

Case ID: 080915-01

Accident Narrative

At about 7:30 AM on 15 September 2008, an inter-city bus started its trip from Suphanburi (A) and on its way had a fatal accident between KM. 63+100 and 63+200 of Highway No. 321 (**Figure 3-1**). According to a victim's description, the accident occurred during the morning peak hour with approximately 71 passengers on board. Only about 5 km. to Nakhonpathom (B), the driver lost control of the vehicle while traveling on the fast lane. It ran into the adjacent raised median and hit a bridge barrier on its front-right. As a result, the front part of the bus plunged into the canal while the rear part hung on the bridge barrier.

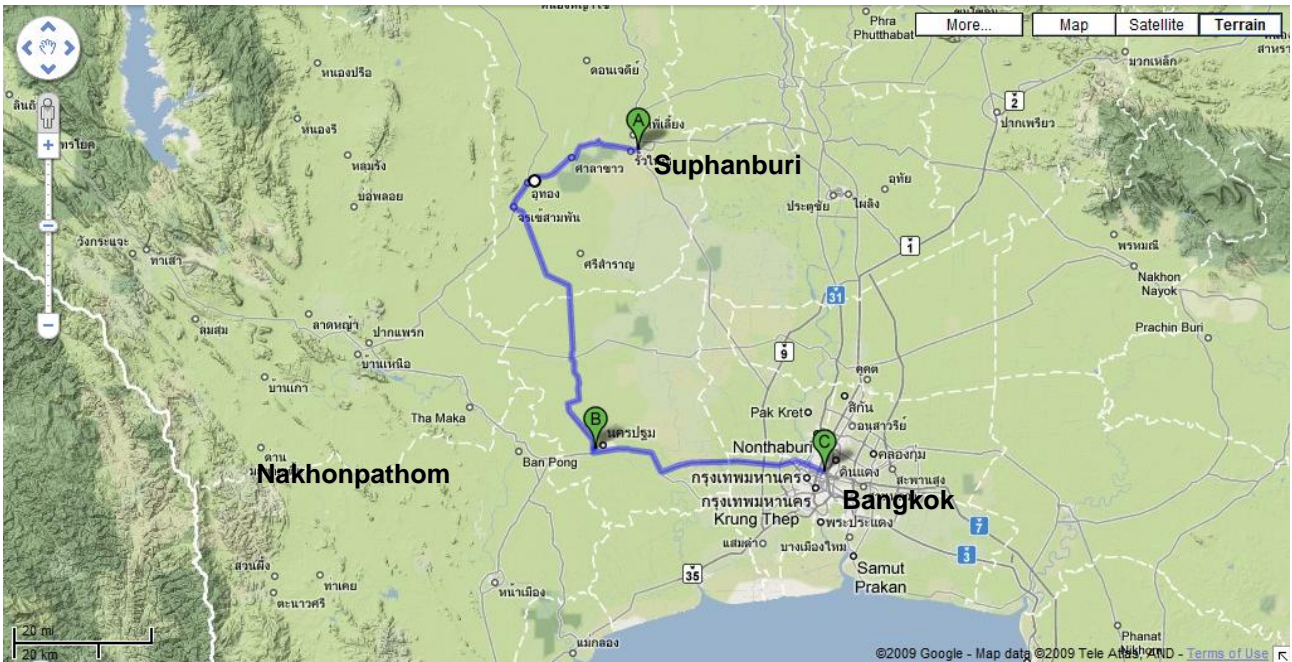


Figure 3-1: Location of the Bus Crash Site on Highway No. 321 KM. 63+100

Seven persons including the driver lost their life, while another 44 and 20 suffered serious and slight injuries, respectively. It was reported that there were numbers of standing passenger because of the peak hour. Identifying the seating position of the victims was impossible.

