The dangers presented in using second-hand vehicles and components that do not meet the minimum standards and are not roadworthy

Intra-African Trade Fair 2021 (15-21 November 2021)

17th November 2021

Reuben Gisore, Technical Director, ARSO

ARSO MISSION

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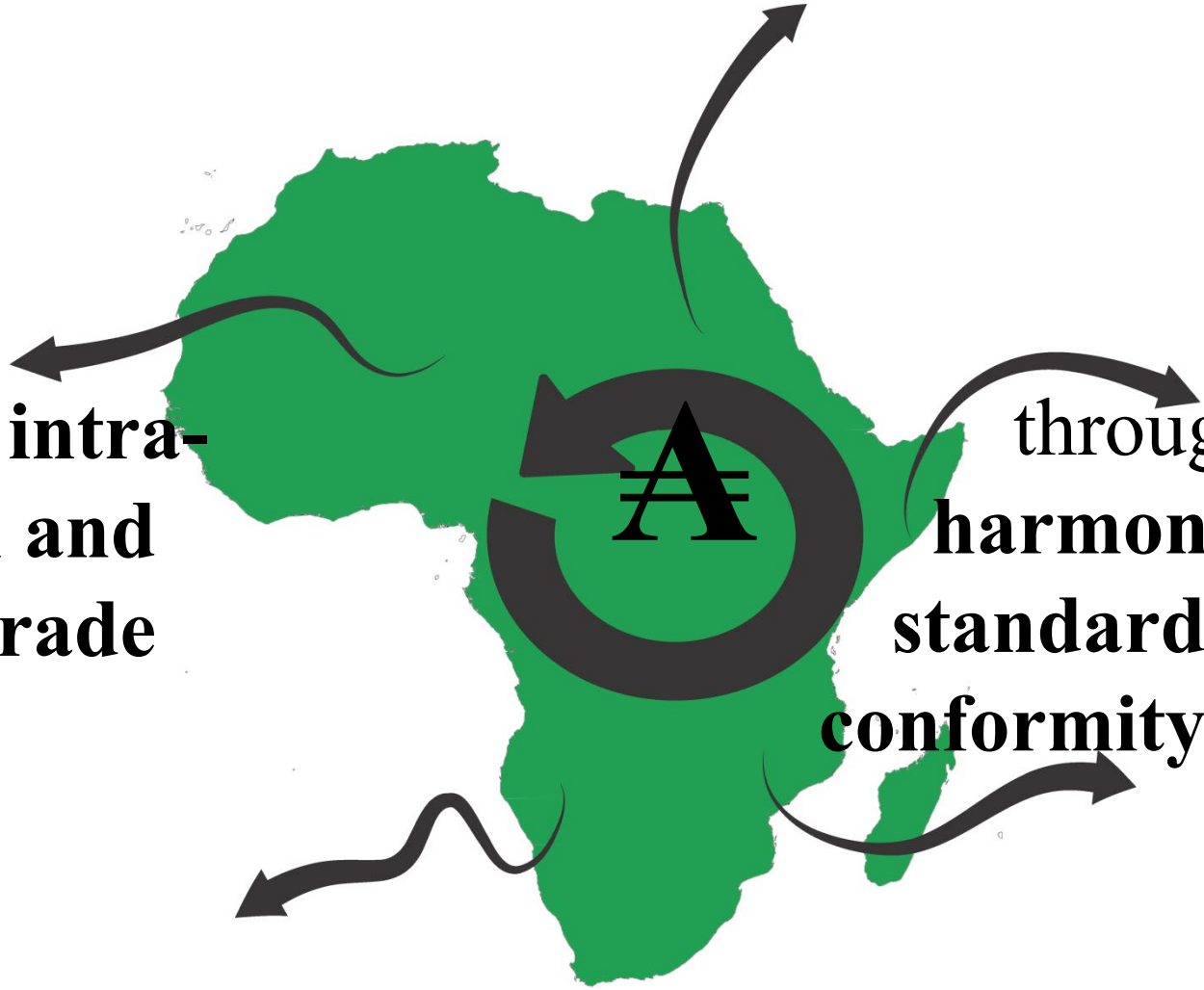


through **harmonized standards and conformity system**

Low Motorization in Africa: Status

Country/Region	2008	2018
Africa	27.2	39.8
Asia, Far East	53.8	118.8
Asia, Middle East	102.7	155.7
Brazil	140.0	212.8
Canada	623.0	656.1
Central & South America	131.9	181.3
China	35.7	167.0
Europe, East	300.0	399.0
Europe, West	593.2	619.5
India	13.2	43.6
Indonesia	34.7	102.2
Mexico	230.2	343.0
Pacific	563.1	607.2
United States	838.5	836.3

Davis, Stacy C., Diegel, Susan W. and Boundy, Robert G. (2021), *Transportation Energy Data Book*

