

Case ID: 080929-01

Accident Narrative

On a rainy 29 September 2008, a couple took a routine trip from their home in Lad Lum Kaew, Pathumthani, on Highway No. 346. At KM.17+500 (**Figure 3-1**), while traveling on the outer lane, the driver lost control of his vehicle. The pickup ran into the adjacent raised median. The vehicle then hit a Palm tree. The palm tree was broken into two parts by the impact while the vehicle was broken into three parts. The driver and passenger suffered serious injuries.

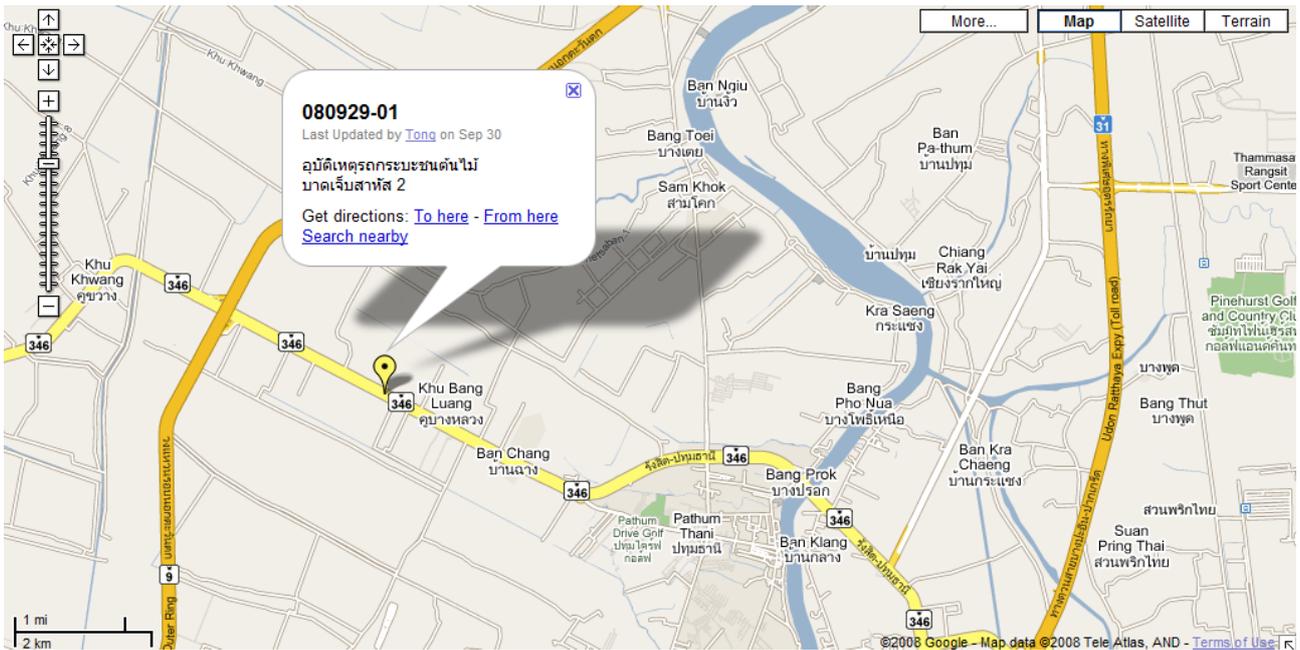


Figure 3-1: Location of Crash Site at KM. 17+500 on Highway No. 346

The couple had taken this route as normal for their business. They were going to take a fresh beef at Klong 1, Pathumthani, to Talad Thai (Thai Market). It was a rainy day at the time of the crash. While traveling on the outer lane, the driver found it difficult to control the pickup. It then started rotating and ran up into the raised median. It hit the palm tree by its left, causing huge damage on the pickup bed. The driver and passenger suffered serious injuries and were hospitalized at Pathumwet Hospital.

