Powered Two-Wheelers (> 25 km/h) in China

Bo Sui
Self introduction

I am a traffic safety research engineer based in Autoliv China since 2012.

My research interests are two-wheeler traffic safety analyses in China.

Publications on PTWs include:


Contents

- Regional facts and figures
- Motorcycle use
- Motorcycle safety situation in China
- Areas of attention, among others:
  - Licensing and helmet use
  - Road infrastructure situation and challenges
  - Safety technology, vehicle aspects and local/regional vehicle requirements
China

- Covers an area of over 9 million km², ~20 times of the Sweden
- 23 provinces, 5 autonomous regions, 4 municipality directly under the central government, 2 special administrative regions
- Over 1.4 billion of people (18% of the global population) in 2019, 61% living in urban area and 39% in rural area. 17% 0-14 years old, 71% 15~64 years old, and 13% >65 years old.
- Nominal GDP totaling approximately US$ 14.3 trillion as of 2019 and over US$ 10,000 per person (one fifth of the Swedish).

Source: China Statistical Yearbook (2020)
PTW (> 25 km/h) usage in China

90 million ownership

300 million ownership

https://baijiahao.baidu.com/s?id=1674053073779921431&wfr=spider&for=pc
Nearly every household has a PTW
Car ownership has increased substantially

* private PTW ownership = private combustion PTW ownership + private electric PTW ownership

Source: China Statistical Yearbook (2020)
Motorcyclist road injuries
Both sexes, All ages, 2019, Deaths per 100,000

Source: Global Health Data Exchange https://vizhub.healthdata.org/gbd-compare/
Motorcyclist road injuries
Both sexes, All ages, 2019, Deaths

* Fatal and severely injured

Source: Global Health Data Exchange https://vizhub.healthdata.org/gbd-compare/
Helmet usage in China

Estimated 20% helmet usage (WHO, 2018)
Inappropriate road use by PTW riders

- By law all PTWs > 25 km/h ride on the road (main carriage way)

- In practice:
  “human-powered bicycles, E-bikes, and motorbikes all share the same cycling space” Gu et al. (2021)


Road scene from Shanghai on road usage by PTW riders
Training and licensing

- **E-level** license for motorcycles & **F-level** for mopeds

  - Online study
  - Two written tests
  - Two driving tests
  - Completion
Safety technology, vehicle aspects and requirements

- National standard
  - GB 20073-2018
  - GB/T 33438-2016

- Consumer rating program: C-NCAP
  - Head-form and leg-form test (pedestrian → two-wheeler rider)
  - Automated Emergency Braking for cars encountering two-wheelers
Thank you!

Bo.sui@autoliv.com
PTW traffic safety in China

15,800 fatalities
Reported by country/area in 2013 (WHO)

46,876 fatalities
Estimated by The Global Health Data Exchange (GHDx)

3 times

Based on the China In-Depth Accident Study (CIDAS), 63% of PTW users' fatalities were on rural roads, 37% on urban roads.
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# PTW safety regulation in China

## Law of the Peoples Republic of China on Road Traffic Safety

<table>
<thead>
<tr>
<th></th>
<th>E-bike</th>
<th>Moped</th>
<th>Motorcycle</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Regulation</strong></td>
<td>GB17761-2018</td>
<td>GB 20073-2018 (Effective: 2018.07.01)</td>
<td>GB 20073-2018 (Effective: 2018.07.01)</td>
</tr>
<tr>
<td><strong>Requirement</strong></td>
<td>Weight &lt;= 55 kg &amp;</td>
<td>Weight &gt; 55 kg (optional)</td>
<td>Weight &gt;55 kg (optional)</td>
</tr>
<tr>
<td></td>
<td>Max. Speed &lt;= 25 km/h &amp;</td>
<td>25km/h &lt; speed &lt;= 50 km/h</td>
<td>Max. Speed &gt; 50 km/h</td>
</tr>
<tr>
<td></td>
<td>Motor power &lt;= 400 W &amp;</td>
<td>Engine capacity &lt;= 50 mL or 400 W &lt; Motor power &lt;= 4 kW</td>
<td>Engine volume &gt; 50 mL or Motor power &gt; 4 kW</td>
</tr>
<tr>
<td></td>
<td>Battery voltage &lt;= 48 V &amp;</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Type</strong></td>
<td>Non-motor vehicle</td>
<td>Motor vehicle</td>
<td></td>
</tr>
<tr>
<td><strong>Helmet usage (GB811-2010)</strong></td>
<td>Required since 2021 in some districts</td>
<td>Required</td>
<td>Required</td>
</tr>
<tr>
<td><strong>Motorcycle driver license</strong></td>
<td>No requirement</td>
<td>F</td>
<td>E</td>
</tr>
<tr>
<td><strong>Insurance</strong></td>
<td>No requirement</td>
<td>Required</td>
<td>Required</td>
</tr>
<tr>
<td><strong>Extra load (passenger)</strong></td>
<td>A child below 12 years (some districts)</td>
<td>None</td>
<td>An adult</td>
</tr>
<tr>
<td><strong>Road</strong></td>
<td>Bicycle lane</td>
<td>Road (main carriageway and designated lanes)</td>
<td>Road (main carriageway with speed limit &gt;= 80 km/h and restrictions in some cities)</td>
</tr>
</tbody>
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**Type**:
- Non-motor vehicle
- Motor vehicle

**Helmet usage (GB811-2010)**:
- Required since 2021 in some districts
- Required
- Required

**Motorcycle driver license**:
- No requirement
- F
- E

**Insurance**:
- No requirement
- Required
- Required

**Extra load (passenger)**:
- A child below 12 years (some districts)
- None
- An adult

**Road**:
- Bicycle lane
- Road (main carriageway and designated lanes)
- Road (main carriageway with speed limit >= 80 km/h and restrictions in some cities)
References

- http://ghdx.healthdata.org/advanced-search
- WHO road safety status report. http://apps.who.int/iris/bitstream/handle/10665/44122/9789241563840_eng.pdf;jsessionid=EDA0C177CD9C38B57443870773743B97?sequence=1
- https://zhuanlan.zhihu.com/p/162686265
- Weinert, Jonathan X. (2007). The rise of electric two-wheelers in China: Factors for their success and implications for the future. https://escholarship.org/content/qt9wn5r8tj/qt9wn5r8tj_noSplash_8193b0fb4eedfccc66be760a7546fcfaf.pdf?t=I56y89