

Lesson Learnt from Road Accident Investigation in Indonesia

Prof. Ir. Leksmono Suryo Putranto, MT, Ph.D
Professor in Road Traffic Safety, Tarumanagara University
Head of Road Transport Accident Investigation
National Transport Safety Committee

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The Duty of NTSC

- To conduct transportation accident investigation.
- To provide recommendation to related stakeholders regarding results of transportation accident investigation.
- To provide recommendation to President regarding improvement of transportation safety based on transportation accident investigation results.

Transportation Accident Investigation

Study and research on the cause of transportation accident by means of data collection, analysis and objective & systematic data to avoid transportation accident with the same cause happens again.

NTSC Investigation Principles

- *No blame*
- *No judicial*
- *No liability*

NTSC Members

- NTSC is a national committee consist of 6 commisioner (Chairman, Vice Chairman, and Heads of Road/ Railway/ Aviation/ Marine Accident Investigation)
- Each Sub Committee suported by 10 investigators.

Mandatory Road Accident Investigations

Road accidents involving motorized public transport vehicle:

- causing at least 8 fatalities
- Inviting broad public attention
- causing polemic/ controversy
- causing large scale damage of infrastructure
- repeatedly on the same vehicle brand and type within a year
- repeatedly on the same location more than three times a year
- causing damage/ pollution on the environment due to dangerous and poisonous substance

TYPICAL STRUCTURE OF INVESTIGATION REPORT



KOMITE NASIONAL KESELAMATAN TRANSPORTASI

NATIONAL TRANSPORTATION SAFETY COMMITTEE

**CRASH BETWEEN TRAIN 1528 FROM JATINEGARA TO BOGOR
AND MEDIUM BUS B-7760-FD FROM KAMPUNG BANDAN TO
KALIDERES AT RAIL CROSSING 05 KM 03+739 TUBAGUS
ANGKE ROAD, TAMBORA DISTRICT, WEST JAKARTA,
SUNDAY, 6 DECEMBER 2015, 08.43 A.M.**



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CHRONOLOGY

- Sunday, 6 December 2015, 08.00 A.M. the medium bus departed from Jembatan Lima to Kalideres.
- The same day at 08.30 A.M., Electric train 1528 consisting of eight trains departed from Kampung Bandan to Bogor.
- Train dispatcher activate the siren and rail crossing PJL 05 Angke close the rail crossing.
- The medium bus violate the the closure and entering the crossing when its distance to the train 1528 was to short
- At 08.43 WIB the accident happened



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VICTIMS DATA

Severity	Medium Bus Crew	Train 1528 Crew/Passengers	Medium Bus Passengers	Total
Death	2	-	17	19
Injured	-	-	4	4
Total				23

FINDINGS



There was 3.3.meters gap (uncovered) during the rail corssing closure that can be used by the medium bus to violate the closure



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FINDINGS



Minibus driver sight was obstructed by buildings, trees, petrol kiosk and therefore he could not see incoming train 1528 travelling from Kampung Bandan.

FINDINGS



Road signs 50meters before the rail crossing were corroded and obstructed by trees and therefore could not be read thoroughly



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ANALYSIS OF RAILWAY CROSSING DOORSTOP

The doorstop length was only 4.2meters whilst the road with was 7.5meters, leaving 3.3meters gap. This allowed the minibus to enter the crossing. According to Minister of Transportation Regulation No. 10 Year 2011 point no. 5.1., doorstop shoul fully covered the road with to avoid violation of the closure.



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ANALYSIS OF MEDIUM BUS FREE SIGHT DISTANCE

According to site observation, it was predicted that the minibus driver could not see the movement of incoming train 1528 from Kampung Bandan because it was covered by illegal building, trees and petroleum kiosk located in railway. This is not comply with Minister of Transportation Decree No. 36 Year 2011 on crossing between railway and other buildings Chapter 4, stating ". there is environment conditioni that enable free sight both for the machinists of the train (at least 500meters) and motorized vehiicle drivers (at least 150meters). At accident site the free sight distances were too short. The minibus drive could only recognize the arrival of train 1528.



