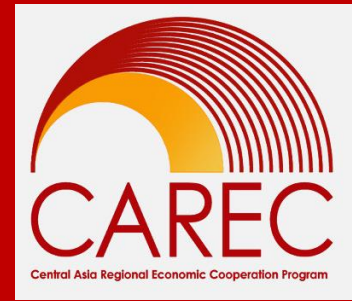




ASIA-PACIFIC  
ROAD SAFETY  
OBSERVATORY



# ROAD TRAFFIC ACCIDENT DATA COLLECTION AND ANALYSIS WORKSHOP COUNTRY: MONGOLIA

**TA-6763 REG: Accelerating Innovation in Transport**

*Presented by*

*David Shelton, Senior Transport Specialist (Road Safety), Asian Development Bank*

*Ravishankar Rajaraman, Road Crash Data Specialist, JP Research India Pvt. Ltd.*

*6 – 7 March 2023*



ASIA-PACIFIC  
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OBSERVATORY



# PART 2: ON-SITE ROAD TRAFFIC ACCIDENT INVESTIGATION BEST PRACTICES

Are eye-witness statements reliable? What are the 5 phases of a crash?

How is on-site crash investigation and reconstruction conducted?

Minimum crash data checklist

# WHAT HAPPENED IN THIS ACCIDENT?



Courtesy: Kolkata Traffic Police

# SAME ACCIDENT, DIFFERENT VIEW POINT



Courtesy: Kolkata Traffic Police

# WHAT DID YOU SEE?

- For whom was the traffic signal initially red? Motorcyclist or car driver?
- What part of the motorcycle contacted the car?
- Was the motorcyclist wearing a helmet?
- What was the source of the motorcyclist's injury on the left hand?

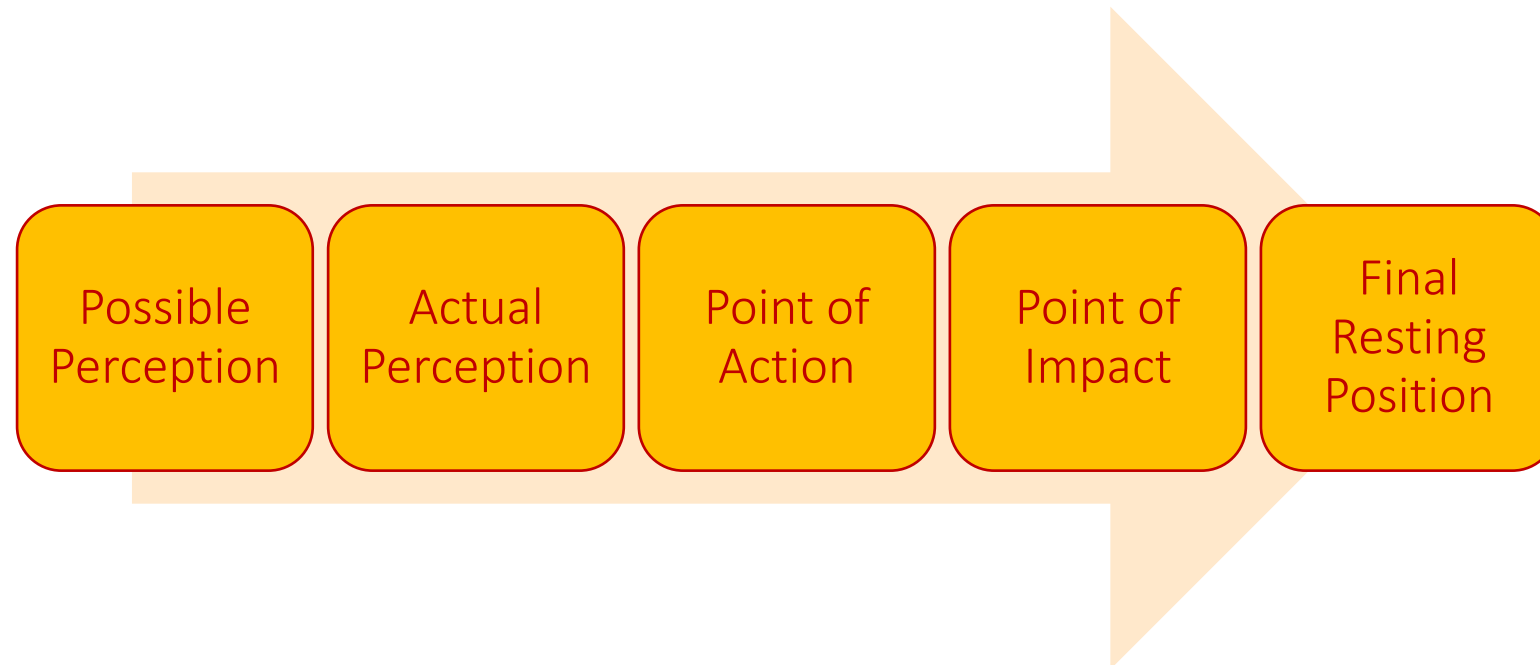
# CHECK YOUR OBSERVATION SKILLS

- Traffic signal was red for Motorcyclist.
- The motorcyclist and other vehicles started to move before the signal turned green.
- The motorcyclist and the car driver cannot see each other due to the bus obstructing vision.
- The front of motorcycle impacted the right side of the car.
- Post impact motorcyclist fell on road.
- The motorcyclist's left palm came under the right front wheel of the bus.

*Нүдний гэрчийн бүртгэл найдвартай биш юм.*

*Тиймээс замын хөдөлгөөний ослыг нарийвчлан судлах шаардлагатай байна.*

# 5 PHASES OF A ROAD ACCIDENT



# PHASE 1: POSSIBLE PERCEPTION

- Driver identifies the situation which may or may not turn into a potential hazard.



*Signal is "Green" for car.*



*Signal is "Red" for motorcyclist.*



# PHASE 2: ACTUAL PERCEPTION

- Driver identifies the situation as a potential hazard and he/she will initiate the reaction.



*Actual perception happened when Motorcyclist crossed the bus and noticed the car coming from its left side.*

# PHASE 3: POINT OF ACTION

- Driver's action to avoid the conflict with the other road user/object



*Motorcyclist braked to avoid the impact with the car. Car driver did not perform any avoidance maneuver.*

# PHASE 4: POINT OF IMPACT

- Position of vehicle/pedestrians at the time of impact is called Point of Impact (POI).



