

MOTORCYCLE BRAKES GTR – ACTION LIST ON 05 – 03 – 1 (AFTER 57/GRRF)

GTR Paragraph	Details of issue	Actions or Possible options	Comments	TC comments	Project leader
1.0 Scope	In the current text there is a sentence containing “..safe braking performance under normal and emergency riding conditions.” This is similar to the contents of FMVSS 135/ECE 13H but should it be included ?	Possible options: a. Delete this sentence b. Provide definitions of “safe” and “emergency ”	Also, is the contents of Scope sufficient ?		IMMA
1.0 Scope	The description of vehicle categories are taken from SR1 that is currently being developed in AC3 and not finalised.	Action: Monitor vehicle category development.			TC
1.0 Scope	The contrasting types of vehicles in use in Europe v N.America and other regions. This issue occurs throughout the GTR. For example, comparing 3 wheelers, in Europe, a typical 3-5 is a low speed utility vehicle using car type construction and brake system – panel drum brakes and single pedal actuation. In N.America, a 3-5 could be high powered trike using motorcycle construction and single brake systems.	Action Discuss at the next GTR meeting.	This issue applies in some part to all tests in the GTR This general issue has been highlighted in a letter from TC to IMMA.		TC
1.0 Scope	The GTR currently includes vehicles with a minimum vehicle Vmax of 25 km/h. Acceptable?	Options: a. 25 km/h as ECE Reg 78 b. Another value		TC flexible, can agree to option a., $V_{max} \geq 25$	TC
3.1.3 Brake System Requirements	This section covers 3 wheelers only and is based on the ECE text but with a modification from TC to include eg. N.American vehicles. Acceptable?	Action: GTR Group to consider current text.			TC
3.1.5 Master cylinder reservoir	NHTSA suggest that there is a statement on reservoir capacity in the GTR.	Possible option Extract from ECE 13H section 5.2.12	Group to agree this minor addition at the next meeting.		NHTSA
3.1.6 SSB warning lamp	In the current text, the words “clearly visible to the rider” are included. This is not definable.	Options: a. Prepare a definition b. Modify the text	All the text in this paragraph should be checked.	Suggest “in clear view of the rider”, as per FMVSS	NHTSA

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3.1.7 ABS warning lamp	Same general issue as for SSB lamp plus confirmation of what the lamp is checking for.	Options: a. Text as in current document b. "...whenever there is a malfunction that affects the generation of transmission of response or control signals in the vehicle's antilock brake system."	Group to decide at next meeting.		NHTSA
3.2 Brake System General Operation.	This section gives a general description of the layout of the overall brake system. Included in ECE 13H etc. TC wish to review the content.	Action: General review of this section of the GTR at the next meeting.		TC can accept as is.	TC
3.2.3 Parking brake system	The text states that the parking brake be applied by "solely mechanical means" and "in the absence of the driver". Acceptable? TC say must be held in position by mechanical means. NHTSA want with driver.	Action Review this paragraph at next meeting.		TC can accept as is.	TC
3.3.2 friction material thickness	For checking drum lining thickness, the text states that "a pointer device designed for that purpose" is written.	Action Group to confirm text at next meeting		TC can accept as is.	TC
4 Tests	To ensure reasonable repeatability, all parameters should have a tolerance eg. speed, control force	Action NHTSA/TC to provide proposal	Correction factors required?	Propose range when specifying baseline deceleration, in 4.6.3 and 4.7.3.1	NHTSA
4.1.1. Test surface friction	At GRRF meeting, it was confirmed that any values specified could only be approximate due to many variable eg. tyres, weather. Similarly, it was not necessary to specify the method of measurement.	Option Use text from Car GTR "the surface shall have an adhesion coefficient (PFC) ≥ 0.85 unless specified otherwise.	Group to discuss at next meeting		NHTSA