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ANALYSIS OF INFRASTRUCTURE

In 2015, there were 227 schedules of trains passing the accident site, consisted of 114 schedules in one direction and 113 schedules in the opposite direction. Therefore the railway crossing was quite busy.

The railway crossing, actually has already been equipped with a flyover. Capacity of the flyover is limited as it is a two lanes-two way flyover. Considering high frequency of trains, the closure of the the railway crossing and optimize the use of flyove.



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CONTRIBUTING FACTORS

- 1) The sight of medium bus driver was obstructed by buildings, trees, flyover concrete columns and petroleum kiosk on the sides of railway causing late recognition of train 1528 arrival.
- 2) The medium bus use the 3.3meters available gap not covered by the doorstop to violate the railway crossing closure.
- 3) Carelessness, invigilance and disobedience of the medium bus driver to traffic information causing driver failure to cope with the critical situation
- 4) Some of the road signs in Tubagus Angke road were corroded and covered by trees..



CONCLUSIONS

- The medium bus driver violates railway crossing closure using the available gap.
- The medium bus driver was not able to correctly react to critical situation.
- The presence of illegal buildings and petroleum kiosk obstructed the sight of medium bus driver causing late recognition of the arrival of train 1528.
- Condition of signs about 50meters from railway crossing were corroded and obstructed by trees and therefore unreadable.



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SAFETY ACTION



The backdrop to warn the people to be careful when crossing the railway and the danger of violating the railway crossing closure. Installed in both directions of the traffic



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RECOMMENDATION I

1. Directorate General of Railways, Ministry of Transportation
Conducting inventory, monitoring and evaluation on performance of all at grade railway crossing, especially in Greater Jakarta
2. PT. Kereta Api Indonesia (Indonesian Railway Company)
 - a. Co-ordinates with related stake holders to conduct law enforcement on illegal buildings 500meters before and after the accident point.
 - b. Installing doorstop across overall width of the road at the accident point
3. West Jakarta Police
 - a. Move the Police Station under the flyover as it obstructs sight of driver from view of railway. Police station also attract visitors who park their cars in the road, adding congestion and trigger potential accident.
 - b. Regularly check the possession of valid driving license to avoid illegal motorized vehicle operation



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REKOMENDASI II

4. Jakarta Transportation Agency
 - a. Monitoring the technical performance and legal document of motoized vehicle especially public motorized vehicle.
 - b. Assist the police to manage traffic especially during peak hours.
5. Jakarta Gardening Agency
Trimming the trees covering traffic signs 150meters before and after accident site.
6. Dinas Bina Marga Provinsi DKI Jakarta
 - a. Close at grade railway crossing at the accident site.
 - b. Install some U-Turn's.
7. PT. Metromini (The Medium Bus Company)
 - a. Requiring all driver to comply to all traffic regulation.
 - b. Replace and renew all fleets which are not complying technical requirement.
 - c. Conduct Safety Manajemen System



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BUS B-7222-KGA ROLLED-OVER AT EXIT RAMP OF JATINGALEH KM 9+300, SEMARANG TOLL ROAD, CENTRAL JAVA, FRIDAY, 20 FEBRUARY 2015 ,1.00 P.M.



Summary

- Thursday, 19 February 2015, bus B 7222 KGA departed from Bojonegoro, East Java at 4 p.m. (Western Indonesian Time) heading to Pekalongan, Central Java to attend a religious event.
- After made several stops to pray they arrived at Pekalongan at 4.30 a.m. the next day.
- They left Pekalongan at 10.30 a.m. after the event and made several stops to buy some local specialities and to pray.
- The accident happened at 12.45 p.m. at Jatingaleh tol exit with sharp curve and downhill gradient.
- 18 passengers died, 21 seriously injured, 25 slightly injured



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CONTRIBUTING FACTORS

- Driver fatigue due to excessive driving hours (more than 10 hours)
- Driving 90 kph exceed speed limit (40 kph) for exit ramp with sharp curve.
- The sharp curve was not accompanied with appropriate superelevation to overcame centrifugal force. The situation was getting worse due to asphalt overlay process without considering appropriate superelevation.
- The bus carry 64 passengers, far beyond normal capacity of 45 seats.