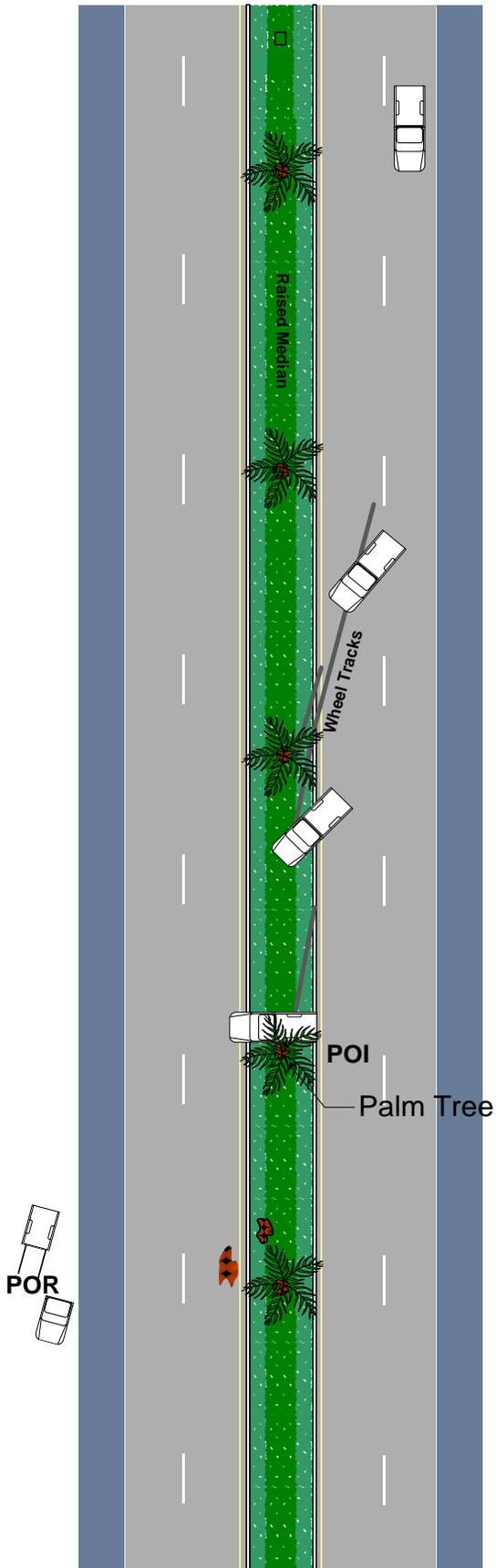


Figure 3-2: Collision Diagram

Vehicle Information

The pickup was a Toyota Vigo E-model, 3,000 CC., automatic-speed transmission. The engine was modified as popular hybrid petrol-LPG, with the LPG tank underneath. The dimension of the pickup was 5.13 m. long, 1.83 m. wide, and 1.79 m. high, with 3.08 m. of wheel base. The details of the pickup's tires are shown in **Table 3-1**.

Table 3-1: Pickup Tires

Location	Damage	Manufacture	Tire Name	Year	Size	Speed Symbol	Tread Depth (mm)	Pressure (psi)
1L	No	Bridgestone	Dueler H/T	4107	255/70 R15	C	5.4	40
1R	No	Bridgestone	Dueler H/T	4107	255/70 R15	C	5.2	40
2L	Yes	Bridgestone	Dueler H/T	4107	255/70 R15	C	4.7	N/A
2R	No	Bridgestone	Dueler H/T	4107	255/70 R15	C	4.3	32

The vehicle was designed for two bucket seats for the driver and front passenger. Both seats were equipped with lap-shoulder belts. The extended cab, space behind the front seats, was equipped with a bench.

Pickup Damage

After the crash the pickup was separated into three parts; occupant compartment, pickup bed, and engine. Evidence found from the pickup bed showed that the major impact with the tree occurred on the left side, at the location between the C-pillar and the rear axle (**Figure 3-3**). It intruded into the pickup bed. The frontal body was substantially damaged. However, it was likely from the ejection of the engine as a consequence of the collision. The connected joints between the main longitudinal bars and the occupant compartment were missing.



