Informal document No. **GRRF-63-40**
(63rd GRRF, 4-8 February 2008,
agenda item 3(e))

ISO 11992 Messages and Signalling

ISO 11992:2003 Part 2

Includes 85 messages as follows:

Towing Vehicle to Trailer:

28 messages

3 of which are mandated by ECE Regulation 13

Trailer to Towing Vehicle:

57 messages

5 of which are mandated by ECE Regulation 13

Industry Working Group set up in June 2003:

Objective:

To define how the current non mandatory messages should be supported

Group members:

Colin Ross (Chairman)	**Knorr-Bremse**
Guenter Heess	**DaimlerChrysler**
Christoph Adam	**Wabco**
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Michael Pehle	**BPW**
Helmut Maltry	**Haldex**
Jim Crawley	**Haldex**

Messages categorised:

1. **Messages defined within ECE Regulation that shall be supported**

2. **Messages transmitted by the trailer which require the towing vehicle to display a driver warning.**

3. **Messages not currently required by ECE Regulation 13 that shall be supported by the towing vehicle or trailer.**

4. **Messages that shall be supported by the towing vehicle or trailer when the vehicle is installed with a function associated with the message.**

5. **Messages where the support is optional.**

Spread Sheet Used to Categorise Messages:

Informal ISO11992 Industry Working Group - 12 December 2006
Data Transfer From Tractor to Trailer as Defined in ISO 11992-2

The following defines the relationship of message "Category" in the spread sheet and when they should be supported

Category	1	Mandatory towing vehicle or trailer messages defined elewhere within the Regulation.
Category	2	Mandatory messages which also require driver warning
Category	3	Messages defined within Annex 16 that are mandatory for either the towing vehicle or trailer.
Category	4	Messages that must be supported whenever the associated function is supported by the vehicle
Category	5	Optional

Byte	Category	Bit	Message	Repetition Rate	ISO 11992 Paragraph Reference	ISO11992-2003 or New Message	ECE Reg 13 Requirement	Comments
Towing Vehicle Messages - EBS 11								
1	5	1 - 2	Vehicle ABS active / passive	10ms	6.4.2.2.17	2003	No	
	5	3 - 4	Vehicle retarder control active / passive		6.4.2.2.14	2003	No	
	5	5 - 6	ASR brake control active / passive		6.4.2.2.23	2003	No	Tractor decides if traction assist is required and transmits the request as necessary
	5	7 - 8	ASR engine control active / passive		6.4.2.2.24	2003	No	Tractor decides if traction assist is required and transmits the request as necessary
2	5	1 - 2	Brake light switch	10ms	6.4.2.2.30	2003	No	Value of this message is unclear as the electric service demand provides information that the brakes are being applied
	4	3 - 4	Vehicle type		6.4.2.2.31	2003	No	Information to identify a dolly within a road train
	4	5 - 6	VDC Active		6.4.2.2.36	Draft 30/9/04	No	The towing vehicle must provide the information on the databus of the status of the stability control system but only when there is a real intervention and not any brake application used as part of a learning process. When the signal is transmitted the motor vehicle shall provide an indication to the driver that the trailer stability system is
3 - 4	1		Service brake demand value	10ms	6.4.2.2.4	2003	Yes	Mandatory support and usage
5	5		Park brake demand value	10ms	6.4.2.2.2	2003	No	This message is for future parking brake systems in trailers, e.g. to support the application of the trailer parking brake by the driver from the moptor vehcile.
6	5		Retarder demand value	10ms	6.4.2.2.3	2003	No	
7	4		Brake demand value for front or left side of vehicle	10ms	6.4.2.2.41	Draft 30/9/04	No	Full trailer: brakes front axle - Semi/centre axle trailer brakes left side only
8	4		Brake demand value for rear or right side of vehicle	10ms	6.4.2.2.42	Draft 30/9/04	No	Full trailer: brakes rear axle - Semi/centre axle trailer brakes right side only
Towing Vehicle Messages - EBS 12								
1	5	1 - 2	Vehicle retarder control active / passive	100ms	6.4.2.2.14	2003	No	
	4	3 - 4	ROP system enabled/disabled		6.4.2.2.57	Draft 28/9/06	No	Signal which indicates the Roll Over Protection (ROP) system is enabled or disabled
	4	5 - 6	YC system enabled/disabled		6.4.2.2.58	Draft 28/9/06	No	Signal which indicates the Yaw Control (YC) system is enabled or disabled
2	4	1 - 2	Enable/disable trailer ROP system	100ms	6.4.2.2.59	Draft 28/9/06	No	Command signal to enable/disable the trailer Roll Over Provention (ROP) system
	4	3 - 4	Enable/disable trailer YC system		6.4.2.2.60	Draft 28/9/06	No	Command signal to enable/disable the trailer Yaw Control (YC) system
3	1	1 - 2	Two electrical circuits brake demand value	100ms	6.4.2.2.26	2003	Yes	Mandatory support and usage. See paragraph 5.1.3.2 of Regulation 13
	5	3 - 4	ABS off road request		6.4.2.2.22	2003	See comment	Use is optional under paragraph 4.5.5 of Annex 13 and shall only be requested if the tractor supports a disconnect/change mode function.
	1	5 - 6	Pneumatic control line		6.4.2.2.25	2003	Yes	Mandatory support and usage. See paragraph 5.1.3.2 of Regulation 13