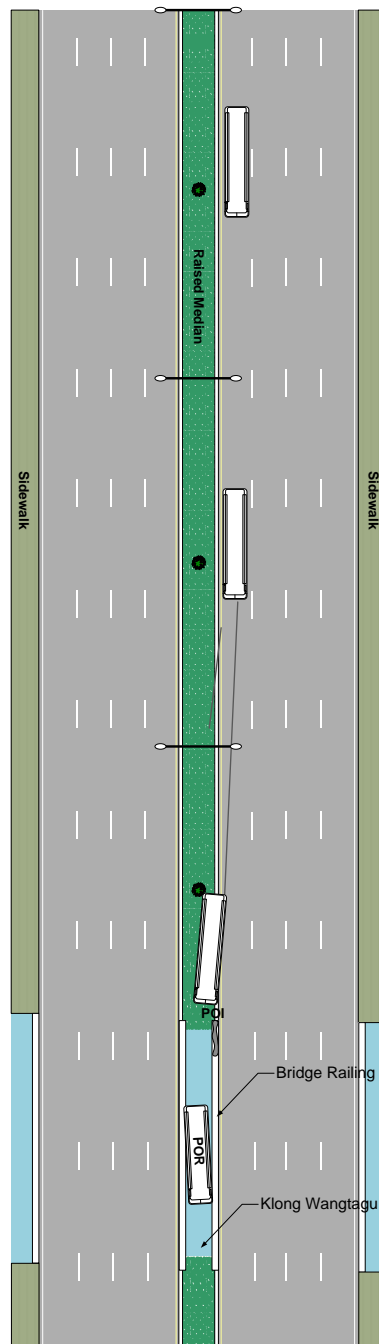


Figure 3-2: Schematic of Crash Scene

Vehicle Information

The single deck bus was locally assembled in Thailand. The body structure was emulated while the structure and engine were imported. The original dimensions were 11.5 m in length. It was white-blue in color. According to the service provider, this is the second class public bus running between Suphanburi and Bangkok.



Figure 3-3: Comparison between Original and Damaged Buses

Bus Damage

The exterior damage of the bus shows on the front. The front and rear axles departed the body structure. A-pillar on the driver side was pushed backward, causing massive damage to the driver's door. The frontal impact destroyed the body structure on the front left corner. The stairs were missing. The collapse of five pillars, including the A-pillar, on the right side caused a deformation of the roof structure. All windows were shattered. **Figure 3-4** describes the deformation on the frontal part of the bus.



Figure 3-4: Frontal Deformation of the Bus

The seating configuration of the bus was arranged as 11 rows of 4 seats (**Figure 3-5**). The passenger's seats were all individual but tightly attached r as a pair. The seats connected to the bus body by a pair of steel hooks, one attached with the floor while another one was attached to a side bar (**Figure 3-6**). However, only on the last row the seats were installed to the bus floor by connected bolts. It was documented that 6 seats departed their original position, including 1L (left), 2L, 3L, 4L, 6R (right), and 8L.

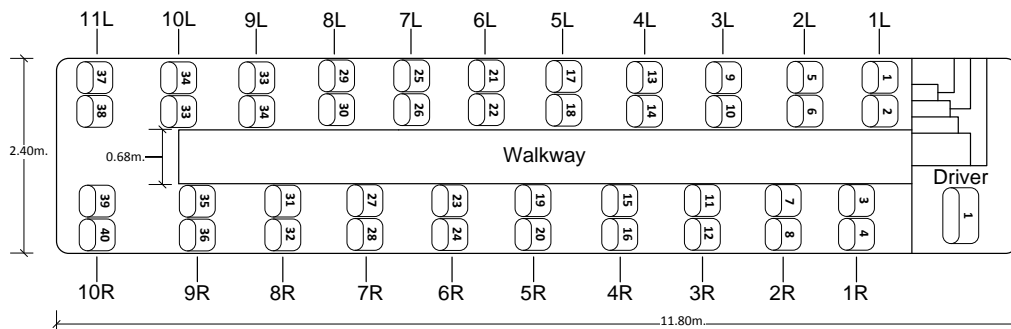


Figure 3-5: Seating Configuration



Figure 3-6: Passenger Seat

Driver Information

The bus driver was a 29 year old male who started the trip from Suphanburi at about 06:00. Some passengers stated that he drove quite fast for that morning traffic condition. Further information about his background and trip familiarity were unavailable.

