



Activity 2.3 - Naturalistic Riding Study

Presented by Alistair Weare
TRL Researcher – 29/06/2010

Agenda



- 1 Introduction to the NRS
- 2 Methodology & timescales
- 3 The data bikes to be used
- 4 Project completion to date
- 5 The next steps



The purpose of the Naturalistic Riding Study



What history and previous research tells us.....

- Behavioural, ergonomic or human factors issues appear to be a major contributing factor to PTW accidents
- Poor or incorrect collision-avoidance strategies are a significant factor in crashes





- No study of real-world motorcycle riding behaviour has previously been published
- Unique opportunity to develop understanding of key rider - and other road user – behaviours
- Potential to record accurately the collision-avoidance measures used by riders in crashes or near-crash situations

Choice of study method



Review of previous studies to draw information from:

- 100-car naturalistic driving study (USA)
- Field Operational Test Support Action (FESTA) project
- Test Site Sweden Field Operational Test

Core requirements determining method:

- Naturalistic
- Not unnecessarily risky
 - Riders must have directly relevant experience of bike similar to test bike
 - Excessively risky riders eliminated
- Repeatable in four different countries
 - Clear ethical boundaries
 - Using proven technical equipment and processes

Developing a methodology for a bike study



This is an 'exploratory' research activity.....



- Key differences
 - Reduced size
 - Additional axis of movement
 - Rider exposure
 - Reduced security



- Unique challenges
 - Ensuring sensors are installed discreetly
 - Maintaining the handling characteristics
 - Maintaining crash-safety

Naturalistic Driving Study (NRS) Procedure



- Legal and ethical considerations
 - Data protection
 - Duty of care
- Bike setup
 - Accredited installer
- Participant recruitment & briefing
- Data collection
 - Regular download intervals
 - Face-to-face interviews
- Data analysis
 - Central communal data storage server



Study timescales



Activity	Scheduled worktime
Participant recruitment	July – August, 2010
Testing of equipment	July – August, 2010
Rider data collection	September, 2010 – May, 2011
Data coding and reduction	September, 2010 – May, 2011
Data analysis	June – July, 2011
Reporting	August – September, 2011

Partners who are taking part in NRS



Instrumented PTW's have been developed by:

- INRETS
- CEESAR
- UNIFI
- UoT
- TRL



The INRETS/CEESAR Databikes



Honda VFR 800



Honda CBF1000

Sensors mounted on bikes

- Throttle position
- 3-axis accelerometer
- 3-axis gyroscope (roll, pitch and yaw)
- Handle bar rotation
- Brake lever application
- Front and rear brake pressures
- Turn signal activations
- Synchronised video (forward & rider facing)
- GPS

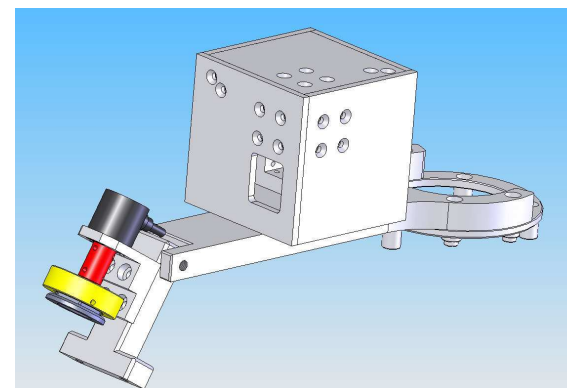
Plus:

- 2 additional side-view cameras
- Front & rear wheel speeds

The INRETS/CEESAR Databikes



The INRETS/CEESAR Databikes



The UNIFI databike



Piaggio Beverly Tourer 300



Sensors mounted on bike

- Throttle position
- 3-axis accelerometer
- 3-axis gyroscope (roll, pitch and yaw)
- Handle bar rotation
- Brake lever application
- Turn signal activations
- Synchronised video (forward & rider facing)
- GPS

Plus:

- Front and rear brake pressure sensors
- Front and rear wheel speeds

The UNIFI databike



BMW F650 Funduro



Sensors mounted on bike

- Throttle position
- 3-axis accelerometer
- 3-axis gyroscope (roll, pitch and yaw)
- Handle bar rotation
- Brake lever application
- Turn signal activations
- Synchronised video (forward & rider facing)
- GPS

The UoT / NTUA databike



The TRL databike



Honda CBR1000RR 'Fireblade'



Sensors mounted on bike

- Throttle position
- 3-axis accelerometer
- 3-axis gyroscope (roll, pitch and yaw)
- Handle bar rotation
- Brake lever application
- Turn signal activations
- Synchronised video (forward & rider facing)
- GPS

Plus:

- Front and rear brake pressures
- Engine speed
- Front and rear wheel speeds
- Front fork loading

The TRL databike



Sensor installation



Project completion to date



Country	Legal issues resolved	Ethical approval given	Sensors installed on bike	Bike certified as roadworthy
UK	✓	✓	✓	n/a
France	✓	x	✓	✓
Italy	✓	n/a	✓	n/a
Greece	✓	n/a	✓	✓

The purpose of the Naturalistic Riding Study



- To produce fundamental knowledge of PTW rider behaviour, performance and safety
- Understand the implications of riding alone and when interacting with other road users
- Inform and develop a broad and integrated package of countermeasures/public policies for improving the safety of PTW riders in Europe.

Thank you

Presented by Alistair Weare
On behalf of Dr Mark Chattington
Tel: +44 1344 77 0714
Email: mchattington@trl.co.uk