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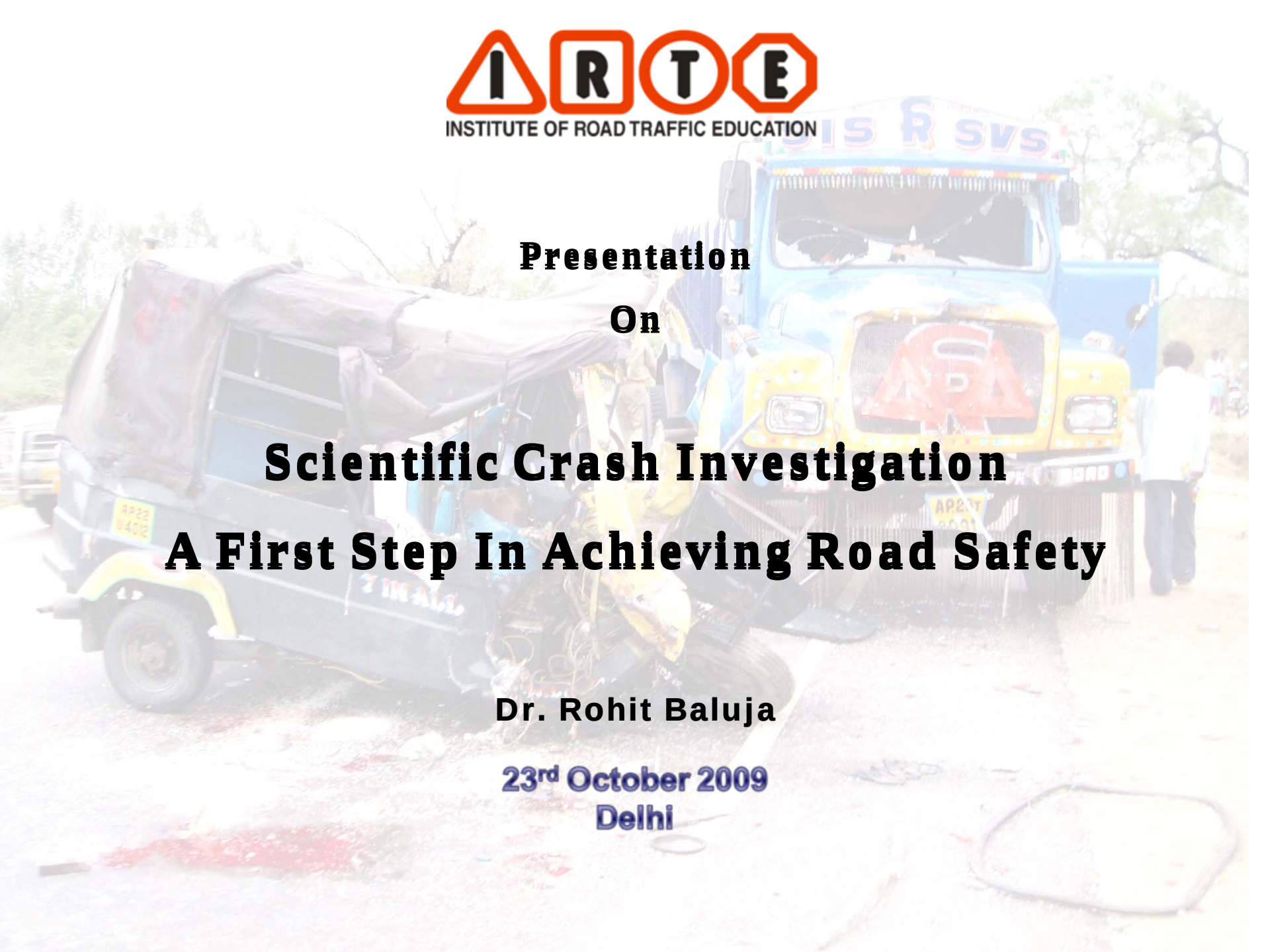

Presentation

On

Scientific Crash Investigation

A First Step In Achieving Road Safety

Dr. Rohit Baluja

23rd October 2009
Delhi


ΔΒΟΕ


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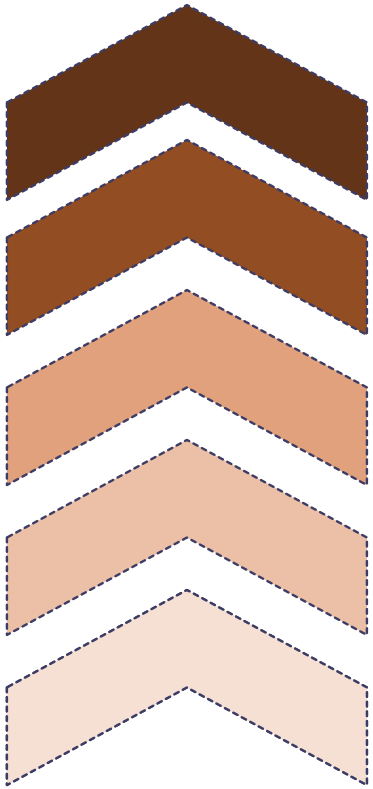
Road Traffic Fatalities-India

2008	1,15,000
2000	79,000
1990	54,000
1980	24,000



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Road Traffic Injuries-India

	Actual		Estimated	
Year	No. of deaths	No. of Injuries	No. of serious injuries	No. of minor injuries
2007	114590	465300	2291800	8021300

9847800

Source: Based on Sundar Committee Report 2007

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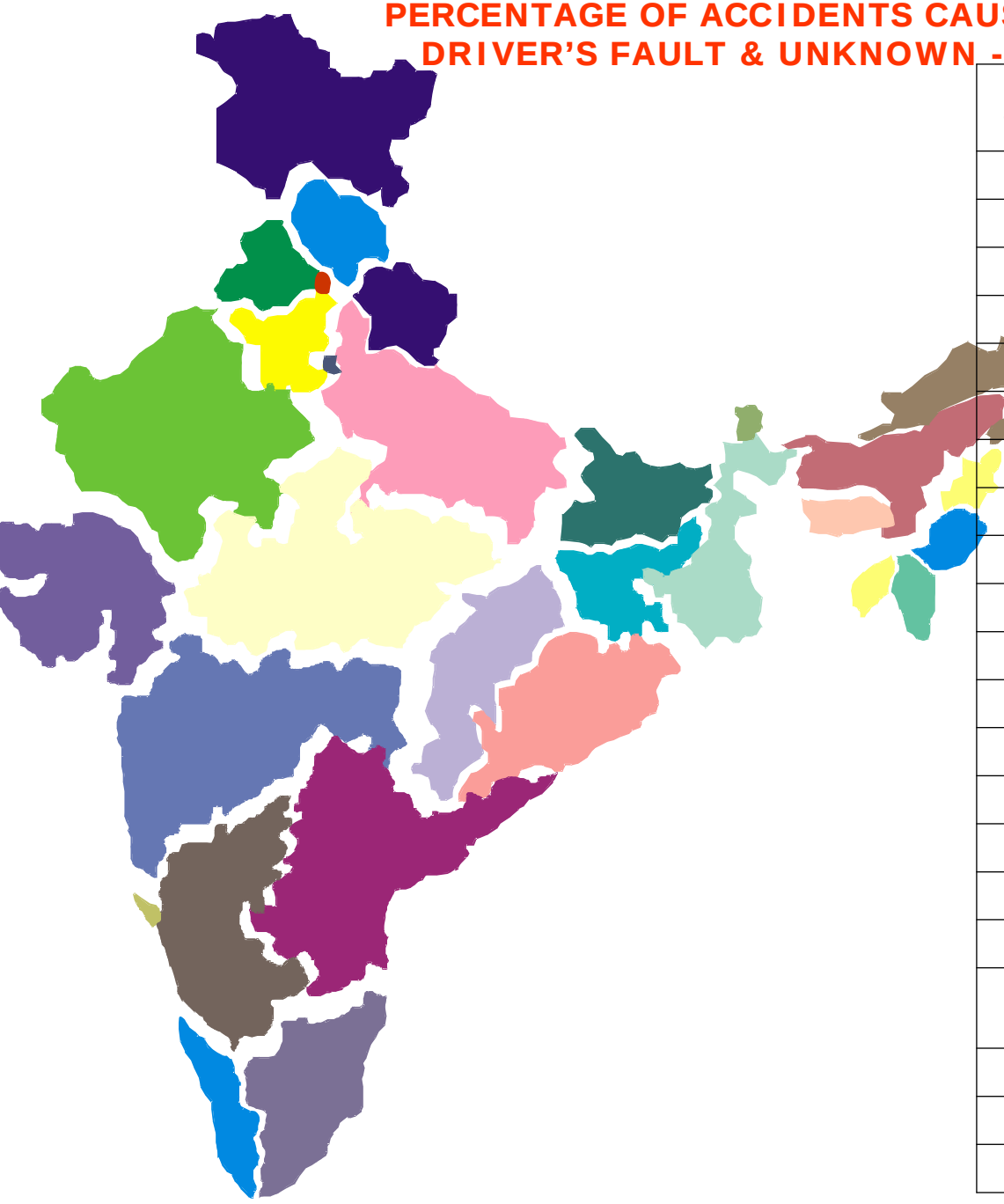
PERCENTAGE OF ACCIDENTS CAUSED BY DRIVER'S FAULT & UNKNOWN -2006