Low Motorization in Africa: Growth Prospects

- Underdeveloped compared to Europe, Asia and North America
- Provides enormous room for growth across the entire value chain
- In 2015, approximately 1.55 million new vehicles were sold or registered across Africa
- South Africa, Egypt, Algeria and Morocco – all countries with established and rapidly developing automotive industries – together accounted for more than 80% of total new vehicle sales in 2015
- Some sources estimate that Africa's passenger vehicle sales could reach up to 10 million units per annum by 2030
- Africa as a whole accounted for less than 1 percent of global vehicle production (831,000 units) in 2014

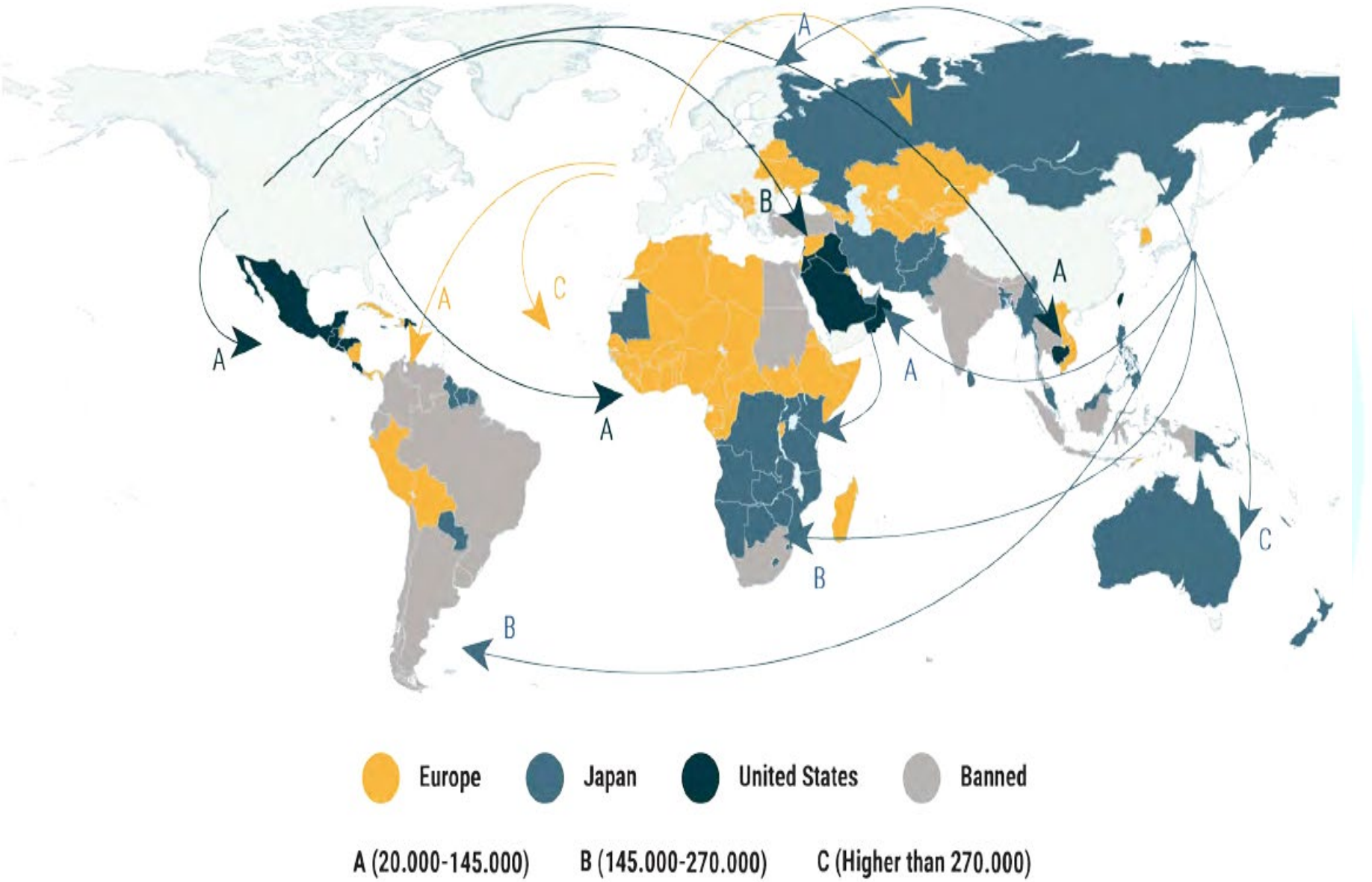
Potential for Growth within the Framework of the AfCFTA

- Viability of automotive assembly or production in Africa is premised on long-term untapped potential
- The implementation of the AfCFTA with its provisions for eliminating tariff and non-tariff barriers is likely to widen the markets for the automotive industry.
- Local manufacturing/assembly with value addition which meets the rules of origin prescribed in the Agreement Establishing the African Continental Free Trade Area (AfCFTA)
- Creating a reliable network of automotive component and spare parts suppliers to service customer needs
- Quality fuel is a necessary condition for the operation of advanced fuel-efficient and emission compliant engine technologies (Automotive World, 2018)
- Construction of motor vehicles meeting established safety standards to create confidence among Member States.