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KECELAKAAN TUNGGAL MOBIL BARANG DUMP TRUK DS-9675-AB
MASUK JURANG DI JL. ALTERNATIF PERUMNAS III WAENA-
ENTROP, JAYAPURA , MINGGU 11 JANUARI 2015 PUKUL 13.00 WIT



To Entrop/Jayapura

Arah to Waena

Summary

- Sunday, 11 January 2015, 11.00 a.m. (Eastern Indonesian Time) a Dump Truck DS-9675-AB departed from Argapura, Jayapura, carrying 51 passengers including driver heading to tourism site at Kampwolker.
- At about 1.00 p.m. the truck was almost reaching the destination. The road gradient was extrem downhill (more than 10%).
- The driver could not control the truck and end up rolled over in the dry Kampwolker river.
- 9 passengers died and the other 42 were injured.



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CONTRIBUTING FACTORS (1)

1. The vehicle is a dump truck. It was not suppose to carry passengers outside the cabin. It was not well maintained. The latest date of mandatory vehicle inspection was 30 May 2010. There was no other vehicle inspection carried out until the accident happened 11 January 2015 although the mandatory vehicle inspection should be done every 6 months.
2. The driver was not well trained to overcome complex driving situation such as extreem gradient.
3. The road gradient was extreem (beyond 10%).
4. Guard rails were not installed in the roadsides, although some of the roadsides were deep cliffs.



CONTRIBUTING FACTORS (2)

5. There was some water in the hose of brake fluid. This was affecting the braking system performance.
6. The depth of the tire groove of the left side tires were below requirement.
7. There was no stopper on the rear shockbreaker which was affecting vehicle stability.

CRASH BETWEEN CRANE VEHICLE B-9387-PD AND
SPECIAL TRAIN KP/10084 FROM BANYUWANGI TO MADIUN

AT GRADE INTERSECTOIN NUMBER 49 KM 20 + $\frac{3}{4}$,
BANJARKEMANTREN BETWEEN SIDOARJO ST. AND
GEDANGAN ST., SIDOARJO REGENCY, EAST JAVA PROVINCE

