Motorcycle Safety in ASEAN
An Accident Research Perspective

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Photo Source: In-depth accident investigation in Coimbatore in cooperation with JP-Research and BOSCH
AASF Vietnam 2016/004
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Introduction

**Motivation:** 1.24 million people die every year on the world’s roads thereof are 285 200 users of motorized 2-3 wheeler[1]

**Aim of the analysis**

- Status-quo accidents involving powered-two wheeler (PTW) in various ASEAN countries
- Determination of addressed accidents by an Antilock-Braking System (ABS) for PTW
- Estimation of the avoidance potential of PTW ABS in ASEAN by applying results out of an in-depth accident study from India

[1] WHO Report 2013 – Global status, Figure 7
In the ASEAN region at least 27,000 people die while riding a motorcycle annually.
Approaches towards traffic safety

Three contributing factors:
(1) Infrastructure – considering all traffic participants
(2) Safety awareness, education and enforcement
(3) Vehicle safety
   Active and passive safety, inspection and maintenance

Global approach to reduce the number of fatalities
→ Accident Research needed to understand accident situation and causation
Vietnam Road Safety Facts

- Fatalities in 2015: 8,671
- WHO Estimate Fatalities: ~22,000

Motorizing vehicles increasing at rapid speed in Vietnam:
- Annual growth rate is 7.3% for motorcycles → 9000 new motorcycles every day
- Annual growth rate is 6.3% for cars → 850 new cars every day

Sources: NTSC, Vietnam register, Vietnam National Statistics Office, Other country data for 2010-2014
# Approaches towards traffic safety

1. **Official accident statistic**: Police reports given by each country
2. **In-depth accident data**: Crash investigation as subsample of official data
3. **Property damage data**: Accidents w/ property damage only i.e. insurance data

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<th>Official statistics</th>
<th>Police reports</th>
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<td>Accidents per year</td>
<td>Police reports</td>
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<td>Number of reported parameters</td>
<td>Number of reported parameters</td>
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<td>In-depth data</td>
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- Official statistics based on police reports provide limited information
- In-depth accident investigation needed to understand root causes
How to estimate PTW ABS benefit in ASEAN?

1. **Comparable Data**: Official accident data, i.e. RASSI database

2. **General Distributions**: i.e. accident type

3. **Field of Effect**

4. **Determine Share of Benefit within Each Distribution**

5. **Vietnam**
   - Official accident statistics (data source)
   - Distributions (if available)
   - Field of effect (est.)
   - Estimate benefit within each distribution
   - Total: Est. benefit MC ABS

* e.g. India by using national related characteristics
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Rough estimation of benefit for PTW ABS in Vietnam

Registered accidents 2015

22 404

~13 200

PTW related
~59% (by WHO)

Share of avoided accidents due to PTW ABS

~3 400

Share of accidents w/ reduced of collision speed due to PTW ABS

~1 600

Note:
benefit estimation based on data of other countries with consideration of local characteristics

More Information about Vietnam accident situation is needed!

Based on Bosch Accident Research; Study based on "Analyzing motorcycle injuries on arterial roads in Bali using a multinomial logic model", Wedagama, 2010; Analysis of 428 accidents w/injuries involving a PTW, Estimation based on avoidance potential out of PTW ABS Study India (2014) and the assumption for similar avoidance in same accident types, 100% installation rate, 2-channel MC ABS

Data source of Vietnam: National Traffic Safety Committee Vietnam

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Example single case analysis for PTW ABS #91-2011-002-008*

Source: Road accident sampling system India - RASSI #91-2011-002-0008
Example single case analysis for PTW ABS #91-2011-002-008*

**ABS antilock braking system**
A system which prevents the wheels from locking up and the vehicle remains steerable. As a consequence the stopping distance is significantly reduced and can steer while braking.

**Initial Situation**
ABS Active

**Brake and Steer**
Collision avoidance by braking and steering

**Final positions**

**Pressure increase** (progressive) during stable phase and bike is steerable on brake

Bike brake & steer avoid collision

Vehicle becomes Stable and collision is avoided

Bike Hit the brakes, the wheel locks, Pressure increase through brake master cylinder

The brake pressure is held and fast decrease in pressure is done to prevent the wheels from lock up

During the lock up phase the brake pressure is held until wheel regains its stability

Pressure increase (progressive) during stable phase and bike is steerable on brake

Bosch Antilock Braking System

Source: Road accident sampling system India - RASSI #91-2011-002-0008
Example single case analysis for PTW ABS #91-2011-002-008*

**With ABS**

**Initial Situation**

**Wheel lock**

**Collision**

**Impact of Head**

**Rider out of Position**

**Second Contact**

**With out Antilock Braking System**

**Initial Situation**

**Wheel lock**

**Final Position**

**Source:** Road accident sampling system India - RASSI #91-2011-002-0008
Summary and Discussion

- Study results limited → More detailed accident information required
- Establishment of in-depth accident research in Vietnam is necessary
- Analysis based on data from Indonesia hence estimation influenced from other accident related factors and could change overall while mapping to Vietnam
- Safety technologies like PTW ABS could potentially avoid every 4th accident w/ casualties (ASEAN study)
- Besides safety awareness high potential seen for PTW safety technologies
- Further research needed to evaluate 1st estimation
Thank You

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