State of the Automotive Industry in Africa

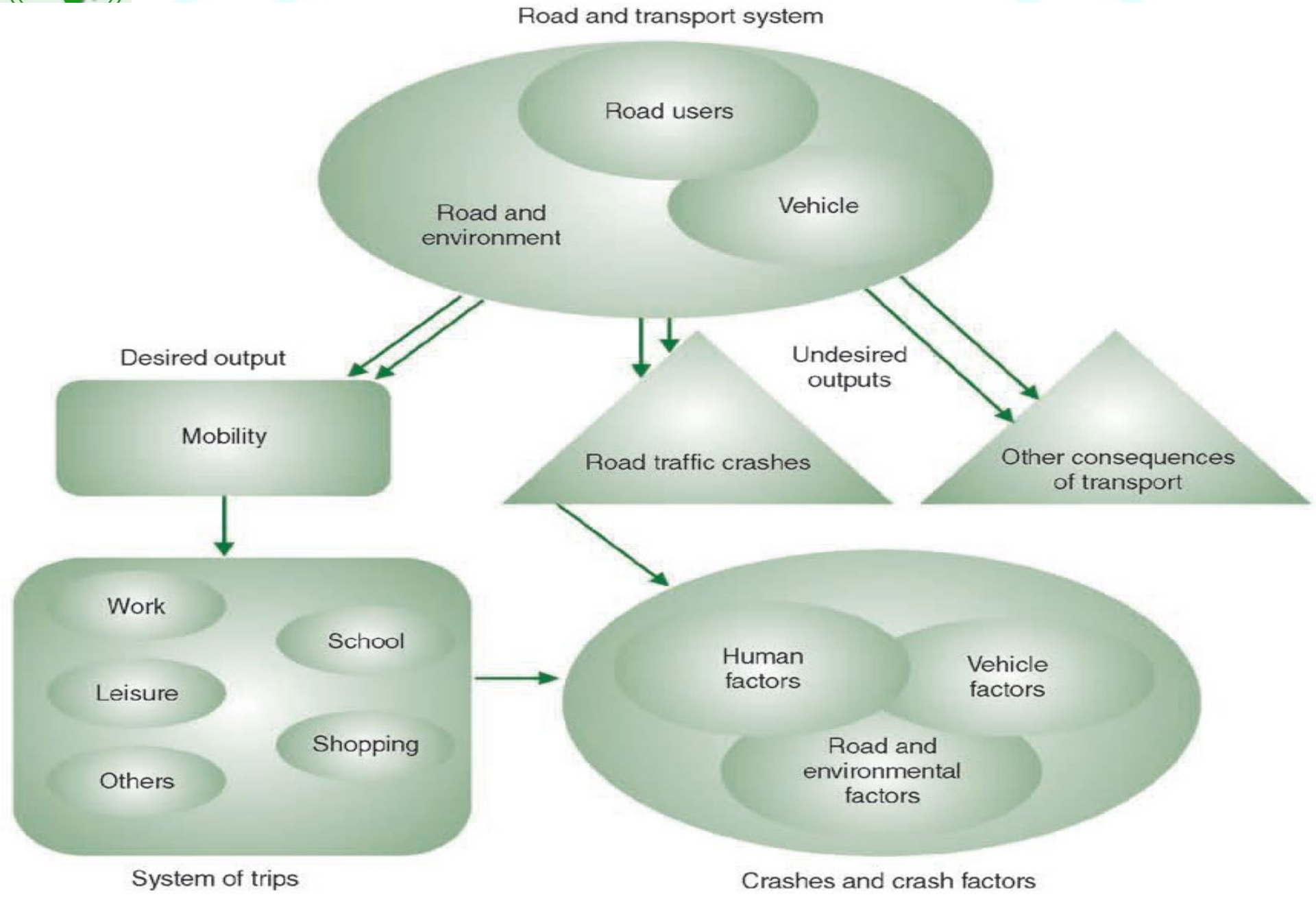
- Due to limited disposable income and the high cost of new vehicles, imported secondhand vehicles dominate the continent's automotive retail sector.
- This is a common trend across the region given that Africa imports four times more automotive products than it exports, with automotive imports worth US$48 billion in 2014 and exports worth only US$11 billion that year.
- Key sources of used vehicles are the United States (US), Europe and Japan. The Middle East for example serves as a notable transit route for vehicles into East Africa.
- Millions of used cars, vans and minibuses exported from Europe, the United States and Japan to the developing world are of poor quality, contributing significantly to air pollution and hindering efforts to mitigate the effects of climate change [21].
- The three largest exporters of used vehicles, the European Union (EU), Japan, and the United States of America (USA), exported 14 million used light duty vehicles (LDVs) worldwide between 2015 and 2018 [21]. The EU was the largest exporter with 54 per cent of the total followed by Japan (27 per cent) and the USA (18 per cent).

Sources of Used Vehicles



UNEP (2020), *Used Vehicles and the Environment: A Global Overview of Light Duty Used Vehicles: Flow, Scale and Regulation*

Road Vehicle Safety: Systems Approach



Second-hand Vehicles: Issues of Concern

(i) **Divergent regulatory frameworks**: Motorization is increasing - mostly driven by the importation of used vehicles. Egypt, South Africa, Sudan, and Seychelles have completely banned the import of used vehicles; Kenya, Rwanda, Angola, Morocco have imposed age restrictions. Out of 54 countries on the continent, 27 countries do not place any restrictions on the import of used vehicles.