Industry Working Group:

Based on the messages currently defined within ISO 11992:2:2003 the group produced (December 2004) a proposal for present to GRRF.

First meeting of the EVSC Ad Hoc Working Group in December 2004.

ISO 11992:2:2003 in the process of being amended to include new messages.

Decision made not to present the proposal to GRRF but to continue development based on the activities of the EVSC Group and ISO.

Development of ISO 11992:2 to include messages associated with vehicle stability control which are seen as an important element to ensure compatibility and to enhance the functionality of stability control functions in the future.

Requirements from the EVSC Group forwarded to ISO for inclusion in the revised standard.

ISO 11992:2:2007 Amend 1

Informal Document GRRF62/09/Add 1: Defines the new messages

For all the messages now specified within ISO11992:2 it is necessary to combine those messages currently specified within ISO 11992:2:2003 with the new messages specified within ISO 11992:2:2007 Amend 1.
A consolidation has not been produced.

New Messages – Towing Vehicle to Trailer:

EBS 11:

- VDC Active
- Brake demand value for front or left side of vehicle
- Brake demand value for front or left side of vehicle

EBS 12:

- ROP system enabled / disabled
- YC system enabled / disabled
- Enable / disable trailer ROP system
- Enable / disable trailer YC system
- Wheel based vehicle speed

TD11:

- Time / date information

New Messages – Trailer to Towing Vehicle

EBS 21:

- Support of side or axle wise brake force distribution
- Lateral acceleration

EBS 22:

- Amber warning signal request
- Electrical supply of non braking systems
- Spring brakes engaged
- Stop lamp request
- Braking via electric control line supported

EBS 24:

- Geometric data index
- Geometric data content

New Messages – Trailer to Towing Vehicle - continued

EBS 25:

- Brake cylinder pressure first axle left wheel
- Brake cylinder pressure first axle right wheel
- Brake cylinder pressure second axle left wheel
- Brake cylinder pressure second axle right wheel
- Brake cylinder pressure third axle left wheel
- Brake cylinder pressure third axle right wheel
- ROP system enabled / disabled
- YC system enabled / disabled

EBS 26:

- Wheel speed first axle, left wheel
- Wheel speed first axle, right wheel

RGE 22:

- Tyre wheel identification
- Axle load

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Update the Regulation to refer to ISO 11992:2003 AND amendment 1:2007

Paragraph 5.1.3.6.1: Reference to the proposed Annex 16 added

Paragraphs 5.2.1.30.5 footnote */, 5.2.2.22.1 footnote ****/ and 5.2.2.22.2 footnote *****/**

Removes current restrictions relating to the update of ISO 11992 to include “stop lamp illumination” message transmitted from the trailer to the towing vehicle and for the towing vehicle to react when the trailer transmits the message.

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Re-introduce Annex 16: Compatibility between towing vehicles and trailers with respect to ISO 11992 Data Communications:

Paragraph 2: Defines how messages transmitted via ISO 11992 shall be supported:

Paragraph 2.1: Messages that shall be supported as specified within the Regulation:

Paragraph 2.1.1. Towing vehicle to trailer

Function / Parameter	ISO11992-2:2003 Reference	Regulation 13 Reference
Service/secondary brake demand value	EBS11 Byte 3-4	Annex 10 Paragraph 3.1.3.2.
Two electrical circuits brake demand value	EBS12 Byte 3 Bit 1-2	Regulation 13 Paragraph 5.1.3.2
Pneumatic control line	EBS12 Byte 3 Bit 5-6	Regulation 13 Paragraph 5.1.3.2

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Paragraph 2.1.2: Trailer to towing vehicle

	Function / Parameter	ISO11992-2:2003 Reference	Regulation 13 Reference
New	VDC Active / passive	EBS21 Byte 2 Bit 1-2	Annex 21 Paragraph 2.1.6
	Vehicle electrical supply sufficient / insufficient	EBS22 Byte 2 Bit 1-2	Regulation 13 Paragraph 5.2.2.20.
	Red warning signal request	EBS22 Byte 2 Bit 3-4	Regulation 13 Paragraphs 5.2.2.15.2.1., 5.2.2.16. and 5.2.2.20.
	Supply line braking request	EBS22 Byte 4 Bit 3-4	Regulation 13 Para. 5.2.2.15.2.
New	Stop lamps request	EBS22 Byte 4 Bit 5-6	Regulation 13 Para. 5.2.2.22.1.
	Vehicle pneumatic supply sufficient / insufficient	EBS23 Byte 1 Bit 7-8	Regulation 13 Para. 5.2.2.16.