*First Point of Impact*



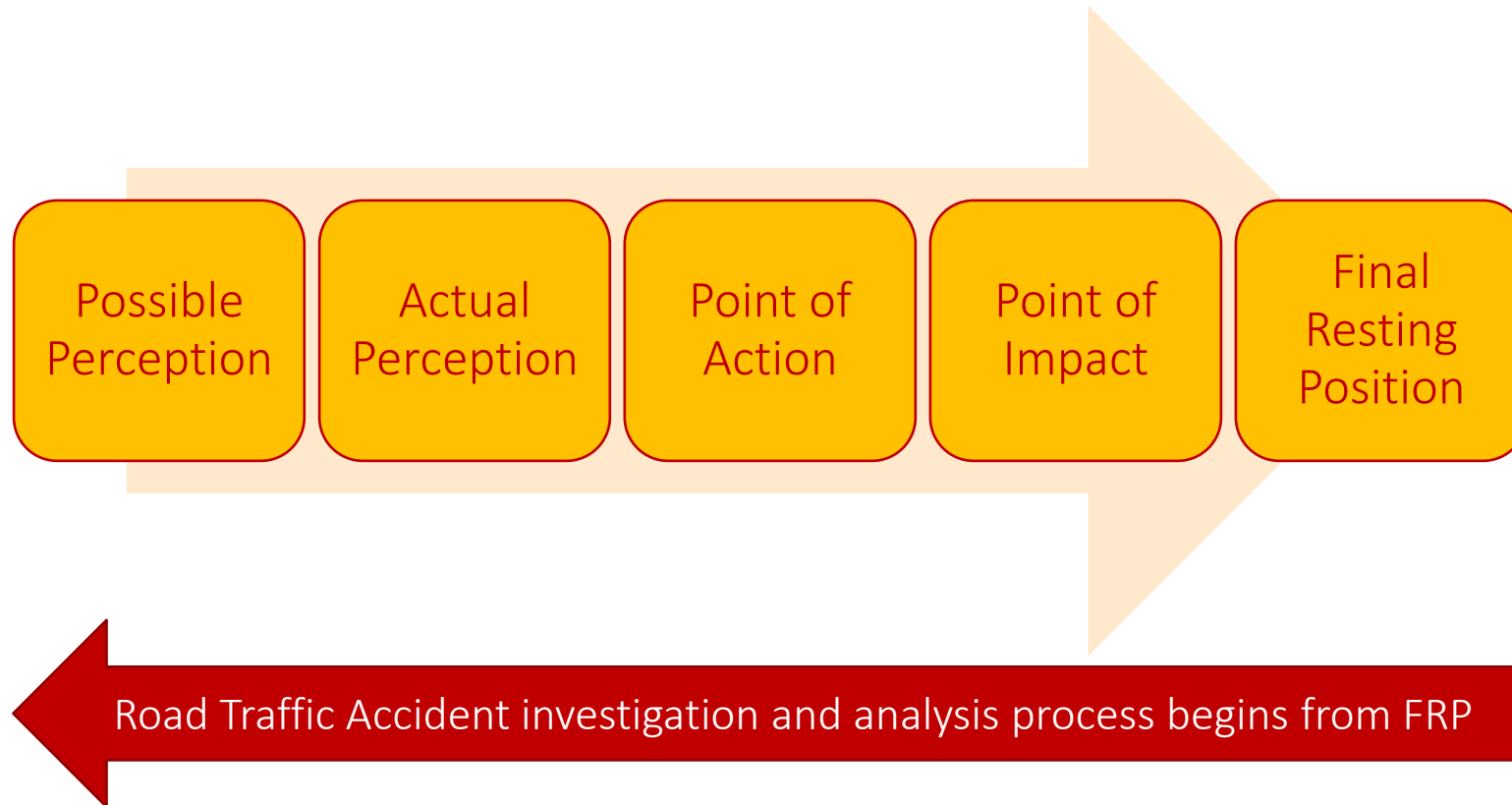
*Second Point of Impact*

# PHASE 5: FINAL RESTING POSITION

- The location where the vehicle(s) come to rest after the Road Traffic Accident.