(ii) The quality and safety of used vehicles

(iii) Pollutant and climate emissions of used vehicles

(iv) Energy consumption and unavailability of quality fuels for modern engine technologies

(v) Costs to operate used vehicles

(vi) Availability of certified component / spare parts: Regional automotive value chains have not developed to a significant extent

(iii) Limited manufacturing capabilities

Unsafe Vehicles: Second-Hand Vehicles

- Certain features of imported second-hand cars (e.g., age, degree of wear and tear, technical design) can increase their likelihood for traffic crashes
- Several studies argue that passenger(s) of the older cars tend to be in higher risk of injuries compared to the passengers in the newer vehicles in case of collusion
- Higher mileage, undisclosed crash damages) influences to a large extent the likelihood and severity of a traffic crash
- Traders can import second-hand cars with various mechanical defects or flaws

Functional automotive safety: Safety design, control of forces and energies

Functional Safety

kinetic

electric

chemical

thermal

nuclear

shine

Shock

EMC

Deformation

Poisoning

Temperature

Fire

Vibration

Radiation

Malfunction

Safety -> prevents injuries

Design

Implemented Safety Mechanisms → Implemented Features → Safety Mechanism in
- Electronics and
- Software

Distinctions of hazard of road vehicles

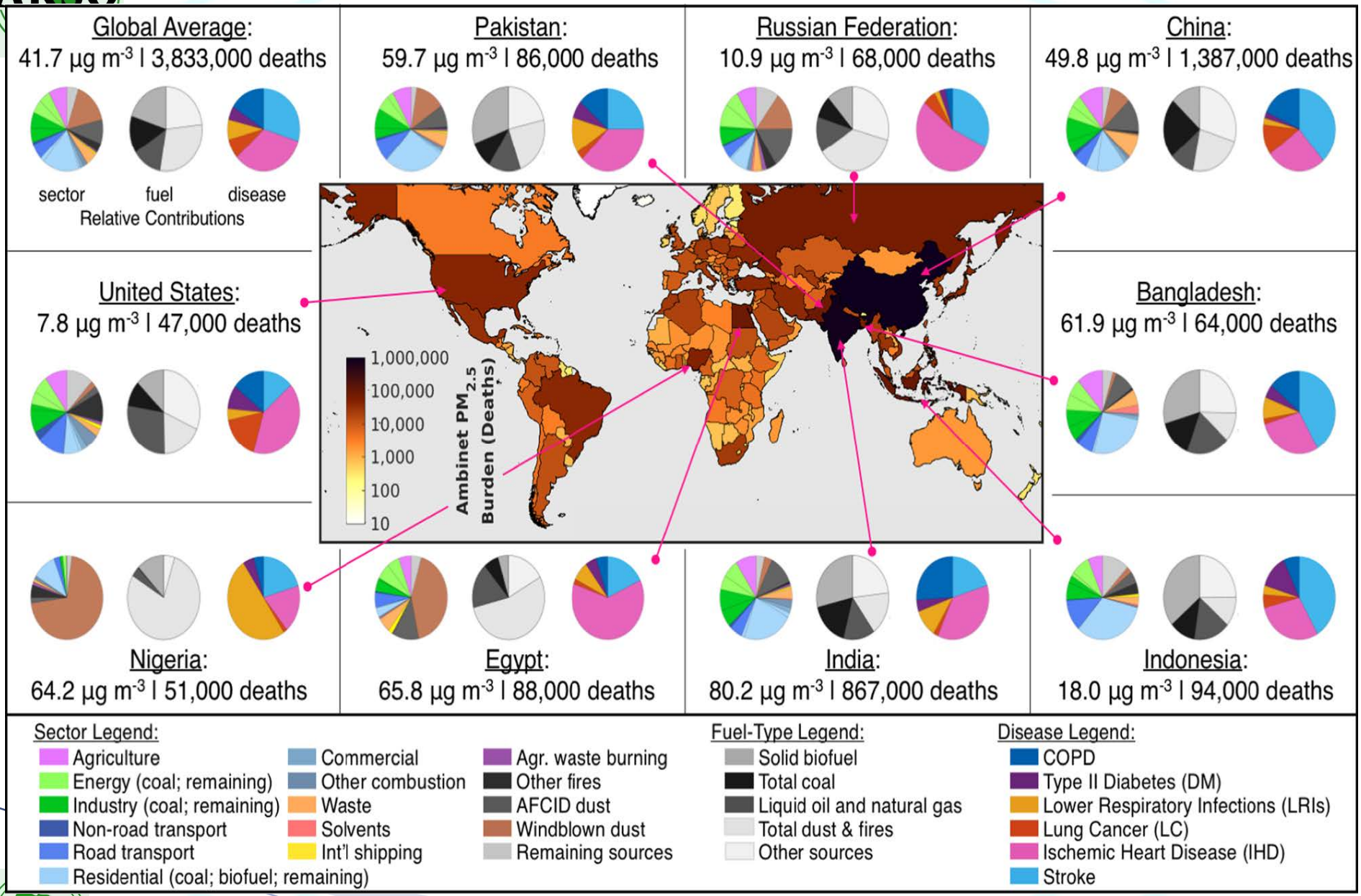
- **Chemical reactions** of substances, materials etc. lead to fire, explosions, injuries, health impairments, poisoning, environmental damage etc.
- **Toxic substances** lead to poisoning (also carbon monoxide), injuries (consequence of for example degassing of batteries, error reactions of the driver or mistakes of the auto repair shop staff), other damages etc.
- **High currents** and especially high voltages lead to damages (in particular personal protection).
- **Radiations** (nuclear, but also radiations like alpha particle semiconductor).
- **Thermic** (damages due to overheating, singe, fire, smoke etc.).
- **Kinetics** (deformation, movement, accelerated mass can lead to injuries).