Sl.No.	States/Uts	Driver's Fault (%)	Unknown (%)
1	Assam	90.63	1.33
2	Goa	82.48	5.10
3	Gujarat	91.10	1.49
4	Haryana	94.51	1.45
5	Himachal Pradesh	86.47	5.45
6	Jharkhand	86.50	1.61
7	Kaarnataka	89.03	3.96
8	Kerala	98.32	0.04
9	Madhya Pradesh	92.57	0.22
10	Maharashtra	85.57	10.92
11	Punjab	87.57	9.21
12	Rajasthan	93.37	4.05
13	Tamil Nadu	95.71	0.23
14	Uttarakhand	86.89	6.90
	UT s		
1	A &N Islands	100.00	0.00
2	Chandigarh	100.00	0.00
3	Dadra & Nagar Haveli	100.00	0.00
4	Daman & Diu	100.00	0.00
6	Lakshadweep	100.00	0.00
7	Pondicherry	100.00	0.00

Causative Factors in Road collisions

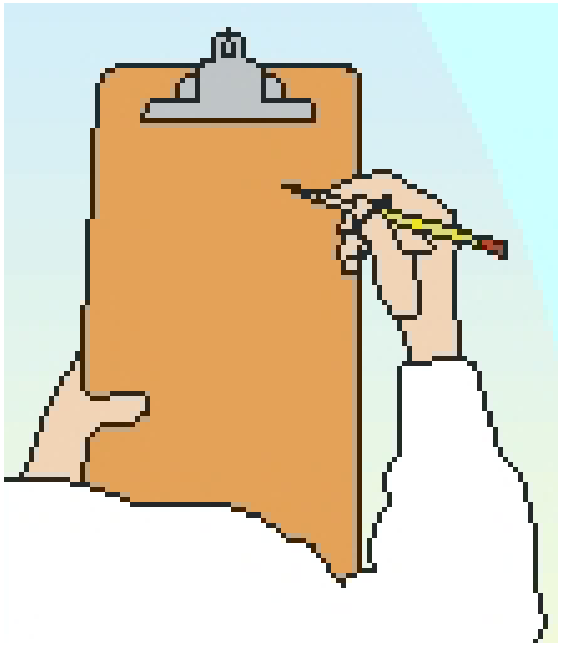
Most collisions have more than one causative factor

Precipitating Factors
(What went wrong)

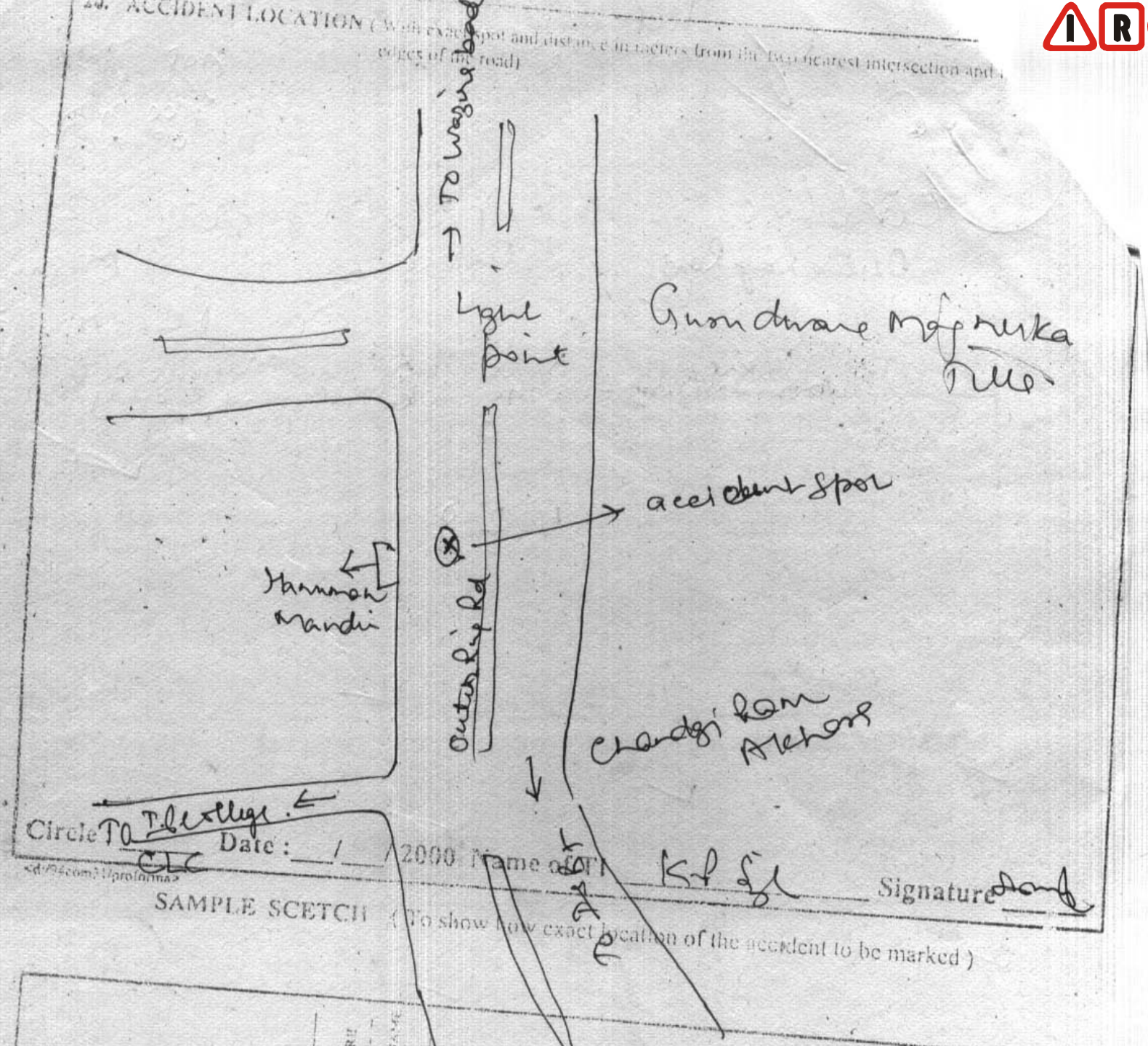
Contributing Factors
(Why did it go wrong)

Recording of an accident

Accidents must be recorded in a comprehensive manner to include all the evidences, parameters to interpret the contribution of vehicle, human, environment, road infrastructure and other static/dynamic dimensions responsible for the collision.



24. ACCIDENT LOCATION (With exact spot and distance in meters from the nearest intersection and edges of the road)



Circle CLC Date : __/__/2000 Name of IO Signature

SAMPLE SCETCH (To show how exact location of the accident to be marked)

PROBLEMS WITH ACCIDENT REPORTING

- The location of the accident spot is not specified. One cant locate the spot where the accident actually happened.
- The condition of the road, road features, road geometry and type of junction are not clear in the Reporting Format.
- The result of the alcohol tests after accidents are not present in the Reporting Format.
- The effect of the weather condition and other miscellaneous things is not mentioned
- The maneuver diagrams of the vehicles involved in the accident is missing.
- Type of the damage to the vehicle, is also not clear in the Reporting Format
- In some of the Reporting Format even the time of the accident is not clear.

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There is an almost vacuum in scientific recording and analysis of road crashes. Hence the real causes and consequences of a crash are never known.

Remedial measures are arbitrary. Data generated has no real value.