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4.1.4 Test speed	For vehicles that are unable to reach the specified test speed, it would be convenient to have a standard requirement of 0.8 or 0.9 Vmax. For some tests and models, it may require a long track to reach 0.9 Vmax and so manufacturers would prefer 0.8V max throughout.	Action Group to discuss the use of 0.8Vmax throughout GTR at next meeting.	Also applies to 4.4.2, 4.5.2, 4.9.5.1 Also applies to 4.2.5 burnish, 4.3.2, etc. wherever a vehicle initial speed is specified.	Unless clear benefit, suggest maintain initial parameters of existing adopted requirements ... no additional justification required.	IMMA
4.1.5 Auto transmission	NHTSA wish to include the sentence “If an auto transmission has a neutral” currently written into the text.	Action: IMMA to check if this relevant		TC can accept.	NHTSA
4.2.3 Control lever application point	NHTSA have proposed a clearer way of defining the front force application point based on measurement from the end of the handgrip instead of lever end – see current text for details.	Action: Group to confirm the proposal at the next meeting.	Group must ensure that the currently specified input force values in the GTR are comparable when the new proposed method is used.	30 mm from end of handgrip may not be sufficient due to lever length, lever location at rest (lever angle to the handle grip) and handgrip designs. As such, force may be	NHTSA

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				applied on lever “ball” or may miss the lever completely. Suggest 50 mm from end of handle grip or measure from lever end as opposed to handle grip end, similar to ECE R60.	
4.2.4 Brake temp measurement	To date, the GTR has included 2 methods of measurement – a. Rubbing thermocouple on disc or drum surface b. Thermocouple embedded in friction material. a and b are not comparable, a is considered to have certain advantages, but b has been convention in NA. NHTSA now state that a. could be standardised.	Actions prior to next meeting - IMMA to provide NHTSA with information on the installation of rubbing thermocouples etc.. - NHTSA to consider .	Discuss at next meeting. More detail eg drgs required in text.	Neither method is perfect. Rubbing thermocouple have issues with installation and read higher temperature due to self-heating. If accepted, should IBT be revised to account for self-heating? No issue with	IMMA

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				installation of plug type thermocouple in North-America.	
4.3.2 Dry Stop Test IBT	NHTSA proposes an IBT of $\geq 55^{\circ}$ - $\leq 100^{\circ}$ C for all performance tests whilst IMMA states that $\leq 100^{\circ}$ C is acceptable stating that the min. temp. inclusion does not affect brake performance results and adds time and complexity to the testing.	Action - IMMA has carried out a series of tests with a range of motorcycles and has presented the data to NHTSA/TC. - NHTSA/TC to study the data and report back to the Group.	Applies also to 4.4.2, 4.5.2, 4.7.2.2, 4.7.3.1, 4.8.2, 4.9.3.1	Some IMMA test results show braking distance varies with IBT. In others, IBT from 0 to 100 seems to have no effect on brake performance. Prefer narrower temp. range to minimize variables / assure more consistent, comparable, repeatable results.	IMMA

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4.3.3 Dry Stop Test – single brake control activated Performance Requirements	TC wish to add a note “ If both braking devices are CBS, the manufacture must specify which is the dominant brake and which the secondary brake”	Action: Group to review this proposal and report	Discuss at next meeting	Remove request. This information is only for certification verification and compliance testing, and is not a performance requirement. Thus should not be part of this regulation.	TC
	TC wish to include s. distance/MFDD requirements for split service brake systems in the table and suggest they should be the same values as for CBS.	Options: a. Same brake performance as CBS b. Other values	Group to consider at next meeting	Agree with option a.	TC
	TC wishes to add performance requirement for category 3-5 vehicles equipped with independent service brake systems.	Options: a) Same performance requirements as for category 3-3. b) Other values.	Group to consider at next meeting	Agree with option a. Category 3-3 and 3-5 have to meet same performance requirements in U.S. and Canada.	TC
4.4.2 Dry Stop test – all brakes Minimum test speed	Currently the value is 45 km/h for this test but this is under review. NHTSA suggest 25 km/h in line with FMVSS 122	Action: Group to review minimum speed for this test		TC requires this test to minimum speed of 25 km/h. Cannot	TC