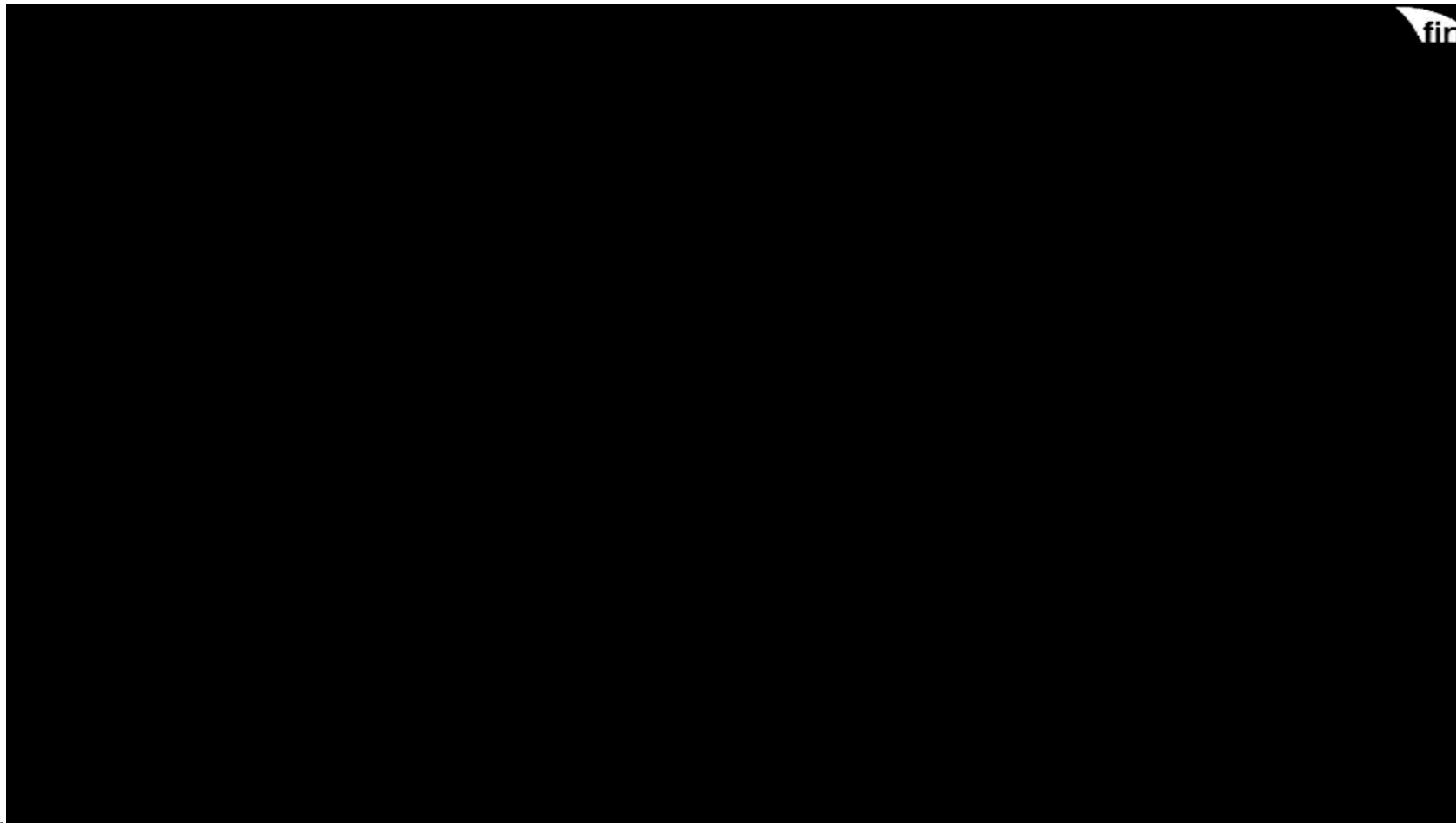
# 5 PHASES OF A ROAD ACCIDENT



# ACCIDENT INVESTIGATION & RECONSTRUCTION

## *CREATIVE VISUALIZATION*

Source: [https://www.youtube.com/watch?v=XUXJ6ky69ki&ab\\_channel=RouteSafety](https://www.youtube.com/watch?v=XUXJ6ky69ki&ab_channel=RouteSafety)



# ROAD TRAFFIC ACCIDENT PHASES



Point of Actual Perception

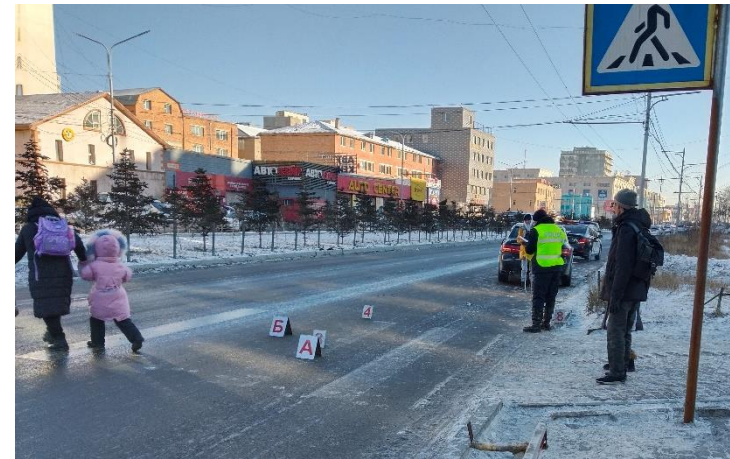
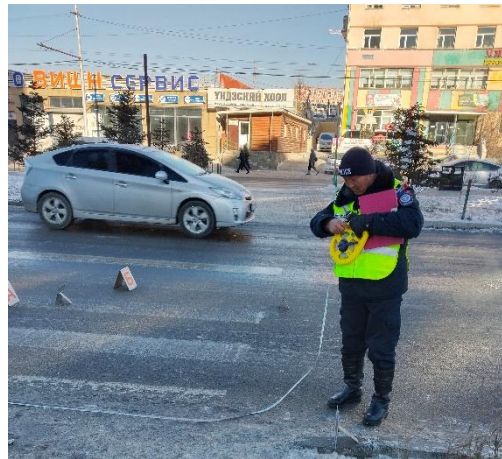
Point of Action

Point of Impact

Final Resting Position

Image Source: [https://www.youtube.com/watch?v=XUXI6ky69kl&ab\\_channel=RouteSafety](https://www.youtube.com/watch?v=XUXI6ky69kl&ab_channel=RouteSafety)

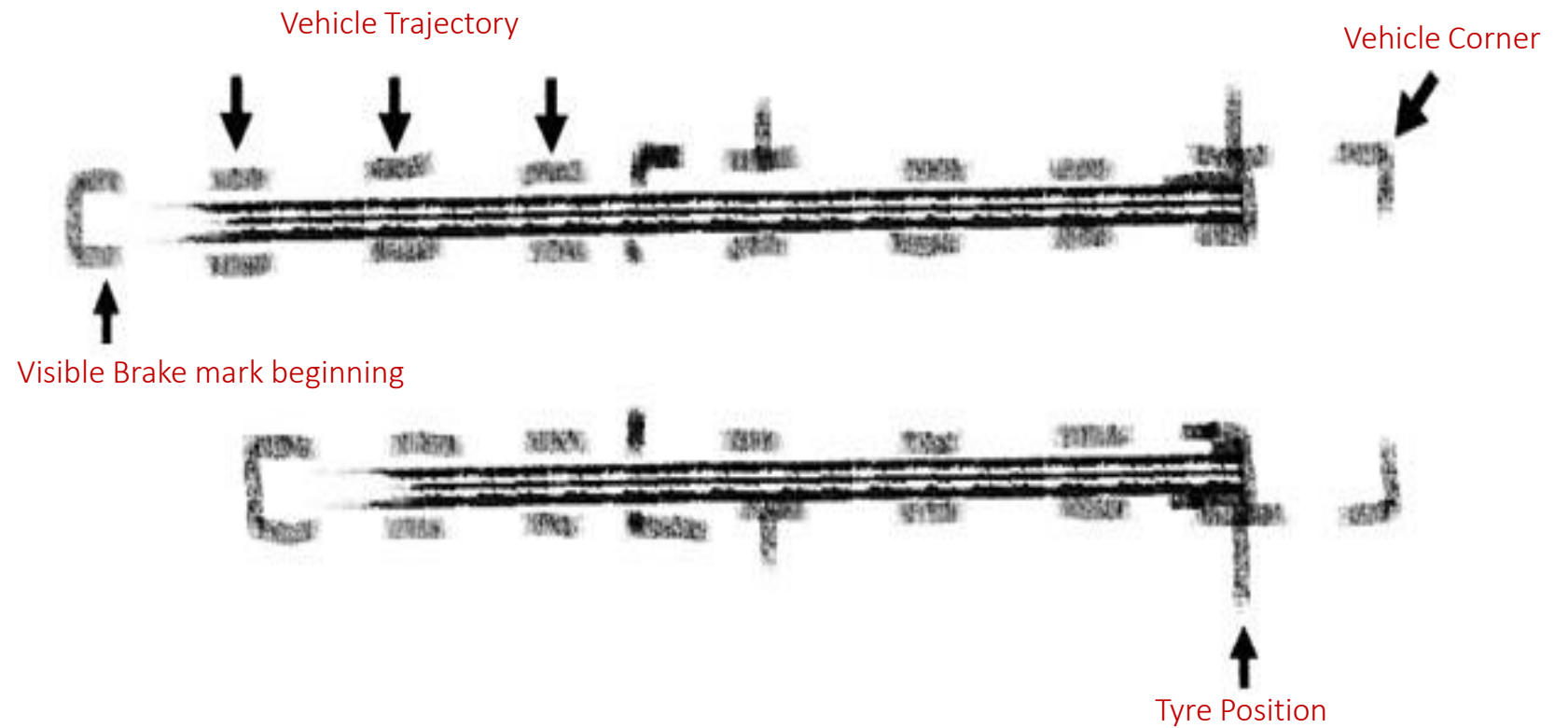
# ROAD TRAFFIC ACCIDENT INVESTIGATION *MONGOLIA POLICE*