(Functional Safety for Road Vehicles: New Challenges and Solutions for E-mobility and Automated Driving)

Transportation-attributable (TA) ambient $PM_{2.5}$ and ozone deaths in 2015

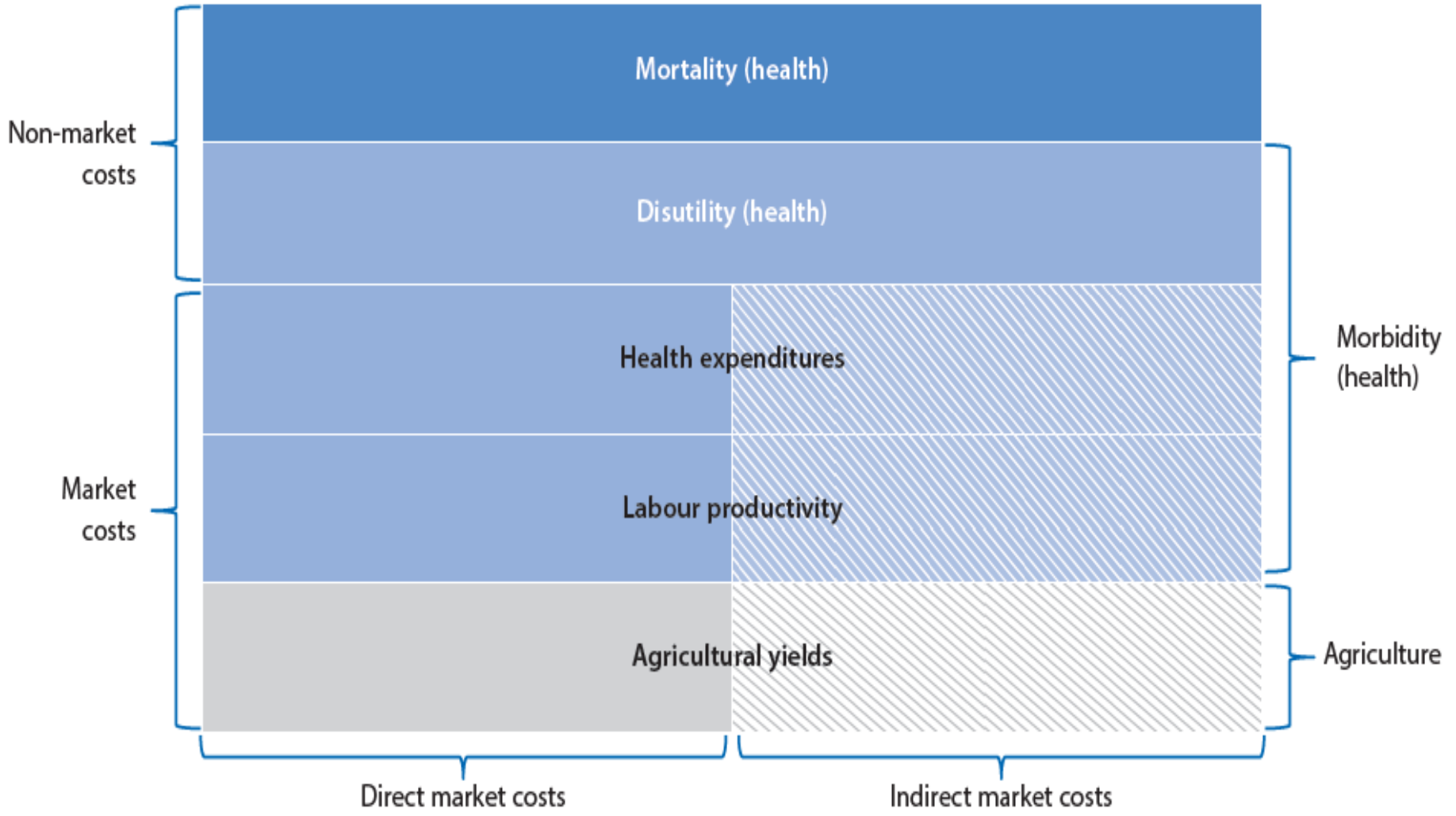
Region name	TA deaths	All emission sources	TA deaths per 100,000 population	Transport-attributable fraction (%)	Population
China	114,000	1,020,000	8.4	11.2%	1,400,000,000
India	74,000	800,000	5.7	9.2%	1,300,000,000
Europe	59,000	245,000	11.6	24.3%	510,000,000
United States	22,000	115,000	6.9	18.9%	320,000,000
Germany	13,000	43,000	17.1	31.4%	79,000,000
Russia	13,000	104,000	9.4	12.7%	140,000,000
Algeria	1,400	13,000	3.7	11.0%	37,000,000
Egypt	4,200	60,000	5.1	7.0%	83,000,000
Ethiopia	240	7,700	0.3	3.1%	91,000,000
Kenya	150	4,700	0.3	3.1%	46,000,000
Morocco	1,200	18,000	3.6	6.4%	32,000,000
Nigeria	1,500	51,000	0.8	2.9%	180,000,000
Rwanda	26	1,300	0.2	2.0%	11,000,000
South Africa	1,400	20,000	2.6	7.0%	54,000,000
Tanzania	78	4,700	0.2	1.7%	48,000,000
Zambia	24	1,800	0.2	1.4%	16,000,000
Zimbabwe	41	2,200	0.3	1.9%	14,000,000
World Total	385,000	3,372,000	5.4	11.4%	7,200,000,000