WEDNESDAY, 16 JULY 2014

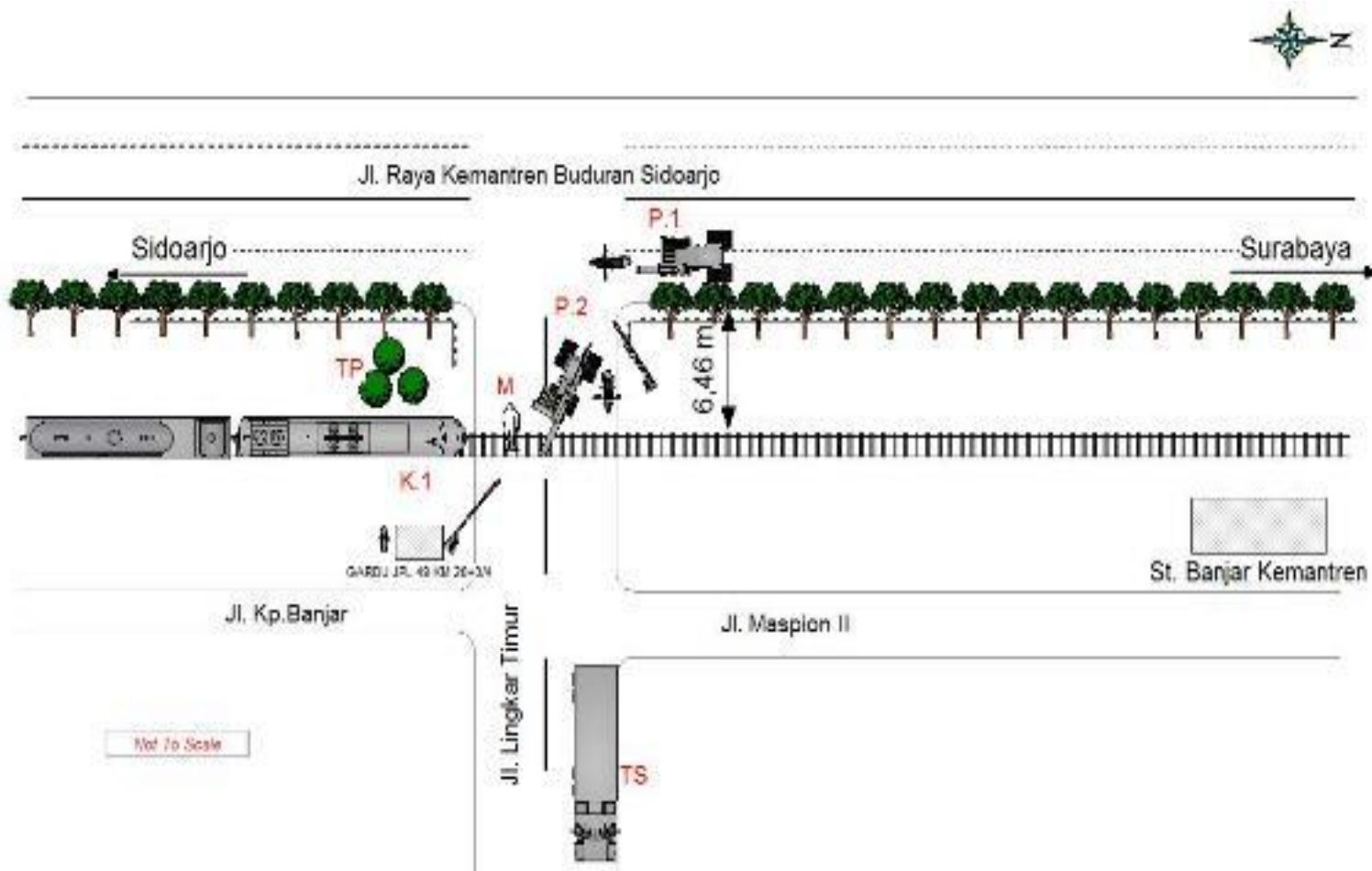
Summary

- Special Train KP/10084 had been carried out inspection to support long national holiday transportation.
- A mobile crane B-9387-PD was leaving nearby construction site to be loaded on a semitrailer low bed truck. The truck could not park near to the site due to drainage work surrounding the site. To reach the parking position the mobile crane should cross the railway.
- The crash between the train and the crane was at about 11.30 PM because the guard was not aware that he should close the doorstop as he did not receive notification on the schedule of the special train.
- 2 fatalities were the one of train crew and one construction worker who supervise the transport of the crane. 3 persons were injured including the crane operator, other construction worker who also supervise the transport of the crane and the other train crew.