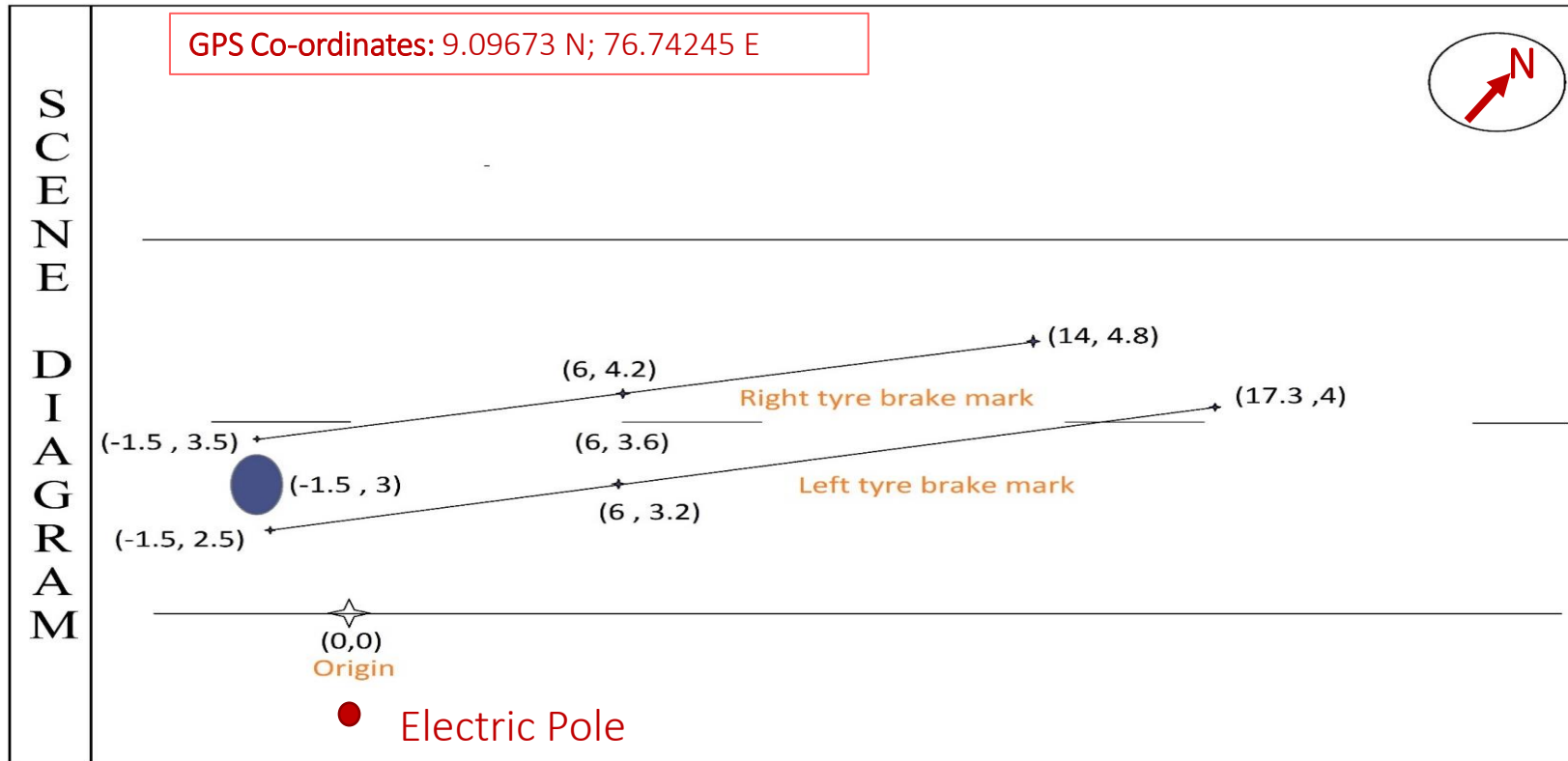
*On-site Road Traffic Accident investigations are being conducted in a professional and scientific manner in Ulaanbaatar.*



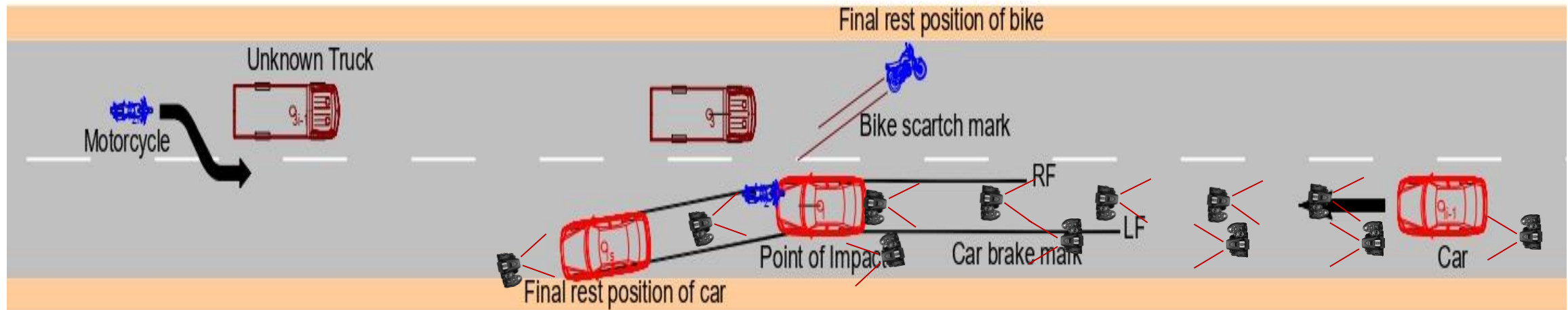
# ROAD TRAFFIC ACCIDENT SCENE EXAMINATION *MARKING EVIDENCE*