Figure 3-3: Deformed Pickup Bed

The interior evidence showed a blood stain on the roof and near the door on the passenger side. Likewise, there were two damage marks on the windshield (**Figure 3-4**).



Figure 3-4: Blood Strain

Driver Information

The driver was a 33 years old male, the pickup's owner. He started the trip from Ku Bang Luang about 10 minutes before crash and was quite familiar with this route since this was his routine trip for the beef selling shop. He had owned this pickup for about a year. Every day, he started the trip late at night at about 01:00 to get fresh beef from Klong 1. However, there was light rain at the time of the crash. He drove on the slower outer lane. When he applied the brakes, the pickup suddenly spun and hit the tree as mentioned.

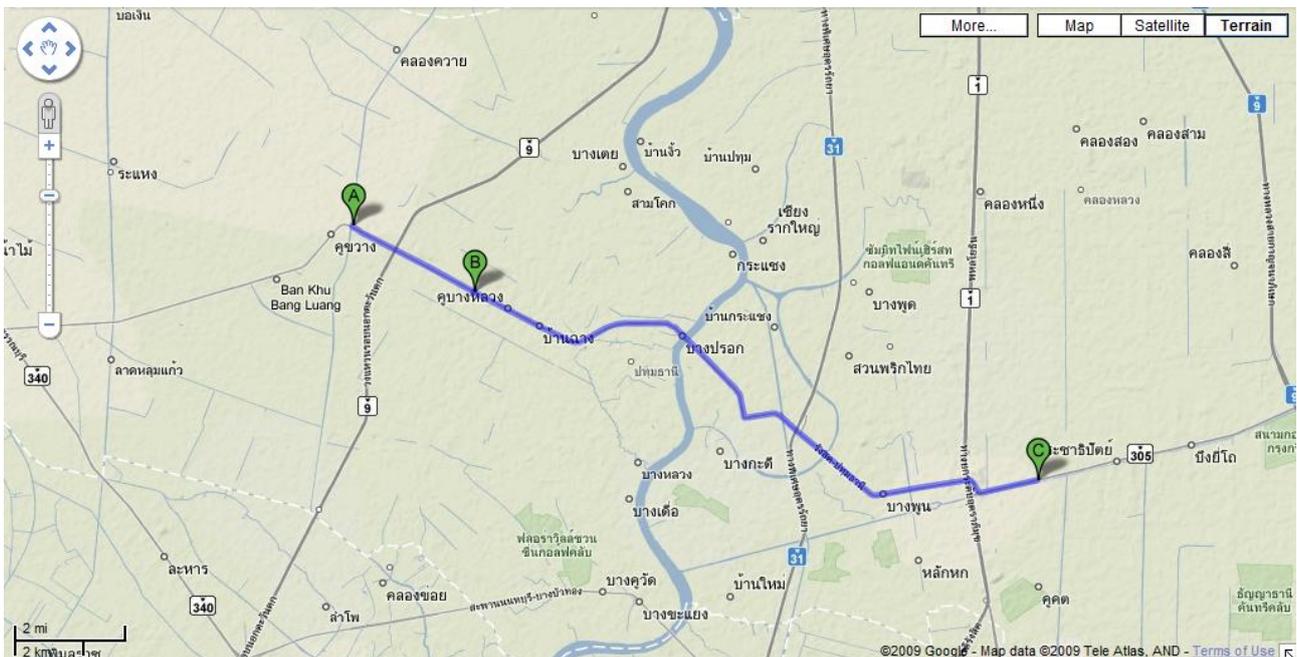


Figure 3-5: Traveled Route

Highway Information

Highway No. 346 connects Phanom Thuan, Kanchanaburi and Thanyaburi, Pathumthani. It is about 112 km. in total length. In the area of the crash, the 4-lane road and concrete pavement is divided by a 3.7 m. width grassy median. Each side of the median ended with 20x10 cm. concrete curbs. West Indian Jasmines, about 65 cm. in height, are planted at the middle of the median. The lane and shoulder width were 3.3 m. and 2.7 m., respectively. Cross section of the road in the area of the crash is shown in **Figure 3-6**.