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				relax present level of stringency, unless demonstrated to be obsolete or no longer applicable. Include options in the gtr?	
4.4.2 Brake actuation force	Current values are based on FMVSS 122 : Hand \leq 250N Foot \leq 400N (500N for 3-5 vehicles) NHTSA propose that these are reduced to align with test 4.3 ie. Hand \leq 200N Foot \leq 350N (500N for 3-5)	Action: Group to consider the 2 options		TC could accept either. The force application location may have a greater effect than the force itself.	IMMA
4.4.3 Dry Stop Test – all brake controls activated. Performance Requirements	This test is taken from FMVSS 122 and converting the stopping distance requirement to MFDD produces an unexpectedly high figure of 7.6 m/s ²	Action Group to discuss at next meeting.		Present requirement in North-America. TC can accept.	IMMA
	At present, this test is applicable to all vehicle types. This should be reviewed based on the general comments made regarding categories in 1.0 Scope in this paper.	Options: a. Modify text or test procedure b. Include power/weight ratio c. Exempt certain vehicles.	Group to discuss at next meeting.	Present requirement in N-A. TC can accept as is.	IMMA
4.5.1 High speed test Categories	At present, this test applicable to 3-3, 3-4, and 3-5 vehicle types. Is this satisfactory ?	Action Group to discuss at next meeting.		TC can accept.	IMMA

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4.5.2 High speed test Minimum speed	TC propose 100 km/h instead of original 80 to prevent overlap with test 4.4.	Action Group to confirm at next meeting			TC
4.6.1 Wet brake test - brake types	GTR text states that all brake types must be tested. For ECE Reg 78, category 3-5 vehicles are exempt because in Europe these are typically “car type vehicles” with panel type drum brakes. Wet brake tests are not included in car regulations. N.American trikes are 3-5 vehicles and can have exposed disc brakes that should be wet tested. How to deal with ?	Possible option: - Test all vehicle types but exempt car type drum brakes (panel brake) Propose a definition of panel brake.	Discuss at next meeting	It was agreed that drum brakes for all other vehicle categories must be tested, in the event there is water penetration. It might be difficult to substantiate exemption of the panel (i.e. drum) brake for category 3-5 only. Support testing all brakes, all categories.	IMMA
4.6.2 Wet brake test - CBS laden test	When CBS fitted, ECE (and GTR) states that it should be tested laden and unladen. The unladen test is more severe for CBS due to lower brake forces to cut through the water film etc. so review the need for the laden test.	Action Discuss at next meeting.		Is there a rational for laden and unladen tests for CBS brakes.	TC

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4.6.3 Wet brake baseline test	The text currently states “....measure the brake control force that will produce an average vehicle deceleration of 2.5 m/s ² ” It will require more than 1 stop to produce a robust value. Further instructions may also be necessary to assist the tester.	Possible option: Modify the definition of Baseline to specify the no. of stops to arrive at a repeatable value eg. 6 max., 3 min.	Group to comment on this proposal and the complete paragraph. Also applies to 4.7.2 – Heat Fade baseline. See new “Baseline” definition.	Propose a range, as it is impossible to obtain exactly 2.5 m/s ² . JSS uses 2.5 to 3.0 m/s ² . Also suggest FMVSS method whereby the control force is based on the average of 3 stops.	IMMA
4.7.3.1 Heat Fade heating procedure	These 10 stops are performed with a constant control force that gives 3 m/s ² for the first stop. It is difficult to achieve both constant control force and constant deceleration.	Options: a. Use constant decel. but modulate control force. (but what is used for the remaining stops?) b. Do a pre test to find a constant force that gives an average decel of 3 m/s ²	Group to discuss this and other possible options.	Propose a range, as it is impossible to obtain exactly 3.0 m/s ² . JSS uses 3.0 to 3.5 m/s ² .	NHTSA
4.7.2.2 Heat Fade Test conditions and procedures	Should this test also apply to category 3-1 and 3-2 vehicles	Group to discuss at next meeting	All category 3 vehicles must pass this test in Canada	Required for Canada	TC
4.8.2 Parking brake test – actuation forces	NHTSA are concerned that the specified forces of 400N hand and 500N foot may be too high and wants the group to consider reducing the forces to those as for performance tests ie. 250/400N.	Discuss at next meeting	Note that car regs FMVSS 135 specify 400N hand/500N foot		NHTSA
Servo failure test	Not in GTR at present. Consider the need for a new test following information from UK.	Discuss at next meeting.			IMMA