# ROAD TRAFFIC ACCIDENT SCENE EXAMINATION *TO-SCALE SCENE DIAGRAM*

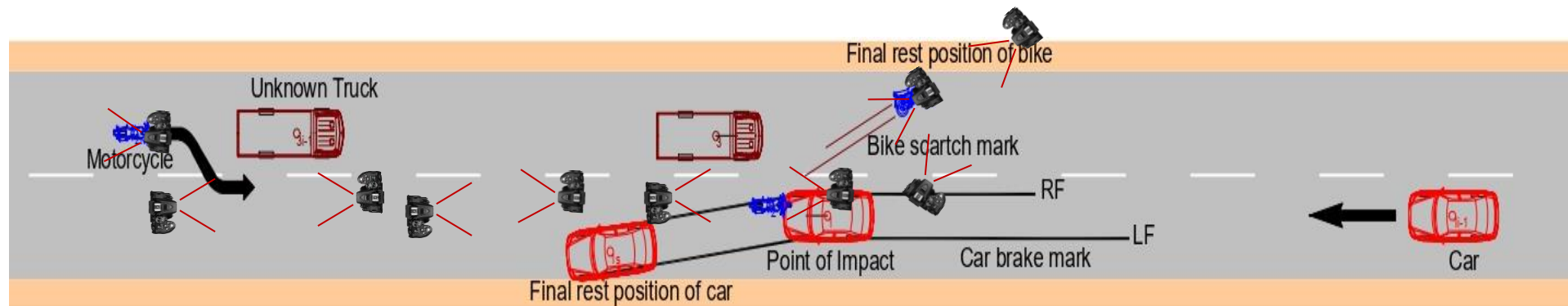


# ROAD TRAFFIC ACCIDENT SCENE EXAMINATION PHOTOGRAPHY SEQUENCE – 1<sup>ST</sup> VEHICLE



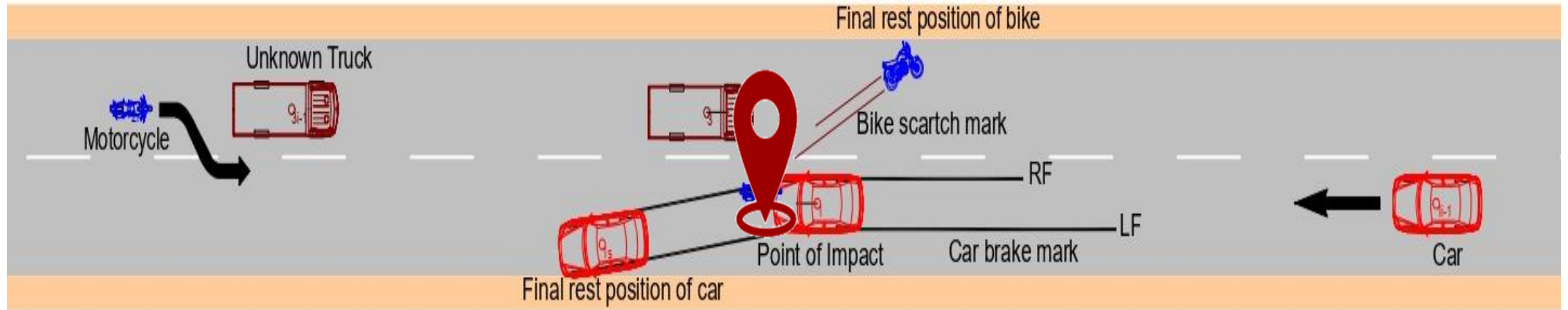
- For each vehicle, start from Final Resting Position and walk towards Point of Perception.
- Then turn around and walk back to the Final Resting Position.
- Keep the camera approximately at vehicle driver's point of view.

# ROAD TRAFFIC ACCIDENT SCENE EXAMINATION *PHOTOGRAPHY SEQUENCE – 2<sup>ND</sup> VEHICLE*



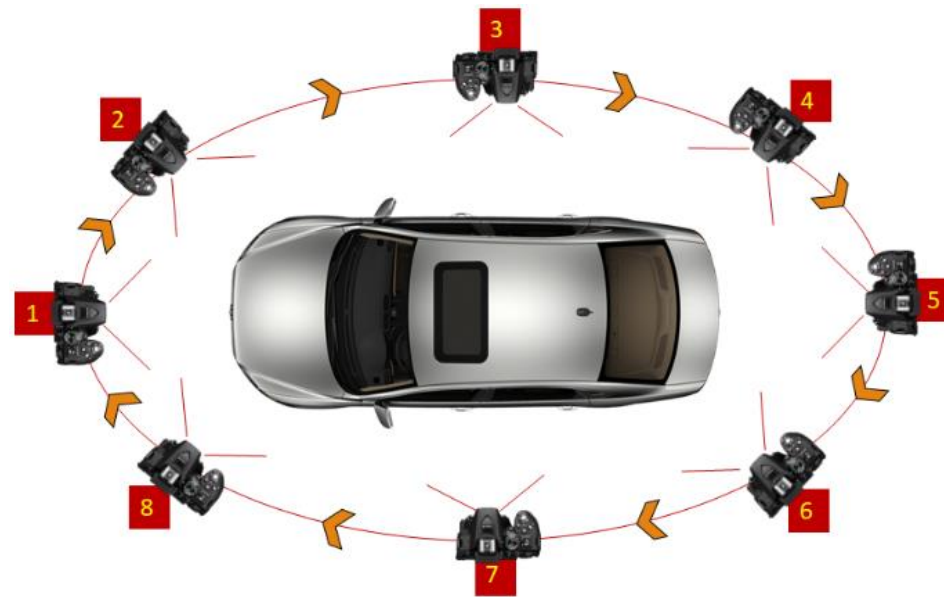
- For each vehicle, start from Final Resting Position and walk towards Point of Perception.
- Then turn around and walk back to the Final Resting Position.
- Keep the camera approximately at vehicle driver's point of view.