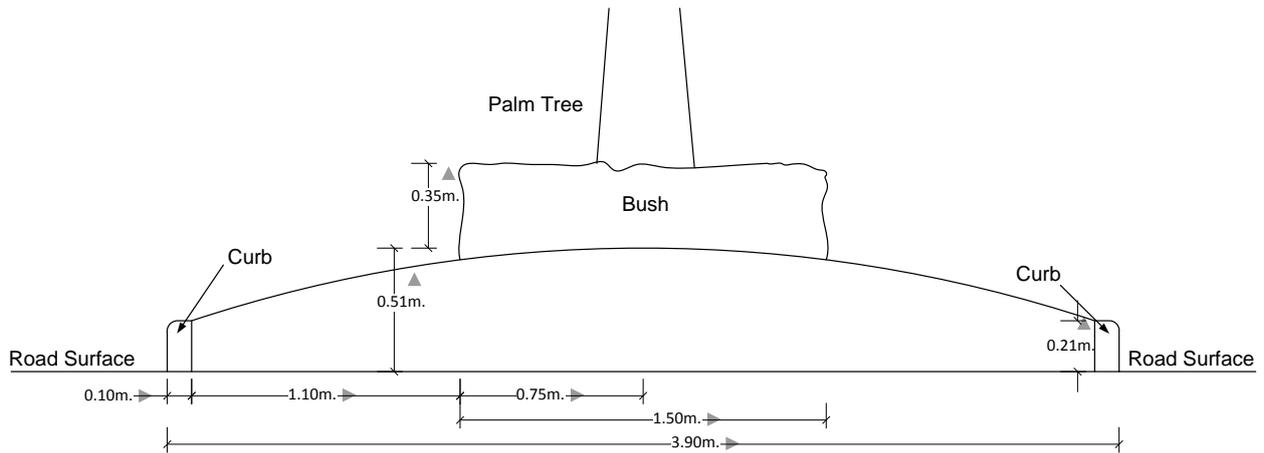


Figure 3-6: Cross Section of Crash Scene

Palm Tree

The palm tree with a 10 m. height and 28 cm. diameter was planted on the median without any protection. The stem formed an elongated cone covered with the projecting remnants of the former leaves or marked with circular scars indicating the position of those leaves which had already fallen away. The space between each palm tree is about 18 m. It was found that the roots of the tree were not firmly implanted into the soil since it was not originally grown here.



Figure 3-7: Palm Tree

Physical Evidence

One of the important evidence showing the movement of the pickup in this case are the yaw marks (**Figure 3-8**). They obviously started from the right lane, 28 m from the 17+500 kilometer post (1) and directed into the raised median. The scrub marks made between the front right tire and the concrete curb were printed 10 m further (2) where the pickup started moving on the median. At about 47 m from POI it showed the movement of the pickup over the West Indian Jasmines with another wheel track on the grass (3). At a point situated 60 m away from POI, the pickup hit a palm tree by its left and landed about 14 m further ahead. Three parts of the pickup separated; the engine, occupant compartment, and pickup bed (5).

