

Transmitted by the expert from India

Informal document GRRF-76-32
(76th GRRF, 17–21 February 2014
agenda item 5(a) and 5(b))

(Changes proposed in ECE/TRANS/WP.29/GRRF/2014/4 and /5 are retained in the same.)

Deletions in proposed clauses and original GTR are double scored ~~like this~~, and additions are in this *this font*)

India's Comments on ECE/TRANS/WP.29/GRRF/2014/4 and /5

General:

India supports the purpose of the amendment to provide same safety in the case of a failure in CBS as that of the conventional system of the two independent brakes for two wheelers. India also appreciates the fact that at the time of preparation of GTR, the full understanding of the possible architectures of CBS was not available.

However, using the very useful and elaborate technical information provided by Expert from Italy and IMMA, and comparing with the existing text in the GTR, India feels that some changes are required in the existing texts of related clauses in the current GTR 3 and R78.

In addition, the architectures considered for developing this amendment are based on those of two wheelers. In the case of three wheelers of category 3-5, the architecture will resemble more towards four wheeler systems rather than two wheeler systems. In the case of 3-2, the architecture could be either like a four wheeler or a two wheeler.

Moreover, in the case 3-5, the two independent braking systems are not permitted as a general option. The secondary brake option of using of parking brake is also provided.

Hence India feels that more detailed study needs to be done in the case of 3 wheelers. Hence it is proposed that the amendment may be finalized for two wheelers.. Similar exercise can be taken up for three wheelers. If GRRF so desires, India can initiate the action for similar changes for 3 wheelers. Moreover the proposed amendments for two wheelers may not be delayed waiting for the ones for three wheelers.

Since this amendment is a positive step for addressing the safety concerns of two wheelers and need not wait for similar improvements in the case of three wheelers.

The changes proposed in the text of the amendment are elaborated below, along with the justifications are given in Annex A and B in GRRF/2014/4 and GRRF/2014/5 respectively.

Annex A. Details comment from India on ECE/TRANS/WP.29/GRRF/2014/4:

Sl. No	Para ref number	May be modified as	Justification
1	3.1.5. of GTR 3	<p>Two-wheeled vehicles of categories 3-1 and 3-3 shall be equipped with either:</p> <p>(a) Two separate service brake systems, or a split service brake system, with at least one brake operating on the front wheel and at least one brake operating on the rear wheel; or</p> <p>(b) <i>A CBS (which may be a split service brake system) and a brake system with independent control and transmission acting atleast on one of the wheels.</i></p>	<p>The proposed reformulation is to take care of the following aspects.</p> <ol style="list-style-type: none"> 1. The architecture of the two separate independent system is Architecture A shown in -GRRF-2014-04. 2. However, the text for requirement for two independent system that each system may work on <u>atleast</u> one front wheel and on <u>atleast</u> on the rear wheel is taken from the time when there was no clarity on CBS. The use of “expression “atleast” could be misunderstood as Architectures B and C can also be considered as independent brakes, which is not the intention. It has to be made very clear that when a single control actuates brakes on two wheels, then only it can be treated as CBS. 3. Architecture B and C have an independent system operating on the front wheel. Variant of Architecture B and C could also be the CBS being operated by the right hand control, in which case the independent brake will operated by the left hand lever or the foot pedal will be operating the rear wheel brake. Hence the fitment of such an independent system is a must now. Hence it is desirable that this requirement is clearly specified upfront for proper clarity 4. The primary intention is to specify the CBS, which some contracting parties (e.g. EU) is planning to mandate in their regions. A split service brake system (SSBS) (as defined in item 2.16 of GTR 3) is possible with CBS only, whereas CBS is possible with/without a split service brake system. <ul style="list-style-type: none"> • For example in Architecture B or C, • If it is mechanical transmission, failure of any one cable would not affect the performance of the other brake. Hence Split service brake system is not necessary. • But in the case of hydraulic transmission, if one the hoses or seal in front brake cylinder fails, it will not be possible to apply front or rear brake, unless the CBS is split. <p>Hence the need of split service brake system depends on the brake design and hence the option has to be retained</p>