# ROAD TRAFFIC ACCIDENT SCENE EXAMINATION *GPS COORDINATES AT POINT OF IMPACT*



# ROAD TRAFFIC ACCIDENT VEHICLE PHOTOGRAPHY

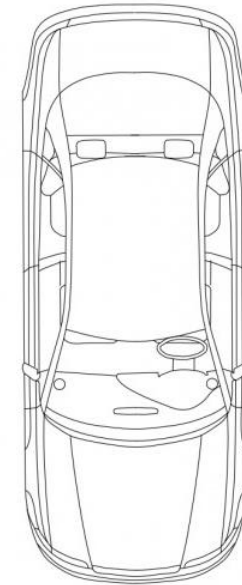
- Essential pictures required for an accident involved vehicles are exterior 8-angle pictures.
- Picture at every 45 degree of a vehicle in a clockwise direction starting from the front end of the vehicle.



# EXAMPLE: CAR 8-ANGLE PICTURES



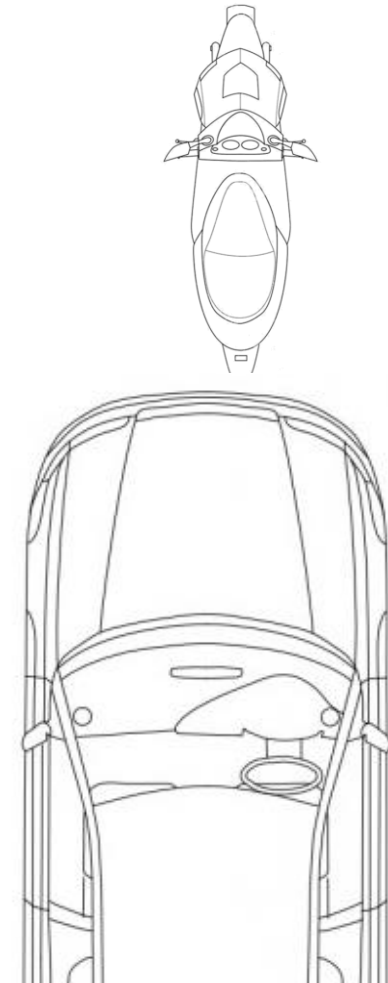
# IDENTIFICATION OF COLLISION ANGLE AT POI *IMPACT DAMAGE MATCHING*





# IDENTIFICATION OF COLLISION ANGLE AT POI

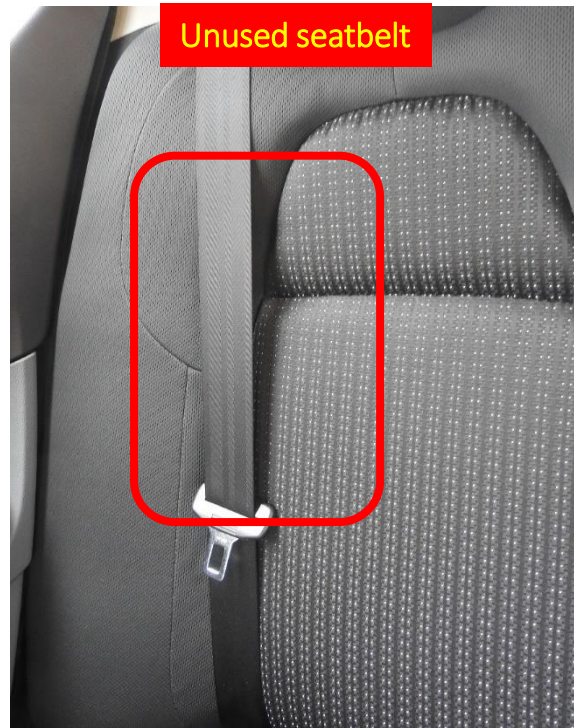
## *IMPACT DAMAGE MATCHING*



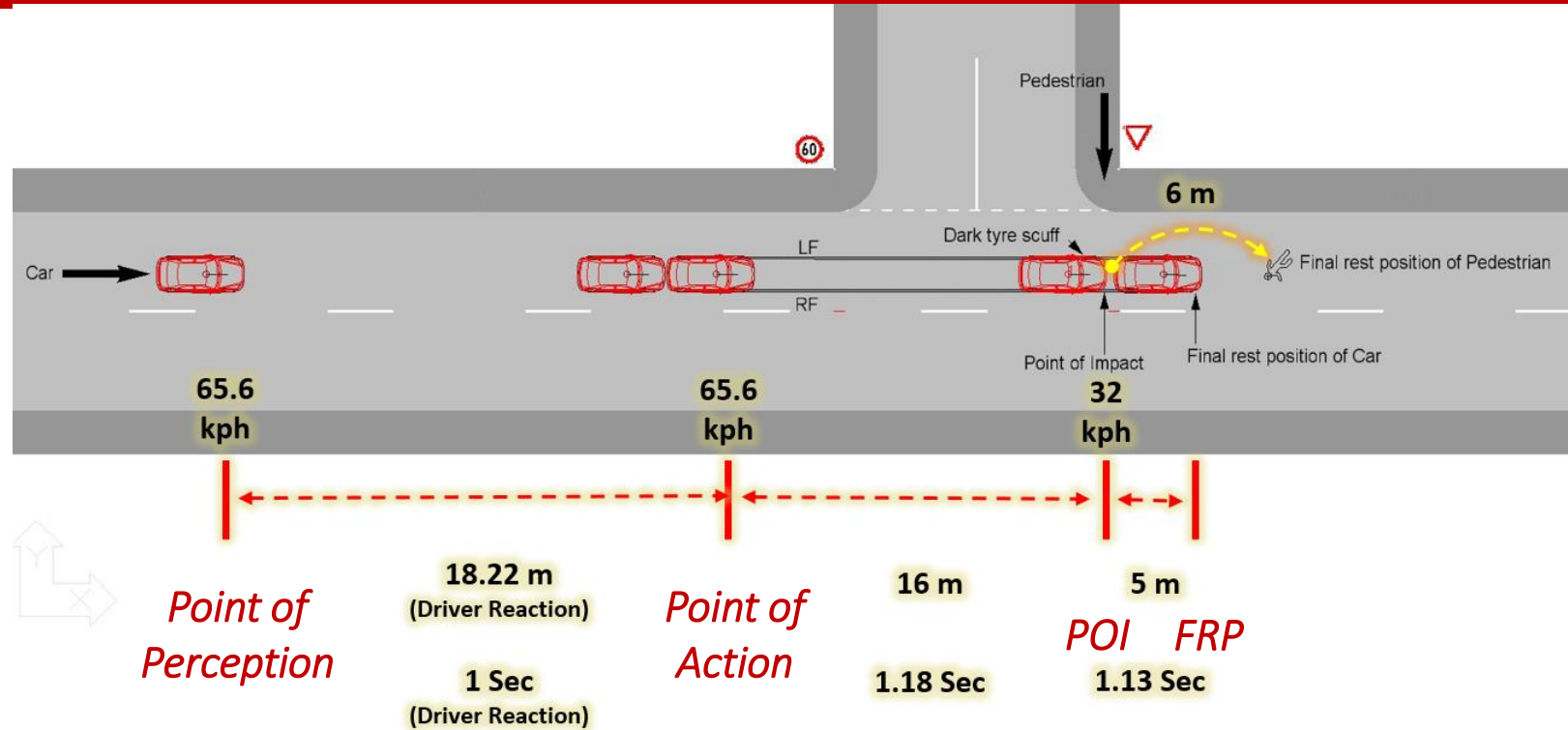
# SEATBELT INSPECTION PLASTIC MELT ON BUCKLE TONGUE