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4.9 ABS tests	In general the content of this section requires review	Discuss at next meeting			NHTSA
4.9.1 ABS tests – list of tests	NHTSA believe complete stops on high and low friction surfaces (a,b) are not required due to duplication.	Discuss at next meeting	Stops a+b are the only ones carried out from the test speed down to standstill. All the others are check stops or snubs.	Should have a test which verifies ABS operation down to standstill, on high and low friction surfaces	NHTSA
4.9.1 EMF tests	NHTSA require a specific test procedure	Options: a. ECE R10 b. Manufacturers data	Discuss at next meeting		NHTSA
4.9.3.2 ABS High friction stops	At 57/GRRF, UK was concerned that the ABS tests did not include any measurement of stopping performance. It was agreed that the Group would consider this	Possible option: For the tests on the high friction surface, the stopping distance shall be \leq or MFDD shall be \geq the values for the relevant part of Dry Stop – single brake control activated table in 4.3.3.	Should not be necessary to measure stopping performance on low friction surface as there is nothing to compare with and not so important as on high friction.	Agree with the option to meet the requirements in 4.3.3 for single brake control. Suggest also requirement in 4.4.3 (all service brake controls activated) if ABS on front and rear wheels. If available, would also support low	IMMA

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				friction surface performance requirements, as ABS operation will likely be more frequent on such surfaces.	
4.9.5.1 ABS check stops	A note is included in the text stating that the test may be terminated when the speed has fallen by 20 km/h.	Action Group to discuss	Also applies to 4.9.6.1	Could agree if full ABS stops are conducted elsewhere, on high and low friction surfaces.	IMMA
4.9.6.1 Wheel lock check	Editorial: Revise test speed per Reg78, which states: "passage from one surface to the other is made at (about) 0.5 Vmax not exceeding 50 km/h."	Action Group to discuss	Also applies to 4.9.7.1		
4.9.7.2 ABS low to high friction check	How to check that the system responds correctly to the increase in surface friction?	Option: Prescribe that the vehicle decel rises to the MFDD value for the Dry Stop table 4.3.3 in X secs.	Group to discuss at next meeting.	Time limit (or other parameter) necessary for performance measurement	IMMA
4.10 Partial failure test	As originally agreed, the text was based on "the remaining sub system having to meet the relevant Dry Stop- single brake control activated test requirement".	Action Group to consider the TC proposal Assume unladen test.	Note the inconsistencies between the proposed vehicle deceleration	Present requirement in N-A.	TC

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	TC propose that the text is based on FMVSS S7.8.2 Partial service brake system test, which is included in the current text		and the Dry stop test – single brake control actuated figures.		
Definitions-ABS	NHTSA have proposed an alternative to that which is in the text as follows: A portion of the service brake system that automatically controls the degree of rotational slip during braking by 1) sensing the rate of angular rotation of the wheels; 2) transmitting signals regarding the rate of wheel angular rotation to a controlling device that interprets those signals and generates responsive controlling output signals; and 3) transmitting those control signals to a modulator device which adjusts brake actuating forces in response to those signals.	Action Group to agree whether to use this new proposal or that which already in the document.			NHTSA
Definitions-V max	New proposal from NHTSA	Action Group to review	See definition in text		NHTSA
Definitions-PFC	In the light of a less specific method of measuring surface friction, should this definition be changed?	Action Group to review		Propose acceptable method(s) be referenced / specified.	NHTSA
Definitions-Laden	SR1 definition is “Gross vehicle mass” which is the maximum mass of the fully laden vehicle based on its construction and design performances, as declared by the manufacture.	Action Group to review	? Change text from “laden” to “Gross vehicle mass” throughout	Agree	IMMA
Definitions-Unladen	SR1 definition is “Mass in running order” which is the sum of the nominal mass of the complete vehicle (As determined by SR1) and the driver’s mass.	Action Group to review	? Change text from “unladen” to “Mass in running order” through.	Specify that additional mass of rider and test equipment does not exceed 90 kg	IMMA

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				(FMVSS origin). On category 3-1 and 3-2, this may exceed the vehicle gross vehicle mass. In this case there is no need to test laden and unladen.	