Sl. No	Para ref number	May be modified as	Justification						
2	3.1.9 of GTR 3, as proposed vide GRRF 2014/4	In where two separate service brake systems are installed, <i>vehicles of categories 3-1 and 3-3 with CBS, the CBS and the other independent brake system</i> the systems may share a common brake, if a failure in one system does not affect the performance of the other a common transmission, or both if the requirements of paragraph 4.12 are met."	<ol style="list-style-type: none"> 1. The failure condition requirements are applicable only in the case of CBS. In the two independent systems now elaborated in the proposed paragraph 3.1.5(a), the question of sharing a common brake or transmission or both does not arise. 2. Moreover, the expression used in 4.12 is CBS failure test. 3. Paragraph 4.12 specifically explains the requirements to be met elaborately, in case of a failure. It is suggested that repeating this phrase "if a failure in one system----of the other" leads to redundancy 						
3	4.3.1 (b) of GTR 3	Laden: For vehicles fitted with CBS and split service brake systems; the vehicle is tested in the lightly loaded condition in addition to the laden condition;	As suggested above, the CBS architecture may or may not be split. It is felt that testing in the lightly loaded condition should be made applicable for all CBS.						
4	Last 2 rows of table after 4.3.3 of GTR 3	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td colspan="3">Vehicles with CBS – secondary service brake systems:</td> </tr> <tr> <td>All 3-2 & 3-5</td> <td>$S \leq 0.1 V + 0.0154 V^2$</td> <td>$\geq 2.5 m/s^2$</td> </tr> </table>	Vehicles with CBS – secondary service brake systems:			All 3-2 & 3-5	$S \leq 0.1 V + 0.0154 V^2$	$\geq 2.5 m/s^2$	With the amendments proposed, the function of secondary service brake systems becomes redundant for two wheelers. Hence this requirement may be retained only for 3 wheelers, i.e. class 3-2 and 3-5.
Vehicles with CBS – secondary service brake systems:									
All 3-2 & 3-5	$S \leq 0.1 V + 0.0154 V^2$	$\geq 2.5 m/s^2$							
5	4.4.2(c) of GTR 3	Brake application: <ol style="list-style-type: none"> (a) <i>In the case of Category 3-1 & 3-3; Simultaneous actuation of both service brake system controls:</i> (b) <i>In the cases of 3-2 and 3-5</i> Simultaneous actuation of both service brake system controls, if so equipped, or of the single service brake system control in the case of a service brake system that operates on all wheels.	With proposed changes, two independent controls have become mandatory for two wheelers.						

Sl. No	Para ref number	May be modified as	Justification
6	4.5.2 (c) of GTR 3	Brake application: <i>(a) In the case of Category 3-1, 3-3 & 3-4; Simultaneous actuation of both service brake system controls:</i> <i>(b) In the cases of 3-2 and 3-5</i> Simultaneous actuation of both service brake system controls, if so equipped, or of the single service brake system control in the case of a service brake system that operates on all wheels	With proposed changes, two independent controls have become mandatory for two wheelers.
7	4.9.3.1 (c) of GTR 3	Brake application: <i>(a) In the case of Category 3-1, 3-3 & 3-4; Simultaneous actuation of both service brake system controls:</i> <i>(b) In the cases of 3-2 and 3-5</i> Simultaneous actuation of both service brake system controls, if so equipped, or of the single service brake system control in the case of a service brake system that operates on all wheels	With proposed changes, two independent controls have become mandatory for two wheelers.
8	4.12.1(a) as proposed vide GRRF 2014/4	This test will only apply to vehicles fitted with CBS of which the separate service brake systems share a common brake, a common transmission or both;	No change
9	4.12.1. (b) as proposed vide GRRF 2014/4	The test is to confirm the performance of the service brake systems in the event of a common: <ul style="list-style-type: none"> • hydraulic hose, or • <i>hydraulic seals</i> • or mechanical cable failure <i>causing a complete loss of braking in the portion of the system which is shared;</i> Only one failure shall be considered at a time	<ol style="list-style-type: none"> 1. Hydraulic seals are considered to be prone to failure in ECE R 13, R13H. R78-03 also had the same consideration. 2. The portion “causing a complete loss of braking in the portion of the system which is shared;” which now appears in 4.12.2.(a) is repositioned to para to give the failure conditions on one place, instead they are appearing in two separate clauses. 3. It is necessary to consider only one failure at a time, as is being followed in the case ECE R13 and ECE R13H.