# SEATBELT INSPECTION BELT WEBBING STRETCH MARKS



# ROAD TRAFFIC ACCIDENT RECONSTRUCTION



*Using physics to determine the speed, distance and time for each phase of a Road Traffic Accident.*

# ROAD TRAFFIC ACCIDENT RECONSTRUCTION TRAINING PROVIDED AT LAW ENFORCEMENT UNIVERSITY



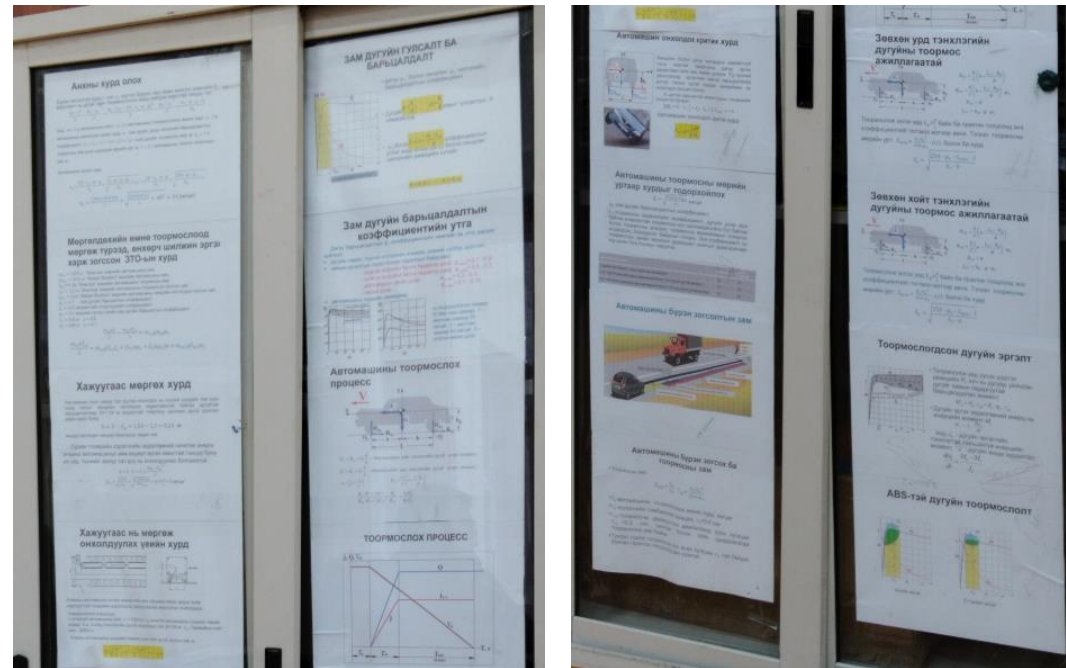
Law Enforcement University

БАКАЛАВРЫН СУРАЛТЫН ХОТӨЛБӨРИЙГ ХЭРЭГЖҮҮЛЭХД ШАРШАГАТАЙ БАГШЫН СУДАЛГАА

Дүн	Хичээлийн нэр	Саяу цаг	Угсаан	Хичээлийн хэлбэр			Бие даалт	
				Лекц	Семинар	Лаб		
Цагдаа суудал-4 жил								
1	MOP.P212	Замын хөдөлгөөний зохицуулалт, асуулыг байдал	2	IV	48	16	32	48
6	TMR.P309	Замын хөдөлгөөний хяналт, зам тээврийн ослыг шалгах ажиллагаа	3	V	80	16	64	64
Цагдаа суудал-3 жил								
4	TMR.P306	Замын хөдөлгөөний хяналт, зам тээврийн ослыг шалгах ажиллагаа	3	II	50	20	30	94
2	MOP.P212	Замын хөдөлгөөний зохицуулалт, асуулыг байдал	2	II	40	20	20	56
Цагдаа суудал-5 жил								
6	TMR.P309	Замын хөдөлгөөний хяналт, зам тээврийн ослыг шалгах ажиллагаа	3	III	50	20	30	94
2	MOP.P212	Замын хөдөлгөөний зохицуулалт, асуулыг байдал	2	II	40	20	20	56
Цагдаа суудал-2 жил								
1	MOP.P212	Замын хөдөлгөөний зохицуулалт, асуулыг байдал	2	II	48	16	32	48
2	TMR.P309	Замын хөдөлгөөний хяналт, зам тээврийн ослыг шалгах ажиллагаа	3	II	64	32	32	80
Цагдаа суудал-3ХАБ-2 жил								
1	TRE.P301	Замын хөдөлгөөний зохицуулалт, хөдөлгөөний зохицуулах техник, хувиар	3	III	64	32	32	80
2	TSM.P304	Замын хөдөлгөөний хяналтын арга зүй	3	III	64	32	32	80
3	OSM.P306	Замын хөдөлгөөний уурдалгаа, зохион байгуулалт	3	III	64	32	32	80
4	CRA.P306	Зам тээврийн ослыг эвчлэхийг шалгах шийдвэрлэх ажиллагаа	3	III	64	32	32	80
5	MOR.P304	Замын хөдөлгөөний асуулыг байдал, зөвхөн цагдаагийн байгууллагын үйл ажиллагаа	3	II	64	32	32	80
1	STC.P201	Замын хөдөлгөөний асуулыг байдалын үндэс	3	II	64	32	32	80
3	RTR.P202	Замын хөдөлгөөний дүрэм судлал	2	II	48	16	32	48
2	RPI.P104	Машины удиртгал	2		48	16	32	48
Цагдаа суудал-ХУС-2 жил								
1	MOP.P212	Замын хөдөлгөөний зохицуулалт, асуулыг байдал	2	II	48	16	32	48
Мөрдөх алба-Шинжлэх мөрдөх-2 жил								
1	MOP.P212	Замын хөдөлгөөний зохицуулалт, асуулыг байдал	2	II	48	16	32	48