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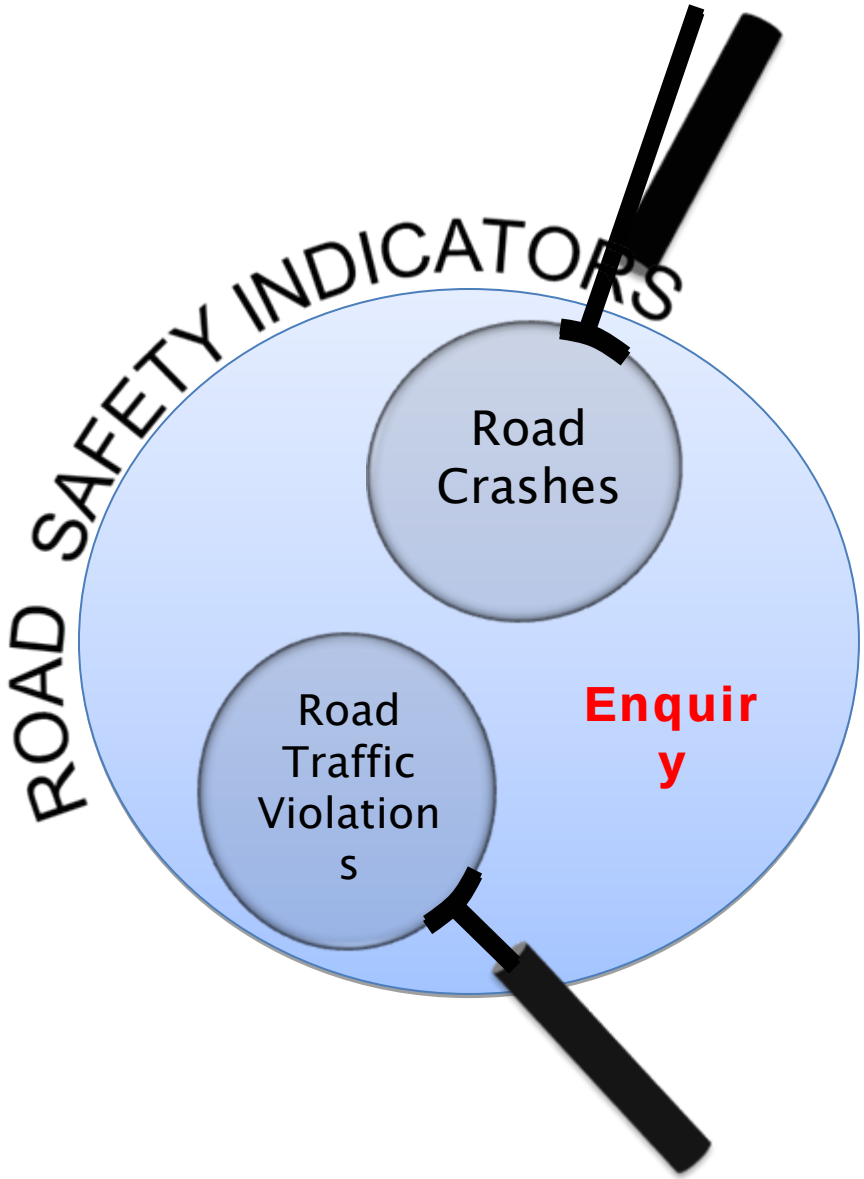
What to Investigate?



Defining Remedial Measures

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The Way Forward

SCIENTIFIC ACCIDENT INVESTIGATION

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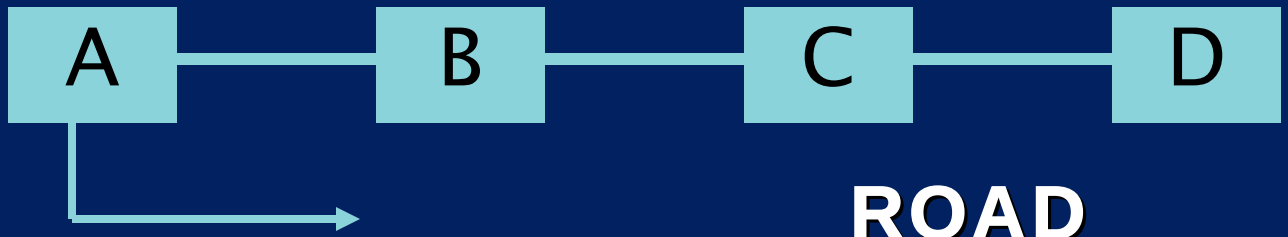
Evidence Collection

A	Road
B	Vehicle
C	Victim
D	Environment

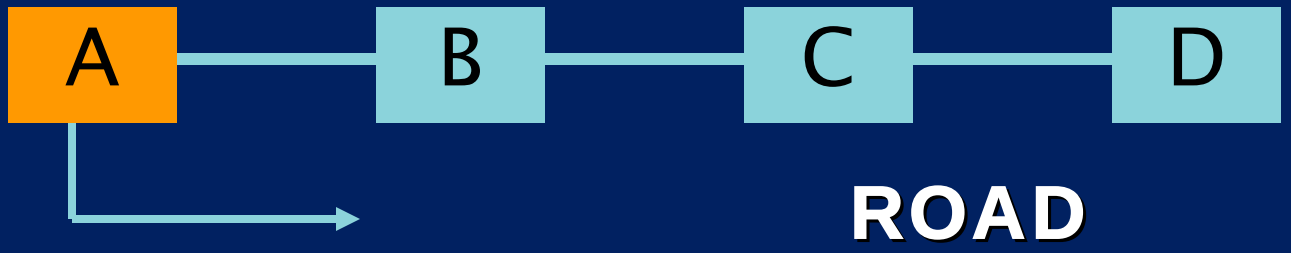
Evidence Collection



ROAD

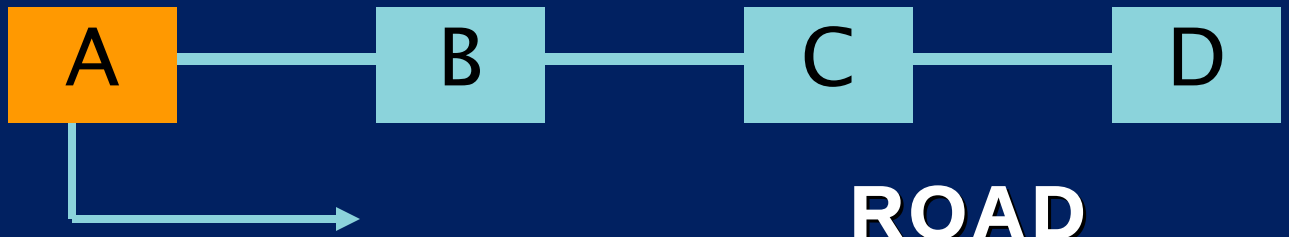
- Damage to road surface,
- Rest Position of all involved vehicles & victims
- road markings and signing together with any defects or obstructions.

Evidence Collection



- Exact positions of any tyre skid marks, fluid trails, scuff or scratch marks, blood stains made in or on the road or verges, pre collision or, as a consequence of the collision including dimensions
- Damage to any roadside

Evidence Collection

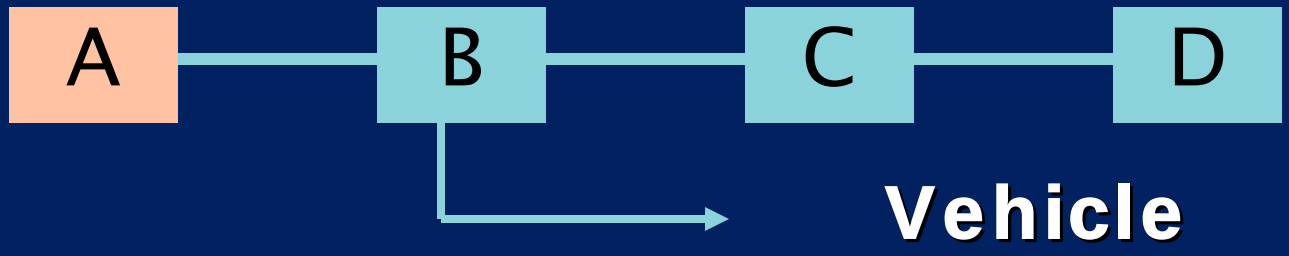


- Position and damage on other material, debris, body or vehicle part lying on the road

Measurement of gradients, road cambers and sight lines

Additional measurements and photographs of vehicle and scene

Evidence Collection



- Position of damage and contact marks to vehicles.

Front

Angular

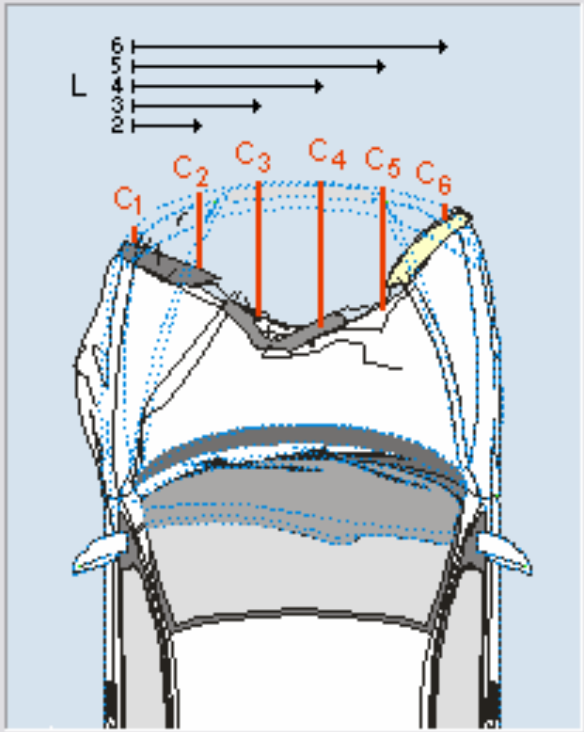
Side

Vehicle damage intrusion measurements that may assist in vehicle speed estimations

