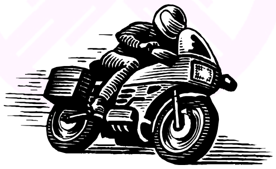
Effects of Alcohol on Motorcycle Riding Skills

Motorcycle Safety Research Session
Lifesavers Conference, April 1, 2009



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Background

- Approximately 35% of fatal motorcycle crashes are alcohol-related
- Run-off-road and loss-of-control crashes among drinking motorcyclists increase at a BAC of 0.05% (Ouellet & Kasantikul, 2006)
- Motorcycle riders frequently include alcohol in their recreational activities

Research Goals

- To quantify behavioral impairment of motorcycle riders in a test track setting when sober and at different BAC levels up to and including 0.08
  - Design a course representative of the skills required to operate a motorcycle in the real world
  - Obtain objective and subjective performance and impairment data

Research Methods

- Blood Alcohol Levels
  - Sober (placebo), 0.02, 0.05, 0.08
  - Subjects completed 3 of 4 levels
- 24 male subjects
  - Moderate drinkers
  - 21-50 years old
  - 5+ years riding experience
- Extensive practice given before completing experimental rides

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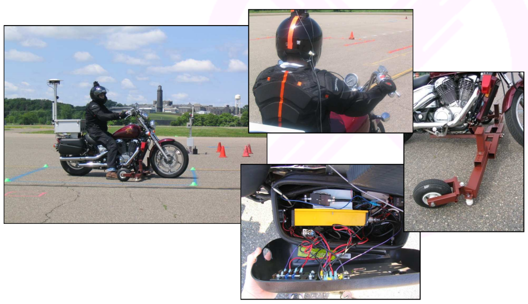
Research Motorcycle



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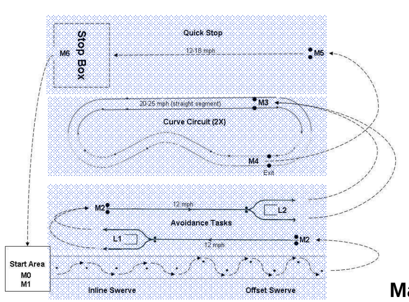
Test Track Course



Emergency Stop

Curve Negotiation

Hazard Avoidance

Control and Maneuverability

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Control & Maneuverability Results

- Riders avoided large steering maneuvers, likely to maintain stability and control of the motorcycle in **BAC 0.08** condition
- Riders hit or miss pylons more often in the **BAC 0.08** condition

Hazard Avoidance Results

- Riders had slower response times in the **BAC 0.05 & 0.08** conditions for near avoidance task
- Riders made more incorrect responses in the **BAC 0.08** condition (both tasks)
- Riders passed too closely to the obstacle, likely due to slowed responses, in the **BAC 0.05 & 0.08** conditions

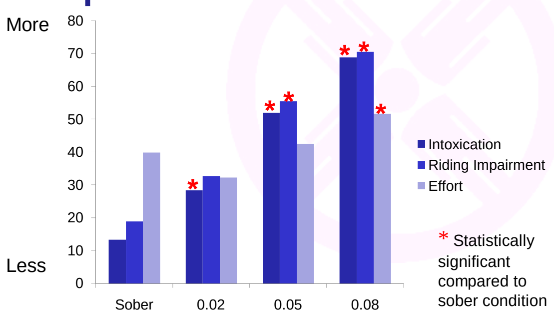
Curve Negotiation Results

- Riders had faster maximum speeds in the straight away for all alcohol conditions
  - **BAC 0.08 = 1.52 mph faster**
  - **BAC 0.05 = 1.74 mph faster**
  - **BAC 0.02 = 1.16 mph faster**
- Riders had trouble maintaining a consistent speed in the course in **all alcohol** conditions
- Riders had the most trouble staying inside the lane lines in the **BAC 0.08** condition

Emergency Stop Results

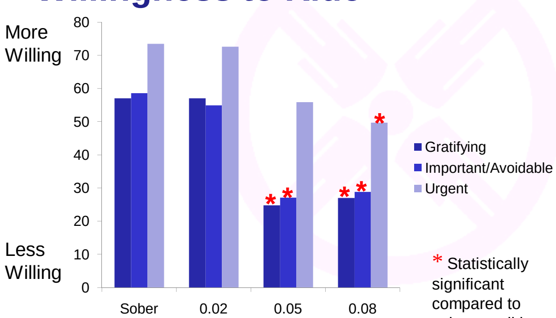
- Riders braked harder and faster to stop in all alcohol conditions, with the rate of deceleration being highest in the **BAC 0.05 & 0.08** conditions
- Riders had more trouble stopping in a straight line in the **BAC 0.05 & 0.08** conditions

Perceived Intoxication, Impairment & Effort



* Statistically significant compared to sober condition

Willingness to Ride



* Statistically significant compared to sober condition

Discussion

- Tasks requiring complex information processing with high time pressure and/or tight constraints showed the most impairment
  - Offset Weave
  - Near Hazard Avoidance Task
  - Curve Circuit
  - Emergency Stop

Discussion

- Certain decrements may correspond to increased rates of run-off-road and loss-of-control crashes seen in curves among drinking drivers, including those seen at 0.05% (Kasantikul & Ouellet, 2005 ; Ouellet & Kasantikul, 2006)
  - E.g., the higher speeds and increased lane variability in the curve circuit

Discussion

- Riders were able to identify when they are impaired and how it might affect their riding performance and willingness to ride
- Factors in the real world likely inhibit riders' desires to exercise this judgment (Syner & Vegega, 2001)

Conclusions

- Impaired riding performance was observable at BACs 0.05 and 0.08
- When combined with recent crash data, the results suggest motorcycle riders are at an increased risk of a crash at BACs between 0.05 and 0.08
- Although the effects seen in this study were small, the magnitude of effects would likely be larger in the real world

Acknowledgements

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- Thanks to Marv Levy, our contract monitor
- Report
  - Creaser, J.I., Ward, N.J., Rakauskas, M.E., Boer, E., Nardi, F. (2007). Effect of Alcohol on Motorcycle Riding Skills (Report DOT-HS-810-877). Washington, DC: USDOT.
  - Under the heading “Studies & Reports” http://www.nhtsa.dot.gov/portal/site/nhtsa/menuitem.d7975d55e8abbe089ca8e410dba046a0/

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