Багшлах бүрэлдэхүүн	Гүйцэтгэж авч	Гүйцэтгэж авсан	Зөрүү
Эрхлэгч, д.х Н.Габбат	12	17.5	5.5
Дэд профессор, х/э С.Хажуугаас	14	27.2	13.2
Ахлах багш, х/м Т.Аюушаар	16	21.6	5.6
Угсаа	42	66.3	24.3

Course list



Calculations for motor vehicle dynamics and speeds

On-site Road Traffic Accident investigation and reconstruction training is being provided by Law Enforcement University, Ulaanbaatar.



INTERNAL. This information is accessible to ADB Management and staff. It may be shared outside ADB with appropriate permission.



# ON-SITE ROAD TRAFFIC ACCIDENT INVESTIGATION *MINIMUM REQUIREMENTS CHECKLIST*

## From the accident site

- Date/Time/Weather/Lighting
- CCTV / Camera footage recording
- Scene and vehicle photographs
- GPS coordinates
- Scene diagram with measurements
  - Length of brake/tire marks
  - Determination of FRP, POI, POA
- Relative position at POI
- Seatbelt/helmet use

## From the hospital/victims

- Medical/Injury reports
- Alcohol/Drug Use reports
- Interviews

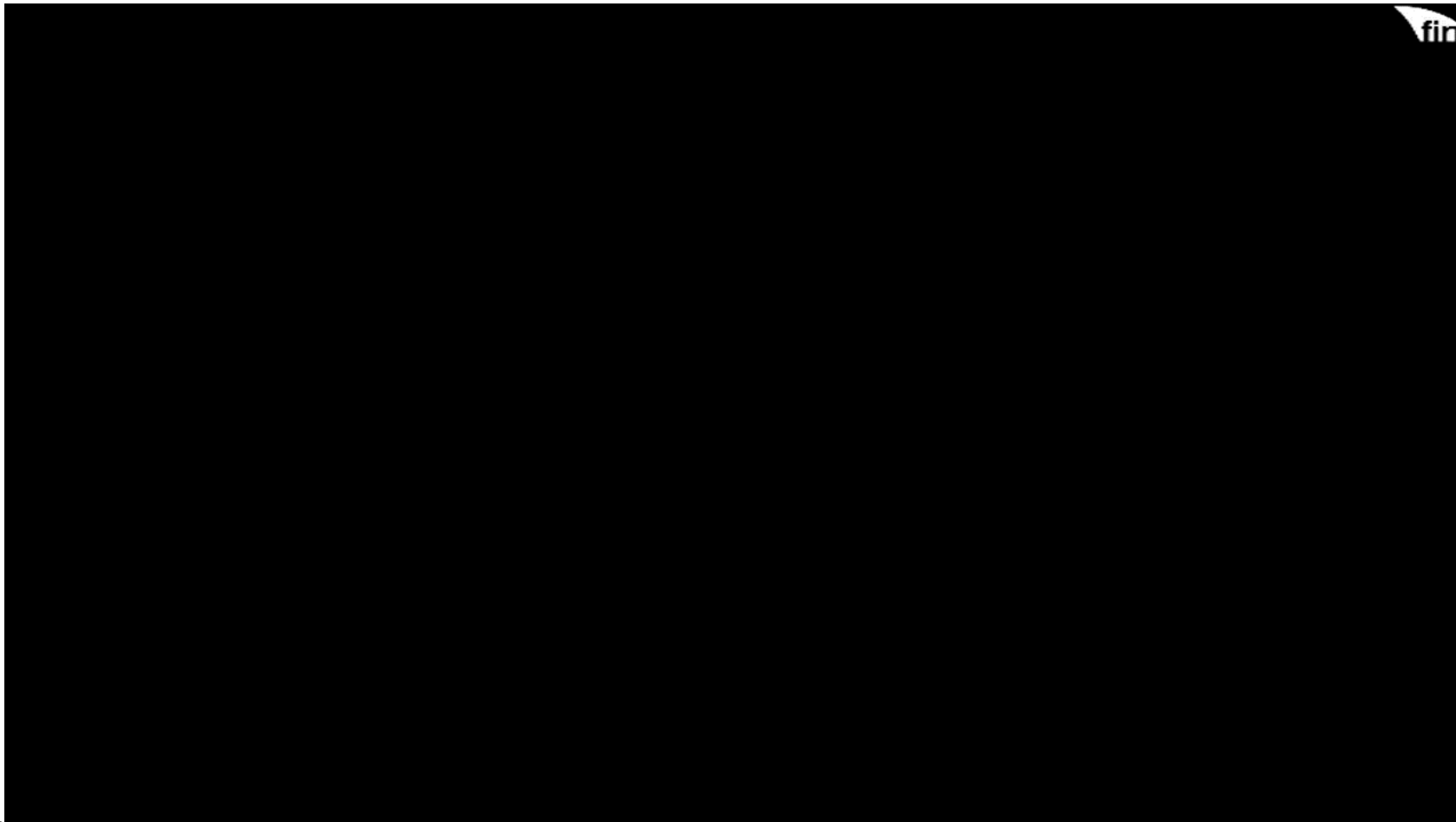
# DATA FROM ROAD ACCIDENT RECONSTRUCTIONS

- Speed, distance and time for each phase of Road Traffic Accident.
- Pre-Impact events
  - Was driver perception delayed?
  - Was the driver action adequate to avoid impact?
- What could have be done to avoid the accident or mitigate the injuries?

# ACCIDENT INVESTIGATION & RECONSTRUCTION

## *CREATIVE VISUALIZATION*

Source: [https://www.youtube.com/watch?v=XUXJ6ky69ki&ab\\_channel=RouteSafety](https://www.youtube.com/watch?v=XUXJ6ky69ki&ab_channel=RouteSafety)







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# PART 2: ON-SITE ROAD TRAFFIC ACCIDENT INVESTIGATION BEST PRACTICES

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[ravishankar@jpri.in](mailto:ravishankar@jpri.in)