Highway Information

The crash occurred on KM.63+100 of Highway No.321. This 107 km. highway links Suphanburi to Naknonpathom on the west side of Bangkok. In the area of the crash, a 8-lane concrete pavement compose of 3.7 m. width in each lane. The road is divided by a 3.5 m. grassy raised median. It is located about 30 cm from the yellow edge line. The median curb is 20x20 cm. in dimension.

Bridge Rail

A 27 m length bridge is constructed over Klong Wangtagu at km.63+052. The height from the water to the pavement was 4 m. The concrete barrier acts as bridge rails connected with the median curb. The distance between the yellow edge line and the bridge rail is the same as with the curb. The height of the bridge rail was measured to be 97 cm from the pavement surface. According to the design, there is a 10 cm notch located 15 cm under the top of the barrier (Figure 3-7). However, the end-treatment on both sides of the rail is not applicable.

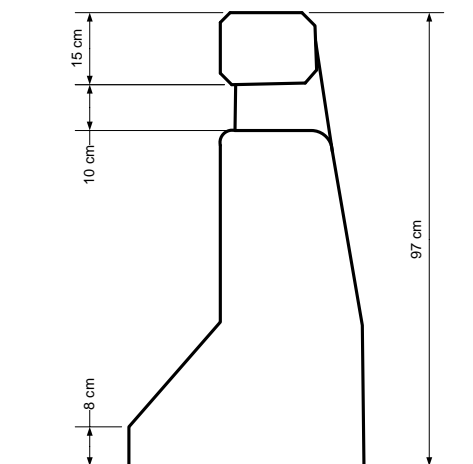


Figure 3-7: Bridge Railing Dimension

Physical Evidences

Measurement conducted on the evidences found at the scene shows that the bus left the traveling way at a point 45.5 m. from the bridge end, showing a tire mark on the median curb (1). About 10 m. before the bridge, there was a scratch mark on the median curb showing the impact with the bus' underneath structure (2). There was no end-treatment installation preceding the bridge structure (3). The 97 cm. height concrete barrier had a minor damage on the top, measuring about 14 m. from the beginning of the bridge (4), as shown in **Figure 3-8**. Two electric poles installed on the bridge railing were hit by the bus.

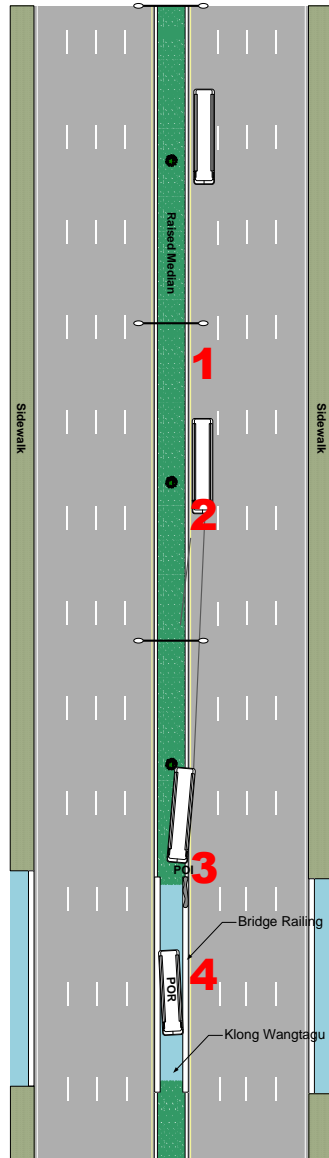


Figure 3-8: Evidences on the Crash Scene

Injuries Information

The injuries information of the occupants were collected from many hospitals as the seriously injured occupants were hospitalized and further transferred to other hospitals. The occupant injury information was collected from Nakhonpathom Hospital and Sanamjan Hospital. All the information are presented in **Table 3-1**. However, since the bus was overloaded, the seating and standing positions of the occupants inside the bus could not be assessed.