Crash 3 EBS Calculation

NHTSA Database | Vehicle crush | EBS

1 AC-Ace/Acel



Crush depth

Number of crush mesurements: 2

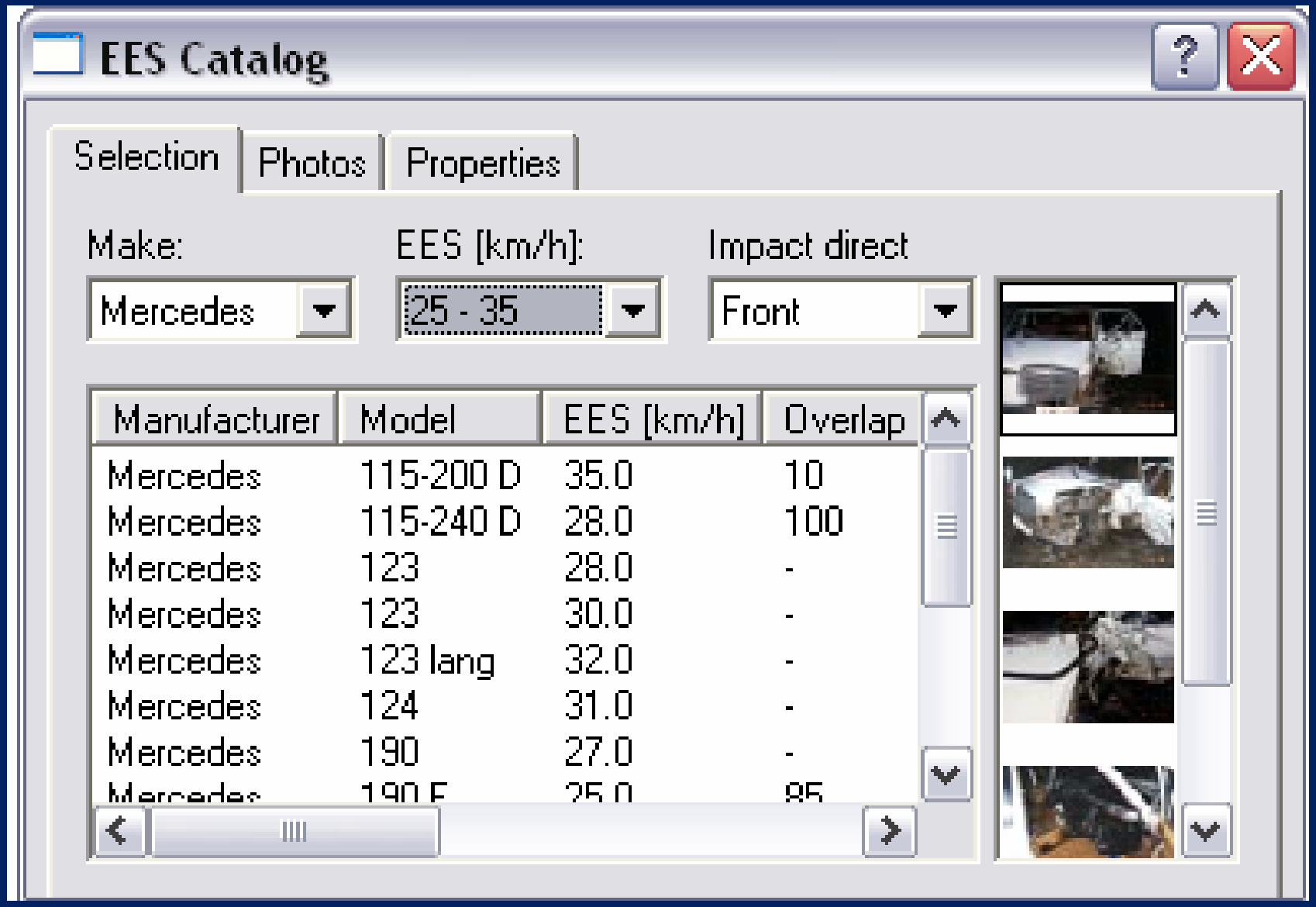
C1	C2	C3	C4	C5	C6	
0	0	0	0	0	0	m

	L2	L3	L4	L5	L6	
	0	0	0	0	0	m

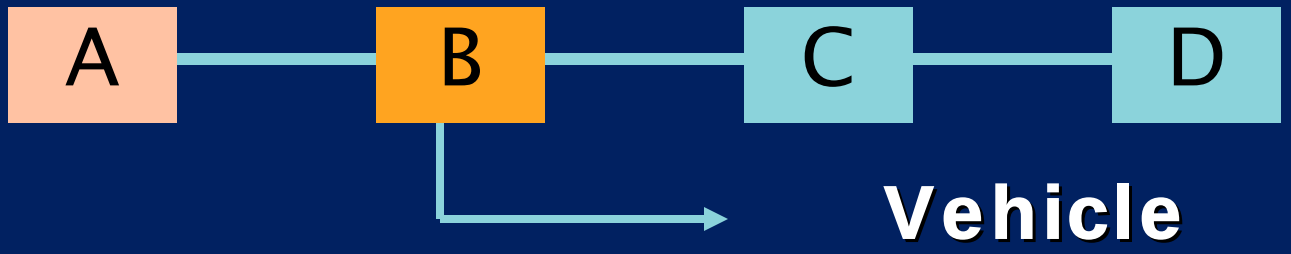
C7	C8	C9	C10	C11	C12	
0	0	0	0	0	0	m

L7	L8	L9	L10	L11	L12	
0	0	0	0	0	0	m

Vehicle damage intrusion measurements that may assist in vehicle speed estimations

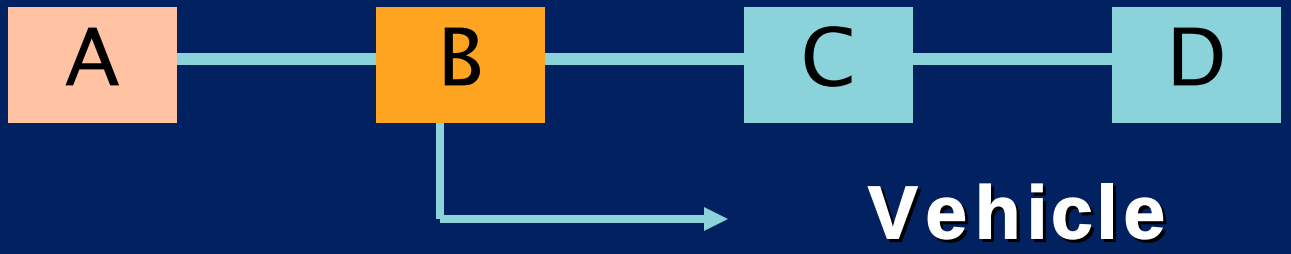


Evidence Collection



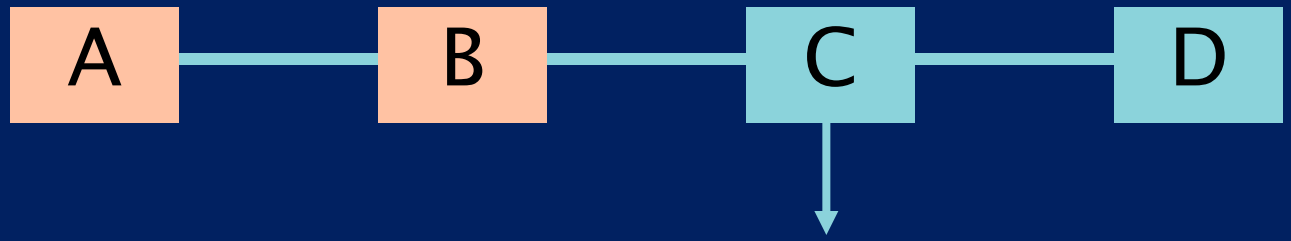
- Complete Mechanical Inspection of the vehicle

Evidence Collection



- Examine and note the position of control systems within the vehicles, i.e. light switches and gears, speedometers. Also, note the condition of the seatbelts.
- Examine and note ot
within the vehicle

