

## Using Video Cameras to Assess the Helmet Use Rate of Myanmar Motorcycle Riders

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### Abstract

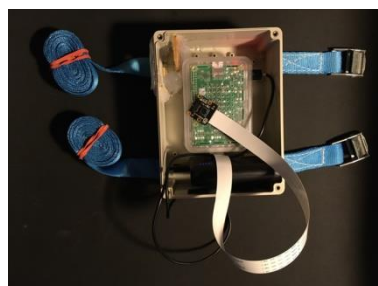
The use of motorcycle helmets is critical to decrease crash injury severity, it is therefore crucial to have detailed data on helmet use in a country. Low cost video cameras were used to film traffic at eight observation sites to update data on motorcycle helmet use throughout Myanmar. Helmet use varied depending on the observation site, time of day, position on the motorcycle, and between urban and rural sites. The use of mobile video cameras proved to be a versatile and flexible method to collect helmet use data, although coding of the recorded videos was time consuming.

### Background

The data on motorcycle helmet use in Myanmar in the Global Status Report on Road Safety (World Health Organization, 2015) was outdated and did not differentiate helmet use of drivers and passengers. Data is not collected regularly since there is no government or research body tracking helmet use of motorcycle riders. Hence, it was necessary to update existing data and provide a more detailed assessment of helmet use in Myanmar. The goal of this study was not to give a complete picture of helmet use in all regions of the country, but to form a starting point for more extensive data collection by identifying factors that influence helmet use in Myanmar.

### Method

Since there was only a small team with limited financial resources available for this study, traffic recording with video cameras was chosen over a direct observation of helmet use in traffic. There are several advantages to this approach: one person can set up multiple cameras at different locations, coding of helmet use can be stopped and resumed at a later time, and repeated coding for multiple variables is possible. Two traffic observation cameras were built from a raspberry pi minicomputer, a camera module and a powerbank for around 90 US\$ per camera. Components were mounted in an off the shelf plastic enclosure (Figure 1). With support by the traffic police, cameras were installed at roadside lampposts at urban and rural sites of eight cities. Sites were chosen for their accessibility and by recommendation of the traffic police. Since traffic police supported this study, further permission was not needed.



*Figure 1. Traffic observation camera*

## Results

Traffic was recorded for a total of 385 hours. While the equipment worked well, the quality of the recorded videos was occasionally degraded by low lighting in the morning and late afternoon, heavy rain, and large trucks obscuring the line of sight. However, issues with degraded video quality occurred in only 2.9% of coded recordings. Helmet use and position on the motorcycle were coded by hand with the freeware program Boris - **B**ehavioral **O**bservation **R**esearch **I**nteractive **S**oftware (Friard & Gamba, 2016). To decrease coding workload, only the first 15 minutes of every recorded hour were coded. Helmet use varies considerably in different regions of Myanmar (see Table 1). In Mandalay, which is the city with the most motorcycles in Myanmar, helmet use is comparatively high with close to 75% of all observed motorcycle riders wearing a helmet. The lowest helmet use rate was observed in the outskirts of the former capital Yangon, where motorcycle driving is prohibited in downtown areas.

*Table 1. Average helmet use and number of coded riders at observation sites*

Observation site	Average helmet use rate	Confidence interval
Bago (N=14,980)	54.18%	53.38% - 54.98%
Mandalay (N=65,366)	74.56%	74.22% - 74.89%
Naypyitaw (N=3,343)	64.49%	62.85% - 66.10%
Nyaung-U (N=9,856)	48.61%	47.62% - 49.60%
Pakokku (N=19,808)	30.63%	30.00% - 31.28%
Patheingyi (N=7,194)	60.04%	58.90% - 61.16%
Yangon (N=1,105)	27.87%	25.31% - 30.59%
Highway (N=3,907)	60.17%	58.63% - 61.70%

A preliminary analysis of helmet use differences between drivers and passengers show a similar pattern to studies from other countries in South-East Asia (Bachani et al., 2013; World Health Organization, 2015), helmet use among motorcycle drivers in Myanmar is higher ( $M = 68.1\%$ ,  $CI: 67.8\%-68.4\%$ ) than helmet use among passengers ( $M = 46.1\%$ ,  $CI: 45.6\%-46.6\%$ ). Furthermore, helmet use is higher at urban observation sites than at rural observation sites, and fluctuates notably throughout the day. Average helmet use in Myanmar, as an average of all observation site means, was 52.6% ( $SD=16.2\%$ ). Since observation sites were not chosen randomly, this value is not representative of the country.

## Conclusions

Using video cameras proved to be a good method to assess the helmet wearing rate of Myanmar motorcycle riders at multiple observation sites. The cameras can be built for about 90 US\$ from off the shelf parts, allowing researchers easy access to camera systems for similar studies. Since this study was purely observational, the underlying reasons for varying helmet use rates in Myanmar are not known and need to be investigated further.

## References

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