Table 3-1: Summary of Occupant Injuries

Person	Gender	Age	Level of Injury	Injury	ICD 10
1 (Driver)	Male	29	Fatal	N/A	N/A
2	Female	60	Fatal	N/A	N/A
3	Female	43	Fatal	N/A	N/A
4	Female	16	Fatal	N/A	N/A
5	Male	30	Fatal	N/A	N/A
6	Female	19	Fatal	Tear Liver	S36.1.
7	Male	16	Fatal	Rupture Liver	S36.1
8	Female	19	Serious	Chest injury	S29.9
				Sprain and strain of back	T09.2
9	Female	16	Serious	Unspecified injury to the head	S09.9
				Unspecified injury to the abdomen	S39.9
10	Female	34	Serious	Hemopneumothorax	S27.2
				Fracture both femur	S72.9
				Fracture both femur	S72.9
11	Female	3	Serious	Mild Head injury	S00.0
12	Female	23	Serious	Rupture Liver	S36.1
13	Male	77	Serious	Chest injury	S29.9
14	Female	49	Serious	Sprain and strain of neck	S13.6
				Sprain and strain of knee	S83.6
15	Male	42	Serious	Fracture of rib	S22.3
16	Female	43	Serious	Open wound of knee	S81.0
17	Female	17	Serious	Injury to the thigh level	S76.4
18	Male	22	Serious	N/A	N/A
19	Female	16	Serious	Superficial injury to the head	S00.9
				Superficial injury to the shoulder	S40.9
20	Female	21	Serious	Sprain of back	T09.2
				Fracture C - spine	S22.0
21	Female	16	Serious	Sprain and strain of neck	S13.6
22	Female	20	Serious	Rupture of ligaments at ankle	S93.2
23	Female	42	Serious	Superficial injury to the backhead	S00.8
				Superficial injuries of knee	S80.8
24	Female	18	Serious	Superficial injuries of knee	S80.8
				Superficial injury to the head	S00.8
25	Female	20	Serious	Injury to the intra-abdominal organ	S39.6
				Superficial injury to the thigh	S70.9
26	Female	16	Serious	Sprain and strain of arm	T11.5
27	Male	17	Serious	Superficial injury to the arm	T11.0
				Superficial injury to the arm	T11.0
28	Female	33	Serious	Superficial injury to the face	S00.8
				Superficial injury to the hand	S60.9
				Superficial injury to the foot	S90.9
29	Male	18	Serious	Superficial injury to the face	S00.8
				Superficial injury to the back	T09.0
				Dislocation of ankle joint	S93.0
30	Female	64	Serious	Sprain and strain of arm	T11.5
				Sprain and strain of knee	S83.6
				Injury to the thorax	S29.9
31	Female	33	Serious	Superficial injury to the face	S00.8
32	Female	44	Serious	Fracture of clavicle	S42.0
33	Female	12	Serious	Contusion of eyeball	S05.1
				Sprain and strain of back	T09.2
34	Female	26	Serious	Sprain and strain of back	T09.2
35	Female	17	Serious	Superficial injuries of wrist	S60.8
36	Female	20	Serious	Fracture of arm	T10.0
37	Female	19	Serious	Superficial injury to the cheek	S00.8
38	Female	19	Serious	Superficial injury to the head	S00.9
				Sprain and strain of shoulder	S43.7
39	Male	22	Serious	Sprain and strain of back	T09.2
40	Female	18	Serious	Fracture of clavicle	S42.0
41	Male	11	Serious	Open wound of head	S01.9
				Superficial injury to the leg	T13.0
42	Male	20	Serious	Superficial injury to the lip	S00.8
				Superficial injury to the thigh	S70.9
				Injury to the thorax	S29.9
				Traumatic rupture of ligament of wrist	S63.3
43	Female	38	Serious	Superficial injury to the thigh	S70.9
				Superficial injury to the thigh	S70.9
				Fracture of arm	T11.0
				Sprain and strain of back	T09.2
44	Female	22	Serious	Superficial injury to the face	S00.8
				Superficial injury to the head	S00.8
				Sprain and strain of back	T09.2
45	Female	25	Serious	Injury to the thorax	S29.9
				Open wound of wrist	S61.9
				Superficial injuries of foot	S90.8

Table 3-28: Summary of Occupant Injuries (Cont.)