Global Burden of Disease concentration-response relationships 2019



Why Africa Needs Cleaner Vehicles

Costs associated with ambient air pollution



Global Road Traffic Injuries and Fatalities

- Approximately 1.3 million people die each year as a result of road traffic crashes.
- The United Nations General Assembly has set an ambitious target of halving the global number of deaths and injuries from road traffic crashes by 2030
- Road traffic crashes cost most countries 3% of their gross domestic product.
- More than half of all road traffic deaths are among vulnerable road users: pedestrians, cyclists, and motorcyclists.
- 93% of the world's fatalities on the roads occur in low- and middle-income countries, even though these countries have approximately 60% of the world's vehicles.
- Road traffic injuries are the leading cause of death for children and young adults aged 5-29 years.
- Between 20 and 50 million more people suffer non-fatal injuries, with many incurring a disability as a result of their injury.
- Road traffic injuries cause considerable economic losses to individuals, their families, and to nations as a whole. These losses arise from the cost of treatment as well as lost productivity for those killed or disabled by their injuries, and for family members who need to take time off work or school to care for the injured. Road traffic crashes cost most countries 3% of their gross domestic product.

(Road Traffic Injuries, WHO 2021)

Causes of accidents: Who is at risk?

- **Socioeconomic status:** More than 90% of road traffic deaths occur in low- and middle-income countries.
- Road traffic injury death rates are highest in the African region.
- Even within high-income countries, people from lower socioeconomic backgrounds are more likely to be involved in road traffic crashes.
- **Age:** Road traffic injuries are the leading cause of death for children and young adults aged 5-29 years.
- **Sex:** From a young age, males are more likely to be involved in road traffic crashes than females.
- About three quarters (73%) of all road traffic deaths occur among young males under the age of 25 years who are almost 3 times as likely to be killed in a road traffic crash as young females.

(Road Traffic Injuries, WHO 2021)

Causes of accidents: Risk factors

- **The Safe System approach - accommodating human error:** safe roads and roadsides, safe speeds, safe vehicles, and safe road users
- **Speeding:** The death risk for pedestrians hit by car fronts rises rapidly (4.5 times from 50 km/h to 65 km/h). In car-to-car side impacts the fatality risk for car occupants is 85% at 65 km/h.
- **Driving under the influence of alcohol and other psychoactive substances: B**lood alcohol concentration (BAC) of ≥ 0.04 g/dl increases risk. Amphetamines is about 5 times the risk of someone who hasn't.
- **Nonuse of motorcycle helmets, seat-belts, and child restraints**
- **Distracted driving:** Drivers using mobile phones are approximately 4 times more likely to be involved in a crash than drivers not using a mobile phone
- **Unsafe road infrastructure: R**oads should be designed keeping in mind the safety of all road users: pedestrians, cyclists, and motorcyclists - footpaths, cycling lanes, safe crossing points, etc
- **Unsafe vehicles:** Safe vehicles play a critical role in averting crashes and reducing the likelihood of serious injury.
- **Inadequate post-crash care:** Delays in detecting and providing care for those involved in a road traffic crash increase the severity of injuries.
- **Inadequate law enforcement of traffic laws**

(Road Traffic Injuries, WHO 2021)