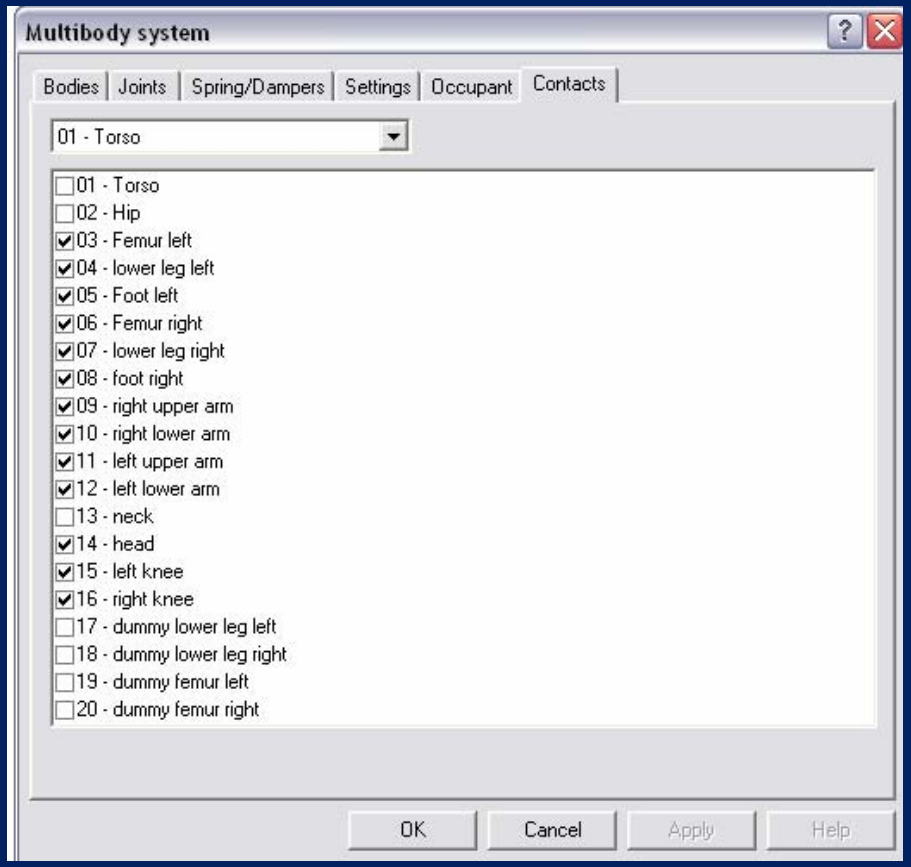
Evidence Collection

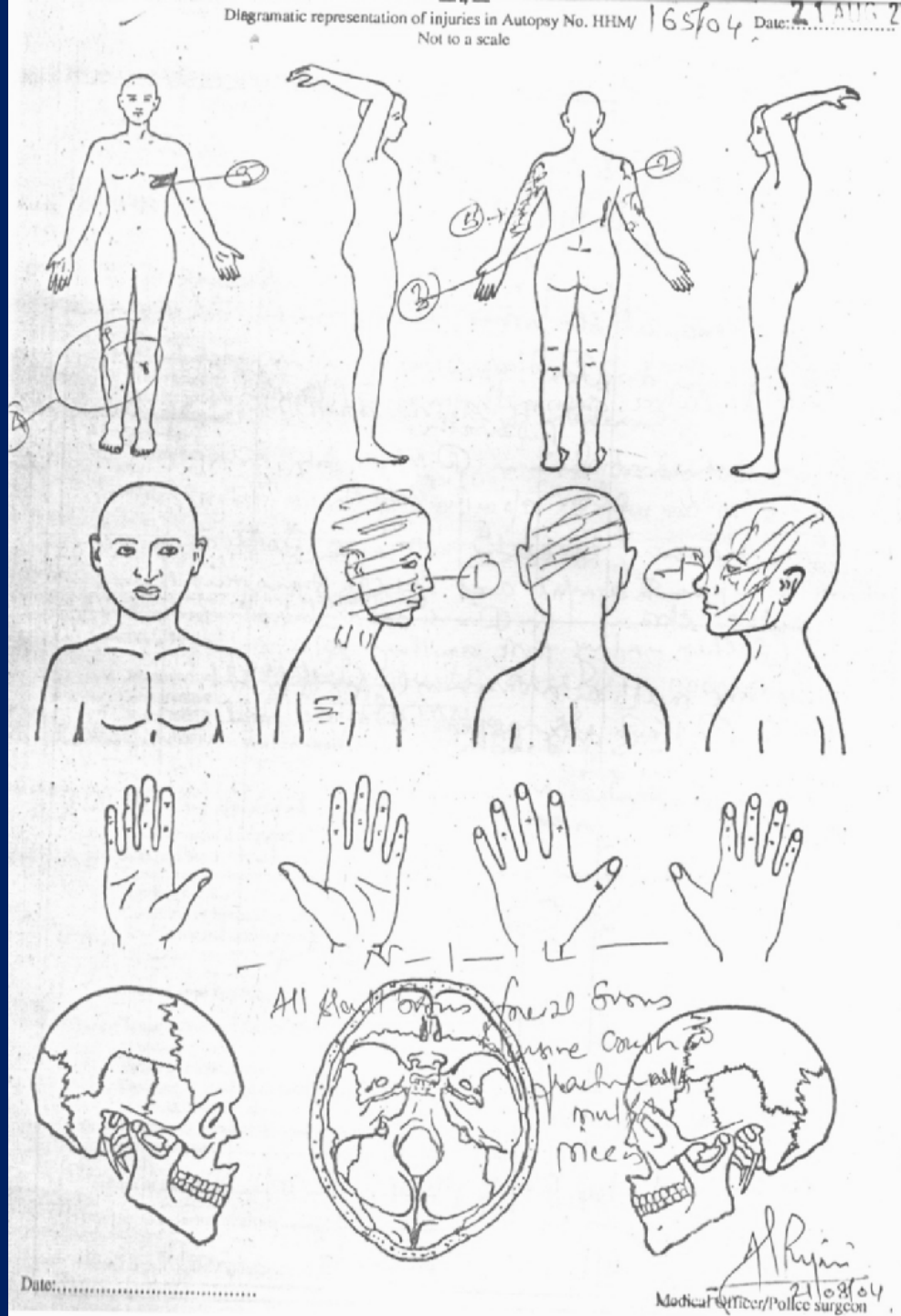


Victims

- Details of the injuries
- Examine and note other materials for ex. Clothes, accessories being carried by the victim etc.

Analysis of injuries to establish points of contact with vehicles and pedestrian positions and movement