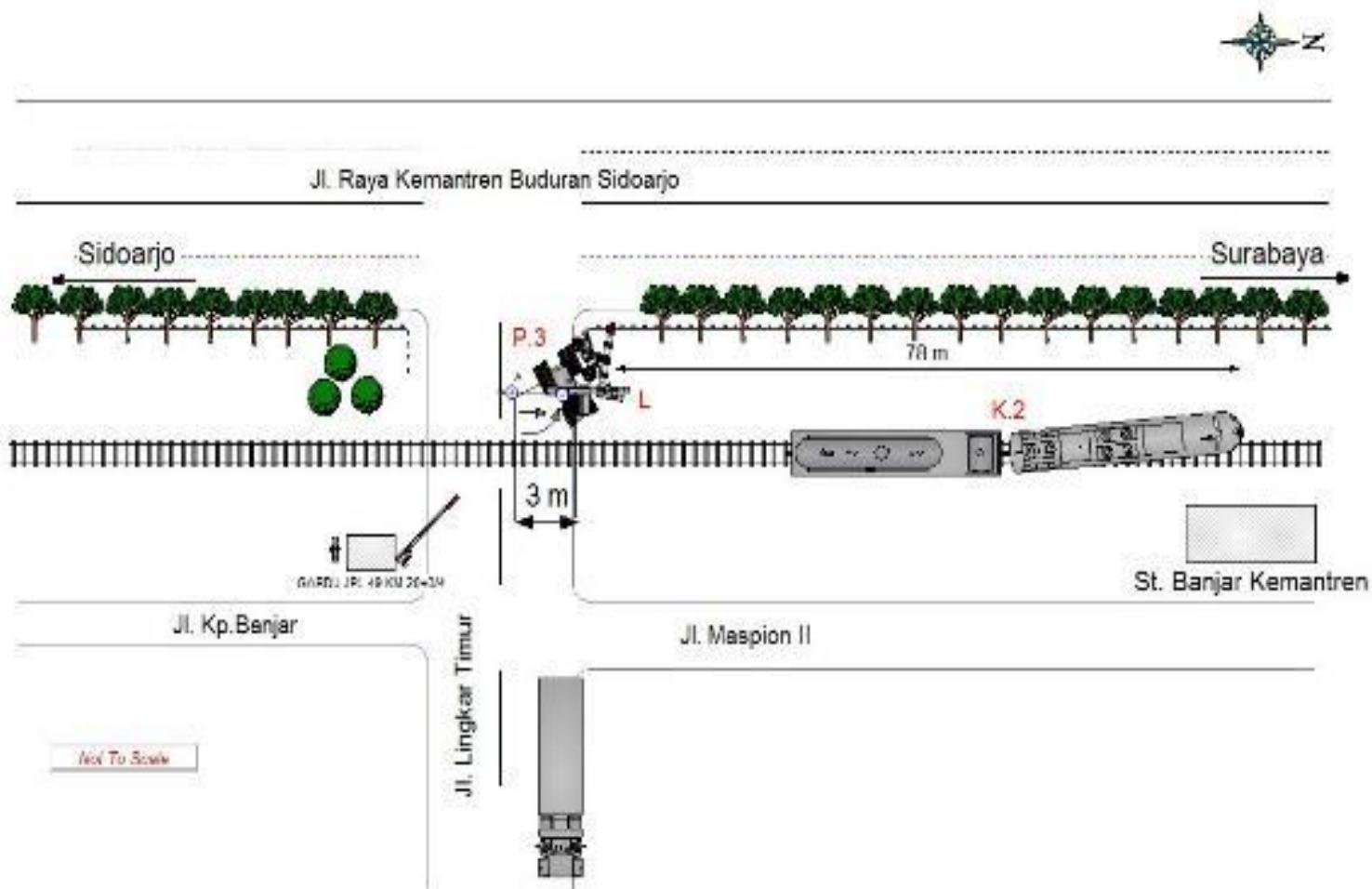
The Crash



The Crash



After the Crash



Conflicting Messages



Contributing Factors

- Mobile crane was operated in public road. According to the legislation, it should be carried by a truck. On the at grade railway crossing, the crane the crane could not stop before the stop sign. As a result when the train cross the accident site the boom of the crane had already reach above the railway.
- Information regarding the schedule of special train was only received by the head of stations along the route of the special train. This was not forwarded to the doorstop attendant. This was just because the attendant in the accident site was employee of Sidoarjo Regency Transport Agency and was not the employee of the Indonesian Railway Company.

CATATAN DARI BEBERAPA INVESTIGASI KECELAKAAN LLAJ YANG TERAKHIR

Driver Working and Rest Time (1)