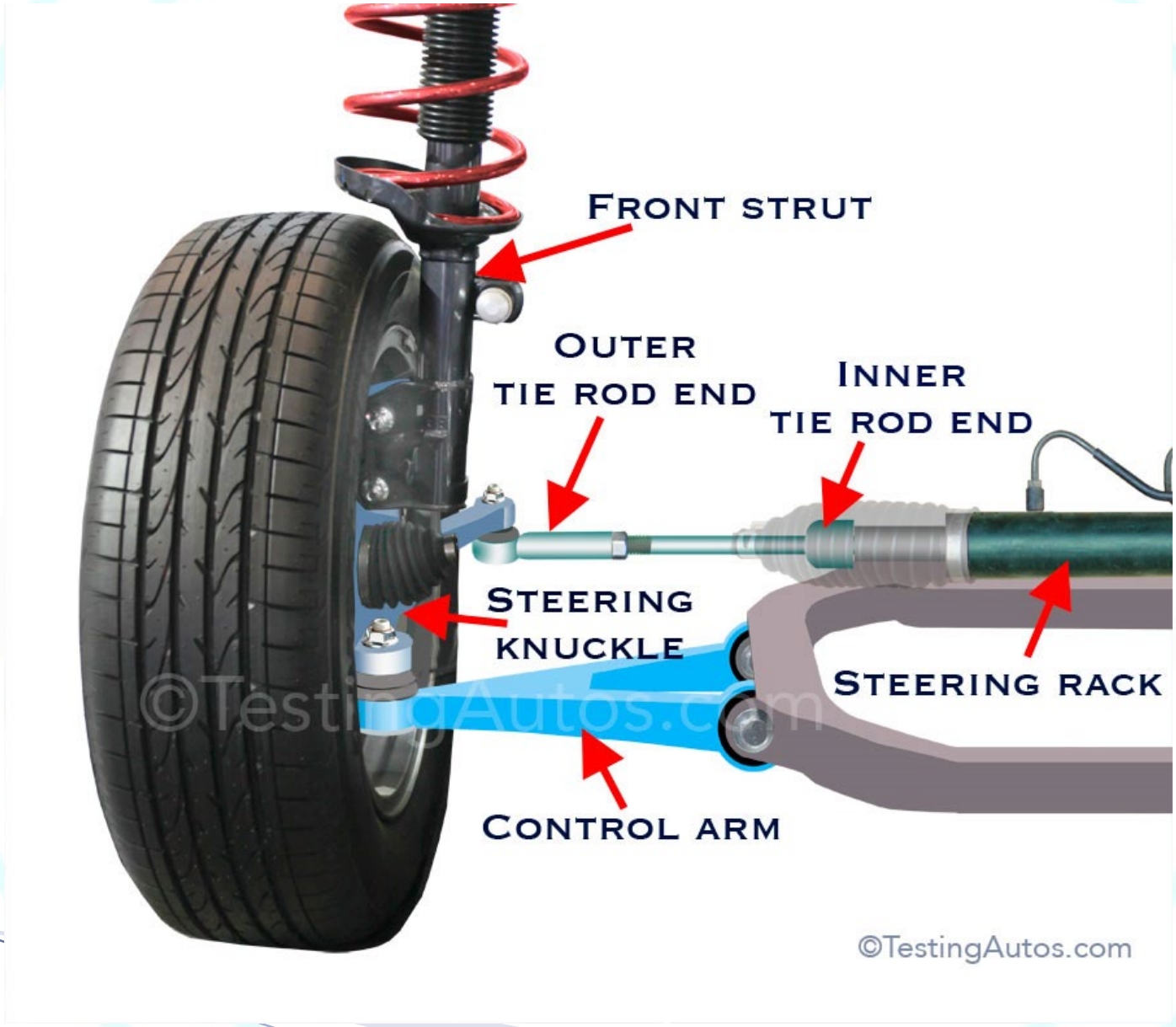
Unsafe Vehicles: Component failures

- Steering/suspension/transmission/engine-related problems
- Brake failure: hydraulic and mechanical components in braking systems; NHTSA survey reported brakes as responsible for 22% of car accidents due to mechanical failure. Faulty/Worn Brake Lines. Leaks in brake lines may allow brake fluid to drain away, compromising brake performance; ABS Malfunctions. Worn Brake Pads & Discs.
- Road Wheels, Hubs and Tyres: rethreaded second hand; bursting tyres
- Windshield Wipers
- Engine Failure
- Timing belts
- Wheel bearings: The wheel bearing can disintegrate and cause the hub assembly to detach from the vehicle. Literally: the wheel coming off, resulting in no steering control
- Universal joints (in vehicles with rear or all-wheel drive): Failure will lead to the prop shaft dropping out of the vehicle, causing severe damage to the rear differential ('diff') and other undercarriage parts
- Ball joint failure leading to loss of steering control
- Worn tie rods can make your steering wheel feel loose and cause degraded handling performance. Driving with a loose tie rod is a major safety concern because if it falls off you will lose control over your vehicle entirely.

Unsafe Vehicles: Brake Failure

By Kutlwano Olifant, Mpiletso Motumi and Brendan Roane. Oct 15, 2014, Johannesburg, South Africa

Unsafe Vehicles: Tie Rod Ends



Outcomes of ARSO Council

The following international standards were approved for adoption as African Standards by the 63rd ARSO Council meeting on 26th November 2020 as per the provisions Clause 7.9 of ***Principles and Procedures for Harmonization of African Standards***.