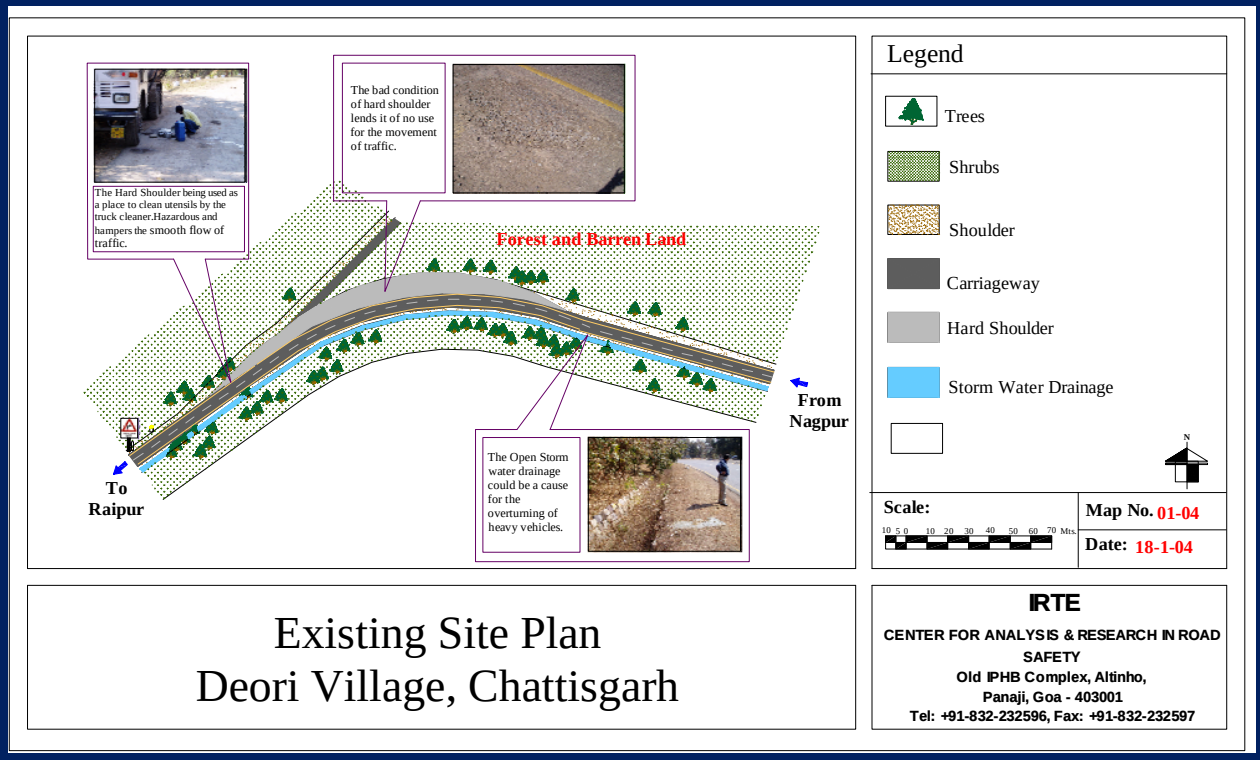


Evidence Collection

A — B — C — D

D → Environment

- Weather Conditions
- Site Characteristics
- Visibility
- Landuse



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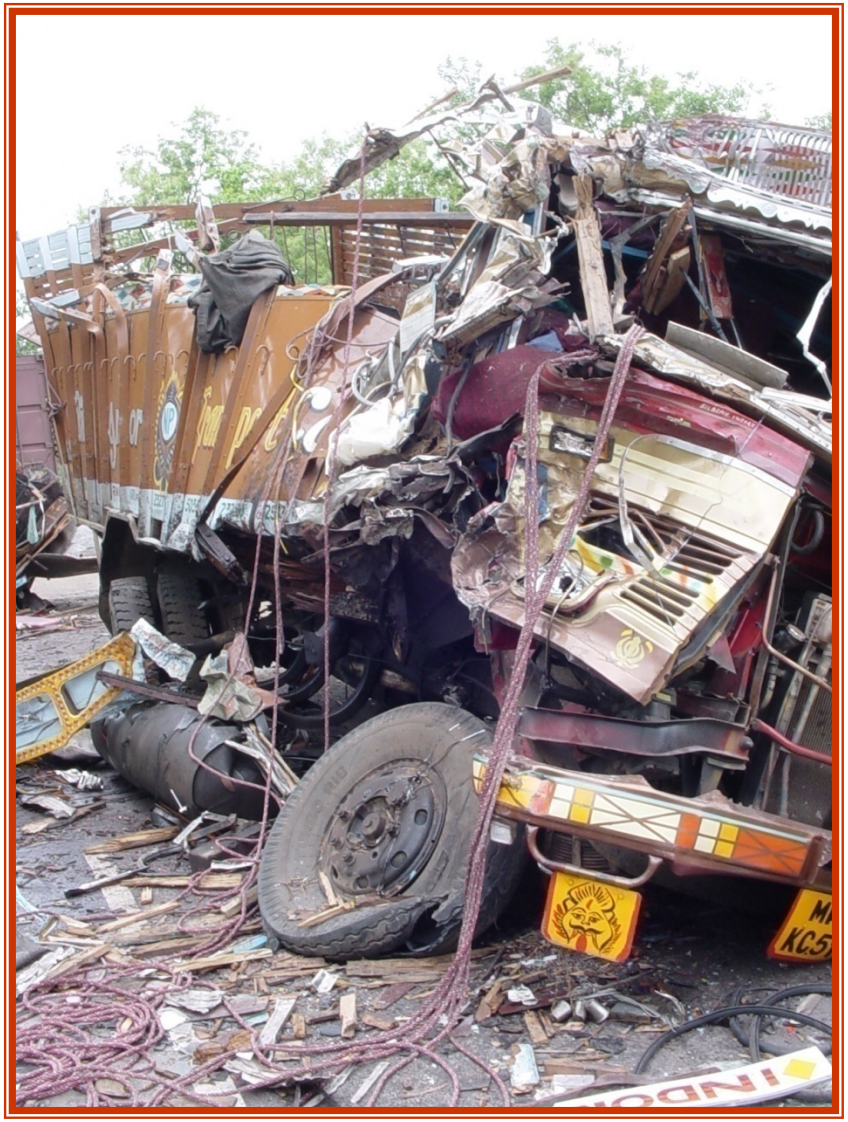
ACCIDENT INVESTIGATION/ RECONSTRUCTION & RECOMMENDATIONS OF DEORI VILLAGE ACCIDENT

BY

AIRC (CARRS)
INSTITUTE OF ROAD TRAFFIC EDUCATION

Think as the driver

From the start



The badly damaged Contractor's truck after the collision.

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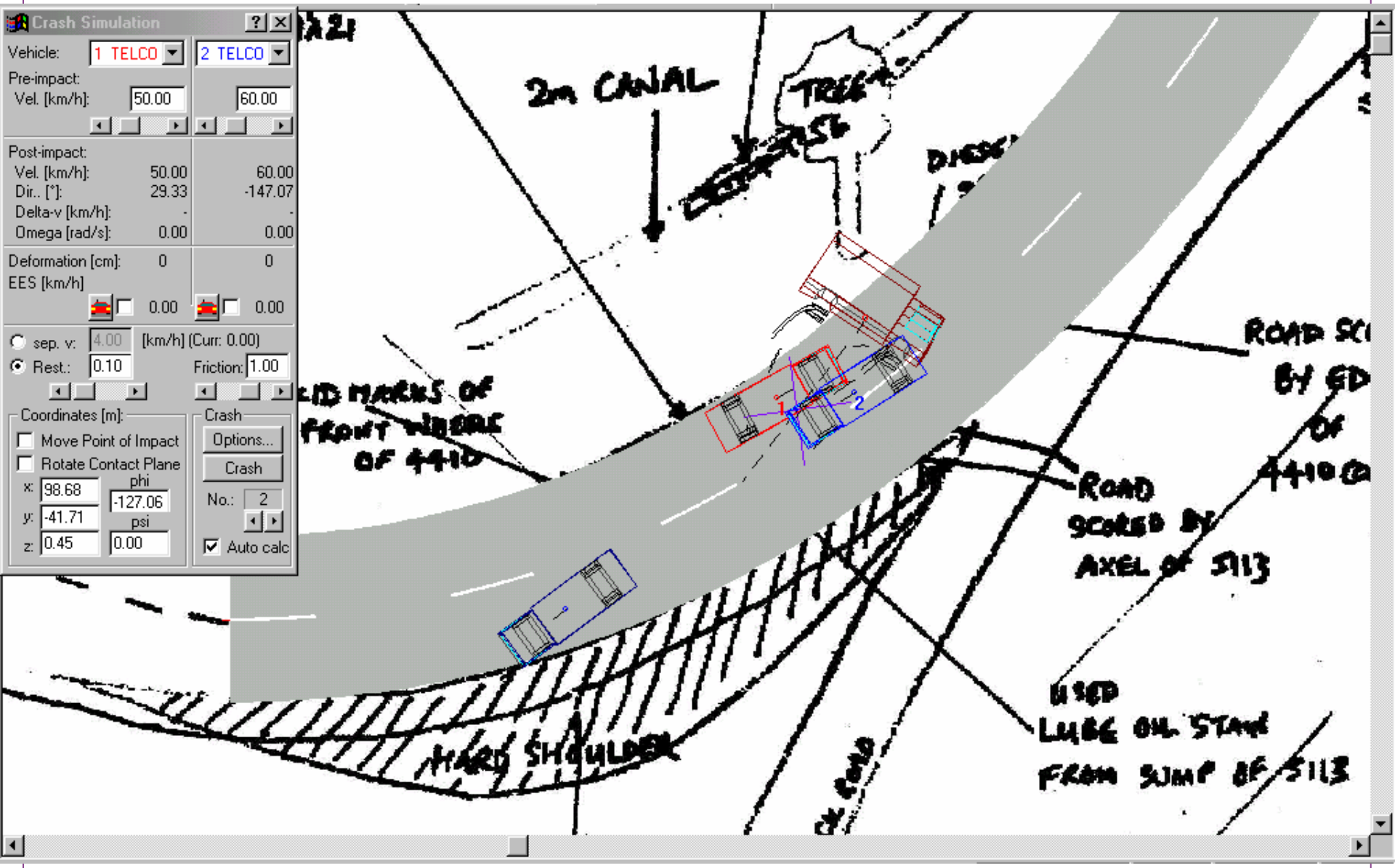
The badly damaged truck after the collision.

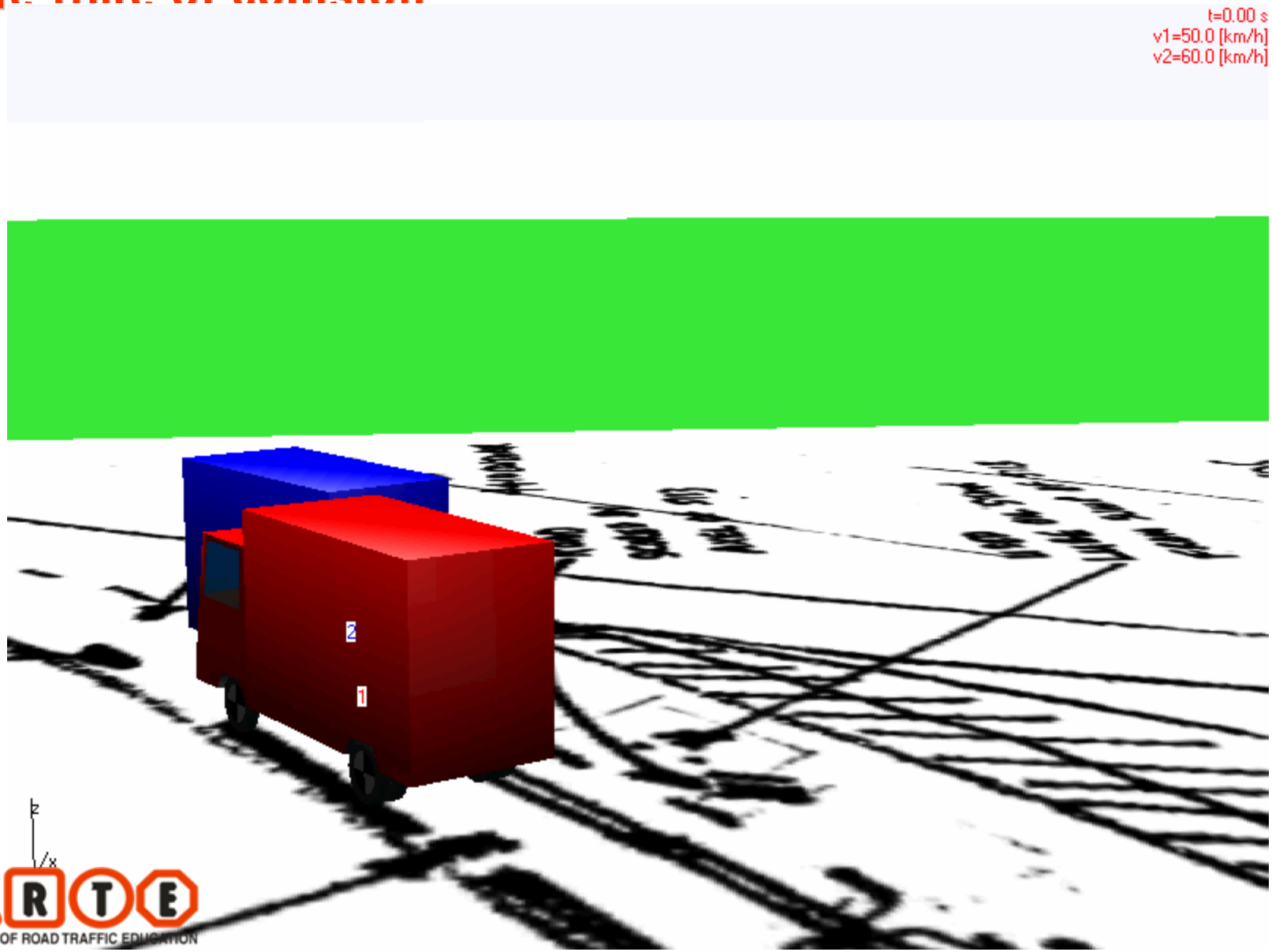
The Container containing the finished goods seen turtled due to the impact of collision.

