

Effectiveness of motorcycle antilock braking systems (ABS) in reducing fatal crashes

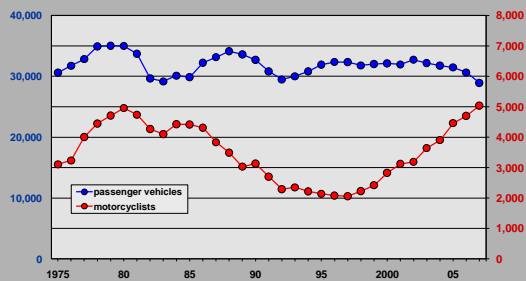
Lifesavers Conference, Nashville, TN, 2009

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Passenger vehicle occupant deaths and motorcyclist deaths 1975-2007



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Some risk factors

- ◆ Lack of vehicle passive safety systems (e.g. safety cage, crumple zone, restraints)
 - Motorcyclist deaths per mile traveled 35 times higher than for car occupants
- ◆ Low helmet use (influenced by lack of helmet laws)
- ◆ Risky driving (e.g. speeding, alcohol use)
- ◆ Type of motorcycle
- ◆ Improper braking
 - Wheel lock
 - Failure to adequately brake

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Motorcycle braking

- ◆ More complicated than automobile braking
 - Separate brake controls (typically)
 - Front brake – right hand lever
 - Rear brake – right foot pedal
 - Locking a wheel in hard braking results in loss of stability
- ◆ Improper braking is a common crash factor
- ◆ Rider training ineffective at reducing crashes

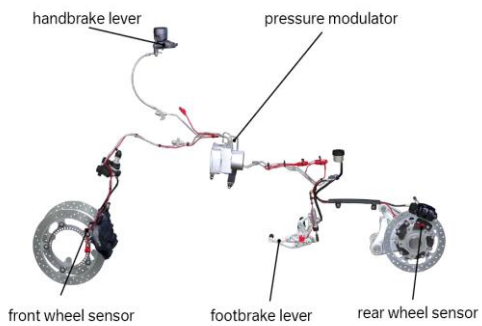
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Motorcycle antilock brakes

- ◆ Prevent wheels from locking during hard braking
 - Helps preserve stability
 - Reduces stopping distances of average drivers
- ◆ Increasingly available on new models as optional or standard equipment

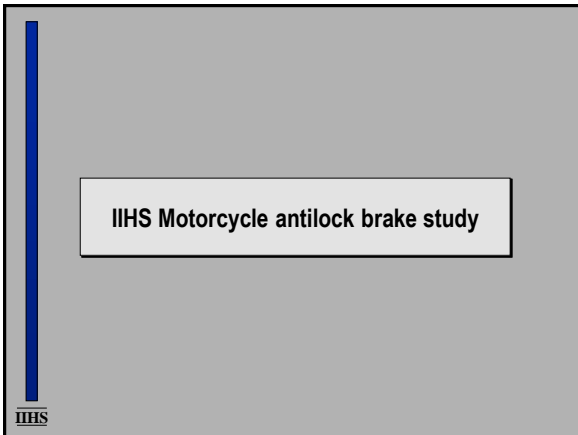
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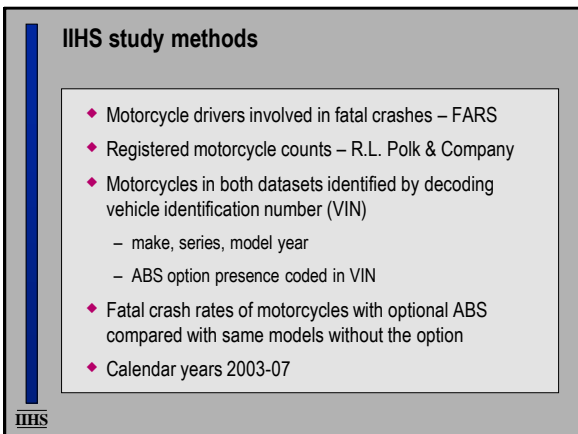
Anatomy of motorcycle antilock brakes



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Examples of motorcycles with optional antilocks