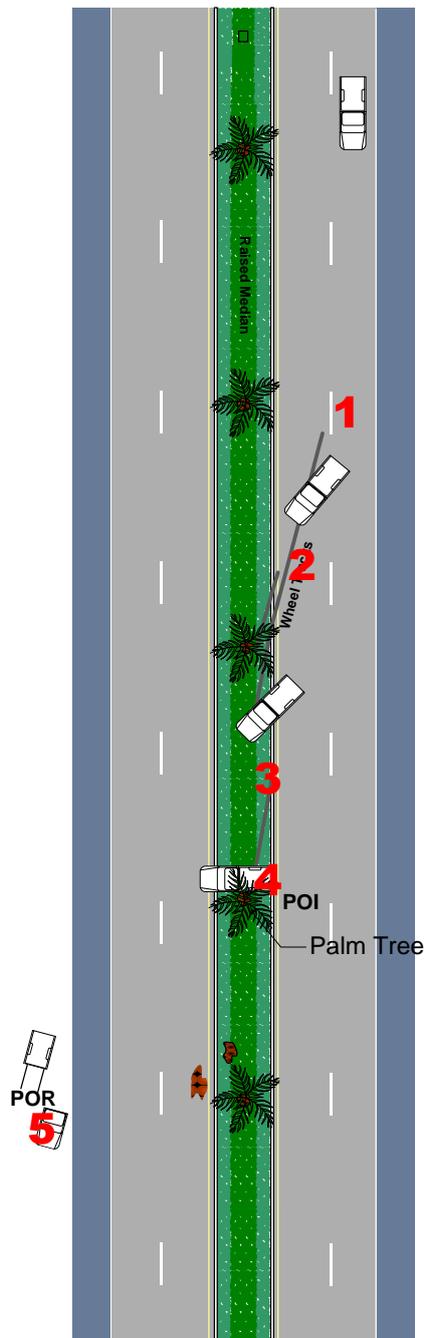


Figure 3-8: Major Events

Injuries Information

Both the driver and passenger suffered serious injuries and were hospitalized at Pathumwet Hospital. The 33 year old driver sustained injuries to his thorax (back) while the 27 year old passenger suffered open wounds on the chin, neck, fingers and knee as well as a contusion of the knee and leg. They admitted not wearing their seatbelts. **Table 3-2** presents the details of injuries resulting from this crash.

Table 3-2: Summary of Occupant Injuries

Gender	Age	Role	Level of Injury	Seating Position	Seat belt	Injury	ICD 10
Male	33	Driver	Serious	11	Not used	Contusion of thorax (back)	S20.2
Female	27	Passenger	Serious	13	Not used	Open wound of chin	S01.8
						Open wound of other parts of neck	S11.8
						Open wound of finger	S61.0
						Contusion of knee	S80.0
						Contusion of lower leg	S80.1
						Open wound of knee	S81.0

Accident Contributing Factors

Lost Control

The major event occurred when the pickup lost control on the wet surface. The victims and witnesses revealed that the rain had just stopped and the sight distance was quite clear at the time of the crash. While driving on the left lane, the pickup drove over a water splash. The driver then applied the brakes which resulted in the pickup spinning over the vertical axis. This kind of event is highly possibly an effect of hydroplaning.

Glennon and Engr (2006) describe Hydroplaning as following;

“is a phenomenon characterized by complete loss of directional control when a tire is moving fast enough that it rides up on a film of water and thereby loses contact with the pavement. Although several vehicle, roadway, and environmental factors affect the probability of hydroplaning, a general rule of thumb for rural highways is that hydroplaning can be expected for speeds above 45 mph where water ponds to a depth of one-tenth inch or greater over a distance of 30 feet or greater”.

At the time when the tire ran over the water film, the water pressure in front of the wheel forced water under the tire, causing it to lift from the road (**Figure 3-9**). If multiple tires hydroplaned, the vehicle may lose directional control and slide until it either collides with other obstacles or slows enough after the tires contact the road again (Wikipedia, 2009).



Figure 3-9: A diagram of a hydroplaning tire

Source: Wikipedia, 2009

Tree

The palm tree was located at the middle of the median without protection. According to the designation of raised median curb on divided highways, the median barrier, i.e. guardrail or concrete barrier, is not required. The tree is considered as hazardous object since its diameter is bigger than 10 cm. However, it had been recently removed from a farm and re-planted, so the roots were not firmly implanted thus reducing the impact force between the collided parties. However, its strength was still high enough to split the pickup into three parts.

Another issue raised regarding this crash is that had the pickup not hit the tree where would it have gone? In this case, the pickup would possibly have run into the opposite traffic and caused other unpredictable collisions with other moving vehicles, pedestrians or roadside buildings. This issue of roadside curb needs to be discussed in Chapter 5 in more details.

Significant Factors

TARC determined that the probable cause of the 080929-01 crash occurrence was the loss of control of the due to hydroplaning as supported by the mentioned evidences. The severity of the crash consequence was increased because of the lack of a sufficient roadside protection.