The misleading crescent shaped hard shoulder leads drivers to believe that the road is wider than what it actually is.

Two Dimensional Simulation of Accident



3-D Simulation of the Accident showing speeds of the vehicles at the time of collision



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Engineering Improvement Plan

- Recommendations

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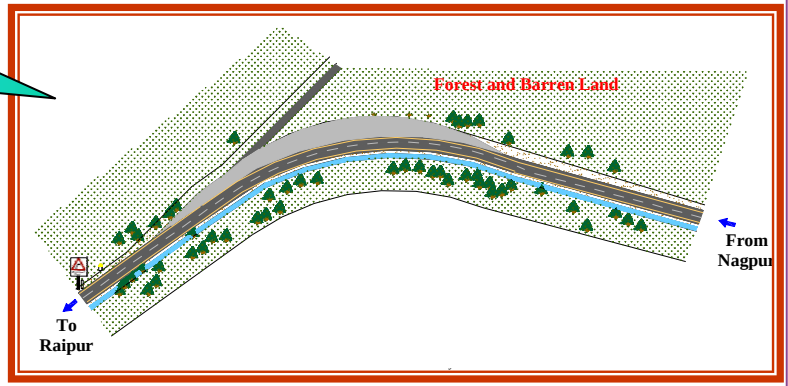
DEORI VILLAGE

Deori Village is situated along National Highway-6. The village is about 220 kms. from Nagpur and falls under the state of Chattisgarh. The stretch under study is about 5 kms from Deori village.



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PROBLEMS:

- There is absence of proper road signages and markings on this stretch thereby failing to provide timely caution to the road users to maneuver this blind curve and leading to accidents.
- The hard shoulder which could be used as a lane for one way movement of traffic is left unattended. The hard shoulder is in poor condition with many potholes in it and is being used as a place to wash utensils by the cleaner of the truck thereby discouraging its use for the movement of traffic.
- The open Storm Water Drainage along this stretch of National Highway-6 is not at all maintained and is covered by bushes and thick vegetation thereby obstructing its visibility and leading the vehicles to fall into this drain and turning turtle.
- The stretch lacks illumination which is a major cause of accidents during night.
- The area lacks immediate Medical aid facilities and helpline. The nearest hospital is nearly 47 kms. from this point.

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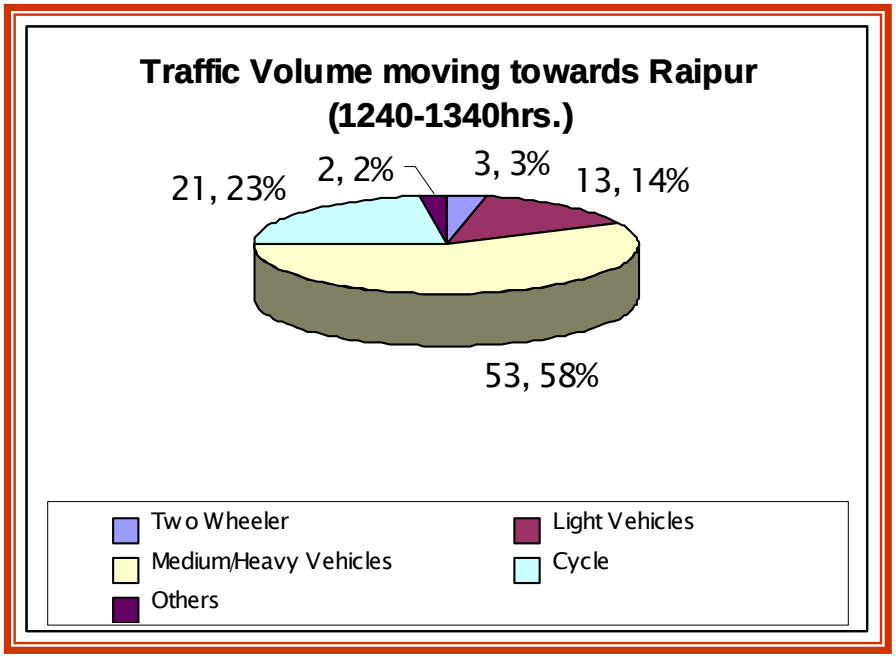
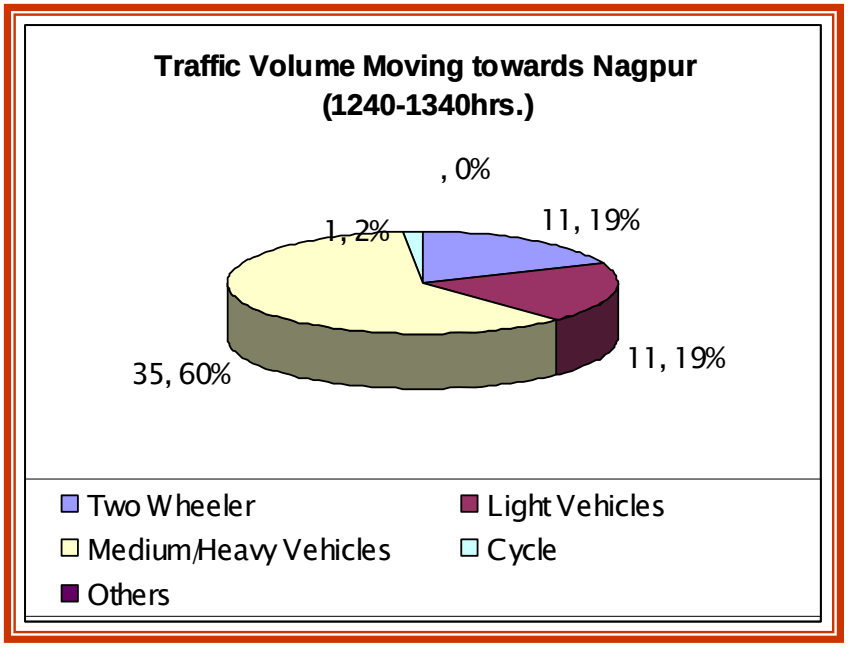
TRAFFIC VOLUME





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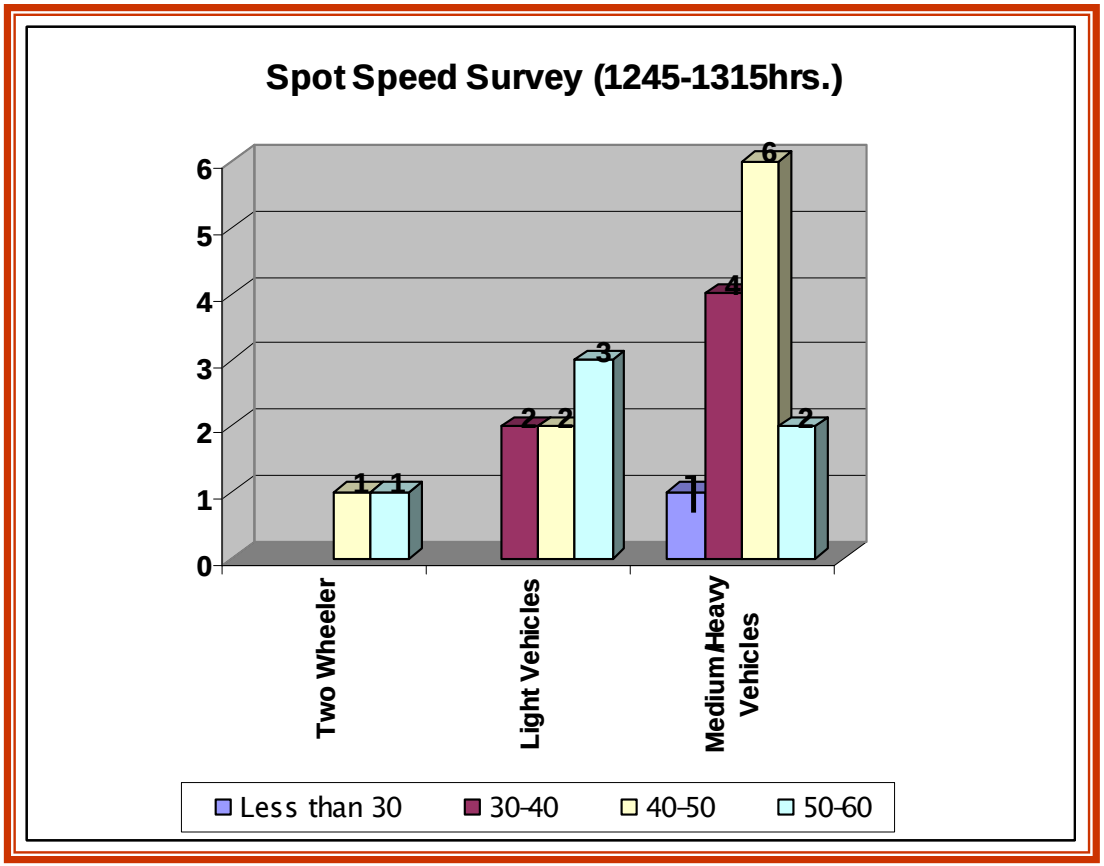
SPOT SPEED



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The Hard Shoulder being used as a place to clean utensils by the truck cleaner.Hazardous and hampers the smooth flow of traffic.