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10	4.12.2 (a) as proposed vide GRRF 2014/4	Alter the brake system to produce a failure described in 4.12.1 (b) a hydraulic hose or mechanical cable type failure causing a complete loss of braking in the portion of the system which is shared;	<ol style="list-style-type: none"> 1. Consequential to India proposal to 4.12.1.(b) 2. Avoids duplication of the failure requirements
11	4.12.2 (b) as proposed vide GRRF 2014/4	<p>Perform the dry stop test specified in section 4.3, following the requirements specified therein, except that:</p> <p><i>(i) Only apply the control for the service brake system not affected by the simulated failure.</i></p> <p><i>(ii) Test shall be done in laden condition.</i></p> <p><i>(iii) Tests with applying the control for the service brake system not affected by the simulated failure only need to be done</i></p> <p>Other conditions to be observed are in paragraphs 4.3.1. (e) and 4.3.2. (a), (b), (d), (e) and (f). Instead of the provisions in section 4.3.2. (e), only apply the control for the service brake system not affected by the simulated failure</p>	Instead of giving cross reference to unchanged conditions, it is better to indicate only the changes. This will avoid duplication and simplify if any additional test conditions are added in 4.3
12	4.12.3. as proposed vide GRRF 2014/4	When the brakes are tested in accordance with the test procedure set out in paragraph 4.12.2., the stopping distance shall be as specified in column 2 or the MFDD shall be as specified in column 3 of the following table:	

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13	Table after 4.12.3. as proposed vide GRRF 2014/4	<table border="1"> <thead> <tr> <th><i>Column</i></th> <th><i>Column 2</i></th> <th><i>Column 3</i></th> </tr> </thead> <tbody> <tr> <td><i>Vehicle Category</i></td> <td><i>(Where V is the specified test speed in km/h and S is the required stopping distance in metres)</i></td> <td><i>MFDD</i></td> </tr> <tr> <td colspan="3">Front wheel(s) braking only (if front brake is unaffected by the failure)</td> </tr> <tr> <td>3-1</td> <td>$S \leq 0.1 V + 0.0111 V^2$</td> <td>$\geq 3.4 \text{ m/s}^2$</td> </tr> <tr> <td>3-2</td> <td>$S \leq 0.1 V + 0.0143 V^2$</td> <td>$\geq 2.7 \text{ m/s}^2$</td> </tr> <tr> <td>3-3</td> <td>$S \leq 0.1 V + 0.0087 V^2$</td> <td>$\geq 4.4 \text{ m/s}^2$</td> </tr> <tr> <td>3-4</td> <td>$S \leq 0.1 V + 0.0105 V^2$</td> <td>$\geq 3.6 \text{ m/s}^2$</td> </tr> <tr> <td>3-5</td> <td>$S \leq 0.1 V + 0.0117 V^2$</td> <td>$\geq 3.3 \text{ m/s}^2$</td> </tr> <tr> <td colspan="3">Rear wheel(s) braking only (if rear brake is unaffected by the failure)</td> </tr> <tr> <td>3-1</td> <td>$S \leq 0.1 V + 0.0143 V^2$</td> <td>$\geq 2.7 \text{ m/s}^2$</td> </tr> <tr> <td>3-2</td> <td>$S \leq 0.1 V + 0.0143 V^2$</td> <td>$\geq 2.7 \text{ m/s}^2$</td> </tr> <tr> <td>3-3</td> <td>$S \leq 0.1 V + 0.0133 V^2$</td> <td>$\geq 2.9 \text{ m/s}^2$</td> </tr> <tr> <td>3-4</td> <td>$S \leq 0.1 V + 0.0105 V^2$</td> <td>$\geq 3.6 \text{ m/s}^2$</td> </tr> <tr> <td>3-5</td> <td>$S \leq 0.1 V + 0.0117 V^2$</td> <td>$\geq 3.3 \text{ m/s}^2$</td> </tr> </tbody> </table>	<i>Column</i>	<i>Column 2</i>	<i>Column 3</i>	<i>Vehicle Category</i>	<i>(Where V is the specified test speed in km/h and S is the required stopping distance in metres)</i>	<i>MFDD</i>	Front wheel(s) braking only (if front brake is unaffected by the failure)			3-1	$S \leq 0.1 V + 0.0111 V^2$	$\geq 3.4 \text{ m/s}^2$	3-2	$S \leq 0.1 V + 0.0143 V^2$	$\geq 2.7 \text{ m/s}^2$	3-3	$S \leq 0.1 V + 0.0087 V^2$	$\geq 4.4 \text{ m/s}^2$	3-4	$S \leq 0.1 V + 0.0105 V^2$	$\geq 3.6 \text{ m/s}^2$	3-5	$S \leq 0.1 V + 0.0117 V^2$	$\geq 3.3 \text{ m/s}^2$	Rear wheel(s) braking only (if rear brake is unaffected by the failure)			3-1	$S \leq 0.1 V + 0.0143 V^2$	$\geq 2.7 \text{ m/s}^2$	3-2	$S \leq 0.1 V + 0.0143 V^2$	$\geq 2.7 \text{ m/s}^2$	3-3	$S \leq 0.1 V + 0.0133 V^2$	$\geq 2.9 \text{ m/s}^2$	3-4	$S \leq 0.1 V + 0.0105 V^2$	$\geq 3.6 \text{ m/s}^2$	3-5	$S \leq 0.1 V + 0.0117 V^2$	$\geq 3.3 \text{ m/s}^2$	<ol style="list-style-type: none"> The architectures considered for the amendment are the typical ones for two wheelers. As detailed earlier, applicability of these provisions for classes 3-2 and 3-5 may be considered at a later date. Text added in the title for better clarity
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Annex B. Details comment from India on ECE/TRANS/WP.29/GRRF/2014/5:

Justification is same as those given in Annex A

Sl. No	Para ref number	May be modified as						
1	5.1.5. of R 78	Two-wheeled vehicles of categories 3-1 and 3-3 shall be equipped with either: <ul style="list-style-type: none"> a) Two separate service brake systems, or a split service brake system, with at least one brake operating on the front wheel and at least one brake operating on the rear wheel; or <i>b) A CBS (which may be a split service brake system) and a brake system with independent control and transmission acting atleast on one of the wheels.</i> 						
2	5.1.9 of R 78, as proposed vide GRRF 2014/5	In where two separate service brake systems are installed, <i>vehicles of categories 3-1 and 3-3 with CBS, the CBS and the other independent brake system</i> the systems may share a common brake, if a failure in one system does not affect the performance of the other <i>a common transmission, or both if the requirements of Annex 3, paragraph 12 are met.</i>						
3	3.1 (b) of Annex 3 of R78	Laden: For vehicles fitted with CBS and split service brake systems: the vehicle is tested in the lightly loaded condition in addition to the laden condition;						
4	Last 2 rows of table after 3.3 of Annex 3 of R78	<table border="1" style="margin: auto;"> <tr> <td colspan="3" style="text-align: center;">Vehicles with CBS – secondary service brake systems:</td> </tr> <tr> <td style="text-align: center;">ALL 3-2 & 3-5</td> <td style="text-align: center;">$S \leq 0.1 V + 0.0154 V^2$</td> <td style="text-align: center;">$\geq 2.5 \text{ m/s}^2$</td> </tr> </table>	Vehicles with CBS – secondary service brake systems:			ALL 3-2 & 3-5	$S \leq 0.1 V + 0.0154 V^2$	$\geq 2.5 \text{ m/s}^2$
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5	4.2(c) of Annex 3 of R78	Brake application: <ul style="list-style-type: none"> a) <i>In the case of Category 3-1 & 3-3; Simultaneous actuation of both service brake system controls:</i> b) <i>In the cases of 3-2 and 3-5</i> Simultaneous actuation of both service brake system controls, if so equipped, or of the single service brake system control in the case of a service brake system that operates on all wheels.						
6	5.2 (c) of Annex 3 of R78	Brake application: <ul style="list-style-type: none"> a) <i>In the case of Category 3-1, 3-3 & 3-4; Simultaneous actuation of both service brake system controls:</i> b) <i>In the cases of 3-2 and 3-5</i> Simultaneous actuation of both service brake system controls, if so equipped, or of the single service brake system control in the case of a service brake system that operates on all wheels						

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8	12.1(a) of Annex 3, as proposed vide GRRF 2014/5	This test will only apply to vehicles fitted with CBS of which the separate service brake systems share a common brake, a common transmission or both;
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10	12.2. (a) of Annex 3, as proposed vide GRRF 2014/5	Alter the brake system to produce a failure described in 12.1 (b) a hydraulic hose or mechanical cable type failure causing a complete loss of braking in the portion of the system which is shared;
11	12.2. (b) of Annex 3, as proposed vide GRRF 2014/5	Perform the dry stop test specified in section 4.3, <i>following the requirements specified therein, except that:</i> <ol style="list-style-type: none"> <i>I. Only apply the control for the service brake system not affected by the simulated failure.</i> <i>II. Test shall be done in laden condition.</i> <i>III. Tests with applying the control for the service brake system not affected by the simulated failure only need to be done</i> Other conditions to be observed are in paragraphs 4.3.1. (c) and 4.3.2. (a), (b), (d), (e) and (f). Instead of the provisions in section 4.3.2. (c), only apply the control for the service brake system not affected by the simulated failure
12	12.3. of Annex 3, as proposed vide GRRF 2014/5	When the brakes are tested in accordance with the test procedure set out in paragraph 12.2., the stopping distance shall be as specified in column 2 or the MFDD shall be as specified in column 3 of the following table:

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