(1) ISO/IEC 18013-1:2018, *Information technology — Personal identification — ISO-compliant driving licence — Part 1: Physical characteristics and basic data set*

(2) ISO/IEC 18013-2:2020, *Information technology — Personal identification — ISO-compliant driving licence — Part 2: Machine-readable technologies*

(3) ISO/IEC 18013-3:2017, *Information technology — Personal identification — ISO-compliant driving licence — Part 3: Access control, authentication and integrity validation*

(4) ISO/IEC 18013-4:2019, *Personal identification — ISO-compliant driving licence — Part 4: Test methods*

(5) ISO 3779:2009, *Road vehicles — Vehicle identification number (VIN) — Content and structure*

Standards Approved by SMC (39) (1)

1. FDARS 1355-1:2021, *Vehicle Standards — Specification for Vehicle Roadworthiness — Part 1: Roadworthiness of vehicles already in use*
2. FDARS 1355-2:2021, *Vehicle Standards — Specification for vehicle roadworthiness — Part 2: Roadworthiness of vehicles prior to entry into service and thereafter*
3. FDARS 1355-3:2021, *Road vehicles — Specification for Vehicle Roadworthiness — Part 3: Supporting information*
4. FDARS 1355-4:2021, *Road vehicles — Specification for Vehicle Roadworthiness — Part 4: Requirements for vehicle examiners*
5. FDARS 1355-5:2021, *Road vehicles — Specification for Vehicle Roadworthiness — Part 5: Requirements for testing equipment*
6. FDARS 1355-6:2021, *Vehicle standards — Specification for vehicle roadworthiness — Part 6: Roadworthiness — Requirements for roadside assessment of vehicles*
7. FDARS 1357:2021, *Vehicle testing station evaluation — Code of practice*
8. FDARS 1362:2021, *Automotive Fuels — Unleaded Petrol — Requirements and test methods*
9. FDARS 1363:2021, *Automotive Fuels — Diesel — Requirements and test methods*
10. FDARS 1370:2021, *Transportation of dangerous goods by road*
11. FDARS 1371:2021, *Cross border road transport management system (XB-RTMS)*
12. FDARS 1379:2021, *Definitions and classifications of power-driven vehicles and trailers*
13. FDARS 1595:2021, *Vehicle homologation*

Standards Approved by SMC (2)

1. ASTM D4950:2019, *Standard classification and specification for automotive service greases*
2. EN 589:2018, *Automotive fuels — LPG — Requirements and test methods*
3. EN 13012:2012, *Petrol filling stations — Construction and performance of automatic nozzles for use on fuel dispensers*
4. EN 15376:2014, *Automotive fuels — Ethanol as a blending component for petrol — Requirements and test methods*
5. EN 15293:2018, *Automotive fuels — Automotive ethanol (E85) fuel — Requirements and test methods*
6. EN 16709:2015+A1:2018, *Automotive fuels — High FAME diesel fuel (B20 and B30) — Requirements and test methods*
7. EN 16734:2016+A1:2018, *Automotive fuels — Automotive B10 diesel fuel — Requirements and test methods*
8. ISO 4925:2020, *Road vehicles — Specification of non-petroleum-base brake fluids for hydraulic systems*
9. ISO 4926:2020, *Road vehicles — Hydraulic braking systems — Non-petroleum-base reference fluids*
10. SAE J310:2005, *Automotive lubricating greases*
11. SAE J357:2016, *Physical and Chemical Properties of Engine Oils*
12. SAE J1616:2016, *Standard for Compressed Natural Gas Vehicle Fuel*
13. SAE J1616:2017, *Recommended Practice for Compressed Natural Gas Vehicle Fuel*
14. SAE J 2227:2019, *Global tests and specifications for automotive engine oils*
15. SAE J1703:2019, *Motor vehicle brake fluids*

Standards Approved by SMC (3)

1. UNECE R036:2008RV3, *Uniform provisions concerning the approval of large passenger vehicles with regard to their general construction*
2. UNECE R052:2008RV3, *Uniform provisions concerning the approval of M2 and M3 small capacity vehicles with regard to their general construction*
3. UNECE R100:2013RV2, *Uniform provisions concerning the approval of vehicles with regard to specific requirements for the electric power train*
4. UNECE R101:2013RV3, *Uniform provisions concerning the approval of passenger cars powered by an internal combustion engine only, or powered by a hybrid electric power train*
5. UNECE R107:2017RV7, *Uniform provisions concerning the approval of category M_2 or M_3 vehicles with regard to their general construction*
6. UNECE R110:2014RV3, *Uniform provisions concerning the approval of: I. Specific components of motor vehicles using compressed natural gas (CNG) and/or liquefied natural gas (LNG) in their propulsion system; II Vehicles with regard to the installation of specific components of an approved type for the use of compressed natural gas (CNG) and/or liquefied natural gas (LNG) in their propulsion system*
7. UNECE R115:2013Rv1, *Uniform provisions concerning the approval of: I. Specific LPG (liquefied petroleum gases) retrofit systems to be installed in motor vehicles for the use of LPG in their propulsion system; II Specific CNG (compressed natural gas) retrofit systems to be installed in motor vehicles for the use of CNG in their propulsion system*
8. UNECE R136:2016, *Uniform provisions concerning the approval of vehicles of category L with regard to specific requirements for the electric power train*

Thank you!

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