The bad condition of hard shoulder lends it of no use for the movement of traffic.

Forest and Barren Land

From Nagpur

To Raipur

The Open Storm water drainage could be a cause for the overturning of heavy vehicles.

Legend

- Trees
- Shrubs
- Shoulder
- Carriageway
- Hard Shoulder
- Storm Water Drainage

N

Scale: 10 5 0 10 20 30 40 50 60 70 Mts.

Map No. 01-04

Date: 18-1-04

Existing Site Plan
Deori Village, Chattisgarh

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CENTER FOR ANALYSIS & RESEARCH IN ROAD SAFETY

Old IPHB Complex, Altinho,
Panaji, Goa - 403001
Tel: +91-832-232596, Fax: +91-832-232597

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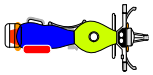
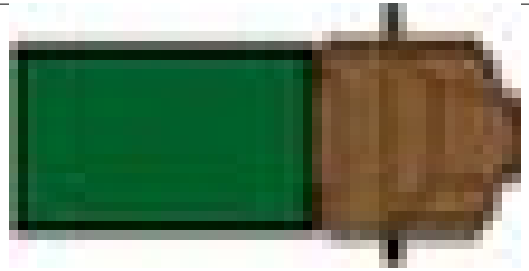
Site Plan of accident Spot





Towards Panjim

Towards Porvorim

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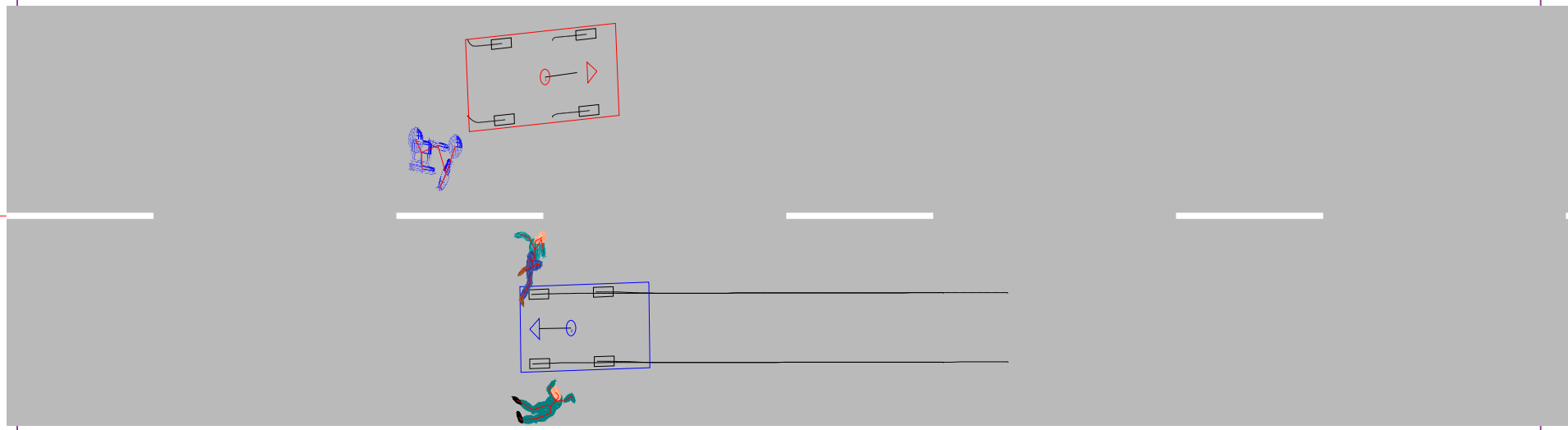
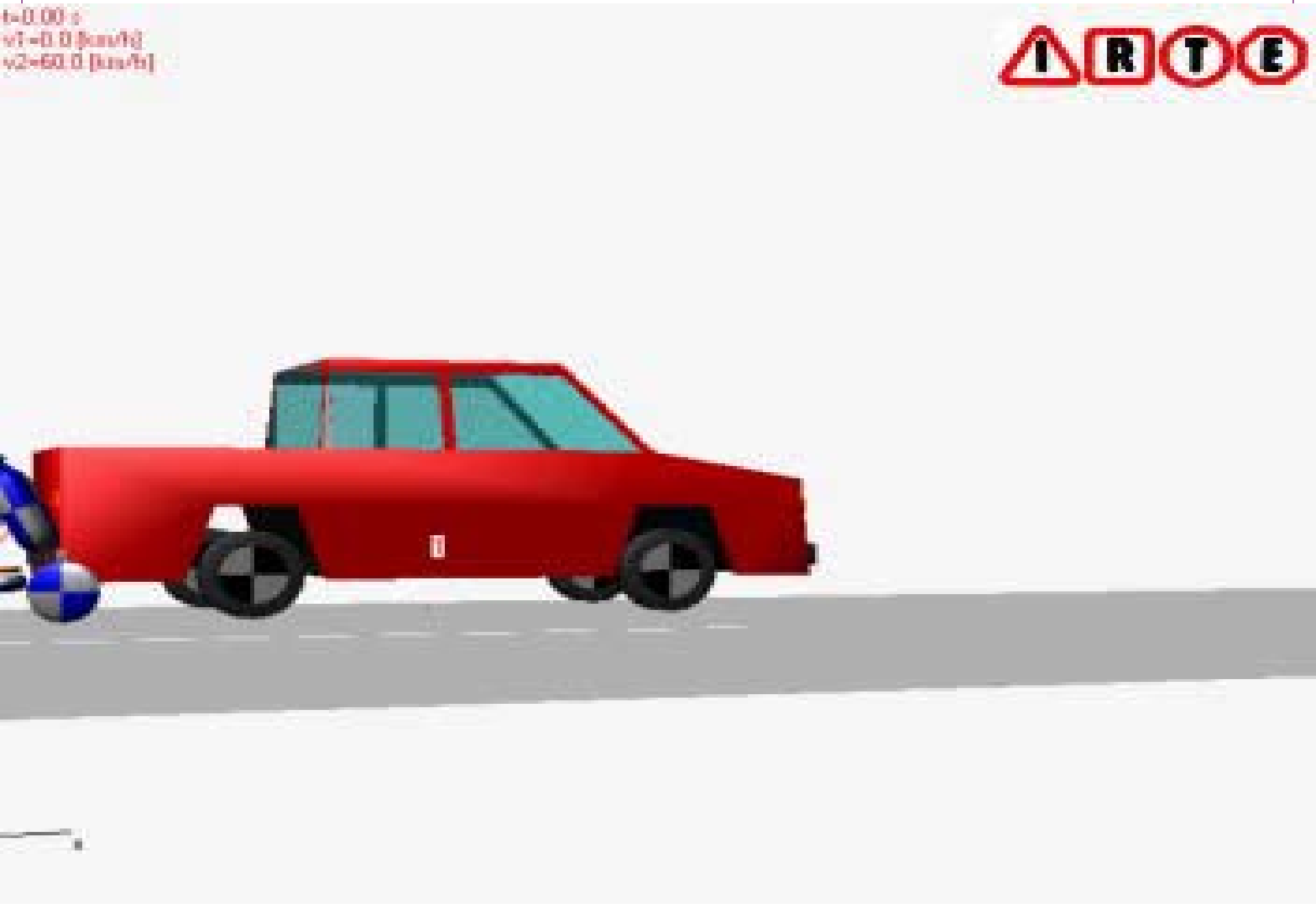
Two Dimensional Simulation of Accident



Three Dimensional Simulation of Accident



Need to

Investigate the circumstances thoroughly and impartially, recording and documenting all information

ANALYSIS OF ROAD CRASHES SHOULD HAVE TWO CLEAR REQUIREMENTS:

- HOW COULD SUCH INCIDENTS BE AVOIDED IN FUTURE

- TO UNDERSTAND THE ABUSE OF POWER BY A FELLOW ROAD USER LEADING TO SUDDEN DEATH OR INJURY OF CRASHES

All serious road crash scenes should be treated

as CRIME SCENES

The intention is to serve justice and to provide support for victims fairly and impartially, without prejudice or preference regardless of race, gender, ethnic origin, religion culture or political background

To standardise the way in which the Police Service investigates road death and serious injury collisions.

Investigate all incidents as

‘UNLAWFUL KILLINGS’

until the contrary is proved.

Ensure the investigation is planned and structured and that all information received is actioned and investigated.

Ensure that the highest levels of evidence are presented to the Courts

Thank You

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