted by double yellow and solid dashed yellow lines dividing eastbound and westbound traffic. The roadway is bordered to the north and south by concrete sidewalks and large buildings. The northernmost and southernmost lanes are devoted primarily for on street parking. There are parking meters placed at regular intervals on both sides of St. Clair Ave.

Distance Determination

In order to determine the speed of the vehicle in the camera, I needed to determine a set distance the vehicle traveled over a portion of time. There were numerous landmarks that the suspected vehicle passed, however the angle of the surveillance camera limited their utility because I could not accurately determine the exact moment where the vehicle crossed their location.

After watching the video numerous times, I noticed that the suspect's head lights became obscured when it passed by two stationary light poles; one in the immediate foreground of the camera's view, and one to the northeast near the intersection of St. Clair and an alley leading to Rockwell Ave. Having the camera's position marked on the diagram, I drew construction lines representing the line of sight from the camera to the respective light poles. I extended the construction lines to represent the area of the scale diagram that would be obscured by the light pole when viewed from the camera's perspective. These construction lines became the reference lines for placing a scale vehicle on the diagram to determine travel distances in conjunction with the video itself.

I also noticed that when the vehicle passes by the foreground pole, it appears to be straddling the northern pavement marking of the center turn lane. When I plotted the vehicle on the scale diagram, I used the center line as a guide for its lateral positioning. Throughout the

video, the vehicle does not appear to make any appreciable lateral movements. Consequently, I determined the vehicle moved in a relatively straight line from its first appearance to when it leaves the camera's field of view. It must be noted, however, that placing the vehicle further to the north would extend the traveled distance in subsequent calculations, resulting in much higher speed estimation. Thus, the speed estimation performed in this report represents a minimum speed estimation based upon conservative distances and average speed calculation over distance.

The beginning point for the distance measurement was found at time stamp 22:34:15:078. At this time stamp, the right front head light is clearly obscured by the light post near the intersection. I placed an exemplar scale vehicle on the scale diagram sight line in such a fashion that its right front head light would be obscured. The ending point was taken in the area where the vehicle's head lights become obscured behind the light pole in the camera foreground. The frame rate of the camera did not produce the exact time when the head lights were totally obscured. However, time stamp 22:34:17:468 is immediately before the head lights become obscured and time stamp 22:34:17:546 is immediately after. Knowing this, I plotted the scale vehicle position immediately before the construction sight line and immediately after.

After I plotted the vehicles, I measured the total distance traveled using the centers of mass for each respective vehicle. I took two measurements; one for the ending time stamp before head lights were obscured and one after the lights had cleared the final post. These two distances were **231.76 ft.** and **239.10 ft.** respectively. To determine the time taken to cover the distance, I subtracted the smaller time stamp from the larger. The respective times to cover the distance were **2.39 seconds** and **2.46 seconds**.

The equation to determine speed through constant motion is as follows:

$$V = \frac{D}{t}$$

Where:

V = Speed of vehicle (ft/sec)

D= Distance traveled by vehicle (ft)

t = Time taken to travel distance (sec)

Pre Light Pole

$$V = \frac{231.76}{2.39}$$

$$V = 96.970$$

Post Light Pole

$$V = \frac{239.10}{2.46}$$

$$V = 97.195$$

The equation to convert speed in ft/sec to miles/hour is as follows:

$$S_{mph} = \frac{S_{fps}}{1.466}$$

Pre Light Pole

$$S = \frac{96.970}{1.466}$$

$$S = 66.145$$

Post Light Pole

$$S = \frac{97.195}{1.466}$$

$$S = 66.299$$

Based upon uniform rate/time and distance calculations, the vehicle was traveling at approximately **66 miles per hour** during the time it was captured on the surveillance camera. This speed determination is based upon conservative distance measurements and time stamps obtained from the surveillance video.

CONCLUSION

Based upon analysis of all evidence obtained, the following conclusion can be made:

1. The suspected vehicle captured in the surveillance camera was traveling at an average speed of 66 miles per hour at the time it passed a stopped police officer at 205 W. St. Clair Ave. The speed calculation performed averages the speed of the vehicle over a measured distance and elapsed time. It does not account for any acceleration or deceleration experienced by the vehicle during the time and distance analysis. The calculation only determines the average speed a vehicle would be traveling to traverse the distance over time.