Undang-undang Nomor 13 Tahun 2003 tentang Ketenagakerjaan	Undang-undang Nomor 22 Tahun 2009 tentang Lalu Lintas dan Angkutan Jalan	PP No. 44 Tahun 1993 tentang Kendaraan dan Pengemudi
<p>Pasal 77</p> <p>(1) Setiap pengusaha wajib melaksanakan ketentuan waktu kerja.</p> <p>(2) Waktu kerja sebagaimana dimaksud dalam ayat (1) meliputi:</p> <ul style="list-style-type: none"> a. 7 (tujuh) jam 1 (satu) hari dan 40 (empat puluh) jam 1 (satu) minggu untuk 6 (enam) hari kerja dalam 1 (satu) minggu; atau b. 8 (delapan) jam 1 (satu) hari dan 40 (empat puluh) jam 1 (satu) minggu untuk 5 (lima) hari kerja dalam 1 (satu) minggu. <p>(3) Ketentuan waktu kerja sebagaimana dimaksud dalam ayat (2) tidak berlaku bagi sektor usaha atau pekerjaan tertentu.</p> <p>(4) Ketentuan mengenai waktu kerja pada sektor usaha atau pekerjaan tertentu sebagaimana dimaksud dalam ayat (3) diatur dengan Keputusan Menteri.</p>	<p>Pasal 90</p> <p>(1) Perusahaan Angkutan Umum wajib mematuhi dan memberlakukan ketentuan mengenai waktu kerja, waktu istirahat, dan pergantian Pengemudi Kendaraan Bermotor Umum sesuai dengan ketentuan peraturan perundang-undangan.</p> <p>(2) Waktu kerja bagi Pengemudi Kendaraan Bermotor Umum sebagaimana dimaksud pada ayat (1) paling lama 8 (delapan) jam sehari.</p> <p>(3) Pengemudi Kendaraan Bermotor Umum setelah mengemudikan Kendaraan selama 4 (empat) jam berturut-turut wajib beristirahat paling singkat setengah jam.</p> <p>(4) Dalam hal tertentu Pengemudi dapat dipekerjakan paling lama 12 (dua belas) jam sehari termasuk waktu istirahat selama 1 (satu) jam</p>	<p>Pasal 240</p> <p>(1) Untuk menjamin keselamatan lalu lintas dan angkutan di jalan, perusahaan angkutan umum wajib mematuhi ketentuan mengenai waktu kerja dan waktu istirahat bagi pengemudi kendaraan umum.</p> <p>(2) Waktu kerja bagi pengemudi kendaraan umum sebagaimana dimaksud dalam ayat (1) adalah 8 (delapan) jam sehari.</p> <p>(3) Pengemudi kendaraan umum setelah mengemudikan kendaraan selama 4 (empat) jam berturut-turut, harus diberikan istirahat sekurang-kurangnya setengah jam.</p> <p>(4) Dalam hal-hal tertentu pengemudi sebagaimana dimaksud dalam ayat (2) dapat dipekerjakan menyimpang dari waktu kerja 8 (delapan) jam sehari, tetapi tidak boleh lebih dari 12 (dua belas) jam sehari termasuk istirahat 1 (satu) jam.</p> <p>(5) Penyimpangan waktu kerja sebagaimana dimaksud dalam ayat (4) tidak berlaku bagi pengemudi kendaraan umum yang mengemudikan kendaraan umum angkutan antar kota.</p> <p>(6) Pengemudi kendaraan umum wajib mematuhi ketentuan waktu kerja dan waktu istirahat sebagaimana dimaksud dalam ayat (2), ayat (3), ayat (4), dan ayat (5).</p>
<p>PP No. 55 tahun 2012 tentang Kendaraan</p> <p>Pasal 186 : Pada saat PP ini mulai berlaku, semua Peraturan PP yang merupakan peraturan pelaksanaan dari PP No. 44 th 1993 tentang Kendaraan dan Pengemudi yang mengatur tentang kendaraan, dinyatakan masih tetap berlaku sepanjang tidak bertentangan dengan PP ini.</p> <p>Pasal 187: Pada saat PP ini mulai berlaku, PP No.44 tahun 1993 tentang Kendaraan & Pengemudi dicabut dan dinyatakan tidak berlaku.</p>		

Driver Working and Rest Time (2)

- Man Power Law stated that maximum daily working time is 8 hours.
- New Traffic Law (2009) stated that maximum daily working time is 12 hours. Government Regulation (1993) regarding Vehicle and Driver stated that for intercity transport maximum daily working time is 8 hours. But this only valid to regulate under the Old Traffic Law (1992). New Government Regulation (2012) is only regarding Vehicle. Although this is valid to regulate under the New Trafic Law (2009) but there is no regulation regarding the driver.

Fatigue

Fatigue can cause micro sleep (temporary unconsciousness) and further can cause deterioration on driver ability to control the vehicle. During peak season such as national religious holiday the government often issue special permit for buses without controlling the bus company who apply. This might cause issuing long distance special permit for a bus company which usually operating short or medium distance bus. As a result the bus driver will not use to operate long distance bus. Therefore, it is urgent to revise laws and regulations regarding vehicle and driver. Not only length of working hours, length of rest time should also be regulated. It should also mention in the regulation. Second driver should be starting working in a fresh condition.