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Paragraph 2.2 When the trailer transmits the following messages the towing vehicle shall provide a driver warning:

New

Function / Parameter	ISO11992-2:2003 Reference	Driver Warning Required
VDC Active / Passive *	EBS21 Byte 2 Bit 1-2	Annex 21, Para. 2.1.6.
Red warning signal request	EBS22 Byte 2 Bit 3-4	Regulation 13, Para. 5.2.1.29.2.1.

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Paragraph 2.3 The following messages shall be supported by the towing vehicle and trailer:

Paragraph 2.3.1: Towing vehicle to trailer:
No messages currently defined

Paragraph 2.3.2: Trailer to towing vehicle:

All New

Function / Parameter	ISO11992-2:2003 Reference
Vehicle service brake active / passive	EBS22 Byte 1, Bit 5-6
Braking via electric control line supported	EBS22 Byte 4, Bit 7-8
Geometric data index	EBS24 Byte 1
Geometric data index content	EBS24 Byte 2

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Paragraph 2.4 The following messages shall be supported by the towing vehicle and trailer when the vehicle supports the associated function:

Paragraph 2.4.1: Towing vehicle to trailer:

Function / Parameter	ISO11992-2:2003 Reference
Vehicle type	EBS11 Byte 2, Bit 3-4
VDC (Vehicle Dynamic Control) Active / passive *	EBS11 Byte 2, Bit 5-6
Brake demand value for front or left side of vehicle	EBS11 Byte 7
Brake demand value for rear or right side of vehicle	EBS11 Byte 8
ROP (Roll Over Protection) system enabled/disabled **	EBS12 Byte 1, Bit 3-4
YC (Yaw Control) system enabled/disabled ***	EBS12 Byte 1, Bit 5-6
Enable/disable trailer ROP (Roll Over Protection) system **	EBS12 Byte 2, Bit 1-2
Enable/disable trailer YC (Yaw Control) system ***	EBS12 Byte 2, Bit 3-4
Traction help request	RGE11 Byte 1, Bit 7-8
Lift axle 1 - position request	RGE11 Byte 2, Bit 1-2
Lift axle 2 - position request	RGE11 Byte 2, Bit 3-4
Steering axle locking request	RGE11 Byte 2, Bit 5-6
Seconds	TD11 Byte 1
Minutes	TD11 Byte 2
Hours	TD11 Byte 3
Months	TD11 Byte 4
Day	TD11 Byte 5
Year	TD11 Byte 6
Local minute offset	TD11 Byte 7
Local hour offset	TD11 Byte 8

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Paragraph 2.4.2: Trailer to towing vehicle:

Function / Parameter	ISO11992-2:2003 Reference
Support of side or axle wise brake force distribution	EBS21 Byte 2, Bit 3-4
Wheel based vehicle speed	EBS21 Byte 3-4
Lateral acceleration	EBS21 Byte 8
Vehicle ABS active / passive	EBS22 Byte 1, Bit 1-2
Amber warning signal request	EBS22 Byte 2, Bit 5-6
Vehicle type	EBS22 Byte 3, Bit 5-6
Loading ramp approach assistance	EBS22 Byte 4, Bit 1-2
Axle load sum	EBS22 Byte 5-6
Tyre pressure sufficient / insufficient	EBS23 Byte 1, Bit 1-2
Brake lining sufficient / insufficient	EBS23 Byte 1, Bit 3-4
Brake temperature status	EBS23 Byte 1, Bit 5-6
Tyre / wheel identification (pressure)	EBS23 Byte 2
Tyre / wheel identification (lining)	EBS23 Byte 3
Tyre / wheel identification (temperature)	EBS23 Byte 4
Tyre pressure (actual tyre pressure)	EBS23 Byte 5
Brake lining	EBS23 Byte 6
Brake temperature	EBS23 Byte 7
Brake cylinder pressure first axle left wheel	EBS25 Byte 1
Brake cylinder pressure first axle right wheel	EBS25 Byte 2

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Paragraph 2.4.2: Trailer to towing vehicle (continued):

