Result of GTRBR's exchange on India's comments on the Brakes GTR - 06/06/06-07

	Item No. of Section of B of Inf. doc 59-24	Proposed amendment	Discussion conclusion At Washington meeting
1.	**1.**	Insert the following in the Scope: "This GTR does not cover additional requirements for braking system fitted with electrical regenerative braking system"	**Agreed: Add to Preamble, not necessary in GTR text**
2.	**2.18**	"Split service brake system (SSBS)" means a brake system that actuates the brakes on all wheels, consisting of two or more subsystems actuated by a single control, ***which may act on selected wheel(s) or all wheels***, designed so that a single failure in any subsystem (such as a leakage type failure of a hydraulic subsystem) does not impair the operation of any other subsystem.	**Agreed: the text does not need to be modified, because the type of system which gave rise to the Indian comment is covered by CBS.**
3.	**2.19**	"Stopping distance" means the distance travelled by the vehicle from the point of application of the control to the point at which the vehicle reaches a full stop. ***When tests are conducted with simultaneous application of two controls the control applied first is considered as the moment of application of the control.***	**Agreed: this should be included for clarification**
4.	**2.20**	"Test speed" means the vehicle speed measured at the moment of application of the brake control(s). ***When tests are conducted with simultaneous application of two controls, the control applied first is considered as the moment of application of the control.***	**Agreed: this should be included for clarification**
5.	**2.22**	"Vmax" means the speed attainable ~~by accelerating at a maximum rate from a standing start for a distance of 1.6 km on a level surface~~, ***when tested as per procedure given in ISO 7117,*** with the vehicle lightly loaded.	The ISO test, like the similar EU test, stabilises the motorcycle in top gear, prior to the speed being measured over a 200m strip. Experience shows that this is a more repeatable procedure, because it avoids the variations inherent in gear-changing. At the practical level, it enables the test to be done on a shorter test track for most

			motorcycles. **Agreed: Either the ISO or the EU method should be included in the text, as both are more repeatable than the present text. The Informal group should agree which text to use.** **Needs further thought, review before 19 June**
6.	New clause for definition	***" Vehicle average deceleration " means the deceleration over the stopping distance , in metres calculated as under.*** ***$d_a = V^2/2S$;*** ***where V = test speed in m/s.*** ***S = stopping distance in metres*** ***d_a = vehicle average deceleration , in m/s².***	This was a problem of understanding the practical requirement. After the discussion. **Agreed: A new definition is not necessary. ARAI's recommendation is now to use the term "instantaneous deceleration" in the final GTR text in relation to the burnishing procedure, the wet test and the heating procedure, as it gives a better understanding of how the deceleration should be measured.** **Agreed: solved by the new text in 3.3.3**
7.	3.1.10. a	".....the fluid level is visible for checking without removal of the cover. ***A single reservoir with partition for each sub-system with a sealed cover is permissible provided the requirements of (b) and (c) above are met for each subsystem. "***	This additional wording covers a design which has two separate reservoirs but one filling cap, which is quite common for cars in general and 3-wheelers in India, in particular. **Agreed: because there was no connection between the two reservoirs, and the other requirements still have to be met, the text should be included.** **Agreed. Leave the text but explain the point in the Preamble**
8.	3.1.11. (a)	Vehicles that are equipped with a split service brake system shall be fitted with a red warning lamp, that is mounted in ***the rider's*** view and which shall be activated, when there is a hydraulic failure on the application of a force of ≤ 90 N on the control,	

	(b)	without actuation of the brake control, when the brake fluid level in the master cylinder reservoir falls below the greater of: (1) the level specified by the manufacturer; and (2) the level less than or equal to half of the fluid reservoir capacity.	This double requirement goes further than the equivalent cars in FMVSS 135 § S 5.5.1 (a) (which gives 3 alternative conditions from which the manufacturer may choose). The requirement also goes beyond the present Indian Regulation for 3-wheelers. In addition, § 4.3.2 of the draft car GTR specifically refers to two alternatives for this issue. **Agreed: for the larger of the 3-wheeler categories, the Indian proposal was appropriate.** **Don't change the text, but India will allow this at national level**
	(c)	***In the case of vehicles of category 3-4, the warning lamp may be activated whenever either of the conditions given in (a) or (b) above occur, (chosen at the option of the manufacturer)***	
9.	3.3.3.	Continuous Deceleration Recording: For tests such as the **burnishing procedure**, the Wet Brake and Heat Fade – Heating Procedure, there is a continuous recording of the **instantaneous** vehicle deceleration from the point where the brake control is applied until the end of the stop.	**Agreed: the additional wording would clarify the point raised under point 6 above.** **Agreed: change the para to say "**For the burnishing procedure and tests…."
10.	4.2.5	Burnishing procedure : The vehicle brakes must be burnished prior to evaluating performance. This procedure may be completed by the manufacturer. - Vehicle lightly loaded. - Engine disconnected. - Test speed :	**Agreed: the comments were based on a misunderstanding of the text, which has been clarified by the amendments to § 3.3.3, (see Point 9 above). No changes are needed.**