Person	Gender	Age	Level of Injury	Injury	ICD 10
46	Female	20	Serious	Superficial injury to the head	S00.9
				Superficial injury to the trunk	T09.0
47	Female	28	Serious	Superficial injury to the elbow	S50.9
				Injury to the thorax	S29.9
				Superficial injuries of finger	S60.8
				Superficial injuries of finger	S60.8
48	Male	18	Serious	Superficial injury to the elbow	S50.9
				Superficial injury to the leg	T13.0
				Superficial injury to the lip	S00.8
49	Female	26	Serious	Superficial injury to the ear	S00.4
				Open wound of foot	S91.3
				Sprain and strain of ankle	S93.4
50	Male	18	Serious	Superficial injury to the head	S00.8
				Fracture of clavicle	S42.0
51	Female	37	Serious	N/A	N/A
52	Male	19	Slight	N/A	N/A
53	Male	17	Slight	N/A	N/A
54	Male	45	Slight	N/A	N/A
55	Female	45	Slight	N/A	N/A
56	Female	45	Slight	N/A	N/A
57	Female	21	Slight	N/A	N/A
58	Female	15	Slight	N/A	N/A
59	Male	13	Slight	N/A	N/A
60	Male	6	Slight	N/A	N/A
61	Female	16	Slight	N/A	N/A
62	Female	16	Slight	N/A	N/A
63	Female	19	Slight	N/A	N/A
64	Female	32	Slight	N/A	N/A
65	Female	18	Slight	N/A	N/A
66	Female	17	Slight	N/A	N/A
67	Female	13	Slight	N/A	N/A
68	Male	5	Slight	N/A	N/A
69	Male	51	Slight	N/A	N/A
70	Female	22	Slight	N/A	N/A
71	Female	22	Slight	N/A	N/A

Accident Contributing Factors

Unsafe Driving

The 29 years old driver was reported to be driving unsafely by several of the passengers. Some of them stated that he drove quite fast for that morning traffic condition. On the way to U-thong, he competed with another bus company. The last stopping station was between km.12 and 13, where 4 more passengers were taken on board. One passenger said that the bus almost ran off the road at Thap Luang curve, about 10 km before the crash scene.

According to the news reports, the public always argue on the competition between bus companies since they provide a service as a paratransit. This means that passengers are able to board a bus anywhere, not only at bus stations. Consequently, the bus drivers try to pick up as many passengers over other companies.

Bridge Railing

The major impact on this crash occurred where the front part of the bus collided with the bridge railing. It caused massive damages to the bus. According to scene documentation, the 97 cm concrete barrier stands about 30 cm away from the traveling way without any protection.

Another issue which has been raised regarding this crash is that if there had not been any bridge railing, where would the bus have gone? In case the driver could not return the bus into the ongoing traffic, it would run into the opposite traffic and cause other unpredictable collisions with other moving vehicles, pedestrians or roadside buildings. As a result, the issue of roadside curb needs to be discussed in Chapter 5 in details.



Figure 3-9: Possible Scenario if No Bridge Railing

Overloaded Bus and Unprotected Passengers

As mentioned, this morning peak trip transported more than 70 passengers on board. However, there were only 42 passenger seats. In other words, about 30 passengers were standing. Some of them revealed that a massive crowd instantly moved towards the front part of the bus after falling down into the canal. The same scenario was repeated like in other bus crashes when the majority of injuries resulted from collisions between passengers, while only the driver was stuck in his position by the intrusion by the front impact, console and steering wheel.

Significant Factors

TARC determined the probable cause of the 080915-01 crash occurrence was the unsafe driving maneuver of the bus driver as supported by passengers' statements. The severity of the crash consequences was increased by the high traveling speed and the lack of a sufficient roadside protection system. The situation became worst when the bus was overloaded and because of the lack of a protection system for the passengers as reflected by the internal impact between passengers.