Brake cylinder pressure second axle left wheel	EBS25 Byte 3
Brake cylinder pressure second axle right wheel	EBS25 Byte 4
Brake cylinder pressure third axle left wheel	EBS25 Byte 5
Brake cylinder pressure third axle right wheel	EBS25 Byte 6
ROP (Roll Over Protection) system enabled/disabled *	EBS25 Byte 7, Bit 1-2
YC (Yaw Control) system enabled/disabled **	EBS25 Byte 7, Bit 3-4
Traction help	RGE21 Byte 1, Bit 5-6
Lift axle 1 position	RGE21 Byte 2, Bit 1-2
Lift axle 2 position	RGE21 Byte 2, Bit 3-4
Steering axle locking	RGE21 Byte 2, Bit 5-6
Tyre wheel identification	RGE23 Byte 1
Tyre temperature	RGE23 Byte 2-3
Air leakage detection (Tyre)	RGE23 Byte 4-5
Tyre pressure threshold detection	RGE23 Byte 6, Bit 1-3

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Paragraph 2.5: The support of all other messages is optional

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Footnotes:

***** **VDC (Vehicle Dynamic Control) as defined within ISO11992:2:2003 including amendment 1:2007 is defined within this Regulation as Vehicle Stability Function – see paragraph 2.32. of the Regulation**

****** **ROP (Roll Over Protection) as defined within ISO11992:2:2003 including amendment 1:2007 is defined within this Regulation as Roll-Over Control – see paragraph 2.32.2.2 of the Regulation**

******* **YC (Yaw Control) as defined within ISO11992:2:2003 including amendment 1:2007 is defined within this Regulation as Directional Control – see paragraph 2.32.2.1. of the Regulation**

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Annex 17:

Additional checks for the towing vehicle:

Add a new paragraph 3.2.2.6 to read:

"3.2.2.6. Illumination of Stop Lamps
Simulate message EBS 22 byte 4 bits 5 to 6 set to 00 and check that the stop lamps are not illuminated.
Simulate message EBS 22 byte 4 bits 5 to 6 set to 01 and check that the stop lamps are illuminated."

Add a new paragraph 3.2.2.7. to read:

"3.2.2.7. Intervention of Trailer Stability Function
Simulate message EBS 21 byte 2 bits 1 to 2 set to 00 and check that the driver warning defined in paragraph 2.1.6. of Annex 21 is not illuminated.
Simulate message EBS 21 byte 2 bits 1 to 2 set to 01 and check that the driver warning defined in paragraph 2.1.6. of Annex 21 is illuminated."

Add a new paragraph 3.2.3.2. to read:

3.2.3.2. Paragraph 2.4.1. of Annex 16 defines additional messages that shall under specific circumstances be supported by the towing vehicle. Additional checks may be carried out to verify the status of supported messages to ensure the requirements of paragraph 5.1.3.6.2. of the Regulation are fulfilled.

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Annex 17:

Additional checks for the trailer:

Add a new paragraph 4.2.2.4. to read:

"4.2.2.4. Automatically Commanded Braking

In the case where the trailer includes a function where its operation results in an automatically commanded braking intervention the following shall be checked:

With no automatically commanded braking intervention is generated check that message EBS 22 byte 4 bits 5 to 6 are set to 00.

Simulate an automatically commended braking intervention where the resulting deceleration is $\geq$0.7m/sec^2 check that message EBS 22 byte 4 bits 5 to 6 are set to 01."

Add a new paragraph 4.2.2.5 to read:

"4.2.2.5. Vehicle Stability Function

In the case of a trailer equipped with a vehicle stability function the following checks shall be carried out:

When the vehicle stability function is inactive check that EBS 21 byte 2 bits 1 to 2 are set to 00.

Simulate an intervention of the vehicle stability control function as specified in paragraph 2.2.4. of Annex 21 and check that message EBS 21 byte 2 bits 1 to 2 are set to 01."

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Annex 17:

Additional checks for the trailer (continued):

Add a new paragraph 4.2.2.6. to read:

"4.2.2.6. Support of the Electric Control Line
Where the trailer braking system does not support braking via the electric control line check that message EBS 22 byte 4 bits 7 to 8 are set to 00
Where the trailer braking system supports the electric control line check that message EBS 22 byte 4 bits 7 to 8 are set to 01."

Add a new paragraph 4.2.3.2. to read:

4.2.3.2. Paragraph 2.4.2. of Annex 16 defines additional messages that shall under specific circumstances be supported by the trailer. Additional checks may be carried out to verify the status of supported messages to ensure the requirements of paragraph 5.1.3.6.2. of the Regulation are fulfilled.