		Initial speed : ≥ 50 km/h for vehicle categories 3-3, 3-4, and 3-5. ≥ 0.8 Vmax for vehicle categories 3-1and 3-2. Final speed = 5 to 10km/h. - Brake application : Each service brake system control applied separately for vehicles with two controls. - Vehicle average deceleration : Single front brake system only : ~~3.0-3.5 m/s2 for vehicle categories 3 - 3, 3 -4 and 3 - 5.~~ 2.5 - 3.0 m/s2 for vehicle categories 3 –3. 2.0 - 2.5 m/s2 for vehicle category 3 – 5. 1.5 - 2.0 m/s2 for vehicle categories 3 –1 and 3 – 2. Single rear brake system only : 1.5 – 2.0 m/s^2 CBS or split service brake system : 2.7 – 3.2 m/s^2 ***for catogories 3-1 and 3-2*** ***3.2 – 3.7 m/s2 for catogories 3-3 and 3-4*** ***3.5 – 4.0 m/s2 for catogories 3-5.*** - Number of decelerations : 100 per brake system. - Initial brake temperature before each application ≤ 100 ° C - For the first stop, accelerate the vehicle to the initial speed and then actuate the brake control under the conditions specified until the final speed is reached. Then reaccelerate the initial speed and maintain that speed until the brake temperature falls to the specified initial value. When these conditions are met, reapply the brake control as specified. Repeat this procedure	

		for the number of specified decelerations.	
11.	4.4.	4.4 Dry Stop Test – all service brake controls actuated [as originally – not parking] 4.4.1 Vehicle condition: - The test is applicable to vehicle categories 3-3, ~~3-4~~ and 3-5, ***with a Vmax greater than 50 km/h*** - Lightly loaded. - Engine disconnected 4.4.2. Test conditions and procedure - Initial brake temperature: ≥ 55 °C and ≤ 100 °C. - Test speed: 100 km/h or 0.9 Vmax, whichever is the lower. - Brake application : Simultaneous application of both service brake system controls, ~~if so equipped, or of the single service brake control in the case of a service brake system that operates on all wheels~~. - Brake actuation force: Hand control: ≤ 250 N Foot control: ≤ 400 N for vehicle categories 3-3 and 3-5 ≤ 500 N for vehicle category 3-4 - Number of stops : until the vehicle meets the performance requirements, with a maximum of 6 stops - For each stop, accelerate the vehicle to the test speed and then apply the brake controls under the conditions specified in this paragraph.	**There are several points related to this test which need consideration.** 1) There are some 3-3 (motorcycles) with a Vmax which is below 50 km/h but with an engine capacity above 50cc. **Agreed: like mopeds, these vehicles should be excluded from this test.** **Agreed: leave this to national implementation** 2) ARAI's second point is that CBS/SSBS vehicles already have to be tested in the lightly-loaded condition in § 4.3. For the 3-4 category this means a very small variation in the test speed (i.e. 10 km/h max), which ARAI regards as insufficient for requiring an additional test. **Agreed: delete category 3-4 from this test.** 3) As explained in 15-GTRBR-06, ARAI considers the performance requirements to be inappropriate for the different classes of vehicle; in particular, the requirement under a) to be more severe than for b). **Agreed: this issue needed to be discussed by Indian and USA experts, in order to clarify the requirements, and then by the Informal group to reach a suitable solution.** **(Indian experts have taken note of the meeting planned for 2006/06/06-07)**

		4.4.3. Performance requirements : When the brakes are tested in accordance with the test procedure set out in paragraph 4.4.2, the stopping distance (S) shall be: ~~(a) For test speeds < 80.5 km/h, S ≤ 0.0055 V^2~~ ~~(b) For test speeds ≥ 80.5 km/h, S ≤ 0.0060 V^2~~ ~~(where V is the specified test speed in km/h and S is the required stopping~~ distance in ~~metres)~~ ***(a) S ≤ 0.1V + 0.0067V2 for vehicle with VMax ≤ 125 km/h*** ***(b) S ≤ 0.0060 V2 for vehicle with VMax > 125 km/h***	
12.	4.6.3.1	In the first bullet, change "vehicle deceleration of 2.5 – 3.0 m/s2" to "vehicle ***average*** deceleration of 2.5 – 3.0 m/s2"	**Agreed: this point had been dealt with under points 6 and 9 above, no change is needed.**
13.	4.7.3.2	In the fourth bullet, change "vehicle deceleration of 3.0 – 3.5 m/s2" to "vehicle ***average*** deceleration of 3.0 – 3.5 m/s2"	**Agreed: this point had been dealt with under points 6 and 9 above, no change is needed.**