SOME ACCIDENTS CAUSED BY FATIGUES

Rukun Sayur Bus 14 July 2015

Palimanan-Kanci KM 202



Isuzu Elf-3 Minibus December 2015

Cikampek-Palimanan KM 136+900



Unsafe Vehicle.

Type approval for new vehicle type in Indonesia, include only test of some vehicle parts and analysis of drawing and specification. No physical test such as crash test is conducted. Therefore due to accident, it was often that vehicle superstructure seriously deformed. Corrosion made the deformation more serious. Mandatory periodic vehicle inspection is conducted every 6 months. But this is far from comprehensive. Moreover number of routine vehicle inspection unit are limited. Indonesia has limited resources both financially and in terms of man power.



Insufficient Survival Space

Excessive deformation on vehicle cause on reduction of survival space for passengers and driver. This condition could cause more fatalities and more severity of the injured persons. Therefore for future new vehicle type approval, physical test should be conducted including superstructure.



Crashworthiness Tests

Before Indonesia be able to conduct new car assessment program such as crash test, Indonesia can conduct computer simulation model to model to improve vehicle crashworthiness (the ability of the vehicle to reduce impact of the crash to passengers and driver).

The Use of Non-Safety Glass

Some vehicles still use non-safety glass, causing sharp pieces of window which endanger the passengers and the driver after crash.



Middle Column as Hazard

Straight and level highway with high speed vehicles are dangerous. In such highway often found middle column for pedestrian bridge or vehicle overpass . For freeway it is recommended not to use middle column and use prestress beam to get longer span or cable stayed support



Accident in Bojonegoro at a National Road with Uneven Lane Width



OTHER IMPORTANT ISSUES

Difficulties to Recruit Investigators

According to the law each mode should be supported by 10 investigators. In reality, nowadays only aviation investigators which have been operating with full team of 10. There were only 7 road traffic investigators, 6 railways investigators , and 5 maratime investigators.



Investigators Skills and Background

In the past, when road accident happened, voluntary investigators were helping . Most of them were local vehicle inspectors. Therefore, traditionally, mechanical/ automotive engineering point of view were dominant in investigation , analysis and recommendation set up. Safer road in point of view of civil engineer or road safety engineer was rare. Some investigators in aviation and maritime are airplane and ship captains. Bus/ truck drivers usually not competent enough to become an investigator.



Independence

Although by the law NTSC is directly under and responsible to him but in practice, the budget of NTSC is under Secretariat General of Minstry of Transportation. In one hand bythe law NTSC should be independent, responsible and objective regarding the transport accident investigation result. On the other hand, NTSC organization is still not independent. NTSC is preparing to transform intu National Board of Transport Safety in order to become equal to other national boards which are partners of Ministry of Transports such as Board of Metreology, Climatology and Geophysics or National Board of Search and

Facilities

Nowadays NTSC is using the third floor of Ministry of Transport Research Board. Therefore, it is difficult to design working spaces, meeting room,, laboratories and other facilities as indicated by organization needs.



Relationships with The Police

For road traffic investigation, actually NTSC and National Police have been signed an MoU. In reality MoU which had been signed in national level, has not been understood by regional polices. Often, there were obstacles in the field such as to get permission to interview key witness (mainly the driver) especially when he has become the suspect for the case.



Priority Scale

By history NTSC was started with aviation and maritime accident investigation which in international level can refer to ICAO and IMO for safety standard. No wonder that roads and railways accident investigation are still far from advance. In the previous period, even these two modes were under one management (land transport accident investigation). This affect to many different aspects, such as budget allocation, cooperation with NTSC international partner, availability of investigation guidelines, availability of investigation equipments, etc.



Accident at Railway Crossing

Accident between train and vehicles in railway crossing by law should be investigated by road accident investigators. However as railway terminologies are very specific, during investigation and report writing railway investigators will be asked to join the team.



Accident of Ferries

In Ministry of Transport ferry transport is regulated by Directorate General of Land Transport. As ferry transport basically using ships, ferry accident investigation is conducted by marine accident investigators.