Yamaha FJR1300



Honda Silver Wing



Honda Gold Wing



Motorcycle models in IIHS antilock brake study

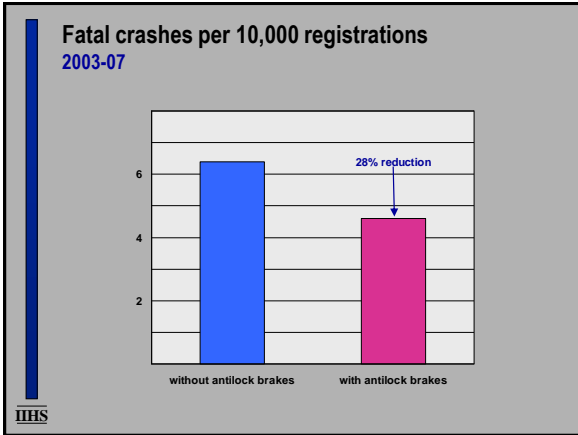
make	series	Class
Honda	Gold Wing	Touring
	Interceptor 800	Sport
	Reflex	Scooter
	Silver Wing	Scooter
	ST1300	Sport-touring
Suzuki	Bandit 1250	Standard
	Burgman 650	Scooter
	SV650	Unclad Sport
Triumph	Sprint ST	Sport
Yamaha	FJR1300	Sport-touring



Fatal crash involvements and registrations
 2003-07

	non-ABS models	ABS models
Drivers in fatal crashes	190	38
Registered vehicle years	311,058	81,789





HLDI Motorcycle antilock brake study

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Collision claims data

- ◆ **Collision coverage** covers crash damage to the insured person's own vehicle.
- ◆ **1 insured vehicle year** = 1 vehicle insured for 1 year = 2 vehicles each insured for 6 months = et cetera
- ◆ **Claim frequency** = average number of claims per 100 insured vehicle years
- ◆ **Claim severity** = average claim size (\$)
- ◆ **Collision losses** = $\text{claim frequency}/100 \times \text{claim severity}$
= average cost of providing 1 vehicle with 1 year of collision coverage

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HLDI study methods

- ◆ Based on collision coverage insurance records
- ◆ Sample size 72,475 insured vehicle years
- ◆ Motorcycles identified by decoding VIN
 - make, series, model year
 - optional ABS coded in VIN
- ◆ Analyses accounted for rated driver age and gender, motorcycle age, and registered vehicle density
- ◆ 2003-07 model years



Predicted effects on collision claim frequency 2003-07 models

ABS	
ABS vs non-ABS	19 percent lower
Vehicle age	
1 year older	23 percent lower
Rated Driver Age	
14-24 vs 25-39	79 percent higher
40-64 vs 25-39	13 percent lower
65+ vs 25-39	7 percent lower
Density (vehicles per square mile)	
0-99 vs 100-499	12 percent lower
500+ vs 100-499	13 percent higher
Gender	
Female vs male	19 percent lower
Series	
Highest vs lowest	365 percent higher



Predicted effects on collision claim severity 2003-07 models

ABS	
ABS vs non-ABS	2 percent lower
Vehicle age	
1 year older	6 percent lower
Rated Driver Age	
14-24 vs 25-39	19 percent higher
40-64 vs 25-39	6 percent higher
65+ vs 25-39	4 percent higher
Density (vehicles per square mile)	
0-99 vs 100-499	3 percent lower
500+ vs 100-499	6 percent higher
Gender	
Female vs male	3 percent higher
Series	
Highest vs lowest	298 percent higher

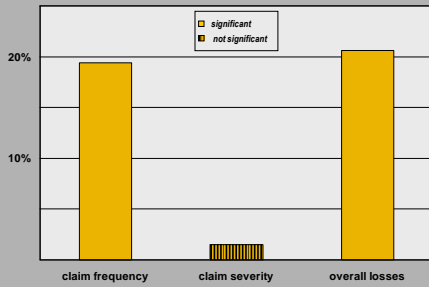


Predicted effects on overall collision losses
 2003-07 models

ABS	
ABS vs non-ABS	21 percent lower
Vehicle age	
1 year older	28 percent lower
Rated Driver Age	
14-24 vs 25-39	113 percent higher
40-64 vs 25-39	8 percent lower
65+ vs 25-39	3 percent lower
Density (vehicles per square mile)	
0-99 vs 100-499	15 percent lower
500+ vs 100-499	19 percent higher
Gender	
Female vs male	16 percent lower
Series	
Highest vs lowest	459 percent higher



Percent reduction in collision losses due to the presence of ABS option
 2003-07 models



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